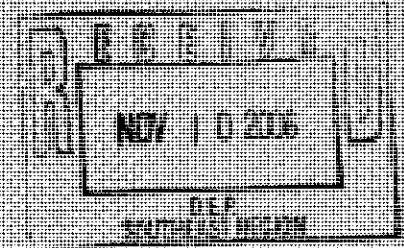


SCANNED



PHASE II COMPREHENSIVE SITE
ASSESSMENT
EAGLE GAS INC.
131 MAIN STREET
CARVER, MASSACHUSETTS
RTN# 417582,
RELATED RTN#417825
VOLUME 1 OF 2

PREPARED FOR:

EAGLE GAS, INC.
NAJIB BADAQUI
131 MAIN STREET
CARVER, MASSACHUSETTS

FILE NO. 91-204082.00
NOVEMBER 2006

PREPARED BY:

ecs

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SCANNED

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 ASSESSMENT OBJECTIVES.....	1
1.2 DISPOSAL SITE IDENTIFICATION	2
1.3 REGULATORY STATUS	2
1.4 CONCEPTUAL SITE MODEL.....	2
2.0 DISPOSAL SITE CHARACTERISTICS	4
2.1 SITE DESCRIPTION.....	4
2.2 CURRENT PROPERTY USE AND DESCRIPTION	4
2.3 DESCRIPTION OF RELEASE	5
2.4 SOURCE OF CONTAMINATION AND AREA OF IMPACT	5
2.5 ENVIRONMENTAL CHARACTERISTICS.....	6
2.6 UTILITIES.....	7
2.7 TOPOGRAPHY, VEGETATION AND HYDROLOGY.....	8
3.0 SUMMARY OF SOIL AND GROUNDWATER CATEGORIZATION.....	9
4.0 SITE INVESTIGATIONS	10
4.1 SUMMARY OF PREVIOUS INVESTIGATIONS.....	10
4.2 SITE HEALTH AND SAFETY PLAN	14
4.3 SOIL BORING AND WELL INSTALLATION - ECS	15
4.4 MONITORING WELL DEVELOPMENT	15
4.5 SURVEY OF MONITORING WELL-HEADS.....	15
4.6 GROUNDWATER LEVEL MEASUREMENTS	15
4.7 FIELD SCREENING AND ANALYTICAL RESULTS.....	16
4.7.1 Soil.....	16
4.7.2 Groundwater	16
4.7.3 Potable Wells	17
4.7.4 Storm Water Drain Line Manhole and Catch Basin Screening.....	17
4.7.5 Storm Water/Surface Water.....	18
4.7.6 Sediment.....	19
4.7.7 Indoor Air	19
5.0 ENVIRONMENTAL FATE AND TRANSPORT.....	21
5.1 CONTAMINANTS OF CONCERN	21
5.2 CONTAMINANT FATE AND TRANSPORT CHARACTERISTICS	21
5.3 CONTAMINANT FATE AND TRANSPORT PROCESSES.....	23
5.3.1 Site Specific Fate and Transport Characteristics.....	24
5.4 POTENTIAL AND EXISTING MIGRATION PATHWAYS	25
5.4.1 Groundwater	26
5.4.2 Soil.....	26
5.4.3 Bedrock	26
5.4.4 Subsurface Conduits	26
5.4.5 Vapor Migration.....	27
5.4.6 Surface Water Runoff.....	27

TABLE OF CONTENTS (continued)

6.0	SITE HYDROGEOLOGY.....	28
6.1	GEOLOGY.....	28
6.1.1	Surficial Geology.....	28
6.1.2	Bedrock Geology.....	28
6.2	HYDROGEOLOGY.....	28
6.2.1	Hydraulic Conductivity of Aquifer Materials.....	28
6.2.2	Groundwater Flow and Horizontal Hydraulic Gradient.....	28
7.0	NATURE AND EXTENT OF CONTAMINATION.....	31
7.1	NATURE AND EXTENT OF SOIL CONTAMINATION.....	31
7.2	NATURE AND EXTENT OF GROUNDWATER CONTAMINATION.....	32
7.3	NATURE AND EXTENT OF SURFACE WATER AND SEDIMENT CONTAMINATION.....	32
7.4	NATURE AND EXTENT OF INDOOR/AMBIENT AIR CONTAMINATION.....	33
8.0	SITE RISK CHARACTERIZATION.....	34
9.0	SUMMARY AND FINDINGS.....	35
10.0	REFERENCES.....	38

FIGURES:

Figure 1	Site Locus
Figure 2	Site Plan
Figure 3	Area Plan with Disposal Site Boundary
Figure 4	Groundwater Contour Plans (8/18/05)
Figure 5	Groundwater Contour Plans (4/17/06)
Figure 6	LNAPL Plume (5/31/06)
Figure 7	Extent of Dissolved Contamination

TABLES:

Table 1	Summary of Static Groundwater Gauging and Elevation Data
Table 2	Historical Groundwater Analytical Data Summary: VPH and EPH
Table 3	Summary of Potable Well Sampling Analytical Results
Table 4	Summary of MNA Measurements -- Sampling/Monitoring
Table 4A	Summary of Natural Attenuation Analytical Parameters -- Comparison of Literature and Empirical Data
Table 5	VPH/EPH Compounds Historical Soil Sampling Results Summary
Table 6	Historical Summary of Analytical Results-Surface Water
Table 7	Historical Summary of Analytical Results-Sediment Sampling
Table 8	Summary of Field Screening- Manholes and Catch basins
Table 9	Summary of EFR Information
Table 10	Summary of LNAPL/Groundwater Manually Removed from Well
Table 11	Indoor Air Sampling Results Summary

TABLE OF CONTENTS (continued)

APPENDICES:

Appendix A	MADEP Transmittal Form, copy
Appendix B	21E Site Scoring Map
Appendix C	Boring Logs
Appendix D	Survey Data
Appendix E	Miscellaneous Plans from Other Reports
Appendix F	Groundwater Elevations vs. Invert Elevation of Storm Water Drain Line
Appendix G	Laboratory Reports
Appendix H	Properties of Contaminants
Appendix I	Method 3 Risk Characterization
Appendix J	Public Notification

Abbreviations and Acronyms

ACEC	Area of Critical Environmental Concern
ACO	Administrative Consent Order
AWQC	Ambient Water Quality Criteria
APH	Air Petroleum Hydrocarbon
AS	Air Sparge
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AUL	Activity and Use Limitation
BOL	Bill of Lading
BOH	Board of Health
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BWSC	Bureau of Waste Site Cleanup
CAM	Compendium of Analytical Methods
CEP	Critical Exposure Pathway
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CMR	Code of Massachusetts Regulations
COC	Contaminants of Concern
CSA	Comprehensive Site Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid
DO	Dissolved Oxygen
DOT	Department of Transportation
DPS	Downgradient Property Status
DWSA	Drinking Water Source Area
ECS	Environmental Compliance Services, Inc.
EFR	Enhanced Fluid Extraction
ELCR	Excess Lifetime Cancer Risk
EPA	Environmental Protection Agency
EPC	Exposure Point Concentration
EPH	Extractable Petroleum Hydrocarbons, MADEP Method 04-1.1
ESA	Environmental Site Assessment
EW	Extraction Well
FIR	Final Inspection Report
ft	Foot
GAC	Granular Activated Carbon
GPR	Ground Penetrating Radar
GWA	Groundwater Analytical, Inc.
GW-1, GW-2, GW-3	MCP Method 1 Groundwater Categories
HI	Hazard Index
hp	Horsepower
in. HG	inches of mercury
IRA	Immediate Response Action
ISCO	In Situ Chemical Oxidation
IW	Injection Well
IWPA	Interim Wellhead Protection Area
LEL	Lower Explosive Limit
LEP	Licensed Environmental Professional
LGAC	Liquid-Phase Granular Activated Carbon
LNAPL	Light Non-Aqueous Phase Liquid
LRA	Limited Removal Action
LSI	Limited Subsurface Investigation
LSP	Licensed Site Professional
MADEP	Massachusetts Department of Environmental Protection
MBAS	Methyl Blue Active Substance
MCP	Massachusetts Contingency Plan
MDL	Method Detection Limit
M.G.L.c. 21E	Massachusetts General Law, chapter 21E
mg/L	milligrams per liter
MNA	Monitored Natural Attenuation
Mod	Modification
MPE	Multi-Phase Extraction
MtBE	Methyl Tertiary Butyl Ether
MW	Monitoring Well
ND	Non-detect
NHESP	National Heritage & Endangered Species Program



Abbreviations and Acronyms

NON	Notice of Noncompliance
NOR	Notice of Responsibility
NRS	Numerical Ranking System
OHM	Oil and Hazardous Materials
OMM	Operation, Maintenance and/or Monitoring
Ondrick	Ted Ondrick Company, LLC
ORP	Oxidation-Reduction Potential
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated biphenyl
PEL	Permissible Exposure Limit
PDWW	Private Drinking Water Well
Phase I	Phase I Initial Site Investigation
Phase I ESA	Phase I Environmental Site Assessment
Phase II	Phase II Comprehensive Site Assessment
Phase II ESA	Phase II Environmental Site Assessment
Phase III	Phase III Identification, Evaluation and Selection of Comprehensive Remedial Action Alternatives
Phase IV	Phase IV – Implementation of Selected Remedial Action Alternative
PID	Photoionization Detector
POET	Point of Entry Treatment
POTW	Publicly Owned Treatment Works
PPA	Potentially Productive Aquifer
ppb	Parts-per-Billion
ppm	Parts-per-Million
ppm(v)	Parts per million (by volume)
RAA	Remedial Action Alternative
RAM	Release Abatement Measure
RAO	Response Action Outcome
RAP	Remedial Action Plan
RC	Risk Characterization
RCGW-1, RCGW-2 RCS-1, RCS-	Reportable Concentration Groundwater/Soil Categories
RCRA	Resource Conservation and Recovery Act
RIP	Remedy Implementation Plan
RMR	Remedial Monitoring Report
RLF	Release Log Form
RNF	Release Notification Form
ROS	Remedy Operation Status
RTN	Release Tracking Number
RW	Recovery Well
Scfm	Standard cubic feet per minute
S-1, S-2, S-3	MCP Method 1 Soil Categories
SOP	Standard Operating Procedures
SOW	Scope-of-Work
Spectrum	Spectrum Analytical, Inc.
SRM	Substantial Release Migration
SVE	Soil Vapor Extraction
SVOC	Semi Volatile Organic Compound
SWQG	Surface Water Quality Guidance
TOVs	Total Organic Vapors
TPH	Total Petroleum Hydrocarbons
ug/L	micrograms per liter
USEPA	United States Environmental Protection Agency
USGS	United States Geologic Survey
UST	Underground Storage Tank
Vactor	High Vacuum Extractor
VGAC	Vapor-Phase Granular Activated Carbon
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbons, MADEP Method 04-1.1

1.0 INTRODUCTION

This report presents results of a Phase II CSA, conducted by ECS on behalf of Eagle Gas, Inc. (Eagle Gas), for a release of diesel fuel (RTN's 4-17582 & 4-17825) that occurred at the petroleum retail station located at 131 Main Street in Carver, Massachusetts. There are many acronyms utilized throughout this report that are common to the environmental industry and/or state specific jargon. A list that defines the acronyms presented in this report follows the Table of Contents.

The Phase II CSA was completed to gather information in order to characterize and evaluate the risk of harm that the release may pose to human health, safety, public welfare, and the environment. In addition, this Phase II CSA was designed to provide the data necessary to assist in the development a Phase III RAP. The Phase III is being submitted as a separate report, concurrent with this report. Due to the complexities of the Site including the previous involvement of a different environmental consultant and detection of several feet of LNAPL within several monitoring wells, the Phase II was not performed within the required regulatory time frame. MADEP was consulted about the delay in submitting the Phase II and Phase III reports.

This Phase II was conducted per 310 CMR 40.0000, the MCP. All opinions presented in this report are based upon the investigations described herein. This report, to a certain degree, relies on the information previously collected by others during assessment activities at the Eagle Gas property and surrounding properties. Much of the laboratory data that was generated by others is summarized within tables in this report, the actual laboratory reports are not included herein. References to these reports are included at the end of the text for this report. This Phase II report is being submitted as an attachment to a Comprehensive Response Action Transmittal Form & Phase I Completion Statement (BWSC-108). A copy of the form is presented as **Appendix A**.

Several Tables and Figures have been prepared that summarize pertinent data collected during various assessment/remedial activities. The titles of the Tables and Figures are presented in the Table of Contents, the actual Tables and Figures follow the text of this report. Other backup information or data are presented in the Appendices that follow the text of this report, a listing of the Appendices is presented in the Table of Contents.

1.1 ASSESSMENT OBJECTIVES

At the request of Eagle Gas, ECS has completed this Phase II investigation at the Disposal Site in accordance with the applicable requirements outlined in the MCP. The objectives of this assessment were to determine the source, nature, extent, and potential impacts of releases of OHM identified during investigations associated with the subject release; to evaluate the risk of harm posed by the Disposal Site to health, safety, public welfare, and the environment; and to determine if further remedial actions are required to achieve a permanent solution and a condition of no significant risk.

To achieve the objectives of the investigation, several response actions have been completed, including but not limited to the following: the review of environmental reports submitted previously by other consultants who have performed activities at or in close proximity to the Site; the completion of soil borings and the installation of monitoring/extraction wells within the borings to horizontally define the extent of impact in the vicinity of the release; soil and groundwater sampling and analyses; utility manhole screening; surface water sampling and analyses; the performance of a water table elevation survey to aid in the determination of groundwater flow direction, and; the

preparation of the Phase II Report inclusive of a Method 3 Risk Characterization. In addition to assessment, IRA's conducted at the Site have included remediation. Remediation activities have included LNAPL removal (EFR and manual bailing) and the installation of a recovery trench in Main Street that included soil excavation. Numerous reports (IRA Plans, IRA Plan Modifications, IRA Status reports, Phase I ISA, Tier Classification and Phase II SOW) have been submitted to MADEP.

1.2 DISPOSAL SITE IDENTIFICATION

For the purpose of this investigation, the Eagle Gas "property" is defined as the land located within the property boundaries of 131 Main Street, Carver, Massachusetts. There are two RTN's associated with the Eagle Gas property which are discussed below. The "Disposal Site" or "Site" is defined as all areas where contamination originating from the releases associated with RTNs 4-17582 and 4-17825 at the Eagle Gas property have come to be located above appropriate standards based on the detection of contaminants associated with the release of diesel fuel at the Eagle Gas property. A Site Location Map is provided as **Figure 1** and a Site Plan is provided as **Figure 2**. The Disposal Site boundaries are discussed in Section 7.0 of this report and are depicted on **Figure 3**.

1.3 REGULATORY STATUS

RTN 4-17582 & 4-17825:

In January 2003, 10-inches of LNAPL diesel fuel was detected in MW-BP-5RR. Eagle Gas reported this finding to MADEP and had the UST system tightness tested the next day. According to the station owner, the UST system tested tight. MADEP assigned RTN 4-17582 for the release condition. The UST system was again tested in mid May 2006. The remote fill line for the diesel fuel UST failed the test at this time. Deliveries to this line were immediately ceased.

In mid May 2003, the storm water drainage line outfall to South Meadow Brook was inspected and a sheen was observed on the surface water discharging from the outfall pipe. MADEP issued RTN 4-17825 for this release condition.

In April 2004, a Phase I and an NRS Scoresheet were submitted for the Site in which the 2 RTN's were linked. The Site was classified as a Tier 1A Site, however, a Tier 1 Permit Application was not submitted at this time. A Tier 1 Permit Application and revised NRS Scoresheet were eventually submitted to MADEP in December 2005. A Phase II SOW was submitted to MADEP in May 2006.

1.4 CONCEPTUAL SITE MODEL

This CSM is based on the interpretation of the data collected during various investigations completed for the Site. Please note that the information contained in this section is presented in greater detail throughout this report. The CSM is a tool that is constantly being revised as new information is obtained. It is presented here in a written format in an attempt to present a clear summary of site conditions. The following CSM presents a general summary of Site conditions, the observed effects of Site conditions on contaminant distribution and potential receptors and the observed distribution of petroleum constituents as a result of the documented release at the Site.

The Site is located in Carver, Massachusetts in a residential/commercial area (**Figure 1**). The source area of the Site is an active petroleum dispensing facility that was developed as such circa

1940. Minor automobile maintenance is also conducted at the station, however, is not a primary business. The facility currently maintains 4 UST's, 3 gasoline and 1 diesel. Two abandoned 1,000 gallon UST's are located beneath the reception area of the facility building. These UST's reportedly formerly contained gasoline and were closed circa 1978. The building is a 2 story, slab on grade structure with a residential apartment on the second floor. At the time of this writing the apartment is occupied by the attendant who dispenses the petroleum product. Groundwater at the Site is classified as GW-1.

Prior to and concurrent with the subject diesel fuel release being discovered, response actions were being conducted at the site by others to address a release of gasoline to soil and groundwater. The gasoline release was discovered at the facility in September 1997 during a groundwater sampling event. The sampling event was being performed in response to the detection of gasoline constituents in a private drinking water supply well located in a residence downgradient from the facility (132 Main Street). In January 2003, a ten-inch thickness of LNAPL (determined to be diesel fuel) was observed in a monitoring well located adjacent to the dispensers and a subsurface remote fill line for the diesel UST. This diesel release is the subject of this report. In mid May 2003, it was determined that the remote fill line for the diesel UST was apparently leaking and deliveries to this line were immediately ceased.

The released diesel fuel migrated through soil onto groundwater and dissolved into the groundwater. The diesel fuel release essentially co-mingled with and overshadowed the previous gasoline release in the area where diesel fuel impact is located. The soil at the Site consists of fine to medium sand in the upper approximate 5-feet, grading to very fine sand/silt with some clay at greater depths to approximately 20-feet. Below this, fine grained lacustrine deposits are reported to exist to a depth of 60-80 feet above weathered bedrock. The lacustrine sediments would be expected to act as an aquitard. The static water table is generally present at depths between 4-6 feet at the Site, based on the season and the associated precipitation. Though greater depths have been observed. Groundwater has been interpreted to flow to the east under a low hydraulic gradient. The LNAPL has been observed to essentially "pool" in the immediate release area, migrating to the east and west over the approximate area as shown in **Figures 6 & 7**. Diesel fuel has apparently infiltrated the subsurface drain line (invert depth approximately 5.5-feet below grade) under Main Street and has resulted in historical impact at the stormwater outfall to South Meadow Brook. Recent analytical results and visual observations indicate that current impact to the storm water in the drain line is minor and based on sampling locations, has no direct correlation to the release present at the Site.

Historical air screening from within the drainage system indicates low impact to air and 0 % LEL. Based on groundwater analyses, migration along the outer annulus of the drain pipe appears to be insignificant. The extent of dissolved diesel fuel constituents has been defined as shown in **Figures 3 and 7**. No private water supply wells have been impacted by the diesel fuel release. The potential for impact to indoor air may exist at the facility building since it is located adjacent to an area in which LNAPL has been observed. However, analysis of indoor air indicates that detected impacts are not likely associated with the subject release but rather with general operational activities associated with a petroleum retail facility. Potential impact to other buildings from Site derived contaminants is not anticipated.

The implementation of EFR events has resulted in the removal of significant amounts of LNAPL, dissolved-phase and vapor-phase diesel fuel. To a lesser extent, passive recovery and manual bailing have resulted in the removal of additional LNAPL and dissolved phase diesel fuel constituents.

2.0 DISPOSAL SITE CHARACTERISTICS

2.1 SITE DESCRIPTION

Active MADEP Release Tracking
Number(s): 4-17582 & 4-17825 (Diesel Fuel)

Tier Category: Tier IA

Property and Building Owner &
Contact: Mr. Najib Badaoui
131 Main Street
Carver, MA 02330
PH: 1-508-866-9098

Facility Location: 131 Main Street, Carver, MA

USGS Quadrangle: Plympton, MA

UTM Coordinates: 19 0355405E / 4638195N

Zoning: Commercial/Residential

Number of Institutions within
500 feet of the Disposal Site: None Identified.

Flood Hazard: According to the FEMA Flood Insurance Rate Map (FIRM) for Carver, Massachusetts date July 19, 1982, the station location is located in an area designated as Zone C, an area of minimal flooding. South Meadow Brook is located in an area designated as Zone A2, an area within the 100 year floodplain.

Refer to **Figure 1**, Site Locus, for geographic location and **Figure 2**, the Site Plan, for pertinent Site features.

2.2 CURRENT PROPERTY USE AND DESCRIPTION

The property is located on the west side of Route 58 in Carver, Massachusetts in a residential/commercial area. The property was first developed as a petroleum dispensing facility circa 1940. The property is developed with a petroleum fuel dispensing facility and associated 2-story wooden building with slab on grade that includes a reception area, a small office, a garage used for vehicle maintenance and an apartment on the second floor. The facility currently maintains 4 UST's, 3 x 5,000 gallon gasoline and 1 x 4,000 gallon diesel fuel, all of fiberglass construction. Two abandoned 1,000 gallon UST's (steel construction) are located beneath the reception area of the facility building. These UST's reportedly formerly contained gasoline and were closed-in-place circa 1978. The property is serviced by private water and sewer. However, the private water supply is not used for consumption, per the station owner/operator bottled water

is supplied for consumption. The apartment is occupied by the station attendant. See Figure 2 for details.

2.3 DESCRIPTION OF RELEASE

Prior to the subject release, response actions were being conducted at the subject property by Richard Nantais (former property owner) to address a release of gasoline to soil and groundwater. The gasoline release was discovered at the facility in September 1997 during a groundwater sampling event. On or about January 2003, during groundwater assessment activities related to RTN 4-13333 for the gasoline release, a ten-inch thickness of LNAPL diesel fuel was observed in a monitoring well (BR-5RR) located adjacent to the dispensers and a subsurface remote fill line for the diesel UST. Eagle Gas had the UST system tightness tested on January 16, 2003. On January 21, 2003 MADEP issued an NOR (RTN 4-17582) for the release. In mid May 2003, the stormwater outfall to South Meadow Brook was inspected for the first time and impact was noted. MADEP had reason to believe that the detected impact was a result of the release of diesel fuel and issued an NOR (RTN 4-17825) for the release condition. Also in mid May 2003, it was determined that the remote fill line for the diesel UST was apparently leaking and deliveries to this line were immediately ceased. The diesel fuel release has overshadowed the prior gasoline release in the area of detected diesel fuel.

2.4 SOURCE OF CONTAMINATION AND AREA OF IMPACT

The source of diesel fuel contamination was determined to be the remote diesel fuel fill line that is located in the subsurface and runs under the Site from the area of the gasoline UST area to the diesel fuel UST (Figure 2). The extent of the release of diesel fuel in the area of the Eagle Gas property and into Main Street is approximately 68-feet in length (east-west) in the source area and approximately 40-feet wide (north-south). Evidence indicates that diesel fuel has migrated from the source area into the municipal storm water drainage system beneath Main Street. The storm water drainage system discharges to surface water in South Meadow Brook, at a point approximately 650 feet south of the former source area. Surface water at the outfall and sediment in the immediate vicinity of the outfall have been impacted. The municipal storm water drainage line between the source area and the discharge point at South Meadow Brook, the outfall at South Meadow Brook, and surface water and sediment in the immediate vicinity of the outfall at the inlet to South Meadow Brook, are therefore included in the Disposal Site Area (Figure 3). Available evidence provides no indication of impacts to groundwater or soil associated with the release along the outer annulus of the length of the surface water drainage line between the Disposal Site Area and the outfall.

Based on the specific gravity of diesel fuel, the depth to groundwater and the stratigraphy encountered below the Site, ECS does not expect impact from the subject release to exceed 20-feet in depth. Diesel fuel has also apparently entered the subsurface storm drain line under Main street and has traveled, with storm water flow, to the discharge at South Meadow Brook. Limited sampling of sediment and surface water at the storm water inlet to the brook indicates impact is present in this area. Since impact from the disposal site has been observed at the storm water outfall to this surface water body, this point is considered to be included within the boundary of the disposal site. However, no diesel fuel impact has been detected in the water sampled from the manholes associated with the storm water drain line since April 2006, therefore, there does not appear to be an on-going release to South Meadow Brook. In addition, concentrations of VPH have been detected in the groundwater samples collected as part of this investigation. Though some of the VPH contamination is possibly related to the release of diesel fuel, it is the opinion of ECS that

a substantial amount of the VPH contamination is due to the previous release of gasoline at the Site. The current interpretation of the Disposal Site Boundary is shown on **Figure 3**.

2.5 ENVIRONMENTAL CHARACTERISTICS

This following environmental resource characteristics are based on field reconnaissance, review of the MADEP Site Scoring Map (**Appendix B**), review of the USGS Plympton Quadrangle Map, state and municipal file review and review of other pertinent information. Distances were determined from the appropriate maps using estimated Site boundaries.

Resource Areas Within 500 Feet of the Disposal Site

Surface Waters:

Streams:

The Disposal Site is located in the Coastal Drainage System within the Buzzards Bay Coastal Drainage Area. The nearest surface water body to the Eagle Gas property is South Meadow Brook, located approximately 500-feet southeast of the subject property. South Meadow Brook is not listed in *314 CMR 4.00, Massachusetts Surface Water Quality Standards*, or listed as an Outstanding Resource Water in the publication *Designated Outstanding Resource Waters of Massachusetts, 1995*;

Wetlands/Vernal Pools:

A review of the 21E Site Resources Map indicates that the release area is not located within a Priority Habitat of Rare Species or an Estimated Habitat of Rare Wildlife and Certified Vernal Pools. However, the Site is located within 500-feet of wetlands;

Ponds/Lakes:

None identified;

Rivers:

None identified;

Reservoirs:

None identified;

Drinking Water Supplies:

Zone II:

None identified;

Zone A of a Class A Surface Water Body:

None identified;

IWPA:

The Site is located within 500-feet of an IWPA for the strip mall located to the north;

Potentially Productive Aquifer:

The Site is located within a medium yield potentially productive aquifer;

Drinking Water Source Area: The Site is located within a Current Drinking Water Source Area. Refer to **Appendix B** for a copy of the BWSC Site Scoring Map;

Private Well(s): The Site is located within 500-feet of 4 private drinking water wells. The wells are located at 131 Main Street (Eagle Gas property), 132, 133 & 134 Main Street;

Other Resource Areas:

Areas of Critical Environmental Concern: None identified;

Sole Source Aquifers: The Site is located within a Sole Source Aquifer;

Protected Open Space: The Disposal Site appears to be located within 500 feet of protected open space, located hydrogeologically up-gradient to the northeast.

Fish Habitats: South Meadow Brook.

2.6 UTILITIES

The existence and location of utilities was evaluated as part of this PH II CSA. Please refer to Figure 2 for the location of utilities.

Natural Gas – None identified.

Water – A private well supplies the property with water. The well is located within the southwest corner of the garage, as shown on **Figure 2**. According to the station owner/operator, the water is not used for consumption, bottled water is provided for this purpose.

Sewer – The property is serviced by on-site septic. The septic structures and leach field are located to the west of the property building.

Storm water Drains – A Storm Water Drain pipe is located beneath Main Street. The drain pipe accepts Storm Water runoff from catch basins located in Main Street. Refer to Figures 2 & 3 for locations of the drain line and associated catch basins and outfall in the site vicinity.

Other – Main electrical lines in the area are overhead and run parallel to Main Street adjacent to the station property. Electric service enters the north side of the property building.

2.7 TOPOGRAPHY, VEGETATION AND HYDROLOGY

The Site area occurs in a commercial/residential zone. The majority of the Site is covered with bituminous concrete. The UST's are covered in aggregate concrete and Main Street is paved. The area above the drain line off of Main Street to the outfall to South Meadow Brook is vegetated. The general topography of the Site and immediate area is flat, and slopes with a gentle downward grade to the south. Storm Water runoff is typically controlled by topography and has been observed to flow to the south. A majority of the storm water from the Site appears to discharge to a catch basin (CB-4) located in Main Street. The catch basin discharges to the storm water drain line located beneath Main Street (**Figure 3**).

3.0 SUMMARY OF SOIL AND GROUNDWATER CATEGORIZATION

This is a summary of soil and groundwater characterization. A complete description of the categorization is included in the Method 3 Risk Characterization included as **Appendix I**. Current and potential future use of soil at the disposal site area is categorized based on accessibility and on the frequency and intensity of use by children and adults. Access to site soil at 131 Main Street and under Main Street is primarily limited by asphalt pavement and the depth to impacted soil is greater than 3-feet. Adults and children are likely to be present at the 131 Main Street address. Since this portion of the Site is used as a residence, per the regulations the frequency and intensity of use are considered high for both children and adults. (Note that the actual frequency of use by children at 131 Main Street is low as children are rarely present except as passengers in automobiles. The residential apartment on the second floor of the station is provided for the sole use of employee(s) of the station and, according to the facility owner, is not currently and will not be utilized by children. Regardless, there is the potential for children to reside in the apartment). The soil beneath Main Street is potentially accessible and the intensity of use by both children and adults is considered low.

Soil/sediment at the storm water drainage outfall is accessible. Adults and children may be present near the stormwater drainage outfall area since access is not restricted. The frequency of use is considered low since children and adults do not typically access the area. However, the intensity of use can be considered high since there is a likelihood to disturb the surficial soil by children and adults who may wander into the area. Thus, soil at the Site is categorized as GW-1, GW-2 and GW-3.

According to Massachusetts Geographic Information System data, Massachusetts Surface Water Quality Standard documentation, site reconnaissance, a current review of the Site conditions and location, and other sources:

- Groundwater within the Disposal Site is subject to GW-1 standards since it is located in an area defined as a *Current or Potential Drinking Water Source Area, i.e. a Sole Source Aquifer, a Potentially Productive Aquifer, an Interim Well Protection Area and within 500 feet of a private drinking water supply well*;
- The average annual depth to groundwater at the Site is 15 feet or less, and portions of the Disposal Site are located within 30 feet of an existing occupied buildings or structures, therefore, groundwater within certain areas of the Disposal Site is subject to GW-2 standards; and,
- As is the case for all groundwater in Massachusetts, groundwater within the Disposal Site is a potential source of discharge to surface water bodies and is subject to GW-3 standards.

4.0 SITE INVESTIGATIONS

During assessment activities performed by ECS, standard assessment protocols/procedures including but not limited to field equipment calibration, equipment decontamination, boring advancement, well installation, monitoring well development, soil characterization, soil screening, soil sample collection, groundwater sample collection, sample labeling, storage and transport were performed in general conformance with ECS SOPs and appropriate MADEP Policies. All field screening for TOV utilized a Thermo 580B with a 10.6eV lamp calibrated as benzene with an isobutylene span gas. ECS SOPs are on file at ECS. Phase II field investigations were completed to define the extent of impact from the subject diesel fuel release and to evaluate current contaminant conditions. Assessments completed by ECS consisted of, but were not limited to, the advancement of 11 soil borings, the installation of extraction wells within 9 of the borings, a monitoring well installed within one boring, refusal in one boring, collection of soil/groundwater samples for field screening and/or laboratory analysis, groundwater gauging and monitoring, sampling and analysis of private drinking water well water from the subject property and surrounding residences, indoor air screening, sampling and analysis at the station building, utility manhole/catch basin air screening, storm water sampling from manholes, surface water and sediment sampling from the storm water outfall area and the performance of a well-head elevation survey. All analytical samples were submitted to Spectrum Analytical, Inc. of Agawam, Massachusetts. The laboratory reports are presented in **Appendix G**.

Based on release conditions, analyses required to evaluate impacted media were based on the typical analyses required to evaluate a release of diesel fuel as presented in *DEP Publication #WSC-401-91, Policy for the Investigation, Assessment, and Remediation of Petroleum Releases, 1991(WSC-401-91) and Policy #WSC-02-411, Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach, Final Policy, October 31, 2002*. These Policies require evaluation of petroleum hydrocarbons including EPH and VPH. All samples submitted for laboratory analyses by ECS were submitted to Spectrum Analytical, Inc. of Agawam, MA under Chain of Custody documentation procedures.

4.1 SUMMARY OF PREVIOUS INVESTIGATIONS

Accounts of previous investigations were obtained by ECS from the reports prepared by Decoulos and Company (Decoulos) and Bennett and O'Reilly, Inc. (BOI). These reports are included in this Phase II by way of reference, section 10. Assessment activities have been conducted at the property since September 1997 associated with RTN's 4-12848 and 4-13333 (a gasoline release unrelated to the subject diesel fuel release). Several monitoring wells (i.e. BP wells, KEI wells, FF wells) were installed as part of these investigations and are still being used to assess groundwater associated with the releases. Since the discovery of the subject release in January 2003 until July/August 2005, James Decoulos was the LSP-of-Record and directed response actions for Eagle Gas. He installed several monitoring wells (DCW wells) and installed an LNAPL/groundwater interceptor/recovery trench under Main Street. The trench never became operational and LNAPL recovery was limited to passive recovery and manual bailing.

ECS took over the project in August 2005. Since that time, Eagle Gas has been aggressive in performing assessment and remediation activities at the Site. The field work required for a Phase II has been completed as part of previous IRA activities implemented at the site by ECS and Decoulos, et al. Assessment activities completed by ECS and others that can be used in the assessment of the disposal site include the installation of approximately 22 (1-inch diameter and 2-inch diameter) monitoring wells, 14 liquid extraction wells (4-inch diameter), the collection,

screening and analysis of multiple soil samples, the collection and analysis of groundwater and LNAPL samples, the collection and analysis of private drinking water well samples, the completion of multiple rounds of monitoring well gauging (depth to liquid and the thickness of LNAPL measurements), the survey of monitoring wells and other pertinent site features, the sampling and analysis of indoor air and the evaluation of the extent of LNAPL and dissolved phase contamination.

In addition, Eagle Gas has been conducting active remediation, i.e. EFR events to reduce the thickness and extent of LNAPL (to date, 7 EFR events have been completed (9/22/05, 10/31/05, 11/1/05, 2/3/06, 3/28/06, 04/29/06 & 08/15/06) and the recovery and off-site transport for recycling of approximately 13,000 gallons of diesel fuel LNAPL and groundwater removed during EFR events and manual LNAPL bailing events. Absorbent boom has been maintained at the storm water outfall area. The groundwater monitoring well locations and other pertinent Site features are shown on **Figures 2 & 3**. Data for the various gauging and sampling activities are summarized in **Table 1**. A summary of events completed prior to ECS involvement at the Site, based on information extracted from the Decoulos reports, follows:

IRA Plan 03/17/03 Decoulos 4-17582

Initial IRA Plan. Proposed assessment & remediation of conditions associated with LNAPL detected in well BP-5RR. Apartment above station was vacant.

- 09/09/97 MADEP RTN 4-13333 - Original release of gasoline compounds (Bartlett Paulding, Jr., LSP; Richard Nantais, owner of station) associated w/ UST removal. (Beimett and O'Reilly account differs, indicates that RTN was triggered by detection of gasoline constituents in off-property PDWW at 132 Main Street, RTN 4-12848 assigned initially);
- 09/16/97 IRA Plan presented history of USTs; 8 micro-wells installed, analytical summary;
- 02/04/98 PHII, PH III & Class C RAO filed by Paulding (with no PH I);
- 12/08/98 MADEP issued NON. Shortly thereafter, Paulding withdrew as LSP;
- 03/18/99 Kaegael Env. Filed PH I & TC;
- 04/26/99 MADEP notified Nantais that PH I was incomplete (NRS needed modification);
- 07/21/99 Kaegael addressed NRS issues;
- 11/27/01 3 replacement wells installed (BR-5RR, BP-4R & BP-5R);
- 12/17/02 Kaegael sampled MW's;
- 01/15/03 10-inches LNAPL observed in BP-5RR by Kaegael during groundwater assessment related to RTN 4-13333;
- 01/16/03 USTs and lines tightness tested by Eagle Gas, all passed;
- 01/21/03 MADEP issued NOR and RTN 4-17582 for LNAPL on groundwater;
- 03/17/03 IRAP and RNF submitted by Decoulos for Eagle Gas.

IRA Status 07/03/03 Decoulos 4-17582

Initial IRA Status. Reporting on assessment and remediation of LNAPL. New release condition also discovered at storm water outfall. The apartment above the station is unoccupied.

- 04/24/03 6.27 ' LNAPL observed. Removal of LNAPL from BP-5RR with drum vac, no indication of volume;
- 05/14/03 6.67 ' LNAPL in BP-5RR.

- Mid May Eagle Gas determines remote diesel fuel line is leaking via tank and line testing. All deliveries via this line ceased;
- 05/16/03 South Meadow Brook inspected for first time. Sheen observed. Source was identified as subject outfall, sheen observed on water flowing from outfall pipe. Decoulos concern was that LNAPL may have had potential to migrate along exterior wall of drain line. Manholes in Main Street screened with PID. MH-1 = 0 ppm, MH-2 = 0.5 ppm, MH-3 = 27 ppm & MH-4 = 28 ppm. Apparently, no sheen observed in MH. Boom and Pad placed at outfall;
- 05/21/03 Groundwater/surface water/private well sampling conducted. Results indicate private wells not impacted by diesel fuel;
- 06/02/03 Resumed recovery of LNAPL from BP-5RR with bailer. Geoprobe borings (DCA – DCE and wells DCW-1 to DCW-3) were completed. Stratigraphy = 1-4' fine –medium SAND; Silt & Clay 4-10'. Report states that release is diesel fuel;
- 06/12/03 0.28' LNAPL in BP-5RR. GW/PDDW sampling conducted. Results indicate diesel did not migrate along outer annulus of storm water drain line and PDDW's not impacted with diesel fuel;
- 07/03/03 IRA Status report submitted,. Findings – manual bailing effective, no automated recovery required, evaluate methods to address soil impact near BP-5RR. States that diesel has not caused condition at drainage outfall to South Meadow Brook, rather, impact was the result of storm water runoff.

IRA Plan 01/21/04 Decoulos 4-17825

This IRA Plan was prepared in response to NON-SE-03-3T-109, issued by MADEP on November 26, 2003 for failure to submit RNF, IRA Plan, IRA Completion report or RAO for the release to surface water. Decoulos submitted IRAP and RNF. Decoulos plan was to implement BMP for stormwater quality control that will reduce the discharge of oil to south Meadow Brook. Decoulos states that impact to South Meadow Brook has occurred from stormwater surface runoff from the Eagle Gas station. Apartment above station is unoccupied. IRA Plan proposed:

- Reconstruction of concrete pad overlying UST's;
- Installation of overhead canopy;
- Installation of an oil/water separator at the Eagle Gas property to capture all surface water runoff from the property prior to discharge to storm water drain line;
- Cleaning of the impacted stormwater collection system.

IRAP Mod 04/21/04 Decoulos 4-17825 (missing report pages from obtained copy)

IRA Plan Mod was submitted in response to April 5, 2004 request from MADEP to perform an IH evaluation, a CEP evaluation and a plan to eliminate the condition of SRM, among others. Opinion was retained that the impact observed at the outfall was derived from overland storm water flow. Apartment above station remains unoccupied. In general, IRAP Mod proposed the following with completion dates:

- Biweekly inspection & replacement of absorbent material at outfall area, initiating on 05/06/04;
- Surface water, sediment, wetland soil, monitoring well sampling – initiate on 05/20/04;
- Stabilize sediment discharge via dike – 06/03/04;
- Application to Buzzards Bay Estuary Program and to CZM for CPR Grant – 06/04/04;
- Forensics Assessment of soil, sediment and water data – 06/09/04;

- IH Evaluation, 06/25/04;
- Preparation of NOI -- 06/17/04;
- Video inspection Survey of drainline -- 06/17/04;
- Remediation Plan to eliminate storm water contamination -- 07/29/04.

Phase I Initial Site Assessment 04/30/04 Decoulos

The NRS Scoresheet indicated the Site was a Tier 1A Site, however, a Tier 1 Permit Application was not submitted. The RTN's (4-17582 and 4-17825) were linked in this submittal.

IRA Status & Plan Mod 06/15/04 Decoulos 4-17582

Due to a failure to comply with timelines, MADEP issued NON-SE-03-3T-103 that requested IRA Status & Plan Mod. Since 04/24/03, 25 gallons of LNAPL recovered from BP-5RR. LNAPL observed in DCW-1 on 06/03/04. Decoulos recommended the installation and operation of a recovery trench adjacent to the west side (Eagle Gas side) of the drain line. This Mod was denied in July and a revised Mod was requested by MADEP.

IRA Status & Plan Mod 11/05/04 Decoulos 4-17582

This was the second modification to the original IRAP for RTN 4-17582.

- 06/03/04 Groundwater sampling completed. Analyses indicate no preferential migration of diesel fuel along exterior of drain pipe or to residential wells;
- 08/17-18/04 Four-inch wells (ERW-1 thru ERW-4) and 1-inch wells DCW-4 thru DCW-8) were installed. No soil samples were collected associated with 4-inch wells. A composite soil sample from DCW-4 was analyzed for VPH. Two composite soil samples were collected from DCW-7 and analyzed for VPH, LNAPL saturated soil observed at ~ 7'. (EPH not analyzed for).
- 08/26/04 Indoor Air sample collected from 2nd floor. Low levels detected. LNAPL thicknesses also measured.
- 10/07/04 Manual LNAPL recovery efforts resumed (previously terminated on 05/03/04);
- 10/28/04 Passive recovery bailer installed in ERW-2;
- Decoulos proposed automated GW recovery using ERW-1 & ERW-4, with LNAPL recovery by retrofitted passive skimmers and separation tank. Pump test proposed. Once LNAPL removed, Chem Ox to be utilized.

IRA Plan Mod 12/22/04 Decoulos 4-17582

MADEP denied 11/05/04 IRAP Mod on 11/26/04. MADEP listed several reasons for the denial and required that the issues be addressed. Passive recovery of LNAPL continued in ERW-1 thru ERW-3. From 10/07/04 to 12/22/04, it was estimated that approximately 113 liters of LNAPL were recovered.

- IH Evaluation - Decoulos found that an IH could potentially exist at the Site and therefore additional evaluation and remediation were necessary;
- CEP Evaluation - Decoulos found that impacts to residential or working spaces were not known to exist;
- SRM Evaluation - Decoulos found that a condition of SRM was appropriate for the Site;
- 12/10/04 Borings (EGS-1 thru EGS-8) and monitoring wells DCW-9 & DCW-10 were advanced/installed. LNAPL was detected in soil on the east side of the drain line;
- 12/14-15/04 LNAPL interceptor trench to be installed on east side of drain line under Main Street was conditionally approved by MADEP;

- 1216-17/04 LNAPL interceptor trench was installed on the east side of the drain line & GW sampling conducted. Impermeable membrane was not effectively installed on the east side of the trench;
- Decoulos proposed the passive recovery of LNAPL from ERW wells and recovery from the interceptor trench via vacuum pumping of the 2-inch screen located at the bottom of the trench. The liquid would then be transferred via centrifugal pump to a treatment trailer;
- Decoulos also provided information on the proposed management of remediation waste, an environmental monitoring plan, and an implementation schedule;
- Decoulos states that all evidence collected to date demonstrates that the petroleum impacts to South Meadow Brook are caused by surface water runoff from Main Street.

IRA Status 05/06/05 Decoulos 4-17582

This report summarized all of the work that had been conducted under IRA activities since project inception (included are select boring logs, manifests, BOLs and lab reports).

- 02/02/05-03/05/05 - Rising head testing was performed on wells EOW-1 & EOW-2, located within the recovery trench. Hydraulic conductivity was calculated between 1.66×10^{-5} cm/sec to 1.85×10^{-5} cm/sec.
- 02/09/05, 02/16/05, 02/23/05, 03/16/05 and 04/13/05 - The trench was dewatered via vacuum truck, passive bailers emptied of contents and liquid was evacuated from several wells with the vacuum truck;
- 04/20/05 Sheen observed on storm water flow in a manhole (not identified) and water sample collected from same "indicated that contaminated GW had impacted the storm drain system";
- 04/26/05 Sheen not present on stormwater in manhole.

IRA Plan Mod 07/08/05 Decoulos 4-17582

The report includes IH and SRM evaluations and modification to IRAP based on 11/26/04 MADEP IRAP denial. The plan presents a summary of completed response actions and submittals.

- IH evaluation --Decoulos indicates an IH does not exist, but further response actions are required to insure that one doesn't develop;
- CEP evaluation --Decoulos indicates that a CEP does not exist;
- SRM evaluation -- Decoulos indicates that "a condition of SRM is appropriate for the Site";
- Proposed LNAPL Recovery and GW Treatment Operation does not include active LNAPL recovery, the use of passive skimmers was the selected option;
- Storm Water runoff is proposed as the primary cause of impact to the surface water at the storm water outfall. A catch basin insert, a "trench filter" for the outfall and a sand bag dike were proposed as remedial alternatives to be implemented;
- The IRAP Mod also provides details on remediation waste management, an environmental monitoring plan and an implementation schedule

4.2 SITE HEALTH AND SAFETY PLAN

A Health and Safety Plan, as required by the OSHA under Hazardous Waste Operations & Emergency Response, 29 CFR 1910.120, and the MCP, was developed for this project. The Health and Safety Plan only covers ECS employees and subcontractors hired by ECS. A copy of the Site Health and Safety Plan is on file at ECS.

4.3 SOIL BORING AND WELL INSTALLATION - ECS

Several borings were advanced by ECS using Hollow Stem Auger Methodology. Wells were completed with flush thread coupled schedule 40 PVC materials per construction details presented in the boring logs. The well screens intersected the water table. During drilling, soil samples were field screened for total TOVs using a PID. Field observations including PID readings and soil descriptions are noted on the soil boring logs/well construction details included in **Appendix C**. Well locations are shown on **Figures 2 & 3**.

On August 22, 2005 ECS initiated drilling activities and injection/extraction (I/E) well installation. Soil samples were collected from boring ECS-1 (depths of 5 ft, 10 ft, and 15 ft below grade) and submitted for laboratory analysis of VPH with target analytes. The results are presented in **Table 5**.

On August 26, 2005, ECS continued drilling and I/E well installation activities. I/E wells ECS-3 through ECS-5, and ECS-8 through ECS-10 were installed. Soil boring ECS-6, located within the Site building, was advanced to a depth of 7 feet below grade using vacuum excavation; refusal was encountered at a depth of 7 feet. A second I/E well installation was not attempted within the building. Monitoring well ECS-7 was installed at a location approximately 400 feet southeast of the Site property, adjacent to the storm sewer line which discharges into South Meadow Brook.

On October 28, 2005, I/E well ECS-11 was installed. An attempt was made to advance a boring for ECS-12, however during pre-digging for boring clearance an obstruction was encountered and ECS was unable to install I/E well ECS-12.

4.4 MONITORING WELL DEVELOPMENT

All monitoring wells used in this assessment were developed to improve the hydraulic connection between the wells and the surrounding aquifer materials and to assure that representative groundwater samples would be obtained during sampling activities. Well development was performed using a combination of surging and bailing techniques.

4.5 SURVEY OF MONITORING WELL-HEADS

On September 22, 2006, ECS conducted a relative horizontal location and elevation survey of monitoring wells and other pertinent features. The top of PVC protective casing of each monitoring well was surveyed for relative elevation referenced to a benchmark of 100 feet. All horizontal locations were rounded to the nearest 1-foot and all vertical locations were rounded to the nearest 0.01-foot. Data generated during the Site survey were used to prepare the Site Plan (**Figure 2**). Survey Data is presented in **Appendix D**.

4.6 GROUNDWATER LEVEL MEASUREMENTS

Groundwater level measurements were obtained by ECS on several occasions from August 2005 through October 2006. A summary of gauging results is presented in **Table 1**. All water level measurements were made with an EIP and rounded to 0.01 feet. These measurements were used in the preparation of groundwater table contour maps (**Figures 4 & 5**). Based on the groundwater elevations and using a modified straight line interpolation method, ECS estimates groundwater flow to be in an easterly direction, which is consistent with past interpretations.

4.7 FIELD SCREENING AND ANALYTICAL RESULTS

4.7.1 Soil

Soil samples collected by ECS during drilling activities were screened for the presence of TOVs using a PID. One soil sample (ECS-1), collected in August 2005, was submitted for laboratory analysis of VPH. Decoulos also collected and analyzed (EPH & VPH) several soil samples in 2003 & 2004 (sample id's DC & EGS) from borings in front of the station, adjacent to Main Street. In the opinion of ECS, the extent of soil impact approximates the extent of the LNAPL plume associated with the diesel fuel release, thus soil sampling and analysis for this Phase II was limited. In addition, a summary of soil samples (Left UST and Right UST) collected in 1998 adjacent to the 2 "closed in place" gasoline USTs that are currently located beneath the building, is presented in the table. The results indicate VPH and EPH impact to the soil was present in 1998. The highest concentrations of EPH related compounds, as expected, were observed in the area just downgradient of the source for the diesel fuel release. The highest concentrations of VPH carbon fractional ranges were detected adjacent to the "closed in place" gasoline UST's. Refer to **Table 5** for a summary of soil sample analytical data. Results of soil screening are found on the boring logs in **Appendix C**. The laboratory analytical report for the ECS samples is presented in **Appendix G**. Locations of the soil borings and monitoring wells are shown on **Figures 2 & 3**. Locations of the Decoulos borings are presented in **Appendix E**.

4.7.2 Groundwater

Groundwater samples have been collected from and within the vicinity of the Site since 1997. ECS has collected samples since August 24, 2005 primarily using low flow techniques. EPH and VPH analyses have been performed on the samples. The data are summarized in **Table 2**. This summary of data provides an historical view of groundwater quality for baseline comparisons as well as for evaluation of current groundwater quality. The data were used to define the extent of groundwater impact above GW-1, GW-2 and/or GW-3 groundwater standards as presented on **Figure 8**. **Figure 8** indicates that the extent of dissolved groundwater impact associated with the diesel fuel release approximates the extent of the LNAPL plume.

On March 1, 2006 ECS collected samples of LNAPL from ECS-10 and DCW-7 and submitted the samples to Spectrum for forensics analyses to type and age the LNAPL samples. Both samples were identified as fresh diesel fuel. It was further indicated that ECS-10 contains gasoline at up to 10%, and MtBE at up to 0.05% (estimated). DCW-7 was not found to contain gasoline or MtBE. Since both samples were identified as fresh diesel fuel, it is likely that they are from the same diesel fuel release. However, only one sample (ECS-10) was found to contain MtBE, which indicates that the MtBE detected in this sample resulted from another source, i.e. gasoline. The only documented gasoline release at the property is associated with RTN 4-13333, currently being addressed by others. Though it has been documented that MtBE may exist in diesel fuel via the sharing of tanker trucks and ancillary equipment with gasoline, it would not be expected that the elevated MtBE concentrations detected at the Site would be the result of residual concentrations of MtBE that may occur in diesel fuel.

As part of the evaluation of groundwater at the Site, ECS also evaluated analyzed/field screened samples for parameters to evaluate MNA. The parameters evaluated, along with the results, are summarized in Table 4. Microbes obtain energy by facilitating thermodynamically advantageous reduction-oxidation reactions that involve the transfer of electrons. The biodegradation of petroleum hydrocarbons occurs as a result of these metabolic processes. These reactions provide evidence of their occurrence by altering the geochemical characteristics of an aquifer. ECS has evaluated indicators of four degradation processes: aerobic respiration, denitrification, sulfate reduction, and iron reduction.

Aerobic respiration is the most energy efficient of the naturally occurring biodegradation processes, and as such it is the first to occur at a release site. As such, the oxygen content of a petroleum-impacted aquifer is rapidly depleted. Aerobic respiration will become limited by the rate of oxygen flux into the impacted zone of the aquifer, but will not cease unless groundwater becomes completely anoxic.

In areas where aerobic respiration has depleted the aquifer of oxygen, microbial populations will shift to populations that utilize nitrate, ferric iron hydroxide, and sulfate as electron acceptors. These respiration processes should deplete the concentrations of nitrate and sulfate and increase concentrations of dissolved iron in the aquifer. In general, the findings indicate that the concentrations of dissolved oxygen and nitrate are lower in wells within the contaminant plume and are relatively higher in wells outside of the area of impact, with the inverse being true for dissolved iron concentrations. Thus, it is apparent that biodegradation processes are naturally occurring at the Site (Table 4A). Groundwater laboratory reports are presented in Appendix G.

4.7.3 Potable Wells

Four private water supply wells are located within 500-feet of the Site. The wells are located at 131, 132, 133 & 134 Main Street. ECS has collected samples from these wells by allowing the cold water to run for a minimum of 10-20 minutes prior to collecting samples. The samples were collected prior to any type of holding or treatment tanks or aeration devices that may be contained in the water system. The water from these wells has been analyzed by ECS for VOC's by EPA Method 524.2. All wells but the one located at 132 Main Street have been analyzed for EPH. The groundwater collected from the private well at 131 Main Street (Eagle Gas property) has consistently contained low concentrations of MtBE and PCE since February 1999. No VOC or EPH compounds have been detected by ECS in any other wells sampled for these parameters. Refer to Table 3 for an historical summary of potable well analyses.

4.7.4 Storm Water Drain Line Manhole and Catch Basin Screening

ECS has screened several of the storm water drain-line manholes and associated catch basins for VOC via PID and for percent LEL. In October 2005, low PID readings were detected in 2 of the manholes and catch basins that were screened. No LEL readings were detected in the manholes. In July 2006, no PID readings were detected in the manholes. The readings are presented in Table 8 and the locations of the utility structures are shown on Figures 2 & 3.

4.7.5 Storm Water/Surface Water

ECS has performed sampling of the storm water from within the manholes and at the outfall to South Meadow Brook. The samples were analyzed for EPH and VPH. No compounds have been detected above MADEP Ambient Water Quality criteria since October 2005, and no compounds have been detected since May 2006. No apparent sheen on the water discharging from the outlet pipe has been observed since March 2006. The analytical results are summarized in Table 6. In May and July 2006 EPH carbon fractional ranges were detected in the water discharging from the outfall pipe, however, no contaminant concentrations were detected in MH-1, MH-2 or MH-3. This suggests another contributing source for the detected dissolved contaminant concentrations at the outfall, i.e. potential impact entering MH-4 or residual concentrations from sediment trapped in the drain-line following MH-3.

Based on the observation of apparent historical petroleum staining and diesel fuel odor observed at the storm water outfall, analytical data from surface water samples collected from the storm water drain line manholes near the Site and at the outfall area (Table 6), and the historical presence of a sheen on the surface water intermittently observed in Manholes #2, #3, #4 and at the outfall, it was suspected that a source of petroleum impact detected/observed within the drain line and at the storm water outfall may be related to the release of diesel fuel that occurred at 131 Main Street. The suspected migration pathway for the observed impact at the outfall and within the drain line was infiltration of Site derived impacted groundwater/LNAPL into the drain line through joints, seams, cracks and/or fissures.

To further evaluate this possibility, on March 1, 2006, ECS personnel directed and observed the video screening of the inner annulus of an approximate 170-foot section of the 15-inch diameter reinforced concrete storm water drain line between Manhole #1 and Manhole #2, as shown on Figure 2. Advanced Pipe Inspection, Inc. (API) of Dedham, MA performed the video screening. Greater details of this assessment are presented in the IRA Status report for RTN 4-17825, submitted to MADEP in March 2006. Part of this section of storm water drain pipe is located adjacent to the LNAPL plume at the Site and is the one area of the drain line where possible infiltration of groundwater and dissolved phase hydrocarbons and/or LNAPL into the pipe may occur. This assertion was based not only on the location of the pipe relevant to the LNAPL plume, but on the detection of dissolved concentrations of EPH in water samples collected from the manholes (Table 6), the observation of sheen on the water surface in Manhole #2 (while no sheen being observed in Manhole #1) and the lack of LNAPL or significant concentrations of EPH compounds in the groundwater adjacent to other sections of the pipe as indicated by results of groundwater samples collected from monitoring wells DCW-2, DCW-3, DCW-4 and ECS-7. (Note that the elevation of the top to PVC casing in DCW-1 has been changed on Table 1 from 99.06- feet (presented in all earlier reports) to 100.24-feet. The 99.06 elevation was incorrectly added to the table during the data input process. The correct elevation, 100.24-feet, is shown on the original survey notes and survey data table included in Appendix D).

No areas exhibiting prominent infiltration of water and or LNAPL were observed on the inside of the pipe, i.e. no cracks or joints with water clearly spraying or leaking into the pipe were observed. No holes were observed in the pipe. However, indications of water intrusion into the pipe through joints and cracks was observed as indicated by wetness around these areas, drops of water seeping from the seams, upward movement of water

from the base of the pipe and/or visual staining along joints. A slight sheen was also periodically observed on the water within the drain line⁴. The staining of the concrete pipe was especially prevalent at the location where the LNAPL had apparently been in contact with the outer portion of the pipe.

In addition, the historical elevations of LNAPL and groundwater at monitoring wells DCW-1, ERW-02 and ECS-4 were compared to the corresponding drain pipe invert elevations at locations perpendicular from the wells to the pipe. Charts that graphically depict this evaluation are presented in **Appendix F**. The charts indicate that LNAPL has been present at elevations above the drain-line invert elevation during the later months of 2005 and the early months of 2006.

4.7.6 Sediment

Limited sediment sampling has been conducted at the storm water outfall to South Meadow Brook. ECS has only collected one sediment sample, SS-1. The sample was collected in October 2005 using a stainless steel hand auger. The sample was collected from the inlet to South Meadow Brook at the location of the storm water discharge pipe outfall. The sample was analyzed for EPH with diesel fuel target analytes and revealed impact by aliphatic and aromatic hydrocarbons. Decoulos also collected several sediment samples, however, ECS has not determined the locations of these samples. The samples were analyzed for EPH with the 17 target PAH as well as for semi volatile organics by EPA Method 8270. The results of the EPH with 4 target PAH are summarized in **Table 7**. The analytical results indicate that the sediments at the outfall have been impacted.

4.7.7 Indoor Air

Indoor air of the building located at 131 Main Street was assessed by ECS. The air sampling was conducted on October 27, 2005 and January 2, 2006. A more detailed discussion of the sampling is presented in the IRA Status report for RTN 4-17582 submitted to MADEP on January 17, 2006. Summa Canisters were used to collect the air samples over an approximate 4-hour time interval. The samples were analyzed using the MADEP Air Petroleum Hydrocarbons (APH) Method. The analytical results of this sampling program are summarized in **Table 12** and the laboratory analytical report is included in **Appendix G**.

These results document that several APH related compounds were detected in indoor and ambient air. The location of the first floor samples (AS-2 & AS-4) is within the working space of the 131 Main Street building (an active petroleum retail/automotive repair facility). Therefore, in the opinion of ECS, comparison to the residential indoor air background concentrations to these sample results is not applicable. An appropriate comparison is to the OSHA permissible exposure levels (PEL) as presented in **Table 12**. As noted in the table, none of the detected concentrations exceed the OSHA PEL.

The indoor air samples collected from the living space (AS-3) are compared to residential indoor air background concentrations. However, it is emphasized here that the MADEP-derived residential indoor air background concentrations are not indicative of a residential apartment overlying an active petroleum retail/automotive repair facility and thus are not true indoor air background conditions for this scenario.

The use of the property as a petroleum retail facility strongly suggests that facility operations involving gasoline are likely the significant contributing source of the detected compounds, if not the sole contributing source. Furthermore, the detected contaminants are lower molecular weight petroleum hydrocarbons (VOC) that are present in gasoline at significantly higher concentrations than are typically found in diesel fuel. Diesel fuel contains primarily heavier molecular weight petroleum hydrocarbons (SVOC) and diesel fuel is the contaminant of concern at the Site. Two of the compounds in the APH target list, naphthalene and 2-methylnaphthalene, are transitional compounds on the chromatographic scale between VOC and SVOC. These compounds were not detected above analytical method detection limits in any of the air samples collected from the Site.

5.0 ENVIRONMENTAL FATE AND TRANSPORT

The following section references the contaminants of concern (COC) detected at the Site, discusses why certain compounds, though identified as COC, are not actually Site related COC, summarizes general fate and transport characteristics of fuel oil constituents, including fate and transport processes, and identifies the potential migration pathways of contaminants detected at the Site.

5.1 CONTAMINANTS OF CONCERN

As part of the Phase II assessment, COC were identified and are presented in **Appendix I**, the Method 3 Risk Characterization. Per the regulations, all chemicals detected at a Site are considered COC unless there is a specific, justifiable rationale for not including the contaminant in the Site evaluation. Compounds were eliminated from the list of study compounds if they were: 1) detected at concentrations at or below background concentrations identified by MADEP or by Site-specific data; 2) laboratory contaminants; or 3) detected infrequently at low concentrations with respect to the detection limit.

In the opinion of the LSP-of-Record, contaminants are present in media at the Site that are not in whole or in part related to the subject release of diesel fuel. However, these contaminants were identified as COC (because they occur at the Site and the regulations require that the compounds be identified as COC) and were evaluated as part of the risk characterization process. The contaminants in question, the related impacted media and the likely or potential source(s) are:

- MTBE and PCE detected in groundwater of the Eagle Gas private drinking water well. These compounds were present in groundwater sampled from the well prior to the release of diesel fuel having occurred. The current concentrations are lower than they were prior to the release. The likely historic sources are gasoline (MtBE) and parts cleaner (PCE);
- APH compounds detected in the indoor air of the 131 Main Street building. As presented in the January 2006 IRA Status report for RTN 4-17582, ECS is of the opinion that the VOC contaminants (APH analysis) detected in the indoor air of the building are attributed to facility operations. To help alleviate this issue, Eagle Gas has installed ventilation fans on the ground level floor to vent the building, and;
- Gasoline related compounds in soil and groundwater. As is documented, a release of gasoline occurred at the property prior to the release of diesel fuel having occurred. The data indicate that VPH carbon fractional ranges and target analytes (BTEX, MtBE and Naphthalene) were present in soil and/or groundwater prior to the subject release of diesel fuel. Though lower concentrations of these compounds can typically be associated with diesel fuel (with the exception of Naphthalene that occurs in diesel fuel at higher concentrations), it would appear that elevated concentrations of these compounds would more realistically be related to gasoline. In particular, the past and present concentration and distribution of MtBE coupled with forensics data on the diesel fuel suggests this compound is primarily derived from a release of gasoline.

5.2 CONTAMINANT FATE AND TRANSPORT CHARACTERISTICS

The OHM of concern has been identified as diesel fuel, which was apparently released from the remote fill line for the diesel fuel UST. The volume of diesel fuel released to the environment is not known. The impact of the release was quantified by examining the results of analytical testing for chemical parameters in Site impacted media. The general characteristics of diesel fuel are presented in **Appendix H** and are discussed further in the Risk Characterization.

Several of the characteristics considered in evaluation of the fate and transport potential of these compounds and compound groups in the environment are solubility, vapor pressure, Henry's Law Constant, fuel-water partition coefficient, adsorption coefficient, and degradation. Chemical properties for the COC's are presented in **Appendix H** and are considered to be semi-volatile or volatile organic compounds. Due to the significance of the detected EPH concentrations and their relation to the Site, as compared to VPH and their apparent relation to the former gasoline release at the property, EPH will be the main focus of the fate and transport characteristics. A review of the chemical properties of EPH indicates that, relative to other lower molecular weight petroleum constituents (such as those found in gasoline), these compounds tend to be less water soluble, have lower vapor pressures, and in general sorb significantly to soil organic matter.

Solubility: Solubility (S) is the extent to which a compound dissolves in water. It is an important parameter in the transport, persistence, and fate of compounds in natural systems. The solubility of a compound and its subsequent concentration in water affect the compound's sorption, dispersion, diffusion, volatilization, degradation, toxicity, and bioaccumulation. Laboratory data regarding solubility in water is available for many of the individual petroleum constituents, although the aquifer temperature, pH, ionic strength, and soil characteristics all may affect hydrocarbon dissolution in the vadose and saturated zones. Solubility's for the EPH COC are considered low.

Vapor Pressure: Vapor pressure (P_v) is a description of volatilization, and indicates the extent to which a chemical will be present in the vapor phase in the environment. A chemical with a low vapor pressure is less likely to volatilize than one with a high vapor pressure. In general, vapor pressure decreases with increasing molecular weight. The EPH COC vapor pressures are considered low.

Henry's Law Coefficient: The Henry's Law coefficient (K_H) is used to estimate the concentration of a solute near the vapor-liquid interface of a dilute solution. The coefficient represents the ratio, under equilibrium conditions, of the vapor pressure of a constituent to its concentration in the aqueous phase. The Henry's Law Constants for the EPH COC are considered low thus indicating a low affinity to partition into the vapor phase.

Distribution Coefficient: The distribution coefficient, (K_d), expresses the extent to which an organic chemical partitions between a solid phase and a liquid phase. The larger the K_d , the greater the extent of partitioning to the solid phase. Distribution coefficients can be measured for a particular chemical in the laboratory or the coefficients may be estimated using other physical/chemical constants. One way to express the distribution coefficient is based on adsorption to organic carbon in the solid-phase medium. This form of the distribution coefficient is designated as K_{oc} . The K_{oc} for the EPH COC are relatively high indicating a high affinity to absorb to soil.

Octanol/Water Partition Coefficient: The octanol/water partition coefficient (K_{ow}) expresses the extent to which an organic chemical partitions between the water (dissolved) phase and an organic (fuel) phase. The larger the octanol/water partition coefficient, the lesser the estimated concentration of a compound in water. This constant is useful in estimating the maximum expected dissolved concentration of a given component. The K_{ow} for the EPH COC is considered high.

Degradation: Mechanisms from both biological and chemical reaction processes are responsible for a chemical's degradation. Degradation commonly results from biological consumption and breakdown, hydrolysis, oxidation/reduction, and photolysis. Aromatic compounds are considered relatively susceptible to microbial attack and subsequent degradation. Numerous factors such as temperature, nutrient and oxygen availability, the availability of certain organic compounds (Fe, NO_3 , SO_4) and sediment characteristics affect degradation. Petroleum products and mixtures may degrade differently than individual hydrocarbons in solution. Under certain environmental conditions, biodegradation increases when hydrocarbons are sorbed to suspended solids. Some hydrocarbons cannot be biologically degraded completely. Degradation information (i.e. categorized as persistent and non-persistent in the environment) for the COC is summarized in Appendix H.

5.3 CONTAMINANT FATE AND TRANSPORT PROCESSES

The following includes general information regarding fate and transport processes that affect the distribution of diesel fuel compounds which have been released to the environment.

Partitioning: The process by which materials move from one media to another, i.e. groundwater, soil gas, soil moisture, and the surface of the soil itself.

Advection: The process by which dissolved materials are transported with flowing groundwater. The groundwater velocity depends upon the hydraulic gradient, the hydraulic conductivity of the aquifer material, the tortuosity of its flow path, that is the ratio of its circuitous path to the actual linear distance traveled, and the pore friction and pore size distribution;

Mechanical dispersion: The process by which contaminated groundwater mixes with uncontaminated groundwater, thereby creating a reduction in contaminant concentrations. This process is governed by the actual velocity of groundwater and contaminant molecules through the aquifer material pore spaces, and by differences in permeability within different soil strata;

Molecular diffusion: The process by which dissolved contaminants migrate from areas of high concentrations to low concentrations, also dependent upon tortuosity; molecular diffusion is typically an order of magnitude less important in terms of the effect on concentration gradients than is mechanical dispersion;

Biodegradation: The process by which a contaminant is transformed by microbial action into successively smaller molecules, often leading to “mineralization” of the compound to carbon dioxide and water. Petroleum constituents have been shown to biodegrade both naturally and under enhanced conditions (i.e. – oxygen enriched scenarios) (ATSDR, 1997; Koenigsberg and Norris, 1999).

Sorption: The process by which organics are bound to the surface of soil particles, particularly where the soil has a significant natural organic content. The K_{oc} value for the compound is an indicator of the degree to which sorption will occur. In the case of the COC's, most of the EPH fractional ranges have higher K_{oc} values, and will tend to sorb to soil organic matter to a greater degree.

Volatilization: The process by which a contaminant leaves the soil moisture and/or water column by diffusing to soil gas. Vapor pressure (P_v) is an indicator of the degree to which a compound will volatilize; however, water solubility also plays an important role. K_H relates P_v and S as described below. Volatilization is considered low for the EPH COC and higher for the VOC COC.

Retardation: The net effect of several processes which slows the movement of a dissolved contaminant relative to advection, causing the velocity of the contaminant flow to be some fraction of the groundwater flow velocity.

5.3.1 Site Specific Fate and Transport Characteristics

EPH, and to a lesser extent VPH, compounds have been detected in soil, groundwater, sediment and surface water that can be attributed to the subject release of diesel fuel. In addition, VPH carbon fractional range compounds and target analytes have been detected in soil and groundwater that are likely attributed to the documented release of gasoline that has occurred at the Eagle Gas property (RTN4-13333), and which are not associated with the subject release. Pursuant to 310 CMR 40.0835 (4)(e), the following fate and transport characteristics apply to the release conditions at the Disposal Site:

Mobility

Mobility is based largely upon solubility and organic carbon partitioning coefficients (K_{oc}) and is a measure of how freely a compound will move in the environment. See Appendix H for chemical properties.

- C_9 - C_{18} aliphatics, C_{19} - C_{36} aliphatics and C_{11} - C_{22} aromatics: In the opinion of ECS, and based on relatively low water solubility and high to moderate K_{oc} (affinity to absorb to soil/organic matter), C_9 - C_{18} aliphatics and C_{11} - C_{22} aromatics are considered to be of slight to low mobility. C_{19} - C_{36} aliphatics, which are essentially non-soluble in water and more likely to sorb to soil organic matter, are considered immobile. This aspect of low mobility has been observed at the Site as the contaminant plume has not been observed to migrate substantially through the aquifer;

- C₅-C₈ aliphatics, C₉-C₁₂ aliphatics and C₉-C₁₀ aromatics: In the opinion of ECS, and based on relatively low water solubility and moderate K_{oc}'s, C₅-C₈ aliphatics and C₉-C₁₀ aromatics are considered to be of slight to low mobility. C₉-C₁₂ aliphatics, which are less water soluble and more likely to sorb to soil organic matter, are considered relatively immobile, although volatilization may be an important migration process;
- BTEX: As the most highly water soluble and least sorbing constituent of BTEX, benzene is considered to be of high mobility. Though at this Site, benzene has not been observed to play a significant role. Toluene, ethylbenzene and xylenes are of low to moderate mobility (Fetter, 1994). The presence of these compounds has been documented prior to the subject release (BP-5, 1997 & 1999, BP-9, 1997 & 1999, MW-A, 1997 & 1999), though are also typically associated with diesel fuel. However, analyses of diesel fuel samples indicated that the diesel fuel adjacent to the building did not contain appreciable VOC whereas the diesel fuel adjacent to the road did contain an appreciable amount of VOC. The diesel fuel samples were identified as being the same and as such suggest that the majority of the VOC contaminants are from a different source;
- MtBE: MtBE is highly water soluble, sorbs minimally, and in the opinion of ECS, is considered to be of very high mobility. The presence of MtBE has been documented prior to the subject release and is typically not present in diesel fuel at significant concentrations. Analyses of the diesel fuel samples indicated that the diesel fuel adjacent to the building did not contain detectable MtBE whereas the diesel fuel adjacent to the road did contain an appreciable amount of MtBE. The diesel fuel samples were identified as being the same and as such suggest that the majority of the MtBE contaminants are from a different source, and;
- PAH Compounds: With relatively low water solubility and a moderate to high K_{oc}, the PAH's are of low mobility (Fetter, 1994).

Stability and Persistence – As shown in **Appendix H**, C₉-C₁₈ aliphatics and C₁₁-C₂₂ aromatics, C₅-C₈ aliphatics, C₉-C₁₂ aliphatics, C₉-C₁₀ aromatics, naphthalene and BTEX are considered to be non-persistent and C₁₉-C₃₆ aliphatics are considered to be persistent. MtBE is not expected to be significantly degraded compared with other compounds in gasoline. On the whole, petroleum is considered to be non-persistent.

Volatility – All of the BPH COC have vapor pressures which indicate that volatility is not a potential transport mechanism of concern. The VPH COC have higher vapor pressures, thus, volatilization of VOC is considered a potential transport mechanism. However, as stated above, it appears that the majority of the VOC contaminants are from an unrelated source.

Bioaccumulation – Bioaccumulation has not been documented for any of the COC. Currently, in the opinion of ECS, bioaccumulation is not expected to be of concern at the Disposal Site.

5.4 POTENTIAL AND EXISTING MIGRATION PATHWAYS

The potential source diesel fuel, relevant to this investigation, includes the remote diesel fuel transfer line to which deliveries have been ceased. The line has been locked off so diesel fuel can not inadvertently be delivered to this line. The primary migration pathway for diesel fuel released to the subsurface was determined to be migration through soil to groundwater and the migration or "spreading" of the LNAPL across the water table and saturation of the capillary fringe with LNAPL. Dissolved constituents have also been observed to migrate to a limited extent with

groundwater flow. The approximate extent of the LNAPL contaminant plume is shown on **Figure 6**. The soil and groundwater impact from the diesel fuel were determined to approximate the extent of the LNAPL plume (**Figure 7**). The other migration pathway identified at the Site is groundwater/LNAPL transport through the overburden aquifer and infiltration to the inner annulus of the subsurface storm water drain-line located beneath Main Street. Vapor migration of diesel fuel constituents along utility conduits or to indoor air has not been observed and is not believed to be a significant pathway.

5.4.1 Groundwater

Contaminants migrate in groundwater by the process of advection, dispersion, and to a lesser degree, diffusion. Groundwater is migrating in the overburden aquifer. Based on gauging events on 08/15/05 and 04/17/06, 2 groundwater table contour maps were developed using a modified straight line interpolation method. The groundwater contour plans are presented as **Figures 4 & 5**. Groundwater flow from the Eagle Gas property was determined to be to the east. This is consistent with past interpretations by others and by local topography including surface water expression. The approximate current extent of the LNAPL plume is depicted on **Figure 6** and extends approximately 60 feet from the Eagle Gas building to the approximate center of Main Street in an irregular "S" shape. The dissolved contaminant plume (**Figure 7**), has been observed to extend just beyond the boundary of the LNAPL plume. The plumes have not been observed to have migrated substantially since ECS became involved.

5.4.2 Soil

Contaminants located in soil may migrate vertically into the water table. Based on the molecular weight and specific gravity of the diesel fuel compounds, their low mobility and affinity to sorb, and on experience with spills of the similar nature, ECS does not expect the contaminants to migrate past approximately 20 feet in depth.

5.4.3 Bedrock

Bedrock was not encountered during subsurface activities at the Site and is reportedly located at depths of between 60-80 feet below grade. Since diesel fuel has a specific gravity less than one and the underlying sediments are silt and clay, it is not likely that groundwater in bedrock will become impacted by the release.

5.4.4 Subsurface Conduits

One subsurface utility conduit (storm water drain line beneath Main Street) was identified at the Site. The inner annulus of this utility is believed to act as a preferential migratory pathway at times of elevated groundwater levels. The invert of the drain line occurs at a depth of approximately 5-6 feet below the surface grade. Groundwater and LNAPL have apparently periodically entered the storm drain line. This would be expected to occur when the liquid level (groundwater/LNAPL) is at or above the invert elevation of the storm water drain pipe (see **Appendix F** for charts of LNAPL and groundwater elevations compared to the elevation of the stormwater drain line). The charts indicate that the liquid level was above the drain line invert elevation through late 2005 into early 2006. This coincides with the observation of sheens in the drainage system and/or outfall by ECS. The occurrence of sheen on the stormwater is not a consistent occurrence. Based on the analyses of groundwater collected from several monitoring wells located along the drain line (DCW-2, DCW-3, DCW-4 and ECS-7), preferential

migration of diesel fuel along the outer annulus of the utility pipe has not been observed to any significant degree.

5.4.5 Vapor Migration

The average depth to groundwater at the Site is less than 15 feet, therefore groundwater is considered to be a potential source of vapors to indoor air and has the potential to migrate within the inner/outer annulus of the storm drain line. The volatilization of diesel fuel compounds from the groundwater and soil and/or adsorption onto soil particles and organic matter is dependent on the characteristics of diesel fuel in conjunction with other Site specific characteristics. Diesel fuel constituents are typically of low volatility and sorb well to soils. Petroleum odors and detected contaminant concentrations have been observed within the Eagle Gas building but appear to be associated with facility operations, as previously documented. No petroleum odors have been reported from residences in the area. PID readings were detected in the air within the storm drain line and associated catch basins (Table 8). The readings were detected in October 2005 when a sheen was observed, however, in July 2006, no PID readings were detected. Thus, the drain line has the potential to act as a conduit for vapor migration but apparently only when groundwater/LNAPL enters the drain. Based on the results of assessment activities, it does not appear that contaminant vapor migration into indoor air of adjacent residences is likely. However, the potential for vapor migration into the indoor air of the Eagle Gas building or within the drain line does exist.

5.4.6 Surface Water Runoff

No impact to surface water runoff from Site derived contaminants is expected due to fact that the impacted area is paved and is located several feet below grade.

6.0 SITE HYDROGEOLOGY

6.1 GEOLOGY

6.1.1 Surficial Geology

Soils encountered during the soil boring exploration on the property consisted primarily of medium to fine sand and silt. It is reported that lacustrine clays and silt are present at a depth of approximately 20 feet to bedrock at 60-80 feet below grade. Thus the unconfined aquifer beneath the Site (to a depth of approximately 20 feet) consists of Silt and fine sand, consistent with glacio-fluvial deposition. Bedrock was not encountered during the Phase II subsurface explorations.

6.1.2 Bedrock Geology

Bedrock was not encountered during subsurface activities at the Site. No samples of bedrock were collected for characterization or identification. Bedrock reportedly occurs at approximately 60-80 feet below surface grade. According to the Bedrock Geologic Map of Massachusetts (Zen, 1983), the subject properties lies within the Milford-Dedham Zone, a Proterozoic Z age Granite, Gneiss and Schist. Bedrock outcrops have not been observed in the vicinity of the subject property.

6.2 HYDROGEOLOGY

6.2.1 Hydraulic Conductivity of Aquifer Materials

The hydraulic conductivity of the aquifer underlying the Site was estimated based on descriptions of soil encountered during soil boring and monitoring well installation activities conducted by ECS combined with information obtained from the BOI RAO report (2005) and Decoulos IRA Status report (May 2005). The soil in the shallow unconfined aquifer is characterized as predominately Silt and fine sand. According to published literature (Freeze and Cherry), the hydraulic conductivity in this type of soil is estimated to be 10^{-5} cm/s (0.00001 cm/s). Decoulos also calculated the hydraulic conductivity to be 10^{-5} cm/sec (0.00001 cm/sec) based on rising head permeability "slug" tests performed on the recovery trench. BOI performed rising head permeability "slug" tests on monitoring well FF-4. BOI calculated the hydraulic conductivity at this location to be 11 ft/day (3.82×10^{-3} cm/s). The boring log (Appendix C) indicates the stratigraphy at this location as Silt to approximately 9 feet underlain by loamy sand and gravel. Thus, ECS opines that the hydraulic conductivity of the shallow unconfined aquifer at the Site in the area of the Site property is more on the order of 10^{-5} cm/s (as no saturated loamy sand and gravel was observed at the Site).

6.2.2 Groundwater Flow and Horizontal Hydraulic Gradient

Based on historical potentiometric surface elevations observed in wells during gauging activities at the Site, groundwater was determined to flow to the west. This corresponds with local/regional topography including surface water expression. Figures 4 & 5 depict groundwater flow direction based on measurements collected on August 18, 2005 and April 17, 2006. For this study, 2 average hydraulic gradients for the shallow unconsolidated

aquifer were calculated; one existing on the property and one from the property to across Main Street. The justification for determining 2 hydraulic gradients is due to the interpretation of the groundwater contour maps that indicates 2 distinct hydraulic gradients exists. The average hydraulic gradient of the unconfined aquifer under the property was determined to be approximately 0.043 and that under Main Street to be approximately 0.012. The presence of LNAPL at the Site appears to affect the local gradient within the disposal Site boundaries, creating a minor depression just to the west of the trench.

The velocity of groundwater flow can be estimated using Darcy's equation as follows [Fetter, 1994]:

$$Q = K (dh/dl) A \quad \{1\}$$

where:

Q = flow through the aquifer (cm³/s)
dh/dl = the hydraulic gradient (ft/ft)
A = the cross-sectional area normal to flow direction (cm²)
K = hydraulic conductivity of the aquifer material (cm/s)

rearranging,

$$q = Q/A = K (dh/dl) \quad \{2\}$$

where:

q = specific discharge of the aquifer (cm/s)

the seepage velocity, or average linear velocity ($v_{\text{groundwater}}$) is represented by (Domenico and Schwarz, 1990; Fetter, 1994):

$$v_{\text{groundwater}} = K (dh/dl) / n_e \quad \{3\}$$

where:

n_e = the effective porosity (the percentage of porosity available for fluid flow)

Thus, the estimated linear velocity of groundwater flow for the disposal site under the 2 calculated hydraulic gradients is:

Across Property: $v_{\text{groundwater}} = 0.00001 \text{ cm/s} (0.043) / 0.21$

$$v_{\text{groundwater}} = 2.01 \times 10^{-6} \text{ cm/s}$$

From Property across Main Street: $v_{\text{groundwater}} = 0.00001 \text{ cm/s} (0.012) / 0.21$

$$v_{\text{groundwater}} = 5.71 \times 10^{-7} \text{ cm/s}$$

Converting cm/s to ft/day and ft/year results in a linear flow of approximately 0.006 ft/day (2.19 ft/yr) for groundwater flow across the Site property and a linear flow of approximately 0.002 ft/day (0.73 ft/year) for groundwater flow from the property across Main Street.

In the calculation, effective porosity, or the percentage of interconnected pore space, was used instead of total porosity to better estimate groundwater flow velocities. The effective porosity was obtained by assuming that the specific discharge is comparable to the effective porosity. Therefore, a literature value for specific discharge of 21% was obtained for fine sands (Fetter, 1994). The total porosity literature value of 35% for fine sands was obtained for the overburden

(Domenico and Schwartz, 1990). Based on this, the effective porosity is 60% of the total porosity, indicating a reasonable assumption.

7.0 NATURE AND EXTENT OF CONTAMINATION

The Disposal Site Area defined for the release of diesel fuel in the area of the Eagle Gas property and into Main Street is approximately 68-feet in length (east-west) in the former source area and approximately 40-feet wide (north-south), measured roughly parallel to Main Street (**Figure 3**). This area is also depicted on **Figure 7** as the extent of EPH/VPH above standards. The estimated extent of LNAPL at the disposal site is approximately 60-feet in length and up to 30-feet in width and is configured in an "S" shape (**Figure 6**). The northern boundary of the Disposal Site Area is controlled by the absence of contamination in groundwater at well DCW-5. The absence of impacts to groundwater at the locations of wells DCW-9, BP-1, DCW-10, and BP-2 control the eastern boundary of the Disposal Site Area. The absence of diesel fuel related compounds in wells DCW-2, DCW-4 and MW-A control the extent of the south-southeastern extent of the disposal site. The western boundary of the Disposal Site Area is controlled by the absence of contamination associated with diesel fuel in groundwater from well DCW-8.

Evidence indicates that petroleum contamination related to the diesel fuel release at the Site property migrates south from the vicinity of the Site property via the municipal storm water drainage system beneath Main Street. The storm water drainage system in the vicinity of the Site property discharges to surface water in South Meadow Brook, at a point approximately 650 feet south of the former source area. Surface water at the outfall and sediment in the immediate vicinity of the outfall have been impacted by the release which is the subject of this report. The municipal storm water drainage line between the former source area and the discharge point at South Meadow Brook, the outfall at South Meadow Brook, and surface water and sediment in the immediate vicinity of the outfall at the inlet to South Meadow Brook, are therefore included in the Disposal Site Area defined for the diesel fuel release on the Site property (**Figure 3**). Available evidence provides no indication of impacts to groundwater or soil associated with the release in question along the outer annulus of the length of the surface water drainage line between the Disposal Site Area at the Site property and the outfall.

The area of the Disposal Site Area in the vicinity of the Site property is approximately 3,000 square feet (0.07 acres); that portion of the Disposal Site Area within the municipal drainage line south of the Site property, and at the outfall of the municipal drainage line at South Meadow Brook is estimated to comprise at most 1,500 additional square feet (0.034 acres) in area (with the inlet to South Meadow Brook consisting of approximately 200 square feet).

7.1 NATURE AND EXTENT OF SOIL CONTAMINATION

The nature of the soil contamination is diesel fuel that was apparently released from the remote diesel fuel line during fueling of the diesel fuel UST. The release is manifested by the reported detections of LNAPL diesel fuel, EPH and select target PAH analytes, and to a lesser extent, select VPH and target analytes.

The horizontal extent of soil contamination is defined based upon soil samples collected from the Site and from an estimate of the extent of groundwater contamination. Thus, the area of impacted soil in the area of the Site property mimics the extent of dissolved EPH contamination (**Figure 7**), an area of approximately 68-feet in length (east-west) in the former source area and approximately 40-feet wide (north-south).

The vertical extent of soil contamination in the Site property area is estimated based upon soil laboratory analytical results and the field screening results. These findings indicate that the vertical extent of soil impact is present at a depth of 15-feet below surface grade. Based on the chemical characteristics of diesel fuel, combined with the Site specific stratigraphy (Silt and fine sand) and experience at sites with similar characteristics, ECS would not expect impacts to have migrated vertically greater than 20 feet below surface grade.

Soil was apparently impacted with diesel fuel at the outfall area in the immediate area of the outfall pipe (1-4 feet horizontally), along the banks of the inlet to South Meadow Brook. This was manifested by the observance of stained soil adjacent to the outfall pipe. It is not expected that this impact migrated vertically more than 2-3 feet based on the likely amount of time the LNAPL would have been in contact with the soil.

7.2 NATURE AND EXTENT OF GROUNDWATER CONTAMINATION

The nature of the groundwater contamination is diesel fuel that was apparently released from the remote diesel fuel line during fueling of the diesel fuel UST. The release is manifested by the reported detections of LNAPL diesel fuel, EPH and select target PAH analytes, and to a lesser extent, select VPH and target analytes.

The horizontal extent of groundwater diesel fuel derived contamination is defined based upon groundwater samples collected from the Site (Figure 7 & Table 2). This comprises an area of approximately 68-feet in length (east-west) in the former source area and approximately 40-feet wide (north-south).

The vertical extent of groundwater contamination is defined based upon groundwater samples collected from the Site (Figure 7 & Table 2) and measurements of LNAPL in monitoring wells. The wells are typically set at 10-15 feet below grade. Based on the chemical characteristics of diesel fuel, combined with the Site specific stratigraphy (Silt and fine sand) and experience at sites with similar characteristics, ECS would not expect impacts to have migrated vertically greater than 20 feet below surface grade.

7.3 NATURE AND EXTENT OF SURFACE WATER AND SEDIMENT CONTAMINATION

The nature of the surface water and sediment contamination is diesel fuel that was apparently released from the remote diesel fuel line during fueling of the diesel fuel UST. The released diesel fuel entered the subsurface storm water drain line located beneath Main Street and migrated with stormwater flow to the outfall. The outfall discharges to an inlet to the brook that is approximately 200 square feet in area. The release is manifested by the reported detections of EPH and select target PAH analytes in surface water within the drainage system and the inlet and sediment within the inlet. Surface water impact was not detected in South Meadow Brook (SW-2 Up-stream and SW-3 Down-stream). The current lateral extent of the diesel fuel impact to sediment mirrors the inlet (approximately 10-feet wide by 20-feet long) and is not expected to be greater than 2-3 feet in vertical depth. Impact to the storm water within the drainage pipe has not been detected in MH-1,2 or 3 since April 2006 when a minor concentration of C¹⁹-C³⁶ Aliphatics was detected in MH-3. However, impact to stormwater at the mouth of the outfall pipe, just prior to its discharge to the inlet, was detected during the most recent sampling completed in May and July of 2006. This indicates that either another potential source could exist, possibly entering into MH-4, or that residual concentrations of Site derived impact are slowly leaching from the storm drainage system at an origin past MH-3.

7.4 NATURE AND EXTENT OF INDOOR/AMBIENT AIR CONTAMINATION

Petroleum odors and detected contaminant concentrations have been observed within the Eagle Gas building but appear to be associated with facility operations, as previously documented. No petroleum odors have been reported from residences in the area. PID readings were detected in the air within the storm drain line and associated catch basins (Table 8). The readings were detected in October 2005 when a sheen was observed, however, in July 2006, no PID readings were detected. Thus, the drain line has the potential to act as a conduit for vapor migration but apparently only when groundwater/LNAPL enters the drain. Based on the results of assessment activities, it does not appear that contaminant vapor migration into indoor air of adjacent residences or into the drain line is likely.

8.0 SITE RISK CHARACTERIZATION

The purpose of the Site risk characterization is to document the existence of present or potential risk of harm to health, safety and public welfare or the environment which may be posed by conditions which exist at the Site currently or which may come to exist in the reasonably foreseeable future, and to determine if additional remedial actions are necessary to mitigate such risks.

A characterization of the risk of harm to health, safety, public welfare and the environment has been performed to provide qualitative and quantitative information to evaluate the need for further remedial actions to mitigate such risks. A Method 3 Risk Characterization has been conducted in accordance with Subpart I of the Massachusetts Contingency Plan (310 CMR 40.0900). The content and format of this risk characterization is based on MADEP policy "Guidance for Disposal Site Risk Characterization" (BWSC ORS-95-141, July 1995) and the MCP (310 CMR 40.0000). The Method 3 Risk Characterization is included in **Appendix I**.

Conditions on the Site have been evaluated in terms of Imminent Hazard and Condition of Substantial Release Migration, and with respect to risk of harm to health, the public welfare and safety and the environment. It is the opinion of ECS that an Imminent Hazard does not exist but that a condition of SRM does exist. This is in agreement with past evaluations. It is also the opinion of ECS that conditions within the Disposal Site Area with respect to the subject release of diesel fuel do not present a condition of No Significant Risk of harm to human health, now and for the reasonably foreseeable future. It is further opined that a condition of No Significant Risk of harm to the public welfare or safety does not exist due to the local presence of separate-phase petroleum on the water table. Current conditions within the Disposal Site Area were determined to constitute No Significant Risk of harm to the environment.

9.0 SUMMARY AND FINDINGS

On behalf of Eagle Gas, ECS has completed a Phase II - CSA and Method 3 Risk Characterization for RTN 4-17582 & 4-17825, assigned for a release of diesel fuel at the Eagle Gas property located at 131 Main Street in Carver, Massachusetts. This investigation was conducted to satisfy the requirements of Massachusetts General Laws Chapter 21-E and the Massachusetts Contingency Plan, 310 CMR 40.0000. ECS presents the following summary and findings:

- The subject property is currently used as a retail petroleum fuel dispensing facility. The subject release relates to diesel fuel. In January 2003, LNAPL diesel fuel was detected in a monitoring well located adjacent to Main Street and MADEP assigned RTN 4-17582 for the release condition. In May 2003, it was determined that the remote fill line for the diesel fuel UST was the cause of the release. Deliveries to this line were immediately ceased upon discovery.

In mid May 2003, the storm water drainage line outfall to South Meadow Brook was inspected and a sheen was observed on the surface water discharging from the outfall pipe. MADEP had reason to believe that the release was associated with RTN 4-17582 and issued RTN 4-17825 to Eagle Gas for this release condition.

In April 2004, Eagle Gas submitted a Phase I and an NRS Scoresheet in which the 2 RTN's were linked. The Site was classified as a Tier 1A Site, however, a Tier 1 Permit Application was not submitted at this time. A Tier 1 Permit Application and revised NRS Scoresheet were eventually submitted to MADEP in December 2005. A Phase II SOW was submitted to MADEP in May 2006. Several IRA reports have been submitted to MADEP since Site inception.

Prior to ECS involvement, a groundwater interceptor trench was installed in Main Street. The trench was never "activated" with an automated recovery system. EFR events and manual bailing of LNAPL have been implemented as remedial activities under an IRA.

- Assessments completed to define the extent of impact have included, but are not limited to: soil boring advancement and monitoring well installation; soil screening (PID); soil and groundwater sampling and analyses; storm drain manhole/catch basin screening (PID); sediment and surface water sampling and analyses, and; indoor air screening, sampling and analysis. The results are summarized in Tables attached to this report.
- The extent of the Disposal Site in the area of the Eagle Gas property is approximately 68-feet in length (east-west) and approximately 40-feet wide (north-south), (**Figure 3**). The estimated extent of LNAPL at the disposal site is approximately 60-feet in length and up to 30-feet in width (**Figure 6**). Soil and groundwater impact are not expected to exceed a vertical depth of 20 feet in this area.

The diesel fuel released at the Site property exists as LNAPL and dissolved phase hydrocarbon and is limited in extent in groundwater and soil in the vicinity of the Eagle Gas property. Diesel fuel has migrated to the east with groundwater beneath Main Street and has apparently intercepted the subsurface drain line beneath Main Street. Migration with groundwater is limited, impact has not been detected on the east side of Main Street or along the outer annulus of the storm drain pipe to any substantial degree downgradient

of the Site property. At times of high water, when the groundwater table intersects the outer annulus of the storm drain line, LNAPL and diesel fuel impacted groundwater apparently enter the drain line. Thus, the drain line from the source area to the outfall, including the outfall area, i.e. the inlet to South Meadow Brook, are included in the disposal site boundary. Surface water, soil and sediment in the immediate vicinity of the outfall have apparently been impacted by the release (approximate 200 square foot area). It is expected that the vertical impact in this area does not exceed 2-3 feet.

The area of the Disposal Site includes: approximately 3,000 square feet in the area of the Site property and approximately 1,500 square feet within the drain line and at the outfall area. The total area of the disposal site is currently estimated as 4,500 square feet.

- The COC identified relate to diesel fuel and primarily consist of SVOC (EFH and PAH) with a lower percentage of VOC (VPH). The majority of the COC are relatively low in mobility, are relatively non-persistent, and are relatively non-volatile. Their observed distribution supports this. The detected contaminants do not bioaccumulate.
- Stratigraphy at the Site consists of fine sand and silt consistent with glaciofluvial deposits. The hydraulic conductivity was estimated to be 1.0×10^{-5} cm/s. Groundwater was determined to flow under the Site property to the east under an average gradient of 0.043; and under Main Street to the east at an average gradient of 0.012. Linear groundwater velocities for the 2 hydraulic gradients were calculated to be 2.19 and 0.73 feet per year, respectively.
- The primary migration pathway for diesel fuel released to the subsurface was determined to be migration through soil to groundwater and the migration or "spreading" of the LNAPL across the water table. Dissolved constituents have also been observed to migrate to a limited extent with groundwater flow. The approximate extent of the LNAPL contaminant plume is shown on Figure 6. The soil and groundwater impact from the diesel fuel were determined to approximate the extent of the LNAPL plume (Figure 7). The other migration pathway identified at the Site is infiltration to the inner annulus of the subsurface storm water drain-line located beneath Main Street and discharge at the outfall to South Meadow Brook. Vapor migration of diesel fuel constituents along utility conduits or to indoor air has not been observed and is not believed to be a significant pathway.
- The area of the Site near the Site property is covered by bituminous concrete. The area of the Site near the outfall is unpaved. The soil categories applicable to the Site are S-1, S-2 and S-3. The Site and surrounding area are categorized as a Current or Potential Drinking Water Source Area. The MCP groundwater categories applicable to the Site are: GW-1, GW-2 (within 30 feet of an occupied structure) and GW-3.
- South Meadow Brook is located approximately 650 feet south of the source area. South Meadow Brook discharges into the WeWeantic River, which ultimately discharges to Buzzards Bay in the Atlantic Ocean. The WeWeantic River is categorized as a Class B and Class SA surface water down stream of the Site. Water from South Meadow Brook is also apparently used for irrigation downstream of the subject outfall area.
- Conditions within the Disposal Site Area have been evaluated in a MCP Method 3 Risk Characterization. Potential exposure of Site workers, utility workers, construction workers, visitors, trespassers, and passersby, and current and potential future residents to

residual contamination present within the Disposal Site Area has been evaluated. Conditions on the Site have been evaluated in terms of Imminent Hazard and Condition of Substantial Release Migration, and with respect to risk of harm to health, the public welfare, safety and the environment. It is the opinion of ECS that an Imminent Hazard does not exist but that a condition of SRM does exist. This is in agreement with past evaluations. It is also the opinion of ECS that conditions within the Disposal Site Area with respect to the release in question do not present a condition of No Significant Risk of harm to human health, now and for the reasonably foreseeable future. It is further determined that a condition of No Significant Risk of harm to the public welfare or safety does not exist due to the local presence of separate-phase petroleum on the water table. Current conditions within the Disposal Site Area were determined to constitute No Significant Risk of harm to the environment. It is therefore concluded that conditions with respect to the release in question do not present a condition of No Significant Risk of harm and that further remedial response actions are required.

10.0 REFERENCES

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DeCoulos & Company (July 5, 2003) Immediate Response Action Plan Status Report

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DeCoulos & Company (April 21, 2004) Immediate Response Action Modification Plan

DeCoulos & Company (April 30, 2004) Phase I Initial Site Investigation and Tier Classification

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DeCoulos & Company (July 8, 2005) Immediate Response Action Modification Plan

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Environmental Compliance Services (March 23, 2006) Immediate Response Action Status Report

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Environmental Compliance Services (July 19, 2006) Immediate Response Action Status Report
(ECS#3) (Sheen on SW)

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MADEP (2002), WSC-02-411, *Characterizing Risks from Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach*, Final Policy, October, 31.

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Zen (1983), Bedrock Geologic Map of Massachusetts

FIGURES



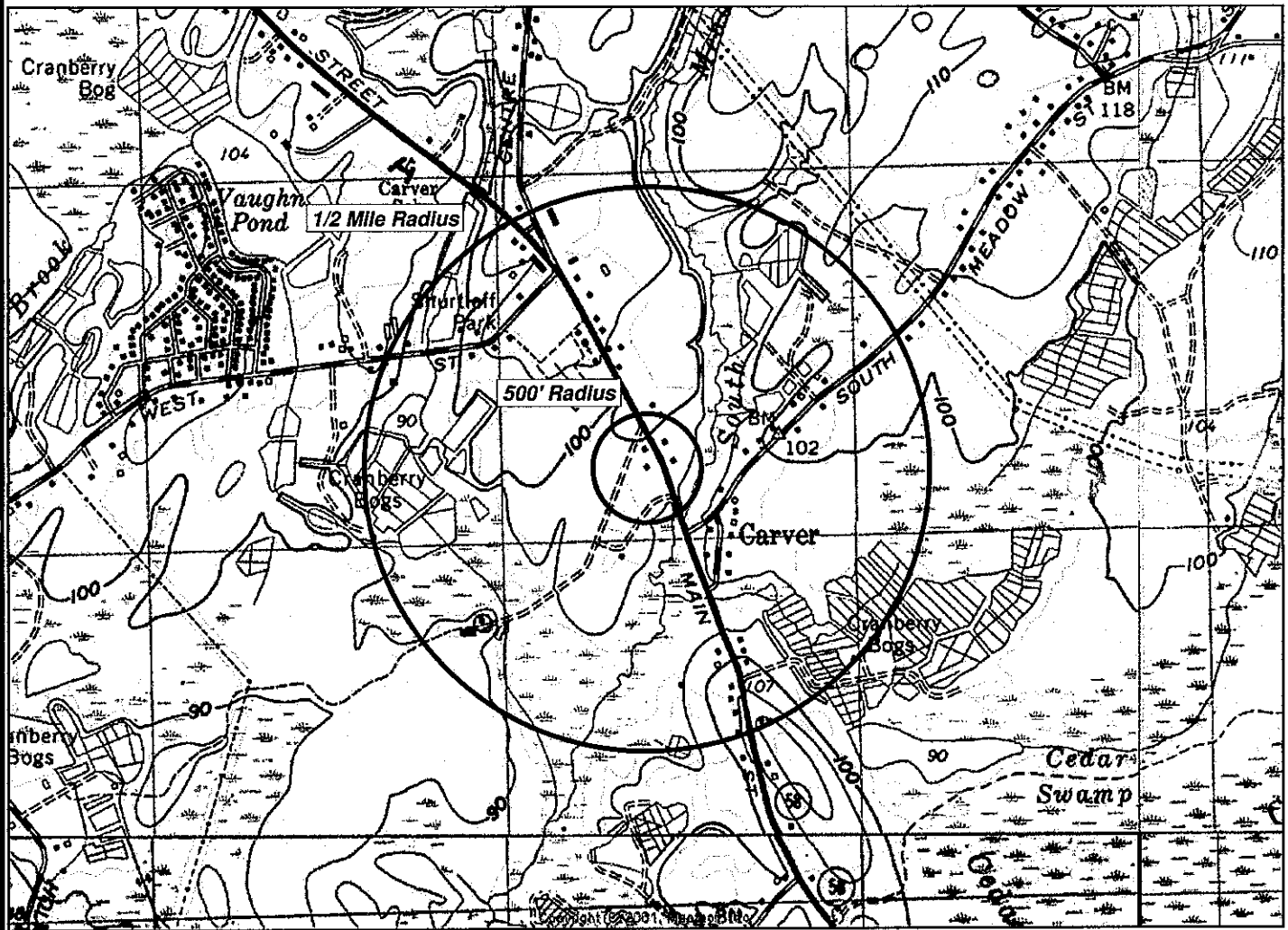
Environmental Compliance Services, Inc.
588 Silver Street, Agawam, MA 01001
Phone (413)-789-3530 Fax (413)-789-2776
www.ecsconsult.com

SITE LOCUS

Figure: 1

Eagle Gas, Inc.
131 Main St - Route 58
Carver, MA
02330

Job Number: 204082



1

1/2

0

1 Mile

1 inch = 1500 feet

Contour Interval: 10 Feet

North

Base Map: U.S. Geological Survey; Quadrangle Location: Plympton, MA

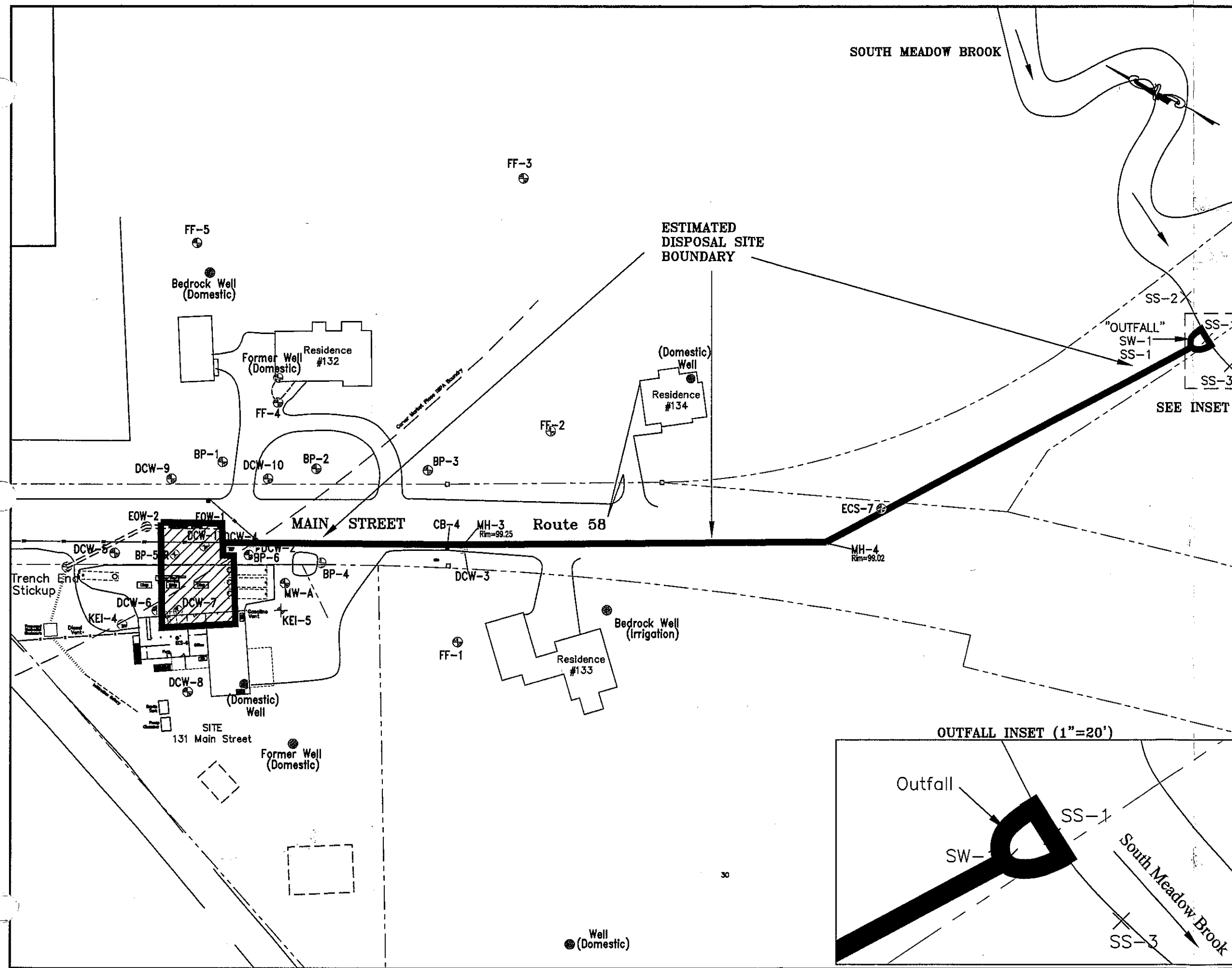
UTM Coordinates: 19 0353405 East / 4638195 North



Map Edited: 1977

Map Revised: 1977

Generated By: RAS



Legend

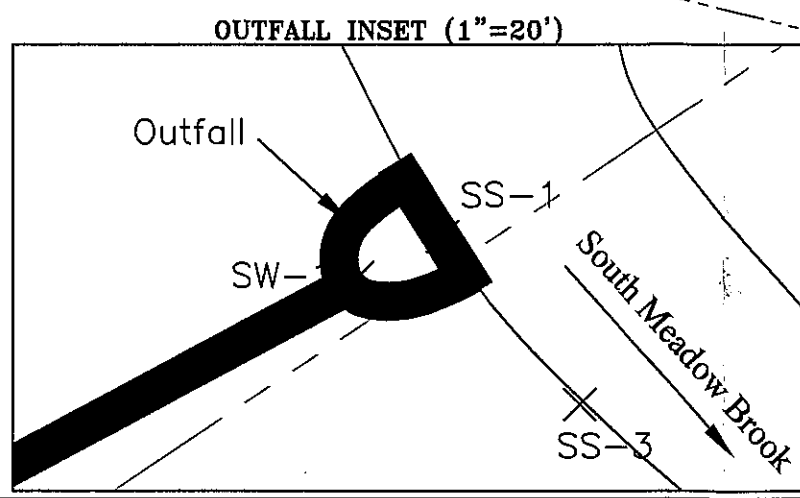
---	Approximate Property Line
SS	Sanitary Sewer Line
SW	Storm Sewer Line
W	Water Line
NG	Natural Gas Line
OE	Overhead Electric Line
---	Disposal Site Boundary
⊕	Manhole
▢	Catchbasin
⬮	Water Gate
⬮	Fire Hydrant
⊕	Utility Pole
⊕	Monitoring Well
⊕	Domestic Well
⊕	Destroyed Monitoring Well
⊕	Soil Boring
△	Monitoring Well (KES)
ECS-1	Well I.D.
⊕	4" Recovery Well
▨	Proposed System Trenching
X	Surface Water Location
X	Sediment Sample Location
---	Disposal Site Boundary

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

Base plan taken from Bennett & O'Reilly, Inc. plan job # B004-4169.

Locations of site-related recovery wells are located on Figure 2: Site Plan.



555 Silver Street • Agawam, MA 01001
Phone 1-800-788-9898 Fax 413-788-9898
econtact.com

PROJECT:			
Eagle Gas 131 Main Street - Route 58 Carver, Massachusetts			
TITLE:			
AREA PLAN and DISPOSAL SITE BOUNDARY			
CLIENT:			
Najib Badaoui			
GRAPHIC SCALE:			
COMPUTER CADFILE: 204082SPR.DWG			
DRAWN BY:	DESIGNED BY:	CHECKED BY:	APPROVED BY:
RAS	NB	NB	PS
SCALE:	DATE:	JOB NO.:	FIGURE NO.:
1" = 60'	OCT 2006	204082	3

Notes:

Horizontal, and vertical locations of wells, and selected site features determined through measurements made by representatives of ECS.

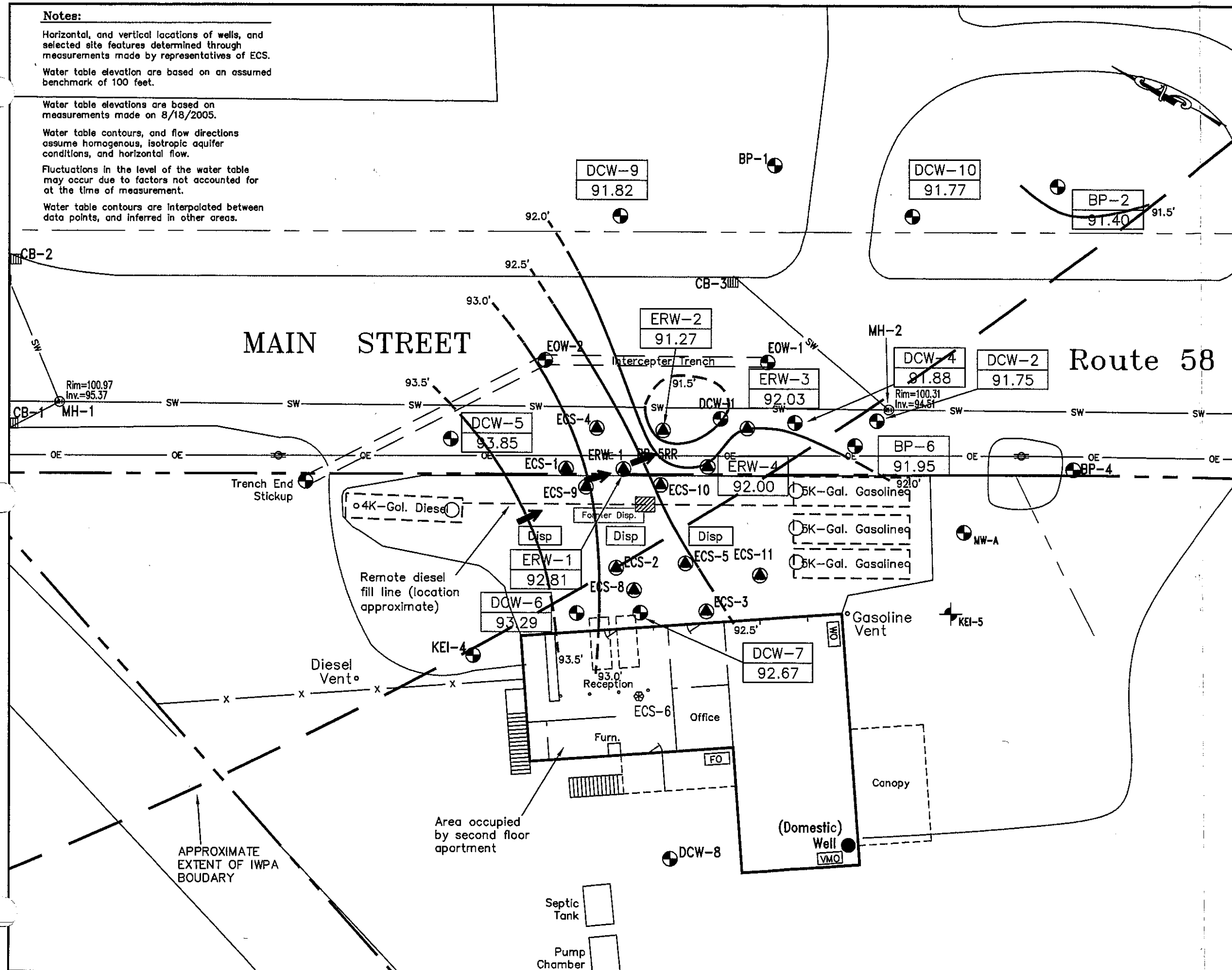
Water table elevation are based on an assumed benchmark of 100 feet.

Water table elevations are based on measurements made on 8/18/2005.

Water table contours, and flow directions assume homogenous, isotropic aquifer conditions, and horizontal flow.

Fluctuations in the level of the water table may occur due to factors not accounted for at the time of measurement.

Water table contours are interpolated between data points, and inferred in other areas.



Notes:

Horizontal, and vertical locations of wells, and selected site features determined through measurements made by representatives of ECS.

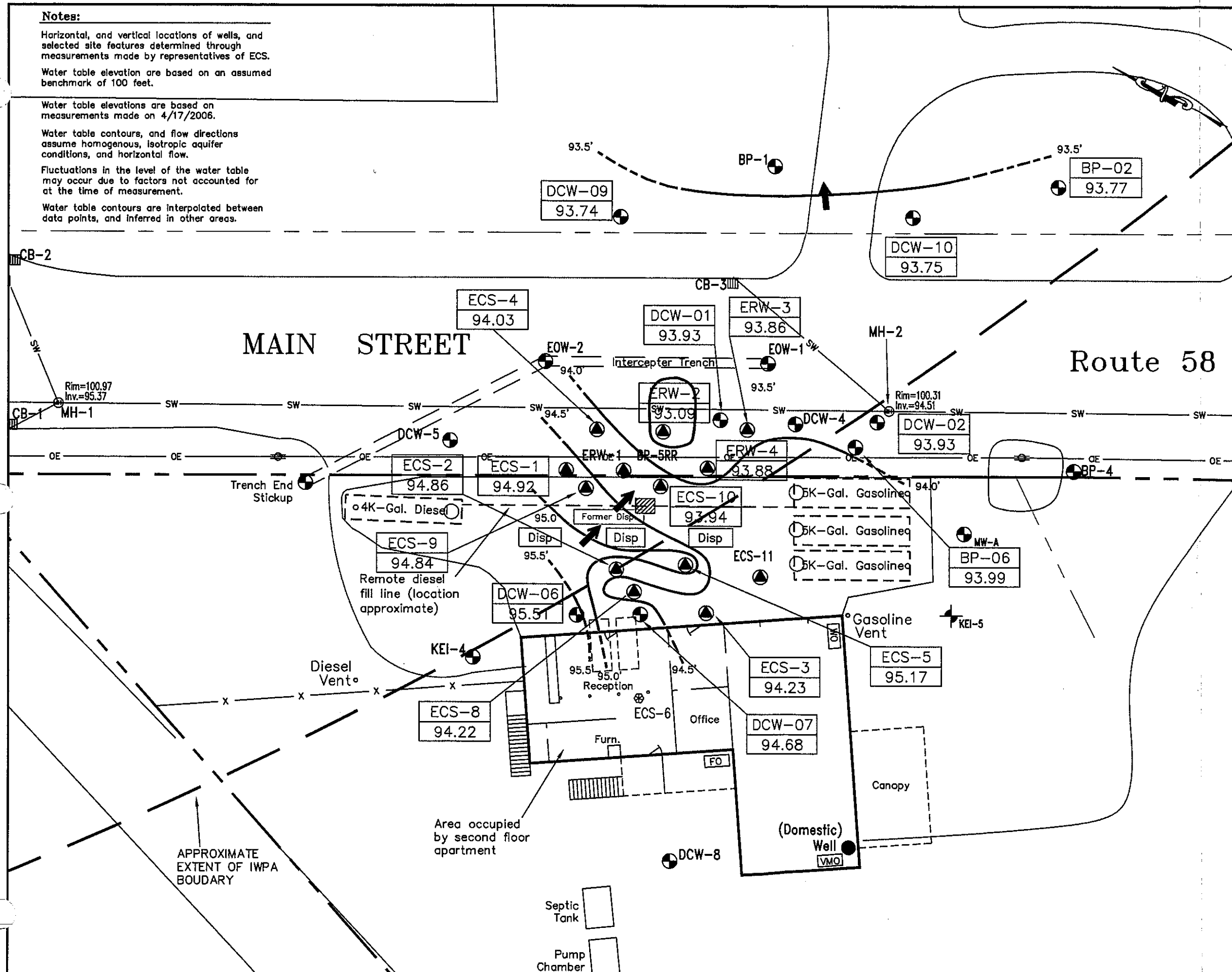
Water table elevation are based on an assumed benchmark of 100 feet.

Water table elevations are based on measurements made on 4/17/2006.

Water table contours, and flow directions assume homogenous, isotropic aquifer conditions, and horizontal flow.

Fluctuations in the level of the water table may occur due to factors not accounted for at the time of measurement.

Water table contours are interpolated between data points, and inferred in other areas.



Legend

- Approximate Property Line
- SS --- Sanitary Sewer Line
- SW --- Storm Sewer Line
- W --- Water Line
- NG --- Natural Gas Line
- OE --- Overhead Electric Line
- ⊙ Manhole
- ⊞ Catchbasin
- ⊙ Water Gate
- ⊙ Fire Hydrant
- ⊙ Utility Pole
- ⊙ Monitoring Well
- ⊙ Soil Boring
- △ Monitoring Well (KES)
- ECS-1 Well I.D.
- ⊙ 4" Recovery Well
- ⊙ Destroyed Monitoring Well
- Proposed System Trenching
- Excavation to assess joint in line
- WO Waste Oil AST
- FO Fuel Oil AST
- VMO Virgin Motor Oil AST
- Approximate location of (2) 1,000-gallon abandoned USTs under the building, USTs filled with grout in April 1988.
- BP-2 Monitoring Well ID
- 93.77 Water Table Elevation
- 90.0 Water Table Contour (Dashed where Inferred)
- Flow Direction Indicator

General Notes:

All locations, dimensions, and property lines depicted on this plan are approximate. This plan should not be used for construction or land conveyance purposes.

Base plan taken from Bennett & O'Reilly, Inc. plan job # B004-4169.

5,000-gallon gasoline USTs installed 1989
4,000-gallon diesel UST installed 1989



588 Silver Street • Agawam, MA 01001
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ecsconsult.com

PROJECT:

Eagle Gas

131 Main Street - Route 58
Carver, Massachusetts

TITLE:

GROUNDWATER CONTOUR PLAN: 4/17/06

CLIENT:

Najib Badaoui

GRAPHIC SCALE:

20 10 0 10 20

COMPUTER CADFILE: 204082SPR.DWG

DRAWN BY: DESIGNED BY: CHECKED BY: APPROVED BY:

RAS/JH CEK CEK CEK

SCALE: DATE: JOB NO.: FIGURE NO.:

1" = 20' OCT 2006 204082 5

TABLES

TABLE 1
SUMMARY OF STATIC GROUNDWATER GAUGING and ELEVATION DATA

131 Main Street, Carver, Massachusetts
MADEP RTN: 4-17582
06/12/03 to 10/17/06

Well Location & Elevation (Feet)	Gauge Date	Depth to Water (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to Top of Screen	Depth to Bottom of Well (feet)	Comments
BP-01	6/12/2003	5.95	-	0.00	NA		13.45	*
	4/6/2005	5.40	-	0.00	NA		13.45	*
	8/18/2005	8.05	-	0.00	NA			
	4/17/2006	6.22	-	0.00	NA			
	4/29/2006	6.52	-	0.00	NA			***
	5/31/2006	6.04	-	0.00	NA			
	7/21/2006	6.33	-	0.00	NA			
	9/29/2006	7.11	-	0.00	NA			
BP-02 99.78	6/12/2003	6.14	-	0.00	93.64		13.85	*
	4/6/2005	5.00	-	0.00	94.78		13.85	*
	8/18/2005	8.38	-	0.00	91.40			
	8/24/2005	8.35	-	0.00	91.43		13.40	
	9/14/2005	7.52	-	0.00	92.26		13.54	
	2/3/2006	4.54	-	0.00	95.24			
	4/17/2006	6.01	-	0.00	93.77			
	4/29/2006	6.07	-	0.00	93.71			***
	5/31/2006	5.91	-	0.00	93.87			
	9/29/2006	7.01	-	0.00	92.77			
	6/12/2003	5.42	-	0.00	NA		13.52	*
	9/29/2006	6.48	-	0.00	NA			
BP-03 Not Found at Survey	6/12/2003	5.77	-	0.00	NA		9.50	*
	4/17/2006	6.16	-	0.00	NA		9.50	
	5/31/2006	5.91	-	0.00	NA			
	10/17/2006	7.03	-	0.00	NA		8.24	
	4/24/2003	9.94	3.67	6.27	94.89		11.30	*
BP-05RR 99.81	5/14/2003			6.67			10.72	*
	8/26/2004		5.97	3.60				*
	10/7/2004		5.67	3.83				*
	8/18/2005	8.90	5.88	3.02	93.33			
	9/14/2005	6.28	-	0.00	93.53		8.70	
	9/22/2005	6.62	-	0.00	93.19			
	8/18/2005	8.00	-	0.00	91.95			
	9/22/2005	6.32	-	0.00	93.63			
BP-06 99.95	4/17/2006	5.96	-	0.00	93.99			
	4/29/2006	7.26	-	0.00	92.69			***
	5/31/2006	5.70	-	0.00	94.25			
	6/12/2003	5.98	-	0.00	94.26		12.05	*
	4/6/2005	5.00	-	0.00	95.24		11.60	*
DCW-01 100.24	9/14/2005	7.45	-	0.00	92.79		11.60	
	9/22/2005	6.54	6.53	0.01	93.71			
	10/28/2005	5.10	-	0.00	95.14			
	11/30/2005	5.45	-	0.00	94.79			
	12/30/2005	5.50	-	0.00	94.74		11.91	
	1/18/2006	4.26	-	0.00	95.98		11.91	
	2/3/2006	8.04	-	0.00	92.20			
	3/1/2006	6.17	5.84	0.33	94.33		11.45	
	3/28/2006	6.24	6.23	0.01	94.01		11.45	
	4/17/2006	6.31	-	0.00	93.93		11.45	
	4/29/2006	6.55	-	0.00	93.69			
	5/31/2006	6.08	-	0.00	94.16			
	7/21/2006	6.37	6.36	0.01	93.88			
	9/29/2006	7.28	-	0.00	92.96			

TABLE 1
SUMMARY OF STATIC GROUNDWATER GAUGING and ELEVATION DATA

131 Main Street, Carver, Massachusetts
MADEP RTN: 4-17582
06/12/03 to 10/17/06

Well Location & Elevation (Feet)	Gauge Date	Depth to Water (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to Top of Screen	Depth to Bottom of Well (feet)	Comments
DCW-02 100.13	6/12/2003	5.79	-	0.00	94.34		11.40	*
	4/6/2005	5.32	-	0.00	94.81		12.36	*
	8/18/2005	8.38	-	0.00	91.75			
	8/24/2005	8.49	-	0.00	91.64		12.30	
	9/22/2005	6.55	-	0.00	93.58			
	12/30/2005	5.33	-	0.00	94.80		11.90	
	1/18/2006	5.29	-	0.00	94.84		11.90	
	2/3/2006	5.22	-	0.00	94.91			
	3/1/2006	5.52	-	0.00	94.61			
	3/28/2006	6.21	-	0.00	93.92			
	4/17/2006	6.20	-	0.00	93.93			
	4/29/2006	6.59	-	0.00	93.54			***
	5/31/2006	5.98	-	0.00	94.15			
	9/29/2006	7.27	-	0.00	92.86			
DCW-03 99.12	6/12/2003	4.90	-	0.00	94.22		10.80	*
	4/6/2005	4.52	-	0.00	94.60		11.00	*
	8/18/2005	7.38	-	0.00	91.74			
	8/25/2005	7.41	-	0.00	91.71		10.90	
	3/1/2006	4.91	-	0.00	94.21		10.91	
DCW-04 100.18	4/17/2006	7.39	-	0.00	91.73		10.91	***
	9/29/2006	6.23	-	0.00	92.89			
	8/26/2004	7.12	-	0.00	92.00		12.60	*
	10/7/2004	6.84	-	0.00	93.34			*
	4/6/2005	5.18	-	0.00	93.94		12.70	*
	8/18/2005	8.30	-	0.00	91.88			
	8/24/2005	8.39	-	0.00	91.79		13.30	
	9/14/2005	7.54	-	0.00	92.64		13.10	
	9/22/2005	6.60	-	0.00	93.58			
	10/28/2005	5.11	-	0.00	95.07			
DCW-05 100.49	2/3/2006	5.90	-	0.00	94.28			
	3/1/2006	5.96	-	0.00	94.22		13.10	
	4/29/2006	7.07	-	0.00	93.11			
	5/31/2006	6.21	-	0.00	93.97			
	9/29/2006	7.29	-	0.00	92.89			
	8/26/2004	5.60	-	0.00	94.58		11.95	*
	10/7/2004	5.31	-	0.00	94.87			*
	4/6/2005	3.64	-	0.00	96.54		11.50	*
	8/18/2005	6.64	-	0.00	93.85			
	9/22/2005	5.34	-	0.00	95.15			
DCW-06 100.74	3/1/2006	4.41	-	0.00	96.08		11.39	
	4/29/2006	5.29	-	0.00	95.20			***
	10/17/2006	5.66	-	0.00	94.83		12.11	
	8/26/2004	6.57	-	0.00	94.17		12.30	*
	10/7/2004	6.28	-	0.00	94.46			*
	4/6/2005	3.62	-	0.00	97.12		12.60	*
	8/18/2005	7.45	-	0.00	93.29			
	8/22/2005	7.45	-	0.00	93.29		13.90	
	8/24/2005	7.69	-	0.00	93.05		14.00	
	3/1/2006	5.96	-	0.00	94.78		13.10	
	9/22/2005	6.21	-	0.00	94.53			
	11/30/2005	4.35	-	0.00	96.39			
	12/30/2005	4.39	-	0.00	96.35		13.90	
	1/18/2006	3.67	-	0.00	97.07		13.90	
	2/3/2006	6.81	-	0.00	93.93			
	3/1/2006	4.83	-	0.00	95.91		13.94	
	3/28/2006	5.34	-	0.00	95.40			
	4/17/2006	5.23	-	0.00	95.51			
	4/29/2006	6.13	-	0.00	94.61			***
	5/31/2006	4.81	-	0.00	95.93			
	7/21/2006	5.11	-	0.00	95.63			
	9/29/2006	6.63	-	0.00	95.63			

TABLE 1
SUMMARY OF STATIC GROUNDWATER GAUGING and ELEVATION DATA

131 Main Street, Carver, Massachusetts
MADEP RTN: 4-17582
06/12/03 to 10/17/06

Well Location & Elevation (Feet)	Gauge Date	Depth to Water (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to Top of Screen	Depth to Bottom of Well (feet)	Comments
DCW-07	8/26/2004	8.19	6.87	1.32	93.65		12.20	*
	10/7/2004	12.78	5.79	6.99	93.59			*
	8/18/2005	14.35	6.55	7.80	92.67			
100.78	8/22/2005	14.11	6.86	7.25	92.47		14.35	
	8/25/2005	10.03	7.69	2.34	92.62		14.35	
	8/26/2005	10.25	7.70	2.55	92.57		14.35	
	9/14/2005	13.50	6.34	7.16	93.01		14.35	
	9/22/2005	8.94	6.06	2.88	94.14			
	10/28/2005	5.05	3.78	1.27	96.75			
	11/30/2005	4.15	-	0.00	96.63			
	12/30/2005	4.79	-	0.00	95.99		11.81	
	1/18/2006	4.12	3.81	0.31	96.91		11.81	
	2/3/2006	5.55	4.82	0.73	95.81			
	3/1/2006	5.96	5.04	0.92	95.56		12.00	
	3/28/2006	6.39	5.89	0.50	94.79			
	4/17/2006	6.22	6.07	0.15	94.68			
	4/29/2006	6.27	6.26	0.01	94.52			
	5/31/2006	7.63	5.42	2.21	94.92			
	7/21/2006	6.22	5.69	0.53	94.98			
	9/29/2006	7.32	7.17	0.15	93.58			
	10/17/2006	7.08	7.02	0.06	93.75		11.81	
DCW-08	4/6/2005	5.60	-	0.00	NA		13.60	*
	8/18/2005	8.80	-	0.00	NA			
	8/24/2005	8.87	-	0.00	NA		13.32	
	11/30/2005	4.80	-	0.00	NA			
	2/3/2006	5.48	-	0.00	NA			
	3/1/2006	6.27	-	0.00	NA		13.23	
	5/31/2006	6.66	-	0.00	NA			
	9/29/2006	7.77	-	0.00	NA			
DCW-09	8/18/2005	8.34	-	0.00	91.82			
	8/24/2005	8.33	-	0.00	91.83		11.62	
	11/30/2005	5.39	-	0.00	94.77			
	12/30/2005	5.69	-	0.00	94.47		11.61	
	1/18/2006	5.61	-	0.00	94.55		11.61	
	2/3/2006	5.15	-	0.00	95.01			
	3/1/2006	6.06	-	0.00	94.10		10.43	
	4/17/2006	6.42	-	0.00	93.74		10.43	
	4/29/2006	6.77	-	0.00	93.39			***
	5/31/2006	6.31	-	0.00	93.85			
DCW-10	8/18/2005	8.38	-	0.00	91.77			
	8/24/2005	8.45	-	0.00	91.70		11.13	
	9/14/2005	7.57	-	0.00	92.58		11.40	
	11/30/2005	5.20	-	0.00	94.95			
	12/30/2005	5.35	-	0.00	94.80		11.45	
	1/18/2006	5.98	-	0.00	94.17		11.45	
	2/3/2006	4.94	-	0.00	95.21			
	3/1/2006	5.92	-	0.00	94.23		11.34	
	4/17/2006	6.40	-	0.00	93.75		11.34	
	4/29/2006	6.70	-	0.00	93.45			***
	5/31/2006	6.25	-	0.00	93.90			
	7/21/2006	6.49	-	0.00	93.66			
	9/29/2006	7.81	-	0.00	92.34			
	8/25/2005	7.30	-	0.00	92.89		14.20	
ECS-01	9/1/2005	6.37	-	0.00	93.82			
	9/14/2005	6.78	-	0.00	93.41		14.50	
	9/22/2005	5.67	-	0.00	94.52			
	10/28/2005	4.43	-	0.00	95.76			
	11/30/2005	4.21	-	0.00	95.98			
	12/30/2005	4.35	-	0.00	95.84		14.28	
	1/18/2006	3.98	-	0.00	96.21		14.28	
	2/3/2006	3.96	-	0.00	96.23			
	3/1/2006	4.69	-	0.00	95.50		14.33	
	3/28/2006	5.20	-	0.00	94.99		14.33	
	4/17/2006	5.27	-	0.00	94.92		14.33	
	4/29/2006	5.47	-	0.00	94.72			
	5/31/2006	4.82	-	0.00	95.37			
	7/21/2006	5.13	-	0.00	95.06			
	9/29/2006	6.54	-	0.00	93.65			

TABLE 1
SUMMARY OF STATIC GROUNDWATER GAUGING and ELEVATION DATA

131 Main Street, Carver, Massachusetts
MADEP RTN: 4-17582
06/12/03 to 10/17/06

Well Location & Elevation (Feet)	Gauge Date	Depth to Water (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to Top of Screen	Depth to Bottom of Well (feet)	Comments
ECS-02 100.41	8/26/2005	7.50	-	0.00	92.91		15.20	
	9/1/2005	5.90	-	0.00	94.51			
	9/14/2005	6.78	-	0.00	93.63		15.18	
	9/22/2005	5.98	5.97	0.01	94.44			
	10/28/2005	4.25	-	0.00	96.16			
	12/30/2005	4.51	-	0.00	95.90		14.60	
	1/18/2006	3.97	-	0.00	96.44		14.60	
	3/1/2006	4.05	-	0.00	96.36		14.57	
	3/28/2006	5.39	-	0.00	95.02		14.57	
	4/17/2006	5.55	-	0.00	94.86		14.57	
	4/29/2006	5.76	-	0.00	94.65			
	5/31/2006	5.25	-	0.00	95.16			
	7/21/2006	5.36	-	0.00	95.05			
	9/29/2006	6.45	-	0.00	93.96			
ECS-03 100.45	9/1/2005	7.90	7.88	0.02	92.57			
	9/14/2005	7.15	-	0.00	93.30		14.30	
	9/22/2005	6.32	6.31	0.01	94.14			
	10/28/2005	3.95	3.74	0.21	96.67			
	11/30/2005	4.35	-	0.00	96.10			
	12/30/2005	4.80	-	0.00	95.65		11.96	
	1/18/2006	5.16	-	0.00	95.29		11.96	
	2/3/2006	4.25	4.05	0.20	96.36			
	3/1/2006	5.25	5.21	0.04	95.23		11.91	
	3/28/2006	6.00	5.92	0.08	94.51		11.91	
	4/17/2006	6.25	6.21	0.04	94.23		11.91	
	4/29/2006	6.46	6.40	0.06	94.04			
	5/31/2006	7.75	5.98	1.77	94.12			
	7/21/2006	6.78	6.18	0.60	94.15			
	9/29/2006	7.37	7.27	0.10	93.16			
ECS-04 99.99	10/17/2006	7.70	7.12	0.58	93.21		11.96	
	9/1/2005	6.54	-	0.00	93.45			
	9/14/2005	7.18	-	0.00	92.81		12.90	
	9/22/2005	6.24	6.24	0.00	93.75			
	10/28/2005	4.63	4.61	0.02	95.38			
	11/30/2005	4.52	-	0.00	95.47			
	12/30/2005	4.69	-	0.00	95.30		11.69	
	1/18/2006	4.10	-	0.00	95.89		11.69	
	2/3/2006	5.70	-	0.00	94.29			
	3/1/2006	4.70	-	0.00	95.29		11.78	
	3/28/2006	5.64	-	0.00	94.35		11.78	
	4/17/2006	6.03	5.94	0.09	94.03		11.78	
	4/29/2006	6.17	6.09	0.08	93.88			
	5/31/2006	5.32	-	0.00	94.67			
	7/21/2006	5.74	5.70	0.04	94.28			
ECS-05 100.13	9/29/2006	6.81	-	0.00	93.18			
	10/17/2006	7.67	-	0.00	92.32		11.69	
	9/1/2005	8.52	6.45	2.07	93.27			
	9/14/2005	12.10	6.71	5.39	92.34		13.60	
	9/22/2005	10.98	5.86	5.12	93.25			
	10/28/2005	4.60	3.70	0.90	96.25			
	12/30/2005	5.08	3.95	1.13	95.95		11.95	
	1/18/2006	4.65	-	0.00	95.48		11.95	
	2/3/2006	7.10	4.50	2.60	95.11			
	3/1/2006	6.62	4.43	2.19	95.26		11.94	
	3/28/2006	5.95	5.10	0.85	94.86		11.94	
	4/17/2006	5.52	5.31	0.21	94.78		11.94	
	4/29/2006	6.14	5.50	0.64	94.50			
	5/31/2006	6.38	4.73	1.65	95.07			****
	7/21/2006	5.12	5.09	0.03	95.03			****
ECS-07 99.25	9/29/2006	8.62	5.62	3.00	93.91			****
	10/17/2006	11.95	5.43	6.52	93.40		11.95	****
	9/14/2005	8.50	-	0.00	90.75		17.70	
	11/30/2005	6.65	-	0.00	92.60		17.92	
	3/1/2006	7.40	-	0.00	91.85			
	4/17/2006	7.40	-	0.00	91.85			
	5/31/2006	7.55	-	0.00	91.70			
	9/29/2006	9.01	-	0.00	90.24			

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131 Main Street, Carver, Massachusetts
MADEP RTN: 4-17582
06/12/03 to 10/17/06

Well Location & Elevation (Feet)	Gauge Date	Depth to Water (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to Top of Screen	Depth to Bottom of Well (feet)	Comments
ECS-08 100.5	9/1/2005	6.71	6.70	0.01	93.80			
	9/14/2005	6.97	-	0.00	93.53		14.50	
	9/22/2005	6.19	-	0.00	94.31			
	10/28/2005	4.25	-	0.00	96.25			
	11/30/2005	3.85	-	0.00	96.65			
	12/30/2005	4.51	-	0.00	95.99		11.21	
	1/18/2006	3.95	-	0.00	96.55		11.21	
	2/3/2006	3.90	-	0.00	96.60			
	3/1/2006	5.20	-	0.00	95.30		12.15	
	3/28/2006	6.00	-	0.00	94.50			
	4/17/2006	6.28	-	0.00	94.22			
	4/29/2006	6.47	-	0.00	94.03			
	5/31/2006	5.49	-	0.00	95.01			
	7/21/2006	5.49	-	0.00	95.01			
	9/29/2006	7.63	-	0.00	92.87			
ECS-09 100.26	9/1/2005	6.44	-	0.00	93.82			
	9/14/2005	6.79	-	0.00	93.47		14.80	
	9/22/2005	5.78	-	0.00	94.48			
	10/28/2005	4.02	-	0.00	96.24			
	11/30/2005	4.40	-	0.00	95.86		14.32	
	12/30/2005	4.40	-	0.00	95.86		14.45	
	1/18/2006	3.89	-	0.00	96.37		14.45	
	2/3/2006	3.88	-	0.00	96.38			
	3/1/2006	4.56	-	0.00	95.70		14.32	
	3/28/2006	5.38	5.34	0.04	94.91			
	4/17/2006	5.42	-	0.00	94.84			
	4/29/2006	5.69	5.67	0.02	94.59			
	5/31/2006	5.01	-	0.00	95.25			
	7/21/2006	5.32	-	0.00	94.94			
	9/29/2006	6.85	-	0.00	93.41			
ECS-10 99.8	9/1/2005	7.26	6.33	0.93	93.28			
	9/14/2005	10.20	6.22	3.98	92.78		12.30	
	9/22/2005	10.43	5.15	5.28	93.59			
	12/30/2005	5.30	-	0.00	94.50		12.43	**
	1/18/2006	6.18	-	0.00	93.62		12.43	**
	2/3/2006	2.57	-	0.00	97.23			**
	3/1/2006	7.65	-	0.00	92.15		11.34	**
	4/17/2006	8.46	5.21	3.25	93.94		11.34	
	4/29/2006	7.69	5.63	2.06	93.76		11.34	
	5/31/2006	10.03	6.34	3.69	92.72			
	7/21/2006	9.90	6.35	3.55	92.82			**
	9/29/2006	NM						**
ECS-11	10/17/2006	10.76	8.52	2.24	90.83		12.43	
	12/30/2005	5.79	-	0.00	NA		12.40	
	1/18/2006	4.14	-	0.00	NA		12.40	
	2/3/2006	8.57	8.55	0.02	NA			
	3/1/2006	5.94	5.88	0.06	NA		10.99	
	3/28/2006	6.59	6.45	0.14	NA			
	4/17/2006	6.56	6.55	0.01	NA			
	4/29/2006	6.77	6.74	0.03	NA			
	5/31/2006	6.40	6.35	0.05	NA			
	7/21/2006	6.66	6.59	0.07	NA			
EOW-01	9/29/2006	7.65	7.64	0.01	NA			
	10/17/2006	7.56	7.53	0.03	NA		12.40	
	8/25/2005	>8.0	-	0.00	NA		8.00	
	11/30/2005	5.10	5.08	0.02	NA			
	12/30/2005	5.20	-	0.00	NA		8.03	
	1/18/2006	4.64	-	0.00	NA		8.03	
	2/3/2006	6.54	-	0.00	NA			
	3/1/2006	5.45	5.40	0.05	NA		8.05	
	3/28/2006	5.94	5.88	0.06	NA		8.05	
	4/17/2006	5.93	-	0.00	NA		8.05	
EOW-2	4/29/2006	6.74	6.73	0.01	NA			
	5/31/2006	5.66	5.65	0.01	NA			
	7/21/2006	5.93	5.90	0.03	NA			
	9/29/2006	7.93	7.89	0.04	NA			
	8/25/2005	8.32	-	0.00	NA			
	12/30/2005	5.70	-	0.00	NA		9.95	
	1/18/2006	5.06	-	0.00	NA		9.95	
	2/3/2006	6.75	-	0.00	NA			
	3/1/2006	5.91	-	0.00	NA			
	3/28/2006	6.35	-	0.00	NA			
	4/17/2006	6.42	-	0.00	NA			
	4/29/2006	6.63	-	0.00	NA			
	5/31/2006	5.14	-	0.00	NA			
	7/21/2006	6.37	-	0.00	NA			
	9/29/2006	7.39	-	0.00	NA			

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131 Main Street, Carver, Massachusetts
MADEP RTN: 4-17582
06/12/03 to 10/17/06

Well Location & Elevation (Feet)	Gauge Date	Depth to Water (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Corrected Groundwater Elevation (feet)	Depth to Top of Screen	Depth to Bottom of Well (feet)	Comments
ERW-01 100.04	8/26/2004	6.86	-	0.00	93.18		12.90	*
	10/7/2004	6.94	6.34	0.60	93.58			*
	8/18/2005	7.45	7.15	0.30	92.83			
	8/25/2005	7.73	7.49	0.24	92.50		12.70	
	9/1/2005	6.53	6.42	0.11	93.60			
	9/14/2005	6.70	-	0.00	93.34		12.70	
	9/22/2005	5.73	5.72	0.01	94.32			
	10/28/2005	4.38	4.10	0.28	95.88			
	11/30/2005	4.32	-	0.00	95.72			
	12/30/2005	5.51	4.40	1.11	95.42		12.70	
	1/18/2006	4.15	3.98	0.17	96.03		12.70	
	2/3/2006	4.41	3.95	0.46	96.00			
	3/1/2006	5.45	4.75	0.70	95.15		11.85	
	3/28/2006	5.93	5.36	0.57	94.57			
	4/17/2006	6.78	NM					**
	4/29/2006	6.73	NM					**
	5/31/2006	6.23	5.74	0.49	94.20			
	7/21/2006	6.63	5.59	1.04	94.24			
	9/29/2006	6.87	-	0.00	93.17			
	10/17/2006	7.14	6.83	0.31	93.15		12.70	
ERW-02 99.90	8/26/2004	7.32	7.03	0.29	92.81		12.80	*
	10/7/2004	9.58	6.30	3.28	92.94			*
	8/18/2005	8.85	8.58	0.27	91.27			
	8/25/2005	9.08	8.90	0.18	90.96		12.30	
	9/1/2005	7.45	7.42	0.03	92.47			
	9/14/2005	7.70	-	0.00	92.20		12.20	
	9/22/2005	7.04	6.93	0.11	92.95			
	10/28/2005	5.10	4.40	0.70	95.36			
	11/30/2005	4.79	-	0.00	95.11			
	12/30/2005	4.80	-	0.00	95.10		10.84	
	1/18/2006	5.13	4.02	1.11	95.66		10.84	
	2/3/2006	6.65	-	0.00	93.25			
	3/1/2006	5.43	5.24	0.19	94.62		10.92	
	3/28/2006	6.10	5.70	0.40	94.12			
	4/17/2006	6.93	6.78	0.15	93.09			
	4/29/2006	6.18	6.00	0.18	93.86			
	5/31/2006	5.77	5.55	0.22	94.31			
	7/21/2006	6.69	5.66	1.03	94.03			
	9/29/2006	6.93	6.76	0.17	93.11			
	10/17/2006	7.85	7.71	0.14	92.16		10.84	
ERW-03 99.57	8/26/2004	7.14	-	0.00	92.43		13.60	*
	10/7/2004	6.93	-	0.00	92.64			*
	8/18/2005	7.70	7.50	0.20	92.03			
	8/22/2005	7.75	7.55	0.20	91.98			
	9/1/2005	6.22	6.20	0.02	93.37			
	9/14/2005	6.88	-	0.00	92.69		13.20	
	9/22/2005	5.95	-	0.00	93.62			
	10/28/2005	4.75	-	0.00	94.82			
	11/30/2005	4.80	-	0.00	94.77			
	12/30/2005	4.85	-	0.00	94.72		12.96	
	1/18/2006	4.39	-	0.00	95.18		12.96	
	2/3/2006	4.55	-	0.00	95.02			
	3/1/2006	5.19	-	0.00	94.38		12.90	
	3/28/2006	5.65	-	0.00	93.92			
	4/17/2006	5.71	-	0.00	93.86			
	4/29/2006	6.70	-	0.00	92.87			
	5/31/2006	5.52	-	0.00	94.05			
	7/21/2006	5.73	-	0.00	93.84			
	9/29/2006	6.61	-	0.00	92.96			
ERW-04 99.58	8/26/2004	7.10	7.05	0.05	92.52		12.70	*
	10/7/2004	8.41	6.53	1.88	92.67			*
	8/18/2005	8.16	7.43	0.73	92.00			
	8/22/2005	9.45	8.70	0.75	90.73		13.20	
	8/25/2005	8.40	7.60	0.80	91.82		13.00	
	9/1/2005	6.63	6.08	0.55	93.39			
	9/14/2005	7.00	6.70	0.30	92.82		12.60	
	9/22/2005	9.47	5.86	3.61	93.00			
	10/28/2005	4.98	4.30	0.68	95.14			
	11/30/2005	4.65	-	0.00	94.93			
	12/30/2005	6.55	4.54	2.01	94.64		12.60	
	1/18/2006	6.02	4.81	1.21	94.53		12.60	
	2/3/2006	4.18	-	0.00	95.40			
	3/1/2006	5.75	4.99	0.76	94.44		12.02	
	3/28/2006	6.44	5.51	0.93	93.88		12.02	
	4/17/2006	5.84	5.67	0.17	93.88		12.02	
	4/29/2006	6.07	5.87	0.20	93.67			
	5/31/2006	7.77	7.46	0.31	92.06			
	7/21/2006	6.85	5.56	1.29	93.76			
	9/29/2006	6.62	6.61	0.01	92.97			
	10/17/2006	6.56	-	0.00	93.02		12.60	

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MADEP RTN: 4-17582
06/12/03 to 10/17/06

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FF-01	8/18/2005	8.25	-	0.00	91.85			
100.10	9/22/2005	6.59	-	0.00	93.51			
	10/17/2006	7.16	-	0.00	92.94		14.33	
FF-02	8/18/2005	7.65	-	0.00	90.00			
97.65	8/25/2005	8.32	-	0.00	89.33		10.10	
	9/22/2005	4.01	-	0.00	93.64			
FF-03	8/18/2005	6.10	-	0.00	90.09			
96.19	9/22/2005	4.77	-	0.00	91.42			
FF-04	8/18/2005	7.91	-	0.00	91.89			
99.80	9/22/2005	6.25	-	0.00	93.55			
FF-05	8/18/2005	6.21	-	0.00	91.80			
98.01	9/22/2005	4.48	-	0.00	93.53			
KEI-04	6/12/2003	4.16	-	0.00	96.78		12.30	*
100.94	8/18/2005	7.41	-	0.00	93.53			
	11/30/2005	3.00	-	0.00	97.94		11.95	
	2/3/2006	3.22	-	0.00	97.72			
	3/1/2006	4.46	-	0.00	96.48		11.90	
	4/29/2006	5.35	-	0.00	95.59			***
	5/31/2006	4.48	-	0.00	96.46			
	9/29/2006	6.52	-	0.00	94.42			
KEI-05	8/18/2005	>7.75	-	0.00	NA		7.75	
100.25	8/25/2005	>7.70	-	0.00	NA		7.70	
	9/14/2005	7.55	-	0.00	92.70		7.70	
	10/17/2006	>7.01	-	0.00	NA		7.01	
MW-A	6/12/2003	5.82	-	0.00	94.45		14.30	*
100.27	8/18/2005	8.50	-	0.00	91.77			
	8/24/2005	8.60	-	0.00	91.67		14.00	
	9/14/2005	7.80	-	0.00	92.47		14.00	
	9/22/2005	6.88	-	0.00	93.39			
	10/17/2006	7.34	-	0.00	92.93		13.86	

NA is not applicable, NM is Not Measured.

Corrected GW Elevation based on the density of diesel fuel, 0.8 gm/gm

* Completed by Decoulos

** Passive LNAPL Recovery Bailer in Well - LNAPL present in bailer

Survey Date - 09/22/05

Note: 2/3/06 event performed while EFR event was ongoing - not indicative of static measurements

*** = Measurement taken approximately 1 hr following initiation of EFR event

**** = Measurement suspect

Table 2
Historical Groundwater Analytical Data Summary: VPH and EPH
Eagle Gas, Inc., 131 Main Street, Carver, MA
RTN: 4-17582

Well	Date	Notes	Groundwater Elevation (ft)	EPH Carbon Fractions			EPH Diesel Target Analytes				VPH Target Analytes						VPH Carbon Fractions					
				C9-C18 Aliphatics (mg/L)	C19-C36 Aliphatics (mg/L)	C11-C22 Aromatics (mg/L)	Acenaphthene (ug/L)	Naphthalene (ug/L)	2-Methylnaphthalene (ug/L)	Phenanthrene (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)	Naphthalene (ug/L)	C5-C8 Aliphatics (mg/L)	C9-C12 Aliphatics (mg/L)	C9-C10 Aromatics (mg/L)			
Method 1 Groundwater Standards																						
GW-1							4	5	0.2	20	140	10	300	5	1,000	700	10,000	70	140	0.4	4	0.2
GW-2							1	NA	50	NS	1,000	10,000	NS	2,000	8,000	30,000	900	50,000	1,000	1	1	5
GW-3							20	20	30	5,000	20,000	3,000	50	10,000	4,000	4,000	500	50,000	20,000	4	20	4
BP-1	11/17/97	!		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	
	02/03/99	#		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	
	12/18/02	#		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0	<5.0	<5.0	<10.0	<5.0	<5.0	<0.020	<0.020	<0.020
	06/03/04	*		< 0.100	< 0.100	< 0.100	< 1.0	< 1.0	< 1.0	< 1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	07/20/04	#		ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	12/16/04	*		< 0.100	< 0.100	< 0.100	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	03/03/05	\$		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	04/06/05	*		< 0.100	< 0.100	< 0.100	< 1.0	< 1.0	< 1.0	< 1.0	<5.0	<5.0	<5.0	<10.0	<5.0	<20.0	<0.040	<0.015	<0.055	<0.040	<0.015	<0.055
	04/06/05	*		< 0.100	< 0.100	< 0.100	< 1.0	< 1.0	< 1.0	< 1.0	<5.0	<5.0	<5.0	<10.0	<5.0	<20.0	<0.040	<0.015	<0.055	<0.040	<0.015	<0.055
	06/08/05	\$		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BP-2	05/31/06			<0.2	<0.2	<0.2	<5.56	<5.56	<5.56	<5.56	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250	<0.0750	<0.0250	<0.0250
	09/29/06			<0.2	<0.2	<0.2	<5.38	<5.38	<5.38	<5.38	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.025.0	<0.0250	<0.0750	<0.0250	<0.0250
	11/17/97	!		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/03/99	#		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/18/02	#		NA	NA	NA	NA	NA	NA	NA	<1.0	<5.0	<5.0	<10.0	<5.0	<5.0	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
	05/21/03	*		0.192	0.100	0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<10.0	<5.0	<20.0	<0.040	<0.015	<0.055	<0.040	<0.015	<0.055
	06/03/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	ND	ND	ND	ND	16.8	ND	ND	ND	ND	ND	ND	ND
	07/20/04	#		ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	92.0	ND	ND	ND	ND	ND	ND	ND
	12/16/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	03/03/05	\$		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	04/06/05	*		< 0.100	< 0.100	< 0.100	< 1.0	< 1.0	< 1.0	< 1.0	<5.0	<5.0	<5.0	<10.0	<5.0	<20.0	<0.040	<0.015	<0.055	<0.040	<0.015	<0.055
	06/08/05	\$		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	08/24/05		91.43	<0.2	<0.2	<0.2	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	12.3	<5.0	<0.0750	<0.0250	<0.0250	<0.0750	<0.0250	<0.0250
05/31/06		93.87	<0.2	<0.2	<0.2	<5.68	<5.68	<5.68	<5.68	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.075	<0.025	<0.0250	<0.075	<0.025	<0.0250	
09/29/06		92.77	<0.2	<0.2	<0.2	<7.35	<7.35	<7.35	<7.35	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250	<0.0750	<0.0250	<0.0250	

Historical Groundwater Analytical Data Summary: VPH and EPH
Eagle Gas, Inc., 131 Main Street, Carver, MA
RTN: 4-17582

Well	Date	Notes	Groundwater Elevation (ft)	EPH Carbon Fractions			EPH Diesel Target Analytes				VPH Target Analytes						VPH Carbon Fractions		
				C9-C18 Aliphatics (mg/L)	C19-C36 Aliphatics (mg/L)	C11-C22 Aromatics (mg/L)	Acenaphthene (ug/L)	Naphthalene (ug/L)	2-Methylnaphthalene (ug/L)	Phenanthrene (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)	Naphthalene (ug/L)	C5-C8 Aliphatics (mg/L)	C9-C12 Aliphatics (mg/L)	C9-C10 Aromatics (mg/L)
Method 1 Groundwater Standards																			
GW-1				4	5	0.2	20	140	10	300	5	1,000	700	10,000	70	140	0.4	4	0.2
GW-2				1	NA	50	NS	1,000	10,000	NS	2,000	8,000	30,000	900	50,000	1,000	1	1	5
GW-3				20	20	30	5,000	20,000	3,000	50	10,000	4,000	4,000	500	50,000	20,000	4	20	4
BP-3	11/17/97	!		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/03/99	#		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/18/02	#		NA	NA	NA	NA	NA	NA	NA	<1.0	<5.0	<5.0	<10.0	6	<5.0	<0.020	<0.020	<0.020
	05/21/03	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<10.0	<5.0	<20.0	<0.040	<0.015	<0.055
	06/03/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
	07/20/04	#		ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/16/04	\$		ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	03/03/05	\$		ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	06/08/05	\$		ND	ND	ND	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
09/29/06			<0.2	<0.2	<0.2	<5.81	<5.81	<5.81	<5.81	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250	
BP-4	11/17/97	!		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	02/03/99	#		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	06/12/03	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<10.0	15.3	<20.0	<0.040	<0.015	<0.055
	05/31/06			<0.2	<0.2	<0.2	<5.68	<5.68	<5.68	<5.68	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.025	<0.025
	10/17/06			<0.2	<0.2	<0.2	<5.38	<5.38	<5.38	<5.38	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
BP4R	12/19/02	#		NA	NA	NA	NA	NA	NA	NA	<1.0	<5.0	<5.0	<10.0	<5.0	<5.0	<0.020	<0.020	<0.020
BP-5	11/17/1997	!		NA	NA	NA	NA	NA	NA	NA	1,100	2,600	1,900	11,300	4,700	370	11	24	3.4
	02/03/99	#		NA	NA	NA	NA	NA	NA	NA	<10	810.0	2,000	14,200	590	560	2	15	5.1
BP5RR	12/19/02	#		NA	NA	NA	NA	NA	NA	NA	<200,000	<1,000,000	<1,000,000	3,700,000	<1,000,000	3,300,000	23,000	35,000	73,000
BP-6	11/17/1997	!		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	60	ND	0.021	ND	ND
	02/03/99	#		NA	NA	NA	NA		NA	NA	2	11.0	25	168	56	76	0.110	0.270	0.170
	12/19/02	#		NA	NA	NA	NA	NA	NA	NA	<1.0	<5.0	<5.0	<10.0	480	<5.0	<0.020	<0.020	<0.020
BP-7	11/17/1997	!		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	2/3/1999	#		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/17/02	#		NA	NA	NA	NA	NA	NA	NA	<1.0	<5.0	<5.0	<10.0	<5.0	<5.0	<0.020	<0.020	<0.020
BP-9	11/17/1997	!		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	25	ND	0.350	0.690	0.440
	2/3/1999	#		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	1,100	ND	ND	ND	ND
				Destroyed during installation of concrete apron						Destroyed during installation of concrete apron									

Table 2
Historical Groundwater Analytical Data Summary: VPH and EPH
Eagle Gas, Inc., 131 Main Street, Carver, MA
RTN: 4-17582

Well	Date	Notes	Groundwater Elevation (ft)	EPH Carbon Fractions			EPH Diesel Target Analytes				VPH Target Analytes						VPH Carbon Fractions		
				C9-C18 Aliphatics (mg/L)	C19-C36 Aliphatics (mg/L)	C11-C22 Aromatics (mg/L)	Acenaphthene (ug/L)	Naphthalene (ug/L)	2-Methylnaphthalene (ug/L)	Phenanthrene (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)	Naphthalene (ug/L)	C5-C8 Aliphatics (mg/L)	C9-C12 Aliphatics (mg/L)	C9-C10 Aromatics (mg/L)
Method 1 Groundwater Standards																			
GW-1				4	5	0.2	20	140	10	300	5	1,000	700	10,000	70	140	0.4	4	0.2
GW-2				1	NA	50	NS	1,000	10,000	NS	2,000	8,000	30,000	900	50,000	1,000	1	1	5
GW-3				20	20	30	5,000	20,000	3,000	50	10,000	4,000	4,000	500	50,000	20,000	4	20	4
DCW-1 DUP (DCW-A)	6/12/03	*	94.26	<0.100	<0.100	0.15	<1.00	95.3	19.3	<1.00	11.7	1,030	1,500	10,310	6,380	446	<0.800	<0.300	5.41
	06/12/03	*		0.702	<0.100	0.104	<1.00	88.2	18.3	<1.00	9.40	1,110	1,580	11,140	5,930	442	<0.800	<0.300	5.65
	6/3/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/30/05		94.79	3.9	1.9	3.5	<5.88	117	60.2	<5.88	<200	1,220	1,610	8,400	37,400	3,920	7.13	63.2	64.7
	5/31/06		94.16	2.9	1.1	2.0	<5.35	81.5	47.5	<5.35	<250	<250	334	2,530	31,200	1,190	<7.50	18.8	17.0
	9/29/06		92.96	0.7	<0.2	1.2	<7.81	128	54.3	<7.81	<250	274	396	2,218	21,600	332	4.64	6.27	4.89
DCW-2	06/12/03	*	94.34	<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<10.0	243	<20.0	<0.040	<0.015	<0.055
	06/03/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/17/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	<5.0	<20.0	<0.040	<0.015	<0.055
	04/06/05	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5	<5	<5	<10	752	<20	3.38	0.0223	<0.055
	08/24/05		91.64	<0.2	<0.2	<0.2	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	1,240	<5.0	<0.0750	<0.0250	<0.0250
	05/31/06		94.15	0.2	<0.2	<0.2	<5.0	<5.0	<5.0	<5.0	<12.5	<12.5	<12.5	<37.5	2,230	<12.5	<0.375	<0.125	<0.125
DCW-3 DUP	09/29/06		92.86	<0.2	<0.2	<0.2	<6.67	<6.67	<6.67	<6.67	<25.0	<25.0	<25.0	<75.0	2,930	<25.0	<0.375	<0.125	<0.125
	06/12/03	*	94.22	<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<10.0	<5.0	<20.0	<0.040	<0.015	<0.055
	06/03/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
	06/03/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/17/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	<5.0	<20.0	<0.040	<0.015	<0.055
	04/06/05	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
DCW-4 DUP	08/25/05		91.71	<0.2	<0.2	<0.2	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	03/01/06		94.21	<0.2	<0.2	<0.2	<5.49	<5.49	<5.49	<5.49	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	09/29/06		92.89	<0.2	<0.2	<0.2	<6.76	<6.76	<6.76	<6.76	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	12/17/04	*		<0.100	<0.100	<0.100	<1.00	3.26	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
	04/06/05	*		<0.100	<0.100	<0.100	<1.00	4.23	<1.00	<1.00	<5.0	6.37	10.1	188.2	1,460	<20	0.772	<0.015	0.196
	04/06/05	*		<0.100	<0.100	<0.100	<1.00	7.16	2.47	<1.00	<5.0	6.74	9.72	176.1	1,450	<20	0.903	<0.015	0.192
DCW-5	08/24/05		91.79	<0.2	<0.2	0.2	<1.00	2.04	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	638	<5.0	<0.0750	<0.0250	<0.0250
	03/01/06		94.22	<0.2	<0.2	0.5	<6.25	7.1	<6.25	<6.25	<20.0	<20.0	<20.0	131.1	1,630	<20.0	<0.300	<0.100	0.188
	05/31/06		93.97	<0.2	<0.2	<0.2	<5.38	<5.38	<5.38	<5.38	<5.0	<5.0	<5.0	<15.0	594	<5.0	0.944	<0.025	<0.025
	09/29/06		92.89	<0.2	<0.2	<0.2	<6.49	<6.49	<6.49	<6.49	<5.0	<5.0	<5.0	23.4	225	8.1	0.131	0.167	0.150
	04/06/05	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
	03/01/06		96.08	<0.2	<0.2	<0.2	<5.21	<5.21	<5.21	<5.21	<5.0	<5.0	<5.0	<15.0	21.8	<5.0	<0.0750	<0.0250	<0.0250
	10/17/06		94.83	<0.2	<0.2	<0.2	<7.94	<7.94	<7.94	<7.94	<5.0	<5.0	<5.0	<15.0	5.4	<5.0	<0.0750	<0.0250	<0.0250

Historical Groundwater Analytical Data Summary: VPH and EPH
Eagle Gas, Inc., 131 Main Street, Carver, MA
RTN: 4-17582

Well	Date	Notes	Groundwater Elevation (ft)	EPH Carbon Fractions			EPH Diesel Target Analytes				VPH Target Analytes						VPH Carbon Fractions		
				C9-C18 Aliphatics (mg/L)	C19-C36 Aliphatics (mg/L)	C11-C22 Aromatics (mg/L)	Acenaphthene (ug/L)	Naphthalene (ug/L)	2-Methylnaphthalene (ug/L)	Phenanthrene (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)	Naphthalene (ug/L)	C5-C8 Aliphatics (mg/L)	C9-C12 Aliphatics (mg/L)	C9-C10 Aromatics (mg/L)
Method 1 Groundwater Standards																			
GW-1				4	5	0.2	20	140	10	300	5	1,000	700	10,000	70	140	0.4	4	0.2
GW-2				1	NA	50	NS	1,000	10,000	NS	2,000	8,000	30,000	900	50,000	1,000	1	1	5
GW-3				20	20	30	5,000	20,000	3,000	50	10,000	4,000	4,000	500	50,000	20,000	4	20	4
DCW-6 (GW-2)	12/17/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<10.0	30.6	<20.0	<0.040	<0.015	<0.055
	04/06/05	*		<0.100	<0.100	<0.100	<1.00	9.50	7.05	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/24/05		93.05	<0.2	<0.2	0.4	<1.00	32.5	23.4	<1.00	<5.0	<5.0	19.1	93.4	44.7	70.7	0.0934	0.212	0.486
	03/01/06		95.91	0.5	<0.2	0.8	<5.95	11.2	8.6	<5.95	<5.0	<5.0	<5.0	20.0	8.6	30.1	<0.075	0.130	0.254
	05/31/06		95.93	<0.2	<0.2	<0.2	<5.56	<5.56	<5.56	<5.56	<5.0	<5.0	<5.0	<15.0	37.3	17.9	<0.075	0.083	0.142
DCW-8	12/17/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
	04/06/05	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/24/05			<0.2	<0.2	<0.2	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	10.7	<5.0	<0.0750	<0.0250	<0.0250
	11/30/05			<0.2	<0.2	<0.2	<5.32	<5.32	<5.32	<5.32	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	03/01/06			<0.2	<0.2	<0.2	<5.32	<5.32	<5.32	<5.32	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
DCW-9	12/17/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<10.0	<5.0	<20.0	<0.040	<0.015	<0.055
	04/06/05	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/24/05		91.83	<0.2	<0.2	<0.2	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	11/30/05		94.77	<0.2	<0.2	<0.2	<5.68	<5.68	<5.68	<5.68	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	03/01/06		94.10	<0.2	<0.2	<0.2	<5.26	<5.26	<5.26	<5.26	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
DCW-10	04/06/05	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
	08/24/05		91.70	<0.2	<0.2	<0.2	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	11/30/05		94.95	<0.2	<0.2	<0.2	<5.49	<5.49	<5.49	<5.49	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
ECS-1	03/01/06		94.23	<0.2	<0.2	<0.2	<5.26	<5.26	<5.26	<5.26	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	11/30/05		95.98	<0.2	<0.2	0.7	<5.56	61.1	29.1	<5.56	63.5	7.1	106	30.6	5.1	182	0.508	0.370	0.827
	03/01/06		95.50	0.3	<0.2	0.90	<5.10	59.50	57.70	<5.10	77.4	14.4	98.1	36.8	<5.0	167	0.499	0.441	0.787
ECS-4	05/31/06		95.37	<0.2	<0.2	0.40	<5.38	44.6	41.8	<5.38	62.5	14.8	94.2	19.4	14.8	163	0.332	0.355	0.683
	03/01/06		95.29	1.70	0.60	2.10	<6.10	63.4	68.0	<6.10	352.0	127.0	127	280.7	4,760	153	<0.750	1.29	1.51
ECS-7	11/30/05		92.60	<0.2	<0.2	<0.2	<5.38	<5.38	<5.38	<5.38	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	03/01/06		91.85	<0.2	<0.2	<0.2	<5.32	<5.32	<5.32	<5.32	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	05/31/06		91.70	<0.2	<0.2	<0.2	<5.49	<5.49	<5.49	<5.49	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
ECS-8	05/31/06		95.01	0.40	0.20	0.60	<5.68	56.5	41.5	<5.68	35.2	5.3	51.1	86.3	18.7	20.1	0.3	0.5	1.0

Historical Groundwater Analytical Data Summary: VPH and EPH
Eagle Gas, Inc., 131 Main Street, Carver, MA
RTN: 4-17582

Well	Date	Notes	Groundwater Elevation (ft)	EPH Carbon Fractions			EPH Diesel Target Analytes				VPH Target Analytes						VPH Carbon Fractions		
				C9-C18 Aliphatics (mg/L)	C19-C36 Aliphatics (mg/L)	C11-C22 Aromatics (mg/L)	Acenaphthene (ug/L)	Naphthalene (ug/L)	2-Methylnaphthalene (ug/L)	Phenanthrene (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)	Naphthalene (ug/L)	C5-C8 Aliphatics (mg/L)	C9-C12 Aliphatics (mg/L)	C9-C10 Aromatics (mg/L)
Method 1 Groundwater Standards																			
GW-1				4	5	0.2	20	140	10	300	5	1,000	700	10,000	70	140	0.4	4	0.2
GW-2				1	NA	50	NS	1,000	10,000	NS	2,000	8,000	30,000	900	50,000	1,000	1	1	5
GW-3				20	20	30	5,000	20,000	3,000	50	10,000	4,000	4,000	500	50,000	20,000	4	20	4
EOW-2	08/25/05			<0.2	0.2	<0.2	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<15.0	17.7	<5.0	<0.0750	<0.0250	<0.0250
ERW-3	03/01/06		94.38	0.4	<0.2	0.8	<5.38	22.6	11.8	<5.38	17.6	59.2	33	1,143.0	1,230	69.3	0.869	0.813	1.45
MW-A (GW-2)	11/17/1997	!		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	2,300	ND	2.000	0.770	0.350
	2/3/1999	#		NA	NA	NA	NA	NA	NA	NA	110	ND	200	210	3,800	ND	ND	0.72	0.65
	12/19/02	#		NA	NA	NA	NA	NA	NA	NA	8	<5.0	9	8	350	<5.0	<0.020	<0.020	0.170
	05/21/03	*		<0.100	<0.100	<0.100	<1.00	8.21	1.30	<1.00	40.4	22.0	202	597	992	25.2	<0.040	<0.015	0.961
	06/03/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	12.0	<1.00	40.5	ND	173	108	1,730	37.1	ND	0.100	0.252
	08/24/05		91.67	<0.2	<0.2	0.2	<1.00	10.5	<1.00	<1.00	17.4	<5.0	58.7	<15.0	2,300	22	<0.0750	0.134	0.215
MW-1	10/17/06		92.93	<0.2	<0.2	<0.2	<5.21	<5.21	<5.21	<5.21	<5.0	<5.0	11.4	<15.0	71.4	11.1	<0.0750	0.111	0.171
	06/03/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	<5.0	<5.0	<5.0	<10.0	<5.0	<20.0	<0.040	<0.015	<0.055
KEI-4 (GW-2)	05/28/99	#		ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
	12/17/02	#		NA	NA	NA	NA	NA	NA	NA	<1.0	<5.0	<5.0	<10.0	<5.0	<5.0	<0.020	<0.020	<0.020
	06/03/04	*		<0.100	<0.100	<0.100	<1.00	<1.00	<1.00	<1.00	ND	ND	ND	ND	ND	ND	ND	ND	ND
	12/16/04	\$		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	5	ND	ND	ND
	06/08/05	\$		NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
	11/30/05		97.94	<0.2	<0.2	<0.2	<5.49	<5.49	<5.49	<5.49	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	03/01/06		96.48	<0.2	<0.2	<0.2	<5.75	<5.75	<5.75	<5.75	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
	09/29/06		94.42	<0.2	<0.2	<0.2	<6.85	<6.85	<6.85	<6.85	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0	<0.0750	<0.0250	<0.0250
KEI-5 (GW-2)	12/17/04	*		NA	NA	NA	NA	NA	NA	5	<5.0	<5.0	<15.0	162	<5.0	<0.040	0.0253	<0.055	
KEI-6	12/18/02	#		NA	NA	NA	NA	NA	NA	4	<5.0	8	7	230	24	<0.020	0.028	0.290	
FF-1	03/29/06	\$		NA	NA	NA	NA	NA	NA	NA	<1	<5	<5	<10	<5	<5	<0.020	<0.020	<0.020
	10/17/06		92.94	<0.2	<0.2	<0.2	<5.26	<5.26	<5.26	<5.26	<5.0	<5.0	<5.0	<15	<5.0	<5.0	<0.0750	<0.0250	<0.0250
FF-2	03/29/06	\$		NA	NA	NA	NA	NA	NA	NA	<1	<5	<5	<10	<5	<5	<0.020	<0.020	<0.020
FF-4	03/29/06	\$		NA	NA	NA	NA	NA	NA	NA	<1	<5	<5	<10	<5	<5	<0.020	<0.020	<0.020

Historical Groundwater Analytical Data Summary: VPH and EPH
Eagle Gas, Inc., 131 Main Street, Carver, MA
RTN: 4-17582

Well	Date	Notes	Groundwater Elevation (ft)	EPH Carbon Fractions			EPH Diesel Target Analytes				VPH Target Analytes						VPH Carbon Fractions		
				C9-C18 Aliphatics (mg/L)	C19-C36 Aliphatics (mg/L)	C11-C22 Aromatics (mg/L)	Acenaphthene (ug/L)	Naphthalene (ug/L)	2-Methylnaphthalene (ug/L)	Phenanthrene (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	MTBE (ug/L)	Naphthalene (ug/L)	C5-C8 Aliphatics (mg/L)	C9-C12 Aliphatics (mg/L)	C9-C10 Aromatics (mg/L)
Method 1 Groundwater Standards																			
GW-1				4	5	0.2	20	140	10	300	5	1,000	700	10,000	70	140	0.4	4	0.2
GW-2				1	NA	50	NS	1,000	10,000	NS	2,000	8,000	30,000	900	50,000	1,000	1	1	5
GW-3				20	20	30	5,000	20,000	3,000	50	10,000	4,000	4,000	500	50,000	20,000	4	20	4

Notes:

ug/L = Micrograms per Liter.
 NA = Not Applicable or Not Analyzed
 NS = Not Sampled
 NM = Not Measured
 Blank spaces - Analytical Data not yet obtained

GW-1 & GW-3 stds. Apply to all wells.
 GW-2 applies where noted

Analysis by MADEP VPH and/or EPH Method unless otherwise noted
 "<" indicates not detected above reporting limit of analytical method
 Bolded values are above applicable standards
 ! = Samples collected by Paulding, lab reports not reviewed
 \$ = samples collected by Bennett & O'Reilly, lab reports not reviewed
 # = Samples collected by Kaegael
 * = Samples collected by Decoulos
 Samples collected on August 24, 2005 & beyond by ECS

"- 11/97, 5/99, 7/04, 3/05 & 6/05 data taken from table in 10/17/05 Bennett & O'Reilly closure report for RTN 4-13333 laboratory reports not yet reviewed
 "- 2/99 data taken from table in Decoulos 3/17/03 IRAP, laboratory reports not obtained
 "- 06/03/04 VPH results taken from table in 11/05/04 Decoulos IRAP Mod, laboratory report pages not yet obtained

TABLE 3
SUMMARY OF POTABLE WELL SAMPLING ANALYTICAL RESULTS
EMPHASIS ON COMPOUNDS DETECTED POST 08/25/05
EAGLE GAS, Inc.
131 MAIN STREET, CARVER, MA
MADEP RTN: 4-17582

Well Location	Sampling Date	Analytes						
		MTBE (ug/L)	PCE (ug/L)	Benzene (ug/L)	Naphthalene (ug/L)	C9-C18 Aliphatic Hydrocarbons (mg/L)	C11-C22 Aromatic Hydrocarbons (mg/L)	
GW-1		70	5	5	140	4	0.2	
GW-2		50,000	50	2,000	1,000	1	50	
GW-3		50,000	30,000	10,000	20,000	20	30	
131 Main Street (Eagle)	02/03/99 !	27	0.8	ND	ND	NA	NA	
	12/16/04 \$	5	1	ND	ND	NA	NA	
	03/03/05 \$	5	0.8	ND	ND	NA	NA	
	06/08/05 \$	5	ND	ND	ND	NA	NA	
	08/25/05	3.4	2.0	<0.5	<0.5	NA	NA	
	10/28/05	2.7	2.2	<0.5	<0.5	<0.2	<0.2	
	03/01/06	2.6	0.9	<0.5	<0.5	NA	NA	
	3/29/06 \$	3.0	2.0	<0.5	<0.5	NA	NA	
	09/29/06	1.4	1.4	<0.5	<0.5	NA	NA	
132 Main Street (Holmes)	02/03/99 !	31	ND	9	ND	NA	NA	
	05/21/03	214	NA	5.37	<1.00	0.188	<0.100	
	07/20/04 #	ND	ND	ND	ND	NA	NA	
	New Well installed 12/16/2004	12/16/04 \$	ND	ND	ND	ND	NA	NA
		01/07/05 \$	ND	ND	ND	ND	NA	NA
		03/03/05 \$	ND	ND	ND	ND	NA	NA
		06/08/05 \$	ND	ND	ND	ND	NA	NA
		08/25/05	< 0.5	< 0.5	<0.5	<0.5	NA	NA
	03/29/06 \$	<0.5	<0.5	<0.5	<0.5	NA	NA	
	09/29/06	<0.5	<0.5	<0.5	<0.5	NA	NA	
133 Main Street (Malley)	02/03/99 !	ND	ND	ND	ND	NA	NA	
	05/21/03	<5.0	NA	<5.0	112	0.266	0.112	
	08/10/04 #	ND	ND	ND	ND	NA	NA	
	12/16/04 \$	ND	ND	ND	ND	NA	NA	
	06/08/05 \$	ND	ND	ND	ND	NA	NA	
	10/27/05	< 0.5	< 0.5	<0.5	<0.5	<0.2	<0.2	
	03/29/06 \$	< 0.5	< 0.5	<0.5	<0.5	NA	NA	
	09/29/06	<0.5	<0.5	<0.5	<0.5	NA	NA	
134 Main Street	02/03/99 !	ND	ND	ND	ND	NA	NA	
	08/10/04 #	ND	ND	ND	ND	NA	NA	
	10/28/05	< 0.5	< 0.5	<0.5	<0.5	<0.2	<0.2	
	03/29/06 \$	<0.5	<0.5	<0.5	<0.5	NA	NA	
	09/29/06	Water Ran Dry After 5 Minutes - Unable To Sample						

Notes:

ug/L = Micrograms per Liter

Samples analyzed via EPA Method 524.2

"<" indicates not detected above reporting limit of analytical method

MTBE - Methyl Tertiary Butyl Ether

PCE - Tetrachloroethylene

\$ = Samples collected by Bennett & O'Reilly

! = samples collected by Paulding

= Samples collected by Kaegel

Summary of MNA Measurements - Sampling/Monitoring
Eagle Gas, Inc.
131 Main Street, Carver, MA, MADEP RTN: 4-17582

Well ID	Date	Temperature (deg. C)	Specific Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Nitrate (mg/l)	Sulfate (mg/l)	Dissolved Iron (mg/l)
BP-1	5/31/06	12.83	144	8.64	1.52	686.5	1.31	6.94	0.0204
BP-2	8/24/05	15.75	250	5.84	4.37	237			
	5/31/06	12.50	100	4.55	1.05	695.5	<0.100	9.75	0.0322
	9/29/06	16.10	149	7.4	4.71	488.1	NA	NA	NA
BP-4	5/31/06	15.54	410	6.99	4.78	3,633	NA	NA	NA
BP-6	5/31/06	17.45	42	3.21	6.07	256.9	NA	NA	NA
DCW-1	11/30/05	14.93	2,114	2.46	4.27	396.3	<0.5	54.4	2.12
	5/31/06	13.94	2,977	1.82	5.37	143.3	<0.100	47.4	12.5
	9/29/06	18.84	4,114	1.17	5.01	330.09	NA	NA	NA
DCW-2	8/24/05	21.16	4,360	2.88	5.40	185	NA	NA	NA
	3/1/06	4.59	1,964	6.43	6.01	244	NA	NA	NA
	5/31/06	13.56	2,621	3.57	4.90	361.8	8.62	138	0.0176
	9/29/06	15.69	3,115	5.79	5.52	314.9	NA	NA	NA
DCW-3	8/25/05	18.97	643	1.91	5.27	-13	NA	NA	NA
	3/1/06	7.25	282	1.21	5.97	185.6	NA	NA	NA
	9/29/06	16.81	252	1.75	5.01	465.9	NA	NA	NA
DCW-4	8/24/05	20.82	1,620	1.21	4.32	-33	NA	NA	NA
	3/1/06	9.64	2,470	1.10	5.04	253	NA	NA	NA
	5/31/06	12.89	1,722	2.58	4.89	279.2	NA	NA	NA
DCW-5	3/1/06	7.89	598	5.78	4.58	154.4	NA	NA	NA
	10/17/06	16.65	114	1.64	5.17	3423	NA	NA	NA
DCW-6	8/24/05	18.21	250	1.49	4.48	-40	NA	NA	NA
	3/1/06	9.76	451	7.5	5.98	125.8	0.1	17.2	0.0237
	5/31/06	13.68	289	1.56	3.55	576.2	NA	NA	NA
DCW-8	8/24/05	16.66	144	5.14	4.70	105	NA	NA	NA
	11/30/05	11.59	162	7.72	5.64	220.5	1.12	8.52	<0.01
	3/1/06	7.8	247	8.39	5.87	162.5	1.09	10.6	<0.01
	9/29/06	15.16	163	5.48	5.57	323.6	NA	NA	NA
DCW-9	8/24/05	15.3	480	5.19	4.01	181	NA	NA	NA
	11/30/05	14.76	376	4.66	4.35	283.3	1.10	23.1	<0.01
	3/1/06	10	135	5.09	4.35	306	1.06	24	0.0158
DCW-10	8/24/05	18.42	1,020	1.60	4.00	200	NA	NA	NA
	11/30/05	15.13	371	5.04	4.55	241	1.13	13.6	0.0143
	3/1/06	9.78	385	7.53	4.42	295.2	1.1	19.2	0.0405

**Summary of MNA Measurements - Sampling/Monitoring
Eagle Gas, Inc.
131 Main Street, Carver, MA, MADEP RTN: 4-17582**

Well ID	Date	Temperature (deg. C)	Specific Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Nitrate (mg/l)	Sulfate (mg/l)	Dissolved Iron (mg/l)
ECS-1	11/30/05	15.03	1,198	0.32	5.76	94.7	<0.1	10.3	87.6
	3/1/06	8.9	1,451	0.35	5.75	-7.7	<0.1	6.5	119
	5/31/06	14.42	1,371	0.47	3.69	418.5	<0.100	5.66	59.2
ECS-4	3/1/06	8.25	2,668	0.02	6.21	-51.9	NA	NA	NA
ECS-7	11/30/05	12.31	254	5.22	5.53	277	0.0679	26.1	0.0413
	3/1/06	6.17	950	3.07	5.34	303.5	0.3	10.8	3.76
	5/31/06	14.05	689.9	1.53	1.27	689.6	NA	NA	NA
ECS-8	5/31/06	13.43	NM	NM	2.61	569.8	<0.100	18.9	2.05
FF-1	10/17/06	14.59	85	7.16	5.50	306.2	NA	NA	NA
MW-A	8/24/05	18.32	1,720	1.33	6.29	-14	NA	NA	NA
EOW-2	8/25/05	21.23	2,740	0.88	6.42	112	NA	NA	NA
KEI-4	11/30/05	12.28	146	4.53	5.04	265.9	<0.1	19.6	0.105
	3/1/06	6.59	185	2.01	5.23	141.9	NA	NA	NA
	9/29/06	17.09	106	3.49	4.49	506.3	NA	NA	NA
ERW-3	3/1/06	8.91	2,823	0.73	5.06	206.8	NA	NA	NA
SW-1 (outfall)	11/30/05	14.15	79	11.72	6.12	255.5	<0.1	<1.	0.0765

Notes

D.O. - dissolved oxygen

ORP - oxidation-reduction potential

mV - millivolts

NM - Not Measured

mg/L -milligrams per liter

deg. C - degress celsius

uS\cm - microsiemens per centimeter

Readings were recorded following stabilization and prior to groundwater sample collection

Table 4A
Summary of Natural Attenuation Analytical Parameters
Comparison of Literature and Empirical Data
 Eagle Gas, Inc.
 131 Main Street
 Carver, Massachusetts

Literature Summary

Well Location	DO	ORP	pH	Dissolved Iron	Nitrate	Sulfate
Upgradient Area	High	High	Neutral	Low	High	High
Target Area	Low	Low	Low	High	Low	Low
Downgradient Area	High	High	Neutral	Low	High	High
Aerobic Trends				Anaerobic Trends		

Well Location	DO	ORP	pH	Dissolved Iron	Nitrate	Sulfate
Upgradient Area	5.32	235.00	5.14	0.04	0.74	12.9
Target Area	1.01	166.79	5.14	66.98	<0.01	19.22
Downgradient Area	5.55	361.36	3.73	0.02	0.93	16.1
Conclusion	+	+	+/-	+	+/-	-

Notes:

DO- Dissolved Oxygen

ORP- Oxygen Reducing Potential

Upgradient Area- includes monitoring wells DCW-5, DCW-8 & KEI-4

Target Area- includes monitoring wells ECS-1, ECS-4, ERW-3, DCW-1 & EOW-2

Downgradient Area- includes monitoring wells DCW-9, DCW-10, BP-1 & BP-2

+ - natural attenuation is indicated by monitoring result

-- natural attenuation is not indicated by monitoring result

+/- - natural attenuation is inconclusive by monitoring result

Monitoring results is based on data collected from 8/24/05 to 09/29/06 as presented in Table 4.

Table 5: Volatile Organic Compounds
Historical Soil Sampling Results Summary
Eagle Gas 131 Main Street Carver, MA , RTN: 4-17582

Well	Date	Notes	Sample Depth	Headspace Screening	Benzene (ug/Kg)	Toluene (ug/Kg)	Ethylbenzene (ug/Kg)	Xylenes (ug/Kg)	MTBE (ug/Kg)	Naphthalene (ug/Kg)	C5-C8 Aliphatics (mg/Kg)	C9-C12 Aliphatics (mg/Kg)	C9-C10 Aromatics (mg/Kg)	C9-C18 Aliphatics (mg/Kg)	C19-C36 Aliphatics (mg/Kg)	C11-C22 Aromatics (mg/Kg)	Acenaphthene (ug/Kg)	Naphthalene (ug/Kg)	2-Methylnaphthalene (ug/Kg)	Phenanthrene (ug/Kg)
Method 1 Soil Standards																				
S-1 GW-1					2,000	30,000	80,000	400,000	100	4,000	100	1,000	100	1,000	2,500	200	20,000	4,000	4,000	700,000
S-1 GW-2					30,000	300,000	500,000	300,000	100,000	40,000	100	1,000	100	1,000	2,500	800	1,000,000	40,000	500,000	1,000,000
S-1 GW-3					30,000	500,000	500,000	300,000	100,000	500,000	100	1,000	100	1,000	2,500	800	1,000,000	500,000	500,000	100,000
ECS-1	08/22/05		5 ft.	675	<343	<343	<343	4,210	<343	15,900	52.6	238	293	NA	NA	NA	NA	NA	NA	NA
	08/22/05		10 ft.	307	<71.4	<71.4	<71.4	220	<71.4	2,920	12.4	39.4	41.0	NA	NA	NA	NA	NA	NA	NA
	08/22/05		15 ft.	250	<69.0	<69.0	<69.0	<207	<69.0	1,170	4.19	21.5	17.6	NA	NA	NA	NA	NA	NA	NA
EGS-2	12/10/04	*	8 ft.	6	<500	<500	<500	<500	<250	<1,000	<1.50	<0.50	<0.50	<10	<10	<10	<100	<50	<50	<50
EGS-3	12/10/04	***	7 ft.	103	<100	<100	142.0	784.0	3,000	<1,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EGS-4	12/10/04	*	6 ft.	3	<500	<500	<500	<500	<250	<1,000	<1.50	<0.50	<0.50	<10	<10	<10	<100	<50	<50	<50
EGS-7	12/10/04	*	6 ft.	2	<500	<500	<500	<500	<250	<1,000	<1.50	<0.50	<0.50	<10	<10	<10	<100	<50	<50	<50
EIS-1	12/16/04	*			<500	<500	<500	<500	<250	<1,000	<1.50	<0.50	<0.50	<10	<10	<10	<100	<50	<50	<50
EIS-2	12/16/04	*			<500	<500	<500	<500	<250	<1,000	<1.50	6.68	4.11	51.0	40.9	24.1	<100	<50	<50	<50
DCA	06/02/03	*	5-10 ft.		NA	NA	NA	NA	NA	NA	NA	NA	NA	2,680	1,080	1,610	284	2,130	9,460	2,170
DCB	06/02/03	*	5-10 ft.		<500	3,880	9,610	31,200	524	18,900	89.5	81.8	<1.50	7,960	2,840	3,530	717	4,720	25,500	6,240
DCD	06/02/03	*	5-10 ft.		<500	<500	<500	<1,000	<500	<500	59.9	<6.50	<1.50	62.2	37.6	18.8	<100	<50	<50	<50
DCE	06/02/03	*	5-10 ft.		1,420	15,000	29,700	121,000	4,930	62,800	167	216	<1.50	10,200	3,740	3,560	1,270	6,600	43,200	9,510
DCW-2	06/02/03	*	5-10 ft.		<500	<500	<500	<1000	<500	<100	64.3	<6.50	<1.50	<10.0	17.2	<10.0	<100	<50	<50	64.2
DCW-3	06/02/03	*	5-10 ft.		<500	<500	<500	<1000	<500	<100	52.5	<6.50	<1.50	<10.0	<10.0	<10.0	<100	<50	<50	<050
Left UST	04/16/98	**	6-7 ft.		<1000	<1000	6,590	118,300	<1000	9,150	537	1,830	1,010	NA	NA	NA	NA	NA	NA	NA
Right UST	04/16/98	**	6-7 ft.		<100	<100	<100	<200	<100	<100	0.250	0.338	<0.200	NA	NA	NA	NA	NA	NA	NA
Notes: ug/L = Micrograms per Liter NA = Not Applicable or Not Analyzed NS = Not Sampled NM = Not Measured * Collected by Decoulos mg/L = Milligram per Liter "<" indicates not detected above reporting limit of analytical method "***" indicates LNAPL present Bolded values are above applicable standards ** Locations of samples not determined Left UST refers to the southern most "abandoned in place" 1,000 gallon UST Right UST refers to the northern most "abandoned in place" 1,000 gallon UST																				

6
Historical Summary of Analytical Results - Surface Water
Eagle Gas
131 Main Street
Carver, Massachusetts
MADEP RTN: 4-17825 (Parent RTN: 4-17582)

Surface Water (SW) and Storm Water (MH) Samples

Sample Designation	Date	EPH Carbon Fractions			EPH Diesel Target PAH				VPH Carbon Fractions			VPH Target Analytes					
		C9-C18 Aliphatics (ng/L)	C19-C36 Aliphatics (ng/L)	C11-C22 Aromatics (ng/L)	Acenaphthene (ng/L)	Naphthalene (ng/L)	2-Methylnaphthalene (ng/L)	Phenanthrene (ng/L)	C5-C8 Aliphatics (ng/L)	C9-C12 Aliphatics (ng/L)	C9-C10 Aromatics (ng/L)	Benzene (ng/L)	Toluene (ng/L)	Ethylbenzene (ng/L)	Xylenes (ng/L)	MTBE (ng/L)	Naphthalene (ng/L)
MH-1	10/28/05	<0.2	<0.2	<0.2	< 5.49	< 5.49	< 5.49	< 5.49	NA	NA	NA	NA	NA	NA	NA	NA	NA
	01/18/06	<0.2	0.2	<0.2	<5.38	<5.38	<5.38	<5.38	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	03/01/06	<0.2	<0.2	<0.2	<5.32	<5.32	<5.32	<5.32	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	04/17/06	<0.2	<0.2	<0.2	<5.26	<5.26	<5.26	<5.26	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	05/31/06	<0.2	<0.2	<0.2	<5.68	<5.68	<5.68	<5.68	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	07/21/06	<0.2	<0.2	<0.2	<5.56	<5.56	<5.56	<5.56	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
MH-2	10/28/05	6.1	2.4	4.0	< 5.32	19.9	52	9.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12/30/05	0.9	0.4	0.5	<6.41	<6.41	<6.41	<6.41	<0.0750	0.0324	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	5.5
	01/18/06	0.9	0.4	0.8	<5.68	<5.68	<5.68	<5.68	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	03/01/06	<0.2	<0.2	<0.2	<5.26	<5.26	<5.26	<5.26	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	04/17/06	<0.2	<0.2	<0.2	<5.26	<5.26	<5.26	<5.26	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	05/31/06	<0.2	<0.2	<0.2	<6.58	<6.58	<6.58	<6.58	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	07/21/06	<0.2	<0.2	<0.2	<5.95	<5.95	<5.95	<5.95	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	09/29/06	<0.2	<0.2	<0.2	<5.21	<5.21	<5.21	<5.21	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
MH-3	01/18/06	3.6	1.7	2.2	<5.43	<5.43	<5.43	<5.43	0.075	0.0271	0.0407	<5.0	<5.0	<5.0	<15.0	<5.0	10.0
	04/17/06	<0.2	0.3	<0.2	<5.43	<5.43	<5.43	<5.43	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	05/31/06	<0.2	<0.2	<0.2	<5.49	<5.49	<5.49	<5.49	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	07/21/06	<0.2	<0.2	<0.2	<5.95	<5.95	<5.95	<5.95	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	09/29/06	<0.2	<0.2	<0.2	<6.10	<6.10	<6.10	<6.10	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
*SW Outfall	05/21/03	2.08	0.72	0.7	41.4	113	4,658	73.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-1 (or SW Outfall to boomed inlet to South Meadow Brook)	10/27/05	11.4	7.3	8.2	< 5.32	< 5.32	10.6	19.2	NA	NA	NA	NA	NA	NA	NA	NA	NA
	11/30/05	0.7	0.9	0.9	<5.68	<5.68	<5.68	<5.68	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	12/30/05	0.8	0.7	0.6	<5.26	<5.26	<5.26	<5.26	<0.0750	0.319	0.258	<5.0	<5.0	<5.0	<15.0	<5.0	27.4
	01/18/06	3.0	1.7	1.7	<5.49	<5.49	9.45	<5.49	<0.0750	0.0296	0.0518	<5.0	<5.0	<5.0	<15.0	<5.0	8.5
	04/17/06	<0.2	<0.2	<0.2	<5.26	<5.26	<5.26	<5.26	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	05/31/06	1.4	1.1	0.8	<6.49	<6.49	<6.49	<6.49	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
	07/21/06	1.6	0.5	0.7	<5.68	<5.68	<5.68	<5.68	<0.0750	<0.0250	<0.0250	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
SW-2 (outfall adj brook)	12/30/05	<0.2	<0.2	<0.2	<5.75	<5.75	<5.75	<5.75	<0.0750	0.0438	0.0258	<5.0	<5.0	<5.0	<15.0	<5.0	<5.0
SW-2 (up-stream)	10/27/05	<0.2	<0.2	<0.2	< 5.75	< 5.75	< 5.75	< 5.75	NA	NA	NA	NA	NA	NA	NA	NA	NA
SW-3 (down-stream)	10/27/05	<0.2	<0.2	<0.2	< 5.49	< 5.49	< 5.49	< 5.49	NA	NA	NA	NA	NA	NA	NA	NA	NA

6
Historical Summary of Analytical Results - Surface Water
Eagle Gas
131 Main Street
Carver, Massachusetts
MADEP RTN: 4-17825 (Parent RTN: 4-17582)

Sample Designation	Date	EPH Carbon Fractions			EPH Diesel Target PAH				VPH Carbon Fractions			VPH Target Analytes					
		C9-C18 Aliphatics (ng/L)	C19-C36 Aliphatics (ng/L)	C11-C22 Aromatics (ng/L)	Acenaphthene (ng/L)	Naphthalene (ng/L)	2-Methylnaphthalene (ng/L)	Phenanthrene (ng/L)	C5-C8 Aliphatics (ng/L)	C9-C12 Aliphatics (ng/L)	C9-C10 Aromatics (ng/L)	Benzene (ng/L)	Toluene (ng/L)	Ethylbenzene (ng/L)	Xylenes (ng/L)	MTBE (ng/L)	Naphthalene (ng/L)
DMH-A (MH-2?)	04/20/05	0.193	<0.100	<0.100	<1.00	3.27	4.30	<1.00	<0.040	<0.015	<0.055	<5	<5	<5	<10	23	<20
ESW-1	06/03/04	NA	NA	NA	<0.5	<0.75	<0.75	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESW-2	06/03/04	NA	NA	NA	<0.5	<0.75	<0.75	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESW-3	06/03/04	NA	NA	NA	<0.5	<0.75	<0.75	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
ESW-4	06/03/04	NA	NA	NA	<0.5	<0.75	<0.75	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
MADEP Ambient Water Quality Criteria																	
¹ Freshwater Chronic Values		-	-	-	520	620	-	6.3	-	-	-	-	-	-	-	-	620
¹ Freshwater Acute Values		-	-	-	1,700	2,300	-	30.0	-	-	-	5,300	17,500	32,000	-	-	2,300
² MADEP Recommended SWQG (Acute)		1.80	2.10	NA ³	-	-	-	-	0.25	1.80	0.54	-	-	-	-	-	-
⁴ Lowest AWQC		-	-	-	520	620	300	406	-	-	-	700	5,000	430	-	7,000	620

Notes:

¹ 310 CMR 40.1516 Environmental Toxicity Values - Ambient Water Quality Criteria - 10/2/99

² - From MADEP Policy #WSC 02-411 - 10/31/02

² - MADEP Recommended Surface Water Quality Guidelines (Acute)

NA³ - Effects may be seen at less than the EPH reporting limit

⁴ Background documentation for the development of the MCP numerical standards, 04/94
Lowest Ambient Water Quality Criteria (AWQC)

NA - Not Applicable/Not Analyzed

* Average of 3 samples (DC-A1, DC-B1 & DC-C1) collected from outfall on 5/21/03 by DeCoullos, IRAS 7/3/03.

SW-1 (12/30/05) collected adjacent to the outfall pipe

SW-2 (12/30/05) collected prior to intersection with stream

ESW-1 thru ESW-4 - collected by Decoullos, locations unknown (data presented in 11/05/04 IRA report)

DMH-A believed to be Manhole #2, sampled by Decoullos

MH - Manhole

SW - Surface Water

Table 7
Historical Summary of Analytical Results - Sediment Sampling
Eagle Gas
131 Main Street
Carver, Massachusetts
MADEP RTN: 4-17825 (Parent RTN: 4-17582)

Sample Designation	Date	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Xylenes (ug/kg)	MTBE (ug/kg)	Naphthalene (ug/kg)	C5-C8 Aliphatics (mg/kg)	C9-C12 Aliphatics (mg/kg)	C9-C10 Aromatics (mg/kg)	C9-C18 Aliphatics (mg/kg)	C19-C36 Aliphatics (mg/kg)	C11-C22 Aromatics (mg/kg)	Acenaphthene (ug/kg)	Naphthalene (ug/kg)	2-Methylnaphthalene (ug/kg)	Phenanthrene (ug/kg)
SS-1	10/27/05	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,330	1,260	1,250	< 355	< 355	< 355	< 355
ESE-1	06/03/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	398	402	316	<100	<50	716	1,300
ESE-2	06/03/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,480	1,240	826	<100	<50	1,060	4,380
ESE-3	06/03/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,800	1,450	1,410	<100	<50	1,930	4,470
ESE-4	06/03/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	494	408	356	<100	<50	<50	1,350
ESE-5	06/03/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	153	605	289	<100	<50	<50	404
ESE-6	06/03/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	<10.0	318	97	<100	<50	<50	325.0
ESE-7	06/03/04	NA	NA	NA	NA	NA	NA	NA	NA	NA	<10.0	272	103	<100	<50	<50	244
MADEP Recommended Freshwater Sediment Screening Values																	
Threshold Effects Concentrations (TECs)		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	176	NE	204

¹Threshold Effects Concentrations from MADEP technical update Freshwater Sediment Screening Benchmarks

Notes:

ug/kg = Micrograms per Kilogram

mg/kg = Milligrams per Kilogram

NE = Not Established

NA = Not Applicable or Not Analyzed

NS = Not Sampled

TABLE 8
SUMMARY OF FIELD SCREENING - MANHOLES AND CATCHBASINS
EAGLE GAS, Inc.
131 MAIN STREET, CARVER, MA
MADEP RTN: 4-17582

Location	Screening Date	PID (ppm)	% LEL
MH-1	10/28/05	<1	0
	07/21/06	<1	NA
MH-2	10/28/05	5.3	0
	07/21/06	<1	NA
MH-3	10/28/05	7.2	0
	07/21/06	<1	NA
CB-1	10/28/05	<1	0
CB-2	10/28/05	<1	0
CB-3	10/28/05	4.6	0
CB-4	10/28/05	5.1	0

Notes:
 MH - manhole
 CB - catchbasin
 ppm - parts per million
 PID - photoionization detector
 LEL - Lower Explosive Limit
 NA - Not Applicable

TABLE 9

SUMMARY OF EFR INFORMATION
EAGLE GAS, INC. 131 MAIN STREET, CARVER, MASSACHUSETTS
MADEP RTN: 4-17582

Date	Wells Extracted	Duration (hours)	Liquid Phase Summary		Vapor Phase Summary		
			Total Liquids Extracted (gallons)	Estimate LNAPL (gallons)	Average Air Flow (scfm)	Average TOV (ppm)	Air Hydrocarbon Mass Removed (estimated lbs)
9/22/2005	ECS-5, 8, 10						
	ERW-2, 4						
	DCW-7	5	537	NA	60	NR	
	BP-5RR						
10/31/2005	ECS-3, 5, 10						
	ERW-1, 2, 4	5.25	2,159	NA	58.18	2,983	13.8
	DCW-7						
11/1/2005	ECS-3, 5, 10						
	ERW-1, 2	5.75	2,703	NA	69.81	1,217	7.4
	DCW-7						
2/3/2006	ECS-3, 5, 8 & 10	7.5	3,502	NA	55.73	2,102	13.3
	ERW-1, 2 & 4						
3/28/2006	DCW-1 & 7	6	1,597	NA	131	914	10.9
	ECS-5 & 10						
	ERW-1, 2 & 4						
	EOW-1, ECS-8 & ECS-11 skimmed						
4/29/2006	DCW-7	5.5	1,300	NA	131	960	10.5
	ECS-3, 4, 5 & 10						
	ERW-1, 2 & 4						
8/15/2006	ERW-1, 2 & 4	4	1,204	NA	92.5		
	ECS-3, 5 & 10						
TOTALS		39	13,002	NA	85.46	1,635	56.0

NA = Not able to be determined. Sheen to skim observed on water within vacuum truck, LNAPL mixed with the water.
 NR = Not Recorded

TABLE 10
SUMMARY OF LNAPL/Groundwater Manually Removed from Wells
131 Main Street, Carver, Massachusetts
MADEP RTN: 4-17582

Well Identification	Date	LNAPL Thickness (feet)	Estimated Total LNAPL/Water Removed (Gallons)	Comments
BP-05RR	8/18/2005	3.02	0.50	LNAPL
DCW-01	3/1/2006	0.33	0.10	LNAPL
DCW-07	8/22/2005	7.25	1.5	LNAPL/Water mixture
	8/26/2005	2.55		Bailed unknown amount for 30min
	1/18/2006	3.00	0.1	LNAPL/Water mixture
	2/3/2006	0.73	1	LNAPL/Water mixture
	4/17/2006	0.15	0.1	LNAPL/Water mixture
	9/29/2006	0.15	0.5	LNAPL/Water mixture
ECS-03	2/3/2006	0.20	1	LNAPL/Water mixture
	3/1/2006	0.04	2.5	LNAPL/Water mixture
	4/17/2006	0.04	0.1	LNAPL/Water mixture
	5/31/2006	1.77	4	LNAPL/Water mixture
	9/29/2006	0.10	2	LNAPL/Water mixture
	10/17/2006	0.58	1	LNAPL/Water mixture
ECS-04	4/17/2006	0.09	0.25	LNAPL/Water mixture
ECS-05	12/30/2005	1.13	7	LNAPL/Water mixture
	3/1/2006	2.19	5	LNAPL/Water mixture
	4/17/2006	0.21	0.5	LNAPL/Water mixture
	5/31/2006	1.65	4	LNAPL/Water mixture
	9/29/2006	3 ⁺	5	LNAPL/Water mixture
	10/17/2006	6.52	5	Pure Product
ECS-10	11/30/2005	NA	2.5	Passive Bailer in Well
	12/30/2005	NA	1	Passive Bailer in Well
	1/18/2006	NA	2	Passive Bailer in Well
	3/1/2006	NA	4	Passive Bailer in Well
	4/17/2006	3.25	4	LNAPL/Water mixture
	5/31/2006	3.69	2.5	LNAPL
	10/17/2006	2.24	4.0	LNAPL/Water mixture
ECS-11	4/17/2006	0.01	0.1	LNAPL/Water mixture
ERW-01	1/18/2006	0.17	1	LNAPL/Water mixture
	3/1/2006	0.7	3	LNAPL/Water mixture
	5/31/2006	0.5	1.5	LNAPL/Water mixture
	10/17/2006	0.3	1.0	LNAPL/Water mixture
ERW-02	9/14/2005	-		Removed unknown amount
	1/18/2006	1.11	1.5	LNAPL/Water mixture
	1/18/2006	1.11	1.5	LNAPL/Water mixture
	5/31/2006	0.27	0.5	LNAPL/Water mixture
	10/17/2006	0.14	1.0	LNAPL/Water mixture
ERW-04	12/30/2005	2.01	5	LNAPL/Water mixture
	1/18/2006	1.21	2	LNAPL/Water mixture
	3/1/2006	0.76	2.5	LNAPL/Water mixture
	4/17/2006	0.17	1	LNAPL/Water mixture
	5/31/2006	0.31	0.25	LNAPL/Water mixture
EOW-01	9/29/2006	0.04	1.00	LNAPL/Water mixture
TOTAL BAILED Gallons			84.00	LNAPL/Water mixture

Table 11
Air Sampling Analytical Results Summary
Eagle Gas, Inc.
131 Main Street
Carver, MA
RTN: 4-17582

Sample ID	Date	Butadiene	Benzene (ug/m ³)	Toluene (ug/m ³)	Ethylbenzene (ug/m ³)	Total Xylenes (ug/m ³)	MTBE (ug/m ³)	Naphthalene (ug/m ³)	2-Methylnaphthalene (ug/m ³)	C5-C8 Aliphatics (ug/m ³)	C9-C12 Aliphatics (ug/m ³)	C9-C10 Aromatics (ug/m ³)
Residential Indoor Air Background values/Permissible Exposure Level												
MADEP		NA	21	29	10	72	3-18	5	NA	85	90	80
OSHA		2,210	3,190	754,000	434,000	434,000	144,000 ¹	52,400	NA	NA	NA	NA
AS-1	10/27/2005	<2.2	4.3	13.4	<2.2	5.6	46.2	<12.6	<18.6	245	<90	<50
	1/2/2006	<2.2	<1.6	2.5	<2.2	<4.4	6.1	<12.6	<18.6	<50	<90	<50
AS-2	10/27/2005	<2.2	20.5	113.0	10.6	41.1	307.0	<25.1	<37.2	1690	<180	<100
	01/02/06	<2.2	5.3	108	14	55.9	65.7	<12.6	<18.6	479	242	184
AS-3	10/27/05	<2.2	6.5	49.7	4.8	19.3	93.8	<12.6	<18.6	444	<90	<50
	01/02/06	<2.2	3.2	39.1	5.2	21.4	44	<12.6	<18.6	239	97.1	53.5
AS-4	01/02/06	<2.2	4.0	48.9	5.6	24.7	42.6	<12.6	<18.6	209	<90	55.6

AS-1 = Ambient Air (Outside Station)

AS-2 = 1st Floor Najib Office

AS-3 = 2nd Floor Living

AS-4 = 1st Floor Reception

Notes:

ug/m³ = micrograms per cubic meter; APH = Air-Phase Petroleum Hydrocarbons; NA= Not Available

MADEP Indoor Air Background Concentrations from *Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach, FINAL POLICY, October 31, 2002, Policy #WSC-02-411.*

Bolded values indicate concentrations above residential indoor air background concentrations.

¹ American Conference of Governmental and Industrial Hygienists (ACGIH), recommended exposure level (8 hours/day, 40 hours/week).

"<" indicates not detected above reporting limit of analytical method

APPENDIX A



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC108

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT

Release Tracking Number

4 - 17582

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

A. SITE LOCATION:

1. Site Name: Eagle Gas, Inc.

2. Street Address: 131 Main Street.

3. City/Town: Carver

4. ZIP Code: 02330-1374

5. UTM Coordinates: a. UTM N: 4638195 b. UTM E: 19 0353405

☒ 6. Check here if a Tier Classification Submittal has been provided to DEP for this disposal site.

☒ a. Tier IA ☐ b. Tier IB ☐ c. Tier IC ☐ d. Tier II

7. If applicable, provide the Permit Number: _____

B. THIS FORM IS BEING USED TO: (check all that apply)

- ☐ 1. Submit a **Phase I Completion Statement**, pursuant to 310 CMR 40.0484.
- ☐ 2. Submit a **Revised Phase I Completion Statement**, pursuant to 310 CMR 40.0484.
- ☐ 3. Submit a **Phase II Scope of Work**, pursuant to 310 CMR 40.0834.
- ☐ 4. Submit an **interim Phase II Report**. This report does not satisfy the response action deadline requirements in 310 CMR 40.0500.
- ☒ 5. Submit a **final Phase II Report and Completion Statement**, pursuant to 310 CMR 40.0836.
- ☐ 6. Submit a **Revised Phase II Report and Completion Statement**, pursuant to 310 CMR 40.0836.
- ☐ 7. Submit a **Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862.
- ☐ 8. Submit a **Revised Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862.
- ☐ 9. Submit a **Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874.
- ☐ 10. Submit a **Modified Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874.
- ☐ 11. Submit an **As-Built Construction Report**, pursuant to 310 CMR 40.0875.
- ☐ 12. Submit a **Phase IV Status Report**, pursuant to 310 CMR 40.0877.
- ☐ 13. Submit a **Phase IV Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879.

Specify the outcome of Phase IV activities: (check one)

- ☐ a. Phase V Operation, Maintenance or Monitoring of the Comprehensive Remedial Action is necessary to achieve a Response Action Outcome.
- ☐ b. The requirements of a Class A Response Action Outcome have been met. No additional Operation, Maintenance or Monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.
- ☐ c. The requirements of a Class C Response Action Outcome have been met. No additional Operation, Maintenance or Monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.
- ☐ d. The requirements of a Class C Response Action Outcome have been met. Further Operation, Maintenance or Monitoring of the remedial action is necessary to ensure that conditions are maintained and that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.

(All sections of this transmittal form must be filled out unless otherwise noted above)



**COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT**

Release Tracking Number

4 - 17582

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

B. THIS FORM IS BEING USED TO (cont.): (check all that apply)

- ☐ 14. Submit a **Revised Phase IV Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879.
- ☐ 15. Submit a **Phase V Status Report**, pursuant to 310 CMR 40.0892.
- ☐ 16. Submit a **Remedial Monitoring Report**. (This report can only be submitted through eDEP.)
- a. Type of Report: (check one) ☐ i. Initial Report ☐ ii. Interim Report ☐ iii. Final Report
- b. Frequency of Submittal: (check all that apply)
- ☐ i. A Remedial Monitoring Report(s) submitted monthly to address an Imminent Hazard.
- ☐ ii. A Remedial Monitoring Report(s) submitted monthly to address a Condition of Substantial Release Migration.
- ☐ iii. A Remedial Monitoring Report(s) submitted concurrent with a Status Report.
- c. Status of Site: (check one) ☐ i. Phase V ☐ ii. Remedy Operation Status ☐ iii. Class C RAO
- d. Number of Remedial Systems and/or Monitoring Programs: _____

A separate BWSC108A, CRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.

- ☐ 17. Submit a **Remedy Operation Status**, pursuant to 310 CMR 40.0893.
- ☐ 18. Submit a **Status Report to maintain a Remedy Operation Status**, pursuant to 310 CMR 40.0893(2).
- ☐ 19. Submit a **Modification of a Remedy Operation Status**, pursuant to 310 CMR 40.0893(5).
- ☐ 20. Submit a **Termination of a Remedy Operation Status**, pursuant to 310 CMR 40.0893(6).
- ☐ 21. Submit a **Phase V Completion Statement**, pursuant to 310 CMR 40.0894.

Specify the outcome of Phase V activities: (check one)

- a. The requirements of a Class A Response Action Outcome have been met. No additional Operation, Maintenance or Monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement (BWSC104) will be submitted to DEP.
- ☐
- b. The requirements of a Class C Response Action Outcome have been met. No additional Operation, Maintenance or Monitoring is necessary to ensure the integrity of the Response Action Outcome. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.
- ☐
- c. The requirements of a Class C Response Action Outcome have been met. Further Operation, Maintenance or Monitoring of the remedial action is necessary to ensure that conditions are maintained and/or that further progress is made toward a Permanent Solution. A completed Response Action Outcome Statement and Report (BWSC104) will be submitted to DEP.
- ☐

- ☐ 22. Submit a **Revised Phase V Completion Statement**, pursuant to 310 CMR 40.0894.
- ☐ 23. Submit a **Post-Class C Response Action Outcome Status Report**, pursuant to 310 CMR 40.0898.

(All sections of this transmittal form must be filled out unless otherwise noted above)



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC108

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT

Release Tracking Number

4 - 17582

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

C. LSP SIGNATURE AND STAMP:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and 309 CMR 4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> if Section B indicates that a Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement is being submitted, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B indicates that a Phase II Scope of Work or a Phase IV Remedy Implementation Plan is being submitted, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B indicates that an As-Built Construction Report, a Remedy Operation Status, a Phase IV, Phase V or Post-Class C RAO Status Report, a Status Report to Maintain a Remedy Operation Status and/or a Remedial Monitoring Report is being submitted, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP #: 9435

2. First Name: Charles E.

3. Last Name: Klingler

4. Telephone: 508-832-6022

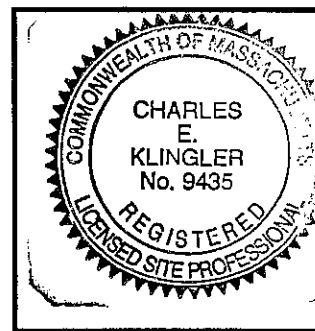
5. Ext.: 15

6. FAX: 508-832-4603

7. Signature:

8. Date: 11/6/06
(mm/dd/yyyy)

9. LSP Stamp:





Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC108

Release Tracking Number

4 - 17582

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

D. PERSON UNDERTAKING RESPONSE ACTIONS:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☐ c. change in the person undertaking response actions

2. Name of Organization: Eagle Gas, Inc.

3. Contact First Name: Najib 4. Last Name: Badaoui

5. Street: 131 Main Street 6. Title: President

7. City/Town: Carver 8. State: MA 9. ZIP Code: 02330-1374

10. Telephone: 508-866-9098 11. Ext.: _____ 12. FAX: _____

E. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTIONS:

☒ 1. RP or PRP ☒ a. Owner ☒ b. Operator ☐ c. Generator ☐ d. Transporter

☐ e. Other RP or PRP Specify: _____

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Undertaking Response Actions Specify Relationship: _____

F. REQUIRED ATTACHMENT AND SUBMITTALS:

☒ 1. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

☒ 2. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the submittal of any Phase Reports to DEP.

☐ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase III Remedial Action Plan.

☐ 4. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase IV Remedy Implementation Plan.

☐ 5. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of any field work involving the implementation of a Phase IV Remedial Action.

☐ 6. If submitting a Modification of a Remedy Operation Status, check here to certify that a statement detailing the compliance history, as per 310 CMR 40.0893(5), for the person making this submittal is attached.

☐ 7. If submitting a Modification of a Remedy Operation Status, check here to certify that written consent of the person who submitted the Remedy Operation Status submittal, as per 310 CMR 40.0893(5), is attached.

☐ 8. Check here if any non-updatable information provided on this form is incorrect, e.g. Site Name. Send corrections to the DEP Regional Office.

☒ 9. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC108

COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT

Release Tracking Number

4 - 17582

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

G. CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTIONS:

1. I, Najib Badaoui, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By: [Signature] (AS AGENT FOR) 3. Title: President

Signature

4. For: Eagle Gas, Inc. 5. Date: _____
(Name of person or entity recorded in Section D) (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section D.

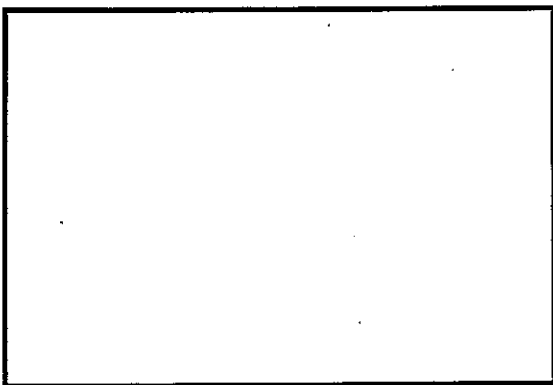
7. Street: _____

8. City/Town: _____ 9. State: _____ 10. ZIP Code: _____

11. Telephone: _____ 12. Ext.: _____ 13. FAX: _____

YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO \$10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)



**131 Main St
P.O. Box 429
Carver, Ma. 02330
Tel: 508-866-9098**

August 12, 2005

Environmental Compliance Services, Inc.
588 Silver Street
Agawam, MA 01001

RE: Blanket Signature Authorization

Dear Sir:

I hereby authorize Environmental Compliance Services, Inc (ECS) to sign on behalf of Eagle Gas, Inc. any waste manifests and waste profiles for the processing and/or disposal of waste materials generated in the course of operation of environmental remedial equipment. I also authorize ECS to sign any Licensed Site Professional Transmittal Form Responsible Party Certifications on behalf of Eagle Gas, Inc.

Sincerely,
Eagle Gas, Inc.



Najib Badaoui

APPENDIX B

MA DEP - Bureau of Waste Site Cleanup

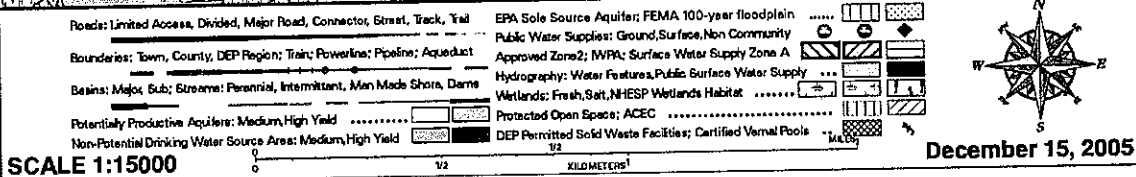
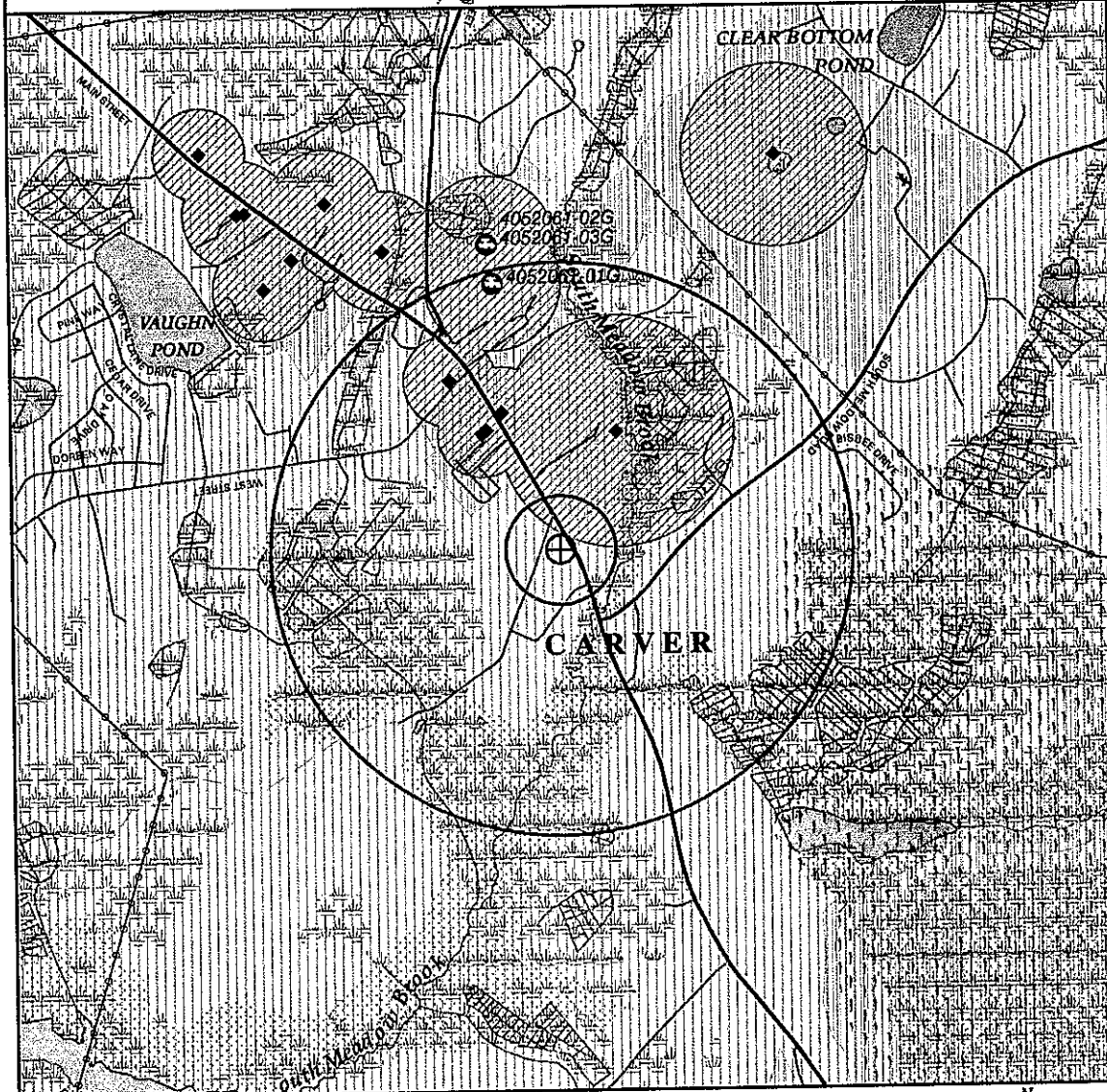
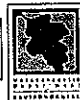
Site Scoring Map: 500 feet & 0.5 Mile Radii

SITE NAME:

Eagle Gas
131 Main Street
CARVER, MA 02330
848506n 260896ew



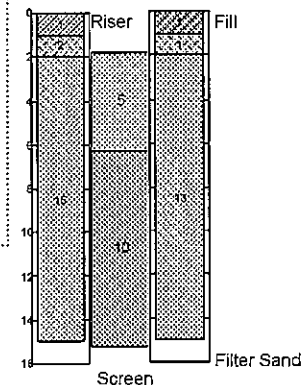
The information shown on this map is the best available at the date of printing. Please refer to the data source descriptions document.



APPENDIX C

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-1**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Corporate Environmental Advisors**Site Name** Eagle Gas, Inc**Address** 127 Hartwell**Address:** 131 Main Street**Town** West Boylston**Town** Caver**State/Zip** MA 01583**State/Zip** MA 02347**Foreman:** Steve**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/22/2005 08/22/2005**Depth:**
(feet)**Penetration/
Recovery**
(inches)**Blow Count**
(per 6 in.)**Strata****Soil Descriptions****Field
Testing**

0 - 1 12 / 0

1 - 2 12 / 0

2 - 3 12 / 0

3 - 4 12 / 0

4 - 5 12 / 0

5 - 6 12 / 0

Medium Sand

gray-brown clumpy medium SAND with odor

675

6 - 7 12 / 0

7 - 8 12 / 0

8 - 9 12 / 0

9 - 10 12 / 0

10 - 11 12 / 0

Medium Sand

damp/wet medium SAND with odor

307

11 - 12 12 / 0

12 - 13 12 / 0

13 - 14 12 / 0

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled

Boring Type Hollow Stem Auger 2

Auger Inside Diameter (in): 4.375

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.5

Sampler Type Dedicated Plastic tube

Sampler Length (in.): 24

ECS Inspector William Borowiec

Well Construction Data:

A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill.

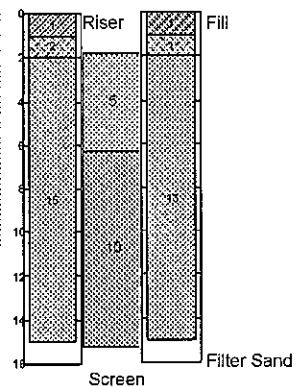
Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

Notes: One unpreserved amber 1-L sample bottle of soil was taken.

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-2**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Corporate Environmental Advisors**Site Name** Eagle Gas, Inc**Address** 127 Hartwell**Address:** 131 Main Street**Town** West Boylston**Town** Caver**State/Zip** MA 01583**State/Zip** MA 02347**Foreman:** Steve**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/22/2005 08/22/2005**Depth:**
(feet)**Penetration/
Recovery**
(inches)**Blow Count**
(per 6 in.)**Strata****Soil Descriptions****Field
Testing**

0 - 1 12 / 0 concrete

1 - 2 12 / 0 concrete

2 - 3 12 / 0 no recovery

3 - 4 12 / 0 no recovery

4 - 5 12 / 0 Medium Sand brown medium SAND with odor 400

5 - 6 12 / 0 Medium Sand brown medium SAND with odor 400

6 - 7 12 / 0 Fine Sand brown/gray fine SAND and Silt with odor 163

7 - 8 12 / 0 Fine Sand brown/gray fine SAND and Silt with odor 163

8 - 9 12 / 0 Fine Sand brown/gray fine SAND and Silt with odor 157

9 - 10 12 / 0 Fine Sand brown/gray fine SAND and Silt with odor 157

10 - 11 12 / 0 Fine Sand brown/gray fine SAND and Silt with odor 145

11 - 12 12 / 0 Fine Sand brown/gray fine SAND and Silt with odor 145

12 - 13 12 / 0 Fine Sand light brown fine SAND and Silt with odor 107

13 - 14 12 / 0 Fine Sand light brown fine SAND and Silt with odor 107

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

Boring Type Hollow Stem Auger 2

Auger Inside Diameter (in): 4.375

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.5

Sampler Type Dedicated Plastic tube

Sampler Length (in.): 24

ECS Inspector William Borowiec

Well Construction Data:

A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill.

Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

Notes: 2 unpreserved amber 1-L samples of soil were taken.

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled

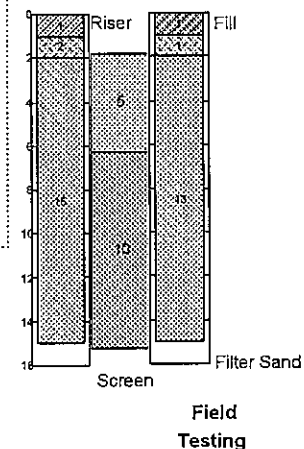
SOIL BORING and MONITORING WELL INSTALLATION LOG

ecs

588 Silver Street Agawam MA 01001

Boring Name: ECS-3**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Corporate Environmental Advisors**Site Name** Eagle Gas, Inc**Address** 127 Hartwell**Address:** 131 Main Street**Town** West Boylston**Town** Caver**State/Zip** MA 01583**State/Zip** MA 02347**Foreman:** Steve**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/26/2005 08/26/2005

Depth: (feet)	Penetration/ Recovery (inches)	Blow Count (per 6 in.)	Strata	Soil Descriptions	Field Testing

0 - 1	12 / 0			concrete	

1 - 2	12 / 0			concrete	

2 - 3	12 / 0			no recovery	

3 - 4	12 / 0			no recovery	

4 - 5	12 / 0			no recovery	

5 - 6	12 / 0		Medium Sand	brown fluffy medium SAND (fill)	151

6 - 7	12 / 0				

7 - 8	12 / 0				

8 - 9	12 / 0				

9 - 10	12 / 0				

10 - 11	12 / 0		Fine Sand	wet gray fine SAND and Silt with odor and slick texture	64

11 - 12	12 / 0				

12 - 13	12 / 0				

13 - 14	12 / 0				

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

Boring Type Hollow Stem Auger 2

Auger Inside Diameter (in): 4.375

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.5

Sampler Type Dedicated Plastic tube

Sampler Length (in.): 24

ECS Inspector William Borowiec

Well Construction Data:

A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill.

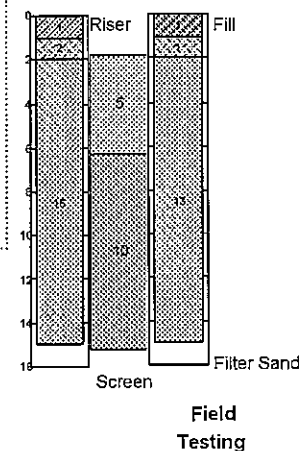
Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

Notes: 2 unpreserved amber 1-L soil samples were taken

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-4**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Corporate Environmental Advisors**Site Name** Eagle Gas, Inc**Address** 127 Hartwell**Address:** 131 Main Street**Town** West Boylston**Town** Caver**State/Zip** MA 01583**State/Zip** MA 02347**Foreman:** Steve**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/26/2005 08/26/2005

Depth: (feet)	Penetration/ Recovery (inches)	Blow Count (per 6 in.)	Strata	Soil Descriptions	Field Testing

0 - 1 12 / 0

1 - 2 12 / 0

2 - 3 12 / 0

3 - 4 12 / 0

4 - 5 12 / 0

5 - 6 12 / 0

Medium Sand black medium SAND with odor

162

6 - 7 12 / 0

7 - 8 12 / 0

8 - 9 12 / 0

9 - 10 12 / 0

10 - 11 12 / 0

Fine Sand damp gray fine SAND and Silt with odor

32

11 - 12 12 / 0

12 - 13 12 / 0

13 - 14 12 / 0

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

Boring Type	Hollow Stem Auger 2	Well Construction Data: A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill.
Auger Inside Diameter (in):	4.375	
Hammer Weight (lbs):	140	Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit
Hammer Fall (in):	30	
Sampler Inside Diameter	1.5	
Sampler Type	Dedicated Plastic tube	
Sampler Length (in.):	24	
ECS Inspector	William Borowiec	

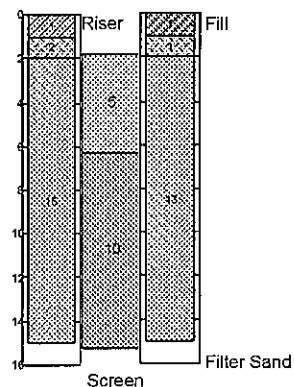
Notes:

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-5**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Corporate Environmental Advisors**Site Name** Eagle Gas, Inc**Address** 127 Hartwell**Address:** 131 Main Street**Town** West Boylston**Town** Caver**State/Zip** MA 01583**State/Zip** MA 02347**Foreman:** Steve**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/26/2005 08/26/2005**Depth:**
(feet)**Penetration/
Recovery**
(inches)**Blow Count**
(per 6 in.)**Strata****Soil Descriptions****Field
Testing**

0 - 1 12 / 0

1 - 2 12 / 0

2 - 3 12 / 0

3 - 4 12 / 0

4 - 5 12 / 0

5 - 6 12 / 0

Medium Sand

medium fluffy brown SAND (fill) with odor

159

6 - 7 12 / 0

7 - 8 12 / 0

Fine Sand

brown medium sand and gray fine SAND and Silt with odor

154

8 - 9 12 / 0

9 - 10 12 / 0

Fine Sand

wet gray fine SAND and Silt with odor

124

10 - 11 12 / 0

11 - 12 12 / 0

Fine Sand

wet gray fine SAND and Silt with odor

133

12 - 13 12 / 0

13 - 14 12 / 0

Fine Sand

wet gray fine SAND and Silt with odor

46

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled

Boring Type Hollow Stem Auger 2

Auger Inside Diameter (in): 4.375

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.5

Sampler Type Dedicated Plastic tube

Sampler Length (in.): 24

ECS Inspector William Borowiec

Well Construction Data:

A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill.

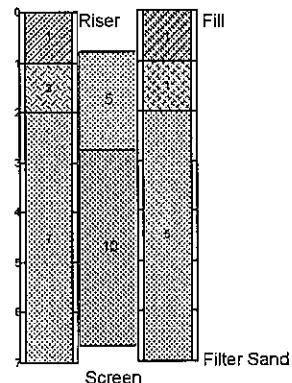
Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

Notes:

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-6**Job Number:** 91-204082.00

EOB: 7.00 ft

Boring Company Corporate Environmental Advisors**Site Name** Eagle Gas, Inc**Address** 127 Hartwell**Address:** 131 Main Street**Town** West Boylston**Town** Caver**State/Zip** MA 01583**State/Zip** MA 02347**Foreman:** Steve**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/26/2005 08/26/2005**Depth:**
(feet)**Penetration/
Recovery**
(inches)**Blow Count**
(per 6 in.)**Strata****Soil Descriptions****Field
Testing**

0 - 1 12 / 0

1 - 2 12 / 0

2 - 3 12 / 0

3 - 4 12 / 0

4 - 5 12 / 0

5 - 6 12 / 0

Medium Sand

brown medium SAND/gray Silt

1.5

6 - 7 12 / 0

Fine Sand

brown medium sand/gray fine SAND and Silt

1.7

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled



Boring Type	Hand Auger
Auger Inside Diameter (in):	4.375
Hammer Weight (lbs):	140
Hammer Fall (in):	30
Sampler Inside Diameter	1.5
Sampler Type	Dedicated Plastic tube
Sampler Length (in.):	24
ECS Inspector	William Borowiec

Well Construction Data:
Soil Boring Only

Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

Notes: Refusal at 7 feet below grade.



Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

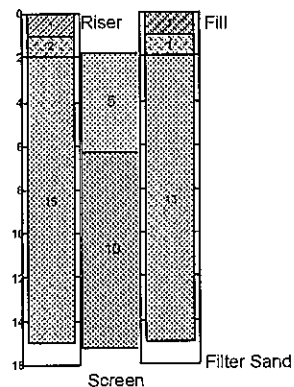
SOIL BORING and MONITORING WELL INSTALLATION LOG

ecs

588 Silver Street Agawam MA 01001

Boring Name: ECS-7**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Corporate Environmental Advisors**Site Name** Eagle Gas, Inc**Address** 127 Hartwell**Address:** 131 Main Street**Town** West Boylston**Town** Caver**State/Zip** MA 01583**State/Zip** MA 02347**Foreman:** Steve**Client** Eagle Gas, Inc**Location of Boring:** Off-site. About 120 feet south of the site on the even side of main street**Installed/Finished** 08/26/2005 08/26/2005

Depth: (feet)	Penetration/ Recovery (inches)	Blow Count (per 6 in.)	Strata

Soil Descriptions**Field
Testing**

0 - 1 12 / 0

1 - 2 12 / 0

2 - 3 12 / 0

3 - 4 12 / 0

4 - 5 12 / 0

5 - 6 12 / 0

6 - 7 12 / 0

7 - 8 12 / 0

8 - 9 12 / 0

9 - 10 12 / 0

10 - 11 12 / 0

11 - 12 12 / 0

12 - 13 12 / 0

13 - 14 12 / 0

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled

Boring Type Hollow Stem Auger 1

Auger Inside Diameter (in): 4.25

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.5

Sampler Type Dedicated Plastic tube

Sampler Length (in.): 24

ECS Inspector William Borowiec

Well Construction Data:

A 2.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill and cement to surface with stick-up casing and cap

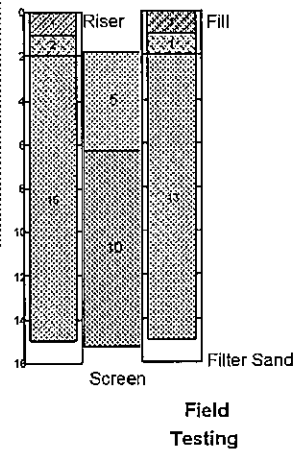
Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

Notes: No soil data/samples were collected. ECS-7 was advanced using an Earthprobe. It was not possible to sample from the augers. ECS-7 was finished as a stick-up 2 inch well.

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-8**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Environmental Compliance Services, Inc**Site Name** Eagle Gas, Inc**Address** 588 Silver Street**Address:** 131 Main Street**Town** Agawam**Town** Caver**State/Zip** MA 01001**State/Zip** MA 02347**Foreman:** Stanley Werbicki**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/26/2005 08/26/2005

Depth: (feet)	Penetration/ Recovery (inches)	Blow Count (per 6 in.)	Strata	Soil Descriptions	Field Testing

0 - 1 12 / 0

1 - 2 12 / 0

2 - 3 12 / 0

3 - 4 12 / 0

4 - 5 12 / 0

5 - 6 12 / 0

Medium Sand brown medium SAND with odor

140

6 - 7 12 / 0

7 - 8 12 / 0

8 - 9 12 / 0

9 - 10 12 / 0

10 - 11 12 / 0

Fine Sand wet gray fine SAND and Silt with odor

90

11 - 12 12 / 0

12 - 13 12 / 0

13 - 14 12 / 0

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

Boring Type Hollow Stem Auger 2

Auger Inside Diameter (in): 4.375

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.5

Sampler Type Dedicated Plastic tube

Sampler Length (in.): 24

ECS Inspector William Borowiec

Well Construction Data:

A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill.

Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

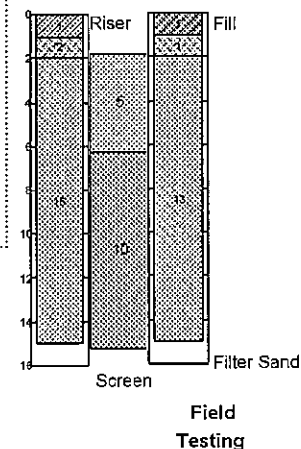
Notes: 2 unpreserved 1-l amber soil samples were taken from ECS-8

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-9**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Environmental Compliance Services , Inc**Site Name** Eagle Gas, Inc**Address** 588 Silver Street**Address:** 131 Main Street**Town** Agawam**Town** Caver**State/Zip** MA 01001**State/Zip** MA 02347**Foreman:** Stanley Werbicki**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/26/2005 08/26/2005

Depth: (feet)	Penetration/ Recovery (inches)	Blow Count (per 6 in.)	Strata	Soil Descriptions	Field Testing
0 - 1	12 / 0				
1 - 2	12 / 0				
2 - 3	12 / 0				
3 - 4	12 / 0				
4 - 5	12 / 0				
5 - 6	12 / 0		Fine Sand	wet gray fine SAND and Silt , clumpy with odor	124
6 - 7	12 / 0				
7 - 8	12 / 0				
8 - 9	12 / 0				
9 - 10	12 / 0				
10 - 11	12 / 0		Fine Sand	wet gray fine SAND and Silt , clumpy with odor	
11 - 12	12 / 0				
12 - 13	12 / 0				
13 - 14	12 / 0				

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

Boring Type Hollow Stem Auger 2

Auger Inside Diameter (in): 4.375

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.5

Sampler Type Dedicated Plastic tube

Sampler Length (in.): 24

ECS Inspector William Borowiec

Well Construction Data:

A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill.

Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

Notes:

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-10**Job Number:** 91-204082.00

EOB: 15.00 ft

Boring Company Environmental Compliance Services , Inc**Site Name** Eagle Gas, Inc**Address** 588 Silver Street**Address:** 131 Main Street**Town** Agawam**Town** Caver**State/Zip** MA 01001**State/Zip** MA 02347**Foreman:** Stanley Werbicki**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 08/26/2005 08/26/2005

Depth: (feet)	Penetration/ Recovery (inches)	Blow Count (per 6 in.)	Strata	Soil Descriptions	Field Testing

0 - 1 12 / 0

1 - 2 12 / 0

2 - 3 12 / 0

3 - 4 12 / 0

4 - 5 12 / 0

5 - 6 12 / 0

Medium Sand brown medium SAND with odor

156

6 - 7 12 / 0

7 - 8 12 / 0

8 - 9 12 / 0

9 - 10 12 / 0

10 - 11 12 / 0

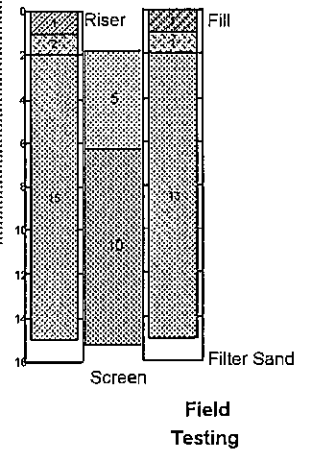
Fine Sand wet gray fine SAND and Silt with odor

105

11 - 12 12 / 0

12 - 13 12 / 0

13 - 14 12 / 0

**Depth(s), Analyte(s), Time(s) Sampled:** Not Sampled

Boring Type Hollow Stem Auger 2

Auger Inside Diameter (in): 4.375

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.5

Sampler Type Dedicated Plastic tube

Sampler Length (in.): 24

ECS Inspector William Borowiec

Well Construction Data:

A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 2.00 feet below grade, bentonite sealed to 1.00 feet below grade; native fill.

Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

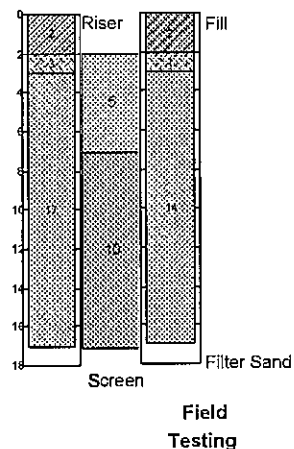
Notes:

Depth(s), Analyte(s), Time(s) Sampled:

Not Sampled

SOIL BORING and MONITORING WELL INSTALLATION LOGecs
588 Silver Street Agawam MA 01001**Boring Name:** ECS-11**Job Number:** 91-204082.00

EOB: 17.00 ft

Boring Company Environmental Compliance Services, Inc**Site Name** Eagle Gas, Inc**Address** 588 Silver Street**Address:** 131 Main Street**Town** Agawam**Town** Caver**State/Zip** MA 01001**State/Zip** MA 02347**Foreman:** Stanley Werbicki**Client** Eagle Gas, Inc**Location of Boring:****Installed/Finished** 10/28/2005 10/28/2005

Depth: (feet)	Penetration/ Recovery (inches)	Blow Count (per 6 in.)	Strata	Soil Descriptions	Field Testing

0 - 1 12 / 0

1 - 2 12 / 0

2 - 3 12 / 0

3 - 4 12 / 0

4 - 5 12 / 0

5 - 6 12 / 0 13/9 wet brown silty fine SAND 20

6 - 7 12 / 0 8/6

7 - 8 12 / 0

8 - 9 12 / 0

9 - 10 12 / 0

10 - 11 12 / 0 8/12 wet brown silty fine SAND 5.6

11 - 12 12 / 0 8/7

12 - 13 12 / 0

13 - 14 12 / 0

Depth(s), Analyte(s), Time(s) Sampled: Not Sampled

14 _ 15 12 / 0

15 _ 16 12 / 0 5/8 wet brown silty fine SAND 2.0

16 _ 17 12 / 0 10/7

Boring Type Hollow Stem Auger 1

Auger Inside Diameter (in): 4.25

Hammer Weight (lbs): 140

Hammer Fall (in): 30

Sampler Inside Diameter 1.375

Sampler Type S.S. Split Spoon 1

Sampler Length (in.): 24

ECS Inspector Stuart Saine

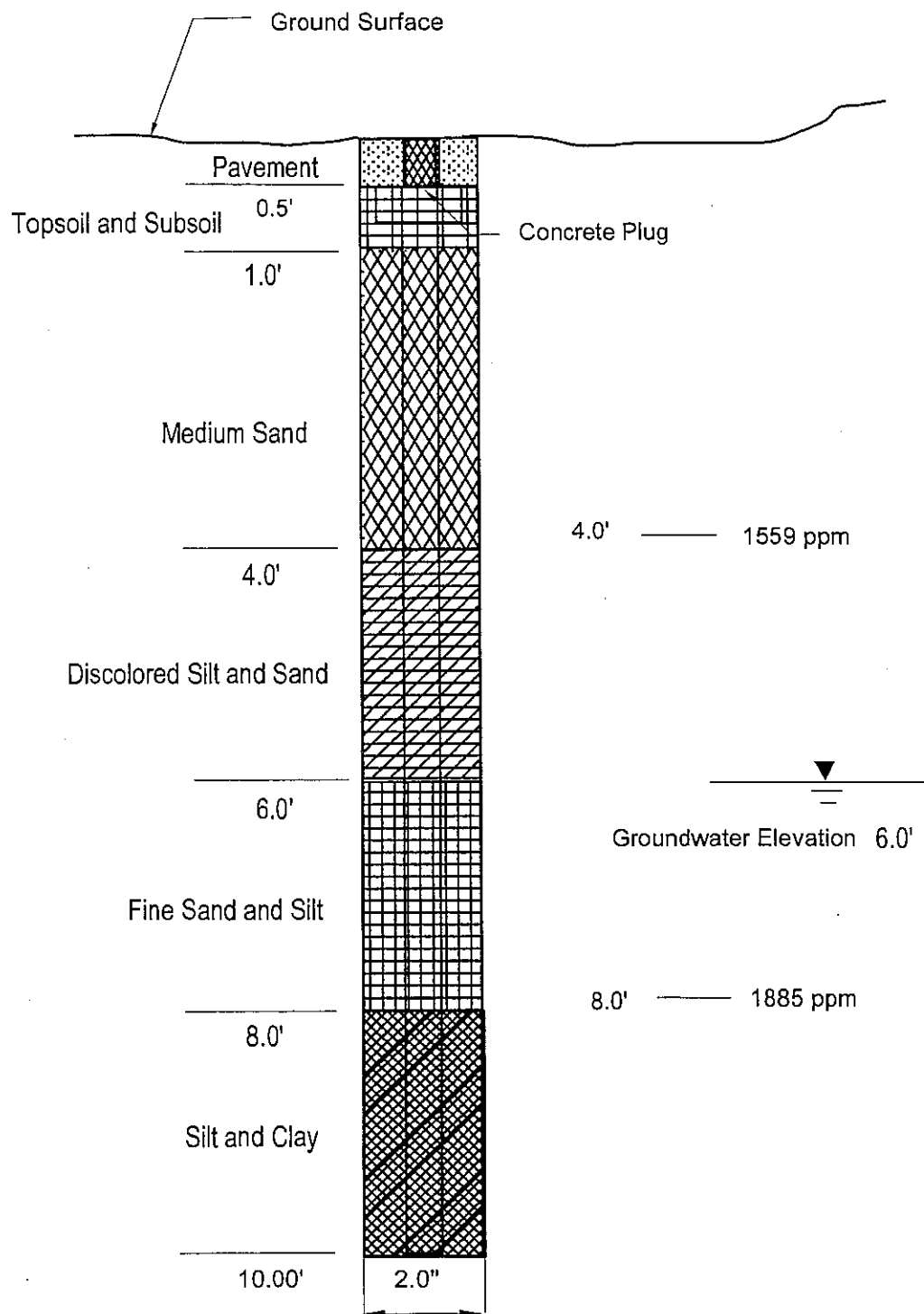
Well Construction Data:

A 4.00 inch monitoring well was installed at 15.00 feet below grade using 10.00 feet of 0.01 slotted screen and 5.00 feet of solid riser, sand packed to 3.00 feet below grade, bentonite sealed to 2.00 feet below grade; native fill.

Notes: Field Testing values represent total volatile organic vapors (referenced to a benzene standard) measured in the headspace of sealed soil sample jars with an OVM 580B photoionization meter with a Detection Limit of 0.1 ppm. Results reported in Parts Per Million (ppm), BDL=Below Detection Limit

Notes: vactor used from 0 to 5 ft bgs

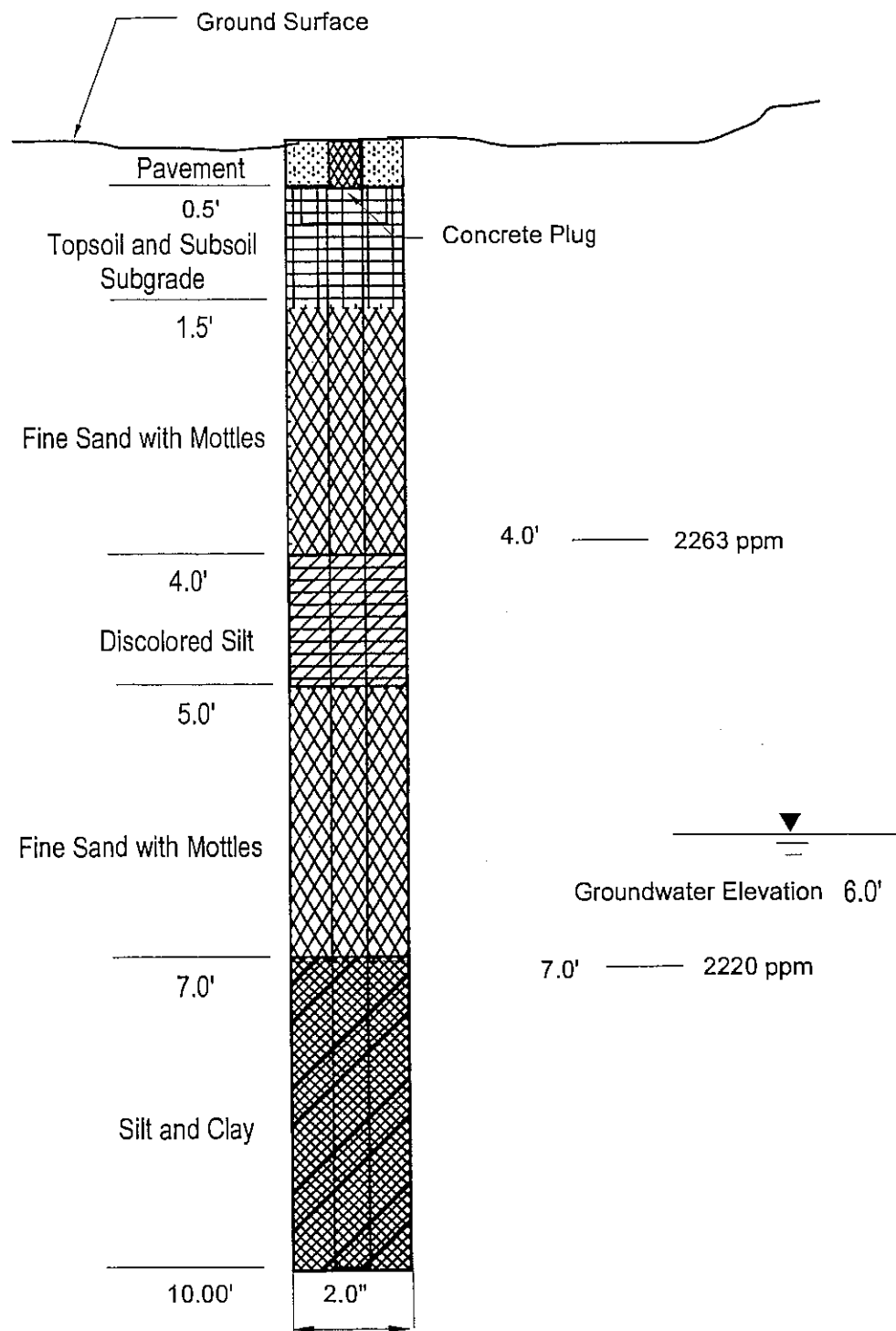
Depth(s), Analyte(s), Time(s) Sampled: Not Sampled



DRILLING METHOD:
DIRECT PUSH PROBE

DCA BORING LOG

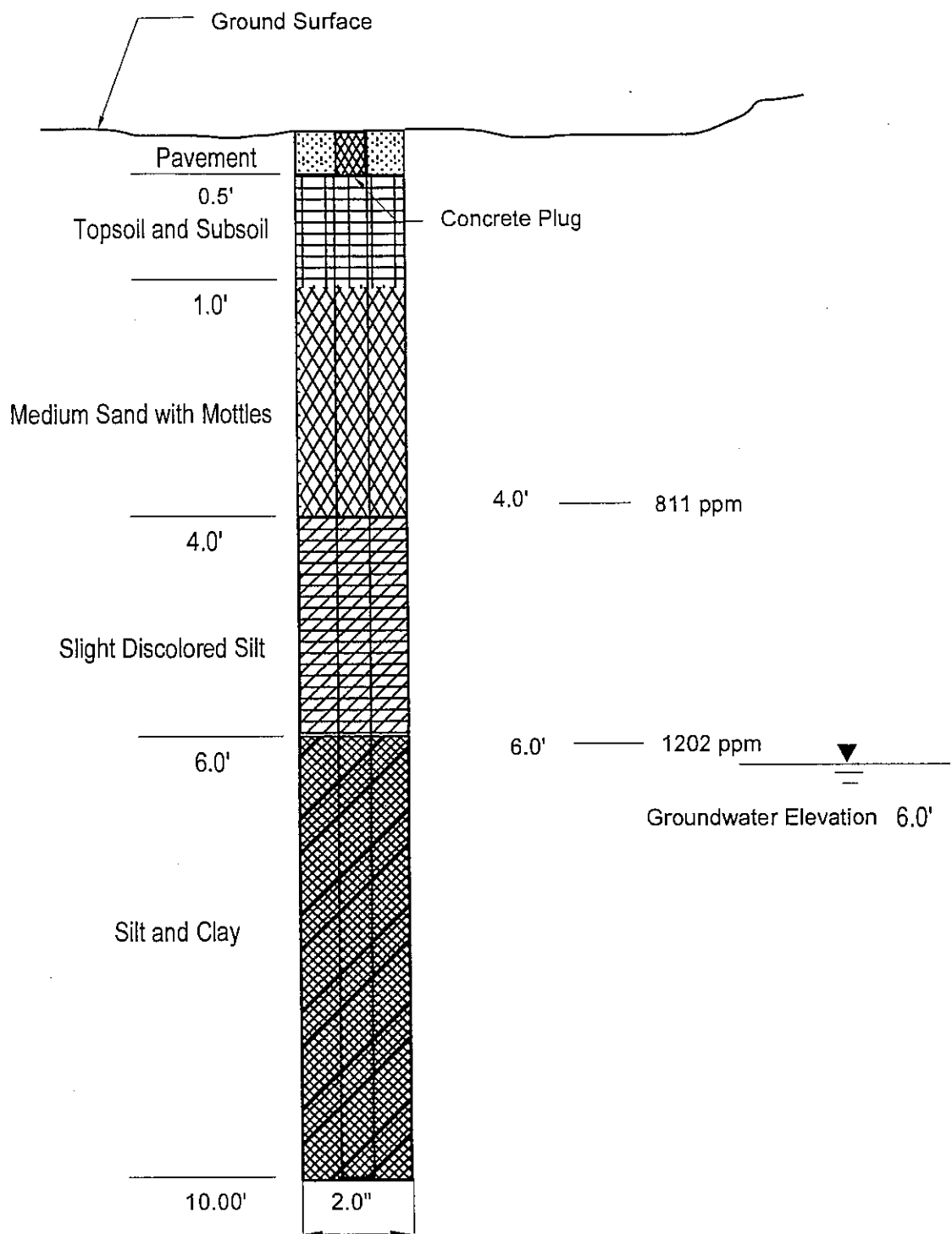
(NOT TO SCALE)



DRILLING METHOD:
DIRECT PUSH PROBE

DCB BORING LOG

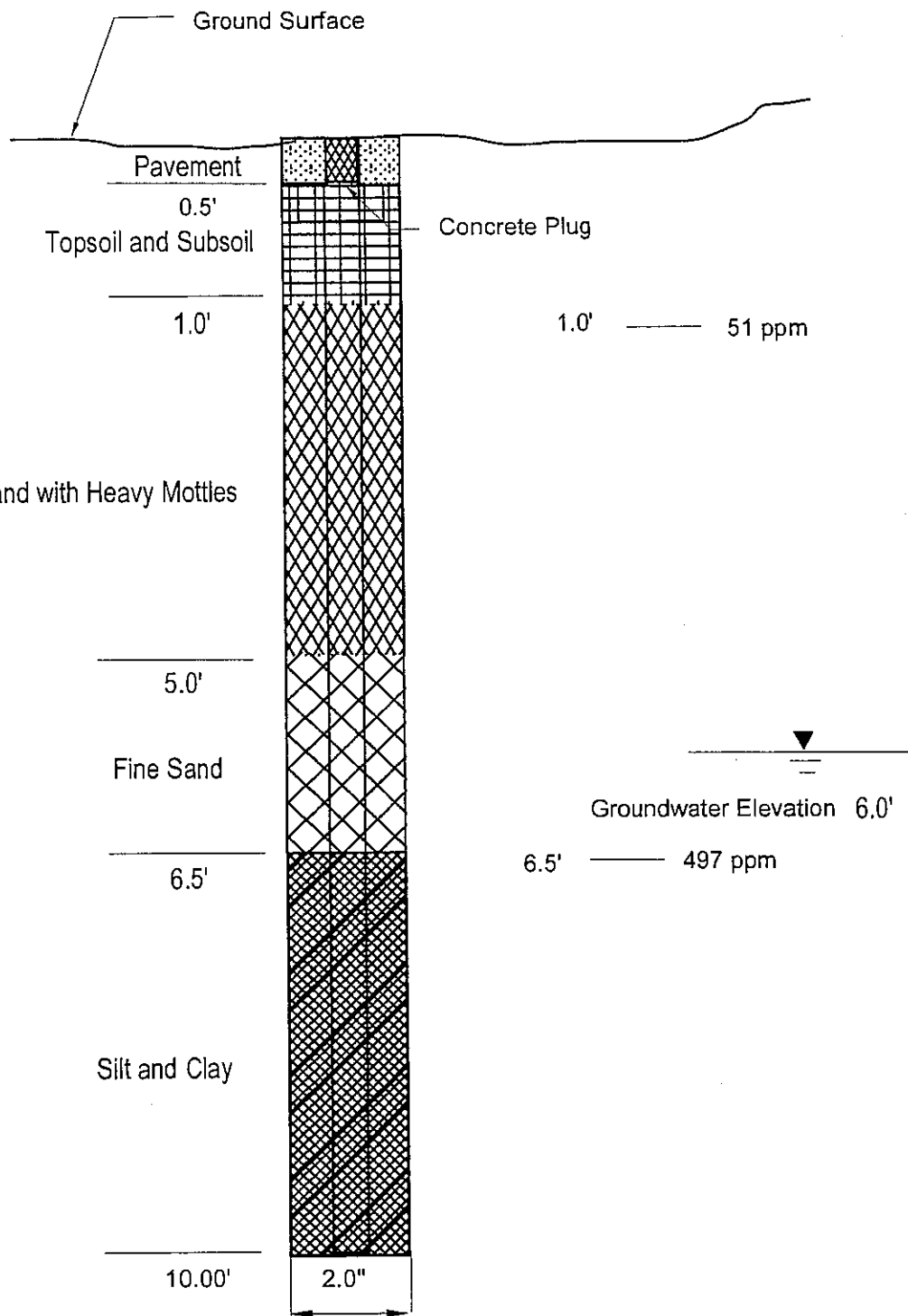
(NOT TO SCALE)



DRILLING METHOD:
DIRECT PUSH PROBE

DCC BORING LOG

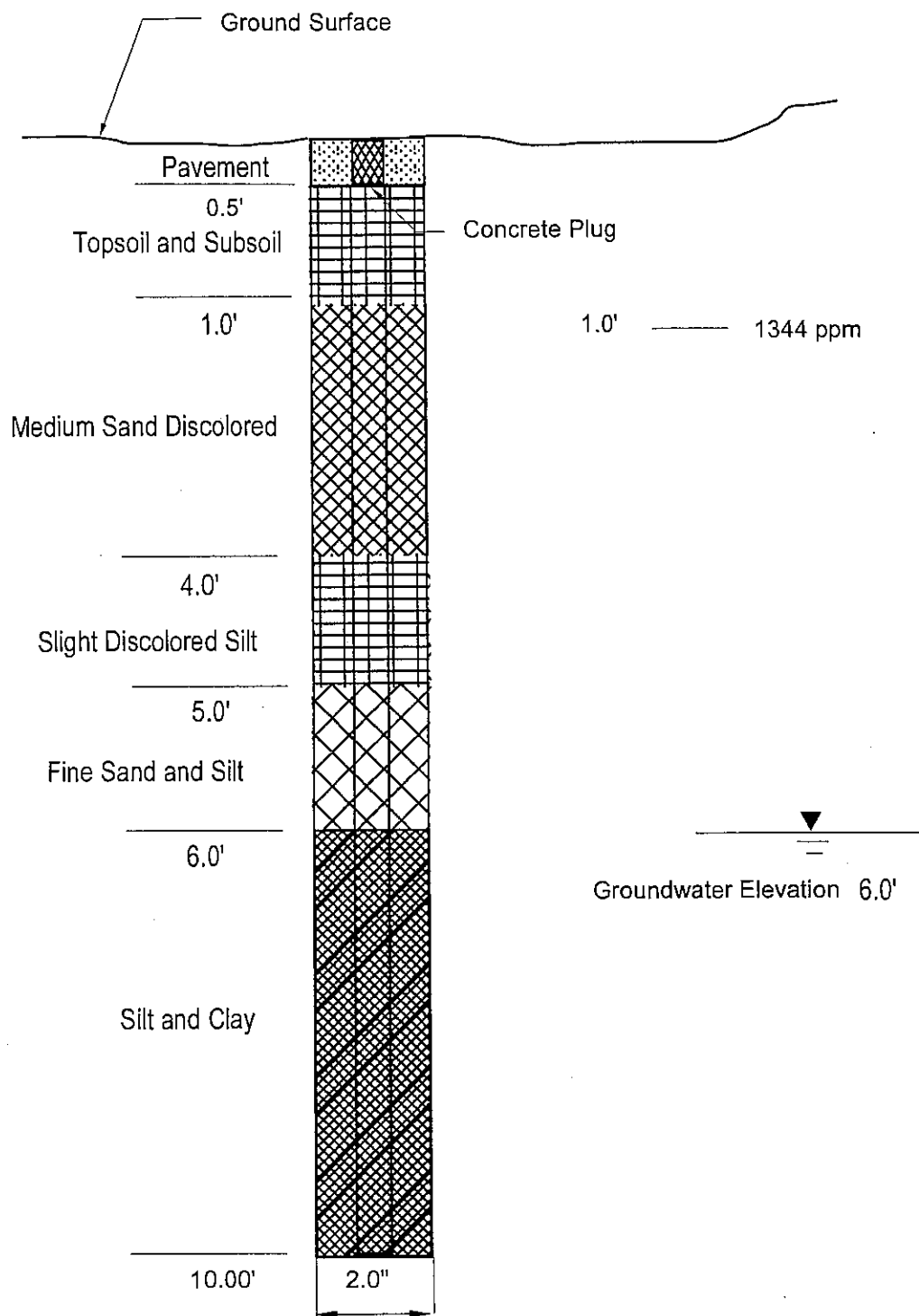
(NOT TO SCALE)



DRILLING METHOD:
DIRECT PUSH PROBE

DCD BORING LOG

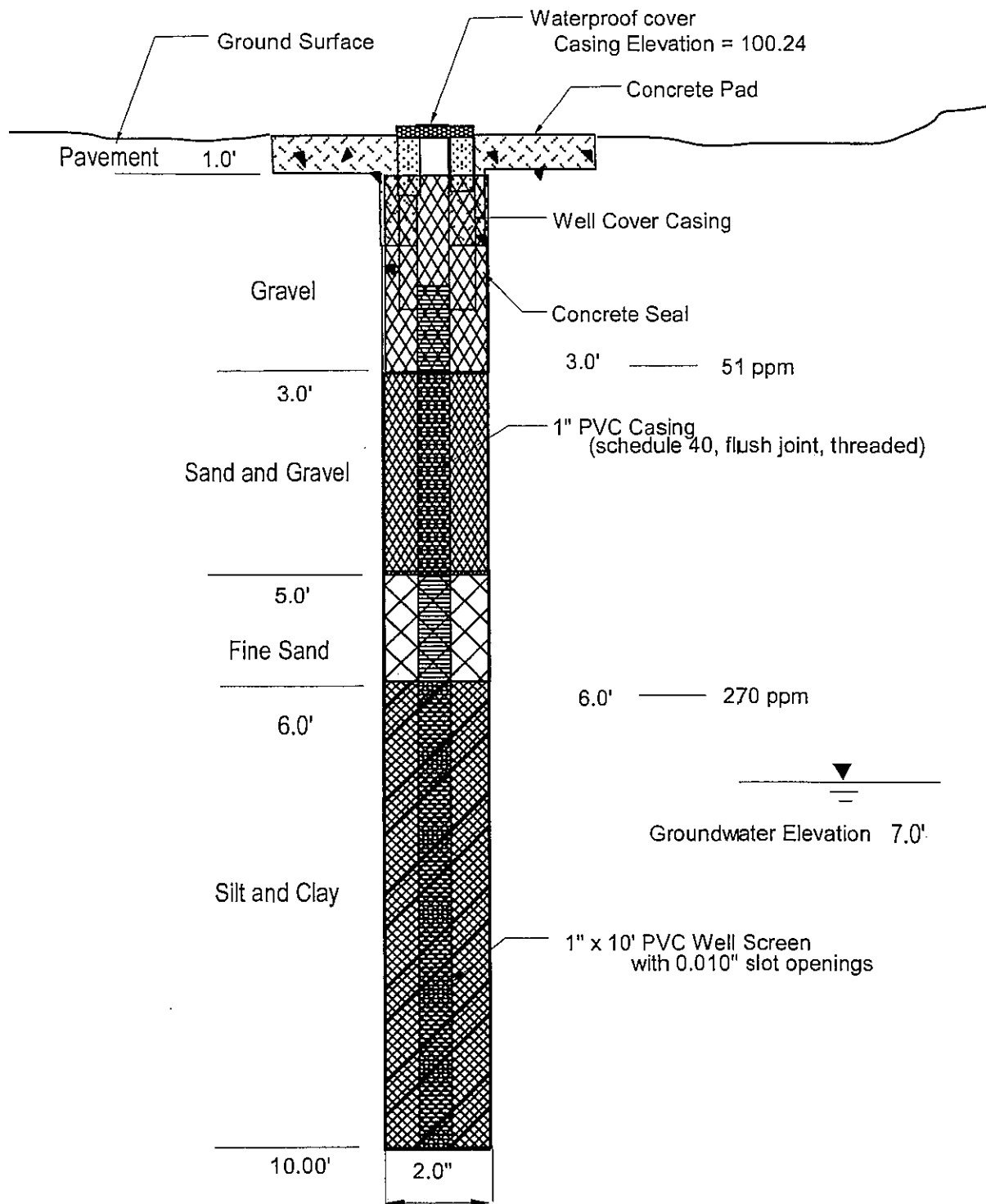
(NOT TO SCALE)



DRILLING METHOD:
DIRECT PUSH PROBE

DCE BORING LOG

(NOT TO SCALE)

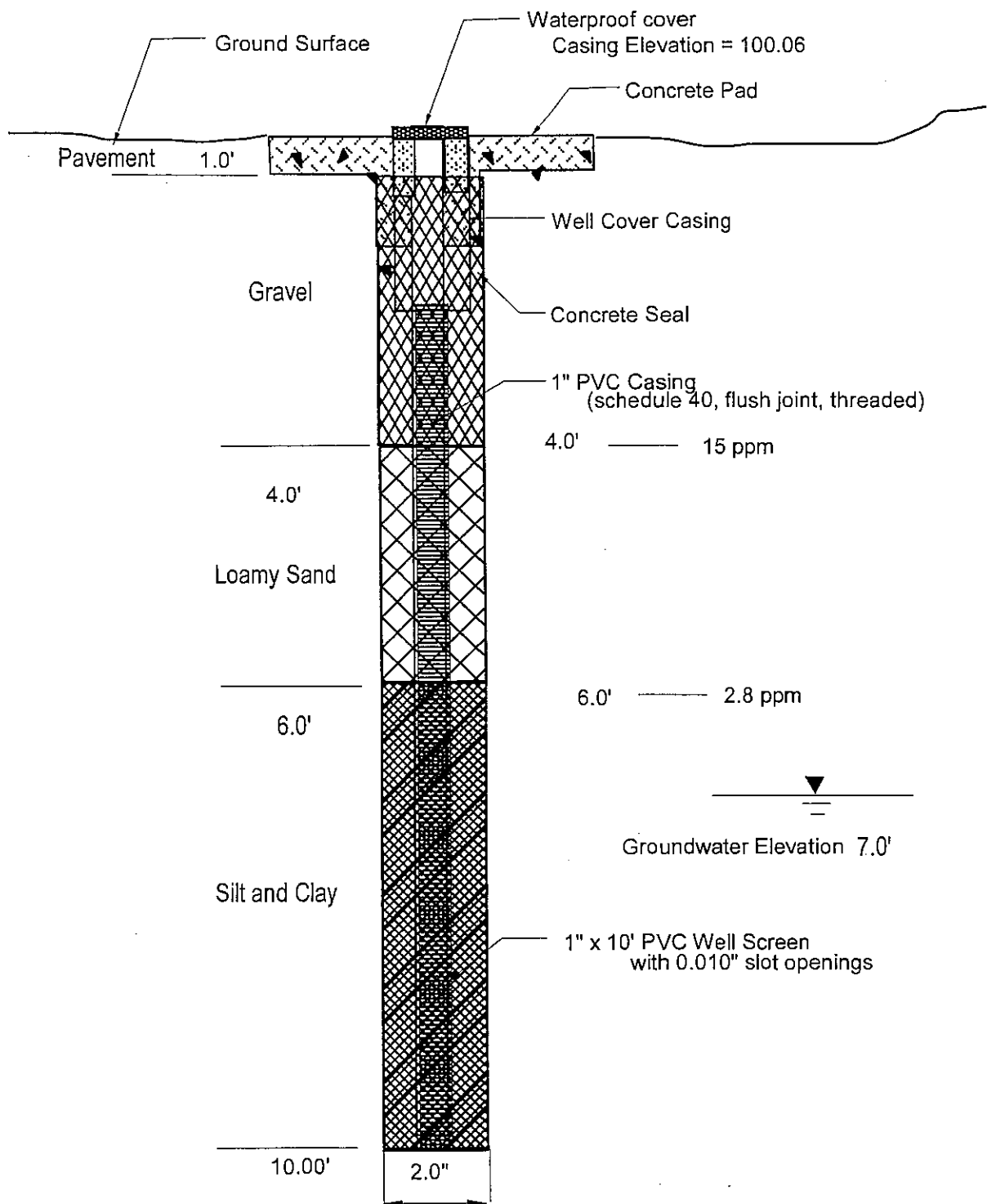


WELL ID NUMBER: DCF/DCW-1

DRILLING METHOD:
DIRECT PUSH PROBE

DCF/DCW-1 BORING LOG

(NOT TO SCALE)

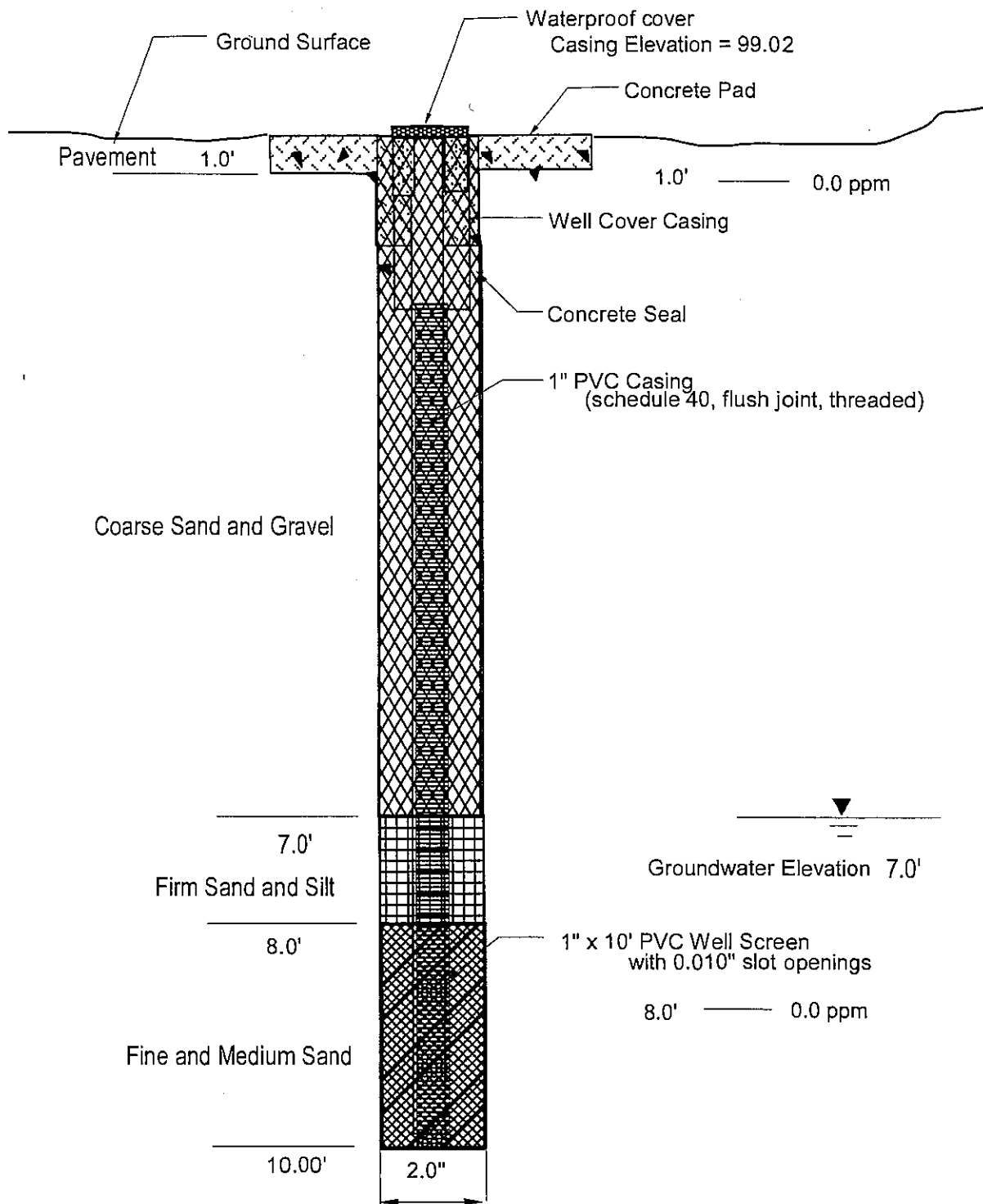


WELL ID NUMBER: DCW-2

DRILLING METHOD:
DIRECT PUSH PROBE

DCG/DCW-2 BORING LOG

(NOT TO SCALE)



WELL ID NUMBER: DCW-3

**DRILLING METHOD:
DIRECT PUSH PROBE**

DCH/DCW-3 BORING LOG

(NOT TO SCALE)

APPENDIX B
SOIL BORING LOGS FROM DECEMBER 10, 2004

Asphalt Pavement

Fine Sand

5'

Fine Sand and Silt

8'

2"

6'

6.5' 42.1 ppm

NAPL

7.5'

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

EGS-1 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Fine Medium Sand

4'

Fine Sand and Silt

6'

Mottled Sand

7'

Compacted Silt

8'

8' 6.1 ppm

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

EGS-2 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Fine Medium Sand

3'

Fine Sand and Silt
with Traces of Clay

6'

NAPL

7.5'

8'

8' 103 ppm

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

EGS-3 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Fine Medium Sand

3'

Fine Sand and Silt
with Traces of Clay

8'

8' 2.8 ppm

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

EGS-4 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Fine Medium Sand

3'

Fine Sand and Silt
with Traces of Clay

8'

8' 2.7 ppm

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

EGS-5 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Fine Medium Sand

3'

Fine Sand and Silt
with Traces of Clay

8'

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

EGS-6 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Fine Medium Sand

3'

Fine Sand and Silt
with Traces of Clay

8'

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

EGS-7 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Fine Medium Sand

3'

Fine Sand and Silt
with Traces of Clay

8'

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

EGS-8 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Waterproof Cover

Concrete Pad

Well Cover Casing

Concrete Seal

1" PVC Casing
(schedule 40, flush joint, threaded)

Fine Medium Sand

3'

Fine Sand with Traces
of Silt and Clay

1" x 10' PVC Well Screen
with 0.010" slot openings

13'

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

DCW-9 BORING LOG

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

Asphalt Pavement

Waterproof Cover

Concrete Pad

Well Cover Casing

Concrete Seal

Fine Medium Sand

2'

1" PVC Casing

(schedule 40, flush joint, threaded)

3'

Fine Sand with Traces
of Silt and Clay

1" x 10' PVC Well Screen
with 0.010" slot openings

12'

2"

DRILLING METHOD:
DIRECT PUSH GEOPROBE 66DT

DCW-10 BORING

(NOT TO SCALE)

DECOULOS & COMPANY

SITE LOCATION: 131 MAIN STREET, CARVER, MA

BENNETT & O'REILLY, INC.

BORING LOG

Project Number: B004-4169	Boring ID: BP-4R	Date: November 27, 2001
Project Address: 131 Main Street, Carver, MA	Boring Depth (feet): 12feet	
Drilling Contractor: Drillex	Boring Diameter (inches): 3.0	
Drill Method: Direct Push Geoprobe	Monitoring Well Installed? Yes, Total Depth = 11'	
Soil Sampling Method: 60" Hollow Tube	Well Diameter (inches): 1.0	
Soil Screening Method: Jar Headspace	Well Construction: 1.0" Sch. 40 PVC Riser w/ Flush Mount Road Box	
Screening Instrument: OVM Model 580B w 10.6 Ev Lamp	Well Screen Description: 10' x .010", Johnson PVC	

Depth	SAMPLE				TOVs (PPM)	SAMPLE DESCRIPTION	Strata	MW Log
	ID	Interval	Pen\Rec	Blows\6"				
5	S1	0-1.5			Max = 0	Medium brown, fine grain, very well sorted, unconsolidated sand, No O/V	Unconsolidated Sand	
	S2	1.5-4			Max = 0	Light brown, fine grain, very well sorted, uncons sand, No V		
	S3	4-8			Max= 0.2	Light brown - gray brown, silt-very fine grain, very well sorted, unconsolidated sand, fining downwards, No O/V		
10	S4	8-12			Max= 0.4	Medium brown, silt-very fine grain, very well sorted, unconsolidated sand AA, minor medium brown, medium grain, oxidized stringers to 2" thick, No O/V		
15						End of Boring		
20								
25								
30								

▼ Groundwater Table at time of drilling

O/V = Olfactory / Visual

NOTE: Log Created from Historic Kaegael Env, Inc. Field Notes



Roadbox/Concrete



Native Soil



Bentonite Seal



Filter Sand

BORING LOG

Project Number: B004-4169	Boring ID: BP-5R	Date: November 27, 2001
Project Address: 131 Main Street, Carver, MA	Boring Depth (feet): 12feet	
Drilling Contractor: Drillex	Boring Diameter (inches): 3.0	
Drill Method: Direct Push Geoprobe	Monitoring Well Installed? No	
Soil Sampling Method: 60" Hollow Tube	Well Diameter (inches): - - -	
Soil Screening Method: Jar Headspace	Well Construction:	
Screening Instrument: OVM Model 580B w 10.6 Ev Lamp	Well Screen Description:	

Depth	SAMPLE				TOVs (PPM)	SAMPLE DESCRIPTION	Strata	MW Log
	ID	Interval	Pen\Rec	Blows\6"				
	S1	0-1			Max = 0	3" Pavement w/ roadbase fill sand & stone to 5" diameter No O/V	Unconsolidated Sand	
	S2	1-4			Max= 0	Medium brown, fine grain, well sorted, uncons sand, No OV		
5	S3	4-8			Max=3.1	Medium brown, very fine grain, well sorted, uncons sand, Trace petroleum O, No V		
10	S4	8-12			Max= 3.1	Medium brown AA, Trace petroleum O, No V		
15						End of Boring		
20								
25								
30								

▼ Groundwater Table at time of drilling

O/V = Olfactory / Visual NOTE: Log Created from Historic Kaegael Env, Inc. Field Notes



Roadbox/Concrete



Native Soil



Bentonite Seal

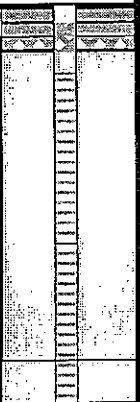


Filter Sand

BENNETT & O'REILLY, INC.

BORING LOG

Project Number: B004-4169	Boring ID: BP-5RR	Date: November 27, 2001
Project Address: 131 Main Street, Carver, MA	Boring Depth (feet): 12feet	
Drilling Contractor: Drillex	Boring Diameter (inches): 3.0	
Drill Method: Direct Push Geoprobe	Monitoring Well Installed? Yes, Total Depth = 11'	
Soil Sampling Method: 60" Hollow Tube	Well Diameter (inches): 1.0	
Soil Screening Method: Jar Headspace	Well Construction: 1.0" Sch. 40 PVC Riser w/ Flush Mount Road Box	
Screening Instrument: OVM Model 580B w 10.6 Ev Lamp	Well Screen Description: 10' x .010", Johnson PVC	

Depth	SAMPLE				TOVs (PPM)	SAMPLE DESCRIPTION	Strata	MW Log
	ID	Interval	Pen\Rec	Blows\6"				
—	S1	0-1			Max = 0	3" Pavement w/ roadbase fill sand & stone to 5" diameter No O/V	Unconsolidated Sand	
—	S2	1-4			Max=1.1	60% Medium brown, veryfine grain, well sorted, uncons sand w/ 40% interbedded fine-medium grain, sand stringers w/ common iron oxidized horizons, Trace petroleum O, No		
5	S3	4-8			Max= 38	Medium brown, AA w/ 50/50 very fine & fine-medium grain, uncons sand, Trace petroleum O, No V		
10	S4	8-12			Max= 33	Medium brown, interbedded sands AA, Trace petroleum O, No V		
15						End of Boring		
20								
25								
30								

▼ Groundwater Table at time of drilling

O/V = Olfactory / Visual NOTE: Log Created from Historic Kaegael Env, Inc. Field Notes



Roadbox/Concrete



Native Soil



Bentonite Seal



Filter Sand

BENNETT & O'REILLY, INC.

BORING LOG

Project Number: B004-4169	Boring ID: KE-6	Date: November 27, 2001
Project Address: 131 Main Street, Carver, MA	Boring Depth (feet): 12feet	
Drilling Contractor: Drillex	Boring Diameter (inches): 3.0	
Drill Method: Direct Push Geoprobe	Monitoring Well Installed? Yes, Total Depth = 11'	
Soil Sampling Method: 60" Hollow Tube	Well Diameter (inches): 1.0	
Soil Screening Method: Jar Headspace	Well Construction: 1.0" Sch. 40 PVC Riser w/ Flush Mount Road Box	
Screening Instrument: OVM Model 580B w 10.6 Ev Lamp	Well Screen Description: 10' x .010", Johnson PVC	

Depth	SAMPLE				TOVs (PPM)	SAMPLE DESCRIPTION	Strata	MW Log
	ID	Interval	Pen\Rec	Blows\6"				
	S1	0-1			Max = 0	3" Pavement w/ roadbase fill sand & stone to 5" diameter No O/V	Unconsolidated Sand	
	S2	1-4			Max=0.8	Light brown, sand&gravel fill, No O/V		
5	S3	4-8			Max=21.9	Light brown-browngray, very fine-fine grain, very well sorted, uncons sand, Trace stale petro odor, No V		
10	S4	8-12			Max=18	AA, fine-minor medium grain, uncons sand, Trace stale petroleum O, No V		
15						End of Boring		
20								
25								
30								

▼ Groundwater Table at time of
drilling

O/V = Olfactory / Visual

NOTE: Log Created from Historic Kaegael Env, Inc. Field Notes



Roadbox/Concrete



Native Soil



Bentonite Seal



Filter Sand

BENNETT & O'REILLY, INC.

BORING LOG

Project Number: B004-4169	Boring ID: KE-7	Date: November 27, 2001
Project Address: 131 Main Street, Carver, MA	Boring Depth (feet): 12feet	
Drilling Contractor: Drillex	Boring Diameter (inches): 3.0	
Drill Method: Direct Push Geoprobe	Monitoring Well Installed? No, boring only to assess off pavement	
Soil Sampling Method: 60" Hollow Tube	Well Diameter (inches):	south of KE-6
Soil Screening Method: Jar Headspace	Well Construction:	
Screening Instrument: OVM Model 580B w 10.6 Ev Lamp	Well Screen Description:	

Depth	SAMPLE				TOVs (PPM)	SAMPLE DESCRIPTION	Strata	MW Log
	ID	Interval	Pen\Rec	Blows\6"				
5	S1	0-4			Max= 0.8	Light brown, fine grain, very well sorted, uncons sand, No O/V	Unconsolidated Sand	
	S2	4-8			Max=1.1	Light brown - gray brown, silt-very fine grain, very well sorted, unconsolidated sand, fining downwards, No O/V		
10	S3	8-12			Max=1.4	Medium brown, silt-very fine grain, very well sorted, unconsolidated sand, minor (<1" thick) medium grain, sand, No O/V		
15						End of Boring		
20								
25								
30								

▼ Groundwater Table at time of drilling

O/V = Olfactory / Visual NOTE: Log Created from Historic Kaegael Env, Inc. Field Notes



Roadbox/Concrete



Native Soil



Bentonite Seal



Filter Sand

KAEGAEL Environmental, Inc. ONE West Street Fall River, MA Phone: (508) 675-9600 FAX: (508) 675-9601						FF-1	
Project No: K199-386				Soil Sampling Method: Continuous			
Project Name: Eagle Gas Site				Soil Sampling Device: 60" Continuous Hollow Tube Sampler			
Address: 133 Main Street, Carver, MA				Monitoring Well(MW):			
Field Technician/Date: Brian Clarke: 12/23/04				MW Construction: 2" PVC; 10 feet of .010" Screen;			
Drilling Contractor: Soil Exploration Corp.				MW Total Depth: 14.85' (from flush roadbox)			
Drilling Method: Direct Push							
Borehole Depth: 15 feet				Depth to Groundwater: 6.42'			
Borehole Diameter: 3 inches				Field Screening: OVM PID w/ 10.6 Ev Lamp			
Depth	Sample ID	Sample Interval (feet)	Penetration (blows/6 inches)	Sample Recovery (inches)	MAX. PID (ppm)	Sample Description	MW Log
10	SS1	0 - 1	NA	0	0	Grass, dark brown loamy topsoil	▼
	SS2	1 - 5		0	0	Light brown, fine grain, well sorted, unconsolidated sand, No O/V	
	SS3	5 - 7		0	0	Light brown, medium grain, uncons sand, No O/V	
	SS4	7 - 10		0	0	Light brown silt, No O/V	
	SS4	10 - 15				No samples, drive casing to 15' & set well	
20							
30							
40							
Native soil/backfill		Bentonite		Filter Sand		Concrete/Road box	
				O/V		Approx. Groundwater Elevation @ time of drilling Olfactory / Visual Evidence	
Notes: 1. USDA Soil Classification System 2. PID Detection Limit = 0.1 ppm 3. AA = As Above 4. NA = Not Applicable							

FF-2

1. USDA Soil Classification System 4. NA = Not Applicable
2. PID Detection Limit = 0.1 ppm
3. AA = As Above

FF-3

Field Screening: OVM PID w/ 10.6 Ev Lamp

O/V

4. NA = Not Applicable

FAX: (508) 675-9601

FF-4

Field Screening: OVM PID w/ 10.6 Ev Lamp

 O/N

3. AA = As Above

FF-5

Field Screening: OVM PID w/ 10.6 Ev Lamp

O/V

1. USDA Soil Classification System
2. PID Detection Limit = 0.1 ppm
3. AA = As Above
4. NA = Not Applicable

134176

Well Completion Report

NOTE: Well Completion Reports must be filed by the registered well driller within 30 days of well completion.

BOARD OF HEALTH COPY



WELL COMPLETION REPORT

WELL LOCATION Address: <u>135 Main St</u> City/Town: <u>Carver</u> Well owner: <u>Township</u> Address: <u>Carver</u> <u>Homes</u> Board of Health permit obtained: yes ☒ no ☐		GEOGRAPHIC DESCRIPTION _____ N S E W of _____ (feet) (circle) _____ (road) _____ N S E W of _____ (ft. in tenths) (circle) intersect. w/ _____ (road)																			
WELL USE Domestic ☒ Public ☐ Industrial ☐ Monitoring ☐ Other _____ Method drilled: <u>Superior Drilling</u> Date drilled: <u>2-29-96</u>		WELL DATA Total well depth: <u>20</u> ft. Depth to bedrock: <u>4750-5000</u> ft. Water-bearing material: <u>unconsolidated material</u> Description: <u>Water-bearing zones:</u> 1) From _____ To _____ 2) From _____ To _____ 3) From _____ To _____ Gravel pack well: _____ dia. Screen: _____ dia. Slot # <u>10</u> length <u>3</u> from <u>17</u> to <u>20</u>																			
CASING Type: <u>Sched 40 PVC</u> Length: <u>17</u> ft. Dia (I.D.): <u>2</u> in. Length into bedrock: _____ ft. Protective well seal: Grout ☐ Other _____																					
STATIC WATER LEVEL (all wells) Static water level below land surface: <u>8</u> ft. Date: <u>2-29-96</u> WELL TEST (production wells) Drawdown: <u>3</u> ft. after pumping <u>4</u> hr. _____ min. at <u>20</u> gpm How measured: <u>Shallow well pump</u> Recovery: <u>3</u> ft. after <u>1</u> hr. _____ min.																					
LOG of FORMATIONS <table border="1"> <thead> <tr> <th>Materials</th> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>Sub Soil</td> <td>0</td> <td>3</td> </tr> <tr> <td>Medium Sand</td> <td>3</td> <td></td> </tr> <tr> <td>+ Fine Sand</td> <td></td> <td>16</td> </tr> <tr> <td>Medium Sand</td> <td>16</td> <td></td> </tr> <tr> <td>Water Bearing Sand</td> <td></td> <td>20</td> </tr> </tbody> </table>		Materials	From	To	Sub Soil	0	3	Medium Sand	3		+ Fine Sand		16	Medium Sand	16		Water Bearing Sand		20	COMMENTS Driller: <u>John Barengo</u> Firm: <u>West End Drilling</u> Address: <u>98 Carver Rd</u> City/Town: <u>Plymouth Me</u> Supervising Driller Reg.# <u>108</u> Signature of supervising registered well driller	
Materials	From	To																			
Sub Soil	0	3																			
Medium Sand	3																				
+ Fine Sand		16																			
Medium Sand	16																				
Water Bearing Sand		20																			

Please print firmly

BOARD OF HEALTH COPY

APPENDIX D

Eagle Sas, Inc.
131 Main Street, Carver, MA
Survey Elevation Data
Septemeber 22, 2005

									11/22/2005 8:30				
Well Id	X	Y	Rim	PVC		Diameter	Curb Box Material	Bolt / #	Ref	DTP	DTW	Thickness	Corrected DTW
BP-01	21259.56	7672.12	Not Found			1						-	-
BP-02	21317.99	7667.89	100.01	99.78		1						-	-
BP-03	21387.59	7667.00	Not Found			1						-	-
BP-04	21321.13	7609.45	Not Found			1						-	-
BP-05RR	21229.73	7614.50	100.44	99.81		1	CI	Hex/Cen	PVC	0.00	6.62	-	-
BP-06	21276.08	7614.30	100.08	99.95		1						-	-
DCW-01	21248.28	7619.81	100.42	100.24		1						-	-
DCW-02	21280.62	7619.40	100.26	100.13		1						-	-
DCW-03	21409.19	7618.39	99.25	99.12		1						-	-
DCW-04	21263.78	7619.05	100.34	100.18		1						-	-
DCW-05	21192.65	7615.56	100.59	100.49		1	AL	Hex/Cen	PVC	0.00	5.34	-	-
DCW-06	21218.72	7579.71	100.88	100.74		1	AL	Hex/Cen	PVC	0.00	6.21	-	-
DCW-07	21231.76	7579.82	100.90	100.78		1						-	-
DCW-08	21237.79	7529.13	Not Surveyed (Tape measured only)			1						-	-
DCW-09	21227.72	7661.62	100.38	100.16		1						-	-
DCW-10	21287.95	7661.65	100.25	100.15		1						-	-
ECS-01	21216.56	7609.48	100.57	100.19		4						-	-
ECS-02	21226.87	7589.09	100.69	100.41		4						-	-
ECS-03	21245.35	7580.14	101.01	100.45		4						-	-
ECS-04	21222.90	7617.84	100.50	99.99		4						-	-
ECS-05	21241.12	7590.01	100.66	100.13		4						-	-
ECS-07	21669.94	7643.14	100.29	99.25		4						-	-

Eagle Sas, Inc.
131 Main Street, Carver, MA
Survey Elevation Data
Septemeber 22, 2005

ECS-08	21230.52	7584.48	100.75	100.50		4						-	-
ECS-09	21220.67	7605.74	100.68	100.26		4						-	-
ECS-10	21236.00	7606.14	100.51	99.80		4						-	-
EOW-01	21258.06	7613.49	100.53			4						-	-
EOW-02	21212.29	7631.85	100.82			4						-	-
ERW-01	21228.36	7609.39	100.46	100.04		4						-	-
ERW-02	21236.54	7617.40	100.42	99.90		4						-	-
ERW-03	21253.78	7617.83	100.35	99.57		4						-	-
ERW-04	21245.66	7609.91	100.37	99.58		4						-	-
FF-01	21405.96	7560.26	100.41	100.10		2						-	-
FF-02	21464.06	7691.35	97.87	97.65		2						-	-
FF-03	21446.88	7848.63	96.50	96.19		2						-	-
FF-04	21294.12	7709.03	99.87	99.80		2						-	-
FF-05	21243.57	7808.36	98.09	98.01		2						-	-
KEI-04	21197.26	7571.00	101.17	100.94		2						-	-
KEI-05	21295.77	7579.69	100.46	100.25		2						-	-
MW-A	21298.74	7596.96	100.37	100.27		2						-	-

9/22/05

204082

Date _____

42- 61

Project / Client

Across St

62.

Location

Date _____

9/22/05

Project / Client

Job 11.

204082

Location

Date _____

42-

63

Project / Client

			100.57		
114	FF-4	Rin	118.764	151 39 10	-0.699 99.87
115	PVC				-0.771 99.80 ✓
116	BCW-10	Rin	74.781	162 58 35	-0.322 100.25
117	PVC				-0.417 100.15 ✓
118	BP-2 (116)		99.780	174 45 35	-0.558 100.01
119	BP-2 (116)				-0.792 99.78 ✓
120	BP-2 (116)				
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188	BP-2 (116)				
189	BP-2 (116)				
190	BP-2 (116)				
191	BP-2 (116)				
192	BP-2 (116)				
193	BP-2 (116)				

This image shows a full page of blank graph paper. The grid consists of small squares formed by thin black lines. There are approximately 20 columns and 25 rows of squares. A single diagonal line is drawn across the bottom right corner of the grid. The paper has some minor scanning artifacts, such as small dark specks and faint horizontal lines near the top edge.

9/22/03

204002

100.47

$\kappa \text{ @ } \rho T - B$
 BS
 $\text{PT} - A$
 $HI = 5.44$

121	PR-A	98.69	00000	0.097	100.57	
122	PRW-4	96.974	4 3/25	-0.094	100.38	
				~~-0.087~~		
				~~-0.087~~	99.58	
129	PRCS-5	101.976	353 2730	+0.187	100.67	
				-0.349	100.12	✓
132	BWD	61.537	179 0720	-0.915	99.55	
133	BWD	74.726	148 1015	+0.024	100.49	
134	PR-3	Run 263.743	116 2755	-3.967	96.50	
135	PR-5	Run 224.227	47 0025	-4.279	96.19	
				-2.377	98.09	
136	PR-5			-2.455	98.01	✓
137	PR-5	204.088	166 4405	-6.221	94.25	WUNTER ON TOP
138	PR-1	51.326	177 5135	-0.352	100.12	
139	PR-1	79.294	218 5220	-0.058	100.41	
				-0.372	100.10	✓

Pitch Black with a Finished!
Long Day.

Location

Date _____

42- 65

Project / Client

[illegible]

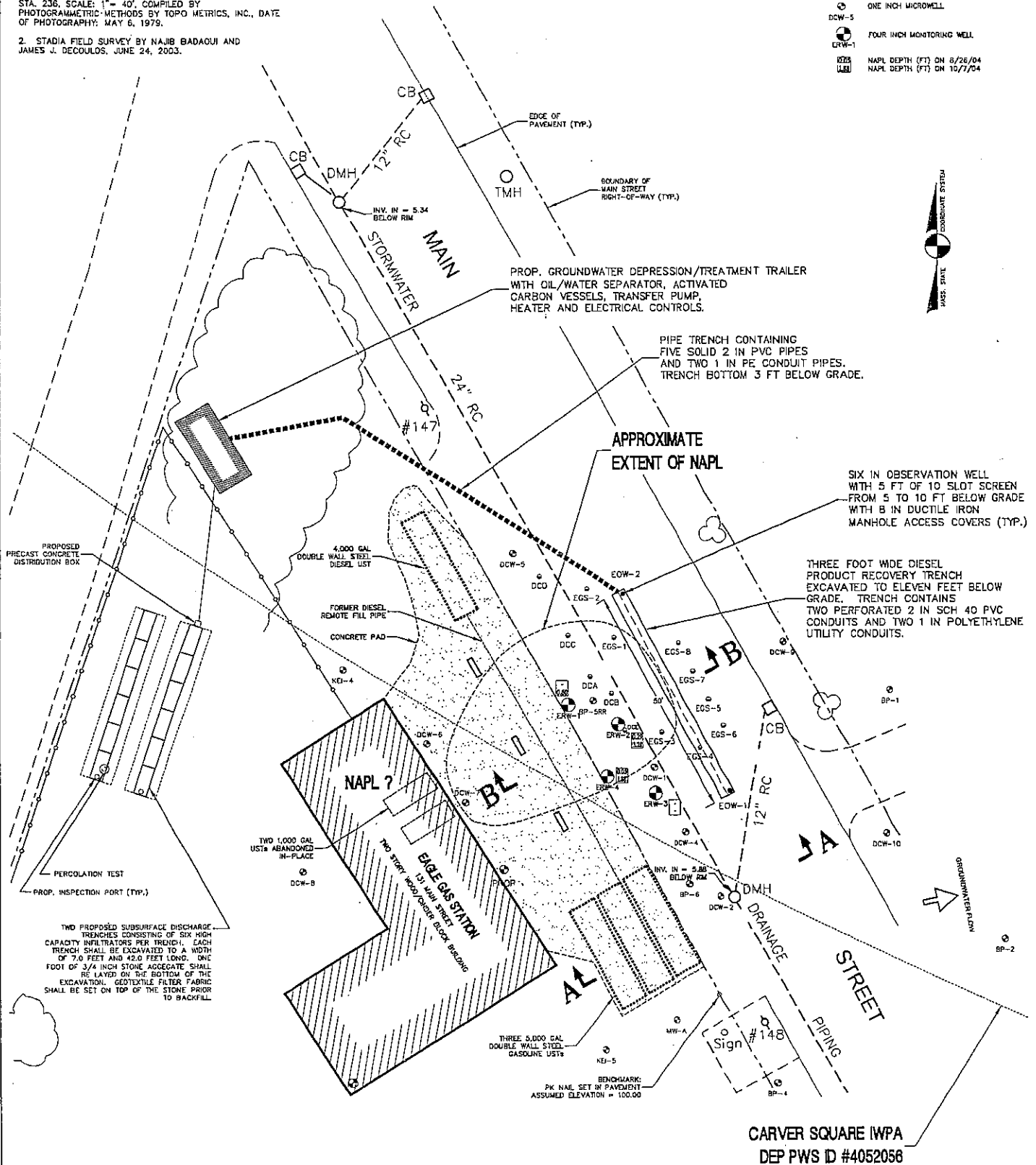
APPENDIX E

REFERENCES

1. LAYOUT OF ROUTE 58, WAREHAM - CARVER, MA
HIGHWAY DEPARTMENT, CONTRACT #20907, STA. 213 TO
STA. 236, SCALE: 1" = 40', COMPILED BY
PHOTOGRAMMETRIC METHODS BY TOPO METRICS, INC., DATE
OF PHOTOGRAPHY: MAY 6, 1979.
2. STADIA FIELD SURVEY BY NAJIB BADAQUI AND
JAMES J. DECOULOS, JUNE 24, 2003.

LEGEND

- ONE INCH SOIL BORING
- DCC
- DCW-5
- DCW-1
- NAPL DEPTH (FT) ON 8/26/04
- NAPL DEPTH (FT) ON 10/7/04

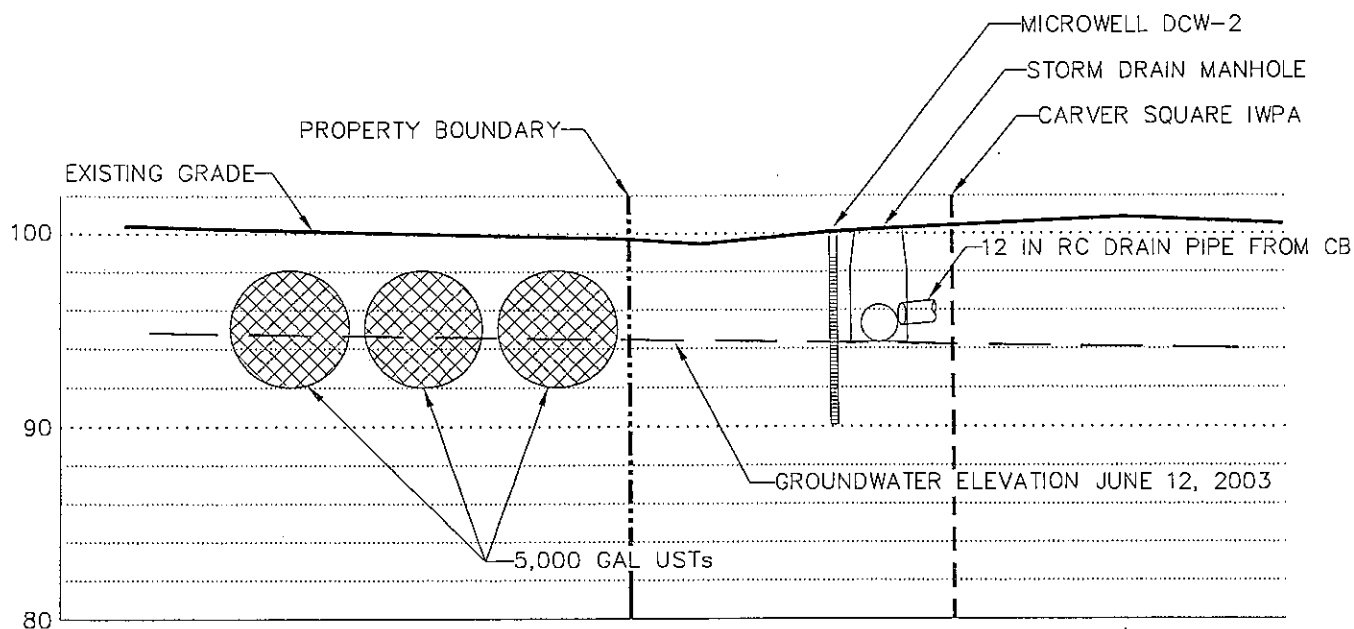


DECOULOS & COMPANY

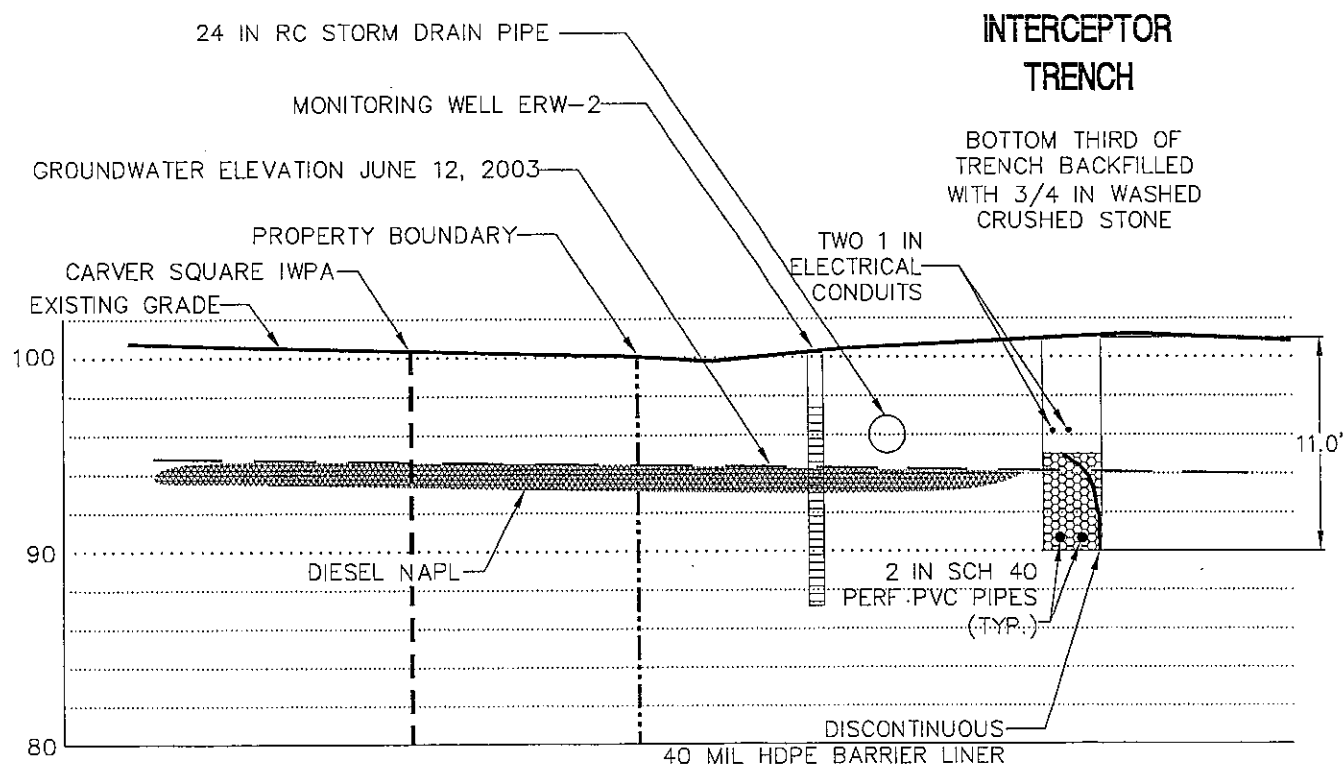
185 ALEWIFE BROOK PKWY, CAMBRIDGE, MA 02138
WWW.DECOULOS.COM
617.489.7795

PROPOSED PRODUCT RECOVERY EAGLE GAS STATION CARVER, MASSACHUSETTS

DATE
JUL 2005
SCALE
1" = 30'
FIGURE NO.
4



SECTION A-A

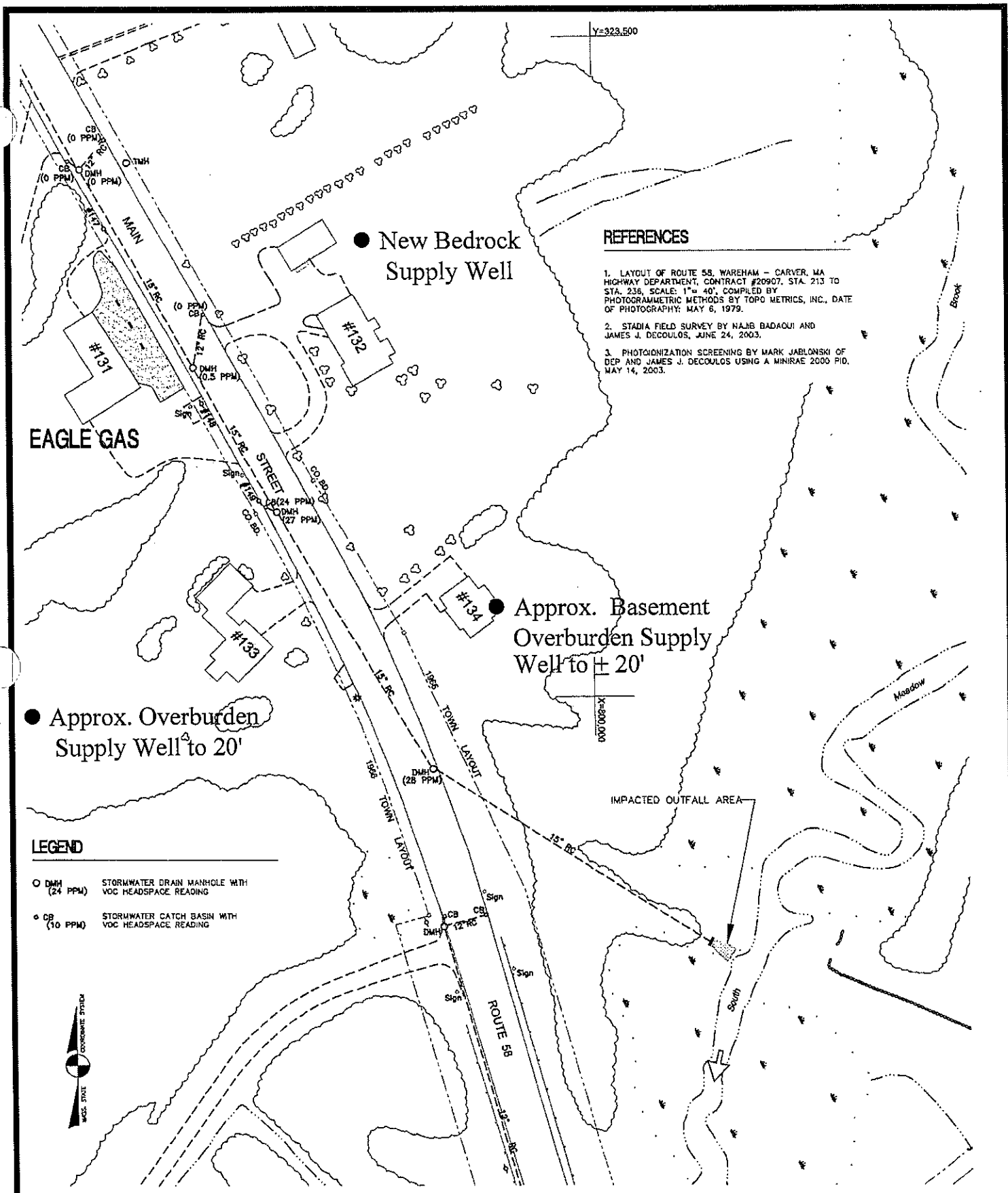


SECTION B-B

DECOULOS & COMPANY
 185 ALEWIFE BROOK PKWY, CAMBRIDGE, MA 02138
 WWW.DECOULOS.COM
 617.489.7795

**CROSS SECTIONS
 EAGLE GAS STATION
 CARVER, MASSACHUSETTS**

DATE
 JUL 2005
 SCALE
 1" = 10'
 FIGURE NO.
 5



131 Main Street
Carver, Massachusetts 02330



**KAEGAEL
ENVIRONMENTAL
INC.**

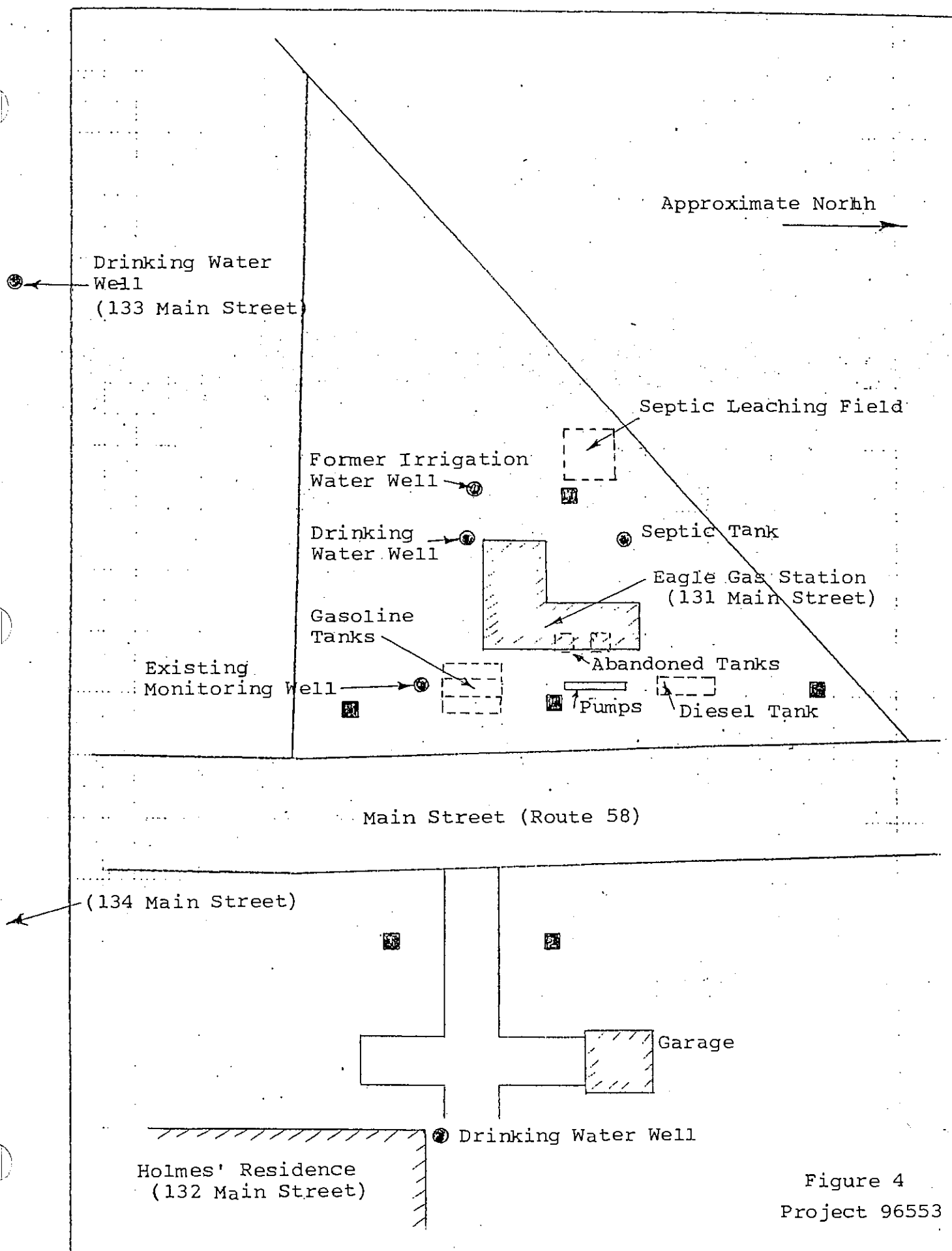


Figure 4
Project 96553

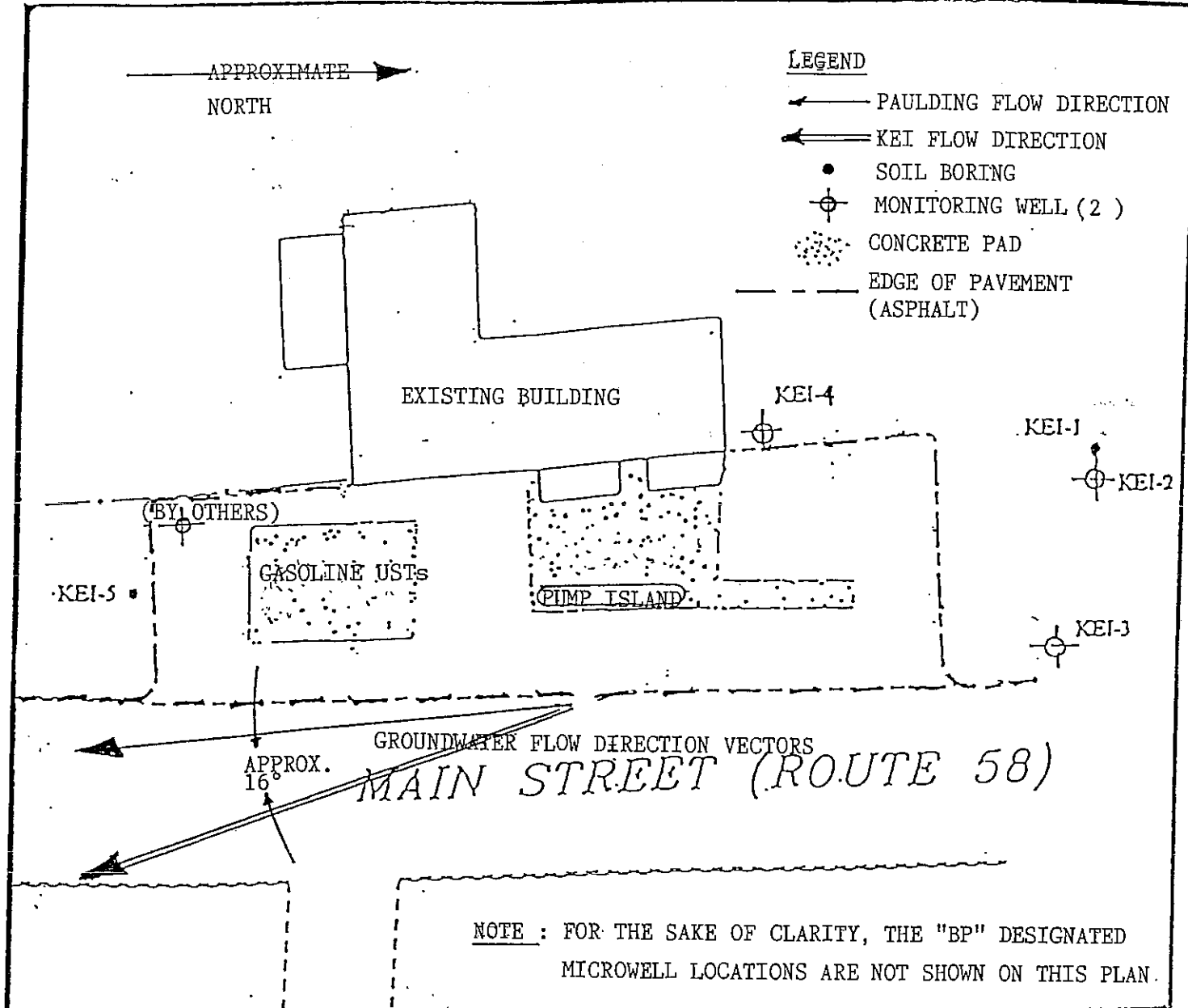


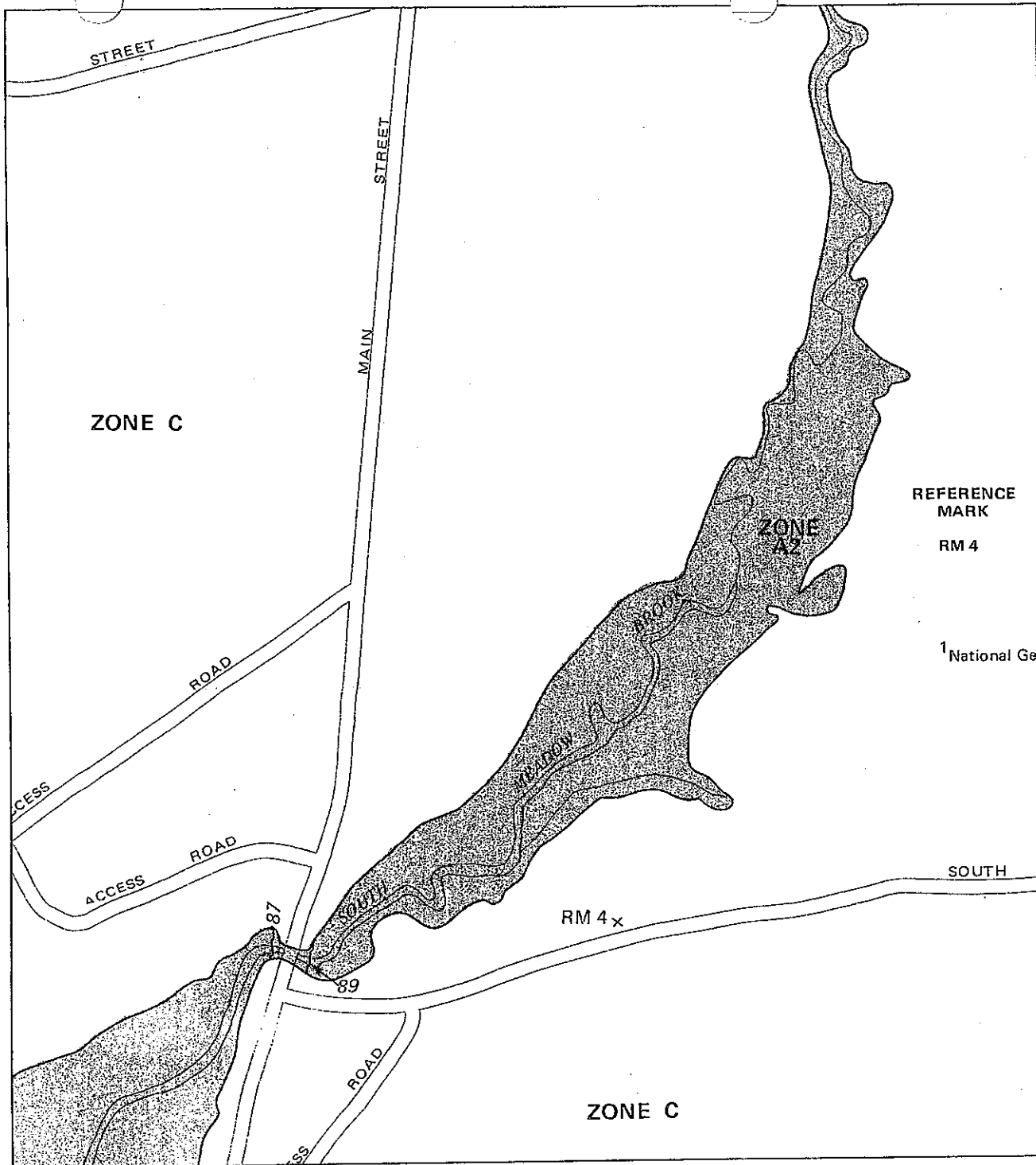
FIGURE 2

KEI MONITORING WELL/SOIL BORING LOCATIONS
AND
GROUNDWATER FLOW DIRECTION

BASE PLAN EXCERPTED FROM PAULDING RAO-C SKETCH



KAEGAEL
ENVIRONMENTAL
INC.



APPROXIMATE SCALE
400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
CARVER,
MASSACHUSETTS
PLYMOUTH COUNTY

PANEL 9 OF 20
(SEE MAP INDEX FOR PANELS NOT PRINTED)

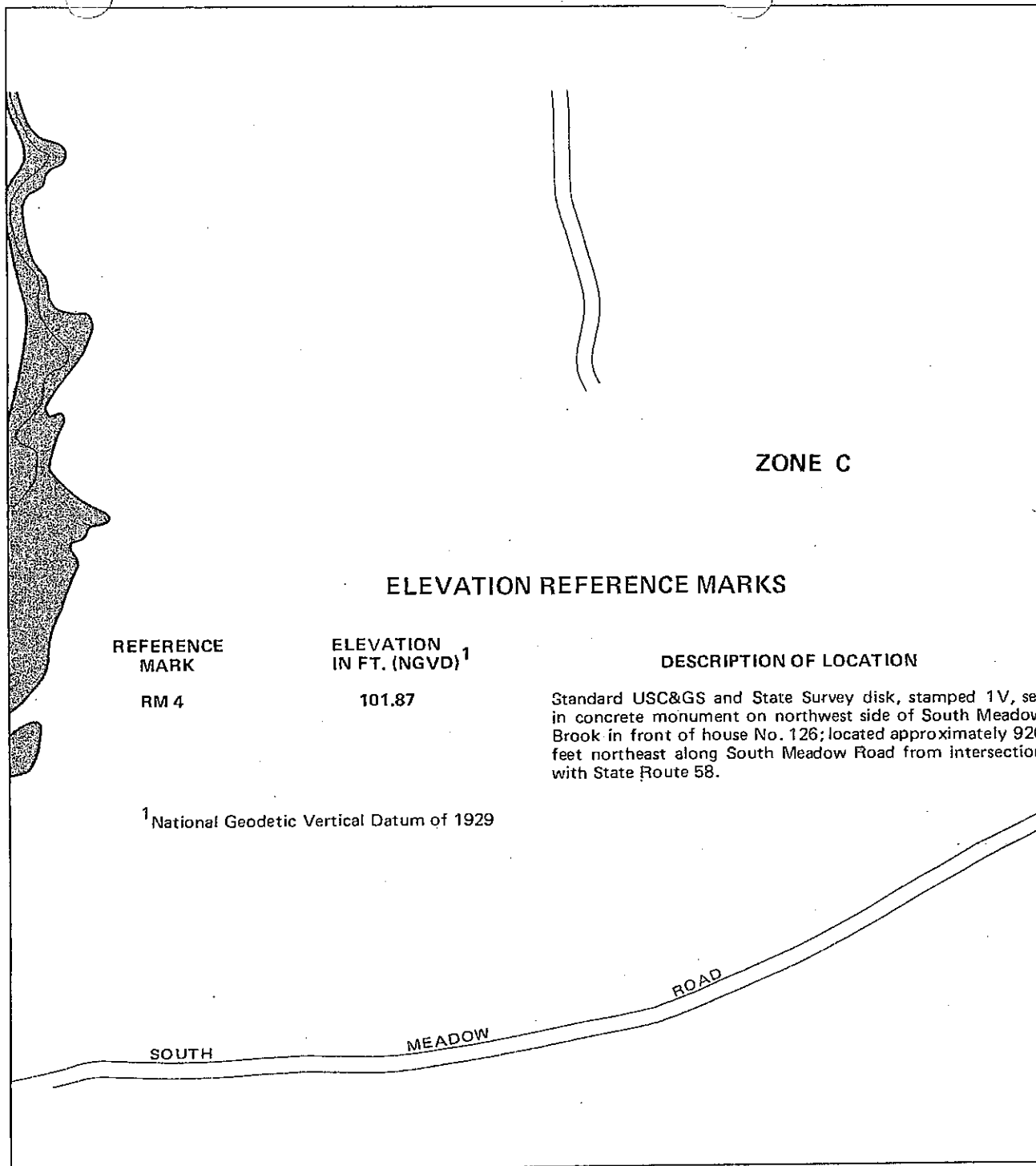
COMMUNITY-PANEL NUMBER
250262 0009 B

EFFECTIVE DATE:
JULY 19, 1982



Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT Version 1.0. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. Further information about National Flood Insurance Program flood hazard maps is available at www.fema.gov/mit/td.



APPROXIMATE SCALE
400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
CARVER,
MASSACHUSETTS
PLYMOUTH COUNTY

PANEL 9 OF 20
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
250262 0009 B

EFFECTIVE DATE:
JULY 19, 1982

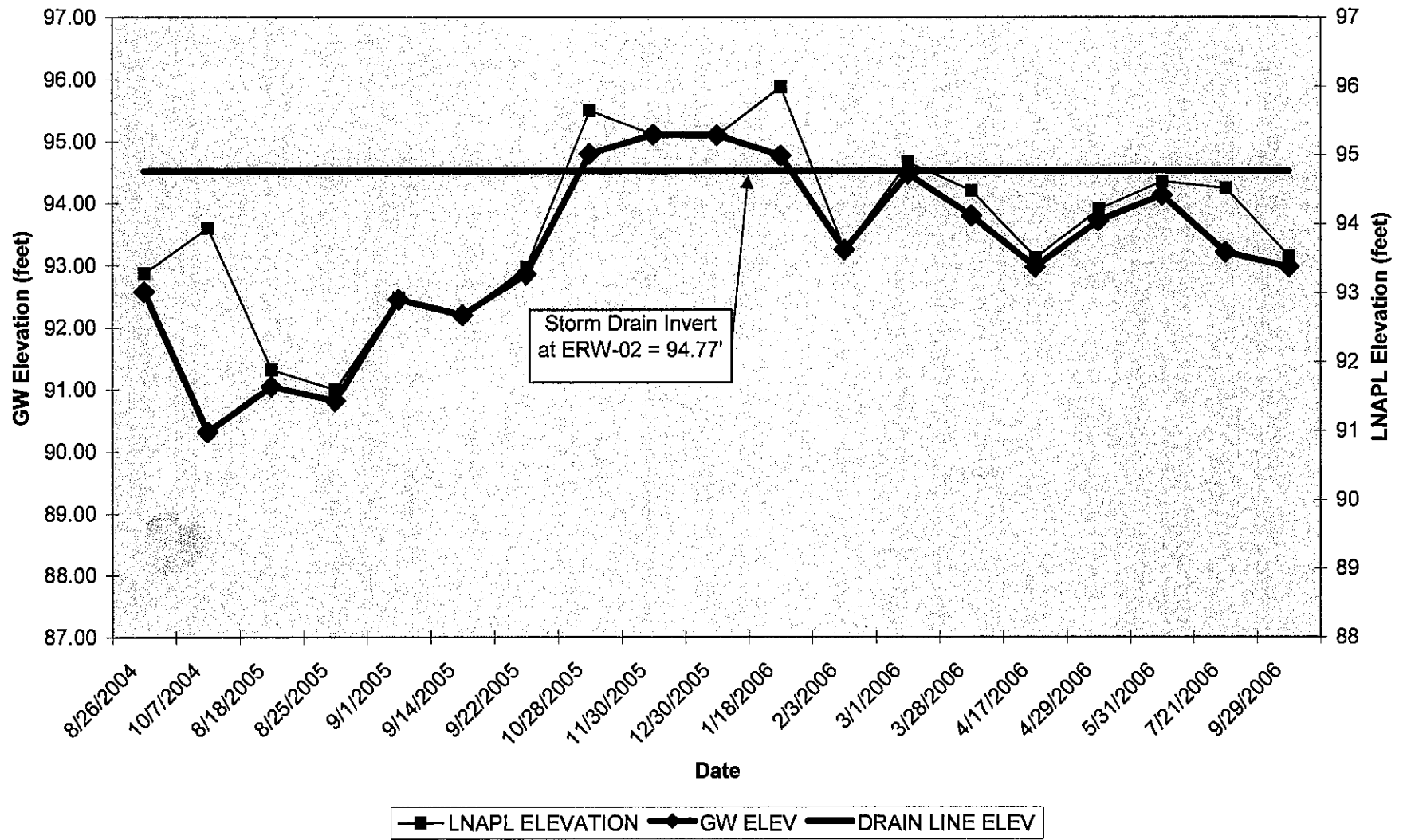


Federal Emergency Management Agency

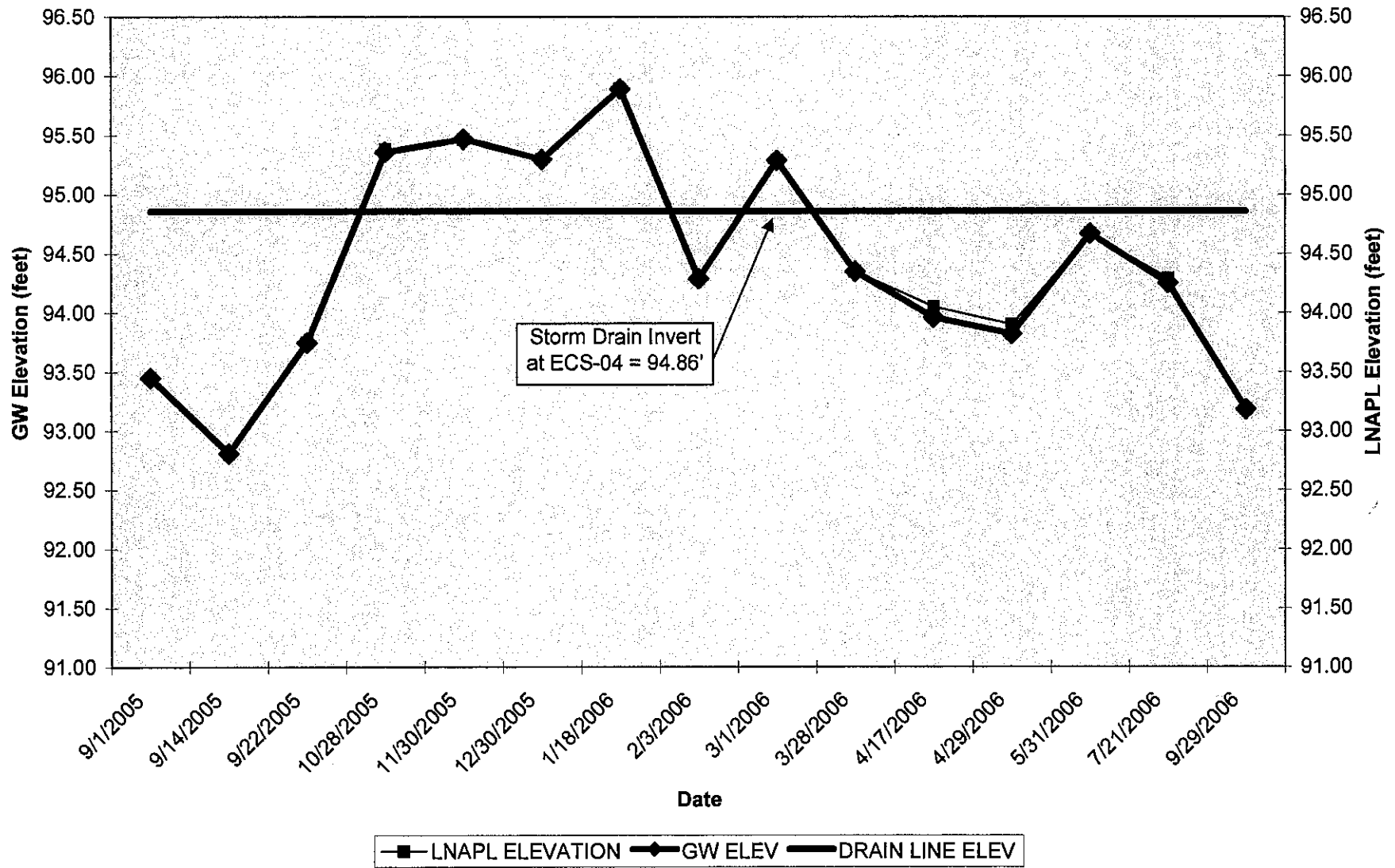
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT Version 1.0. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. Further information about National Flood Insurance Program flood hazard maps is available at www.fema.gov/mit/tsd.

APPENDIX F

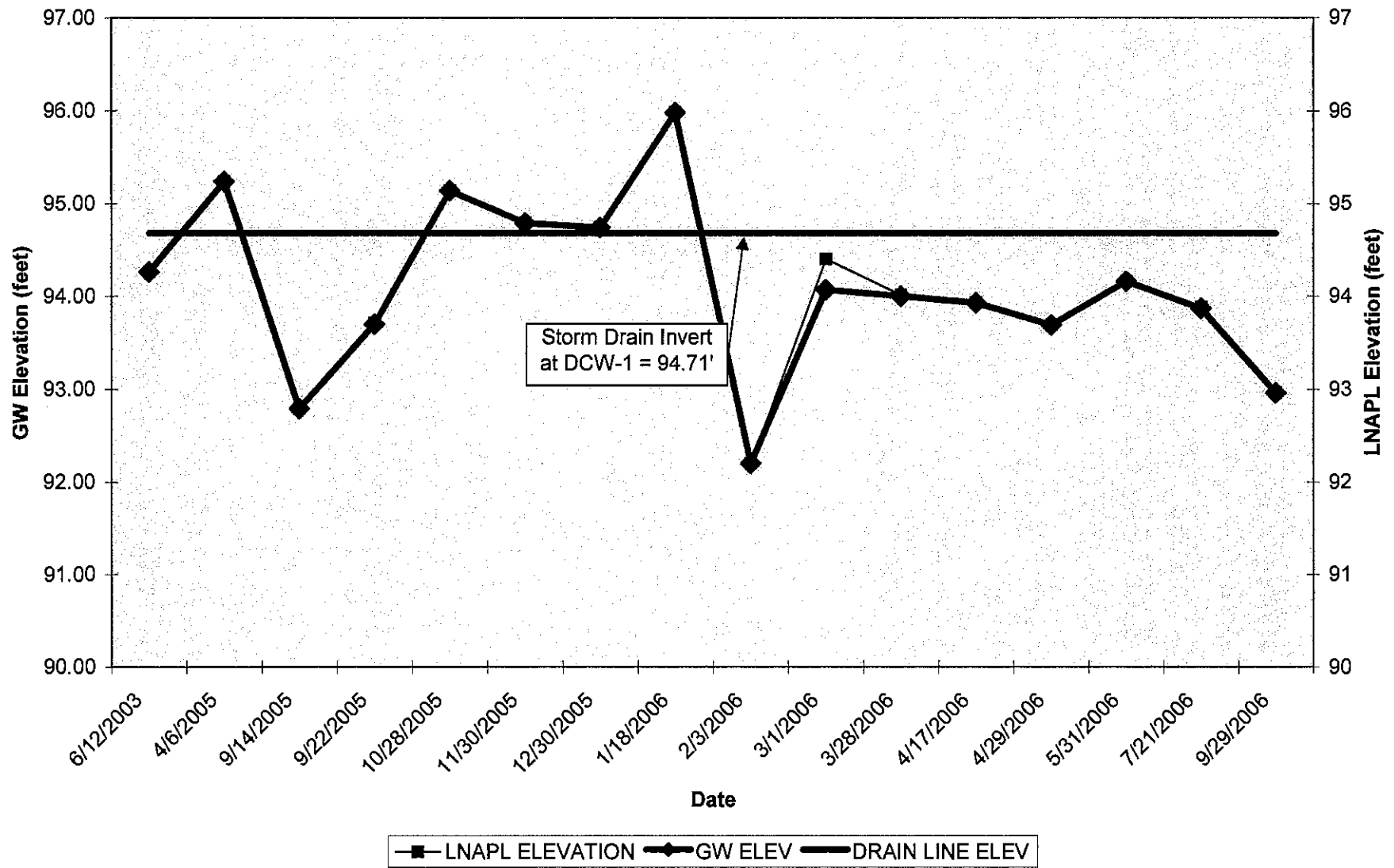
LNAPL and GW ELEVATIONS ERW-02



LNAPL and GW ELEVATIONS ECS-04



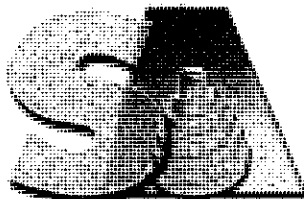
LNAPL and GW ELEVATIONS DCW-01



APPENDIX G

Report Date:
20-Oct-06 15:15

OCT 30 2006



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27 Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 91-204082.02

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA52812-01	DCW-5	Ground Water	17-Oct-06 16:00	18-Oct-06 15:48
SA52812-02	BP-4	Ground Water	17-Oct-06 14:45	18-Oct-06 15:48
SA52812-03	FF-1	Ground Water	17-Oct-06 13:25	18-Oct-06 15:48
SA52812-04	MW-A	Ground Water	17-Oct-06 12:20	18-Oct-06 15:48
SA52812-05	TB	Aqueous	17-Oct-06 00:00	18-Oct-06 15:48

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.

All applicable NELAC requirements have been met.

Please note that this report contains 15 pages of analytical data plus Chain of Custody document(s).

This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc.

Massachusetts Certification # M-MA138/MA1110

Connecticut # PH-0777

Florida # E87600/E87936

Maine # MA138

New Hampshire # 2538/2972

New Jersey # MA011/MA012

New York # 11393/11840

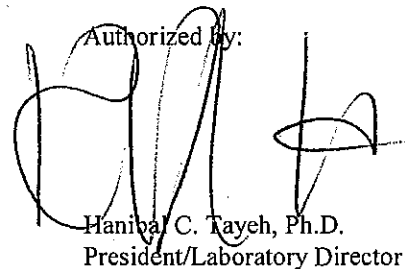
Rhode Island # 98

USDA # S-51435

Vermont # VT-11393



Authorized by:


Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

CASE NARRATIVE:

The data set for work order SA52812 complies with internal QC criteria for the methods performed. The samples were received @ 3.2 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

Sample Identification

DCW-5

SA52812-01

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

17-Oct-06 16:00

Received

18-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	19-Oct-06	20-Oct-06	6101412	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	5.4			µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	5	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	5	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	106			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	88.8			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	19-Oct-06	20-Oct-06	6101360	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	7.94	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	7.94	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	7.94	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	7.94	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	64.5			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	66.2			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	53.1			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	82.7			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 15

Sample Identification

BP-4

SA52812-02

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

17-Oct-06 14:45

Received

18-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	19-Oct-06	20-Oct-06	6101412	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	98.8			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	83.8			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	19-Oct-06	20-Oct-06	6101360	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.38	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.38	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.38	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.38	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	57.4			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	69.0			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	47.4			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	70.7			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 15

Sample Identification

FF-1

SA52812-03

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

17-Oct-06 13:25

Received

18-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	19-Oct-06	20-Oct-06	6101412	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	93.0			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	80.8			70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	19-Oct-06	20-Oct-06	6101360	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.26	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.26	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	53.2			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	70.3			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	47.5			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	74.3			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 15

Sample Identification

MW-A
SA52812-04

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

17-Oct-06 12:20

Received

18-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	19-Oct-06	20-Oct-06	6101412	ss
C9-C12 Aliphatic Hydrocarbons	0.111			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	0.171			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	0.129			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.282			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	11.4			µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	71.4			µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	11.1			µg/l	5.0	5	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	5	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	94.2			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	80.2			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	19-Oct-06	20-Oct-06	6101360	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.21	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.21	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.21	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.21	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	55.3			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	72.6			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	62.8			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	82.5			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 15

Sample Identification

TB

SA52812-05

Client Project #

91-204082.02

Matrix

Aqueous

Collection Date/Time

17-Oct-06 00:00

Received

18-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	19-Oct-06	20-Oct-06	6101412	ss
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL	µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL	µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL	µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL	µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL	µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL	µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL	µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	99.0	70-130 %	"	"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	84.4	70-130 %	"	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 15

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	RPD Limit
Batch 6101412 - VPH										
Blank (6101412-BLK1)										
Prepared & Analyzed: 19-Oct-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	49.5		µg/l		50.0		99.0	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.9		µg/l		50.0		83.8	70-130		
LCS (6101412-BS1)										
Prepared & Analyzed: 19-Oct-06										
C5-C8 Aliphatic Hydrocarbons	114		mg/l		140		81.4	70-130		
C9-C12 Aliphatic Hydrocarbons	63.0		mg/l		55.2		114	70-130		
C9-C10 Aromatic Hydrocarbons	33.7		mg/l		40.0		84.2	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	242		mg/l		280		86.4	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	96.8		mg/l		84.8		114	70-130		
Benzene	18.3		µg/l		20.0		91.5	70-130		
Ethylbenzene	18.1		µg/l		20.0		90.5	70-130		
Methyl tert-butyl ether	19.3		µg/l		20.0		96.5	70-130		
Naphthalene	20.2		µg/l		20.0		101	70-130		
Toluene	17.9		µg/l		20.0		89.5	70-130		
m,p-Xylene	35.8		µg/l		40.0		89.5	70-130		
o-Xylene	18.3		µg/l		20.0		91.5	70-130		
2-Methylpentane	21.4		µg/l		20.0		107	70-130		
n-Nonane	21.7		µg/l		20.0		108	70-130		
n-Pentane	20.3		µg/l		20.0		102	70-130		
1,2,4-Trimethylbenzene	18.7		µg/l		20.0		93.5	70-130		
2,2,4-Trimethylpentane	20.7		µg/l		20.0		104	70-130		
n-Butylcyclohexane	22.4		µg/l		20.0		112	70-130		
n-Decane	18.3		µg/l		20.0		91.5	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	49.5		µg/l		50.0		99.0	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	39.5		µg/l		50.0		79.0	70-130		
LCS Dup (6101412-BSD1)										
Prepared & Analyzed: 19-Oct-06										
C5-C8 Aliphatic Hydrocarbons	113		mg/l		140		80.7	70-130	0.864	25
C9-C12 Aliphatic Hydrocarbons	61.9		mg/l		55.2		112	70-130	1.77	25
C9-C10 Aromatic Hydrocarbons	37.1		mg/l		40.0		92.8	70-130	9.72	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	246		mg/l		280		87.9	70-130	1.72	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	99.0		mg/l		84.8		117	70-130	2.60	25
Benzene	18.5		µg/l		20.0		92.5	70-130	1.09	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6101412 - VPH										
LCS Dup (6101412-BSD1)										
Prepared & Analyzed: 19-Oct-06										
Ethylbenzene	18.7		µg/l		20.0		93.5	70-130	3.26	25
Methyl tert-butyl ether	20.3		µg/l		20.0		102	70-130	5.54	25
Naphthalene	22.9		µg/l		20.0		114	70-130	12.1	25
Toluene	18.5		µg/l		20.0		92.5	70-130	3.30	25
m,p-Xylene	37.3		µg/l		40.0		93.2	70-130	4.05	25
o-Xylene	19.2		µg/l		20.0		96.0	70-130	4.80	25
2-Methylpentane	20.0		µg/l		20.0		100	70-130	6.76	25
n-Nonane	21.4		µg/l		20.0		107	70-130	0.930	25
n-Pentane	18.7		µg/l		20.0		93.5	70-130	8.70	25
1,2,4-Trimethylbenzene	19.2		µg/l		20.0		96.0	70-130	2.64	25
2,2,4-Trimethylpentane	21.2		µg/l		20.0		106	70-130	1.90	25
n-Butylcyclohexane	22.6		µg/l		20.0		113	70-130	0.889	25
n-Decane	22.3		µg/l		20.0		112	70-130	20.1	25
Surrogate: 2,5-Dibromotoluene (FID)	58.0		µg/l		50.0		116	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	46.7		µg/l		50.0		93.4	70-130		
Duplicate (6101412-DUP1) Source: SA52809-06										
Prepared: 19-Oct-06 Analyzed: 20-Oct-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	48.5		µg/l		50.0		97.0	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.0		µg/l		50.0		82.0	70-130		
Matrix Spike (6101412-MS1) Source: SA52809-06										
Prepared: 19-Oct-06 Analyzed: 20-Oct-06										
Benzene	17.3		µg/l		20.0	BRL	86.5	70-130		
Ethylbenzene	17.6		µg/l		20.0	BRL	88.0	70-130		
Methyl tert-butyl ether	17.7		µg/l		20.0	BRL	88.5	70-130		
Naphthalene	18.0		µg/l		20.0	BRL	90.0	70-130		
Toluene	17.2		µg/l		20.0	BRL	86.0	70-130		
m,p-Xylene	34.8		µg/l		40.0	BRL	87.0	70-130		
o-Xylene	17.9		µg/l		20.0	BRL	89.5	70-130		
2-Methylpentane	17.6		µg/l		20.0	BRL	88.0	70-130		
n-Nonane	21.2		µg/l		20.0	BRL	106	70-130		
n-Pentane	16.8		µg/l		20.0	BRL	84.0	70-130		
1,2,4-Trimethylbenzene	18.7		µg/l		20.0	BRL	93.5	70-130		
2,2,4-Trimethylpentane	19.4		µg/l		20.0	BRL	97.0	70-130		
n-Butylcyclohexane	23.3		µg/l		20.0	0.0	116	70-130		
n-Decane	25.5		µg/l		20.0	0.0	128	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	47.8		µg/l		50.0		95.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	37.9		µg/l		50.0		75.8	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6101360 - SW846 3510C										
Blank (6101360-BLK1)										
Prepared & Analyzed: 19-Oct-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.50						
2-Methylnaphthalene	BRL		µg/l	2.50						
Acenaphthene	BRL		µg/l	2.50						
Phenanthrene	BRL		µg/l	2.50						
Anthracene	BRL		µg/l	2.50						
Pyrene	BRL		µg/l	2.50						
Chrysene	BRL		µg/l	2.50						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	25.3		µg/l		50.0		50.6	40-140		
Surrogate: Ortho-Terphenyl	34.6		µg/l		50.0		69.2	40-140		
Surrogate: 2-Bromonaphthalene	21.4		µg/l		40.0		53.5	40-140		
Surrogate: 2-Fluorobiphenyl	32.1		µg/l		40.0		80.2	40-140		
LCS (6101360-BS1)										
Prepared & Analyzed: 19-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.300		mg/l	0.2	0.600		50.0	40-140		
C19-C36 Aliphatic Hydrocarbons	0.336		mg/l	0.2	0.800		42.0	40-140		
C11-C22 Aromatic Hydrocarbons	1.56		mg/l	0.2	1.70		91.8	40-140		
Naphthalene	45.8		µg/l	2.50	100		45.8	40-140		
2-Methylnaphthalene	51.3		µg/l	2.50	100		51.3	40-140		
Acenaphthene	62.4		µg/l	2.50	100		62.4	40-140		
Phenanthrene	80.3		µg/l	2.50	100		80.3	40-140		
Anthracene	77.9		µg/l	2.50	100		77.9	40-140		
Pyrene	87.3		µg/l	2.50	100		87.3	40-140		
Chrysene	89.9		µg/l	2.50	100		89.9	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
Surrogate: 1-Chlorooctadecane	24.8		µg/l		50.0		49.6	40-140		
Surrogate: Ortho-Terphenyl	24.6		µg/l		50.0		49.2	40-140		
Surrogate: 2-Bromonaphthalene	22.6		µg/l		40.0		56.5	40-140		
Surrogate: 2-Fluorobiphenyl	35.8		µg/l		40.0		89.5	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (61013)										
Prepared & Analyzed: 19-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.434		mg/l	0.2	0.600		72.3	40-140		
C19-C36 Aliphatic Hydrocarbons	0.503		mg/l	0.2	0.800		62.9	40-140		
C11-C22 Aromatic Hydrocarbons	1.55		mg/l	0.2	1.70		91.2	40-140		
Naphthalene	55.6		µg/l	2.50	100		55.6	40-140		
2-Methylnaphthalene	68.3		µg/l	2.50	100		68.3	40-140		
Acenaphthene	75.6		µg/l	2.50	100		75.6	40-140		
Phenanthrene	84.7		µg/l	2.50	100		84.7	40-140		
Anthracene	79.8		µg/l	2.50	100		79.8	40-140		
Pyrene	85.4		µg/l	2.50	100		85.4	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 15

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6101360 - SW846 3510C										
Fractionation Check Standard (61013)										
Prepared & Analyzed: 19-Oct-06										
Chrysene	81.9		µg/l	2.50	100		81.9	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
Surrogate: 1-Chlorooctadecane	33.2		µg/l		50.0		66.4	40-140		
Surrogate: Ortho-Terphenyl	25.6		µg/l		50.0		51.2	40-140		
Surrogate: 2-Bromonaphthalene	22.5		µg/l		40.0		56.2	40-140		
Surrogate: 2-Fluorobiphenyl	31.4		µg/l		40.0		78.5	40-140		
LCS Dup (6101360-BSD1)										
Prepared & Analyzed: 19-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.317		mg/l	0.2	0.600		52.8	40-140	5.45	25
C19-C38 Aliphatic Hydrocarbons	0.403		mg/l	0.2	0.800		50.4	40-140	18.2	25
C11-C22 Aromatic Hydrocarbons	1.44		mg/l	0.2	1.70		84.7	40-140	8.05	25
Naphthalene	43.5		µg/l	2.50	100		43.5	40-140	5.15	20
2-Methylnaphthalene	48.5		µg/l	2.50	100		48.5	40-140	5.61	20
Acenaphthene	58.1		µg/l	2.50	100		58.1	40-140	7.14	20
Phenanthrene	75.1		µg/l	2.50	100		75.1	40-140	6.69	20
Anthracene	71.8		µg/l	2.50	100		71.8	40-140	8.15	20
Pyrene	80.8		µg/l	2.50	100		80.8	40-140	7.73	20
Chrysene	82.8		µg/l	2.50	100		82.8	40-140	8.22	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
Surrogate: 1-Chlorooctadecane	26.1		µg/l		50.0		52.2	40-140		
Surrogate: Ortho-Terphenyl	22.6		µg/l		50.0		45.2	40-140		
Surrogate: 2-Bromonaphthalene	22.2		µg/l		40.0		55.5	40-140		
Surrogate: 2-Fluorobiphenyl	36.0		µg/l		40.0		90.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 15

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0610172				
Calibration Check (0610172-CCV1)				
C9-C18 Aliphatic Hydrocarbons	2.51092E+08	2.11039E+08	5.67	25.00
C19-C36 Aliphatic Hydrocarbons	3.56657E+08	1.87394E+08	-3.12	25.00
C11-C22 Aromatic Hydrocarbons	18.7817	14.8239	6.47	25.00
Naphthalene	6.26751	6.21365	-0.859	20.00
2-Methylnaphthalene	3.89698	3.8525	-1.14	20.00
Acenaphthene	3.90202	3.89789	-0.106	20.00
Phenanthrene	5.84798	6.13371	4.89	20.00
Anthracene	6.35301	6.38359	0.481	20.00
Pyrene	6.7102	7.06269	5.25	20.00
Chrysene	6.26728	6.31201	0.714	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 15

Notes and Definitions

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Christopher Hall



Page 14 of 15

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:

This form provides certifications for the following Spectrum Analytical, Inc. work order #: SA52812

Matrix	☒ Groundwater	☐ Soil/Sediment	☐ Drinking Water	☐ Other
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☐ 6010B
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³

1 List Release Tracking Number (RTN), if known

2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method

3 S - SW-846 Methods 7000 Series List individual method and analyte

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☒ Yes ☐ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



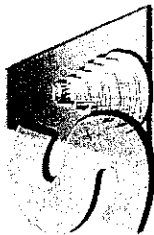
Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Date: 10/20/2006

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* Reportable Detection Limit

BRL = Below Reporting Limit



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Report To: ECS, Auburn

Invoice To: ECS, Agawam

Project No.: 91-204082.02

Project Mgr.: Chuck Klingler

Site Name: Eagle Gas

Location: 131 Main St., Carver

State: MA

1= $\text{Na}_2\text{S}_2\text{O}_3$ 2= HCl 3= H_2SO_4 4= HNO_3 5= NaOH 6=Ascorbic Acid

7= CH_3OH 8= NaHSO_4 9=Fee 10=

Sampler(s): A. Kaczowka

DW=Drinking Water GW=Groundwater WW=Wastewater

O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air

X1= X2= X3=

G=Grab C=Composite

Containers:

Analyses:

QA Reporting Notes:
(check if needed)

State specific reporting standards
If applicable, please list below.

Preservative

Matrix

Type

Time:

Date:

Sample Id:

Lab Id:

Relinquished by:

Received by:

Date:

Time:

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C

Fax results when available to ()

E-mail to cklingler@ecsconsuht.com

EDD Format

Special Handling:

☐ Standard TAT - 7 to 10 business days

☒ Rush TAT - Date Needed: 10-19-06

All TATs subject to laboratory approval.

Min. 24-hour notification needed for rushes.

Samples disposed of after 60 days unless otherwise instructed.

Provide MCP CAM Report

Were all field QC requirements met as per MADEP CAM Section 2.0?

☒ Yes ☐ No

(Response required for CAM report)

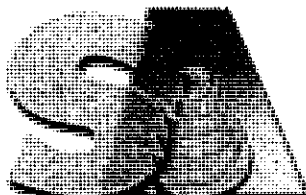
Ref.

11 Almgren Drive • Agawam, Massachusetts 01001 • 413-789-9018 • Fax 413-789-4076 • www.spectrum-analytical.com



Report Date: 13-Oct-06 10:33
OCT 25 2006

BY: *lp*



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27 Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 91-204082.02

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SA51961-01	DCW-1	Ground Water	29-Sep-06 11:20	02-Oct-06 15:30
SA51961-02	DCW-2	Ground Water	29-Sep-06 13:15	02-Oct-06 15:30
SA51961-03	DCW-3	Ground Water	29-Sep-06 16:00	02-Oct-06 15:30
SA51961-04	DCW-8	Ground Water	29-Sep-06 13:45	02-Oct-06 15:30
SA51961-05	KE1-4	Ground Water	29-Sep-06 16:30	02-Oct-06 15:30
SA51961-06	BP-1	Ground Water	29-Sep-06 15:20	02-Oct-06 15:30
SA51961-07	BP-2	Ground Water	29-Sep-06 16:00	02-Oct-06 15:30
SA51961-08	BP-3	Ground Water	29-Sep-06 15:45	02-Oct-06 15:30
SA51961-09	MH-2	Ground Water	29-Sep-06 10:10	02-Oct-06 15:30
SA51961-10	MH-3	Ground Water	29-Sep-06 10:40	02-Oct-06 15:30
SA51961-11	131 Main St	Drinking Water	29-Sep-06 13:30	02-Oct-06 15:30
SA51961-12	132 Main St	Drinking Water	29-Sep-06 12:30	02-Oct-06 15:30
SA51961-13	133 Main St	Drinking Water	29-Sep-06 13:00	02-Oct-06 15:30
SA51961-14	DCW-4	Ground Water	29-Sep-06 11:00	02-Oct-06 15:30

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.

All applicable NELAC requirements have been met.

Please note that this report contains 33 pages of analytical data plus Chain of Custody document(s).

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Massachusetts Certification # M-MA138/MA1110

Connecticut # PH-0777

Florida # E87600/E87936

Maine # MA138

New Hampshire # 2538/2972

New Jersey # MA011/MA012

New York # 11393/11840

Rhode Island # 98

USDA # S-51435

Vermont # VT-11393



Authorized by:

[Signature]
Hanibal C. Fayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification

DCW-1

SA51961-01

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 11:20

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	4.64		mg/l	3.75	250	+MADEP 5/2004 Rev 1.1	11-Oct-06	12-Oct-06	6100780	ss
C9-C12 Aliphatic Hydrocarbons	6.27		mg/l	1.25	250	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	4.89		mg/l	1.25	250	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	29.1		mg/l	3.75	250	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	11.2		mg/l	1.25	250	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	250	250	"	"	"	"	"
100-41-4	Ethylbenzene	396		µg/l	250	250	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	21,600		µg/l	250	250	"	"	"	"	"
91-20-3	Naphthalene	332		µg/l	250	250	"	"	"	"	"
108-88-3	Toluene	274		µg/l	250	250	"	"	"	"	"
1330-20-7	m,p-Xylene	1,550		µg/l	500	250	"	"	"	"	"
95-47-6	o-Xylene	668		µg/l	250	250	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	94.2			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	69.6	S-GC		70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	0.7		mg/l	0.2	1	+MADEP 5/2004 R	05-Oct-06	12-Oct-06	6100299	M.B
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	1.2		mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	1.3		mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	1.9		mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	2.1		mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	128		µg/l	7.81	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	54.3		µg/l	7.81	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	7.81	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	7.81	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	47.0			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	74.8			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	53.3			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	81.8			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 33

Sample Identification

DCW-2

SA51961-02

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 13:15

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.375	25	+MADEP 5/2004 Rev 1.1	11-Oct-06	12-Oct-06	6100780	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.125	25	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.125	25	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	3.02			mg/l	0.375	25	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	BRL			mg/l	0.125	25	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	25.0	25	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	25.0	25	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	2,930		µg/l	25.0	25	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	25.0	25	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	25.0	25	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	50.0	25	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	25.0	25	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	114			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	80.4			70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Oct-06	12-Oct-06	6100299	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	6.67	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	6.67	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	6.67	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	6.67	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	51.0			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	66.6			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	32.6	S-GC		40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	83.9			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 33

Sample Identification

DCW-3

SA51961-03

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 16:00

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	11-Oct-06	12-Oct-06	6100780	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	113			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	80.0			70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Oct-06	12-Oct-06	6100299	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	6.76	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	6.76	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	6.76	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	6.76	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	47.5			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	64.2			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	44.5			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	83.9			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 33

Sample Identification

DCW-8

SA51961-04

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 13:45

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	12-Oct-06	12-Oct-06	6100850	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	104				70-130 %		"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	73.4				70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Oct-06	12-Oct-06	6100299	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.81	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.81	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.81	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.81	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	46.0				40-140 %		"	"	"	"	"
84-15-1 Ortho-Terphenyl	68.0				40-140 %		"	"	"	"	"
580-13-2 2-Bromonaphthalene	63.7				40-140 %		"	"	"	"	"
321-60-8 2-Fluorobiphenyl	83.2				40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 33

Sample IdentificationKEI-4
SA51961-05Client Project #
91-204082.02Matrix
Ground WaterCollection Date/Time
29-Sep-06 16:30Received
02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	12-Oct-06	12-Oct-06	6100850	ss
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic	BRL		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	103			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	73.4			70-130 %		"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	05-Oct-06	12-Oct-06	6100299	M.B
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	6.85	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	6.85	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	6.85	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	6.85	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	61.8			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	76.6			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	47.3			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	88.7			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 33

Sample Identification

BP-1

SA51961-06

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 15:20

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	12-Oct-06	12-Oct-06	6100850	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	104			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	74.2			70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Oct-06	12-Oct-06	6100299	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	5.38	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.38	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.38	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.38	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	52.0			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	71.0			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	30.5	S-GC		40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	82.6			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 33

Sample Identification

BP-2

SA51961-07

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 16:00

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	12-Oct-06	12-Oct-06	6100850	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	104			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	73.4			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Oct-06	12-Oct-06	6100299	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	7.35	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	7.35	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	7.35	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	7.35	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	58.9			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	73.7			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	46.4			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	73.6			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 33

Sample Identification

BP-3

SA51961-08

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 15:45

Received

02-Oct-06

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	12-Oct-06	12-Oct-06	6100850	ss
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	BRL		mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	BRL		mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	112		70-130 %		"	"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	78.6		70-130 %		"	"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	06-Oct-06	12-Oct-06	6100418	M.B
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL		mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL		mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	5.81	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.81	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.81	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.81	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	41.0		40-140 %		"	"	"	"	"	"
84-15-1	Ortho-Terphenyl	70.6		40-140 %		"	"	"	"	"	"
580-13-2	2-Bromonaphthalene	64.3		40-140 %		"	"	"	"	"	"
321-60-8	2-Fluorobiphenyl	122		40-140 %		"	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 33

Sample Identification

MH-2

SA51961-09

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 10:10

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	12-Oct-06	12-Oct-06	6100850	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	107			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	76.0			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	06-Oct-06	12-Oct-06	6100418	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.21	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.21	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.21	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.21	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	49.9			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	74.1			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	37.4	S-GC		40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	82.0			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 33

Sample Identification

MH-3
SA51961-10

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 10:40

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	12-Oct-06	12-Oct-06	6100850	SS
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	12-Oct-06	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	BRL		mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	BRL		mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	110			70-130 %		"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	77.2			70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	06-Oct-06	12-Oct-06	6100418	M.B
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL		mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL		mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL		µg/l	6.10	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL		µg/l	6.10	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL		µg/l	6.10	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL		µg/l	6.10	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	42.0			40-140 %		"	"	"	"	"
84-15-1 Ortho-Terphenyl	44.6			40-140 %		"	"	"	"	"
580-13-2 2-Bromonaphthalene	24.4	S-GC		40-140 %		"	"	"	"	"
321-60-8 2-Fluorobiphenyl	60.9			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 33

Sample Identification131 Main St
SA51961-11Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

29-Sep-06 13:30

Received

02-Oct-06

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
Volatile Organic Compounds											
<u>14.2 Purgeable Organic Compounds</u>											
Prepared by method SW846 5030 Water MS											
67-64-1	Acetone	BRL		µg/l	10.0	1	EPA 524.2	11-Oct-06	12-Oct-06	6100803	ek
107-13-1	Acrylonitrile	BRL		µg/l	1.0	1	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	0.5	1	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	0.5	1	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	0.5	1	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	0.5	1	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
124-48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"
95-3	Dibromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
95-50-1	1,2-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	0.5	1	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
99-87-6	4-Isopropyltoluene	BRL		µg/l	0.5	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	1.4		µg/l	0.5	1	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	0.5	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	0.5	1	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
90-42-5	Styrene	BRL		µg/l	0.5	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 33

Sample Identification131 Main St
SA51961-11Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

29-Sep-06 13:30

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds4.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	0.5	1	EPA 524.2	11-Oct-06	12-Oct-06	6100803	ek
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
127-18-4	Tetrachloroethene	1.4		µg/l	0.5	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	0.5	1	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-01-6	Trichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	0.5	1	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	0.5	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	10.0	1	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL		µg/l	10.0	1	"	"	"	"	"

Surrogate recoveries:

160-00-4	4-Bromofluorobenzene	94.8			80-120 %		"	"	"	"	"
37-26-5	Toluene-d8	91.2			80-120 %		"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	99.8			80-120 %		"	"	"	"	"
1868-53-7	Dibromofluoromethane	97.2			80-120 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 33

Sample Identification132 Main St
SA51961-12Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

29-Sep-06 12:30

Received

02-Oct-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>
Volatile Organic Compounds											
24.2 Purgeable Organic Compounds											
Prepared by method SW846 5030 Water MS											
67-64-1	Acetone	BRL		µg/l	10.0	1	EPA 524.2	11-Oct-06	12-Oct-06	6100803	ek
107-13-1	Acrylonitrile	BRL		µg/l	1.0	1	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	0.5	1	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	0.5	1	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	0.5	1	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	0.5	1	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
124-48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"
95-50-1	Dibromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	0.5	1	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
107-08-2	1,2-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
99-87-6	4-Isopropyltoluene	BRL		µg/l	0.5	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	0.5	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	0.5	1	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
100-42-5	Styrene	BRL		µg/l	0.5	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 14 of 33

Sample Identification132 Main St
SA51961-12Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

29-Sep-06 12:30

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds4.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	0.5	1	EPA 524.2	11-Oct-06	12-Oct-06	6100803	ek
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
127-18-4	Tetrachloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	0.5	1	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-01-6	Trichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	0.5	1	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	0.5	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	10.0	1	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL		µg/l	10.0	1	"	"	"	"	"

Surrogate recoveries:

160-00-4	4-Bromofluorobenzene	93.6			80-120 %		"	"	"	"	"
37-26-5	Toluene-d8	89.8			80-120 %		"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	99.2			80-120 %		"	"	"	"	"
1868-53-7	Dibromofluoromethane	96.4			80-120 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 15 of 33

Sample Identification133 Main St
SA51961-13Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

29-Sep-06 13:00

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
24.2 Purgeable Organic Compounds											
Prepared by method SW846 5030 Water MS											
67-64-1	Acetone	BRL		µg/l	10.0	1	EPA 524.2	11-Oct-06	12-Oct-06	6100803	ek
107-13-1	Acrylonitrile	BRL		µg/l	1.0	1	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	0.5	1	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	0.5	1	"	"	"	"	"
58-23-5	Carbon tetrachloride	BRL		µg/l	0.5	1	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	0.5	1	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
108-43-4	4-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
124-48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"
95-50-1	Dibromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	0.5	1	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
99-87-6	4-Isopropyltoluene	BRL		µg/l	0.5	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	0.5	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	0.5	1	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
100-42-5	Styrene	BRL		µg/l	0.5	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 16 of 33

Sample Identification133 Main St
SA51961-13Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

29-Sep-06 13:00

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds4.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	0.5	1	EPA 524.2	11-Oct-06	12-Oct-06	6100803	ek
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
127-18-4	Tetrachloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	0.5	1	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-01-6	Trichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	0.5	1	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	0.5	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	10.0	1	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL		µg/l	10.0	1	"	"	"	"	"

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	96.2			80-120 %		"	"	"	"	"
37-26-5	Toluene-d8	90.4			80-120 %		"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	99.0			80-120 %		"	"	"	"	"
1868-53-7	Dibromofluoromethane	95.6			80-120 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 17 of 33

Sample IdentificationDCW-4
SA51961-14Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

29-Sep-06 11:00

Received

02-Oct-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	0.131			mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	12-Oct-06	12-Oct-06	6100850	ss
C9-C12 Aliphatic Hydrocarbons	0.167			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	0.150			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic	0.383			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic	0.317			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	225		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	8.1		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	15.1		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	8.3		µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	103		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	72.4		70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	06-Oct-06	12-Oct-06	6100418	M.B
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	6.49	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	6.49	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	6.49	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	6.49	1	"	"	"	"	"

Surrogate recoveries:

3396-33-2	1-Chlorooctadecane	44.8		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	63.0		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	27.6	S-GC	40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	64.0		40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 18 of 33

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100780 - VPH										
Blank (6100780-BLK1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	51.3		µg/l		50.0		103	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	35.6		µg/l		50.0		71.2	70-130		
LCS (6100780-BS1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
C5-C8 Aliphatic Hydrocarbons	137		mg/l		140		97.9	70-130		
C9-C12 Aliphatic Hydrocarbons	66.1		mg/l		55.2		120	70-130		
C9-C10 Aromatic Hydrocarbons	30.8		mg/l		40.0		77.0	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	246		mg/l		280		87.9	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	96.8		mg/l		84.8		114	70-130		
Benzene	15.3		µg/l		20.0		76.5	70-130		
Ethylbenzene	15.4		µg/l		20.0		77.0	70-130		
Methyl tert-butyl ether	16.3		µg/l		20.0		81.5	70-130		
Naphthalene	20.3		µg/l		20.0		102	70-130		
Toluene	15.3		µg/l		20.0		76.5	70-130		
m,p-Xylene	30.7		µg/l		40.0		76.8	70-130		
o-Xylene	15.9		µg/l		20.0		79.5	70-130		
2-Methylpentane	19.8		µg/l		20.0		99.0	70-130		
n-Nonane	21.3		µg/l		20.0		106	70-130		
n-Pentane	18.9		µg/l		20.0		94.5	70-130		
1,2,4-Trimethylbenzene	16.6		µg/l		20.0		83.0	70-130		
2,2,4-Trimethylpentane	21.5		µg/l		20.0		108	70-130		
n-Butylcyclohexane	22.2		µg/l		20.0		111	70-130		
n-Decane	20.4		µg/l		20.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	60.2		µg/l		50.0		120	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	36.8		µg/l		50.0		73.6	70-130		
LCS Dup (6100780-BSD1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
C5-C8 Aliphatic Hydrocarbons	140		mg/l		140		100	70-130	2.12	25
C9-C12 Aliphatic Hydrocarbons	64.4		mg/l		55.2		117	70-130	2.53	25
C9-C10 Aromatic Hydrocarbons	29.4		mg/l		40.0		73.5	70-130	4.65	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	243		mg/l		280		86.8	70-130	1.26	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	93.8		mg/l		84.8		111	70-130	2.67	25
Benzene	14.6		µg/l		20.0		73.0	70-130	4.68	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 19 of 33

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100780 - VPH										
CS Dup (6100780-BSD1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
Ethylbenzene	14.2		µg/l		20.0		71.0	70-130	8.11	25
Methyl tert-butyl ether	16.1		µg/l		20.0		80.5	70-130	1.23	25
Naphthalene	18.3		µg/l		20.0		91.5	70-130	10.9	25
Toluene	14.3		µg/l		20.0		71.5	70-130	6.76	25
m,p-Xylene	28.2		µg/l		40.0		70.5	70-130	8.55	25
o-Xylene	14.8		µg/l		20.0		74.0	70-130	7.17	25
2-Methylpentane	14.9	QR-02	µg/l		20.0		74.5	70-130	28.2	25
n-Nonane	19.0		µg/l		20.0		95.0	70-130	10.9	25
n-Pentane	14.6	QR-02	µg/l		20.0		73.0	70-130	25.7	25
1,2,4-Trimethylbenzene	15.1		µg/l		20.0		75.5	70-130	9.46	25
2,2,4-Trimethylpentane	16.9		µg/l		20.0		84.5	70-130	24.4	25
n-Butylcyclohexane	20.4		µg/l		20.0		102	70-130	8.45	25
n-Decane	21.4		µg/l		20.0		107	70-130	4.78	25
Surrogate: 2,5-Dibromotoluene (FID)	56.4		µg/l		50.0		113	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	35.0		µg/l		50.0		70.0	70-130		
Duplicate (6100780-DUP1) Source: SA51960-04										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
C5-C8 Aliphatic Hydrocarbons	0.00635	J	mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	0.0102	J	mg/l	0.0750		0.00613			49.8	50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	3.3	J	µg/l	5.0		3.5			5.88	50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	59.1		µg/l		50.0		118	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.9		µg/l		50.0		83.8	70-130		
Matrix Spike (6100780-MS1) Source: SA51960-04										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
Benzene	15.0		µg/l		20.0	BRL	75.0	70-130		
Ethylbenzene	15.2		µg/l		20.0	BRL	76.0	70-130		
Methyl tert-butyl ether	20.2		µg/l		20.0	3.54	83.3	70-130		
Naphthalene	20.7		µg/l		20.0	BRL	104	70-130		
Toluene	15.3		µg/l		20.0	BRL	76.5	70-130		
m,p-Xylene	30.0		µg/l		40.0	BRL	75.0	70-130		
o-Xylene	15.8		µg/l		20.0	BRL	79.0	70-130		
2-Methylpentane	19.0		µg/l		20.0	BRL	95.0	70-130		
n-Nonane	19.8		µg/l		20.0	BRL	99.0	70-130		
n-Pentane	17.6		µg/l		20.0	BRL	88.0	70-130		
1,2,4-Trimethylbenzene	16.1		µg/l		20.0	BRL	80.5	70-130		
2,2,4-Trimethylpentane	21.1		µg/l		20.0	BRL	106	70-130		
n-Butylcyclohexane	21.7		µg/l		20.0	0.0	108	70-130		
n-Decane	21.1		µg/l		20.0	0.0	106	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	60.1		µg/l		50.0		120	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	37.8		µg/l		50.0		75.6	70-130		

Batch 6100803 - SW846 5030 Water MS

Blank (6100803-BLK1)

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 20 of 33

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	Limit
Batch 6100803 - SW846 5030 Water MS										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
Acetone	BRL		µg/l	10.0						
Acrylonitrile	BRL		µg/l	1.0						
Benzene	BRL		µg/l	0.5						
Bromobenzene	BRL		µg/l	0.5						
Bromochloromethane	BRL		µg/l	0.5						
Bromodichloromethane	BRL		µg/l	0.5						
Bromoform	BRL		µg/l	0.5						
Bromomethane	BRL		µg/l	0.5						
2-Butanone (MEK)	BRL		µg/l	10.0						
n-Butylbenzene	BRL		µg/l	0.5						
sec-Butylbenzene	BRL		µg/l	0.5						
tert-Butylbenzene	BRL		µg/l	0.5						
Carbon disulfide	BRL		µg/l	0.5						
Carbon tetrachloride	BRL		µg/l	0.5						
Chlorobenzene	BRL		µg/l	0.5						
Chloroethane	BRL		µg/l	0.5						
Chloroform	BRL		µg/l	0.5						
Chloromethane	BRL		µg/l	0.5						
2-Chlorotoluene	BRL		µg/l	0.5						
4-Chlorotoluene	BRL		µg/l	0.5						
1,2-Dibromo-3-chloropropane	BRL		µg/l	0.5						
Dibromochloromethane	BRL		µg/l	0.5						
1,2-Dibromoethane (EDB)	BRL		µg/l	0.5						
Dibromomethane	BRL		µg/l	0.5						
1,2-Dichlorobenzene	BRL		µg/l	0.5						
1,3-Dichlorobenzene	BRL		µg/l	0.5						
1,4-Dichlorobenzene	BRL		µg/l	0.5						
Dichlorodifluoromethane (Freon12)	BRL		µg/l	0.5						
1,1-Dichloroethane	BRL		µg/l	0.5						
1,2-Dichloroethane	BRL		µg/l	0.5						
1,1-Dichloroethene	BRL		µg/l	0.5						
cis-1,2-Dichloroethene	BRL		µg/l	0.5						
trans-1,2-Dichloroethene	BRL		µg/l	0.5						
1,2-Dichloropropane	BRL		µg/l	0.5						
1,3-Dichloropropane	BRL		µg/l	0.5						
2,2-Dichloropropane	BRL		µg/l	0.5						
1,1-Dichloropropene	BRL		µg/l	0.5						
cis-1,3-Dichloropropene	BRL		µg/l	0.5						
trans-1,3-Dichloropropene	BRL		µg/l	0.5						
Ethylbenzene	BRL		µg/l	0.5						
Hexachlorobutadiene	BRL		µg/l	0.5						
2-Hexanone (MBK)	BRL		µg/l	10.0						
Isopropylbenzene	BRL		µg/l	0.5						
4-Isopropyltoluene	BRL		µg/l	0.5						
Methyl tert-butyl ether	BRL		µg/l	0.5						
4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0						
Methylene chloride	BRL		µg/l	0.5						
Naphthalene	BRL		µg/l	0.5						
n-Propylbenzene	BRL		µg/l	0.5						
Styrene	BRL		µg/l	0.5						
1,1,1,2-Tetrachloroethane	BRL		µg/l	0.5						
1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5						
Tetrachloroethene	BRL		µg/l	0.5						
Toluene	BRL		µg/l	0.5						
1,2,3-Trichlorobenzene	BRL		µg/l	0.5						

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 21 of 33

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100803 - SW846 5030 Water MS										
Blank (6100803-BLK1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
1,2,4-Trichlorobenzene	BRL		µg/l	0.5						
1,1,1-Trichloroethane	BRL		µg/l	0.5						
1,1,2-Trichloroethane	BRL		µg/l	0.5						
Trichloroethene	BRL		µg/l	0.5						
Trichlorofluoromethane (Freon 11)	BRL		µg/l	0.5						
1,2,3-Trichloropropane	BRL		µg/l	0.5						
1,2,4-Trimethylbenzene	BRL		µg/l	0.5						
1,3,5-Trimethylbenzene	BRL		µg/l	0.5						
Vinyl chloride	BRL		µg/l	0.5						
m,p-Xylene	BRL		µg/l	0.5						
o-Xylene	BRL		µg/l	0.5						
Tetrahydrofuran	BRL		µg/l	10.0						
Tert-amyl methyl ether	BRL		µg/l	0.5						
Ethyl tert-butyl ether	BRL		µg/l	0.5						
Di-isopropyl ether	BRL		µg/l	0.5						
Tert-Butanol / butyl alcohol	BRL		µg/l	10.0						
Surrogate: 4-Bromofluorobenzene	47.2		µg/l		50.0		94.4	80-120		
Surrogate: Toluene-d8	44.8		µg/l		50.0		89.6	80-120		
Surrogate: 1,2-Dichloroethane-d4	49.2		µg/l		50.0		98.4	80-120		
Surrogate: Dibromofluoromethane	48.1		µg/l		50.0		96.2	80-120		
LCS (6100803-BS1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
Acetone	11.8	QC-2	µg/l		20.0		59.0	70-130		
Acrylonitrile	17.7		µg/l		20.0		88.5	70-130		
Benzene	16.5		µg/l		20.0		82.5	80-120		
Bromobenzene	21.5		µg/l		20.0		108	80-120		
Bromochloromethane	18.0		µg/l		20.0		90.0	80-120		
Bromodichloromethane	17.1		µg/l		20.0		85.5	80-120		
Bromoform	20.4		µg/l		20.0		102	80-120		
Bromomethane	23.9		µg/l		20.0		120	80-120		
2-Butanone (MEK)	17.2		µg/l		20.0		86.0	70-130		
n-Butylbenzene	22.9		µg/l		20.0		114	80-120		
sec-Butylbenzene	22.2		µg/l		20.0		111	80-120		
tert-Butylbenzene	21.3		µg/l		20.0		106	80-120		
Carbon disulfide	15.0		µg/l		20.0		75.0	70-130		
Carbon tetrachloride	14.8	QC-1	µg/l		20.0		74.0	80-120		
Chlorobenzene	21.4		µg/l		20.0		107	80-120		
Chloroethane	13.6	QC-2	µg/l		20.0		68.0	80-120		
Chloroform	16.5		µg/l		20.0		82.5	80-120		
Chloromethane	16.8		µg/l		20.0		84.0	80-120		
2-Chlorotoluene	22.9		µg/l		20.0		114	80-120		
4-Chlorotoluene	21.7		µg/l		20.0		108	80-120		
1,2-Dibromo-3-chloropropane	23.3		µg/l		20.0		116	80-120		
Dibromochloromethane	16.8		µg/l		20.0		84.0	80-120		
1,2-Dibromoethane (EDB)	16.8		µg/l		20.0		84.0	80-120		
Dibromomethane	17.1		µg/l		20.0		85.5	80-120		
1,2-Dichlorobenzene	22.2		µg/l		20.0		111	80-120		
1,3-Dichlorobenzene	21.4		µg/l		20.0		107	80-120		
1,4-Dichlorobenzene	21.4		µg/l		20.0		107	80-120		
Dichlorodifluoromethane (Freon12)	17.0		µg/l		20.0		85.0	80-120		
1,1-Dichloroethane	17.2		µg/l		20.0		86.0	80-120		
1,2-Dichloroethane	16.6		µg/l		20.0		83.0	80-120		
1,1-Dichloroethene	16.6		µg/l		20.0		83.0	80-120		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 22 of 33

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100803 - SW846 5030 Water MS										
LCS (6100803-BS1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
cis-1,2-Dichloroethene	17.4		µg/l		20.0		87.0	80-120		
trans-1,2-Dichloroethene	16.4		µg/l		20.0		82.0	80-120		
1,2-Dichloropropane	16.9		µg/l		20.0		84.5	80-120		
1,3-Dichloropropane	17.6		µg/l		20.0		88.0	80-120		
2,2-Dichloropropane	15.5	QC-1	µg/l		20.0		77.5	80-120		
1,1-Dichloropropene	17.3		µg/l		20.0		86.5	80-120		
cis-1,3-Dichloropropene	15.5	QC-1	µg/l		20.0		77.5	80-120		
trans-1,3-Dichloropropene	18.0		µg/l		20.0		90.0	80-120		
Ethylbenzene	21.3		µg/l		20.0		106	80-120		
Hexachlorobutadiene	20.6		µg/l		20.0		103	80-120		
2-Hexanone (MBK)	16.0		µg/l		20.0		80.0	70-130		
Isopropylbenzene	20.3		µg/l		20.0		102	80-120		
4-Isopropyltoluene	23.1		µg/l		20.0		116	80-120		
Methyl tert-butyl ether	16.1		µg/l		20.0		80.5	80-120		
4-Methyl-2-pentanone (MIBK)	17.4		µg/l		20.0		87.0	70-130		
Methylene chloride	16.6		µg/l		20.0		83.0	80-120		
Naphthalene	22.0		µg/l		20.0		110	80-120		
n-Propylbenzene	21.4		µg/l		20.0		107	80-120		
Styrene	21.6		µg/l		20.0		108	80-120		
1,1,1,2-Tetrachloroethane	18.5		µg/l		20.0		92.5	80-120		
1,1,2,2-Tetrachloroethane	22.7		µg/l		20.0		114	80-120		
Tetrachloroethane	16.5		µg/l		20.0		82.5	80-120		
Toluene	16.6		µg/l		20.0		83.0	80-120		
1,2,3-Trichlorobenzene	21.7		µg/l		20.0		108	80-120		
1,2,4-Trichlorobenzene	20.6		µg/l		20.0		103	80-120		
1,1,1-Trichloroethane	15.3	QC-1	µg/l		20.0		76.5	80-120		
1,1,2-Trichloroethane	17.6		µg/l		20.0		88.0	80-120		
Trichloroethene	17.2		µg/l		20.0		86.0	80-120		
Trichlorofluoromethane (Freon 11)	17.1		µg/l		20.0		85.5	80-120		
1,2,3-Trichloropropane	23.6		µg/l		20.0		118	80-120		
1,2,4-Trimethylbenzene	21.5		µg/l		20.0		108	80-120		
1,3,5-Trimethylbenzene	21.8		µg/l		20.0		109	80-120		
Vinyl chloride	18.2		µg/l		20.0		91.0	80-120		
m,p-Xylene	43.2		µg/l		40.0		108	80-120		
o-Xylene	22.0		µg/l		20.0		110	80-120		
Tetrahydrofuran	17.7		µg/l		20.0		88.5	70-130		
Tert-amyl methyl ether	17.2		µg/l		20.0		86.0	70-130		
Ethyl tert-butyl ether	15.4		µg/l		20.0		77.0	70-130		
Di-isopropyl ether	16.2		µg/l		20.0		81.0	70-130		
Tert-Butanol / butyl alcohol	169		µg/l		200		84.5	70-130		
Surrogate: 4-Bromofluorobenzene	49.4		µg/l		50.0		98.8	80-120		
Surrogate: Toluene-d8	44.3		µg/l		50.0		88.6	80-120		
Surrogate: 1,2-Dichloroethane-d4	49.0		µg/l		50.0		98.0	80-120		
Surrogate: Dibromofluoromethane	47.5		µg/l		50.0		95.0	80-120		
LCS Dup (6100803-BS1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
Acetone	11.6	QC-2	µg/l		20.0		58.0	70-130	1.71	30
Acrylonitrile	16.5		µg/l		20.0		82.5	70-130	7.02	30
Benzene	17.4		µg/l		20.0		87.0	80-120	5.31	20
Bromobenzene	22.5		µg/l		20.0		112	80-120	3.64	20
Bromochloromethane	18.1		µg/l		20.0		90.5	80-120	0.554	20
Bromodichloromethane	17.6		µg/l		20.0		88.0	80-120	2.88	20
Bromoform	21.7		µg/l		20.0		108	80-120	5.71	20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 23 of 33

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100803 - SW846 5030 Water MS										
CS Dup (6100803-BSD1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
Bromomethane	24.0		µg/l		20.0		120	80-120	0.00	20
2-Butanone (MEK)	17.0		µg/l		20.0		85.0	70-130	1.17	30
n-Butylbenzene	22.9		µg/l		20.0		114	80-120	0.00	20
sec-Butylbenzene	22.6		µg/l		20.0		113	80-120	1.79	20
tert-Butylbenzene	22.0		µg/l		20.0		110	80-120	3.70	20
Carbon disulfide	14.7		µg/l		20.0		73.5	70-130	2.02	30
Carbon tetrachloride	16.0		µg/l		20.0		80.0	80-120	7.79	20
Chlorobenzene	22.2		µg/l		20.0		111	80-120	3.67	20
Chloroethane	15.6	QC-2	µg/l		20.0		78.0	80-120	13.7	20
Chloroform	17.1		µg/l		20.0		85.5	80-120	3.57	20
Chloromethane	16.3		µg/l		20.0		81.5	80-120	3.02	20
2-Chlorotoluene	23.4		µg/l		20.0		117	80-120	2.60	20
4-Chlorotoluene	22.2		µg/l		20.0		111	80-120	2.74	20
1,2-Dibromo-3-chloropropane	21.5		µg/l		20.0		108	80-120	7.14	20
Dibromochloromethane	17.9		µg/l		20.0		89.5	80-120	6.34	20
1,2-Dibromoethane (EDB)	17.1		µg/l		20.0		85.5	80-120	1.77	20
Dibromomethane	17.6		µg/l		20.0		88.0	80-120	2.88	20
1,2-Dichlorobenzene	22.9		µg/l		20.0		114	80-120	2.67	20
1,3-Dichlorobenzene	21.7		µg/l		20.0		108	80-120	0.930	20
1,4-Dichlorobenzene	21.4		µg/l		20.0		107	80-120	0.00	20
Dichlorodifluoromethane (Freon12)	17.2		µg/l		20.0		86.0	80-120	1.17	20
1,1-Dichloroethane	17.6		µg/l		20.0		88.0	80-120	2.30	20
1,2-Dichloroethane	17.3		µg/l		20.0		86.5	80-120	4.13	20
1,1-Dichloroethene	17.0		µg/l		20.0		85.0	80-120	2.38	20
cis-1,2-Dichloroethene	18.0		µg/l		20.0		90.0	80-120	3.39	20
trans-1,2-Dichloroethene	17.6		µg/l		20.0		88.0	80-120	7.06	20
1,2-Dichloropropane	17.4		µg/l		20.0		87.0	80-120	2.92	20
1,3-Dichloropropane	17.9		µg/l		20.0		89.5	80-120	1.69	20
2,2-Dichloropropane	16.4		µg/l		20.0		82.0	80-120	5.64	20
1,1-Dichloropropene	18.2		µg/l		20.0		91.0	80-120	5.07	20
cis-1,3-Dichloropropene	16.2		µg/l		20.0		81.0	80-120	4.42	20
trans-1,3-Dichloropropene	18.2		µg/l		20.0		91.0	80-120	1.10	20
Ethylbenzene	22.5		µg/l		20.0		112	80-120	5.50	20
Hexachlorobutadiene	20.6		µg/l		20.0		103	80-120	0.00	20
2-Hexanone (MBK)	14.8		µg/l		20.0		74.0	70-130	7.79	30
Isopropylbenzene	21.7		µg/l		20.0		108	80-120	5.71	20
4-Isopropyltoluene	23.7		µg/l		20.0		118	80-120	1.71	20
Methyl tert-butyl ether	16.3		µg/l		20.0		81.5	80-120	1.23	20
4-Methyl-2-pentanone (MIBK)	16.3		µg/l		20.0		81.5	70-130	6.53	30
Methylene chloride	16.4		µg/l		20.0		82.0	80-120	1.21	20
Naphthalene	22.1		µg/l		20.0		110	80-120	0.00	20
n-Propylbenzene	22.2		µg/l		20.0		111	80-120	3.67	20
Styrene	21.5		µg/l		20.0		108	80-120	0.00	20
1,1,1,2-Tetrachloroethane	20.5		µg/l		20.0		102	80-120	9.77	20
1,1,2,2-Tetrachloroethane	23.2		µg/l		20.0		116	80-120	1.74	20
Tetrachloroethene	17.4		µg/l		20.0		87.0	80-120	5.31	20
Toluene	16.6		µg/l		20.0		83.0	80-120	0.00	20
1,2,3-Trichlorobenzene	23.7		µg/l		20.0		118	80-120	8.85	20
1,2,4-Trichlorobenzene	20.9		µg/l		20.0		104	80-120	0.966	20
1,1,1-Trichloroethane	16.5		µg/l		20.0		82.5	80-120	7.55	20
1,1,2-Trichloroethane	17.9		µg/l		20.0		89.5	80-120	1.69	20
Trichloroethene	18.0		µg/l		20.0		90.0	80-120	4.55	20
Trichlorofluoromethane (Freon 11)	18.2		µg/l		20.0		91.0	80-120	6.23	20

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100803 - SW846 5030 Water MS										
CS Dup (6100803-BSD1)										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
1,2,3-Trichloropropane	25.5	QC-1	µg/l		20.0		128	80-120	8.13	20
1,2,4-Trimethylbenzene	22.0		µg/l		20.0		110	80-120	1.83	20
1,3,5-Trimethylbenzene	22.1		µg/l		20.0		110	80-120	0.913	20
Vinyl chloride	20.0		µg/l		20.0		100	80-120	9.42	20
m,p-Xylene	45.2		µg/l		40.0		113	80-120	4.52	20
o-Xylene	22.7		µg/l		20.0		114	80-120	3.57	20
Tetrahydrofuran	16.2		µg/l		20.0		81.0	70-130	8.85	30
Tert-amyl methyl ether	18.2		µg/l		20.0		91.0	70-130	5.65	30
Ethyl tert-butyl ether	16.0		µg/l		20.0		80.0	70-130	3.82	30
Di-isopropyl ether	16.8		µg/l		20.0		84.0	70-130	3.64	30
Tert-Butanol / butyl alcohol	149		µg/l		200		74.5	70-130	12.6	30
Surrogate: 4-Bromofluorobenzene	49.6		µg/l		50.0		99.2	80-120		
Surrogate: Toluene-d8	44.2		µg/l		50.0		88.4	80-120		
Surrogate: 1,2-Dichloroethane-d4	48.3		µg/l		50.0		96.6	80-120		
Surrogate: Dibromofluoromethane	46.7		µg/l		50.0		93.4	80-120		
Matrix Spike (6100803-MS1) Source: SA51952-01										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
Benzene	14.6	QM-07	µg/l		20.0	BRL	73.0	80-120		
Chlorobenzene	20.0		µg/l		20.0	BRL	100	80-120		
1,1-Dichloroethene	11.0	QM-07	µg/l		20.0	BRL	55.0	80-120		
Toluene	21.2	QM-07	µg/l		20.0	8.62	62.9	80-120		
Trichloroethene	13.9	QM-07	µg/l		20.0	BRL	69.5	80-120		
Surrogate: 4-Bromofluorobenzene	48.4		µg/l		50.0		96.8	80-120		
Surrogate: Toluene-d8	45.3		µg/l		50.0		90.6	80-120		
Surrogate: 1,2-Dichloroethane-d4	49.9		µg/l		50.0		99.8	80-120		
Surrogate: Dibromofluoromethane	48.5		µg/l		50.0		97.0	80-120		
Matrix Spike Dup (6100803-MSD1) Source: SA51952-01										
Prepared: 11-Oct-06 Analyzed: 12-Oct-06										
Benzene	14.7	QM-07	µg/l		20.0	BRL	73.5	80-120	0.683	20
Chlorobenzene	20.8		µg/l		20.0	BRL	104	80-120	3.92	20
1,1-Dichloroethene	11.3	QM-07	µg/l		20.0	BRL	56.5	80-120	2.69	20
Toluene	23.4	QM-07	µg/l		20.0	8.62	73.9	80-120	16.1	20
Trichloroethene	14.3	QM-07	µg/l		20.0	BRL	71.5	80-120	2.84	20
Surrogate: 4-Bromofluorobenzene	48.4		µg/l		50.0		96.8	80-120		
Surrogate: Toluene-d8	44.4		µg/l		50.0		88.8	80-120		
Surrogate: 1,2-Dichloroethane-d4	48.6		µg/l		50.0		97.2	80-120		
Surrogate: Dibromofluoromethane	47.3		µg/l		50.0		94.6	80-120		
Batch 6100850 - VPH										
Blank (6100850-BLK1)										
Prepared & Analyzed: 12-Oct-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 25 of 33

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100850 - VPH										
Blank (6100850-BLK1)										
Prepared & Analyzed: 12-Oct-06										
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	51.3		µg/l		50.0		103	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	36.1		µg/l		50.0		72.2	70-130		
LCS (6100850-BS1)										
Prepared & Analyzed: 12-Oct-06										
C5-C8 Aliphatic Hydrocarbons	142		mg/l		140		101	70-130		
C9-C12 Aliphatic Hydrocarbons	69.1		mg/l		55.2		125	70-130		
C9-C10 Aromatic Hydrocarbons	29.6		mg/l		40.0		74.0	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	246		mg/l		280		87.9	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	98.7		mg/l		84.8		116	70-130		
Benzene	15.2		µg/l		20.0		76.0	70-130		
Ethylbenzene	14.7		µg/l		20.0		73.5	70-130		
Methyl tert-butyl ether	15.7		µg/l		20.0		78.5	70-130		
Naphthalene	17.5		µg/l		20.0		87.5	70-130		
Toluene	14.9		µg/l		20.0		74.5	70-130		
m,p-Xylene	29.2		µg/l		40.0		73.0	70-130		
o-Xylene	14.9		µg/l		20.0		74.5	70-130		
2-Methylpentane	22.3		µg/l		20.0		112	70-130		
n-Nonane	22.6		µg/l		20.0		113	70-130		
n-Pentane	20.5		µg/l		20.0		102	70-130		
1,2,4-Trimethylbenzene	15.6		µg/l		20.0		78.0	70-130		
2,2,4-Trimethylpentane	21.7		µg/l		20.0		108	70-130		
n-Butylcyclohexane	23.3		µg/l		20.0		116	70-130		
n-Decane	24.6		µg/l		20.0		123	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	61.3		µg/l		50.0		123	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	37.9		µg/l		50.0		75.8	70-130		
LCS Dup (6100850-BSD1)										
Prepared: 12-Oct-06 Analyzed: 13-Oct-06										
C5-C8 Aliphatic Hydrocarbons	140		mg/l		140		100	70-130	0.995	25
C9-C12 Aliphatic Hydrocarbons	66.6		mg/l		55.2		121	70-130	3.25	25
C9-C10 Aromatic Hydrocarbons	28.7		mg/l		40.0		71.8	70-130	3.02	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	242		mg/l		280		86.4	70-130	1.72	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	95.3		mg/l		84.8		112	70-130	3.51	25
Benzene	14.8		µg/l		20.0		74.0	70-130	2.67	25
Ethylbenzene	14.3		µg/l		20.0		71.5	70-130	2.76	25
Methyl tert-butyl ether	15.2		µg/l		20.0		76.0	70-130	3.24	25
Naphthalene	17.1		µg/l		20.0		85.5	70-130	2.31	25
Toluene	14.5		µg/l		20.0		72.5	70-130	2.72	25
m,p-Xylene	28.4		µg/l		40.0		71.0	70-130	2.78	25
o-Xylene	14.6		µg/l		20.0		73.0	70-130	2.03	25
2-Methylpentane	19.0		µg/l		20.0		95.0	70-130	16.4	25
n-Nonane	19.3		µg/l		20.0		96.5	70-130	15.8	25
n-Pentane	18.8		µg/l		20.0		94.0	70-130	8.16	25
1,2,4-Trimethylbenzene	14.9		µg/l		20.0		74.5	70-130	4.59	25
2,2,4-Trimethylpentane	18.7		µg/l		20.0		93.5	70-130	14.4	25
n-Butylcyclohexane	20.2		µg/l		20.0		101	70-130	13.8	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 26 of 33

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100850 - VPH										
CS Dup (6100850-BSD1)										
Prepared: 12-Oct-06 Analyzed: 13-Oct-06										
n-Decane	20.4		µg/l		20.0		102	70-130	18.7	25
Surrogate: 2,5-Dibromotoluene (FID)	56.7		µg/l		50.0		113	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	35.4		µg/l		50.0		70.8	70-130		
Duplicate (6100850-DUP1) Source: SA51961-04										
Prepared & Analyzed: 12-Oct-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	54.4		µg/l		50.0		109	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	38.2		µg/l		50.0		76.4	70-130		
Matrix Spike (6100850-MS1) Source: SA51961-04										
Prepared & Analyzed: 12-Oct-06										
Benzene	15.5		µg/l		20.0	BRL	77.5	70-130		
Ethylbenzene	15.0		µg/l		20.0	BRL	75.0	70-130		
Methyl tert-butyl ether	15.6		µg/l		20.0	BRL	78.0	70-130		
Naphthalene	17.8		µg/l		20.0	BRL	89.0	70-130		
Toluene	15.0		µg/l		20.0	BRL	75.0	70-130		
m,p-Xylene	30.0		µg/l		40.0	BRL	75.0	70-130		
o-Xylene	15.3		µg/l		20.0	BRL	76.5	70-130		
2-Methylpentane	22.2		µg/l		20.0	BRL	111	70-130		
n-Nonane	22.4		µg/l		20.0	BRL	112	70-130		
n-Pentane	22.6		µg/l		20.0	BRL	113	70-130		
1,2,4-Trimethylbenzene	15.7		µg/l		20.0	BRL	78.5	70-130		
2,2,4-Trimethylpentane	21.2		µg/l		20.0	BRL	106	70-130		
n-Butylcyclohexane	22.4		µg/l		20.0	0.0	112	70-130		
n-Decane	22.7		µg/l		20.0	0.0	114	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	61.3		µg/l		50.0		123	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	37.2		µg/l		50.0		74.4	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 27 of 33

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100299 - SW846 3510C										
Blank (6100299-BLK1)										
Prepared: 05-Oct-06 Analyzed: 06-Oct-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.78						
2-Methylnaphthalene	BRL		µg/l	2.78						
Acenaphthene	BRL		µg/l	2.78						
Phenanthrene	BRL		µg/l	2.78						
Anthracene	BRL		µg/l	2.78						
Pyrene	BRL		µg/l	2.78						
Chrysene	BRL		µg/l	2.78						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	23.8		µg/l		55.6		42.8	40-140		
Surrogate: Ortho-Terphenyl	41.3		µg/l		55.6		74.3	40-140		
Surrogate: 2-Bromonaphthalene	25.4		µg/l		44.4		57.2	40-140		
Surrogate: 2-Fluorobiphenyl	38.0		µg/l		44.4		85.6	40-140		
LCS (6100299-BS1)										
Prepared: 05-Oct-06 Analyzed: 06-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.292		mg/l	0.2	0.698		41.8	40-140		
C19-C36 Aliphatic Hydrocarbons	0.442		mg/l	0.2	0.930		47.5	40-140		
C11-C22 Aromatic Hydrocarbons	1.78		mg/l	0.2	1.98		89.9	40-140		
Naphthalene	65.2		µg/l	2.91	116		56.2	40-140		
2-Methylnaphthalene	71.5		µg/l	2.91	116		61.6	40-140		
Acenaphthene	81.9		µg/l	2.91	116		70.6	40-140		
Phenanthrene	87.2		µg/l	2.91	116		75.2	40-140		
Anthracene	87.3		µg/l	2.91	116		75.3	40-140		
Pyrene	92.5		µg/l	2.91	116		79.7	40-140		
Chrysene	90.8		µg/l	2.91	116		78.3	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		116			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		116			0-200		
Surrogate: 1-Chlorooctadecane	15.1	S-GC	µg/l		58.1		26.0	40-140		
Surrogate: Ortho-Terphenyl	46.8		µg/l		58.1		80.6	40-140		
Surrogate: 2-Bromonaphthalene	38.8		µg/l		46.5		83.4	40-140		
Surrogate: 2-Fluorobiphenyl	47.0		µg/l		46.5		101	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (610029)										
Prepared & Analyzed: 05-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.342		mg/l	0.2	0.600		57.0	40-140		
C19-C36 Aliphatic Hydrocarbons	0.456		mg/l	0.2	0.800		57.0	40-140		
C11-C22 Aromatic Hydrocarbons	1.57		mg/l	0.2	1.70		92.4	40-140		
Naphthalene	74.2		µg/l	2.50	100		74.2	40-140		
2-Methylnaphthalene	76.5		µg/l	2.50	100		76.5	40-140		
Acenaphthene	79.6		µg/l	2.50	100		79.6	40-140		
Phenanthrene	78.5		µg/l	2.50	100		78.5	40-140		
Anthracene	79.3		µg/l	2.50	100		79.3	40-140		
Pyrene	80.9		µg/l	2.50	100		80.9	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 28 of 33

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100299 - SW846 3510C										
Fractionation Check Standard (610029)										
Prepared & Analyzed: 05-Oct-06										
Chrysene	75.5		µg/l	2.50	100		75.5	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
Surrogate: 1-Chlorooctadecane	21.3		µg/l		50.0		42.6	40-140		
Surrogate: Ortho-Terphenyl	41.2		µg/l		50.0		82.4	40-140		
Surrogate: 2-Bromonaphthalene	29.2		µg/l		40.0		73.0	40-140		
Surrogate: 2-Fluorobiphenyl	35.7		µg/l		40.0		89.2	40-140		
LCS Dup (6100299-BSD1)										
Prepared: 05-Oct-06 Analyzed: 06-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.299		mg/l	0.2	0.667		44.8	40-140	6.93	25
C19-C36 Aliphatic Hydrocarbons	0.408		mg/l	0.2	0.889		45.9	40-140	3.43	25
C11-C22 Aromatic Hydrocarbons	1.63		mg/l	0.2	1.89		86.2	40-140	4.20	25
Naphthalene	55.2		µg/l	2.78	111		49.7	40-140	12.3	20
2-Methylnaphthalene	60.6		µg/l	2.78	111		54.6	40-140	12.0	20
Acenaphthene	71.2		µg/l	2.78	111		64.1	40-140	9.65	20
Phenanthrene	82.5		µg/l	2.78	111		74.3	40-140	1.20	20
Anthracene	83.6		µg/l	2.78	111		75.3	40-140	0.00	20
Pyrene	90.0		µg/l	2.78	111		81.1	40-140	1.74	20
Chrysene	88.4		µg/l	2.78	111		79.6	40-140	1.65	20
Naphthalene (aliphatic fraction)	0.00		µg/l		111			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		111			0-200		200
Surrogate: 1-Chlorooctadecane	22.8		µg/l		55.6		41.0	40-140		
Surrogate: Ortho-Terphenyl	44.5		µg/l		55.6		80.0	40-140		
Surrogate: 2-Bromonaphthalene	33.9		µg/l		44.4		76.4	40-140		
Surrogate: 2-Fluorobiphenyl	39.5		µg/l		44.4		89.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Batch 6100418 - SW846 3510C										
Blank (6100418-BLK1)										
Prepared: 06-Oct-06 Analyzed: 07-Oct-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.98						
2-Methylnaphthalene	BRL		µg/l	2.98						
Acenaphthene	BRL		µg/l	2.98						
Phenanthrene	BRL		µg/l	2.98						
Anthracene	BRL		µg/l	2.98						
Pyrene	BRL		µg/l	2.98						
Chrysene	BRL		µg/l	2.98						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	14.6	S-GC	µg/l		59.5		24.5	40-140		
Surrogate: Ortho-Terphenyl	44.1		µg/l		59.5		74.1	40-140		
Surrogate: 2-Bromonaphthalene	36.0		µg/l		47.6		75.6	40-140		
Surrogate: 2-Fluorobiphenyl	41.7		µg/l		47.6		87.6	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 29 of 33

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100418 - SW846 3510C										
CS (6100418-BS1)										
Prepared: 06-Oct-06 Analyzed: 07-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.365		mg/l	0.2	0.732		49.9	40-140		
C19-C36 Aliphatic Hydrocarbons	0.471		mg/l	0.2	0.976		48.3	40-140		
C11-C22 Aromatic Hydrocarbons	1.45		mg/l	0.2	2.07		70.0	40-140		
Naphthalene	65.2		µg/l	3.05	122		53.4	40-140		
2-Methylnaphthalene	69.0		µg/l	3.05	122		56.6	40-140		
Acenaphthene	76.2		µg/l	3.05	122		62.5	40-140		
Phenanthrene	80.5		µg/l	3.05	122		66.0	40-140		
Anthracene	82.6		µg/l	3.05	122		67.7	40-140		
Pyrene	85.5		µg/l	3.05	122		70.1	40-140		
Chrysene	83.6		µg/l	3.05	122		68.5	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		122			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		122			0-200		
Surrogate: 1-Chlorooctadecane	32.5		µg/l		61.0		53.3	40-140		
Surrogate: Ortho-Terphenyl	45.0		µg/l		61.0		73.8	40-140		
Surrogate: 2-Bromonaphthalene	36.2		µg/l		48.8		74.2	40-140		
Surrogate: 2-Fluorobiphenyl	43.4		µg/l		48.8		88.9	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (610041)										
Prepared & Analyzed: 06-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.355		mg/l	0.2	0.600		59.2	40-140		
C19-C36 Aliphatic Hydrocarbons	0.435		mg/l	0.2	0.800		54.4	40-140		
C11-C22 Aromatic Hydrocarbons	1.30		mg/l	0.2	1.70		76.5	40-140		
Naphthalene	59.0		µg/l	2.50	100		59.0	40-140		
2-Methylnaphthalene	62.5		µg/l	2.50	100		62.5	40-140		
Acenaphthene	66.5		µg/l	2.50	100		66.5	40-140		
Phenanthrene	68.7		µg/l	2.50	100		68.7	40-140		
Anthracene	70.4		µg/l	2.50	100		70.4	40-140		
Pyrene	73.5		µg/l	2.50	100		73.5	40-140		
Chrysene	72.0		µg/l	2.50	100		72.0	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
Surrogate: 1-Chlorooctadecane	25.9		µg/l		50.0		51.8	40-140		
Surrogate: Ortho-Terphenyl	38.1		µg/l		50.0		76.2	40-140		
Surrogate: 2-Bromonaphthalene	26.5		µg/l		40.0		66.2	40-140		
Surrogate: 2-Fluorobiphenyl	30.1		µg/l		40.0		75.2	40-140		
LCS Dup (6100418-BSD1)										
Prepared: 06-Oct-06 Analyzed: 07-Oct-06										
C9-C18 Aliphatic Hydrocarbons	0.355		mg/l	0.2	0.706		50.3	40-140	0.798	25
C19-C36 Aliphatic Hydrocarbons	0.454		mg/l	0.2	0.941		48.2	40-140	0.207	25
C11-C22 Aromatic Hydrocarbons	1.36		mg/l	0.2	2.00		68.0	40-140	2.90	25
Naphthalene	56.1		µg/l	2.94	118		47.5	40-140	11.7	20
2-Methylnaphthalene	59.0		µg/l	2.94	118		50.0	40-140	12.4	20
Acenaphthene	65.6		µg/l	2.94	118		55.6	40-140	11.7	20
Phenanthrene	71.8		µg/l	2.94	118		60.8	40-140	8.20	20
Anthracene	73.6		µg/l	2.94	118		62.4	40-140	8.15	20
Pyrene	78.6		µg/l	2.94	118		66.6	40-140	5.12	20
Chrysene	75.6		µg/l	2.94	118		64.1	40-140	6.64	20
Naphthalene (aliphatic fraction)	0.00		µg/l		118			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		118			0-200		200
Surrogate: 1-Chlorooctadecane	27.2		µg/l		58.8		46.3	40-140		
Surrogate: Ortho-Terphenyl	40.4		µg/l		58.8		68.7	40-140		
Surrogate: 2-Bromonaphthalene	32.2		µg/l		47.1		68.4	40-140		
Surrogate: 2-Fluorobiphenyl	36.4		µg/l		47.1		77.3	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 30 of 33

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6100418 - SW846 3510C										
laphthalene Breakthrough	0.00		%					0-5		
Methylnaphthalene Breakthrough	0.00		%					0-5		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 31 of 33

Notes and Definitions

QC-1 Analyte out of acceptance range.

QC-2 Analyte out of acceptance range in QC spike but no reportable concentration present in sample

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.

The following outlines the condition of all VPH samples contained within this report upon laboratory receipt

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Sample Preservative	Aqueous (acid-preserved)	☐ N/A	☒ pH $\leq$ 2	☐ pH > 2
	Soil or Sediment	☒ N/A		☐ Samples not received in Methanol or air-tight container ☐ Samples received in Methanol: ☐ covering soil/sediment ☐ not covering soil/sediment ☐ Samples received in air-tight container:
Temperature	☐ Received on ice ☒ Received at 4 ± 2 °C ☐ Other: _____ °C			

Were all QA/QC procedures followed as required by the VPH method? Yes ☒ No ☐

Were any significant modifications made to the VPH method as specified in section 11.3? No ☒ *see below

Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐

* Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GCMS using all QC criteria specified in the method

The following outlines the condition of all EPH samples contained within this report upon laboratory receipt

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Aqueous Preservative	☐ N/A	☒ pH $\leq$ 2	☐ pH > 2	☐ pH adjusted to < 2 in lab
Temperature	☐ Received on ice ☒ Received at 4 ± 2 °C ☐ Other: _____ °C			

Were all QA/QC procedures followed as required by the EPH method? Yes ☒ No ☐

Were any significant modifications made to the EPH method as specified in Section 11.3? No ☒

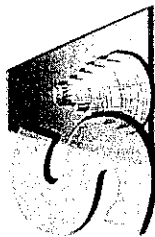
Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete

Authorized by:



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director



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Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 2

Report To: ECS - Auburn
27 Midstate Dr. Suite 218
Auburn MA 01501

Invoice To: ECS - Agawam
Route 142 979 (R)
P.O. No.: RQN: C003 2nd fl

Project No.: 91-204082-02
Site Name: Eagle Bar
Location: Cover State: MA
Sampler(s): D. Anderson, A. Maczawka

Project Mgr.: Chuck Klingler

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=ICE 10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:
SAS1961-01	DW-1	9/29	11:20
02	DW-2		1:15
03	DW-3		4:00
04	DW-8		1:45
05	KE-4		4:30
06	BE-1		3:20
07	BP-2		4:00
08	BP-3		3:45
09	MH-2		10:10
10	MH-3		10:40

Containers:

of VOA Vials

of Amber Glass

of Clear Glass

of Plastic

Analyses:

QA Reporting Notes:
(check if needed)

State specific reporting standards
If applicable, please list below.

☐ Provide MCP CAM Report

Were all field QC requirements met
as per MADEP CAM Section 2.0?

☐ Yes ☐ No

(Response required for CAM report)

☐ Fax results when available to ()

☒ E-mail to C.Klingler@eecs.com

EDD Format

Condition upon receipt: ☐ Iced ☐ Ambient 48 Per

Relinquished by:

Received by:

Date:

Time:

Diana Anderson

Patricia Herzog

10/2/06

1300

Ben Herzog

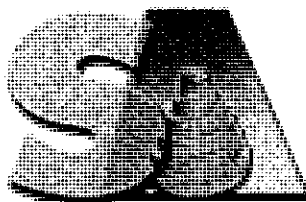
[Signature]

10/2/06

15:30



Report Date:
07-Aug-06 15:08



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

RECEIVED
AUG 14 2006

BY: *[Signature]*

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 93-204082.02

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA48659-01	MH-1	Surface Water	21-Jul-06 11:15	25-Jul-06 15:00
SA48659-02	MH-2	Surface Water	21-Jul-06 11:30	25-Jul-06 15:00
SA48659-03	MH-3	Surface Water	21-Jul-06 11:45	25-Jul-06 15:00
SA48659-04	SW-Outfall	Surface Water	21-Jul-06 14:00	25-Jul-06 15:00
SA48659-05	Trip Blank	Aqueous	21-Jul-06 00:00	25-Jul-06 15:00

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.

All applicable NELAC requirements have been met.

Please note that this report contains 12 pages of analytical data plus Chain of Custody document(s).

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Massachusetts Certification # M-MA138/MA1110

Connecticut # PH-0777

Florida # E87600/E87936

Maine # MA138

New Hampshire # 2538/2972

New Jersey # MA011/MA012

New York # 11393/11840

Rhode Island # 98

USDA # S-51435

Vermont # VT-11393



Authorized by:

[Signature]

Hanibal C. Tayeh, Ph.D.

President/Laboratory Director

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ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification

MH-1

SA48659-01

Client Project #

93-204082.02

Matrix

Surface Water

Collection Date/Time

21-Jul-06 11:15

Received

25-Jul-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsEPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	01-Aug-06	02-Aug-06	6080054	SS
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	94.4	70-130 %	"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	77.6	70-130 %	"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	31-Jul-06	02-Aug-06	6071902	JD
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL		µg/l	5.56	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL		µg/l	5.56	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL		µg/l	5.56	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL		µg/l	5.56	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	46.2	40-140 %	"	"	"	"	"
84-15-1 Ortho-Terphenyl	61.2	40-140 %	"	"	"	"	"
580-13-2 2-Bromonaphthalene	58.1	40-140 %	"	"	"	"	"
321-60-8 2-Fluorobiphenyl	72.3	40-140 %	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 12

Sample Identification

MH-2
SA48659-02

Client Project #

93-204082.02

Matrix

Surface Water

Collection Date/Time

21-Jul-06 11:30

Received

25-Jul-06

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>

Volatile Organic CompoundsEPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	01-Aug-06	02-Aug-06	6080054	SS
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	90.4	70-130 %	"	"	"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	73.8	70-130 %	"	"	"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	31-Jul-06	02-Aug-06	6071902	JD
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL		µg/l	5.95	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL		µg/l	5.95	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL		µg/l	5.95	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL		µg/l	5.95	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	52.8	40-140 %	"	"	"	"	"	"	"
84-15-1 Ortho-Terphenyl	61.3	40-140 %	"	"	"	"	"	"	"
580-13-2 2-Bromonaphthalene	62.8	40-140 %	"	"	"	"	"	"	"
321-60-8 2-Fluorobiphenyl	79.6	40-140 %	"	"	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 12

Sample Identification

MH-3

SA48659-03

Client Project #

93-204082.02

Matrix

Surface Water

Collection Date/Time

21-Jul-06 11:45

Received

25-Jul-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL	mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	01-Aug-06	02-Aug-06	6080054	SS
C9-C12 Aliphatic Hydrocarbons	BRL	mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL	mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL	µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL	µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL	µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL	µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL	µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL	µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL	µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	95.0	70-130 %	"	"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	78.4	70-130 %	"	"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	mg/l	0.2	1	+MADEP 5/2004 R	31-Jul-06	02-Aug-06	6071902	JD
C19-C36 Aliphatic Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL	µg/l	5.49	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL	µg/l	5.49	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL	µg/l	5.49	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL	µg/l	5.49	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	51.5	40-140 %	"	"	"	"	"	"
84-15-1 Ortho-Terphenyl	57.0	40-140 %	"	"	"	"	"	"
580-13-2 2-Bromonaphthalene	48.4	40-140 %	"	"	"	"	"	"
321-60-8 2-Fluorobiphenyl	69.1	40-140 %	"	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 12

Sample Identification

SW-Outfall

SA48659-04

Client Project #

93-204082.02

Matrix

Surface Water

Collection Date/Time

21-Jul-06 14:00

Received

25-Jul-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	01-Aug-06	02-Aug-06	6080054	SS
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	92.8			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	76.4			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	1.6			mg/l	0.2	1	+MADEP 5/2004 R	31-Jul-06	02-Aug-06	6071902	JD
C19-C36 Aliphatic Hydrocarbons	0.5			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	0.7			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	0.7			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	2.8			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	2.8			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.68	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.68	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.68	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.68	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	56.2			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	55.6			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	61.3			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	68.8			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 12

Sample Identification

Trip Blank

SA48659-05

Client Project #

93-204082.02

Matrix

Aqueous

Collection Date/Time

21-Jul-06 00:00

Received

25-Jul-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds**PH Aliphatic/Aromatic Carbon Ranges**

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	01-Aug-06	02-Aug-06	6080054	SS
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	96.4			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	79.2			70-130 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 12

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6080054 - VPH										
Blank (6080054-BLK1)										
Prepared & Analyzed: 01-Aug-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	49.8		µg/l		50.0		99.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	40.7		µg/l		50.0		81.4	70-130		
LCS (6080054-BS1)										
Prepared: 01-Aug-06 Analyzed: 02-Aug-06										
C5-C8 Aliphatic Hydrocarbons	128		mg/l		140		91.4	70-130		25
C9-C12 Aliphatic Hydrocarbons	66.6		mg/l		55.2		121	70-130		25
C9-C10 Aromatic Hydrocarbons	31.2		mg/l		40.0		78.0	70-130		25
Unadjusted C5-C8 Aliphatic Hydrocarbons	240		mg/l		280		85.7	70-130		25
Unadjusted C9-C12 Aliphatic Hydrocarbons	97.8		mg/l		84.8		115	70-130		25
Benzene	16.4		µg/l		20.0		82.0	70-130		25
Ethylbenzene	15.9		µg/l		20.0		79.5	70-130		25
Methyl tert-butyl ether	16.6		µg/l		20.0		83.0	70-130		25
Naphthalene	16.7		µg/l		20.0		83.5	70-130		25
Toluene	15.8		µg/l		20.0		79.0	70-130		25
m,p-Xylene	31.8		µg/l		40.0		79.5	70-130		25
o-Xylene	16.0		µg/l		20.0		80.0	70-130		25
2-Methylpentane	20.9		µg/l		20.0		104	70-130		25
n-Nonane	20.1		µg/l		20.0		100	70-130		25
n-Pentane	20.7		µg/l		20.0		104	70-130		25
1,2,4-Trimethylbenzene	16.1		µg/l		20.0		80.5	70-130		25
2,2,4-Trimethylpentane	20.2		µg/l		20.0		101	70-130		25
n-Butylcyclohexane	21.1		µg/l		20.0		106	70-130		25
n-Decane	23.2		µg/l		20.0		116	70-130		25
Surrogate: 2,5-Dibromotoluene (FID)	57.6		µg/l		50.0		115	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	44.8		µg/l		50.0		89.6	70-130		
LCS Dup (6080054-BSD1)										
Prepared: 01-Aug-06 Analyzed: 02-Aug-06										
C5-C8 Aliphatic Hydrocarbons	123		mg/l		140		87.9	70-130	3.90	25
C9-C12 Aliphatic Hydrocarbons	67.8		mg/l		55.2		123	70-130	1.64	25
C9-C10 Aromatic Hydrocarbons	32.0		mg/l		40.0		80.0	70-130	2.53	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	242		mg/l		280		86.4	70-130	0.813	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	99.8		mg/l		84.8		118	70-130	2.58	25
Benzene	17.0		µg/l		20.0		85.0	70-130	3.59	25
Ethylbenzene	16.6		µg/l		20.0		83.0	70-130	4.31	25
Methyl tert-butyl ether	17.8		µg/l		20.0		89.0	70-130	6.98	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 12

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6080054 - VPH										
CS Dup (6080054-BSD1)										
Prepared: 01-Aug-06 Analyzed: 02-Aug-06										
Naphthalene	19.1		µg/l		20.0		95.5	70-130	13.4	25
Toluene	16.5		µg/l		20.0		82.5	70-130	4.33	25
m,p-Xylene	33.0		µg/l		40.0		82.5	70-130	3.70	25
o-Xylene	17.1		µg/l		20.0		85.5	70-130	6.65	25
2-Methylpentane	18.5		µg/l		20.0		92.5	70-130	11.7	25
n-Nonane	20.9		µg/l		20.0		104	70-130	3.92	25
n-Pentane	16.9		µg/l		20.0		84.5	70-130	20.7	25
1,2,4-Trimethylbenzene	17.2		µg/l		20.0		86.0	70-130	6.61	25
2,2,4-Trimethylpentane	20.0		µg/l		20.0		100	70-130	0.995	25
n-Butylcyclohexane	21.3		µg/l		20.0		106	70-130	0.00	25
n-Decane	20.8		µg/l		20.0		104	70-130	10.9	25
Surrogate: 2,5-Dibromotoluene (FID)	49.1		µg/l		50.0		98.2	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	37.1		µg/l		50.0		74.2	70-130		
Duplicate (6080054-DUP1) Source: SA48609-01										
Prepared: 01-Aug-06 Analyzed: 02-Aug-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.00640			19.9	50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.00640			19.9	50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		0.00797			37.1	50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	49.6		µg/l		50.0		99.2	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	40.9		µg/l		50.0		81.8	70-130		
Matrix Spike (6080054-MS1) Source: SA48659-01										
Prepared: 01-Aug-06 Analyzed: 02-Aug-06										
Benzene	16.5		µg/l		20.0	BRL	82.5	70-130		30
Ethylbenzene	16.2		µg/l		20.0	BRL	81.0	70-130		30
Methyl tert-butyl ether	17.3		µg/l		20.0	BRL	86.5	70-130		30
Naphthalene	18.0		µg/l		20.0	BRL	90.0	70-130		30
Toluene	16.0		µg/l		20.0	BRL	80.0	70-130		30
m,p-Xylene	31.8		µg/l		40.0	BRL	79.5	70-130		30
o-Xylene	16.5		µg/l		20.0	BRL	82.5	70-130		30
2-Methylpentane	17.3		µg/l		20.0	BRL	86.5	70-130		30
n-Nonane	19.6		µg/l		20.0	BRL	98.0	70-130		30
n-Pentane	15.7		µg/l		20.0	BRL	78.5	70-130		30
1,2,4-Trimethylbenzene	16.6		µg/l		20.0	BRL	83.0	70-130		30
2,2,4-Trimethylpentane	17.1		µg/l		20.0	BRL	85.5	70-130		30
n-Butylcyclohexane	20.5		µg/l		20.0	0.0	102	70-130		30
n-Decane	18.9		µg/l		20.0	0.0	94.5	70-130		30
Surrogate: 2,5-Dibromotoluene (FID)	54.5		µg/l		50.0		109	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.1		µg/l		50.0		82.2	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 12

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6071902 - SW846 3510C										
Blank (6071902-BLK1)										
Prepared: 31-Jul-06 Analyzed: 02-Aug-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.50						
2-Methylnaphthalene	BRL		µg/l	2.50						
Acenaphthene	BRL		µg/l	2.50						
Phenanthrene	BRL		µg/l	2.50						
Anthracene	BRL		µg/l	2.50						
Pyrene	BRL		µg/l	2.50						
Chrysene	BRL		µg/l	2.50						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	28.2		µg/l		50.0		56.4	40-140		
Surrogate: Ortho-Terphenyl	27.4		µg/l		50.0		54.8	40-140		
Surrogate: 2-Bromonaphthalene	24.0		µg/l		40.0		60.0	40-140		
Surrogate: 2-Fluorobiphenyl	26.6		µg/l		40.0		66.5	40-140		
LCS (6071902-B51)										
Prepared: 31-Jul-06 Analyzed: 02-Aug-06										
C9-C18 Aliphatic Hydrocarbons	0.320		mg/l	0.2	0.600		53.3	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.520		mg/l	0.2	0.800		65.0	40-140		25
C11-C22 Aromatic Hydrocarbons	1.12		mg/l	0.2	1.70		65.9	40-140		25
Naphthalene	42.5		µg/l	2.50	100		42.5	40-140		20
2-Methylnaphthalene	47.2		µg/l	2.50	100		47.2	40-140		20
Acenaphthene	56.7		µg/l	2.50	100		56.7	40-140		20
Phenanthrene	65.7		µg/l	2.50	100		65.7	40-140		20
Anthracene	66.6		µg/l	2.50	100		66.6	40-140		20
Pyrene	75.0		µg/l	2.50	100		75.0	40-140		20
Chrysene	75.1		µg/l	2.50	100		75.1	40-140		20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
Surrogate: 1-Chlorooctadecane	38.1		µg/l		50.0		76.2	40-140		
Surrogate: Ortho-Terphenyl	35.8		µg/l		50.0		71.6	40-140		
Surrogate: 2-Bromonaphthalene	22.8		µg/l		40.0		57.0	40-140		
Surrogate: 2-Fluorobiphenyl	31.1		µg/l		40.0		77.8	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (607190)										
Prepared: 31-Jul-06 Analyzed: 01-Aug-06										
C9-C18 Aliphatic Hydrocarbons	0.351		mg/l	0.2	0.600		58.5	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.536		mg/l	0.2	0.800		67.0	40-140		25
C11-C22 Aromatic Hydrocarbons	1.18		mg/l	0.2	1.70		69.4	40-140		25
Naphthalene	51.2		µg/l	2.50	100		51.2	40-140		20
2-Methylnaphthalene	54.7		µg/l	2.50	100		54.7	40-140		20
Acenaphthene	62.3		µg/l	2.50	100		62.3	40-140		20
Phenanthrene	67.9		µg/l	2.50	100		67.9	40-140		20
Anthracene	69.3		µg/l	2.50	100		69.3	40-140		20
Pyrene	78.2		µg/l	2.50	100		78.2	40-140		20
Chrysene	77.7		µg/l	2.50	100		77.7	40-140		20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 12

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6071902 - SW846 3510C										
Fractionation Check Standard (607190)										
Prepared: 31-Jul-06 Analyzed: 01-Aug-06										
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
Surrogate: 1-Chlorooctadecane	36.9		µg/l		50.0		73.8	40-140		
Surrogate: Ortho-Terphenyl	37.2		µg/l		50.0		74.4	40-140		
Surrogate: 2-Bromonaphthalene	27.4		µg/l		40.0		68.5	40-140		
Surrogate: 2-Fluorobiphenyl	31.0		µg/l		40.0		77.5	40-140		
LCS Dup (6071902-BSD1)										
Prepared: 31-Jul-06 Analyzed: 02-Aug-06										
C9-C18 Aliphatic Hydrocarbons	0.271		mg/l	0.2	0.600		45.2	40-140	16.4	25
C19-C36 Aliphatic Hydrocarbons	0.415		mg/l	0.2	0.800		51.9	40-140	22.4	25
C11-C22 Aromatic Hydrocarbons	1.13		mg/l	0.2	1.70		66.5	40-140	0.906	25
Naphthalene	40.0		µg/l	2.50	100		40.0	40-140	6.06	20
2-Methylnaphthalene	45.8		µg/l	2.50	100		45.8	40-140	3.01	20
Acenaphthene	56.1		µg/l	2.50	100		56.1	40-140	1.06	20
Phenanthrene	65.8		µg/l	2.50	100		65.8	40-140	0.152	20
Anthracene	68.7		µg/l	2.50	100		68.7	40-140	3.10	20
Pyrene	78.2		µg/l	2.50	100		78.2	40-140	4.18	20
Chrysene	78.3		µg/l	2.50	100		78.3	40-140	4.17	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
Surrogate: 1-Chlorooctadecane	33.2		µg/l		50.0		66.4	40-140		
Surrogate: Ortho-Terphenyl	35.3		µg/l		50.0		70.6	40-140		
Surrogate: 2-Bromonaphthalene	16.5		µg/l		40.0		41.2	40-140		
Surrogate: 2-Fluorobiphenyl	30.0		µg/l		40.0		75.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 12

Notes and Definitions

BRL	Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

Matrix	☒ Aqueous ☐ Soil ☐ Sediment ☐ Other					
Containers	☒ Satisfactory ☐ Broken ☐ Leaking					
Sample Preservative	Aqueous (acid-preserved)	☐ N/A ☒ pH ≤ 2 ☐ pH > 2 Comment:				
	Soil or Sediment	☒ N/A ☐ Samples not received in Methanol or air-tight container				ml Methanol/g soil ☐ 1:1 +/-25% ☐ Other:
		☐ Samples received in Methanol: ☐ covering soil/sediment ☐ not covering soil/sediment				
		☐ Samples received in air-tight container:				
Temperature	☐ Received on ice ☐ Received at 4 ± 2 °C ☒ Other: 2 °C					

The following outlines the condition of all EPH samples contained within this report upon laboratory receipt.

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Aqueous Preservative	☐ N/A	☒ pH < 2	☐ pH > 2	☐ pH adjusted to < 2 in lab
Temperature	☐ Received on ice	☐ Received at $4 \pm 2^\circ\text{C}$	☒ Other: <u>2</u> °C	

Were all QA/QC procedures followed as required by the EPH method? Yes No
 Were any significant modifications made to the EPH method as specified in Section 11.3? No
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes No

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete

Authorized by:



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director



SPECTRUM ANALYTICAL, INC.
Featuring
HAMBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling: PPD

- ☒ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed: _____
• All TATs subject to laboratory approval.
• Min. 24-hour notification needed for rushes.
• Samples disposed of after 60 days unless otherwise instructed.

Report To: ECI - Auburn

Invoice To: ECI - Agawam

Project No.: 93-204082.02

27 Melrose Dr. Auburn
MA, 01501

10440010751 (91)

Site Name: Eagle Cove

Location: 181 Main St. Leaver State: MA

Project Mgr.: Chuck Klingler

P.O. No.: _____ RQN: _____

Sampler(s): D Anderson

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=JCl₂ 10=_____

Containers:

Analyses:

QA Reporting Notes:
(check if needed)

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

Lab Id: Sample Id: Date: Time:

Type Matrix

Preservative

of VOA Vials
of Amber Glass
of Clear Glass
of Plastic

State specific reporting standards
If applicable, please list below.
☐ Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☐ Yes ☐ No
(Response required for CAM report)

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C 2

24805901 MH-1 7/21/06 11:15 6 SW 293 1
02 MH-2 11:30
03 MH-3 11:45
04 SW-outfall 2:00
05 Trip Blank

Relinquished by:

Received by:

Date: Time:

☐ Fax results when available to ()
☒ E-mail to CKlingler@eciconsult.com
EDD Format _____

Chuck Klingler

Chuck Klingler

7-25-06 12:40
7/25/06 15:00

To: Rich Wandorke
From: Chuck

4 pgs incl cover

9/27/06

Job #

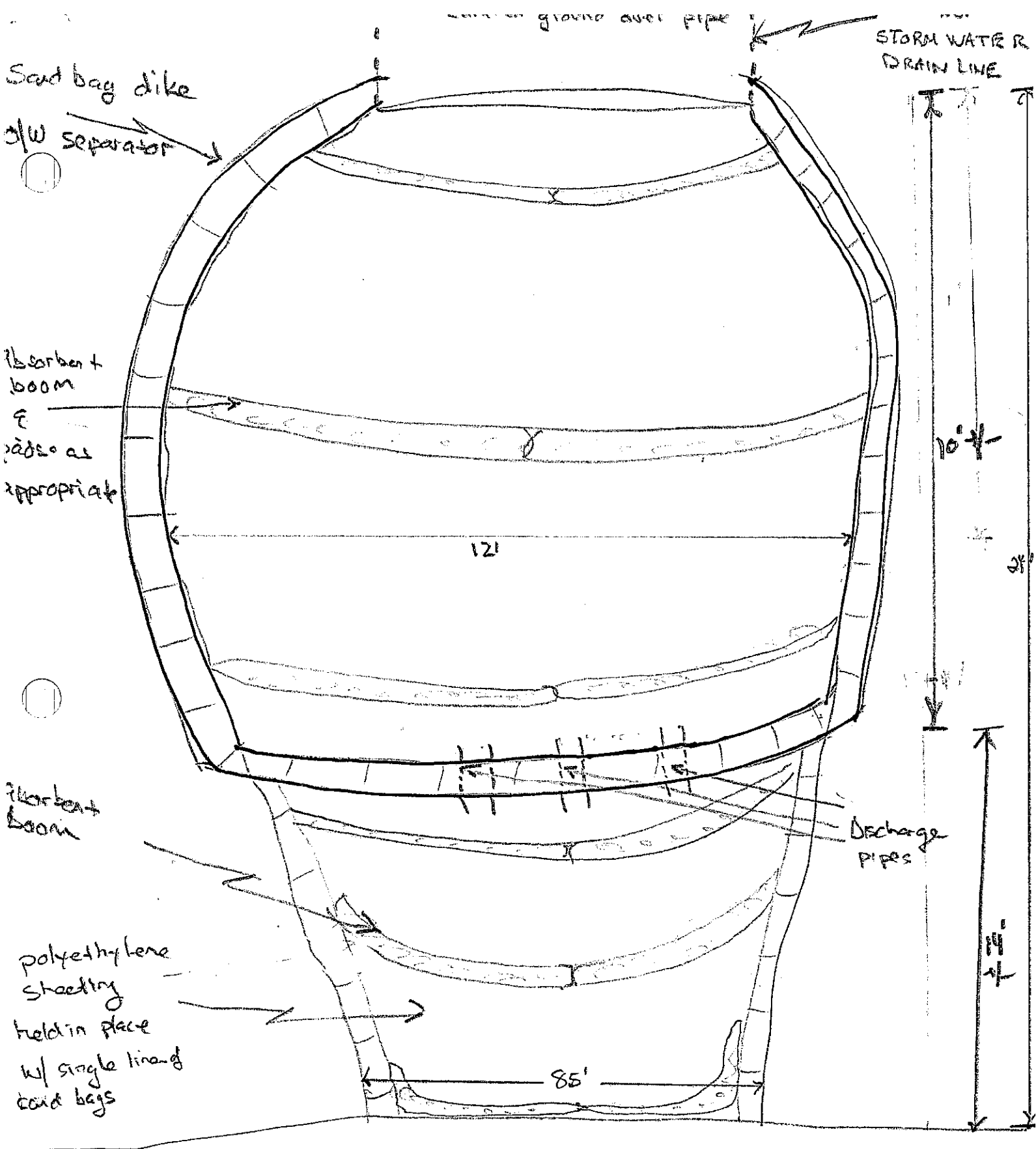
91-204082.02

Task - 2.21.1

Comment - RTN - 4-17825

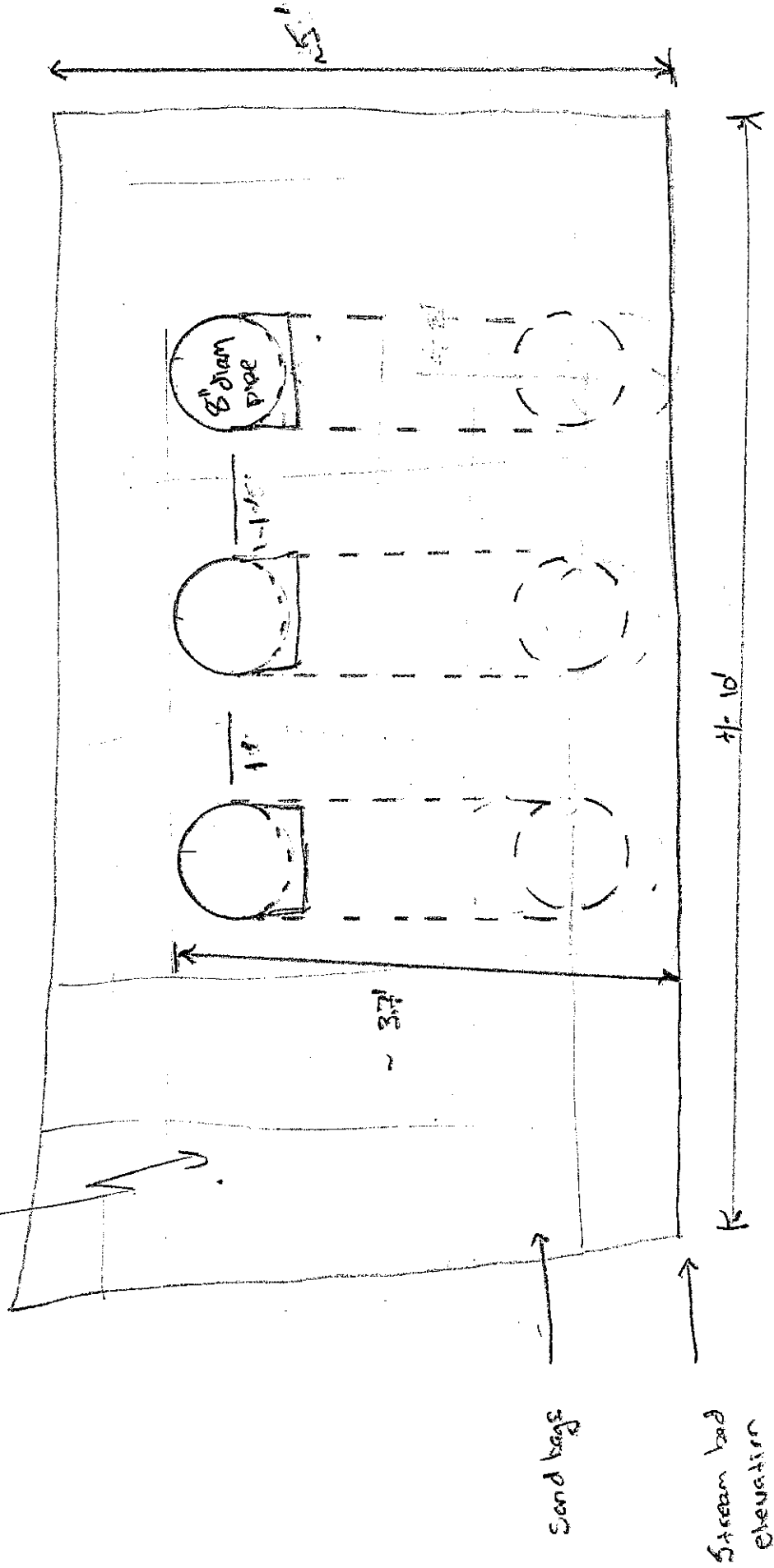
Call me to discuss -

Chuck



Top view

Sand bags



END view

polyethylene
liner

sand
bags

8" diam
"EL"

8" diam
PVC pipe

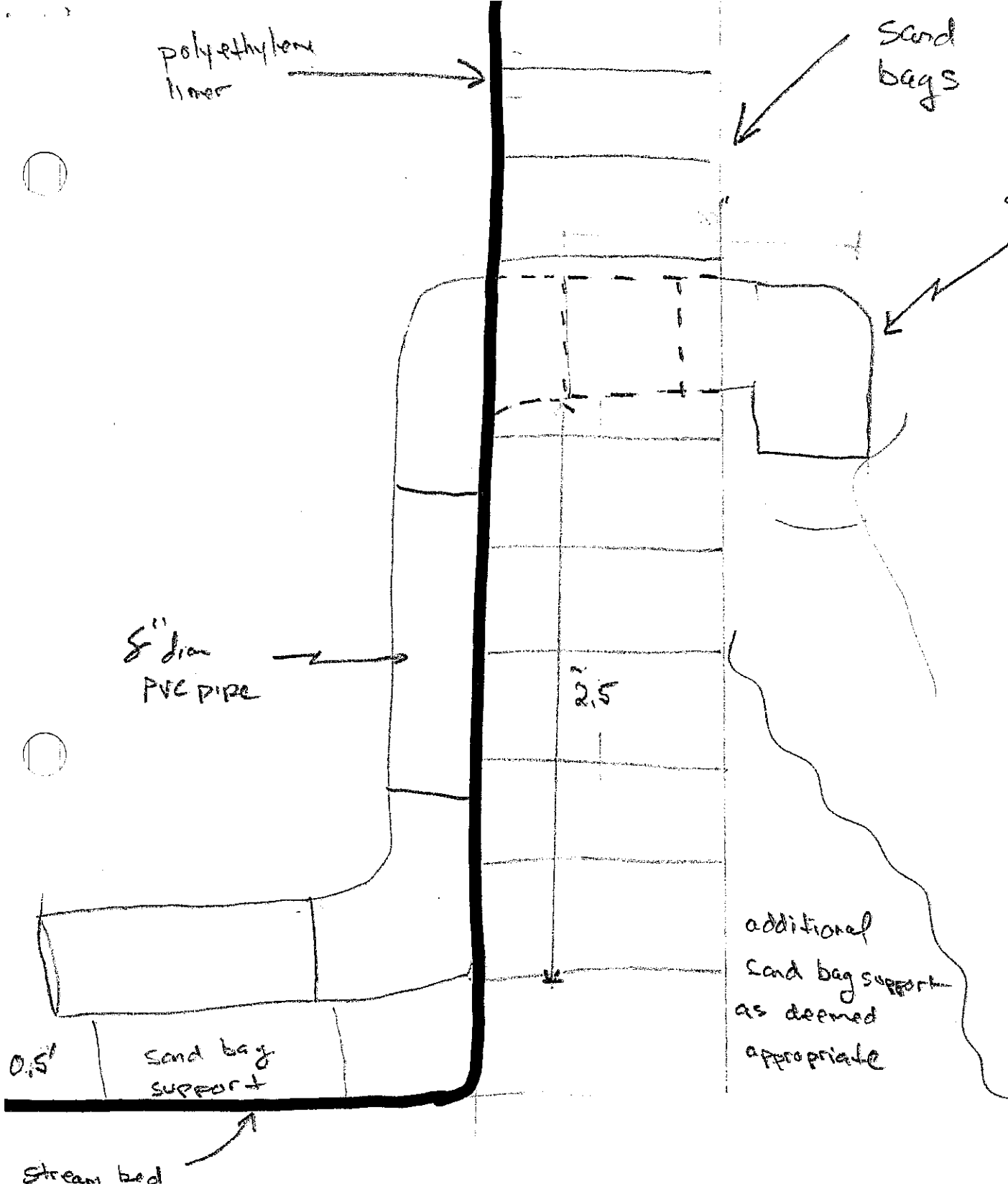
~2.5

additional
sand bag support
as deemed
appropriate

0.5'
sand bag
support

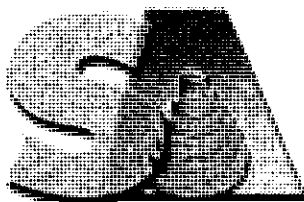
stream bed

Side view of discharge pipe





Report Date:
08-Jun-06 16:39



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

RECEIVED
JUN 14 2006

BY: LP

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 91-204082.02

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA45755-14	SW-Outfall	Surface Water	31-May-06 15:15	01-Jun-06 13:30

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.
Please note that this report contains 11 pages of analytical data plus Chain of Custody document(s).
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New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

Hamid C. Tayeh, Ph.D.
President/Laboratory Director

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CASE NARRATIVE:

The data set for work order SA45755 complies with internal QC criteria for the methods performed. The samples were received @ 4.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification

SW-Outfall

SA45755-14

Client Project #

91-204082.02

Matrix

Surface Water

Collection Date/Time

31-May-06 15:15

Received

01-Jun-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	06-Jun-06	06-Jun-06	6060310	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	96.0			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	88.4			70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	1.4			mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
C19-C36 Aliphatic Hydrocarbons	1.1			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	0.8			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	0.8			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	3.2			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	3.2			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	6.49	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	6.49	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	6.49	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	6.49	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	51.5			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	88.1			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	73.0			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	80.5			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 11

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 6060310 - VPH									
Blank (6060310-BL K1)									
Prepared & Analyzed: 06-Jun-06									
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750					
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250					
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250					
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750					
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250					
Benzene	BRL		µg/l	5.0					
Ethylbenzene	BRL		µg/l	5.0					
Methyl tert-butyl ether	BRL		µg/l	5.0					
Naphthalene	BRL		µg/l	5.0					
Toluene	BRL		µg/l	5.0					
m,p-Xylene	BRL		µg/l	10.0					
o-Xylene	BRL		µg/l	5.0					
2-Methylpentane	BRL		µg/l	5.0					
n-Nonane	BRL		µg/l	10.0					
n-Pentane	BRL		µg/l	10.0					
1,2,4-Trimethylbenzene	BRL		µg/l	5.0					
2,2,4-Trimethylpentane	BRL		µg/l	5.0					
n-Butylcyclohexane	BRL		µg/l	5.0					
n-Decane	BRL		µg/l	5.0					
Surrogate: 2,5-Dibromotoluene (FID)	51.0		µg/l		50.0		102	70-130	
Surrogate: 2,5-Dibromotoluene (PID)	47.1		µg/l		50.0		94.2	70-130	
LCS (6060310-BSD1)									
Prepared & Analyzed: 06-Jun-06									
C5-C8 Aliphatic Hydrocarbons	110		mg/l		140		78.6	70-130	25
C9-C12 Aliphatic Hydrocarbons	65.1		mg/l		55.2		118	70-130	25
C9-C10 Aromatic Hydrocarbons	33.8		mg/l		40.0		84.5	70-130	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	243		mg/l		280		86.8	70-130	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	98.9		mg/l		84.8		117	70-130	25
Benzene	19.0		µg/l		20.0		95.0	70-130	25
Ethylbenzene	19.1		µg/l		20.0		95.5	70-130	25
Methyl tert-butyl ether	19.5		µg/l		20.0		97.5	70-130	25
Naphthalene	21.3		µg/l		20.0		106	70-130	25
Toluene	18.7		µg/l		20.0		93.5	70-130	25
m,p-Xylene	37.7		µg/l		40.0		94.2	70-130	25
o-Xylene	19.1		µg/l		20.0		95.5	70-130	25
2-Methylpentane	18.5		µg/l		20.0		92.5	70-130	25
n-Nonane	19.9		µg/l		20.0		99.5	70-130	25
n-Pentane	18.1		µg/l		20.0		90.5	70-130	25
1,2,4-Trimethylbenzene	19.9		µg/l		20.0		99.5	70-130	25
2,2,4-Trimethylpentane	19.4		µg/l		20.0		97.0	70-130	25
n-Butylcyclohexane	20.9		µg/l		20.0		104	70-130	25
n-Decane	23.0		µg/l		20.0		115	70-130	25
Surrogate: 2,5-Dibromotoluene (FID)	54.5		µg/l		50.0		109	70-130	
Surrogate: 2,5-Dibromotoluene (PID)	48.5		µg/l		50.0		97.0	70-130	
LCS Dup (6060310-BSD1)									
Prepared & Analyzed: 06-Jun-06									
C5-C8 Aliphatic Hydrocarbons	111		mg/l		140		79.3	70-130	0.887 25
C9-C12 Aliphatic Hydrocarbons	59.3		mg/l		55.2		107	70-130	9.78 25
C9-C10 Aromatic Hydrocarbons	35.6		mg/l		40.0		89.0	70-130	5.19 25
Unadjusted C5-C8 Aliphatic Hydrocarbons	245		mg/l		280		87.5	70-130	0.803 25
Unadjusted C9-C12 Aliphatic Hydrocarbons	94.8		mg/l		84.8		112	70-130	4.37 25
Benzene	18.9		µg/l		20.0		94.5	70-130	0.528 25
Ethylbenzene	19.2		µg/l		20.0		96.0	70-130	0.522 25
Methyl tert-butyl ether	19.6		µg/l		20.0		98.0	70-130	0.512 25

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* Reportable Detection Limit

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Page 3 of 11

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	RPD Limit
Batch 6060310 - VPH										
CS Dup (6060310-BSD1)										
Prepared & Analyzed: 06-Jun-06										
Naphthalene	21.0		µg/l		20.0		105	70-130	0.948	25
Toluene	18.6		µg/l		20.0		93.0	70-130	0.536	25
m,p-Xylene	37.8		µg/l		40.0		94.5	70-130	0.318	25
o-Xylene	19.3		µg/l		20.0		96.5	70-130	1.04	25
2-Methylpentane	17.2		µg/l		20.0		86.0	70-130	7.28	25
n-Nonane	19.5		µg/l		20.0		97.5	70-130	2.03	25
n-Pentane	17.3		µg/l		20.0		86.5	70-130	4.52	25
1,2,4-Trimethylbenzene	19.9		µg/l		20.0		99.5	70-130	0.00	25
2,2,4-Trimethylpentane	18.4		µg/l		20.0		92.0	70-130	5.29	25
n-Butylcyclohexane	19.9		µg/l		20.0		99.5	70-130	4.42	25
n-Decane	21.4		µg/l		20.0		107	70-130	7.21	25
Surrogate: 2,5-Dibromotoluene (FID)	50.9		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (FD)	46.6		µg/l		50.0		93.2	70-130		
Duplicate (6060310-DUP1) Source: SA45755-08										
Prepared & Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						50
Benzene	BRL		µg/l	5.0						50
Ethylbenzene	BRL		µg/l	5.0						50
Methyl tert-butyl ether	BRL		µg/l	5.0						50
Naphthalene	BRL		µg/l	5.0						50
Toluene	BRL		µg/l	5.0						50
m,p-Xylene	BRL		µg/l	10.0						50
o-Xylene	BRL		µg/l	5.0						50
Surrogate: 2,5-Dibromotoluene (FID)	47.1		µg/l		50.0		94.2	70-130		
Surrogate: 2,5-Dibromotoluene (FD)	43.1		µg/l		50.0		86.2	70-130		
Matrix Spike (6060310-MS1) Source: SA45755-08										
Prepared & Analyzed: 06-Jun-06										
Benzene	18.5		µg/l		20.0		92.5	70-130		30
Ethylbenzene	19.0		µg/l		20.0		95.0	70-130		30
Methyl tert-butyl ether	19.8		µg/l		20.0		99.0	70-130		30
Naphthalene	21.9		µg/l		20.0		110	70-130		30
Toluene	18.3		µg/l		20.0		91.5	70-130		30
m,p-Xylene	37.4		µg/l		40.0		93.5	70-130		30
o-Xylene	19.0		µg/l		20.0		95.0	70-130		30
2-Methylpentane	17.9		µg/l		20.0		89.5	70-130		30
n-Nonane	16.9		µg/l		20.0		84.5	70-130		30
n-Pentane	17.8		µg/l		20.0		89.0	70-130		30
1,2,4-Trimethylbenzene	20.3		µg/l		20.0		102	70-130		30
2,2,4-Trimethylpentane	18.1		µg/l		20.0		90.5	70-130		30
n-Butylcyclohexane	16.7		µg/l		20.0		83.5	70-130		30
n-Decane	15.3		µg/l		20.0		76.5	70-130		30
Surrogate: 2,5-Dibromotoluene (FID)	53.2		µg/l		50.0		106	70-130		
Surrogate: 2,5-Dibromotoluene (FD)	48.1		µg/l		50.0		96.2	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 11

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 6060211 - SW846 3510C									
Blank (6060211-BLK1)									
Prepared & Analyzed: 05-Jun-06									
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2					
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2					
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2					
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2					
Naphthalene	BRL		µg/l	2.50					
2-Methylnaphthalene	BRL		µg/l	2.50					
Acenaphthene	BRL		µg/l	2.50					
Phenanthrene	BRL		µg/l	2.50					
Anthracene	BRL		µg/l	2.50					
Pyrene	BRL		µg/l	2.50					
Chrysene	BRL		µg/l	2.50					
n-Hexadecane	0.00		µg/l						
n-Tetradecane	0.00		µg/l						
n-Eicosane	0.00		µg/l						
n-Nonadecane	0.00		µg/l						
n-Octacosane	0.00		µg/l						
Naphthalene (aliphatic fraction)	0.00		µg/l						
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l						
Surrogate: 1-Chlorooctadecane	38.1		µg/l		50.0		76.2	40-140	
Surrogate: Ortho-Terphenyl	29.2		µg/l		50.0		58.4	40-140	
Surrogate: 2-Bromonaphthalene	26.2		µg/l		40.0		65.5	40-140	
Surrogate: 2-Fluorobiphenyl	24.9		µg/l		40.0		62.2	40-140	
LCS (6060211-BS1)									
Prepared & Analyzed: 05-Jun-06									
C9-C18 Aliphatic Hydrocarbons	0.428		mg/l	0.2	0.600		71.3	40-140	25
C19-C36 Aliphatic Hydrocarbons	0.890		mg/l	0.2	0.800		111	40-140	25
C11-C22 Aromatic Hydrocarbons	0.900		mg/l	0.2	1.70		52.9	40-140	25
Naphthalene	30.1	QC-1	µg/l	2.50	100		30.1	40-140	20
2-Methylnaphthalene	35.3	QC-1	µg/l	2.50	100		35.3	40-140	20
Acenaphthene	42.8		µg/l	2.50	100		42.8	40-140	20
Phenanthrene	51.8		µg/l	2.50	100		51.8	40-140	20
Anthracene	53.0		µg/l	2.50	100		53.0	40-140	20
Pyrene	57.1		µg/l	2.50	100		57.1	40-140	20
Chrysene	58.2		µg/l	2.50	100		58.2	40-140	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200	200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200	200
5-alpha-Androstane	25.0		µg/l		25.0		128	0-200	
5-alpha-Androstane	25.0		mg/l		0.0250		128	0-200	
Surrogate: 1-Chlorooctadecane	42.2		µg/l		50.0		84.4	40-140	
Surrogate: Ortho-Terphenyl	30.6		µg/l		50.0		61.2	40-140	
Surrogate: 2-Bromonaphthalene	22.5		µg/l		40.0		56.2	40-140	
Surrogate: 2-Fluorobiphenyl	22.0		µg/l		40.0		55.0	40-140	
Naphthalene Breakthrough	0.00		%					0-5	
2-Methylnaphthalene Breakthrough	0.00		%					0-5	
Fractionation Check Standard (606021)									
Prepared & Analyzed: 05-Jun-06									
C9-C18 Aliphatic Hydrocarbons	0.624		mg/l	0.2	0.600		104	40-140	25
C19-C36 Aliphatic Hydrocarbons	0.995		mg/l	0.2	0.800		124	40-140	25
C11-C22 Aromatic Hydrocarbons	1.41		mg/l	0.2	1.70		82.9	40-140	25
Naphthalene	60.5		µg/l	2.50	100		60.5	40-140	20
2-Methylnaphthalene	65.9		µg/l	2.50	100		65.9	40-140	20
Acenaphthene	71.9		µg/l	2.50	100		71.9	40-140	20
Phenanthrene	79.8		µg/l	2.50	100		79.8	40-140	20
Anthracene	80.4		µg/l	2.50	100		80.4	40-140	20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 11

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	RPD Limit
Batch 6060211 - SW846 3510C										
Fractionation Check Standard (606021)										
Prepared & Analyzed: 05-Jun-06										
Pyrene	83.7		µg/l	2.50	100		83.7	40-140		20
Chrysene	84.3		µg/l	2.50	100		84.3	40-140		20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
5-alpha-Androstane	25.0		µg/l		25.0		130	0-200		
5-alpha-Androstane	25.0		mg/l		0.0250		130	0-200		
Surrogate: 1-Chlorooctadecane	59.5		µg/l		50.0		119	40-140		
Surrogate: Ortho-Terphenyl	42.8		µg/l		50.0		85.6	40-140		
Surrogate: 2-Bromonaphthalene	29.4		µg/l		40.0		73.5	40-140		
Surrogate: 2-Fluorobiphenyl	31.6		µg/l		40.0		79.0	40-140		
LCS Dup (6060211-BSD1)										
Prepared: 05-Jun-06 Analyzed: 06-Jun-06										
C9-C18 Aliphatic Hydrocarbons	0.414		mg/l	0.2	0.600		69.0	40-140	3.28	25
C19-C36 Aliphatic Hydrocarbons	0.848		mg/l	0.2	0.800		106	40-140	4.61	25
C11-C22 Aromatic Hydrocarbons	1.09		mg/l	0.2	1.70		64.1	40-140	19.1	25
Naphthalene	40.0	QR-05	µg/l	2.50	100		40.0	40-140	28.2	20
2-Methylnaphthalene	44.0	QR-05	µg/l	2.50	100		44.0	40-140	21.9	20
Acenaphthene	50.7		µg/l	2.50	100		50.7	40-140	16.9	20
Phenanthrene	61.4		µg/l	2.50	100		61.4	40-140	17.0	20
Anthracene	64.1		µg/l	2.50	100		64.1	40-140	19.0	20
Pyrene	68.9		µg/l	2.50	100		68.9	40-140	18.7	20
Chrysene	72.3	QR-02	µg/l	2.50	100		72.3	40-140	21.6	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
Surrogate: 1-Chlorooctadecane	42.3		µg/l		50.0		84.6	40-140		
Surrogate: Ortho-Terphenyl	34.2		µg/l		50.0		68.4	40-140		
Surrogate: 2-Bromonaphthalene	26.8		µg/l		40.0		67.0	40-140		
Surrogate: 2-Fluorobiphenyl	26.4		µg/l		40.0		66.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 11

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0606066				
Calibration Check (0606066-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.60565E+08	1.12499E+08	7.50	25.00
C19-C36 Aliphatic Hydrocarbons	8.40263E+07	7.06183E+07	20.4	25.00
C11-C22 Aromatic Hydrocarbons	26.8433	16.9179	-2.35	25.00
Naphthalene	7.28448	7.05564	-3.14	20.00
2-Methylnaphthalene	4.55306	4.48721	-1.45	20.00
Acenaphthene	4.29598	4.21643	-1.85	20.00
Phenanthrene	6.21583	6.15604	-0.962	20.00
Anthracene	6.48728	6.31389	-2.67	20.00
Pyrene	6.32429	6.39844	1.17	20.00
Chrysene	5.45456	5.51777	1.16	20.00

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 11

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0606089				
Calibration Check (0606089-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.66513E+08	1.57487E+08	-1.67	25.00
C19-C36 Aliphatic Hydrocarbons	1.00596E+08	1.08153E+08	-6.88	25.00
C11-C22 Aromatic Hydrocarbons	26.8433	17.201	-0.588	25.00
Naphthalene	7.28448	6.5121	-10.6	20.00
2-Methylnaphthalene	4.55306	4.07514	-10.5	20.00
Acenaphthene	4.29598	3.87679	-9.76	20.00
Phenanthrene	6.21583	6.0074	-3.35	20.00
Anthracene	6.48728	6.3475	-2.15	20.00
Pyrene	6.32429	6.59784	4.33	20.00
Chrysene	5.45456	5.77128	5.81	20.00

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 11

Notes and Definitions

QC-1 Analyte out of acceptance range.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

QR-05 RPD out of acceptance range.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

Q

* Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GCMS using all QC criteria specified in the method

Q

Q

Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐



10/12/2

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MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:

This form provides certifications for the following Spectrum Analytical, Inc work order #: SA45755

Matrix	☒ Groundwater	☐ Soil/Sediment	☐ Drinking Water	☐ Other
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☒ 6010B
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³

1 List Release Tracking Number(RTN), if known

2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide(PAC) Method

3 S - SW-846 Methods 7000 Series List individual method and analyte

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☐ Yes ☒ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Date: 6/8/2006

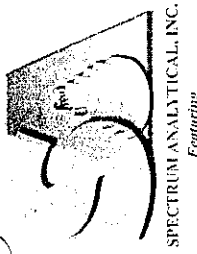
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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 11

457SSMF



CHAIN OF CUSTODY RECORD

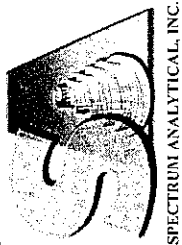
Page 1 of 2

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 6/8/06
- All TATs subject to laboratory approval.
- Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: <u>ECS, Auburn</u>		Invoice To: <u>ECS, Agawam</u>		Project No.: <u>91-204082-02</u>	
Project Mgr.: <u>Chuck Klingler</u>		P.O. No.: <u>03-0503</u> RQN: <u></u>		Site Name: <u>Eagle Gas</u>	
1=Na ₂ S ₂ O ₃ 2=HCl 3=H ₂ SO ₄ 4=HNO ₃ 5=NaOH 6=Ascorbic Acid		7=CH ₃ OH 8=NaHSO ₄ 9= <u>Ice</u> 10= <u></u>		Location: <u>131 Main St. Carver</u> State: <u>MA</u>	
DW=Drinking Water GW=Groundwater WW=Wastewater		O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air		Sampler(s): <u>AKaczorowski, D. Anderson</u>	
X1= <u></u> X2= <u></u> X3= <u></u>		Containers:		QA Reporting Notes: (check if needed)	
		# of VOA Vials		State specific reporting standards If applicable, please list below:	
		# of Amber Glass		☒ Provide MCP CAM Report	
		# of Clear Glass		Were all field QC requirements met as per MADEP CAM Section 2.0?	
		# of Plastic		☒ Yes ☐ No	
		Preservative		(Response required for CAM report)	
		Matrix		<u>separate Lab</u>	
		Type		<u>reports as</u>	
		Time:		<u>indicated</u>	
		Date:		<u>4</u>	
		Sample Id:		<u>Totals</u>	
		Lab Id:		<u>4</u>	
		G=Grab C=Composite		<u>4</u>	
		DCW-1		<u>4</u>	
		DCW-2		<u>4</u>	
		ECS-1		<u>4</u>	
		ECS-7		<u>4</u>	
		ECS-8		<u>4</u>	
		BP-1		<u>4</u>	
		BP-2		<u>4</u>	
		BP-4		<u>4</u>	
		DCW-4		<u>4</u>	
		DCW-6		<u>4</u>	
		Relinquished by:		Received by:	
		Date:		Time:	
		Fax results when available to ()		Date: <u>6/1/06</u> Time: <u>10:53-</u>	
		E-mail to <u>cklingler@eecsconsult.com</u>		Date: <u>6/1/06</u> Time: <u>1:30</u>	
		EDD Format			
		Condition upon receipt: ☐ Iced ☐ Ambient ☐ <u>4</u>			

12 acknowledged



HANIBAL TECHNOLOGY
Featuring

CHAIN OF CUSTODY RECORD

Page 2 of 2

Report To: FCS, Auburn

Invoice To: FCS, Agawam

Project Mgr.: Check Klingler

Project No.: 91-204082-02

Site Name: Eagle Gas

Location: 131 Main St., Carver

State: MA

Sampler(s): A. Kaczmarek, D. Anderson

P.O. No.: 03-0503 RQN: _____

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=LC 10=_____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:
45755-11 *	MH-1	5-31-06	11:00
-12 *	MH-2	↓	10:25
-13 *	MH-3	↓	10:45
-14 *	SW-aerial	↓	5:15
Trip blank (RW)			

Preservative

of VOA Vials
of Amber Glass
of Clear Glass
of Plastic

Containers:

Analyses:

QA Reporting Notes:
(check if needed)

State specific reporting standards
If applicable, please list below.

☒ Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☒ Yes ☐ No
(Response required for CAM report)

See comments on
pg 1 of 2

☐ Fax results when available to ()

☒ E-mail to CKlingler@fcsconsult.com

EDD Format _____

Condition upon receipt: ☐ Iced ☐ Ambient ☒ 4°C

Relinquished by:

Received by:

Date:

Time:

Caron Macauba

Jack Henry

6/1/06 1055

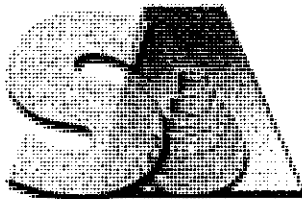
Jack Henry

Jack Henry

6/1/06 130



Report Date:
08-Jun-06 16:34



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

RECEIVED
JUN 14 2006

BY: *lp*

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 91-204082.02

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA45755-01	DCW-1	Ground Water	31-May-06 09:00	01-Jun-06 13:30
SA45755-02	DCW-2	Ground Water	31-May-06 10:00	01-Jun-06 13:30
SA45755-03	ECS-1	Ground Water	31-May-06 11:15	01-Jun-06 13:30
SA45755-04	ECS-7	Ground Water	31-May-06 15:15	01-Jun-06 13:30
SA45755-08	BP-4	Ground Water	31-May-06 11:55	01-Jun-06 13:30
SA45755-09	DCW-4	Ground Water	31-May-06 09:15	01-Jun-06 13:30
SA45755-11	MH-1	Surface Water	31-May-06 11:00	01-Jun-06 13:30
SA45755-12	MH-2	Surface Water	31-May-06 10:25	01-Jun-06 13:30
SA45755-13	MH-3	Surface Water	31-May-06 10:45	01-Jun-06 13:30

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 31 pages of analytical data plus Chain of Custody document(s).

This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc.

Massachusetts Certification # M-MAI38/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

[Signature]
Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

CASE NARRATIVE:

The data set for work order SA45755 complies with internal QC criteria for the methods performed. The samples were received @ 4.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

Sample Identification

DCW-1

SA45755-01

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 09:00

Received

01-Jun-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
PH Aliphatic/Aromatic Carbon Ranges		R-05									
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	7.50	500	+MADEP 5/2004 Rev 1.1	05-Jun-06	06-Jun-06	6060231	ss
	C9-C12 Aliphatic Hydrocarbons	18.8		mg/l	2.50	500	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	17.0		mg/l	2.50	500	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	33.4		mg/l	7.50	500	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	35.8		mg/l	2.50	500	"	"	"	"	"
VPH Target Analytes		R-05									
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	250	500	"	"	"	"	"
100-41-4	Ethylbenzene	334		µg/l	250	500	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	31,200		µg/l	250	500	"	"	"	"	"
91-20-3	Naphthalene	1,190		µg/l	250	500	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	250	500	"	"	"	"	"
1330-20-7	m,p-Xylene	1,740		µg/l	500	500	"	"	"	"	"
95-47-6	o-Xylene	790		µg/l	250	500	"	"	"	"	"
Surrogate recoveries:											
615-59-8	2,5-Dibromotoluene (FID)	104		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	88.0		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
EPH Aliphatic/Aromatic Ranges											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	2.9		mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
	C19-C36 Aliphatic Hydrocarbons	1.1		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	2.0		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	2.2		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	6.0		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	6.2		mg/l	0.2	1	"	"	"	"	"
EPH Diesel Target PAH Analytes											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	81.5		µg/l	5.35	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	47.5		µg/l	5.35	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.35	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.35	1	"	"	"	"	"
Surrogate recoveries:											
3386-33-2	1-Chlorooctadecane	61.1		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	83.2		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	65.4		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	68.2		40-140 %			"	"	"	"	"
Semivolatile Organic Compounds by GCMS											
	Filtration	Completed		N/A		1	EPA 200.7	05-Jun-06	05-Jun-06	6060211	WHA
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	12.5		mg/l	0.0100	1	SW846 6010B	06-Jun-06	06-Jun-06	6060362	CW
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	06-Jun-06	06-Jun-06	6060350	JR
General Chemistry Parameters											

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 31

Sample IdentificationDCW-1
SA45755-01Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 09:00

Received

01-Jun-06

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
General Chemistry Parameters										
797-55-8 Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	01-Jun-06 12:00	02-Jun-06	6060153	Alex
14808-79-8 Sulfate as SO4	47.4		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 31

Sample Identification

DCW-2

SA45755-02

Client Project

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 10:00

Received

01-Jun-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.375	25	+MADEP 5/2004 Rev 1.1	05-Jun-06	06-Jun-06	6060231	SS
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.125	25	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.125	25	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	1.82		mg/l	0.375	25	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.125	25	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	12.5	25	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	12.5	25	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	2,230		µg/l	12.5	25	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	12.5	25	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	12.5	25	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	25.0	25	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	12.5	25	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	97.6		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	87.8		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	0.2		mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	0.2		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	0.2		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.00	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.00	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.00	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.00	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	43.2		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	83.8		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	73.8		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	69.8		40-140 %			"	"	"	"	"
Semivolatile Organic Compounds by GCMS											
	Filtration	Completed		N/A		1	EPA 200.7	05-Jun-06	05-Jun-06	6060211	WHA
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0176		mg/l	0.0100	1	SW846 6010B	06-Jun-06	06-Jun-06	6060362	CW
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	06-Jun-06	06-Jun-06	6060350	JR
General Chemistry Parameters											

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 31

Sample Identification

DCW-2

SA45755-02

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 10:00

Received

01-Jun-06

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
General Chemistry Parameters											
797-55-8	Nitrate as N	8.62		mg/l	0.100	1	EPA 300.0	01-Jun-06 12:00	02-Jun-06	6060153	Alex
14808-79-8	Sulfate as SO4	138		mg/l	5.00	5	"	07-Jun-06	07-Jun-06	6060459	Al

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 31

Sample Identification

ECS-1

SA45755-03

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 11:15

Received

01-Jun-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	0.332		mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	05-Jun-06	06-Jun-06	6060231	ss
	C9-C12 Aliphatic Hydrocarbons	0.355		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	0.683		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	0.542		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	1.04		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	62.5		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	94.2		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	14.8		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	163		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	14.3		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	19.4		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	92.2		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	85.4		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	0.4		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	0.5		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	0.4		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	0.5		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	44.6		µg/l	5.38	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	41.8		µg/l	5.38	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.38	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.38	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	42.6		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	74.5		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	68.6		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	70.0		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	59.2		mg/l	0.0100	1	SW846 6010B	06-Jun-06	06-Jun-06	6060362	CW
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	06-Jun-06	06-Jun-06	6060350	JR
General Chemistry Parameters											
14797-55-8	Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	01-Jun-06 12:00	02-Jun-06	6060153	Alex
808-79-8	Sulfate as SO4	5.66		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 31

Sample Identification

ECS-7

SA45755-04

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 15:15

Received

01-Jun-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	05-Jun-06	06-Jun-06	6060231	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	107			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	98.6			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.49	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.49	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.49	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.49	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	41.5			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	82.1			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	65.5			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	72.0			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 31

Sample Identification

BP-4

SA45755-08

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 11:55

Received

01-Jun-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	06-Jun-06	06-Jun-06	6060310	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	103			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	95.8			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.68	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.68	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.68	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.68	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	56.3			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	88.2			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	59.6			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	86.4			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 31

Sample Identification

DCW-4

SA45755-09

Client Project

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 09:15

Received

01-Jun-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds

PH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	0.0944			mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	06-Jun-06	07-Jun-06	6060404	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	0.688			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	594			µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	5	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	5	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	95.8			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	88.0			70-130 %			"	"	"	"	"

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.38	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.38	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.38	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.38	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	53.2			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	84.9			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	78.6			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	74.0			40-140 %			"	"	"	"	"

Semivolatile Organic Compounds by GCMS

Filtration	Completed			N/A		1	EPA 200.7	05-Jun-06	05-Jun-06	6060211	WHA

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 31

Sample Identification

MH-1

SA45755-11

Client Project #

91-204082.02

Matrix

Surface Water

Collection Date/Time

31-May-06 11:00

Received

01-Jun-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>

Volatile Organic CompoundsEPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	06-Jun-06	06-Jun-06	6060310	ss
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	96.8	70-130 %	"	"	"	"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	87.8	70-130 %	"	"	"	"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL		µg/l	5.68	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL		µg/l	5.68	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	56.9	40-140 %	"	"	"	"	"	"	"	"
84-15-1 Ortho-Terphenyl	93.7	40-140 %	"	"	"	"	"	"	"	"
580-13-2 2-Bromonaphthalene	85.9	40-140 %	"	"	"	"	"	"	"	"
321-60-8 2-Fluorobiphenyl	81.8	40-140 %	"	"	"	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 31

Sample Identification

MH-2
SA45755-12

Client Project #
91-204082.02

Matrix
Surface Water

Collection Date/Time
31-May-06 10:25

Received
01-Jun-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	06-Jun-06	06-Jun-06	6060310	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	95.8			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	87.0			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	06-Jun-06	07-Jun-06	6060211	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	6.58	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	6.58	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	6.58	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	6.58	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	61.1			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	91.6			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	82.9			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	79.3			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 31

Sample Identification

MH-3

SA45755-13

Client Project

91-204082.02

Matrix

Surface Water

Collection Date/Time

31-May-06 10:45

Received

01-Jun-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds

PH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	06-Jun-06	06-Jun-06	6060310	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	92.2			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	83.0			70-130 %			"	"	"	"	"

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.68	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.68	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.68	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.68	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	45.4			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	82.2			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	91.9			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	86.2			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 31

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060231 - VPH										
Blank (6060231-BLK1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	46.4		µg/l		50.0		92.8	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	44.4		µg/l		50.0		88.8	70-130		
LCS (6060231-BS1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	115		mg/l		140		82.1	70-130		25
C9-C12 Aliphatic Hydrocarbons	53.8		mg/l		55.2		97.5	70-130		25
C9-C10 Aromatic Hydrocarbons	30.5		mg/l		40.0		76.2	70-130		25
Unadjusted C5-C8 Aliphatic Hydrocarbons	242		mg/l		280		86.4	70-130		25
Unadjusted C9-C12 Aliphatic Hydrocarbons	84.3		mg/l		84.8		99.4	70-130		25
Benzene	18.2		µg/l		20.0		91.0	70-130		25
Ethylbenzene	18.3		µg/l		20.0		91.5	70-130		25
Methyl tert-butyl ether	17.7		µg/l		20.0		88.5	70-130		25
Naphthalene	19.4		µg/l		20.0		97.0	70-130		25
Toluene	18.3		µg/l		20.0		91.5	70-130		25
m,p-Xylene	36.4		µg/l		40.0		91.0	70-130		25
o-Xylene	18.6		µg/l		20.0		93.0	70-130		25
2-Methylpentane	17.5		µg/l		20.0		87.5	70-130		25
n-Nonane	17.9		µg/l		20.0		89.5	70-130		25
n-Pentane	19.2		µg/l		20.0		96.0	70-130		25
1,2,4-Trimethylbenzene	18.3		µg/l		20.0		91.5	70-130		25
2,2,4-Trimethylpentane	18.3		µg/l		20.0		91.5	70-130		25
n-Butylcyclohexane	17.2		µg/l		20.0		86.0	70-130		25
n-Decane	15.0		µg/l		20.0		75.0	70-130		25
Surrogate: 2,5-Dibromotoluene (FID)	47.7		µg/l		50.0		95.4	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.9		µg/l		50.0		83.8	70-130		
LCS Dup (6060231-BSD1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	116		mg/l		140		82.9	70-130	0.970	25
C9-C12 Aliphatic Hydrocarbons	63.1		mg/l		55.2		114	70-130	15.6	25
C9-C10 Aromatic Hydrocarbons	34.6		mg/l		40.0		86.5	70-130	12.7	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	248		mg/l		280		88.6	70-130	2.51	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	97.7		mg/l		84.8		115	70-130	14.6	25
Benzene	18.8		µg/l		20.0		94.0	70-130	3.24	25
Ethylbenzene	19.0		µg/l		20.0		95.0	70-130	3.75	25
Methyl tert-butyl ether	18.1		µg/l		20.0		90.5	70-130	2.23	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 14 of 31

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 6060231 - VPH									
CS Dup (6060231-BSD1)									
Prepared & Analyzed: 05-Jun-06									
Naphthalene	19.6		µg/l		20.0		98.0 70-130	1.03	25
Toluene	18.8		µg/l		20.0		94.0 70-130	2.70	25
m,p-Xylene	37.7		µg/l		40.0		94.2 70-130	3.46	25
o-Xylene	19.3		µg/l		20.0		96.5 70-130	3.69	25
2-Methylpentane	20.0		µg/l		20.0		100 70-130	13.3	25
n-Nonane	22.4		µg/l		20.0		112 70-130	22.3	25
n-Pentane	21.7		µg/l		20.0		108 70-130	11.8	25
1,2,4-Trimethylbenzene	19.0		µg/l		20.0		95.0 70-130	3.75	25
2,2,4-Trimethylpentane	21.1		µg/l		20.0		106 70-130	14.7	25
n-Butylcyclohexane	22.1		µg/l		20.0		110 70-130	24.5	25
n-Decane	21.3	QR-02	µg/l		20.0		106 70-130	34.3	25
Surrogate: 2,5-Dibromotoluene (FID)	50.5		µg/l		50.0		101 70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.4		µg/l		50.0		90.8 70-130		
Duplicate (6060231-DUP1) Source: SA45528-02									
Prepared: 05-Jun-06 Analyzed: 06-Jun-06									
C5-C8 Aliphatic Hydrocarbons	0.806		mg/l	0.0750		0.726		10.4	50
C9-C12 Aliphatic Hydrocarbons	0.487		mg/l	0.0250		0.365		28.6	50
C9-C10 Aromatic Hydrocarbons	0.968		mg/l	0.0250		0.783		21.1	50
Unadjusted C5-C8 Aliphatic Hydrocarbons	1.02		mg/l	0.0750		0.897		12.8	50
Unadjusted C9-C12 Aliphatic Hydrocarbons	1.46		mg/l	0.0250		1.15		23.8	50
Benzene	BRL		µg/l	5.0		BRL			50
Ethylbenzene	103		µg/l	5.0		82.0		22.7	50
Methyl tert-butyl ether	5.9		µg/l	5.0		5.1		14.5	50
Naphthalene	43.0		µg/l	5.0		35.0		20.5	50
Toluene	8.1		µg/l	5.0		7.3		10.4	50
m,p-Xylene	70.7		µg/l	10.0		56.5		22.3	50
o-Xylene	26.5		µg/l	5.0		20.4		26.0	50
Surrogate: 2,5-Dibromotoluene (FID)	49.5		µg/l		50.0		99.0 70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.5		µg/l		50.0		87.0 70-130		
Matrix Spike (6060231-MS1) Source: SA45528-02									
Prepared & Analyzed: 05-Jun-06									
Benzene	18.6		µg/l		20.0	BRL	93.0 70-130		30
Ethylbenzene	39.5		µg/l		20.0	16.4	116 70-130		30
Methyl tert-butyl ether	19.5		µg/l		20.0	1.02	92.4 70-130		30
Naphthalene	29.3		µg/l		20.0	7.00	112 70-130		30
Toluene	18.8		µg/l		20.0	1.46	86.7 70-130		30
m,p-Xylene	51.4		µg/l		40.0	11.3	100 70-130		30
o-Xylene	24.2		µg/l		20.0	4.08	101 70-130		30
2-Methylpentane	39.1		µg/l		20.0	18.4	104 70-130		30
n-Nonane	18.4		µg/l		20.0	BRL	92.0 70-130		30
n-Pentane	30.6		µg/l		20.0	10.6	100 70-130		30
1,2,4-Trimethylbenzene	81.3	QM-07	µg/l		20.0	50.6	154 70-130		30
2,2,4-Trimethylpentane	32.3		µg/l		20.0	13.2	95.5 70-130		30
n-Butylcyclohexane	26.8		µg/l		20.0	2.34	122 70-130		30
n-Decane	18.3		µg/l		20.0	0.0	91.5 70-130		30
Surrogate: 2,5-Dibromotoluene (FID)	50.1		µg/l		50.0		100 70-130		
Surrogate: 2,5-Dibromotoluene (PID)	51.7		µg/l		50.0		103 70-130		
Matrix Spike Dup (6060231-MSD1) Source: SA45528-02									
Prepared & Analyzed: 05-Jun-06									
Benzene	18.5		µg/l		20.0	BRL	92.5 70-130	0.539	30
Ethylbenzene	37.9		µg/l		20.0	16.4	108 70-130	7.14	30
Methyl tert-butyl ether	19.7		µg/l		20.0	1.02	93.4 70-130	1.08	30
Naphthalene	29.3		µg/l		20.0	7.00	112 70-130	0.00	30

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 15 of 31

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	Limit
Batch 6060231 - VPH										
Matrix Spike Dup (6060231-MSD1) Source: SA45528-02										
Prepared & Analyzed: 05-Jun-06										
Toluene	18.7		µg/l		20.0	1.46	86.2	70-130	0.578	30
m,p-Xylene	50.0		µg/l		40.0	11.3	96.8	70-130	3.25	30
o-Xylene	23.7		µg/l		20.0	4.08	98.1	70-130	2.91	30
2-Methylpentane	37.9		µg/l		20.0	18.4	97.5	70-130	6.45	30
n-Nonane	18.3		µg/l		20.0	BRL	91.5	70-130	0.545	30
n-Pentane	30.6		µg/l		20.0	10.6	100	70-130	0.00	30
1,2,4-Trimethylbenzene	78.1	QM-07	µg/l		20.0	50.6	138	70-130	11.0	30
2,2,4-Trimethylpentane	32.7		µg/l		20.0	13.2	97.5	70-130	2.07	30
n-Butylcyclohexane	25.9		µg/l		20.0	2.34	118	70-130	3.33	30
n-Decane	18.2		µg/l		20.0	0.0	91.0	70-130	0.548	30
Surrogate: 2,5-Dibromotoluene (FID)	51.1		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	42.9		µg/l		50.0		85.8	70-130		

Batch 6060310 - VPH

Blank (6060310-BLK1)

Prepared & Analyzed: 06-Jun-06

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	51.0		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	47.1		µg/l		50.0		94.2	70-130		

LCS (6060310-BS1)

Prepared & Analyzed: 06-Jun-06

C5-C8 Aliphatic Hydrocarbons	110		mg/l		140		78.6	70-130		25
C9-C12 Aliphatic Hydrocarbons	65.1		mg/l		55.2		118	70-130		25
C9-C10 Aromatic Hydrocarbons	33.8		mg/l		40.0		84.5	70-130		25
Unadjusted C5-C8 Aliphatic Hydrocarbons	243		mg/l		280		86.8	70-130		25
Unadjusted C9-C12 Aliphatic Hydrocarbons	98.9		mg/l		84.8		117	70-130		25
Benzene	19.0		µg/l		20.0		95.0	70-130		25
Ethylbenzene	19.1		µg/l		20.0		95.5	70-130		25
Methyl tert-butyl ether	19.5		µg/l		20.0		97.5	70-130		25
Naphthalene	21.3		µg/l		20.0		106	70-130		25
Toluene	18.7		µg/l		20.0		93.5	70-130		25
m,p-Xylene	37.7		µg/l		40.0		94.2	70-130		25
o-Xylene	19.1		µg/l		20.0		95.5	70-130		25
2-Methylpentane	18.5		µg/l		20.0		92.5	70-130		25
n-Nonane	19.9		µg/l		20.0		99.5	70-130		25
n-Pentane	18.1		µg/l		20.0		90.5	70-130		25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 16 of 31

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060310 - VPH										
<u>LCS (6060310-BS1)</u>										
Prepared & Analyzed: 06-Jun-06										
1,2,4-Trimethylbenzene	19.9		µg/l		20.0		99.5	70-130		25
2,2,4-Trimethylpentane	19.4		µg/l		20.0		97.0	70-130		25
n-Butylcyclohexane	20.9		µg/l		20.0		104	70-130		25
n-Decane	23.0		µg/l		20.0		115	70-130		25
Surrogate: 2,5-Dibromotoluene (FID)	54.5		µg/l		50.0		109	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	48.5		µg/l		50.0		97.0	70-130		
<u>LCS Dup (6060310-BSD1)</u>										
Prepared & Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	111		mg/l		140		79.3	70-130	0.887	25
C9-C12 Aliphatic Hydrocarbons	59.3		mg/l		55.2		107	70-130	9.78	25
C9-C10 Aromatic Hydrocarbons	35.6		mg/l		40.0		89.0	70-130	5.19	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	245		mg/l		280		87.5	70-130	0.803	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	94.8		mg/l		84.8		112	70-130	4.37	25
Benzene	18.9		µg/l		20.0		94.5	70-130	0.528	25
Ethylbenzene	19.2		µg/l		20.0		96.0	70-130	0.522	25
Methyl tert-butyl ether	19.6		µg/l		20.0		98.0	70-130	0.512	25
Naphthalene	21.0		µg/l		20.0		105	70-130	0.948	25
Toluene	18.6		µg/l		20.0		93.0	70-130	0.536	25
m,p-Xylene	37.8		µg/l		40.0		94.5	70-130	0.318	25
o-Xylene	19.3		µg/l		20.0		96.5	70-130	1.04	25
2-Methylpentane	17.2		µg/l		20.0		86.0	70-130	7.28	25
n-Nonane	19.5		µg/l		20.0		97.5	70-130	2.03	25
n-Pentane	17.3		µg/l		20.0		86.5	70-130	4.52	25
1,2,4-Trimethylbenzene	19.9		µg/l		20.0		99.5	70-130	0.00	25
2,2,4-Trimethylpentane	18.4		µg/l		20.0		92.0	70-130	5.29	25
n-Butylcyclohexane	19.9		µg/l		20.0		99.5	70-130	4.42	25
n-Decane	21.4		µg/l		20.0		107	70-130	7.21	25
Surrogate: 2,5-Dibromotoluene (FID)	50.9		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	46.6		µg/l		50.0		93.2	70-130		
<u>Duplicate (6060310-DUP1)</u> Source: SA45755-08										
Prepared & Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		0.00501			32.9	50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	47.1		µg/l		50.0		94.2	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.1		µg/l		50.0		86.2	70-130		
<u>Matrix Spike (6060310-MS1)</u> Source: SA45755-08										
Prepared & Analyzed: 06-Jun-06										
Benzene	18.5		µg/l		20.0	BRL	92.5	70-130		30
Ethylbenzene	19.0		µg/l		20.0	BRL	95.0	70-130		30
Methyl tert-butyl ether	19.8		µg/l		20.0	BRL	99.0	70-130		30
Naphthalene	21.9		µg/l		20.0	BRL	110	70-130		30
Toluene	18.3		µg/l		20.0	BRL	91.5	70-130		30
m,p-Xylene	37.4		µg/l		40.0	BRL	93.5	70-130		30

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 17 of 31

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	Limit
Batch 6060310 - VPH										
Matrix Spike (6060310-MS1) Source: SA45755-08										
Prepared & Analyzed: 06-Jun-06										
o-Xylene	19.0		µg/l		20.0	BRL	95.0	70-130		30
2-Methylpentane	17.9		µg/l		20.0	BRL	89.5	70-130		30
n-Nonane	16.9		µg/l		20.0	BRL	84.5	70-130		30
n-Pentane	17.8		µg/l		20.0	BRL	89.0	70-130		30
1,2,4-Trimethylbenzene	20.3		µg/l		20.0	BRL	102	70-130		30
2,2,4-Trimethylpentane	18.1		µg/l		20.0	BRL	90.5	70-130		30
n-Butylcyclohexane	16.7		µg/l		20.0	0.0	83.5	70-130		30
n-Decane	15.3		µg/l		20.0	0.0	76.5	70-130		30
Surrogate: 2,5-Dibromotoluene (FID)	53.2		µg/l		50.0		106	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	48.1		µg/l		50.0		96.2	70-130		

Batch 6060404 - VPH

Blank (6060404-BLK1)

Prepared & Analyzed: 07-Jun-06

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	49.4		µg/l		50.0		98.8	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	44.2		µg/l		50.0		88.4	70-130		

LCS (6060404-BS1)

Prepared & Analyzed: 07-Jun-06

C5-C8 Aliphatic Hydrocarbons	122		mg/l		140		87.1	70-130		25
C9-C12 Aliphatic Hydrocarbons	65.0		mg/l		55.2		118	70-130		25
C9-C10 Aromatic Hydrocarbons	35.0		mg/l		40.0		87.5	70-130		25
Unadjusted C5-C8 Aliphatic Hydrocarbons	254		mg/l		280		90.7	70-130		25
Unadjusted C9-C12 Aliphatic Hydrocarbons	99.9		mg/l		84.8		118	70-130		25
Benzene	19.4		µg/l		20.0		97.0	70-130		25
Ethylbenzene	18.9		µg/l		20.0		94.5	70-130		25
Methyl tert-butyl ether	17.7		µg/l		20.0		88.5	70-130		25
Naphthalene	17.4		µg/l		20.0		87.0	70-130		25
Toluene	18.9		µg/l		20.0		94.5	70-130		25
m,p-Xylene	37.9		µg/l		40.0		94.8	70-130		25
o-Xylene	19.1		µg/l		20.0		95.5	70-130		25
2-Methylpentane	21.0		µg/l		20.0		105	70-130		25
n-Nonane	23.5		µg/l		20.0		118	70-130		25
n-Pentane	22.2		µg/l		20.0		111	70-130		25
1,2,4-Trimethylbenzene	20.1		µg/l		20.0		100	70-130		25
2,2,4-Trimethylpentane	21.1		µg/l		20.0		106	70-130		25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 18 of 31

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limits	RPD	RPD Limit
Batch 6060404 - VPH										
CS (6060404-BS1)										
Prepared & Analyzed: 07-Jun-06										
n-Butylcyclohexane	23.7		µg/l		20.0		118	70-130		25
n-Decane	25.9		µg/l		20.0		130	70-130		25
Surrogate: 2,5-Dibromotoluene (FID)	48.2		µg/l		50.0		96.4	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.1		µg/l		50.0		86.2	70-130		
LCS Dup (6060404-BSD1)										
Prepared & Analyzed: 07-Jun-06										
C5-C8 Aliphatic Hydrocarbons	120		mg/l		140		85.7	70-130	1.62	25
C9-C12 Aliphatic Hydrocarbons	66.2		mg/l		55.2		120	70-130	1.68	25
C9-C10 Aromatic Hydrocarbons	32.5		mg/l		40.0		81.2	70-130	7.47	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	255		mg/l		280		91.1	70-130	0.440	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	98.7		mg/l		84.8		116	70-130	1.71	25
Benzene	19.7		µg/l		20.0		98.5	70-130	1.53	25
Ethylbenzene	19.3		µg/l		20.0		96.5	70-130	2.09	25
Methyl tert-butyl ether	18.6		µg/l		20.0		93.0	70-130	4.96	25
Naphthalene	19.4		µg/l		20.0		97.0	70-130	10.9	25
Toluene	19.0		µg/l		20.0		95.0	70-130	0.528	25
m,p-Xylene	38.7		µg/l		40.0		96.8	70-130	2.09	25
o-Xylene	19.6		µg/l		20.0		98.0	70-130	2.58	25
2-Methylpentane	23.1		µg/l		20.0		116	70-130	9.95	25
n-Nonane	23.1		µg/l		20.0		116	70-130	1.71	25
n-Pentane	22.5		µg/l		20.0		112	70-130	0.897	25
1,2,4-Trimethylbenzene	20.1		µg/l		20.0		100	70-130	0.00	25
2,2,4-Trimethylpentane	22.1		µg/l		20.0		110	70-130	3.70	25
n-Butylcyclohexane	23.5		µg/l		20.0		118	70-130	0.00	25
n-Decane	25.7		µg/l		20.0		128	70-130	1.55	25
Surrogate: 2,5-Dibromotoluene (FID)	54.5		µg/l		50.0		109	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	48.5		µg/l		50.0		97.0	70-130		
Duplicate (6060404-DUP1) Source: SA45708-01										
Prepared & Analyzed: 07-Jun-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.0115			15.3	50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		0.0110			15.1	50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		0.0252			3.23	50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.0496			4.12	50
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.0372		mg/l	0.0250		0.0362			2.72	50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	36.6		µg/l	5.0		37.0			1.09	50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	49.5		µg/l		50.0		99.0	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.2		µg/l		50.0		90.4	70-130		
Matrix Spike (6060404-MS1) Source: SA45708-01										
Prepared & Analyzed: 07-Jun-06										
Benzene	19.9		µg/l		20.0	1.21	93.4	70-130		30
Ethylbenzene	18.2		µg/l		20.0	BRL	91.0	70-130		30
Methyl tert-butyl ether	54.9		µg/l		20.0	37.0	89.5	70-130		30
Naphthalene	23.6		µg/l		20.0	2.20	107	70-130		30
Toluene	17.9		µg/l		20.0	BRL	89.5	70-130		30
m,p-Xylene	36.4		µg/l		40.0	BRL	91.0	70-130		30
o-Xylene	18.5		µg/l		20.0	BRL	92.5	70-130		30
2-Methylpentane	19.0		µg/l		20.0	BRL	95.0	70-130		30

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 19 of 31

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060404 - VPH										
Matrix Spike (6060404-MS1) Source: SA45708-01										
Prepared & Analyzed: 07-Jun-06										
n-Nonane	20.2		µg/l		20.0	BRL	101	70-130		30
n-Pentane	19.5		µg/l		20.0	0.529	94.9	70-130		30
1,2,4-Trimethylbenzene	18.7		µg/l		20.0	BRL	93.5	70-130		30
2,2,4-Trimethylpentane	18.2		µg/l		20.0	BRL	91.0	70-130		30
n-Butylcyclohexane	22.1		µg/l		20.0	1.49	103	70-130		30
n-Decane	25.5		µg/l		20.0	0.0	128	70-130		30
Surrogate: 2,5-Dibromotoluene (FID)	51.4		µg/l		50.0		103	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.6		µg/l		50.0		91.2	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 20 of 31

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060211 - SW846 3510C										
Blank (6060211-BLK1)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.50						
2-Methylnaphthalene	BRL		µg/l	2.50						
Acenaphthene	BRL		µg/l	2.50						
Phenanthrene	BRL		µg/l	2.50						
Anthracene	BRL		µg/l	2.50						
Pyrene	BRL		µg/l	2.50						
Chrysene	BRL		µg/l	2.50						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	38.1		µg/l		50.0		76.2	40-140		
Surrogate: Ortho-Terphenyl	29.2		µg/l		50.0		58.4	40-140		
Surrogate: 2-Bromonaphthalene	26.2		µg/l		40.0		65.5	40-140		
Surrogate: 2-Fluorobiphenyl	24.9		µg/l		40.0		62.2	40-140		
LCS (6060211-BS1)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	0.428		mg/l	0.2	0.600		71.3	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.890		mg/l	0.2	0.800		111	40-140		25
C11-C22 Aromatic Hydrocarbons	0.900		mg/l	0.2	1.70		52.9	40-140		25
Naphthalene	30.1	QC-1	µg/l	2.50	100		30.1	40-140		20
2-Methylnaphthalene	35.3	QC-1	µg/l	2.50	100		35.3	40-140		20
Acenaphthene	42.8		µg/l	2.50	100		42.8	40-140		20
Phenanthrene	51.8		µg/l	2.50	100		51.8	40-140		20
Anthracene	53.0		µg/l	2.50	100		53.0	40-140		20
Pyrene	57.1		µg/l	2.50	100		57.1	40-140		20
Chrysene	58.2		µg/l	2.50	100		58.2	40-140		20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
5-alpha-Androstane	25.0		mg/l		0.0250		128	0-200		
5-alpha-Androstane	25.0		µg/l		25.0		128	0-200		
Surrogate: 1-Chlorooctadecane	42.2		µg/l		50.0		84.4	40-140		
Surrogate: Ortho-Terphenyl	30.6		µg/l		50.0		61.2	40-140		
Surrogate: 2-Bromonaphthalene	22.5		µg/l		40.0		56.2	40-140		
Surrogate: 2-Fluorobiphenyl	22.0		µg/l		40.0		55.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (606021)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	0.624		mg/l	0.2	0.600		104	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.995		mg/l	0.2	0.800		124	40-140		25
C11-C22 Aromatic Hydrocarbons	1.41		mg/l	0.2	1.70		82.9	40-140		25
Naphthalene	60.5		µg/l	2.50	100		60.5	40-140		20
2-Methylnaphthalene	65.9		µg/l	2.50	100		65.9	40-140		20
Acenaphthene	71.9		µg/l	2.50	100		71.9	40-140		20
Phenanthrene	79.8		µg/l	2.50	100		79.8	40-140		20
Anthracene	80.4		µg/l	2.50	100		80.4	40-140		20

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* Reportable Detection Limit

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Page 21 of 31

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 6060211 - SW846 3510C									
Fractionation Check Standard (606021)									
Prepared & Analyzed: 05-Jun-06									
Pyrene	83.7		µg/l	2.50	100		83.7 40-140		20
Chrysene	84.3		µg/l	2.50	100		84.3 40-140		20
Naphthalene (aliphatic fraction)	0.00		µg/l		100		0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100		0-200		200
5-alpha-Androstane	25.0		µg/l		25.0		130 0-200		
5-alpha-Androstane	25.0		mg/l		0.0250		130 0-200		
Surrogate: 1-Chlorooctadecane	59.5		µg/l		50.0		119 40-140		
Surrogate: Ortho-Terphenyl	42.8		µg/l		50.0		85.6 40-140		
Surrogate: 2-Bromonaphthalene	29.4		µg/l		40.0		73.5 40-140		
Surrogate: 2-Fluorobiphenyl	31.6		µg/l		40.0		79.0 40-140		
LCS Dup (6060211-BSD1)									
Prepared: 05-Jun-06 Analyzed: 06-Jun-06									
C9-C18 Aliphatic Hydrocarbons	0.414		mg/l	0.2	0.600		69.0 40-140	3.28	25
C19-C36 Aliphatic Hydrocarbons	0.848		mg/l	0.2	0.800		106 40-140	4.61	25
C11-C22 Aromatic Hydrocarbons	1.09		mg/l	0.2	1.70		64.1 40-140	19.1	25
Naphthalene	40.0	QR-05	µg/l	2.50	100		40.0 40-140	28.2	20
2-Methylnaphthalene	44.0	QR-05	µg/l	2.50	100		44.0 40-140	21.9	20
Acenaphthene	50.7		µg/l	2.50	100		50.7 40-140	16.9	20
Phenanthrene	61.4		µg/l	2.50	100		61.4 40-140	17.0	20
Anthracene	64.1		µg/l	2.50	100		64.1 40-140	19.0	20
Pyrene	68.9		µg/l	2.50	100		68.9 40-140	18.7	20
Chrysene	72.3	QR-02	µg/l	2.50	100		72.3 40-140	21.6	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100		0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100		0-200		200
Surrogate: 1-Chlorooctadecane	42.3		µg/l		50.0		84.6 40-140		
Surrogate: Ortho-Terphenyl	34.2		µg/l		50.0		68.4 40-140		
Surrogate: 2-Bromonaphthalene	26.8		µg/l		40.0		67.0 40-140		
Surrogate: 2-Fluorobiphenyl	26.4		µg/l		40.0		66.0 40-140		
Naphthalene Breakthrough	0.00		%				0-5		
2-Methylnaphthalene Breakthrough	0.00		%				0-5		

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Soluble Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limits	RPD	RPD Limit
Batch 6060362 - SW846 3005A										
Blank (6060362-BLK1)										
Prepared & Analyzed: 06-Jun-06										
Iron	BRL		mg/l	0.0100						
LCS (6060362-BS1)										
Prepared & Analyzed: 06-Jun-06										
Iron	1.02		mg/l	0.0100	1.00		102	85-115		20
LCS Dup (6060362-BSD1)										
Prepared & Analyzed: 06-Jun-06										
Iron	0.990		mg/l	0.0100	1.00		99.0	85-115	2.99	20
Duplicate (6060362-DUP1) Source: SA45755-06										
Prepared & Analyzed: 06-Jun-06										
Iron	0.0141	QR-06	mg/l	0.0100						20
Matrix Spike (6060362-MS1) Source: SA45755-07										
Prepared & Analyzed: 06-Jun-06										
Iron	1.03		mg/l	0.0100	1.00		103	75-125		20
Matrix Spike Dup (6060362-MSD1) Source: SA45755-07										
Prepared & Analyzed: 06-Jun-06										
Iron	1.04		mg/l	0.0100	1.00		104	75-125	0.966	20

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* Reportable Detection Limit

BRL = Below Reporting Limit

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060153 - General Preparation										
Blank (6060153-BLK1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
Blank (6060153-BLK2)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
LCS (6060153-BS1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	19.7		mg/l	1.00	20.0		98.5	90-110		200
Nitrate as N	2.00		mg/l	0.100	2.00		100	90-110		200
LCS (6060153-BS2)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	3.98		mg/l	1.00	4.00		99.5	90-110		200
Nitrate as N	0.400		mg/l	0.100	0.400		100	90-110		200
LCS (6060153-BS3)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	19.2		mg/l	1.00	20.0		96.0	90-110		200
Nitrate as N	1.96		mg/l	0.100	2.00		98.0	90-110		200
LCS (6060153-BS4)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	3.74		mg/l	1.00	4.00		93.5	90-110		200
Nitrate as N	0.390		mg/l	0.100	0.400		97.5	90-110		200
Duplicate (6060153-DUP1) Source: SA45713-02										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	6.90		mg/l	1.00		7.92			13.8	20
Nitrate as N	0.830		mg/l	0.100		0.810			2.44	20
Duplicate (6060153-DUP2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	47.2		mg/l	1.00		47.2			0.00	20
Nitrate as N	BRL		mg/l	0.100		BRL				20
Duplicate (6060153-DUP3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	31.6		mg/l	1.00		31.4			0.635	20
Nitrate as N	0.160		mg/l	0.100		0.160			0.00	20
Matrix Spike (6060153-MS1) Source: SA45713-02										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	12.6		mg/l	1.00	4.00	7.92	117	80-120		20
Nitrate as N	1.26		mg/l	0.100	0.400	0.810	112	80-120		20
Matrix Spike (6060153-MS2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	50.7		mg/l	1.00	4.00	47.2	87.5	80-120		20
Nitrate as N	0.410		mg/l	0.100	0.400	BRL	102	80-120		20
Matrix Spike (6060153-MS3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	35.2		mg/l	1.00	4.00	31.4	95.0	80-120		20
Nitrate as N	0.560		mg/l	0.100	0.400	0.160	100	80-120		20
Matrix Spike Dup (6060153-MSD1) Source: SA45713-02										

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 24 of 31

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060153 - General Preparation										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	12.5		mg/l	1.00	4.00	7.92	114	80-120	0.797	20
Nitrate as N	1.26		mg/l	0.100	0.400	0.810	112	80-120	0.00	20
Matrix Spike Dup (6060153-MSD2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	51.1		mg/l	1.00	4.00	47.2	97.5	80-120	0.786	20
Nitrate as N	0.410		mg/l	0.100	0.400	BRL	102	80-120	0.00	20
Matrix Spike Dup (6060153-MSD3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	35.2		mg/l	1.00	4.00	31.4	95.0	80-120	0.00	20
Nitrate as N	0.560		mg/l	0.100	0.400	0.160	100	80-120	0.00	20
Reference (6060153-SRM1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	24.6		mg/l	1.00	25.0		98.4	90-110		
Nitrate as N	2.52		mg/l	0.100	2.50		101	90-110		
Reference (6060153-SRM2)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	4.74		mg/l	1.00	5.00		94.8	90-110		
Nitrate as N	0.490		mg/l	0.100	0.500		98.0	90-110		
Reference (6060153-SRM3)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	23.8		mg/l	1.00	25.0		95.2	90-110		
Nitrate as N	2.45		mg/l	0.100	2.50		98.0	90-110		
Reference (6060153-SRM4)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	4.49	QL-01	mg/l	1.00	5.00		89.8	90-110		
Nitrate as N	0.470		mg/l	0.100	0.500		94.0	90-110		
Batch 6060459 - General Preparation										
Blank (6060459-BLK1)										
Prepared & Analyzed: 07-Jun-06										
Sulfate as SO ₄	BRL		mg/l	1.00						
Blank (6060459-BLK2)										
Prepared: 07-Jun-06 Analyzed: 08-Jun-06										
Sulfate as SO ₄	BRL		mg/l	1.00						
LCS (6060459-BS1)										
Prepared & Analyzed: 07-Jun-06										
Sulfate as SO ₄	20.2		mg/l	1.00	20.0		101	90-110		200
LCS (6060459-BS2)										
Prepared & Analyzed: 07-Jun-06										
Sulfate as SO ₄	4.02		mg/l	1.00	4.00		100	90-110		200
LCS (6060459-BS3)										
Prepared: 07-Jun-06 Analyzed: 08-Jun-06										
Sulfate as SO ₄	18.2		mg/l	1.00	20.0		91.0	90-110		200
LCS (6060459-BS4)										
Prepared: 07-Jun-06 Analyzed: 08-Jun-06										
Sulfate as SO ₄	3.48	QL-01	mg/l	1.00	4.00		87.0	90-110		200
Duplicate (6060459-DUP2) Source: SA46051-07										
Prepared & Analyzed: 07-Jun-06										
Sulfate as SO ₄	42.8		mg/l	1.00		43.0			0.466	20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 25 of 31

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060459 - General Preparation										
<u>Duplicate (6060459-DUP3)</u>	Source: SA46051-17									
Prepared: 07-Jun-06 Analyzed: 08-Jun-06										
Sulfate as SO4	2.64		mg/l	1.00		2.27			15.1	20
<u>Matrix Spike (6060459-MS2)</u>	Source: SA46051-07									
Prepared & Analyzed: 07-Jun-06										
Sulfate as SO4	47.1		mg/l	1.00	4.00	43.0	102	80-120		20
<u>Matrix Spike (6060459-MS3)</u>	Source: SA46051-17									
Prepared: 07-Jun-06 Analyzed: 08-Jun-06										
Sulfate as SO4	7.05		mg/l	1.00	4.00	2.27	120	80-120		20
<u>Matrix Spike Dup (6060459-MSD2)</u>	Source: SA46051-07									
Prepared & Analyzed: 07-Jun-06										
Sulfate as SO4	47.3		mg/l	1.00	4.00	43.0	108	80-120	0.424	20
<u>Matrix Spike Dup (6060459-MSD3)</u>	Source: SA46051-17									
Prepared: 07-Jun-06 Analyzed: 08-Jun-06										
Sulfate as SO4	6.72		mg/l	1.00	4.00	2.27	111	80-120	4.79	20
<u>Reference (6060459-SRM1)</u>										
Prepared & Analyzed: 07-Jun-06										
Sulfate as SO4	24.3		mg/l	1.00	25.0		97.2	90-110		
<u>Reference (6060459-SRM2)</u>										
Prepared & Analyzed: 07-Jun-06										
Sulfate as SO4	5.03		mg/l	1.00	5.00		101	90-110		
<u>Reference (6060459-SRM3)</u>										
Prepared: 07-Jun-06 Analyzed: 08-Jun-06										
Sulfate as SO4	21.7	QL-01	mg/l	1.00	25.0		86.8	90-110		
<u>Reference (6060459-SRM4)</u>										
Prepared: 07-Jun-06 Analyzed: 08-Jun-06										
Sulfate as SO4	4.95		mg/l	1.00	5.00		99.0	90-110		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 26 of 31

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	%D	Limit
Batch 0606066				
Calibration Check (0606066-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.60565E+08	1.12499E+08	7.50	25.00
C19-C36 Aliphatic Hydrocarbons	8.40263E+07	7.06183E+07	20.4	25.00
C11-C22 Aromatic Hydrocarbons	26.8433	16.9179	-2.35	25.00
Naphthalene	7.28448	7.05564	-3.14	20.00
2-Methylnaphthalene	4.55306	4.48721	-1.45	20.00
Acenaphthene	4.29598	4.21643	-1.85	20.00
Phenanthrene	6.21583	6.15604	-0.962	20.00
Anthracene	6.48728	6.31389	-2.67	20.00
Pyrene	6.32429	6.39844	1.17	20.00
Chrysene	5.45456	5.51777	1.16	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0606089				
Calibration Check (0606089-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.66513E+08	1.57487E+08	-1.67	25.00
C19-C36 Aliphatic Hydrocarbons	1.00596E+08	1.08153E+08	-6.88	25.00
C11-C22 Aromatic Hydrocarbons	26.8433	17.201	-0.588	25.00
Naphthalene	7.28448	6.5121	-10.6	20.00
2-Methylnaphthalene	4.55306	4.07514	-10.5	20.00
Acenaphthene	4.29598	3.87679	-9.76	20.00
Phenanthrene	6.21583	6.0074	-3.35	20.00
Anthracene	6.48728	6.3475	-2.15	20.00
Pyrene	6.32429	6.59784	4.33	20.00
Chrysene	5.45456	5.77128	5.81	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 28 of 31

Notes and Definitions

Comp Completed

LF Lab Filtered

QC-1 Analyte out of acceptance range.

QL-01 Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

QR-05 RPD out of acceptance range.

QR-06 The RPD exceeded the QC control limits; however precision is demonstrated with acceptable RPD values for MS/MSD.

R-05 The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

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* Reportable Detection Limit BRL = Below Reporting Limit

Page 29 of 31

The following outlines the condition of all VPH samples contained within this report upon laboratory receipt

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Sample Preservative	Aqueous (acid-preserved)	☐ N/A	☒ pH ≤ 2	☐ pH > 2
	Soil or Sediment	☒ N/A		ml Methanol/g soil ☐ 1:1 +/-25% ☐ Other:
		☐ Samples not received in Methanol or air-tight container ☐ Samples received in Methanol: ☐ covering soil/sediment ☐ not covering soil/sediment		
		☐ Samples received in air-tight container.		
Temperature	☐ Received on ice	☒ Received at 4 ± 2 °C	☐ Other:	°C

Were all QA/QC procedures followed as required by the VPH method? Yes ☒ No ☐
 Were any significant modifications made to the VPH method as specified in section 11.3? No ☒ *see below
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐
 * Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GCMS using all QC criteria specified in the method

The following outlines the condition of all EPH samples contained within this report upon laboratory receipt

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Aqueous Preservative	☐ N/A	☒ pH ≤ 2	☐ pH > 2	☐ pH adjusted to <2 in lab
Temperature	☐ Received on ice	☒ Received at 4 ± 2 °C	☐ Other:	°C

Were all QA/QC procedures followed as required by the EPH method? Yes ☒ No ☐
 Were any significant modifications made to the EPH method as specified in Section 11.3? No ☒
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐

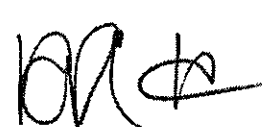
I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete

Authorized by:



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹ :					
This form provides certifications for the following Spectrum Analytical, Inc work order #: SA45755					
Matrix	☒ Groundwater	☐ Soil/Sediment	☐ Drinking Water	☐ Other	
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☒ 6010B	☐ 7470A/1A
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020	☐ 9014M ²
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³	☐ 7196A
¹ List Release Tracking Number (RTN), if known ² M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method ³ S - SW-846 Methods 7000 Series List individual method and analyte					
<i>An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status</i>					
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?				☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?				☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?				☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?				☒ Yes ☐ No
<i>A response to questions E and F below is required for "Presumptive Certainty" status</i>					
E	Were all analytical QC performance standards and recommendations for the specified methods achieved?				☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?				☐ Yes ☒ No
<i>All negative responses are addressed in a case narrative on the cover page of this report.</i>					
I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.  Hanibal C. Tayeh, Ph.D. President/Laboratory Director Date: 6/8/2006					

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 31 of 31



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CHAIN OF CUSTODY RECORD

Page 2 of 3

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 6/1/06
- ☐ All TATs subject to laboratory approval.
- Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: FCS, Auburn Invoice To: FCS, Agawam Project No.: 91-204082.02

Project Mgr.: Chuck Klingler Site Name: Eagle Gas

P.O. No.: 03-0503 RQN: Location: 131 Main St, Carver State: MA

Sampler(s): A. Kaczorowska, D. Anderson

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=ACE 10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

Lab Id:	Sample Id:	Date:	Time:	G=Grab C=Composite				Matrix	Type	Containers:				Analyses:				QA Reporting Notes: (check if needed)
				# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic											
45755-11	* MH-1	5-31-06	11:00	3	1			SW	G	3								Provide MCP CAM Report Were all field QC requirements met as per MADEP CAM Section 2.0? ☒ Yes ☐ No (Response required for CAM report)
-12	* MH-2		10:25	3	1			SW	G	3								See remarks on pg 1 of 2
-13	* MH-3		10:45	3	1			SW	G	3								
-14	* SW-outfall		3:15	3	1			SW	G	3								
	<u>trip blank</u>																	

Relinquished by: Caron Kaczorowska Received by: Chuck Klingler Date: 6/1/06 Time: 10:55

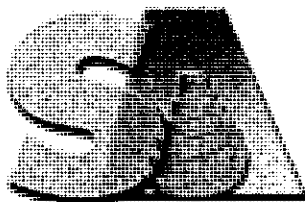
E-mail to: CKlingler@fcsconsult.com

Condition upon receipt: ☐ Iced ☐ Ambient ☒ 4

IN REPLY



Report Date:
08-Jun-06 16:36



SPECTRUM ANALYTICAL, INC.

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HANIBAL TECHNOLOGY

Laboratory Report

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

RECEIVED
JUN 14 2006

BY: *lp*

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 91-204082.02

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA45755-05	ECS-8	Ground Water	31-May-06 12:45	01-Jun-06 13:30
SA45755-10	DCW-6	Ground Water	31-May-06 13:05	01-Jun-06 13:30

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 18 pages of analytical data plus Chain of Custody document(s).

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Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

[Signature]
Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

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CASE NARRATIVE:

The data set for work order SA45755 complies with internal QC criteria for the methods performed. The samples were received @ 4.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification

ECS-8

SA45755-05

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 12:45

Received

01-Jun-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	0.323		mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	05-Jun-06	06-Jun-06	6060231	ss
	C9-C12 Aliphatic Hydrocarbons	0.497		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	0.980		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	0.520		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	1.48		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	35.2		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	51.1		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	18.7		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	201		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	5.3		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	50.0		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	36.3		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	94.2		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	87.0		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	0.4		mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
	C19-C36 Aliphatic Hydrocarbons	0.2		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	0.6		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	0.8		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	1.2		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	1.3		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	56.5		µg/l	5.68	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	41.5		µg/l	5.68	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.68	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.68	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	51.1		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	78.7		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	70.3		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	69.5		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	2.05		mg/l	0.0100	1	SW846 6010B	06-Jun-06	06-Jun-06	6060362	CW
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	06-Jun-06	06-Jun-06	6060350	JR
General Chemistry Parameters											
14797-55-8	Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	01-Jun-06 12:00	02-Jun-06	6060153	Alex
908-79-8	Sulfate as SO4	18.9		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 18

Sample Identification

DCW-6

SA45755-10

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 13:05

Received

01-Jun-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	06-Jun-06	06-Jun-06	6060310	ss
	C9-C12 Aliphatic Hydrocarbons	0.0831		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	0.142		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	0.225		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	37.3		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	17.9		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	97.4		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	89.0		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.56	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.56	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.56	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.56	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	47.7		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	87.4		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	78.8		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	76.4		40-140 %			"	"	"	"	"
Semivolatile Organic Compounds by GCMS											
	Filtration	Completed		N/A		1	EPA 200.7	05-Jun-06	05-Jun-06	6060211	WHA

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* Reportable Detection Limit

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Page 3 of 18

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060231 - VPH										
Blank (6060231-BLK1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	46.4		µg/l		50.0		92.8	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	44.4		µg/l		50.0		88.8	70-130		
LCS (6060231-BS1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	115		mg/l		140		82.1	70-130		25
C9-C12 Aliphatic Hydrocarbons	53.8		mg/l		55.2		97.5	70-130		25
C9-C10 Aromatic Hydrocarbons	30.5		mg/l		40.0		76.2	70-130		25
Unadjusted C5-C8 Aliphatic Hydrocarbons	242		mg/l		280		86.4	70-130		25
Unadjusted C9-C12 Aliphatic Hydrocarbons	84.3		mg/l		84.8		99.4	70-130		25
Benzene	18.2		µg/l		20.0		91.0	70-130		25
Ethylbenzene	18.3		µg/l		20.0		91.5	70-130		25
Methyl tert-butyl ether	17.7		µg/l		20.0		88.5	70-130		25
Naphthalene	19.4		µg/l		20.0		97.0	70-130		25
Toluene	18.3		µg/l		20.0		91.5	70-130		25
m,p-Xylene	36.4		µg/l		40.0		91.0	70-130		25
o-Xylene	18.6		µg/l		20.0		93.0	70-130		25
2-Methylpentane	17.5		µg/l		20.0		87.5	70-130		25
n-Nonane	17.9		µg/l		20.0		89.5	70-130		25
n-Pentane	19.2		µg/l		20.0		96.0	70-130		25
1,2,4-Trimethylbenzene	18.3		µg/l		20.0		91.5	70-130		25
2,2,4-Trimethylpentane	18.3		µg/l		20.0		91.5	70-130		25
n-Butylcyclohexane	17.2		µg/l		20.0		86.0	70-130		25
n-Decane	15.0		µg/l		20.0		75.0	70-130		25
Surrogate: 2,5-Dibromotoluene (FID)	47.7		µg/l		50.0		95.4	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.9		µg/l		50.0		83.8	70-130		
LCS Dup (6060231-BSD1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	116		mg/l		140		82.9	70-130	0.970	25
C9-C12 Aliphatic Hydrocarbons	63.1		mg/l		55.2		114	70-130	15.6	25
C9-C10 Aromatic Hydrocarbons	34.6		mg/l		40.0		86.5	70-130	12.7	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	248		mg/l		280		88.6	70-130	2.51	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	97.7		mg/l		84.8		115	70-130	14.6	25
Benzene	18.8		µg/l		20.0		94.0	70-130	3.24	25
Ethylbenzene	19.0		µg/l		20.0		95.0	70-130	3.75	25
Methyl tert-butyl ether	18.1		µg/l		20.0		90.5	70-130	2.23	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 18

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060231 - VPH										
CS Dup (6060231-BSD1)										
Prepared & Analyzed: 05-Jun-06										
Naphthalene	19.6		µg/l		20.0		98.0	70-130	1.03	25
Toluene	18.8		µg/l		20.0		94.0	70-130	2.70	25
m,p-Xylene	37.7		µg/l		40.0		94.2	70-130	3.46	25
o-Xylene	19.3		µg/l		20.0		96.5	70-130	3.69	25
2-Methylpentane	20.0		µg/l		20.0		100	70-130	13.3	25
n-Nonane	22.4		µg/l		20.0		112	70-130	22.3	25
n-Pentane	21.7		µg/l		20.0		108	70-130	11.8	25
1,2,4-Trimethylbenzene	19.0		µg/l		20.0		95.0	70-130	3.75	25
2,2,4-Trimethylpentane	21.1		µg/l		20.0		106	70-130	14.7	25
n-Butylcyclohexane	22.1		µg/l		20.0		110	70-130	24.5	25
n-Decane	21.3	QR-02	µg/l		20.0		106	70-130	34.3	25
Surrogate: 2,5-Dibromotoluene (FID)	50.5		µg/l		50.0		101	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.4		µg/l		50.0		90.8	70-130		
Duplicate (6060231-DUP1) Source: SA45528-02										
Prepared: 05-Jun-06 Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	0.806		mg/l	0.0750		0.726			10.4	50
C9-C12 Aliphatic Hydrocarbons	0.487		mg/l	0.0250		0.365			28.6	50
C9-C10 Aromatic Hydrocarbons	0.968		mg/l	0.0250		0.783			21.1	50
Unadjusted C5-C8 Aliphatic Hydrocarbons	1.02		mg/l	0.0750		0.897			12.8	50
Unadjusted C9-C12 Aliphatic Hydrocarbons	1.46		mg/l	0.0250		1.15			23.8	50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	103		µg/l	5.0		82.0			22.7	50
Methyl tert-butyl ether	5.9		µg/l	5.0		5.1			14.5	50
Naphthalene	43.0		µg/l	5.0		35.0			20.5	50
Toluene	8.1		µg/l	5.0		7.3			10.4	50
m,p-Xylene	70.7		µg/l	10.0		56.5			22.3	50
o-Xylene	26.5		µg/l	5.0		20.4			26.0	50
Surrogate: 2,5-Dibromotoluene (FID)	49.5		µg/l		50.0		99.0	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.5		µg/l		50.0		87.0	70-130		
Matrix Spike (6060231-MS1) Source: SA45528-02										
Prepared & Analyzed: 05-Jun-06										
Benzene	18.6		µg/l		20.0	BRL	93.0	70-130		30
Ethylbenzene	39.5		µg/l		20.0	16.4	116	70-130		30
Methyl tert-butyl ether	19.5		µg/l		20.0	1.02	92.4	70-130		30
Naphthalene	29.3		µg/l		20.0	7.00	112	70-130		30
Toluene	18.8		µg/l		20.0	1.46	86.7	70-130		30
m,p-Xylene	51.4		µg/l		40.0	11.3	100	70-130		30
o-Xylene	24.2		µg/l		20.0	4.08	101	70-130		30
2-Methylpentane	39.1		µg/l		20.0	18.4	104	70-130		30
n-Nonane	18.4		µg/l		20.0	BRL	92.0	70-130		30
n-Pentane	30.6		µg/l		20.0	10.6	100	70-130		30
1,2,4-Trimethylbenzene	81.3	QM-07	µg/l		20.0	50.6	154	70-130		30
2,2,4-Trimethylpentane	32.3		µg/l		20.0	13.2	95.5	70-130		30
n-Butylcyclohexane	26.8		µg/l		20.0	2.34	122	70-130		30
n-Decane	18.3		µg/l		20.0	0.0	91.5	70-130		30
Surrogate: 2,5-Dibromotoluene (FID)	50.1		µg/l		50.0		100	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	51.7		µg/l		50.0		103	70-130		
Matrix Spike Dup (6060231-MSD1) Source: SA45528-02										
Prepared & Analyzed: 05-Jun-06										
Benzene	18.5		µg/l		20.0	BRL	92.5	70-130	0.539	30
Ethylbenzene	37.9		µg/l		20.0	16.4	108	70-130	7.14	30
Methyl tert-butyl ether	19.7		µg/l		20.0	1.02	93.4	70-130	1.08	30
Naphthalene	29.3		µg/l		20.0	7.00	112	70-130	0.00	30

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 18

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060231 - VPH										
Matrix Spike Dup (6060231-MSD1) Source: SA45528-02										
Prepared & Analyzed: 05-Jun-06										
Toluene	18.7		µg/l		20.0	1.46	86.2	70-130	0.578	30
m,p-Xylene	50.0		µg/l		40.0	11.3	96.8	70-130	3.25	30
o-Xylene	23.7		µg/l		20.0	4.08	98.1	70-130	2.91	30
2-Methylpentane	37.9		µg/l		20.0	18.4	97.5	70-130	6.45	30
n-Nonane	18.3		µg/l		20.0	BRL	91.5	70-130	0.545	30
n-Pentane	30.6		µg/l		20.0	10.6	100	70-130	0.00	30
1,2,4-Trimethylbenzene	78.1	QM-07	µg/l		20.0	50.6	138	70-130	11.0	30
2,2,4-Trimethylpentane	32.7		µg/l		20.0	13.2	97.5	70-130	2.07	30
n-Butylcyclohexane	25.9		µg/l		20.0	2.34	118	70-130	3.33	30
n-Decane	18.2		µg/l		20.0	0.0	91.0	70-130	0.548	30
Surrogate: 2,5-Dibromotoluene (FID)	51.1		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	42.9		µg/l		50.0		85.8	70-130		
Batch 6060310 - VPH										
Blank (6060310-BLK1)										
Prepared & Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	51.0		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	47.1		µg/l		50.0		94.2	70-130		
LCS (6060310-BS1)										
Prepared & Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	110		mg/l		140		78.6	70-130		25
C9-C12 Aliphatic Hydrocarbons	65.1		mg/l		55.2		118	70-130		25
C9-C10 Aromatic Hydrocarbons	33.8		mg/l		40.0		84.5	70-130		25
Unadjusted C5-C8 Aliphatic Hydrocarbons	243		mg/l		280		86.8	70-130		25
Unadjusted C9-C12 Aliphatic Hydrocarbons	98.9		mg/l		84.8		117	70-130		25
Benzene	19.0		µg/l		20.0		95.0	70-130		25
Ethylbenzene	19.1		µg/l		20.0		95.5	70-130		25
Methyl tert-butyl ether	19.5		µg/l		20.0		97.5	70-130		25
Naphthalene	21.3		µg/l		20.0		106	70-130		25
Toluene	18.7		µg/l		20.0		93.5	70-130		25
m,p-Xylene	37.7		µg/l		40.0		94.2	70-130		25
o-Xylene	19.1		µg/l		20.0		95.5	70-130		25
2-Methylpentane	18.5		µg/l		20.0		92.5	70-130		25
n-Nonane	19.9		µg/l		20.0		99.5	70-130		25
n-Pentane	18.1		µg/l		20.0		90.5	70-130		25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 18

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060310 - VPH										
LCS (6060310-BS1)										
Prepared & Analyzed: 06-Jun-06										
1,2,4-Trimethylbenzene	19.9		µg/l		20.0		99.5	70-130		25
2,2,4-Trimethylpentane	19.4		µg/l		20.0		97.0	70-130		25
n-Butylcyclohexane	20.9		µg/l		20.0		104	70-130		25
n-Decane	23.0		µg/l		20.0		115	70-130		25
Surrogate: 2,5-Dibromotoluene (FID)	54.5		µg/l		50.0		109	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	48.5		µg/l		50.0		97.0	70-130		
LCS Dup (6060310-BSD1)										
Prepared & Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	111		mg/l		140		79.3	70-130	0.887	25
C9-C12 Aliphatic Hydrocarbons	59.3		mg/l		55.2		107	70-130	9.78	25
C9-C10 Aromatic Hydrocarbons	35.6		mg/l		40.0		89.0	70-130	5.19	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	245		mg/l		280		87.5	70-130	0.803	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	94.8		mg/l		84.8		112	70-130	4.37	25
Benzene	18.9		µg/l		20.0		94.5	70-130	0.528	25
Ethylbenzene	19.2		µg/l		20.0		96.0	70-130	0.522	25
Methyl tert-butyl ether	19.6		µg/l		20.0		98.0	70-130	0.512	25
Naphthalene	21.0		µg/l		20.0		105	70-130	0.948	25
Toluene	18.6		µg/l		20.0		93.0	70-130	0.536	25
m,p-Xylene	37.8		µg/l		40.0		94.5	70-130	0.318	25
o-Xylene	19.3		µg/l		20.0		96.5	70-130	1.04	25
2-Methylpentane	17.2		µg/l		20.0		86.0	70-130	7.28	25
n-Nonane	19.5		µg/l		20.0		97.5	70-130	2.03	25
n-Pentane	17.3		µg/l		20.0		86.5	70-130	4.52	25
1,2,4-Trimethylbenzene	19.9		µg/l		20.0		99.5	70-130	0.00	25
2,2,4-Trimethylpentane	18.4		µg/l		20.0		92.0	70-130	5.29	25
n-Butylcyclohexane	19.9		µg/l		20.0		99.5	70-130	4.42	25
n-Decane	21.4		µg/l		20.0		107	70-130	7.21	25
Surrogate: 2,5-Dibromotoluene (FID)	50.9		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	46.6		µg/l		50.0		93.2	70-130		
Duplicate (6060310-DUP1) Source: SA45755-08										
Prepared & Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						50
Benzene	BRL		µg/l	5.0						50
Ethylbenzene	BRL		µg/l	5.0						50
Methyl tert-butyl ether	BRL		µg/l	5.0						50
Naphthalene	BRL		µg/l	5.0						50
Toluene	BRL		µg/l	5.0						50
m,p-Xylene	BRL		µg/l	10.0						50
o-Xylene	BRL		µg/l	5.0						50
Surrogate: 2,5-Dibromotoluene (FID)	47.1		µg/l		50.0		94.2	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.1		µg/l		50.0		86.2	70-130		
Matrix Spike (6060310-MS1) Source: SA45755-08										
Prepared & Analyzed: 06-Jun-06										
Benzene	18.5		µg/l		20.0		92.5	70-130		30
Ethylbenzene	19.0		µg/l		20.0		95.0	70-130		30
Methyl tert-butyl ether	19.8		µg/l		20.0		99.0	70-130		30
Naphthalene	21.9		µg/l		20.0		110	70-130		30
Toluene	18.3		µg/l		20.0		91.5	70-130		30
m,p-Xylene	37.4		µg/l		40.0		93.5	70-130		30

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* Reportable Detection Limit

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Page 7 of 18

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limits	RPD	RPD Limit
Batch 6060310 - VPH										
Matrix Spike (6060310-MS1)										
Source: SA45755-08										
Prepared & Analyzed: 06-Jun-06										
o-Xylene	19.0		µg/l		20.0		95.0	70-130		30
2-Methylpentane	17.9		µg/l		20.0		89.5	70-130		30
n-Nonane	16.9		µg/l		20.0		84.5	70-130		30
n-Pentane	17.8		µg/l		20.0		89.0	70-130		30
1,2,4-Trimethylbenzene	20.3		µg/l		20.0		102	70-130		30
2,2,4-Trimethylpentane	18.1		µg/l		20.0		90.5	70-130		30
n-Butylcyclohexane	16.7		µg/l		20.0		83.5	70-130		30
n-Decane	15.3		µg/l		20.0		76.5	70-130		30
Surrogate: 2,5-Dibromotoluene (FID)	53.2		µg/l		50.0		106	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	48.1		µg/l		50.0		96.2	70-130		

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* Reportable Detection Limit

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Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060211 - SW846 3510C										
Blank (6060211-BLK1)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.50						
2-Methylnaphthalene	BRL		µg/l	2.50						
Acenaphthene	BRL		µg/l	2.50						
Phenanthrene	BRL		µg/l	2.50						
Anthracene	BRL		µg/l	2.50						
Pyrene	BRL		µg/l	2.50						
Chrysene	BRL		µg/l	2.50						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	38.1		µg/l		50.0		76.2	40-140		
Surrogate: Ortho-Terphenyl	29.2		µg/l		50.0		58.4	40-140		
Surrogate: 2-Bromonaphthalene	26.2		µg/l		40.0		65.5	40-140		
Surrogate: 2-Fluorobiphenyl	24.9		µg/l		40.0		62.2	40-140		
LCS (6060211-BS1)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	0.428		mg/l	0.2	0.600		71.3	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.890		mg/l	0.2	0.800		111	40-140		25
C11-C22 Aromatic Hydrocarbons	0.900		mg/l	0.2	1.70		52.9	40-140		25
Naphthalene	30.1	QC-1	µg/l	2.50	100		30.1	40-140		20
2-Methylnaphthalene	35.3	QC-1	µg/l	2.50	100		35.3	40-140		20
Acenaphthene	42.8		µg/l	2.50	100		42.8	40-140		20
Phenanthrene	51.8		µg/l	2.50	100		51.8	40-140		20
Anthracene	53.0		µg/l	2.50	100		53.0	40-140		20
Pyrene	57.1		µg/l	2.50	100		57.1	40-140		20
Chrysene	58.2		µg/l	2.50	100		58.2	40-140		20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
5-alpha-Androstane	25.0		mg/l		0.0250		128	0-200		
5-alpha-Androstane	25.0		µg/l		25.0		128	0-200		
Surrogate: 1-Chlorooctadecane	42.2		µg/l		50.0		84.4	40-140		
Surrogate: Ortho-Terphenyl	30.6		µg/l		50.0		61.2	40-140		
Surrogate: 2-Bromonaphthalene	22.5		µg/l		40.0		56.2	40-140		
Surrogate: 2-Fluorobiphenyl	22.0		µg/l		40.0		55.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (606021)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	0.624		mg/l	0.2	0.600		104	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.995		mg/l	0.2	0.800		124	40-140		25
C11-C22 Aromatic Hydrocarbons	1.41		mg/l	0.2	1.70		82.9	40-140		25
Naphthalene	60.5		µg/l	2.50	100		60.5	40-140		20
2-Methylnaphthalene	65.9		µg/l	2.50	100		65.9	40-140		20
Acenaphthene	71.9		µg/l	2.50	100		71.9	40-140		20
Phenanthrene	79.8		µg/l	2.50	100		79.8	40-140		20
Anthracene	80.4		µg/l	2.50	100		80.4	40-140		20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 18

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limits	RPD	RPD Limit
Batch 6060211 - SW846 3510C										
Fractionation Check Standard (606021)										
Prepared & Analyzed: 05-Jun-06										
Pyrene	83.7		µg/l	2.50	100		83.7	40-140		20
Chrysene	84.3		µg/l	2.50	100		84.3	40-140		20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
5-alpha-Androstane	25.0		µg/l		25.0		130	0-200		
5-alpha-Androstane	25.0		mg/l		0.0250		130	0-200		
Surrogate: 1-Chlorooctadecane	59.5		µg/l		50.0		119	40-140		
Surrogate: Ortho-Terphenyl	42.8		µg/l		50.0		85.6	40-140		
Surrogate: 2-Bromonaphthalene	29.4		µg/l		40.0		73.5	40-140		
Surrogate: 2-Fluorobiphenyl	31.6		µg/l		40.0		79.0	40-140		
LCS Dup (6060211-BSD1)										
Prepared: 05-Jun-06 Analyzed: 06-Jun-06										
C9-C18 Aliphatic Hydrocarbons	0.414		mg/l	0.2	0.600		69.0	40-140	3.28	25
C19-C36 Aliphatic Hydrocarbons	0.848		mg/l	0.2	0.800		106	40-140	4.61	25
C11-C22 Aromatic Hydrocarbons	1.09		mg/l	0.2	1.70		64.1	40-140	19.1	25
Naphthalene	40.0	QR-05	µg/l	2.50	100		40.0	40-140	28.2	20
2-Methylnaphthalene	44.0	QR-05	µg/l	2.50	100		44.0	40-140	21.9	20
Acenaphthene	50.7		µg/l	2.50	100		50.7	40-140	16.9	20
Phenanthrene	61.4		µg/l	2.50	100		61.4	40-140	17.0	20
Anthracene	64.1		µg/l	2.50	100		64.1	40-140	19.0	20
Pyrene	68.9		µg/l	2.50	100		68.9	40-140	18.7	20
Chrysene	72.3	QR-02	µg/l	2.50	100		72.3	40-140	21.6	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
Surrogate: 1-Chlorooctadecane	42.3		µg/l		50.0		84.6	40-140		
Surrogate: Ortho-Terphenyl	34.2		µg/l		50.0		68.4	40-140		
Surrogate: 2-Bromonaphthalene	26.8		µg/l		40.0		67.0	40-140		
Surrogate: 2-Fluorobiphenyl	26.4		µg/l		40.0		66.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		

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Page 10 of 18

Soluble Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060362 - SW846 3005A										
<u>Blank (6060362-BLK1)</u>										
Prepared & Analyzed: 06-Jun-06										
Iron	BRL		mg/l	0.0100						
<u>LCS (6060362-BS1)</u>										
Prepared & Analyzed: 06-Jun-06										
Iron	1.02		mg/l	0.0100	1.00		102	85-115		20
<u>LCS Dup (6060362-BSD1)</u>										
Prepared & Analyzed: 06-Jun-06										
Iron	0.990		mg/l	0.0100	1.00		99.0	85-115	2.99	20
<u>Duplicate (6060362-DUP1)</u> Source: SA45755-06										
Prepared & Analyzed: 06-Jun-06										
Iron	0.0141	QR-06	mg/l	0.0100						20
<u>Matrix Spike (6060362-MS1)</u> Source: SA45755-07										
Prepared & Analyzed: 06-Jun-06										
Iron	1.03		mg/l	0.0100	1.00		103	75-125		20
<u>Matrix Spike Dup (6060362-MSD1)</u> Source: SA45755-07										
Prepared & Analyzed: 06-Jun-06										
Iron	1.04		mg/l	0.0100	1.00		104	75-125	0.966	20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 18

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060153 - General Preparation										
Blank (6060153-BLK1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
Blank (6060153-BLK2)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
LCS (6060153-BS1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	19.7		mg/l	1.00	20.0		98.5	90-110		200
Nitrate as N	2.00		mg/l	0.100	2.00		100	90-110		200
LCS (6060153-BS2)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	3.98		mg/l	1.00	4.00		99.5	90-110		200
Nitrate as N	0.400		mg/l	0.100	0.400		100	90-110		200
LCS (6060153-BS3)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	19.2		mg/l	1.00	20.0		96.0	90-110		200
Nitrate as N	1.96		mg/l	0.100	2.00		98.0	90-110		200
LCS (6060153-BS4)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	3.74		mg/l	1.00	4.00		93.5	90-110		200
Nitrate as N	0.390		mg/l	0.100	0.400		97.5	90-110		200
Duplicate (6060153-DUP1) Source: SA45713-02										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	6.90		mg/l	1.00		7.92			13.8	20
Nitrate as N	0.830		mg/l	0.100		0.810			2.44	20
Duplicate (6060153-DUP2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	47.2		mg/l	1.00		47.2			0.00	20
Nitrate as N	BRL		mg/l	0.100		BRL				20
Duplicate (6060153-DUP3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	31.6		mg/l	1.00		31.4			0.635	20
Nitrate as N	0.160		mg/l	0.100		0.160			0.00	20
Matrix Spike (6060153-MS1) Source: SA45713-02										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	12.6		mg/l	1.00	4.00	7.92	117	80-120		20
Nitrate as N	1.26		mg/l	0.100	0.400	0.810	112	80-120		20
Matrix Spike (6060153-MS2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	50.7		mg/l	1.00	4.00	47.2	87.5	80-120		20
Nitrate as N	0.410		mg/l	0.100	0.400	BRL	102	80-120		20
Matrix Spike (6060153-MS3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	35.2		mg/l	1.00	4.00	31.4	95.0	80-120		20
Nitrate as N	0.560		mg/l	0.100	0.400	0.160	100	80-120		20
Matrix Spike Dup (6060153-MSD1) Source: SA45713-02										

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Page 12 of 18

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060153 - General Preparation										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	12.5		mg/l	1.00	4.00	7.92	114	80-120	0.797	20
Nitrate as N	1.26		mg/l	0.100	0.400	0.810	112	80-120	0.00	20
Matrix Spike Dup (6060153-MSD2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	51.1		mg/l	1.00	4.00	47.2	97.5	80-120	0.786	20
Nitrate as N	0.410		mg/l	0.100	0.400	BRL	102	80-120	0.00	20
Matrix Spike Dup (6060153-MSD3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	35.2		mg/l	1.00	4.00	31.4	95.0	80-120	0.00	20
Nitrate as N	0.560		mg/l	0.100	0.400	0.160	100	80-120	0.00	20
Reference (6060153-SRM1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	24.6		mg/l	1.00	25.0		98.4	90-110		
Nitrate as N	2.52		mg/l	0.100	2.50		101	90-110		
Reference (6060153-SRM2)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	4.74		mg/l	1.00	5.00		94.8	90-110		
Nitrate as N	0.490		mg/l	0.100	0.500		98.0	90-110		
Reference (6060153-SRM3)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	23.8		mg/l	1.00	25.0		95.2	90-110		
Nitrate as N	2.45		mg/l	0.100	2.50		98.0	90-110		
Reference (6060153-SRM4)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	4.49	QL-01	mg/l	1.00	5.00		89.8	90-110		
Nitrate as N	0.470		mg/l	0.100	0.500		94.0	90-110		

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 18

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	%D	Limit
Batch 0606066				
Calibration Check (0606066-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.60565E+08	1.12499E+08	7.50	25.00
C19-C36 Aliphatic Hydrocarbons	8.40263E+07	7.06183E+07	20.4	25.00
C11-C22 Aromatic Hydrocarbons	26.8433	16.9179	-2.35	25.00
Naphthalene	7.28448	7.05564	-3.14	20.00
2-Methylnaphthalene	4.55306	4.48721	-1.45	20.00
Acenaphthene	4.29598	4.21643	-1.85	20.00
Phenanthrene	6.21583	6.15604	-0.962	20.00
Anthracene	6.48728	6.31389	-2.67	20.00
Pyrene	6.32429	6.39844	1.17	20.00
Chrysene	5.45456	5.51777	1.16	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 14 of 18

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	%D	Limit
Batch 0606089				
Calibration Check (0606089-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.66513E+08	1.57487E+08	-1.67	25.00
C19-C36 Aliphatic Hydrocarbons	1.00596E+08	1.08153E+08	-6.88	25.00
C11-C22 Aromatic Hydrocarbons	26.8433	17.201	-0.588	25.00
Naphthalene	7.28448	6.5121	-10.6	20.00
2-Methylnaphthalene	4.55306	4.07514	-10.5	20.00
Acenaphthene	4.29598	3.87679	-9.76	20.00
Phenanthrene	6.21583	6.0074	-3.35	20.00
Anthracene	6.48728	6.3475	-2.15	20.00
Pyrene	6.32429	6.59784	4.33	20.00
Chrysene	5.45456	5.77128	5.81	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Notes and Definitions

Comp Completed

LF Lab Filtered

QC-1 Analyte out of acceptance range.

QL-01 Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

QR-05 RPD out of acceptance range.

QR-06 The RPD exceeded the QC control limits; however precision is demonstrated with acceptable RPD values for MS/MSD.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

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* Reportable Detection Limit BRL = Below Reporting Limit

Page 16 of 18

The following outlines the condition of all VPH samples contained within this report upon laboratory receipt

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Sample Preservative	Aqueous (acid-preserved)	☐ N/A	☒ pH $\leq$ 2	☐ pH > 2
	Soil or Sediment	☒ N/A		☐ Samples not received in Methanol or air-tight container
		☐ Samples received in Methanol:		☐ covering soil/sediment
				☐ not covering soil/sediment
		☐ Samples received in air-tight container:		
Temperature	☐ Received on ice ☒ Received at 4 ± 2 °C ☐ Other: °C			

Were all QA/QC procedures followed as required by the VPH method? Yes ☒ No ☐

Were any significant modifications made to the VPH method as specified in section 11.3? No ☒ *see below

Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐

* Yes, if PID and FID surrogate recoveries are listed as *n/a*, then that sample was run via GCMS using all QC criteria specified in the method

The following outlines the condition of all EPH samples contained within this report upon laboratory receipt

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Aqueous Preservative	☐ N/A	☒ pH $\leq$ 2	☐ pH > 2	☐ pH adjusted to $\leq$ 2 in lab
Temperature	☐ Received on ice ☒ Received at 4 ± 2 °C ☐ Other: °C			

Were all QA/QC procedures followed as required by the EPH method? Yes ☒ No ☐

Were any significant modifications made to the EPH method as specified in Section 11.3? No ☒

Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete

Authorized by:



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

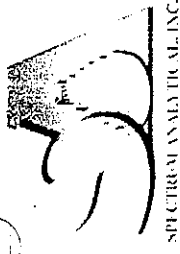
MADEP RTN ¹ :					
This form provides certifications for the following Spectrum Analytical, Inc work order #: SA45755					
Matrix	☒ Groundwater	☐ Soil/Sediment	☐ Drinking Water	☐ Other	
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☒ 6010B	☐ 7470A/1A
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020	☐ 9014M ²
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³	☐ 7196A
¹ List Release Tracking Number (RTN), if known ² M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide(PAC) Method ³ S - SW-846 Methods 7000 Series List individual method and analyte					
An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status					
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?				☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?				☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?				☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?				☒ Yes ☐ No
A response to questions E and F below is required for "Presumptive Certainty" status					
E	Were all analytical QC performance standards and recommendations for the specified methods achieved?				☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?				☐ Yes ☒ No
<i>All negative responses are addressed in a case narrative on the cover page of this report.</i>					
I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.  Hanibal C. Tayeh, Ph.D. President/Laboratory Director Date: 6/8/2006					

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 18 of 18



CHAIN OF CUSTODY RECORD

Page 1 of 2

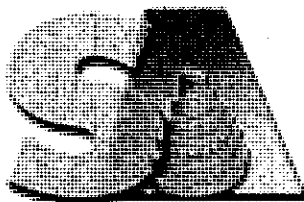
Report To: <u>ECS, Auburn</u>		Invoice To: <u>ECS, Agawam</u>		Project No.: <u>91-204082.02</u>	
Project Mgr.: <u>Chuck Klingler</u>		P.O. No.: <u>03-0503</u> RQN:		Site Name: <u>Eagle Gas</u>	
1=Na ₂ SO ₃ 2=HCl 3=H ₂ SO ₄ 4=HNO ₃ 5=NaOH 6=Ascorbic Acid 7=CH ₃ OH 8=NaHSO ₄ 9= <u>Ice</u> 10= <u> </u>		Containers:		Location: <u>131 Main St. Carver</u> State: <u>MA</u>	
DW=Drinking Water GW=Groundwater WW=Wastewater O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air X1= <u> </u> X2= <u> </u> X3= <u> </u>		Preservative		Sampler(s): <u>Ascarzo, K., D. Anderson</u>	
G=Grab C=Composite		Matrix		QA Reporting Notes: (check if needed)	
Lab Id:	Sample Id:	Date:	Time:	State specific reporting standards If applicable, please list below.	
SANSTSS-01	*DCW-1	5-31-06	9:00	☒ Provide MCP CAM Report Were all field QC requirements met as per MADEP CAM Section 2.0? ☒ Yes ☐ No (Response required for C, I, M report)	
-02	*DCW-2		10:00	Separate Lab	
03	*ECS-1		11:15	Reports as	
04	*ECS-7		3:15	Indicated 4	
05	*ECS-8		12:45	Totals	
06	*BP-1		2:20		
07	*BP-2		2:30		
08	*BF-4		11:55		
09	*DCW-4		9:15		
700	DCW-6		1:05		
Relinquished by: <u>Aaron Magenta</u>			Received by: <u>Chuck Klingler</u>		
Date: <u>6/1/06</u>			Time: <u>10:53</u>		
E-mail to: <u>cklingler@eecsconsult.com</u>			Date: <u>6/1/06</u>		
EDD Format			Time: <u>1:30</u>		
Condition upon receipt: ☐ Iced ☐ Ambient ☒ <u> </u>					

Q

Q

Q

Report Date:
08-Jun-06 16:38



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

RECEIVED
JUN 14 2006

BY: lp

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 91-204082.02

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA45755-06	BP-1	Ground Water	31-May-06 14:20	01-Jun-06 13:30
SA45755-07	BP-2	Ground Water	31-May-06 14:30	01-Jun-06 13:30

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

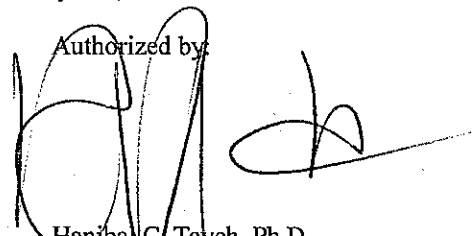
Please note that this report contains 16 pages of analytical data plus Chain of Custody document(s).

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Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:


Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

CASE NARRATIVE:

The data set for work order SA45755 complies with internal QC criteria for the methods performed. The samples were received @ 4.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification**BP-1**

SA45755-06

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 14:20

Received

01-Jun-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
PH Aliphatic/Aromatic Carbon Ranges											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	05-Jun-06	06-Jun-06	6060231	ss
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
VPH Target Analytes											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
Surrogate recoveries:											
615-59-8	2,5-Dibromotoluene (FID)	105		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	96.8		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
EPH Aliphatic/Aromatic Ranges											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
EPH Diesel Target PAH Analytes											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.56	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.56	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.56	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.56	1	"	"	"	"	"
Surrogate recoveries:											
3386-33-2	1-Chlorooctadecane	37.4	S-GC	40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	78.8		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	64.0		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	74.5		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0204		mg/l	0.0100	1	SW846 6010B	06-Jun-06	06-Jun-06	6060362	CW
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	06-Jun-06	06-Jun-06	6060350	JR
General Chemistry Parameters											
14797-55-8	Nitrate as N	1.31		mg/l	0.100	1	EPA 300.0	01-Jun-06 12:00	02-Jun-06	6060153	Alex
08-79-8	Sulfate as SO4	6.94		mg/l	1.00	1	"	"	"	"	"

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 16

Sample Identification

BP-2

SA45755-07

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

31-May-06 14:30

Received

01-Jun-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	05-Jun-06	06-Jun-06	6060231	ss
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	96.8		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	90.0		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	05-Jun-06	07-Jun-06	6060211	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.68	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.68	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	50.9		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	81.5		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	70.8		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	66.6		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0322		mg/l	0.0100	1	SW846 6010B	06-Jun-06	06-Jun-06	6060362	CW
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	06-Jun-06	06-Jun-06	6060350	JR
General Chemistry Parameters											
14797-55-8	Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	01-Jun-06 12:00	02-Jun-06	6060153	Alex
108-79-8	Sulfate as SO4	9.75		mg/l	1.00	1	"	"	"	"	"

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Page 3 of 16

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060231 - VPH										
Blank (6060231-BLK1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	46.4		µg/l		50.0		92.8	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	44.4		µg/l		50.0		88.8	70-130		
LCS (6060231-BS1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	115		mg/l		140		82.1	70-130		25
C9-C12 Aliphatic Hydrocarbons	53.8		mg/l		55.2		97.5	70-130		25
C9-C10 Aromatic Hydrocarbons	30.5		mg/l		40.0		76.2	70-130		25
Unadjusted C5-C8 Aliphatic Hydrocarbons	242		mg/l		280		86.4	70-130		25
Unadjusted C9-C12 Aliphatic Hydrocarbons	84.3		mg/l		84.8		99.4	70-130		25
Benzene	18.2		µg/l		20.0		91.0	70-130		25
Ethylbenzene	18.3		µg/l		20.0		91.5	70-130		25
Methyl tert-butyl ether	17.7		µg/l		20.0		88.5	70-130		25
Naphthalene	19.4		µg/l		20.0		97.0	70-130		25
Toluene	18.3		µg/l		20.0		91.5	70-130		25
m,p-Xylene	36.4		µg/l		40.0		91.0	70-130		25
o-Xylene	18.6		µg/l		20.0		93.0	70-130		25
2-Methylpentane	17.5		µg/l		20.0		87.5	70-130		25
n-Nonane	17.9		µg/l		20.0		89.5	70-130		25
n-Pentane	19.2		µg/l		20.0		96.0	70-130		25
1,2,4-Trimethylbenzene	18.3		µg/l		20.0		91.5	70-130		25
2,2,4-Trimethylpentane	18.3		µg/l		20.0		91.5	70-130		25
n-Butylcyclohexane	17.2		µg/l		20.0		86.0	70-130		25
n-Decane	15.0		µg/l		20.0		75.0	70-130		25
Surrogate: 2,5-Dibromotoluene (FID)	47.7		µg/l		50.0		95.4	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.9		µg/l		50.0		83.8	70-130		
LCS Dup (6060231-BSD1)										
Prepared & Analyzed: 05-Jun-06										
C5-C8 Aliphatic Hydrocarbons	116		mg/l		140		82.9	70-130	0.970	25
C9-C12 Aliphatic Hydrocarbons	63.1		mg/l		55.2		114	70-130	15.6	25
C9-C10 Aromatic Hydrocarbons	34.6		mg/l		40.0		86.5	70-130	12.7	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	248		mg/l		280		88.6	70-130	2.51	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	97.7		mg/l		84.8		115	70-130	14.6	25
Benzene	18.8		µg/l		20.0		94.0	70-130	3.24	25
Ethylbenzene	19.0		µg/l		20.0		95.0	70-130	3.75	25
Methyl tert-butyl ether	18.1		µg/l		20.0		90.5	70-130	2.23	25

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Page 4 of 16

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060231 - VPH										
CS Dup (6060231-BSD1)										
Prepared & Analyzed: 05-Jun-06										
Naphthalene	19.6		µg/l		20.0		98.0	70-130	1.03	25
Toluene	18.8		µg/l		20.0		94.0	70-130	2.70	25
m,p-Xylene	37.7		µg/l		40.0		94.2	70-130	3.46	25
o-Xylene	19.3		µg/l		20.0		96.5	70-130	3.69	25
2-Methylpentane	20.0		µg/l		20.0		100	70-130	13.3	25
n-Nonane	22.4		µg/l		20.0		112	70-130	22.3	25
n-Pentane	21.7		µg/l		20.0		108	70-130	11.8	25
1,2,4-Trimethylbenzene	19.0		µg/l		20.0		95.0	70-130	3.75	25
2,2,4-Trimethylpentane	21.1		µg/l		20.0		106	70-130	14.7	25
n-Butylcyclohexane	22.1		µg/l		20.0		110	70-130	24.5	25
n-Decane	21.3	QR-02	µg/l		20.0		106	70-130	34.3	25
Surrogate: 2,5-Dibromotoluene (FID)	50.5		µg/l		50.0		101	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.4		µg/l		50.0		90.8	70-130		
Duplicate (6060231-DUP1) Source: SA45528-02										
Prepared: 05-Jun-06 Analyzed: 06-Jun-06										
C5-C8 Aliphatic Hydrocarbons	0.806		mg/l	0.0750		0.726			10.4	50
C9-C12 Aliphatic Hydrocarbons	0.487		mg/l	0.0250		0.365			28.6	50
C9-C10 Aromatic Hydrocarbons	0.968		mg/l	0.0250		0.783			21.1	50
Unadjusted C5-C8 Aliphatic Hydrocarbons	1.02		mg/l	0.0750		0.897			12.8	50
Unadjusted C9-C12 Aliphatic Hydrocarbons	1.46		mg/l	0.0250		1.15			23.8	50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	103		µg/l	5.0		82.0			22.7	50
Methyl tert-butyl ether	5.9		µg/l	5.0		5.1			14.5	50
Naphthalene	43.0		µg/l	5.0		35.0			20.5	50
Toluene	8.1		µg/l	5.0		7.3			10.4	50
p-Xylene	70.7		µg/l	10.0		56.5			22.3	50
o-Xylene	26.5		µg/l	5.0		20.4			26.0	50
Surrogate: 2,5-Dibromotoluene (FID)	49.5		µg/l		50.0		99.0	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.5		µg/l		50.0		87.0	70-130		
Matrix Spike (6060231-MS1) Source: SA45528-02										
Prepared & Analyzed: 05-Jun-06										
Benzene	18.6		µg/l		20.0	BRL	93.0	70-130		30
Ethylbenzene	39.5		µg/l		20.0	16.4	116	70-130		30
Methyl tert-butyl ether	19.5		µg/l		20.0	1.02	92.4	70-130		30
Naphthalene	29.3		µg/l		20.0	7.00	112	70-130		30
Toluene	18.8		µg/l		20.0	1.46	86.7	70-130		30
m,p-Xylene	51.4		µg/l		40.0	11.3	100	70-130		30
o-Xylene	24.2		µg/l		20.0	4.08	101	70-130		30
2-Methylpentane	39.1		µg/l		20.0	18.4	104	70-130		30
n-Nonane	18.4		µg/l		20.0	BRL	92.0	70-130		30
n-Pentane	30.6		µg/l		20.0	10.6	100	70-130		30
1,2,4-Trimethylbenzene	81.3	QM-07	µg/l		20.0	50.6	154	70-130		30
2,2,4-Trimethylpentane	32.3		µg/l		20.0	13.2	95.5	70-130		30
n-Butylcyclohexane	26.8		µg/l		20.0	2.34	122	70-130		30
n-Decane	18.3		µg/l		20.0	0.0	91.5	70-130		30
Surrogate: 2,5-Dibromotoluene (FID)	50.1		µg/l		50.0		100	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	51.7		µg/l		50.0		103	70-130		
Matrix Spike Dup (6060231-MSD1) Source: SA45528-02										
Prepared & Analyzed: 05-Jun-06										
Benzene	18.5		µg/l		20.0	BRL	92.5	70-130	0.539	30
Ethylbenzene	37.9		µg/l		20.0	16.4	108	70-130	7.14	30
Methyl tert-butyl ether	19.7		µg/l		20.0	1.02	93.4	70-130	1.08	30
Naphthalene	29.3		µg/l		20.0	7.00	112	70-130	0.00	30

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Page 5 of 16

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060231 - VPH										
Matrix Spike Dup (6060231-MSD1) Source: SA45528-02										
Prepared & Analyzed: 05-Jun-06										
Toluene	18.7		µg/l		20.0	1.46	86.2	70-130	0.578	30
m,p-Xylene	50.0		µg/l		40.0	11.3	96.8	70-130	3.25	30
o-Xylene	23.7		µg/l		20.0	4.08	98.1	70-130	2.91	30
2-Methylpentane	37.9		µg/l		20.0	18.4	97.5	70-130	6.45	30
n-Nonane	18.3		µg/l		20.0	BRL	91.5	70-130	0.545	30
n-Pentane	30.6		µg/l		20.0	10.6	100	70-130	0.00	30
1,2,4-Trimethylbenzene	78.1	QM-07	µg/l		20.0	50.6	138	70-130	11.0	30
2,2,4-Trimethylpentane	32.7		µg/l		20.0	13.2	97.5	70-130	2.07	30
n-Butylcyclohexane	25.9		µg/l		20.0	2.34	118	70-130	3.33	30
n-Decane	18.2		µg/l		20.0	0.0	91.0	70-130	0.548	30
Surrogate: 2,5-Dibromotoluene (FID)	51.1		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	42.9		µg/l		50.0		85.8	70-130		

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Page 6 of 16

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060211 - SW846 3510C										
Blank (6060211-BLK1)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.50						
2-Methylnaphthalene	BRL		µg/l	2.50						
Acenaphthene	BRL		µg/l	2.50						
Phenanthrene	BRL		µg/l	2.50						
Anthracene	BRL		µg/l	2.50						
Pyrene	BRL		µg/l	2.50						
Chrysene	BRL		µg/l	2.50						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	38.1		µg/l		50.0		76.2	40-140		
Surrogate: Ortho-Terphenyl	29.2		µg/l		50.0		58.4	40-140		
Surrogate: 2-Bromonaphthalene	26.2		µg/l		40.0		65.5	40-140		
Surrogate: 2-Fluorobiphenyl	24.9		µg/l		40.0		62.2	40-140		
LCS (6060211-BS1)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	0.428		mg/l	0.2	0.600		71.3	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.890		mg/l	0.2	0.800		111	40-140		25
C11-C22 Aromatic Hydrocarbons	0.900		mg/l	0.2	1.70		52.9	40-140		25
Naphthalene	30.1	QC-1	µg/l	2.50	100		30.1	40-140		20
2-Methylnaphthalene	35.3	QC-1	µg/l	2.50	100		35.3	40-140		20
Acenaphthene	42.8		µg/l	2.50	100		42.8	40-140		20
Phenanthrene	51.8		µg/l	2.50	100		51.8	40-140		20
Anthracene	53.0		µg/l	2.50	100		53.0	40-140		20
Pyrene	57.1		µg/l	2.50	100		57.1	40-140		20
Chrysene	58.2		µg/l	2.50	100		58.2	40-140		20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
5-alpha-Androstane	25.0		µg/l		25.0		128	0-200		
5-alpha-Androstane	25.0		mg/l		0.0250		128	0-200		
Surrogate: 1-Chlorooctadecane	42.2		µg/l		50.0		84.4	40-140		
Surrogate: Ortho-Terphenyl	30.6		µg/l		50.0		61.2	40-140		
Surrogate: 2-Bromonaphthalene	22.5		µg/l		40.0		56.2	40-140		
Surrogate: 2-Fluorobiphenyl	22.0		µg/l		40.0		55.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (606021)										
Prepared & Analyzed: 05-Jun-06										
C9-C18 Aliphatic Hydrocarbons	0.624		mg/l	0.2	0.600		104	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.995		mg/l	0.2	0.800		124	40-140		25
C11-C22 Aromatic Hydrocarbons	1.41		mg/l	0.2	1.70		82.9	40-140		25
Naphthalene	60.5		µg/l	2.50	100		60.5	40-140		20
2-Methylnaphthalene	65.9		µg/l	2.50	100		65.9	40-140		20
Acenaphthene	71.9		µg/l	2.50	100		71.9	40-140		20
Phenanthrene	79.8		µg/l	2.50	100		79.8	40-140		20
Anthracene	80.4		µg/l	2.50	100		80.4	40-140		20

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Page 7 of 16

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 6060211 - SW846 3510C									
Fractionation Check Standard (606021)									
Prepared & Analyzed: 05-Jun-06									
Pyrene	83.7		µg/l	2.50	100		83.7 40-140		20
Chrysene	84.3		µg/l	2.50	100		84.3 40-140		20
Naphthalene (aliphatic fraction)	0.00		µg/l		100		0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100		0-200		200
5-alpha-Androstane	25.0		mg/l		0.0250		130 0-200		
5-alpha-Androstane	25.0		µg/l		25.0		130 0-200		
Surrogate: 1-Chlorooctadecane	59.5		µg/l		50.0		119 40-140		
Surrogate: Ortho-Terphenyl	42.8		µg/l		50.0		85.6 40-140		
Surrogate: 2-Bromonaphthalene	29.4		µg/l		40.0		73.5 40-140		
Surrogate: 2-Fluorobiphenyl	31.6		µg/l		40.0		79.0 40-140		
LCS Dup (6060211-BSD1)									
Prepared: 05-Jun-06 Analyzed: 06-Jun-06									
C9-C18 Aliphatic Hydrocarbons	0.414		mg/l	0.2	0.600		69.0 40-140	3.28	25
C19-C36 Aliphatic Hydrocarbons	0.848		mg/l	0.2	0.800		106 40-140	4.61	25
C11-C22 Aromatic Hydrocarbons	1.09		mg/l	0.2	1.70		64.1 40-140	19.1	25
Naphthalene	40.0	QR-05	µg/l	2.50	100		40.0 40-140	28.2	20
2-Methylnaphthalene	44.0	QR-05	µg/l	2.50	100		44.0 40-140	21.9	20
Acenaphthene	50.7		µg/l	2.50	100		50.7 40-140	16.9	20
Phenanthrene	61.4		µg/l	2.50	100		61.4 40-140	17.0	20
Anthracene	64.1		µg/l	2.50	100		64.1 40-140	19.0	20
Pyrene	68.9		µg/l	2.50	100		68.9 40-140	18.7	20
Chrysene	72.3	QR-02	µg/l	2.50	100		72.3 40-140	21.6	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100		0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100		0-200		200
Surrogate: 1-Chlorooctadecane	42.3		µg/l		50.0		84.6 40-140		
Surrogate: Ortho-Terphenyl	34.2		µg/l		50.0		68.4 40-140		
Surrogate: 2-Bromonaphthalene	26.8		µg/l		40.0		67.0 40-140		
Surrogate: 2-Fluorobiphenyl	26.4		µg/l		40.0		66.0 40-140		
Naphthalene Breakthrough	0.00		%				0-5		
2-Methylnaphthalene Breakthrough	0.00		%				0-5		

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Page 8 of 16

Soluble Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	RPD Limit
Batch 6060362 - SW846 3005A										
Blank (6060362-BLK1)										
Prepared & Analyzed: 06-Jun-06										
Iron	BRL		mg/l	0.0100						
LCS (6060362-BS1)										
Prepared & Analyzed: 06-Jun-06										
Iron	1.02		mg/l	0.0100	1.00		102	85-115		20
LCS Dup (6060362-BSD1)										
Prepared & Analyzed: 06-Jun-06										
Iron	0.990		mg/l	0.0100	1.00		99.0	85-115	2.99	20
Duplicate (6060362-DUP1) Source: SA45755-06										
Prepared & Analyzed: 06-Jun-06										
Iron	0.0141	QR-06	mg/l	0.0100		0.0204			36.5	20
Matrix Spike (6060362-MS1) Source: SA45755-07										
Prepared & Analyzed: 06-Jun-06										
Iron	1.03		mg/l	0.0100	1.00	0.0322	99.8	75-125		20
Matrix Spike Dup (6060362-MSD1) Source: SA45755-07										
Prepared & Analyzed: 06-Jun-06										
Iron	1.04		mg/l	0.0100	1.00	0.0322	101	75-125	0.966	20

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Page 9 of 16

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060153 - General Preparation										
Blank (6060153-BLK1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
Blank (6060153-BLK2)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
LCS (6060153-BS1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	19.7		mg/l	1.00	20.0		98.5	90-110		200
Nitrate as N	2.00		mg/l	0.100	2.00		100	90-110		200
LCS (6060153-BS2)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	3.98		mg/l	1.00	4.00		99.5	90-110		200
Nitrate as N	0.400		mg/l	0.100	0.400		100	90-110		200
LCS (6060153-BS3)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	19.2		mg/l	1.00	20.0		96.0	90-110		200
Nitrate as N	1.96		mg/l	0.100	2.00		98.0	90-110		200
LCS (6060153-BS4)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	3.74		mg/l	1.00	4.00		93.5	90-110		200
Nitrate as N	0.390		mg/l	0.100	0.400		97.5	90-110		200
Duplicate (6060153-DUP1) Source: SA45713-02										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	6.90		mg/l	1.00		7.92			13.8	20
Nitrate as N	0.830		mg/l	0.100		0.810			2.44	20
Duplicate (6060153-DUP2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	47.2		mg/l	1.00		47.2			0.00	20
Nitrate as N	BRL		mg/l	0.100		BRL				20
Duplicate (6060153-DUP3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	31.6		mg/l	1.00		31.4			0.635	20
Nitrate as N	0.160		mg/l	0.100		0.160			0.00	20
Matrix Spike (6060153-MS1) Source: SA45713-02										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO4	12.6		mg/l	1.00	4.00	7.92	117	80-120		20
Nitrate as N	1.26		mg/l	0.100	0.400	0.810	112	80-120		20
Matrix Spike (6060153-MS2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	50.7		mg/l	1.00	4.00	47.2	87.5	80-120		20
Nitrate as N	0.410		mg/l	0.100	0.400	BRL	102	80-120		20
Matrix Spike (6060153-MS3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO4	35.2		mg/l	1.00	4.00	31.4	95.0	80-120		20
Nitrate as N	0.560		mg/l	0.100	0.400	0.160	100	80-120		20
Matrix Spike Dup (6060153-MSD1) Source: SA45713-02										

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 16

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6060153 - General Preparation										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	12.5		mg/l	1.00	4.00	7.92	114	80-120	0.797	20
Nitrate as N	1.26		mg/l	0.100	0.400	0.810	112	80-120	0.00	20
Matrix Spike Dup (6060153-MSD2) Source: SA45771-05										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	51.1		mg/l	1.00	4.00	47.2	97.5	80-120	0.786	20
Nitrate as N	0.410		mg/l	0.100	0.400	BRL	102	80-120	0.00	20
Matrix Spike Dup (6060153-MSD3) Source: SA45773-14										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	35.2		mg/l	1.00	4.00	31.4	95.0	80-120	0.00	20
Nitrate as N	0.560		mg/l	0.100	0.400	0.160	100	80-120	0.00	20
Reference (6060153-SRM1)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	24.6		mg/l	1.00	25.0		98.4	90-110		
Nitrate as N	2.52		mg/l	0.100	2.50		101	90-110		
Reference (6060153-SRM2)										
Prepared & Analyzed: 01-Jun-06										
Sulfate as SO ₄	4.74		mg/l	1.00	5.00		94.8	90-110		
Nitrate as N	0.490		mg/l	0.100	0.500		98.0	90-110		
Reference (6060153-SRM3)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	23.8		mg/l	1.00	25.0		95.2	90-110		
Nitrate as N	2.45		mg/l	0.100	2.50		98.0	90-110		
Reference (6060153-SRM4)										
Prepared: 01-Jun-06 Analyzed: 02-Jun-06										
Sulfate as SO ₄	4.49	QL-01	mg/l	1.00	5.00		89.8	90-110		
Nitrate as N	0.470		mg/l	0.100	0.500		94.0	90-110		

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 16

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0606066				
Calibration Check (0606066-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.60565E+08	1.12499E+08	7.50	25.00
C19-C36 Aliphatic Hydrocarbons	8.40263E+07	7.06183E+07	20.4	25.00
C11-C22 Aromatic Hydrocarbons	26.8433	16.9179	-2.35	25.00
Naphthalene	7.28448	7.05564	-3.14	20.00
2-Methylnaphthalene	4.55306	4.48721	-1.45	20.00
Acenaphthene	4.29598	4.21643	-1.85	20.00
Phenanthrene	6.21583	6.15604	-0.962	20.00
Anthracene	6.48728	6.31389	-2.67	20.00
Pyrene	6.32429	6.39844	1.17	20.00
Chrysene	5.45456	5.51777	1.16	20.00

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 16

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	%D	Limit
Batch 0606089				
Calibration Check (0606089-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.66513E+08	1.57487E+08	-1.67	25.00
C19-C36 Aliphatic Hydrocarbons	1.00596E+08	1.08153E+08	-6.88	25.00
C11-C22 Aromatic Hydrocarbons	26.8433	17.201	-0.588	25.00
Naphthalene	7.28448	6.5121	-10.6	20.00
2-Methylnaphthalene	4.55306	4.07514	-10.5	20.00
Acenaphthene	4.29598	3.87679	-9.76	20.00
Phenanthrene	6.21583	6.0074	-3.35	20.00
Anthracene	6.48728	6.3475	-2.15	20.00
Pyrene	6.32429	6.59784	4.33	20.00
Chrysene	5.45456	5.77128	5.81	20.00

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 16

Notes and Definitions

LF Lab Filtered

QC-1 Analyte out of acceptance range.

QL-01 Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

QR-05 RPD out of acceptance range.

QR-06 The RPD exceeded the QC control limits; however precision is demonstrated with acceptable RPD values for MS/MSD.

S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 14 of 16



Were any significant modifications made to the VPH method as specified in section 11.3? No *see below

* Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GCMS using all QC criteria specified in the method

Were any significant modifications made to the EPH method as specified in Section 11.3? No

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹ :					
This form provides certifications for the following Spectrum Analytical, Inc work order #: SA45755					
Matrix	☒ Groundwater		☐ Soil/Sediment	☐ Drinking Water	☐ Other
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☒ 6010B	☐ 7470A/1A
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020	☐ 9014M ²
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³	☐ 7196A
¹ List Release Tracking Number (RTN), if known ² M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide(PAC) Method ³ S - SW-846 Methods 7000 Series List individual method and analyte					
An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status					
A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?				☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?				☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?				☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?				☒ Yes ☐ No
A response to questions E and F below is required for "Presumptive Certainty" status					
E	Were all analytical QC performance standards and recommendations for the specified methods achieved?				☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?				☐ Yes ☒ No
<i>All negative responses are addressed in a case narrative on the cover page of this report.</i>					
I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.  Hanibal C. Tayeh, Ph.D. President/Laboratory Director Date: 6/8/2006					

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

SH57SSMF



CHAIN OF CUSTODY RECORD

Page 1 of 2

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 6/8/06
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

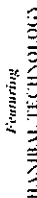
Report To: ECS, Auburn
Project Mgr.: Chuck Klingler
Invoice To: ECS, Agawam
Site Name: Eagle Gas
Location: 31 Main St. Carver State: MA
P.O. No.: 03-05037 RQN:

Project No.: 91-204082.02
Sample(s): As Kaczoraka, D. Anderson

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid 10=
7=CH₃COOH 8=NaHSO₄ 9=Ice
DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
N1= N2= N3=

G-Grab C=Composite				Containers:				Analysis:				QA Reporting Notes:			
Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Preservative	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analysis:	State specific reporting standards	If applicable, please list below:		
AN57SS-01	*DCW-1	5-31-06	9:00	G	GW	29	3	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-02	*DCW-2		10:00	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-03	*ECS-1		11:15	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-04	*ECS-7		3:15	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-05	*ECS-8		12:45	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-06	*BP-1		2:20	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-07	*BP-2		2:30	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-08	*BP-4		11:55	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-09	*DCW-4		9:15	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		
-10	*DCW-6		1:05	G	GW	29	1	1	2	2	EPH-Lab 6/7/06	State specific reporting standards	If applicable, please list below:		

Relinquished by: Dan Magenta Received by: And Harvey Date: 6/1/06 Time: 10:53
Condition upon receipt: ☐ Ice ☐ Ambient ☒ 4



Page 2 of 2

Special Handling:

☐ Standard TAT - 7 to 10 business days
☒ Rush TAT - Date Needed: 6/26/16
 • All TATs subject to laboratory approval.
 Min. 24-hour notification needed for rushes.
 • Samples disposed of after 60 days unless otherwise instructed.

Report To: FCS, Auburn

Invoice To: FCS, Agawan

Project No.: 91-204082.02

Site Name: Eagle Gas

Location: 131 Main St, Carver State: MA

Project Mgr.: Chuck Krieger

P.O. No: 03-0502 RON:

Sampler(s): A. Kaczmarek, D. Anderson

1 = $\text{Na}_2\text{S}_2\text{O}_3$ 2 = HCl 3 = H_2SO_4 4 = HNO_3 5 = NaOH 6 = Ascorbic Acid
7 = $\text{C}^{14}\text{H}_2\text{O}_4$ 8 = NaHSO_4 9 = C_2H_2 10 =

DW=Drinking Water GW=Groundwater WW=Wastewater
 OO=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
 X1= X2= X3=

G=Grab C=Composite

Lab 1d:

Sample Id:

Date:

Time:

Type	Matrix

Present	# of VO	# of AI	# of CI	# of PI
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9
10	10	10	10	10
11	11	11	11	11
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85	85	85	85	85
86	86	86	86	86
87	87	87	87	

Analyses:

Containers:

QA Reporting Notes:
(check if needed)

State specific reporting standards
If applicable, please list below:

~~X~~ Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
(Response required for CAM report)

See remarks on
pg 1 of 2

☐ Fax results when available to ()

☒ E-mail to CKinder@jesconsult.com

FDD Form

Condition upon receipt: ☐ Iced ☐ Ambient ☒ 9°C ~~4~~

Relinquished by:

Received by:

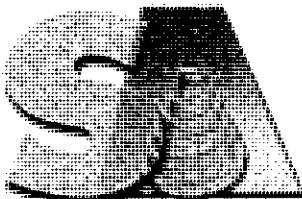
Date:	Time:

11 Almgren Drive • Agawam, Massachusetts 01001 • 413-789-9018 • Fax 413-789-4076 • www.spectrum-analytical.com

1901-1902



Report Date:
21-Apr-06 16:09



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

☒ Final Report
☐ Re-Issued Report
☐ Revised Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 91-204082.02

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA43564-01	MH-1	Surface Water	17-Apr-06 10:15	18-Apr-06 14:45
SA43564-02	MH-2	Surface Water	17-Apr-06 10:50	18-Apr-06 14:45
SA43564-03	MH-3	Surface Water	17-Apr-06 11:20	18-Apr-06 14:45
SA43564-04	SW Outfall	Surface Water	17-Apr-06 13:45	18-Apr-06 14:45
SA43564-05	Trip Blank	Spring Water	17-Apr-06 00:00	18-Apr-06 14:45

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 12 pages of analytical data plus Chain of Custody document(s).

This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc.

Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification

MH-1

SA43564-01

Client Project #

91-204082.02

Matrix

Surface Water

Collection Date/Time

17-Apr-06 10:15

Received

18-Apr-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsVH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	19-Apr-06	20-Apr-06	6041090	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	82.6			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	70.6			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	20-Apr-06	20-Apr-06	6041171	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.26	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.26	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.26	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.26	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	45.1			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	67.9			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	43.9			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	88.4			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 12

Sample Identification**MH-2**

SA43564-02

Client Project #

91-204082.02

Matrix

Surface Water

Collection Date/Time

17-Apr-06 10:50

Received

18-Apr-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds**PH Aliphatic/Aromatic Carbon Ranges**

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	19-Apr-06	20-Apr-06	6041090	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	97.0	70-130 %	"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	82.8	70-130 %	"	"	"	"	"

Extractable Petroleum Hydrocarbons**EPH Aliphatic/Aromatic Ranges**

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	20-Apr-06	20-Apr-06	6041171	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.26	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.26	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.26	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.26	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	50.4	40-140 %	"	"	"	"	"
84-15-1 Ortho-Terphenyl	56.3	40-140 %	"	"	"	"	"
580-13-2 2-Bromonaphthalene	96.2	40-140 %	"	"	"	"	"
321-60-8 2-Fluorobiphenyl	92.6	40-140 %	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 12

Sample Identification

MH-3

SA43564-03

Client Project #

91-204082.02

Matrix

Surface Water

Collection Date/Time

17-Apr-06 11:20

Received

18-Apr-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	19-Apr-06	20-Apr-06	6041090	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	99.8			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	85.6			70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	20-Apr-06	20-Apr-06	6041171	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.26	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.26	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	47.9			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	67.7			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	78.4			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	92.6			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 12

Sample IdentificationSW Outfall
SA43564-04Client Project #

91-204082.02

Matrix

Surface Water

Collection Date/Time

17-Apr-06 13:45

Received

18-Apr-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	19-Apr-06	20-Apr-06	6041090	ss
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	95.4			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	82.8			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	20-Apr-06	21-Apr-06	6041171	JD
C19-C36 Aliphatic Hydrocarbons	0.3			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	0.3			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	0.3			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.43	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.43	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.43	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.43	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	48.1			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	61.0			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	69.4			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	92.6			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 12

Sample Identification

Trip Blank
SA43564-05

Client Project #

91-204082.02

Matrix

Spring Water

Collection Date/Time

17-Apr-06 00:00

Received

18-Apr-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	19-Apr-06	20-Apr-06	6041090	ss
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	107		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	93.2		70-130 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 12

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6041090 - VPH										
Blank (6041090-BLK1)										
Prepared & Analyzed: 19-Apr-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	50.0		µg/l		50.0		100	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.1		µg/l		50.0		86.2	70-130		
LCS (6041090-B51)										
Prepared & Analyzed: 19-Apr-06										
C5-C8 Aliphatic Hydrocarbons	151		mg/l		140		108	70-130		
C9-C12 Aliphatic Hydrocarbons	56.6		mg/l		55.0		103	70-130		
C9-C10 Aromatic Hydrocarbons	32.8		mg/l		40.0		82.0	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	273		mg/l		280		97.5	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	89.4		mg/l		85.0		105	70-130		
Benzene	16.6		µg/l		20.0		83.0	70-130		
Ethylbenzene	17.7		µg/l		20.0		88.5	70-130		
Methyl tert-butyl ether	18.0		µg/l		20.0		90.0	70-130		
Naphthalene	19.1		µg/l		20.0		95.5	70-130		
Toluene	17.0		µg/l		20.0		85.0	70-130		
m,p-Xylene	35.4		µg/l		40.0		88.5	70-130		
o-Xylene	17.6		µg/l		20.0		88.0	70-130		
2-Methylpentane	18.1		µg/l		20.0		90.5	70-130		
n-Nonane	18.8		µg/l		20.0		94.0	70-130		
n-Pentane	16.7		µg/l		20.0		83.5	70-130		
1,2,4-Trimethylbenzene	19.4		µg/l		20.0		97.0	70-130		
2,2,4-Trimethylpentane	19.4		µg/l		20.0		97.0	70-130		
n-Butylcyclohexane	20.2		µg/l		20.0		101	70-130		
n-Decane	17.1		µg/l		20.0		85.5	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	54.4		µg/l		50.0		109	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.5		µg/l		50.0		87.0	70-130		
LCS Dup (6041090-BSD1)										
Prepared & Analyzed: 19-Apr-06										
C5-C8 Aliphatic Hydrocarbons	138		mg/l		140		98.6	70-130	9.10	25
C9-C12 Aliphatic Hydrocarbons	58.0		mg/l		55.0		105	70-130	1.92	25
C9-C10 Aromatic Hydrocarbons	30.5		mg/l		40.0		76.2	70-130	7.33	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	251		mg/l		280		89.6	70-130	8.44	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	88.5		mg/l		85.0		104	70-130	0.957	25
Benzene	15.5		µg/l		20.0		77.5	70-130	6.85	25
Ethylbenzene	16.4		µg/l		20.0		82.0	70-130	7.62	25
Methyl tert-butyl ether	15.7		µg/l		20.0		78.5	70-130	13.6	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6041090 - VPH										
CS Dup (6041090-BSD1)										
Prepared & Analyzed: 19-Apr-06										
Naphthalene	16.4		µg/l		20.0		82.0	70-130	15.2	25
Toluene	15.9		µg/l		20.0		79.5	70-130	6.69	25
m,p-Xylene	33.0		µg/l		40.0		82.5	70-130	7.02	25
o-Xylene	16.5		µg/l		20.0		82.5	70-130	6.45	25
2-Methylpentane	14.6		µg/l		20.0		73.0	70-130	21.4	25
n-Nonane	16.7		µg/l		20.0		83.5	70-130	11.8	25
n-Pentane	14.3		µg/l		20.0		71.5	70-130	15.5	25
1,2,4-Trimethylbenzene	18.0		µg/l		20.0		90.0	70-130	7.49	25
2,2,4-Trimethylpentane	18.1		µg/l		20.0		90.5	70-130	6.93	25
n-Butylcyclohexane	18.9		µg/l		20.0		94.5	70-130	6.65	25
n-Decane	15.9		µg/l		20.0		79.5	70-130	7.27	25
Surrogate: 2,5-Dibromotoluene (FID)	48.3		µg/l		50.0		96.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	39.2		µg/l		50.0		78.4	70-130		
Duplicate (6041090-DUP1) Source: SA43278-02										
Prepared & Analyzed: 19-Apr-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	53.9		µg/l		50.0		108	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	46.4		µg/l		50.0		92.8	70-130		
Matrix Spike (6041090-MS1) Source: SA43278-05										
Prepared & Analyzed: 19-Apr-06										
Benzene	17.1		µg/l		20.0	0.700	82.0	70-130		
Ethylbenzene	24.4		µg/l		20.0	6.90	87.5	70-130		
Methyl tert-butyl ether	19.3		µg/l		20.0	BRL	96.5	70-130		
Naphthalene	20.0		µg/l		20.0	0.881	95.6	70-130		
Toluene	50.1		µg/l		20.0	31.4	93.5	70-130		
m,p-Xylene	60.8		µg/l		40.0	25.5	88.2	70-130		
o-Xylene	28.5		µg/l		20.0	11.0	87.5	70-130		
2-Methylpentane	21.7		µg/l		20.0	3.10	93.0	70-130		
n-Nonane	19.5		µg/l		20.0	BRL	97.5	70-130		
n-Pentane	19.3		µg/l		20.0	1.30	90.0	70-130		
1,2,4-Trimethylbenzene	24.9		µg/l		20.0	5.98	94.6	70-130		
2,2,4-Trimethylpentane	21.3		µg/l		20.0	BRL	106	70-130		
n-Butylcyclohexane	22.3		µg/l		20.0	0.0	112	70-130		
n-Decane	22.2		µg/l		20.0	0.0	111	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	49.3		µg/l		50.0		98.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	40.6		µg/l		50.0		81.2	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 12

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6041171 - SW846 3510C										
<u>Blank (6041171-BLK1)</u>										
Prepared & Analyzed: 20-Apr-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.50						
2-Methylnaphthalene	BRL		µg/l	2.50						
Acenaphthene	BRL		µg/l	2.50						
Phenanthrene	BRL		µg/l	2.50						
Anthracene	BRL		µg/l	2.50						
Pyrene	BRL		µg/l	2.50						
Chrysene	BRL		µg/l	2.50						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	21.3		µg/l		50.0		42.6	40-140		
Surrogate: Ortho-Terphenyl	28.9		µg/l		50.0		57.8	40-140		
Surrogate: 2-Bromonaphthalene	35.4		µg/l		40.0		88.5	40-140		
Surrogate: 2-Fluorobiphenyl	33.0		µg/l		40.0		82.5	40-140		
<u>LCS (6041171-BS1)</u>										
Prepared & Analyzed: 20-Apr-06										
C9-C18 Aliphatic Hydrocarbons	0.245		mg/l	0.2	0.600		40.8	40-140		
C19-C36 Aliphatic Hydrocarbons	0.636		mg/l	0.2	0.800		79.5	40-140		
C11-C22 Aromatic Hydrocarbons	1.16		mg/l	0.2	1.70		68.2	40-140		
Naphthalene	50.1		µg/l	2.50	100		50.1	40-140		
2-Methylnaphthalene	54.3		µg/l	2.50	100		54.3	40-140		
Acenaphthene	61.3		µg/l	2.50	100		61.3	40-140		
Phenanthrene	66.9		µg/l	2.50	100		66.9	40-140		
Anthracene	65.7		µg/l	2.50	100		65.7	40-140		
Pyrene	69.3		µg/l	2.50	100		69.3	40-140		
Chrysene	64.2		µg/l	2.50	100		64.2	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
Surrogate: 1-Chlorooctadecane	30.4		µg/l		50.0		60.8	40-140		
Surrogate: Ortho-Terphenyl	32.5		µg/l		50.0		65.0	40-140		
Surrogate: 2-Bromonaphthalene	30.6		µg/l		40.0		76.5	40-140		
Surrogate: 2-Fluorobiphenyl	34.5		µg/l		40.0		86.2	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
<u>Fractionation Check Standard (60411)</u>										
Prepared & Analyzed: 20-Apr-06										
C9-C18 Aliphatic Hydrocarbons	0.403		mg/l	0.2	0.600		67.2	40-140		
C19-C36 Aliphatic Hydrocarbons	0.690		mg/l	0.2	0.800		86.2	40-140		
C11-C22 Aromatic Hydrocarbons	1.34		mg/l	0.2	1.70		78.8	40-140		
Naphthalene	56.9		µg/l	2.50	100		56.9	40-140		
2-Methylnaphthalene	60.7		µg/l	2.50	100		60.7	40-140		
Acenaphthene	64.0		µg/l	2.50	100		64.0	40-140		
Phenanthrene	63.8		µg/l	2.50	100		63.8	40-140		
Anthracene	63.1		µg/l	2.50	100		63.1	40-140		
Pyrene	63.2		µg/l	2.50	100		63.2	40-140		
Chrysene	63.7		µg/l	2.50	100		63.7	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 12

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6041171 - SW846 3510C										
Fractionation Check Standard (60411)										
Prepared & Analyzed: 20-Apr-06										
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
Surrogate: 1-Chlorooctadecane	36.9		µg/l		50.0		73.8	40-140		
Surrogate: Ortho-Terphenyl	35.6		µg/l		50.0		71.2	40-140		
Surrogate: 2-Bromonaphthalene	32.7		µg/l		40.0		81.8	40-140		
Surrogate: 2-Fluorobiphenyl	33.2		µg/l		40.0		83.0	40-140		
LCS Dup (6041171-BSD1)										
Prepared & Analyzed: 20-Apr-06										
C9-C18 Aliphatic Hydrocarbons	0.251		mg/l	0.2	0.600		41.8	40-140	2.42	25
C19-C36 Aliphatic Hydrocarbons	0.688		mg/l	0.2	0.800		86.0	40-140	7.85	25
C11-C22 Aromatic Hydrocarbons	1.31		mg/l	0.2	1.70		77.1	40-140	12.3	25
Naphthalene	56.4		µg/l	2.50	100		56.4	40-140	11.8	20
2-Methylnaphthalene	61.9		µg/l	2.50	100		61.9	40-140	13.1	20
Acenaphthene	71.4		µg/l	2.50	100		71.4	40-140	15.2	20
Phenanthrene	80.0		µg/l	2.50	100		80.0	40-140	17.8	20
Anthracene	77.9		µg/l	2.50	100		77.9	40-140	17.0	20
Pyrene	79.4		µg/l	2.50	100		79.4	40-140	13.6	20
Chrysene	73.3		µg/l	2.50	100		73.3	40-140	13.2	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
Surrogate: 1-Chlorooctadecane	31.1		µg/l		50.0		62.2	40-140		
Surrogate: Ortho-Terphenyl	41.3		µg/l		50.0		82.6	40-140		
Surrogate: 2-Bromonaphthalene	38.8		µg/l		40.0		97.0	40-140		
Surrogate: 2-Fluorobiphenyl	38.0		µg/l		40.0		95.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
Methylnaphthalene Breakthrough	0.00		%					0-5		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 12

Notes and Definitions

BRL	Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction.

Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

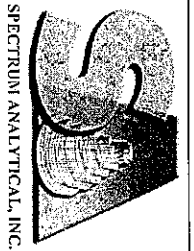
Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown



Were all QA/QC procedures followed as required by the VPH method? Yes ☒ No ☐
 Were any significant modifications made to the VPH method as specified in section 11.3? No *see below
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐
 * Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GC/MS using all QC criteria specified in the method

Were all QA/QC procedures followed as required by the EPH method? Yes ✓ No
 Were any significant modifications made to the EPH method as specified in Section 11.3? No ✓
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes No





CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 4-21-06
- All TATs subject to laboratory approval.
- Mfn. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

HANIBAL TECHNOLOGY

Report To: ECS, Auburn

Invoice To: ECS, Agawam

Project No.: 91-204082.02

Site Name: Carver - Eagle Ges

Location: 13 Main St, Carver State: MA

Sampler(s): A. Kaczorowski

Project Mgr.: Chuck Klingler

P.O. No.: 03-0473

RON: _____

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid

7=CH₃OH 8=NaHSO₄ 9=Ice 10=_____

Containers:

Analyses:

QA Reporting Notes:
(check if needed)

DW=Drinking Water GW=Groundwater WW=Wastewater

O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air

X1=Sealing X2=_____ X3=_____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Preservative	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analyses:	QA Reporting Notes: (check if needed)
4340401	MH-1	4-17-06	10:15		SW	3	1	1	1	1	VP HW / targets	☐ Provide MCP CAM Report Were all field QC requirements met as per MADEP CAM Section 2.0? ☐ Yes ☐ No (Response required for CAM report)
	MH-2		10:50		SW	3	1	1	1	1		
	MH-3		11:20		SW	3	1	1	1	1		
	MH-4		11:45		SW	3	1	1	1	1		
	MH-5				SW	3	1	1	1	1		
	-05 Trip Blank				SW	1	1	1	1	1		

☐ Fax results when available to () _____

☒ E-mail to C.Klingler@ecsconsult.com

EDD Format _____

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C 3

Relinquished by:

Received by:

Date:

Time:

Chuck Klingler

Agawam

4/18/06 12:30 PM

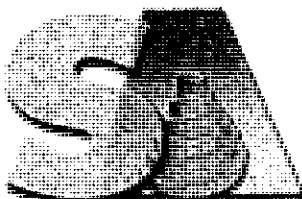
Ref

13

8744340402



Report Date:
03-Apr-06 16:48



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project #: 91-204082.02

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA42645-01	WHT-1	Unknown	28-Mar-06 16:00	29-Mar-06 16:14

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 5 pages of analytical data plus Chain of Custody document(s).

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New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393

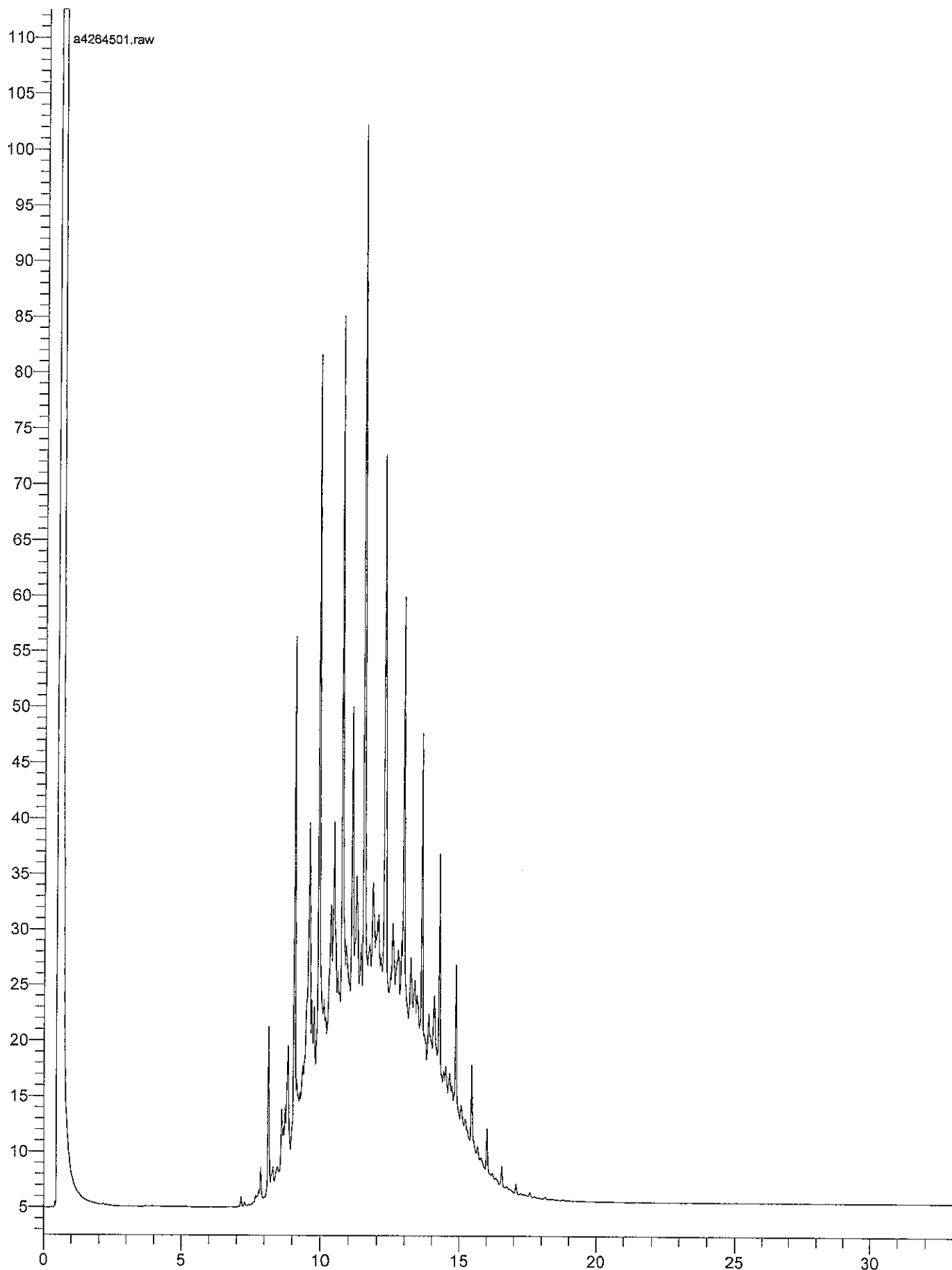


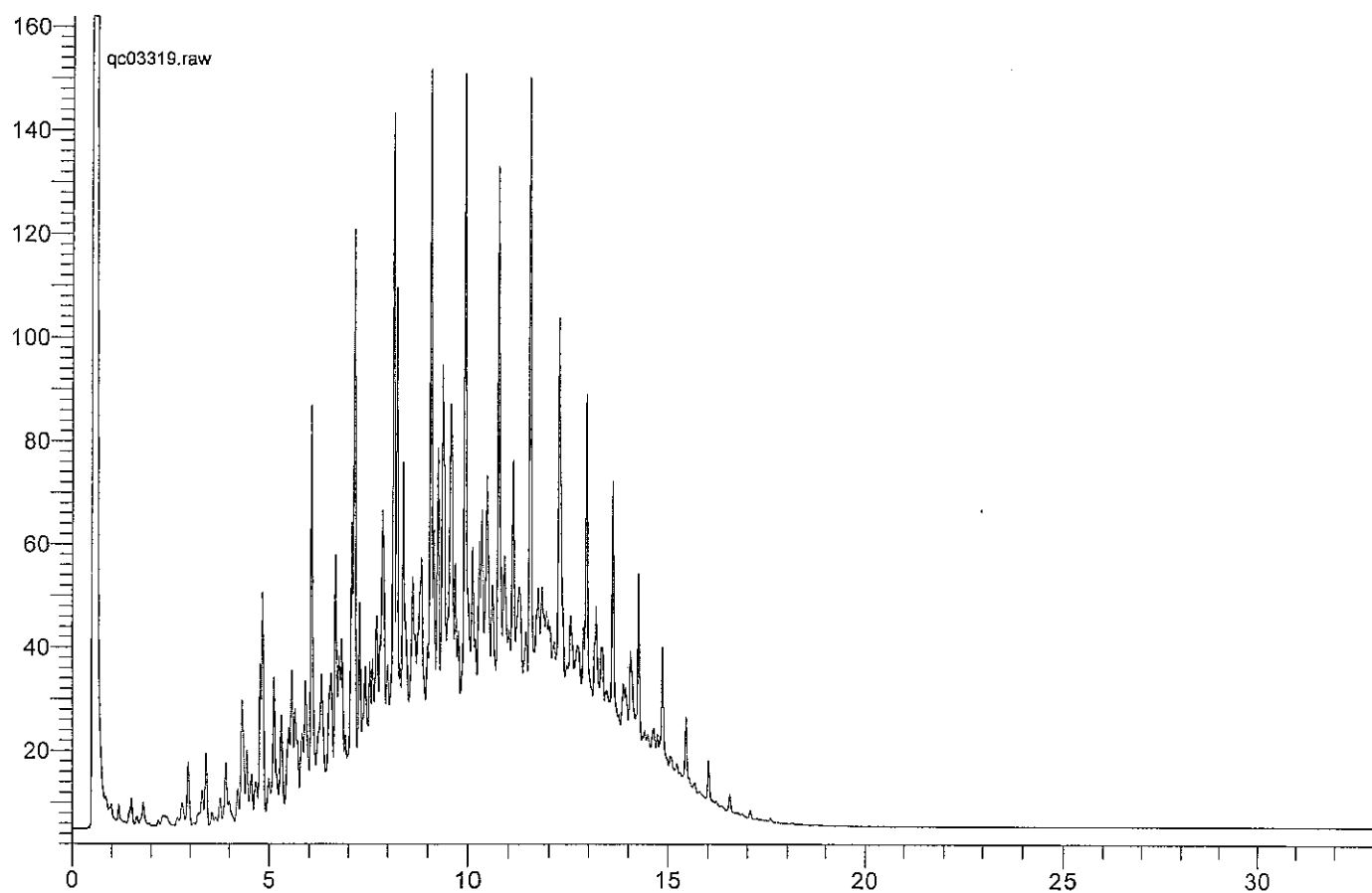
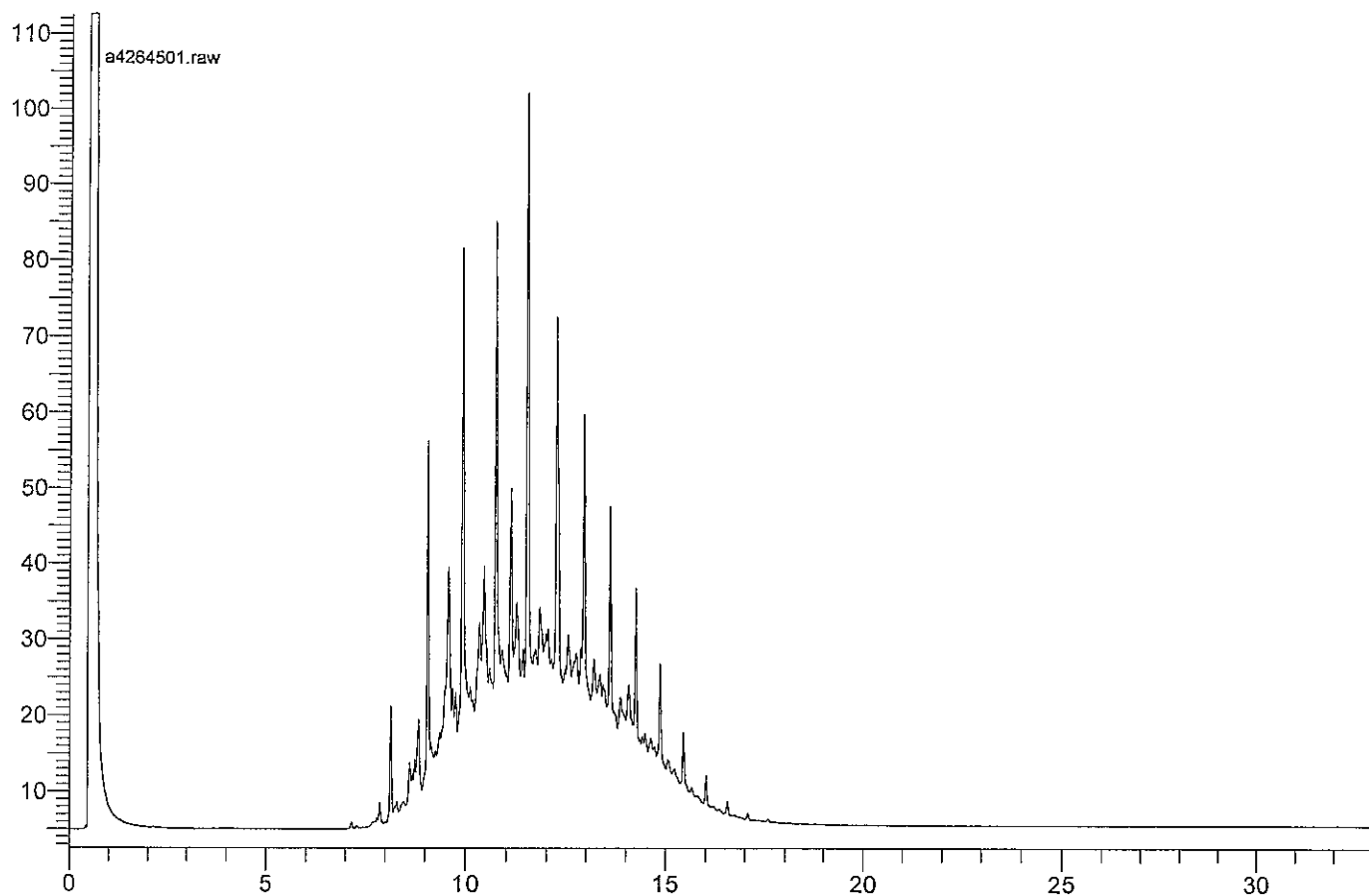
Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

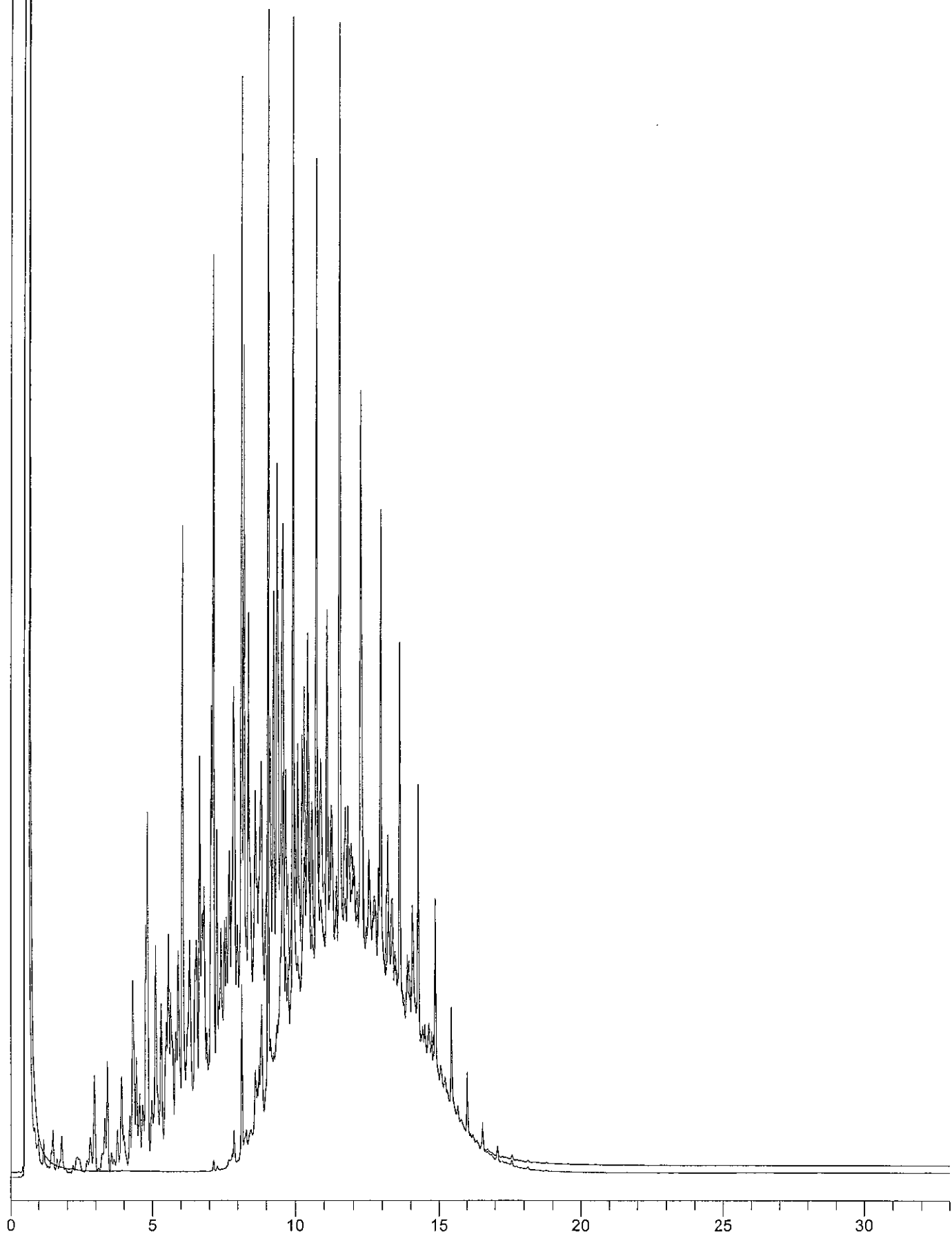
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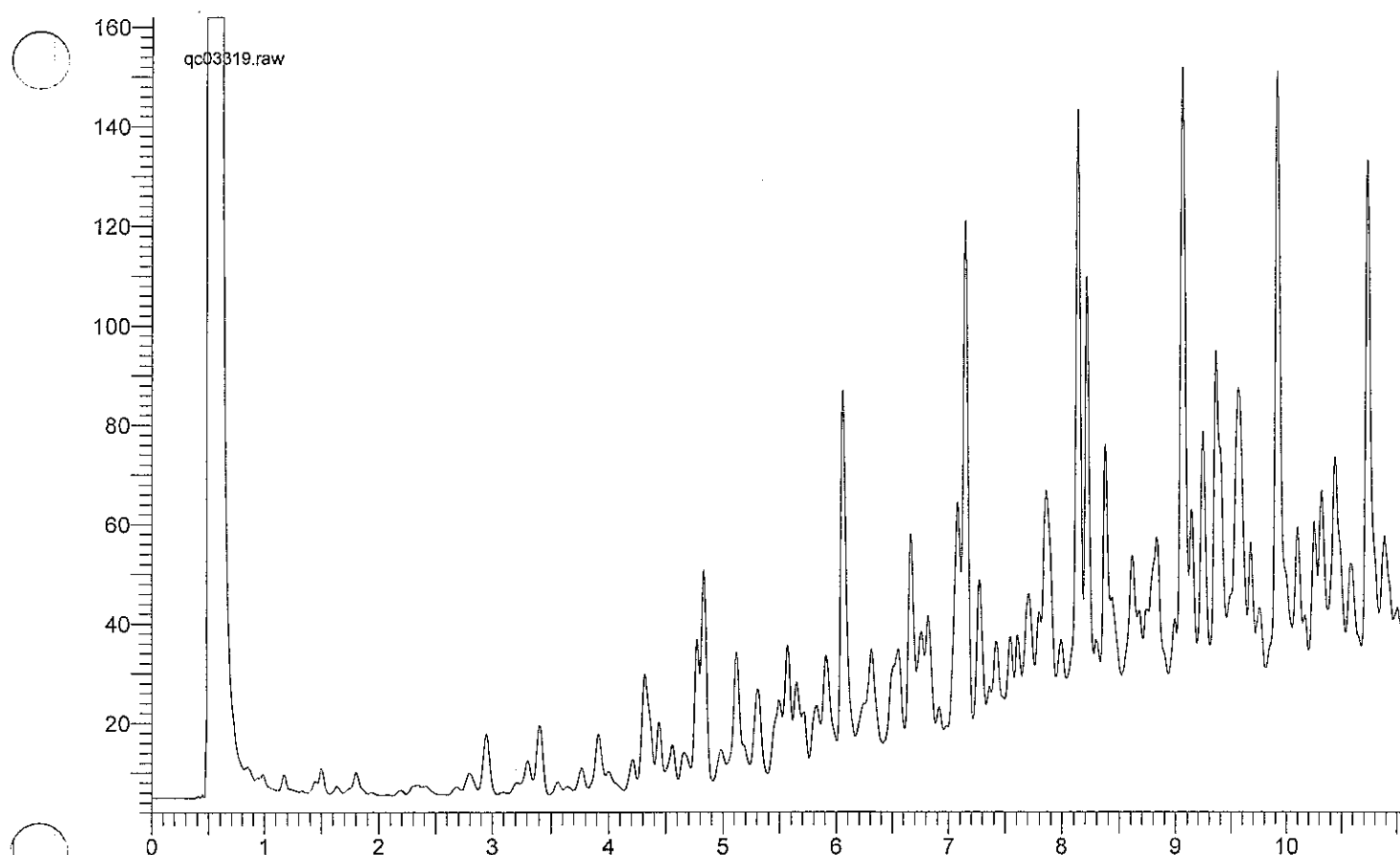
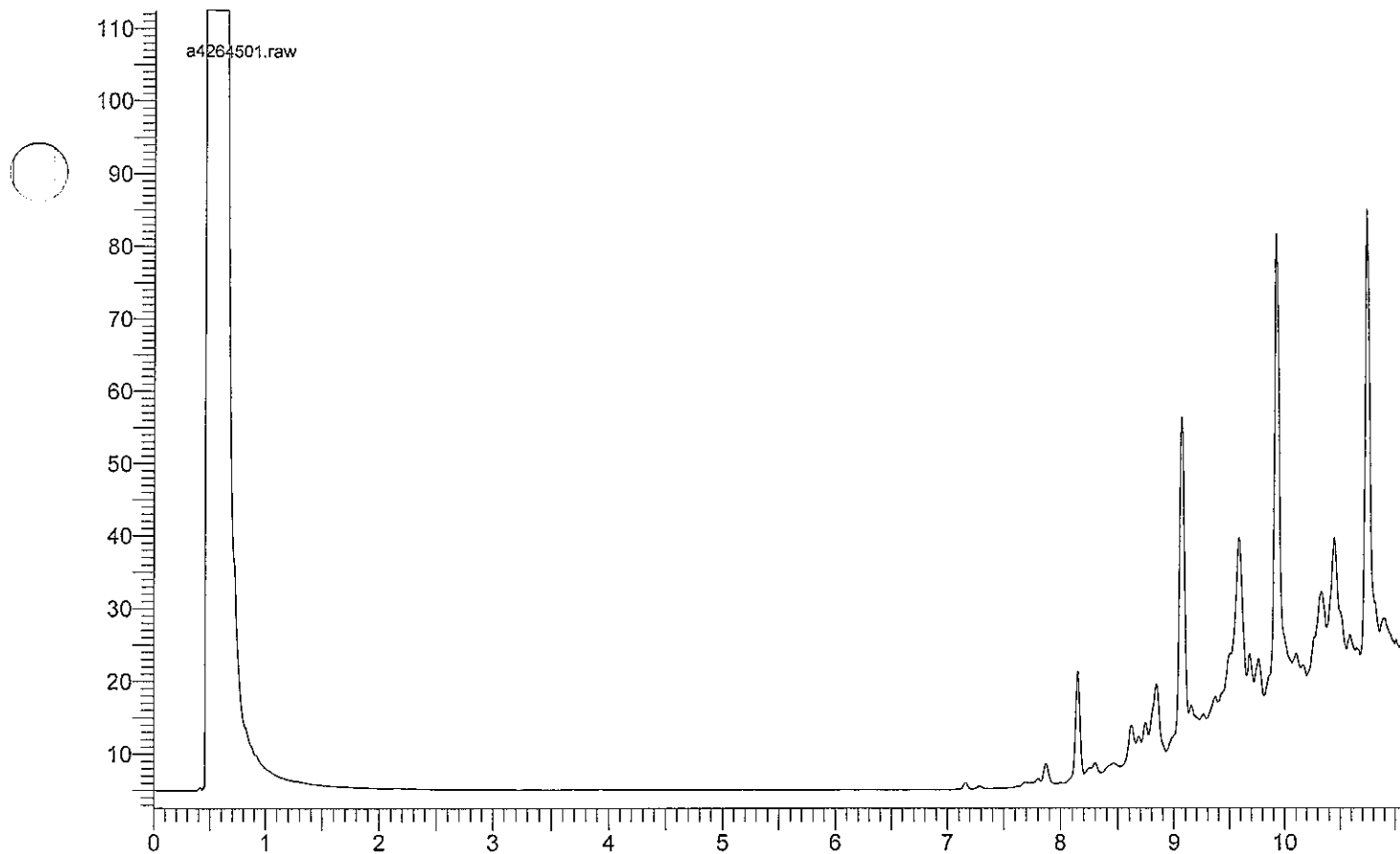
ENVIRONMENTAL ANALYSES

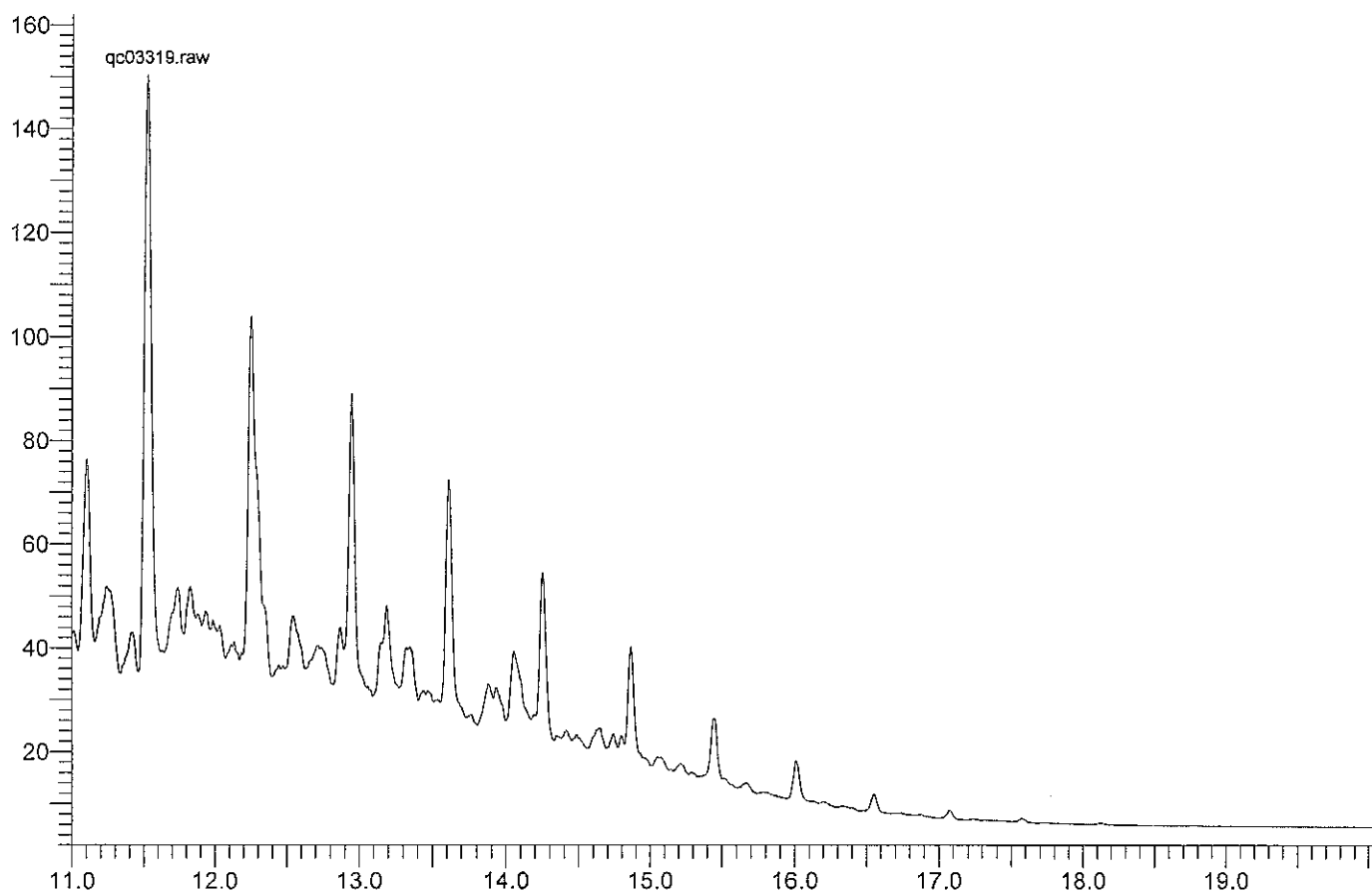
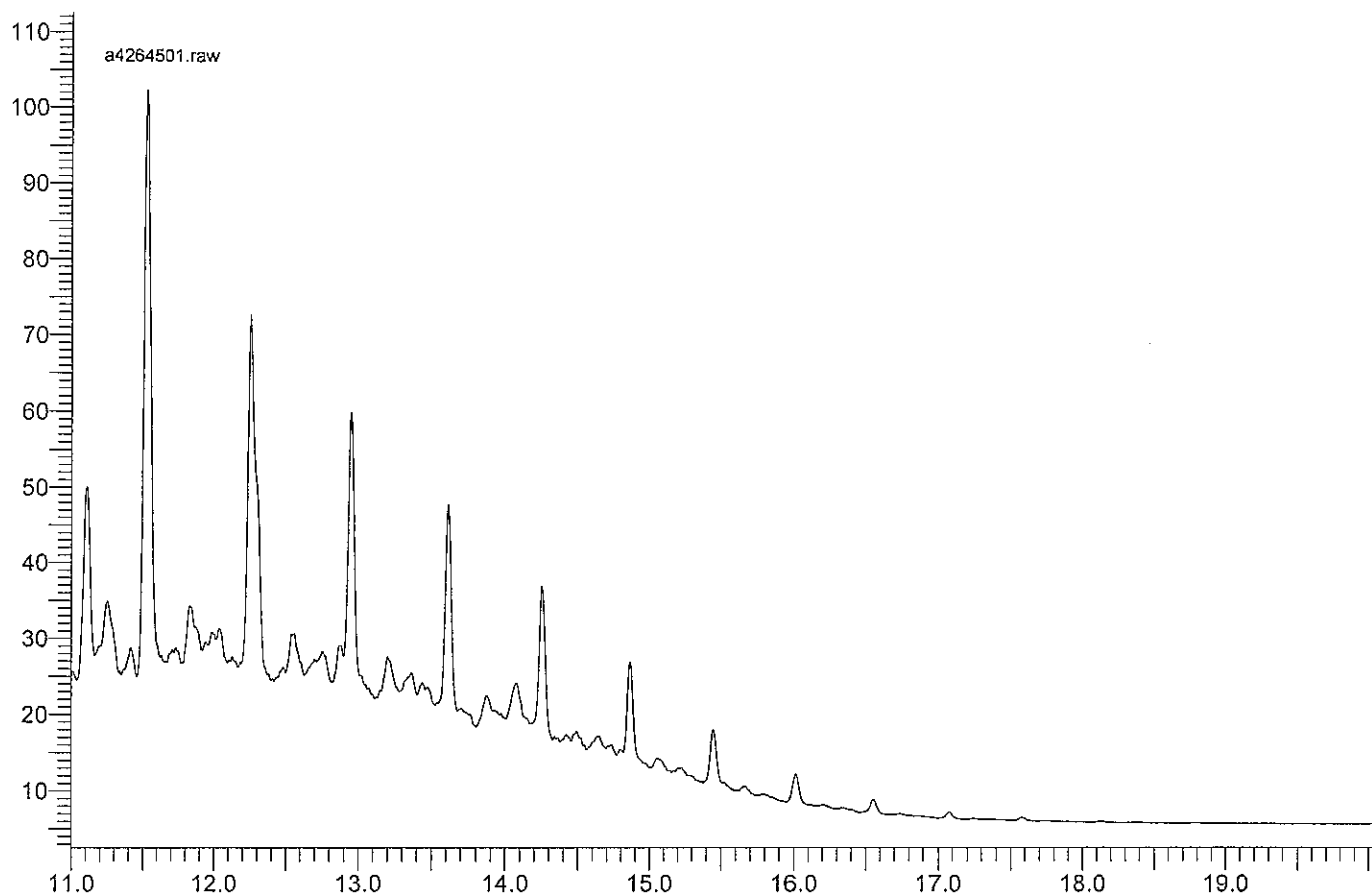




Overlay







Sample Identification

WHT-1

SA42645-01

Client Project #

91-204082.02

Matrix

Unknown

Collection Date/Time

28-Mar-06 16:00

Received

29-Mar-06

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
Extractable Petroleum Hydrocarbons											
PH 8100 by GC											
Prepared by method SW846 3550B											
8006-61-9	Gasoline	BRL		mg/kg	200	1	+SW846 8100Mod.	31-Mar-06	03-Apr-06	6031820	KG
68476-30-2	Fuel Oil #2	Calculated as		mg/kg	200	1	"	"	"	"	"
68476-31-3	Fuel Oil #4	BRL		mg/kg	200	1	"	"	"	"	"
68553-00-4	Fuel Oil #6	BRL		mg/kg	200	1	"	"	"	"	"
M09800000	Motor Oil	BRL		mg/kg	200	1	"	"	"	"	"
8032-32-4	Ligroin	BRL		mg/kg	200	1	"	"	"	"	"
J00100000	Aviation Fuel	BRL		mg/kg	200	1	"	"	"	"	"
	Unidentified	4,520		mg/kg	200	1	"	"	"	"	"
	Other Oil	BRL		mg/kg	200	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	4,520		mg/kg	200	1	"	"	"	"	"
<i>Surrogate recoveries:</i>											
3386-33-2	1-Chlorooctadecane	1860	S-02	40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 5

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6031820 - SW846 3550B										
Blank (6031820-BLK1)										
Prepared: 31-Mar-06 Analyzed: 03-Apr-06										
Gasoline	BRL		mg/kg	133						
Fuel Oil #2	BRL		mg/kg	133						
Fuel Oil #4	BRL		mg/kg	133						
Fuel Oil #6	BRL		mg/kg	133						
Motor Oil	BRL		mg/kg	133						
Ligroin	BRL		mg/kg	133						
Aviation Fuel	BRL		mg/kg	133						
Unidentified	BRL		mg/kg	133						
Other Oil	BRL		mg/kg	133						
Total Petroleum Hydrocarbons	BRL		mg/kg	133						
Surrogate: 1-Chlorooctadecane	2.04		mg/kg		3.33		61.3	40-140		
LCS (6031820-BS1)										
Prepared: 31-Mar-06 Analyzed: 03-Apr-06										
Fuel Oil #2	802		mg/kg	133	667		120	40-140		
Duplicate (6031820-DUP1) Source: SA42652-01										
Prepared: 31-Mar-06 Analyzed: 03-Apr-06										
Gasoline	BRL		mg/kg	16200		BRL				50
Fuel Oil #2	909000	Z-2a	mg/kg	16200		905000			0.441	50
Fuel Oil #4	BRL		mg/kg	16200		BRL				50
Fuel Oil #6	BRL		mg/kg	16200		BRL				50
Motor Oil	BRL		mg/kg	16200		BRL				50
Ligroin	BRL		mg/kg	16200		BRL				50
Aviation Fuel	BRL		mg/kg	16200		BRL				50
Unidentified	91000	Z-2	mg/kg	16200		95000			4.30	50
Other Oil	Calculated as		mg/kg	16200		BRL				50
Total Petroleum Hydrocarbons	1000000		mg/kg	16200		1000000			0.00	50
Surrogate: 1-Chlorooctadecane	4660	S-02	mg/kg		406		NR	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 5

Notes and Definitions

*TPH Calculated as

S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract

Z-2 9.06%

Z-2a 90.94%

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Interpretation of Total Petroleum Hydrocarbon Report

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from analyses of various petroleum products. Possible match categories are as follows:

Gasoline - includes regular, unleaded, premium, etc.

Fuel Oil #2 - includes home heating oil, #2 fuel oil, and diesel

Fuel Oil #4 - includes #4 fuel oil

Fuel Oil #6 - includes #6 fuel oil and bunker "C" oil

Motor Oil - includes virgin and waste automobile oil

Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha

Aviation Fuel - includes kerosene, Jet A and JP-4

Other Oil - includes lubricating and cutting oil, and silicon oil

At times, the unidentified petroleum product is quantified using a calibration that most closely approximates the distribution of compounds in the sample. When this occurs, the result is qualified as *TPH (Calculated as).

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown



SPECTRUM ANALYTICAL, INC.

Featuring
HARIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Report To: ECS Agawam

Invoice To: ECS WMA00399800

Project No.: 91-204087.02

Site Name: EAGLE CAS

Project Mgr.: CEK

P.O. No.: 03-04602

Location: Carver

State: MA

Sampler(s): CEK

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=Chill 10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=unknown X2= X3=

G=Grab C=Composite

Lab Id: Sample Id: Date: Time:

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

SA 4261501 WHT-1 3/28/06 1600

Matrix Type

☐ Fax results when available to ()

☒ E-mail to Kling at ECS

EDD Format

Condition upon receipt: Placed ☐ Ambient dec 5

Relinquished by:

CEK, Y. J.

Received by:

Mary Demer

Date:

3/29/06

Time:

1614

Analyses:

Containers:

Preservative

of VOA Vials

of Amber Glass

of Clear Glass

of Plastic

810m Fingerprint

X

Fingerprint on

white filamentous

material that is

in the water -

State specific reporting standards
If applicable, please list below.

☐ Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☐ Yes ☐ No
(Response required for CAM report)

QA Reporting Notes:
(check if needed)

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 3 days
- All TATs subject to laboratory approval.
- Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.



GROUNDWATER ANALYTICAL

Groundwater Analytical, Inc.
P.O. Box 1200
228 Main Street
Buzzards Bay, MA 02532

Telephone (508) 759-4441
FAX (508) 759-4475
www.groundwateranalytical.com

April 13, 2006

Mr. David Bennett
Bennett & O'Reilly, Inc.
P.O. Box 1667
Brewster, MA 02631

LABORATORY REPORT

Project: **Nantais/4169**
Lab ID: **93058**
Received: **03-30-06**

Dear Dave:

Enclosed are the analytical results for the above referenced project. The project was processed for Standard turnaround.

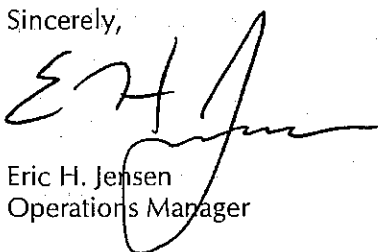
This letter authorizes the release of the analytical results, and should be considered a part of this report. This report contains a sample receipt report detailing the samples received, a project narrative indicating project changes and non-conformances, a quality control report, and a statement of our state certifications.

The analytical results contained in this report meet all applicable NELAC standards, except as may be specifically noted, or described in the project narrative. This report may only be used or reproduced in its entirety.

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Should you have any questions concerning this report, please do not hesitate to contact me.

Sincerely,



Eric H. Jensen
Operations Manager

EHJ/ajh
Enclosures

Sample Receipt Report

Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.
Lab ID: 93058

Delivery: GWA Courier
Airbill: n/a
Lab Receipt: 03-30-06

Temperature: 3.5°C
Chain of Custody: Present
Custody Seal(s): n/a

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-1	Eagle Gas		Aqueous	3/29/06 9:30	EPA 524.2 Volatile Organics				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C750241	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C750230	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C772963	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05		

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-2	Eagle Gas DUP		Aqueous	3/29/06 9:30	EPA 524.2 Volatile Organics				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C750231	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C772951	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05		
C772938	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05		

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-3	132 Holmes		Aqueous	3/29/06 12:00	EPA 524.2 Volatile Organics				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C750229	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C750210	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C750197	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-4	132 Holmes DUP		Aqueous	3/29/06 12:00	EPA 524.2 Volatile Organics				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C750209	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C750184	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C772975	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05		

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-5	133 Malley		Aqueous	3/29/06 11:00	EPA 524.2 Volatile Organics				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C655678	40 mL VOA Vial	Proline	BX18894	HCl	R-4601F	10-24-05	11-15-05		
C750199	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C772926	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05		

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-6	133 Malley DUP		Aqueous	3/29/06 11:00	EPA 524.2 Volatile Organics				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C655668	40 mL VOA Vial	Proline	BX18894	HCl	R-4601F	10-24-05	11-15-05		
C750198	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C772914	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05		

Lab ID	Field ID		Matrix	Sampled	Method			Notes
93058-7	134 Donati		Aqueous	3/29/06 10:15	EPA 524.2 Volatile Organics			
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship	
C750187	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06	
C750185	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06	
C772912	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05	

Sample Receipt Report (Continued)

Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.
Lab ID: 93058

Delivery: GWA Courier
Airbill: n/a
Lab Receipt: 03-30-06

Temperature: 3.5°C
Chain of Custody: Present
Custody Seal(s): n/a

Lab ID	Field ID		Matrix	Sampled	Method			Notes
93058-8	134 Donati DUP		Aqueous	3/29/06 10:15	EPA 524.2 Volatile Organics			
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship	
C750186	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06	
C772936	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05	
C772924	40 mL VOA Vial	Proline	BX19286	HCl	R-4601F	12-19-05	12-28-05	

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-9	FF-1		Aqueous	3/29/06 13:15	MA DEP VPH with Targets				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C655690	40 mL VOA Vial	Proline	BX18894	HCl	R-4601F	10-24-05	11-15-05		
C750208	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C750196	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-10	FF-2		Aqueous	3/29/06 14:15	MA DEP VPH with Targets				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C750253	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C750243	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C750242	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		

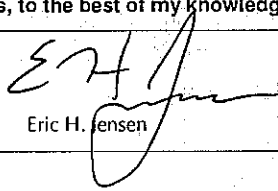
Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-11	FF-4		Aqueous	3/29/06 15:45	MA DEP VPH with Targets				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C675850	40 mL VOA Vial	Proline	BX17871	None	n/a	n/a	09-07-05		
C750255	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		
C750254	40 mL VOA Vial	Proline	BX20182	HCl	R-4683B	03-03-06	03-15-06		

Lab ID	Field ID		Matrix	Sampled	Method				Notes
93058-12	Trip Blank		Aqueous	3/29/06 0:00	EPA 524.2 Volatile Organics				
Con ID	Container	Vendor	QC Lot	Preserv	QC Lot	Prep	Ship		
C655666	40 mL VOA Vial	Proline	BX18894	HCl	R-4601F	10-24-05	11-15-05		

Data Certification

Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Lab ID: 93058
Received: 03-30-06 17:29

MA DEP Compendium of Analytical Methods					
Project Location: n/a		MA DEP RTN: n/a			
This Form provides certifications for the following data set:					
MA DEP VPH: 93058-09,-10,-11					
Sample Matrices:	Groundwater (X)	Soil/Sediment ()	Drinking Water ()	Other ()	
MCP SW-846	8260B ()	8151A ()	8330 ()	6010B ()	7470A/1A ()
Methods Used:	8270C ()	8081A ()	VPH (X)	6020 ()	9012A ² ()
As specified in MA DEP Compendium of Analytical Methods.	8082 ()	8021B ()	EPH ()	7000 S ³ ()	Other ()
1. List Release Tracking Number (RTN), if known. 2. SW-846 Method 9012A (Equivalent to 9014) or MA DEP Physiologically Available Cyanide (PAC) Method 3. S - SW-846 Methods 7000 Series. List individual method and analyte.					
(check all that apply)					
An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status.					
A.	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?				Yes
B.	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?				Yes
C.	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty," as described in Section 2.0 of the MA DEP document CAM VII A, <i>Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data</i> ?				Yes
D.	VPH and EPH methods only: Was the VPH or EPH method run without significant modifications, as specified in Section 11.3?				Yes
A response to questions E and F below is required for "Presumptive Certainty" status.					
E.	Were all QC performance standards and recommendations for the specified methods achieved?				Yes
F.	Were results for all analyte-list compounds/elements for the specified method(s) reported?				Yes
All No answers are addressed in the attached Project Narrative.					
I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.					
Signature: 		Position: Operations Manager			
Printed Name: Eric H. Jensen		Date: 04-13-06			

EPA Method 524.2 Volatile Organics by GC/MS

Field ID: Eagle Gas
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-01
Sampled: 03-29-06 09:30
Received: 03-30-06 17:29
Analyzed: 04-07-06 02:48
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 1 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
75-71-8	Dichlorodifluoromethane	BRL		ug/L	0.5
74-87-3	Chloromethane	BRL		ug/L	0.5
75-01-4	Vinyl Chloride	BRL		ug/L	0.5
74-83-9	Bromomethane	BRL		ug/L	0.5
75-00-3	Chloroethane	BRL		ug/L	0.5
75-69-4	Trichlorofluoromethane	BRL		ug/L	0.5
75-35-4	1,1-Dichloroethene	BRL		ug/L	0.5
75-09-2	Methylene Chloride	BRL		ug/L	0.5
156-60-5	trans-1,2-Dichloroethene	BRL		ug/L	0.5
1634-04-4	Methyl tert-butyl Ether (MTBE)	3		ug/L	0.5
75-34-3	1,1-Dichloroethane	BRL		ug/L	0.5
594-20-7	2,2-Dichloropropane	BRL		ug/L	0.5
156-59-2	cis-1,2-Dichloroethene	BRL		ug/L	0.5
74-97-5	Bromochloromethane	BRL		ug/L	0.5
67-66-3	Chloroform	BRL		ug/L	0.5
71-55-6	1,1,1-Trichloroethane	BRL		ug/L	0.5
56-23-5	Carbon Tetrachloride	BRL		ug/L	0.5
563-58-6	1,1-Dichloropropene	BRL		ug/L	0.5
71-43-2	Benzene	BRL		ug/L	0.5
107-06-2	1,2-Dichloroethane	BRL		ug/L	0.5
79-01-6	Trichloroethene	BRL		ug/L	0.5
78-87-5	1,2-Dichloropropane	BRL		ug/L	0.5
74-95-3	Dibromomethane	BRL		ug/L	0.5
75-27-4	Bromodichloromethane	BRL		ug/L	0.5
10061-01-5	cis-1,3-Dichloropropene	BRL		ug/L	0.5
108-88-3	Toluene	BRL		ug/L	0.5
10061-02-6	trans-1,3-Dichloropropene	BRL		ug/L	0.5
79-00-5	1,1,2-Trichloroethane	BRL		ug/L	0.5
127-18-4	Tetrachloroethene	2		ug/L	0.5
142-28-9	1,3-Dichloropropane	BRL		ug/L	0.5
124-48-1	Dibromochloromethane	BRL		ug/L	0.5
106-93-4	1,2-Dibromoethane	BRL		ug/L	0.5
108-90-7	Chlorobenzene	BRL		ug/L	0.5
630-20-6	1,1,1,2-Tetrachloroethane	BRL		ug/L	0.5
100-41-4	Ethylbenzene	BRL		ug/L	0.5
108-38-3/106-42-3	meta-Xylene and para-Xylene	BRL		ug/L	0.5
95-47-6	ortho-Xylene	BRL		ug/L	0.5
100-42-5	Styrene	BRL		ug/L	0.5
75-25-2	Bromoform	BRL		ug/L	0.5
98-82-8	Isopropylbenzene	BRL		ug/L	0.5
108-86-1	Bromobenzene	BRL		ug/L	0.5
79-34-5	1,1,2,2-Tetrachloroethane	BRL		ug/L	0.5
96-18-4	1,2,3-Trichloropropane	BRL		ug/L	0.5
103-65-1	n-Propylbenzene	BRL		ug/L	0.5
95-49-8	2-Chlorotoluene	BRL		ug/L	0.5
108-67-8	1,3,5-Trimethylbenzene	BRL		ug/L	0.5

EPA Method 524.2 (Continued) Volatile Organics by GC/MS

Field ID: Eagle Gas
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-01
Sampled: 03-29-06 09:30
Received: 03-30-06 17:29
Analyzed: 04-07-06 02:48
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 2 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
106-43-4	4-Chlorotoluene	BRL		ug/L	0.5
98-06-6	tert-Butylbenzene	BRL		ug/L	0.5
95-63-6	1,2,4-Trimethylbenzene	BRL		ug/L	0.5
135-98-8	sec-Butylbenzene	BRL		ug/L	0.5
541-73-1	1,3-Dichlorobenzene	BRL		ug/L	0.5
99-87-6	4-Isopropyltoluene	BRL		ug/L	0.5
106-46-7	1,4-Dichlorobenzene	BRL		ug/L	0.5
95-50-1	1,2-Dichlorobenzene	BRL		ug/L	0.5
104-51-8	n-Butylbenzene	BRL		ug/L	0.5
96-12-8	1,2-Dibromo-3-chloropropane	BRL		ug/L	0.5
120-82-1	1,2,4-Trichlorobenzene	BRL		ug/L	0.5
87-68-3	Hexachlorobutadiene	BRL		ug/L	0.5
91-20-3	Naphthalene	BRL		ug/L	0.5
87-61-6	1,2,3-Trichlorobenzene	BRL		ug/L	0.5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	9.9	99 %	80 - 120 %
4-Bromofluorobenzene	10	9.1	91 %	80 - 120 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

EPA Method 524.2 Volatile Organics by GC/MS

Field ID: Eagle Gas DUP
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-02
Sampled: 03-29-06 09:30
Received: 03-30-06 17:29
Analyzed: 04-07-06 03:17
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 1 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
75-71-8	Dichlorodifluoromethane	BRL		ug/L	0.5
74-87-3	Chloromethane	BRL		ug/L	0.5
75-01-4	Vinyl Chloride	BRL		ug/L	0.5
74-83-9	Bromomethane	BRL		ug/L	0.5
75-00-3	Chloroethane	BRL		ug/L	0.5
75-69-4	Trichlorofluoromethane	BRL		ug/L	0.5
75-35-4	1,1-Dichloroethene	BRL		ug/L	0.5
75-09-2	Methylene Chloride	BRL		ug/L	0.5
156-60-5	trans-1,2-Dichloroethene	BRL		ug/L	0.5
1634-04-4	Methyl tert-butyl Ether (MTBE)	3		ug/L	0.5
75-34-3	1,1-Dichloroethane	BRL		ug/L	0.5
594-20-7	2,2-Dichloropropane	BRL		ug/L	0.5
156-59-2	cis-1,2-Dichloroethene	BRL		ug/L	0.5
74-97-5	Bromochloromethane	BRL		ug/L	0.5
67-66-3	Chloroform	BRL		ug/L	0.5
71-55-6	1,1,1-Trichloroethane	BRL		ug/L	0.5
56-23-5	Carbon Tetrachloride	BRL		ug/L	0.5
563-58-6	1,1-Dichloropropene	BRL		ug/L	0.5
71-43-2	Benzene	BRL		ug/L	0.5
107-06-2	1,2-Dichloroethane	BRL		ug/L	0.5
79-01-6	Trichloroethene	BRL		ug/L	0.5
78-87-5	1,2-Dichloropropane	BRL		ug/L	0.5
74-95-3	Dibromomethane	BRL		ug/L	0.5
75-27-4	Bromodichloromethane	BRL		ug/L	0.5
10061-01-5	cis-1,3-Dichloropropene	BRL		ug/L	0.5
108-88-3	Toluene	BRL		ug/L	0.5
10061-02-6	trans-1,3-Dichloropropene	BRL		ug/L	0.5
79-00-5	1,1,2-Trichloroethane	BRL		ug/L	0.5
127-18-4	Tetrachloroethene	2		ug/L	0.5
142-28-9	1,3-Dichloropropane	BRL		ug/L	0.5
124-48-1	Dibromochloromethane	BRL		ug/L	0.5
106-93-4	1,2-Dibromoethane	BRL		ug/L	0.5
108-90-7	Chlorobenzene	BRL		ug/L	0.5
630-20-6	1,1,1,2-Tetrachloroethane	BRL		ug/L	0.5
100-41-4	Ethylbenzene	BRL		ug/L	0.5
108-38-3/106-42-3	meta-Xylene and para-Xylene	BRL		ug/L	0.5
95-47-6	ortho-Xylene	BRL		ug/L	0.5
100-42-5	Styrene	BRL		ug/L	0.5
75-25-2	Bromoform	BRL		ug/L	0.5
98-82-8	Isopropylbenzene	BRL		ug/L	0.5
108-86-1	Bromobenzene	BRL		ug/L	0.5
79-34-5	1,1,2,2-Tetrachloroethane	BRL		ug/L	0.5
96-18-4	1,2,3-Trichloropropane	BRL		ug/L	0.5
103-65-1	n-Propylbenzene	BRL		ug/L	0.5
95-49-8	2-Chlorotoluene	BRL		ug/L	0.5
108-67-8	1,3,5-Trimethylbenzene	BRL		ug/L	0.5

**EPA Method 524.2 (Continued)
Volatile Organics by GC/MS**

Field ID: Eagle Gas DUP
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Laboratory ID: 93058-02
Sampled: 03-29-06 09:30
Received: 03-30-06 17:29
Analyzed: 04-07-06 03:17
Analyst: CM

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 2 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
106-43-4	4-Chlorotoluene	BRL		ug/L	0.5
98-06-6	tert-Butylbenzene	BRL		ug/L	0.5
95-63-6	1,2,4-Trimethylbenzene	BRL		ug/L	0.5
135-98-8	sec-Butylbenzene	BRL		ug/L	0.5
541-73-1	1,3-Dichlorobenzene	BRL		ug/L	0.5
99-87-6	4-Isopropyltoluene	BRL		ug/L	0.5
106-46-7	1,4-Dichlorobenzene	BRL		ug/L	0.5
95-50-1	1,2-Dichlorobenzene	BRL		ug/L	0.5
104-51-8	n-Butylbenzene	BRL		ug/L	0.5
96-12-8	1,2-Dibromo-3-chloropropane	BRL		ug/L	0.5
120-82-1	1,2,4-Trichlorobenzene	BRL		ug/L	0.5
87-68-3	Hexachlorobutadiene	BRL		ug/L	0.5
91-20-3	Naphthalene	BRL		ug/L	0.5
87-61-6	1,2,3-Trichlorobenzene	BRL		ug/L	0.5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	9.8	98 %	80 - 120 %
4-Bromofluorobenzene	10	9.1	91 %	80 - 120 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

EPA Method 524.2 Volatile Organics by GC/MS

Field ID: 132 Holmes
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-03
Sampled: 03-29-06 12:00
Received: 03-30-06 17:29
Analyzed: 04-07-06 03:47
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 1 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
75-71-8	Dichlorodifluoromethane	BRL		ug/L	0.5
74-87-3	Chloromethane	BRL		ug/L	0.5
75-01-4	Vinyl Chloride	BRL		ug/L	0.5
74-83-9	Bromomethane	BRL		ug/L	0.5
75-00-3	Chloroethane	BRL		ug/L	0.5
75-69-4	Trichlorofluoromethane	BRL		ug/L	0.5
75-35-4	1,1-Dichloroethene	BRL		ug/L	0.5
75-09-2	Methylene Chloride	BRL		ug/L	0.5
156-60-5	trans- 1,2-Dichloroethene	BRL		ug/L	0.5
1634-04-4	Methyl tert- butyl Ether (MTBE)	BRL		ug/L	0.5
75-34-3	1,1-Dichloroethane	BRL		ug/L	0.5
594-20-7	2,2-Dichloropropane	BRL		ug/L	0.5
156-59-2	cis- 1,2-Dichloroethene	BRL		ug/L	0.5
74-97-5	Bromochloromethane	BRL		ug/L	0.5
67-66-3	Chloroform	BRL		ug/L	0.5
71-55-6	1,1,1-Trichloroethane	BRL		ug/L	0.5
56-23-5	Carbon Tetrachloride	BRL		ug/L	0.5
563-58-6	1,1-Dichloropropene	BRL		ug/L	0.5
71-43-2	Benzene	BRL		ug/L	0.5
107-06-2	1,2-Dichloroethane	BRL		ug/L	0.5
79-01-6	Trichloroethene	BRL		ug/L	0.5
78-87-5	1,2-Dichloropropane	BRL		ug/L	0.5
74-95-3	Dibromomethane	BRL		ug/L	0.5
75-27-4	Bromodichloromethane	BRL		ug/L	0.5
10061-01-5	cis- 1,3-Dichloropropene	BRL		ug/L	0.5
108-88-3	Toluene	BRL		ug/L	0.5
10061-02-6	trans- 1,3-Dichloropropene	BRL		ug/L	0.5
79-00-5	1,1,2-Trichloroethane	BRL		ug/L	0.5
127-18-4	Tetrachloroethene	BRL		ug/L	0.5
142-28-9	1,3-Dichloropropane	BRL		ug/L	0.5
124-48-1	Dibromochloromethane	BRL		ug/L	0.5
106-93-4	1,2-Dibromoethane	BRL		ug/L	0.5
108-90-7	Chlorobenzene	BRL		ug/L	0.5
630-20-6	1,1,1,2-Tetrachloroethane	BRL		ug/L	0.5
100-41-4	Ethylbenzene	BRL		ug/L	0.5
108-38-3/106-42-3	meta- Xylene and para- Xylene	BRL		ug/L	0.5
95-47-6	ortho- Xylene	BRL		ug/L	0.5
100-42-5	Styrene	BRL		ug/L	0.5
75-25-2	Bromoform	BRL		ug/L	0.5
98-82-8	Isopropylbenzene	BRL		ug/L	0.5
108-86-1	Bromobenzene	BRL		ug/L	0.5
79-34-5	1,1,2,2-Tetrachloroethane	BRL		ug/L	0.5
96-18-4	1,2,3-Trichloropropane	BRL		ug/L	0.5
103-65-1	n-Propylbenzene	BRL		ug/L	0.5
95-49-8	2-Chlorotoluene	BRL		ug/L	0.5
108-67-8	1,3,5-Trimethylbenzene	BRL		ug/L	0.5

EPA Method 524.2 (Continued) Volatile Organics by GC/MS

Field ID: 132 Holmes
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-03
Sampled: 03-29-06 12:00
Received: 03-30-06 17:29
Analyzed: 04-07-06 03:47
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 2 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
106-43-4	4-Chlorotoluene	BRL		ug/L	0.5
98-06-6	tert-Butylbenzene	BRL		ug/L	0.5
95-63-6	1,2,4-Trimethylbenzene	BRL		ug/L	0.5
135-98-8	sec-Butylbenzene	BRL		ug/L	0.5
541-73-1	1,3-Dichlorobenzene	BRL		ug/L	0.5
99-87-6	4-Isopropyltoluene	BRL		ug/L	0.5
106-46-7	1,4-Dichlorobenzene	BRL		ug/L	0.5
95-50-1	1,2-Dichlorobenzene	BRL		ug/L	0.5
104-51-8	n-Butylbenzene	BRL		ug/L	0.5
96-12-8	1,2-Dibromo-3-chloropropane	BRL		ug/L	0.5
120-82-1	1,2,4-Trichlorobenzene	BRL		ug/L	0.5
87-68-3	Hexachlorobutadiene	BRL		ug/L	0.5
91-20-3	Naphthalene	BRL		ug/L	0.5
87-61-6	1,2,3-Trichlorobenzene	BRL		ug/L	0.5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	9.8	98 %	80 - 120 %
4-Bromofluorobenzene	10	9.1	91 %	80 - 120 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

EPA Method 524.2 Volatile Organics by GC/MS

Field ID: 133 Malley
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-05
Sampled: 03-29-06 11:00
Received: 03-30-06 17:29
Analyzed: 04-07-06 04:47
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 1 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
75-71-8	Dichlorodifluoromethane	BRL		ug/L	0.5
74-87-3	Chloromethane	BRL		ug/L	0.5
75-01-4	Vinyl Chloride	BRL		ug/L	0.5
74-83-9	Bromomethane	BRL		ug/L	0.5
75-00-3	Chloroethane	BRL		ug/L	0.5
75-69-4	Trichlorofluoromethane	BRL		ug/L	0.5
75-35-4	1,1-Dichloroethene	BRL		ug/L	0.5
75-09-2	Methylene Chloride	BRL		ug/L	0.5
156-60-5	trans- 1,2-Dichloroethene	BRL		ug/L	0.5
1634-04-4	Methyl tert- butyl Ether (MTBE)	BRL		ug/L	0.5
75-34-3	1,1-Dichloroethane	BRL		ug/L	0.5
594-20-7	2,2-Dichloropropane	BRL		ug/L	0.5
156-59-2	cis- 1,2-Dichloroethene	BRL		ug/L	0.5
74-97-5	Bromochloromethane	BRL		ug/L	0.5
67-66-3	Chloroform	BRL		ug/L	0.5
71-55-6	1,1,1-Trichloroethane	BRL		ug/L	0.5
56-23-5	Carbon Tetrachloride	BRL		ug/L	0.5
563-58-6	1,1-Dichloropropene	BRL		ug/L	0.5
71-43-2	Benzene	BRL		ug/L	0.5
107-06-2	1,2-Dichloroethane	BRL		ug/L	0.5
79-01-6	Trichloroethene	BRL		ug/L	0.5
78-87-5	1,2-Dichloropropane	BRL		ug/L	0.5
74-95-3	Dibromomethane	BRL		ug/L	0.5
75-27-4	Bromodichloromethane	BRL		ug/L	0.5
10061-01-5	cis- 1,3-Dichloropropene	BRL		ug/L	0.5
108-88-3	Toluene	BRL		ug/L	0.5
10061-02-6	trans- 1,3-Dichloropropene	BRL		ug/L	0.5
79-00-5	1,1,2-Trichloroethane	BRL		ug/L	0.5
127-18-4	Tetrachloroethene	BRL		ug/L	0.5
142-28-9	1,3-Dichloropropane	BRL		ug/L	0.5
124-48-1	Dibromochloromethane	BRL		ug/L	0.5
106-93-4	1,2-Dibromoethane	BRL		ug/L	0.5
108-90-7	Chlorobenzene	BRL		ug/L	0.5
630-20-6	1,1,1,2-Tetrachloroethane	BRL		ug/L	0.5
100-41-4	Ethylbenzene	BRL		ug/L	0.5
108-38-3/106-42-3	meta- Xylene and para- Xylene	BRL		ug/L	0.5
95-47-6	ortho- Xylene	BRL		ug/L	0.5
100-42-5	Styrene	BRL		ug/L	0.5
75-25-2	Bromoform	BRL		ug/L	0.5
98-82-8	Isopropylbenzene	BRL		ug/L	0.5
108-86-1	Bromobenzene	BRL		ug/L	0.5
79-34-5	1,1,2,2-Tetrachloroethane	BRL		ug/L	0.5
96-18-4	1,2,3-Trichloropropane	BRL		ug/L	0.5
103-65-1	n-Propylbenzene	BRL		ug/L	0.5
95-49-8	2-Chlorotoluene	BRL		ug/L	0.5
108-67-8	1,3,5-Trimethylbenzene	BRL		ug/L	0.5

**EPA Method 524.2 (Continued)
Volatile Organics by GC/MS**

Field ID: 133 Malley
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.
Laboratory ID: 93058-05
Sampled: 03-29-06 11:00
Received: 03-30-06 17:29
Analyzed: 04-07-06 04:47
Analyst: CM

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool
QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 2 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
106-43-4	4-Chlorotoluene	BRL		ug/L	0.5
98-06-6	tert-Butylbenzene	BRL		ug/L	0.5
95-63-6	1,2,4-Trimethylbenzene	BRL		ug/L	0.5
135-98-8	sec-Butylbenzene	BRL		ug/L	0.5
541-73-1	1,3-Dichlorobenzene	BRL		ug/L	0.5
99-87-6	4-Isopropyltoluene	BRL		ug/L	0.5
106-46-7	1,4-Dichlorobenzene	BRL		ug/L	0.5
95-50-1	1,2-Dichlorobenzene	BRL		ug/L	0.5
104-51-8	n-Butylbenzene	BRL		ug/L	0.5
96-12-8	1,2-Dibromo-3-chloropropane	BRL		ug/L	0.5
120-82-1	1,2,4-Trichlorobenzene	BRL		ug/L	0.5
87-68-3	Hexachlorobutadiene	BRL		ug/L	0.5
91-20-3	Naphthalene	BRL		ug/L	0.5
87-61-6	1,2,3-Trichlorobenzene	BRL		ug/L	0.5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	9.6	96 %	80 - 120 %
4-Bromofluorobenzene	10	9	90 %	80 - 120 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

EPA Method 524.2 Volatile Organics by GC/MS

Field ID: 134 Donati
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-07
Sampled: 03-29-06 10:15
Received: 03-30-06 17:29
Analyzed: 04-07-06 05:46
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 1 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
75-71-8	Dichlorodifluoromethane	BRL		ug/L	0.5
74-87-3	Chloromethane	BRL		ug/L	0.5
75-01-4	Vinyl Chloride	BRL		ug/L	0.5
74-83-9	Bromomethane	BRL		ug/L	0.5
75-00-3	Chloroethane	BRL		ug/L	0.5
75-69-4	Trichlorofluoromethane	BRL		ug/L	0.5
75-35-4	1,1-Dichloroethene	BRL		ug/L	0.5
75-09-2	Methylene Chloride	BRL		ug/L	0.5
156-60-5	trans- 1,2-Dichloroethene	BRL		ug/L	0.5
1634-04-4	Methyl tert- butyl Ether (MTBE)	BRL		ug/L	0.5
75-34-3	1,1-Dichloroethane	BRL		ug/L	0.5
594-20-7	2,2-Dichloropropane	BRL		ug/L	0.5
156-59-2	cis- 1,2-Dichloroethene	BRL		ug/L	0.5
74-97-5	Bromochloromethane	BRL		ug/L	0.5
67-66-3	Chloroform	3		ug/L	0.5
71-55-6	1,1,1-Trichloroethane	BRL		ug/L	0.5
56-23-5	Carbon Tetrachloride	BRL		ug/L	0.5
563-58-6	1,1-Dichloropropene	BRL		ug/L	0.5
71-43-2	Benzene	BRL		ug/L	0.5
107-06-2	1,2-Dichloroethane	BRL		ug/L	0.5
79-01-6	Trichloroethene	BRL		ug/L	0.5
78-87-5	1,2-Dichloropropane	BRL		ug/L	0.5
74-95-3	Dibromomethane	BRL		ug/L	0.5
75-27-4	Bromodichloromethane	BRL		ug/L	0.5
10061-01-5	cis- 1,3-Dichloropropene	BRL		ug/L	0.5
108-88-3	Toluene	BRL		ug/L	0.5
10061-02-6	trans- 1,3-Dichloropropene	BRL		ug/L	0.5
79-00-5	1,1,2-Trichloroethane	BRL		ug/L	0.5
127-18-4	Tetrachloroethene	BRL		ug/L	0.5
142-28-9	1,3-Dichloropropane	BRL		ug/L	0.5
124-48-1	Dibromochloromethane	BRL		ug/L	0.5
106-93-4	1,2-Dibromoethane	BRL		ug/L	0.5
108-90-7	Chlorobenzene	BRL		ug/L	0.5
630-20-6	1,1,1,2-Tetrachloroethane	BRL		ug/L	0.5
100-41-4	Ethylbenzene	BRL		ug/L	0.5
108-38-3/106-42-3	meta- Xylene and para- Xylene	BRL		ug/L	0.5
95-47-6	ortho- Xylene	BRL		ug/L	0.5
100-42-5	Styrene	BRL		ug/L	0.5
75-25-2	Bromoform	BRL		ug/L	0.5
98-82-8	Isopropylbenzene	BRL		ug/L	0.5
108-86-1	Bromobenzene	BRL		ug/L	0.5
79-34-5	1,1,2,2-Tetrachloroethane	BRL		ug/L	0.5
96-18-4	1,2,3-Trichloropropane	BRL		ug/L	0.5
103-65-1	n-Propylbenzene	BRL		ug/L	0.5
95-49-8	2-Chlorotoluene	BRL		ug/L	0.5
108-67-8	1,3,5-Trimethylbenzene	BRL		ug/L	0.5

EPA Method 524.2 (Continued) Volatile Organics by GC/MS

Field ID: 134 Donati
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.
Laboratory ID: 93058-07
Sampled: 03-29-06 10:15
Received: 03-30-06 17:29
Analyzed: 04-07-06 05:46
Analyst: CM

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool
QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 2 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
106-43-4	4-Chlorotoluene	BRL		ug/L	0.5
98-06-6	tert-Butylbenzene	BRL		ug/L	0.5
95-63-6	1,2,4-Trimethylbenzene	BRL		ug/L	0.5
135-98-8	sec-Butylbenzene	BRL		ug/L	0.5
541-73-1	1,3-Dichlorobenzene	BRL		ug/L	0.5
99-87-6	4-Isopropyltoluene	BRL		ug/L	0.5
106-46-7	1,4-Dichlorobenzene	BRL		ug/L	0.5
95-50-1	1,2-Dichlorobenzene	BRL		ug/L	0.5
104-51-8	n-Butylbenzene	BRL		ug/L	0.5
96-12-8	1,2-Dibromo-3-chloropropane	BRL		ug/L	0.5
120-82-1	1,2,4-Trichlorobenzene	BRL		ug/L	0.5
87-68-3	Hexachlorobutadiene	BRL		ug/L	0.5
91-20-3	Naphthalene	BRL		ug/L	0.5
87-61-6	1,2,3-Trichlorobenzene	BRL		ug/L	0.5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	9.8	98 %	80 - 120 %
4-Bromofluorobenzene	10	9	90 %	80 - 120 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

EPA Method 524.2 Volatile Organics by GC/MS

Field ID: 134 Donati DUP
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-08
Sampled: 03-29-06 10:15
Received: 03-30-06 17:29
Analyzed: 04-07-06 06:16
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 1 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
75-71-8	Dichlorodifluoromethane	BRL		ug/L	0.5
74-87-3	Chloromethane	BRL		ug/L	0.5
75-01-4	Vinyl Chloride	BRL		ug/L	0.5
74-83-9	Bromomethane	BRL		ug/L	0.5
75-00-3	Chloroethane	BRL		ug/L	0.5
75-69-4	Trichlorofluoromethane	BRL		ug/L	0.5
75-35-4	1,1-Dichloroethene	BRL		ug/L	0.5
75-09-2	Methylene Chloride	BRL		ug/L	0.5
156-60-5	trans- 1,2-Dichloroethene	BRL		ug/L	0.5
1634-04-4	Methyl tert- butyl Ether (MTBE)	BRL		ug/L	0.5
75-34-3	1,1-Dichloroethane	BRL		ug/L	0.5
594-20-7	2,2-Dichloropropane	BRL		ug/L	0.5
156-59-2	cis- 1,2-Dichloroethene	BRL		ug/L	0.5
74-97-5	Bromochloromethane	BRL		ug/L	0.5
67-66-3	Chloroform	3		ug/L	0.5
71-55-6	1,1,1-Trichloroethane	BRL		ug/L	0.5
56-23-5	Carbon Tetrachloride	BRL		ug/L	0.5
563-58-6	1,1-Dichloropropene	BRL		ug/L	0.5
71-43-2	Benzene	BRL		ug/L	0.5
107-06-2	1,2-Dichloroethane	BRL		ug/L	0.5
79-01-6	Trichloroethene	BRL		ug/L	0.5
78-87-5	1,2-Dichloropropane	BRL		ug/L	0.5
74-95-3	Dibromomethane	BRL		ug/L	0.5
75-27-4	Bromodichloromethane	BRL		ug/L	0.5
10061-01-5	cis- 1,3-Dichloropropene	BRL		ug/L	0.5
108-88-3	Toluene	BRL		ug/L	0.5
10061-02-6	trans- 1,3-Dichloropropene	BRL		ug/L	0.5
79-00-5	1,1,2-Trichloroethane	BRL		ug/L	0.5
127-18-4	Tetrachloroethene	BRL		ug/L	0.5
142-28-9	1,3-Dichloropropane	BRL		ug/L	0.5
124-48-1	Dibromochloromethane	BRL		ug/L	0.5
106-93-4	1,2-Dibromoethane	BRL		ug/L	0.5
108-90-7	Chlorobenzene	BRL		ug/L	0.5
630-20-6	1,1,1,2-Tetrachloroethane	BRL		ug/L	0.5
100-41-4	Ethylbenzene	BRL		ug/L	0.5
108-38-3/106-42-3	meta- Xylene and para- Xylene	BRL		ug/L	0.5
95-47-6	ortho- Xylene	BRL		ug/L	0.5
100-42-5	Styrene	BRL		ug/L	0.5
75-25-2	Bromoform	BRL		ug/L	0.5
98-82-8	Isopropylbenzene	BRL		ug/L	0.5
108-86-1	Bromobenzene	BRL		ug/L	0.5
79-34-5	1,1,2,2-Tetrachloroethane	BRL		ug/L	0.5
96-18-4	1,2,3-Trichloropropane	BRL		ug/L	0.5
103-65-1	n-Propylbenzene	BRL		ug/L	0.5
95-49-8	2-Chlorotoluene	BRL		ug/L	0.5
108-67-8	1,3,5-Trimethylbenzene	BRL		ug/L	0.5

**EPA Method 524.2 (Continued)
Volatile Organics by GC/MS**

Field ID: 134 Donati DUP
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.
Laboratory ID: 93058-08
Sampled: 03-29-06 10:15
Received: 03-30-06 17:29
Analyzed: 04-07-06 06:16
Analyst: CM

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool
QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 2 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
106-43-4	4-Chlorotoluene	BRL		ug/L	0.5
98-06-6	tert-Butylbenzene	BRL		ug/L	0.5
95-63-6	1,2,4-Trimethylbenzene	BRL		ug/L	0.5
135-98-8	sec-Butylbenzene	BRL		ug/L	0.5
541-73-1	1,3-Dichlorobenzene	BRL		ug/L	0.5
99-87-6	4-Isopropyltoluene	BRL		ug/L	0.5
106-46-7	1,4-Dichlorobenzene	BRL		ug/L	0.5
95-50-1	1,2-Dichlorobenzene	BRL		ug/L	0.5
104-51-8	n-Butylbenzene	BRL		ug/L	0.5
96-12-8	1,2-Dibromo-3-chloropropane	BRL		ug/L	0.5
120-82-1	1,2,4-Trichlorobenzene	BRL		ug/L	0.5
87-68-3	Hexachlorobutadiene	BRL		ug/L	0.5
91-20-3	Naphthalene	BRL		ug/L	0.5
87-61-6	1,2,3-Trichlorobenzene	BRL		ug/L	0.5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	9.9	99 %	80 - 120 %
4-Bromofluorobenzene	10	9.2	92 %	80 - 120 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.



EPA Method 524.2 Volatile Organics by GC/MS

Field ID: Trip Blank
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-12
Sampled: 03-29-06 00:00
Received: 03-30-06 17:29
Analyzed: 04-07-06 06:46
Analyst: CM

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 1 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
75-71-8	Dichlorodifluoromethane	BRL		ug/L	0.5
74-87-3	Chloromethane	BRL		ug/L	0.5
75-01-4	Vinyl Chloride	BRL		ug/L	0.5
74-83-9	Bromomethane	BRL		ug/L	0.5
75-00-3	Chloroethane	BRL		ug/L	0.5
75-69-4	Trichlorofluoromethane	BRL		ug/L	0.5
75-35-4	1,1-Dichloroethene	BRL		ug/L	0.5
75-09-2	Methylene Chloride	BRL		ug/L	0.5
156-60-5	trans- 1,2-Dichloroethene	BRL		ug/L	0.5
1634-04-4	Methyl tert- butyl Ether (MTBE)	BRL		ug/L	0.5
75-34-3	1,1-Dichloroethane	BRL		ug/L	0.5
594-20-7	2,2-Dichloropropane	BRL		ug/L	0.5
156-59-2	cis- 1,2-Dichloroethene	BRL		ug/L	0.5
74-97-5	Bromochloromethane	BRL		ug/L	0.5
67-66-3	Chloroform	BRL		ug/L	0.5
71-55-6	1,1,1-Trichloroethane	BRL		ug/L	0.5
56-23-5	Carbon Tetrachloride	BRL		ug/L	0.5
563-58-6	1,1-Dichloropropene	BRL		ug/L	0.5
71-43-2	Benzene	BRL		ug/L	0.5
107-06-2	1,2-Dichloroethane	BRL		ug/L	0.5
79-01-6	Trichloroethene	BRL		ug/L	0.5
78-87-5	1,2-Dichloropropane	BRL		ug/L	0.5
74-95-3	Dibromomethane	BRL		ug/L	0.5
75-27-4	Bromodichloromethane	BRL		ug/L	0.5
10061-01-5	cis- 1,3-Dichloropropene	BRL		ug/L	0.5
108-88-3	Toluene	0.7		ug/L	0.5
10061-02-6	trans- 1,3-Dichloropropene	BRL		ug/L	0.5
79-00-5	1,1,2-Trichloroethane	BRL		ug/L	0.5
127-18-4	Tetrachloroethene	BRL		ug/L	0.5
142-28-9	1,3-Dichloropropane	BRL		ug/L	0.5
124-48-1	Dibromochloromethane	BRL		ug/L	0.5
106-93-4	1,2-Dibromoethane	BRL		ug/L	0.5
108-90-7	Chlorobenzene	BRL		ug/L	0.5
630-20-6	1,1,1,2-Tetrachloroethane	BRL		ug/L	0.5
100-41-4	Ethylbenzene	BRL		ug/L	0.5
108-38-3/106-42-3	meta- Xylene and para- Xylene	BRL		ug/L	0.5
95-47-6	ortho- Xylene	BRL		ug/L	0.5
100-42-5	Styrene	BRL		ug/L	0.5
75-25-2	Bromoform	BRL		ug/L	0.5
98-82-8	Isopropylbenzene	BRL		ug/L	0.5
108-86-1	Bromobenzene	BRL		ug/L	0.5
79-34-5	1,1,2,2-Tetrachloroethane	BRL		ug/L	0.5
96-18-4	1,2,3-Trichloropropane	BRL		ug/L	0.5
103-65-1	n-Propylbenzene	BRL		ug/L	0.5
95-49-8	2-Chlorotoluene	BRL		ug/L	0.5
108-67-8	1,3,5-Trimethylbenzene	BRL		ug/L	0.5

**EPA Method 524.2 (Continued)
Volatile Organics by GC/MS**

Field ID: Trip Blank
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Laboratory ID: 93058-12
Sampled: 03-29-06 00:00
Received: 03-30-06 17:29
Analyzed: 04-07-06 06:46
Analyst: CM

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

QC Batch ID: VM7-2088-W
Instrument ID: MS-7 Agilent 6890
Sample Volume: 25 mL
Dilution Factor: 1

Page: 2 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
106-43-4	4-Chlorotoluene	BRL		ug/L	0.5
98-06-6	tert-Butylbenzene	BRL		ug/L	0.5
95-63-6	1,2,4-Trimethylbenzene	BRL		ug/L	0.5
135-98-8	sec-Butylbenzene	BRL		ug/L	0.5
541-73-1	1,3-Dichlorobenzene	BRL		ug/L	0.5
99-87-6	4-Isopropyltoluene	BRL		ug/L	0.5
106-46-7	1,4-Dichlorobenzene	BRL		ug/L	0.5
95-50-1	1,2-Dichlorobenzene	BRL		ug/L	0.5
104-51-8	n-Butylbenzene	BRL		ug/L	0.5
96-12-8	1,2-Dibromo-3-chloropropane	BRL		ug/L	0.5
120-82-1	1,2,4-Trichlorobenzene	BRL		ug/L	0.5
87-68-3	Hexachlorobutadiene	BRL		ug/L	0.5
91-20-3	Naphthalene	BRL		ug/L	0.5
87-61-6	1,2,3-Trichlorobenzene	BRL		ug/L	0.5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	9.9	99 %	80 - 120 %
4-Bromofluorobenzene	10	9.1	91 %	80 - 120 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

Massachusetts DEP VPH Method Volatile Petroleum Hydrocarbons by GC/PID/FID

Field ID: FF-1
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Laboratory ID: 93058-09
Sampled: 03-29-06 13:15
Received: 03-30-06 17:29
Analyzed: 04-07-06 18:16
Analyst: TA

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

QC Batch ID: VG1-2425-W
Instrument ID: GC-1 HP 5890
Sample Volume: 5 mL
Dilution Factor: 1

VPH Ranges	Concentration	Notes	Units	Reporting Limit
n-C5 to n-C8 Aliphatic Hydrocarbons [†] [⊖]	BRL		ug/L	20
n-C9 to n-C12 Aliphatic Hydrocarbons [†] [⊗]	BRL		ug/L	20
n-C9 to n-C10 Aromatic Hydrocarbons [†]	BRL		ug/L	20
Unadjusted n-C5 to n-C8 Aliphatic Hydrocarbons [†]	BRL		ug/L	20
Unadjusted n-C9 to n-C12 Aliphatic Hydrocarbons [†]	BRL		ug/L	20

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
1634-04-4	Methyl tert-butyl Ether [‡]	BRL		ug/L	5
71-43-2	Benzene [‡]	BRL		ug/L	1
108-88-3	Toluene [‡]	BRL		ug/L	5
100-41-4	Ethylbenzene [†]	BRL		ug/L	5
108-38-3 and 106-42-3	meta-Xylene and para-Xylene [†]	BRL		ug/L	5
95-47-6	ortho-Xylene [†]	BRL		ug/L	5
91-20-3	Naphthalene	BRL		ug/L	5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
2,5-Dibromotoluene (PID)	50	50	100 %	70 - 130 %
2,5-Dibromotoluene (FID)	50	48	95 %	70 - 130 %

QA/QC Certification	
1. Were all QA/QC procedures required by the method followed?	Yes
2. Were all performance/acceptance standards for the required QA/QC procedures achieved?	Yes
3. Were any significant modifications made to the method, as specified in Section 11.3.2.1?	No
Method non-conformances indicated above are detailed below on this data report, or in the accompanying project narrative and project quality control report. Release of this data is authorized by the accompanying signed project cover letter. The accompanying cover letter, project narrative and quality control report are considered part of this data report.	

Method Reference: Method for the Determination of Volatile Petroleum Hydrocarbons, MA DEP (Revision 1.1, 2004).

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

† Hydrocarbon range data excludes concentrations of any surrogate(s) and/or internal standards eluting in that range.

⊖ n-C5 to n-C8 Aliphatic Hydrocarbons range data excludes the method target analyte concentrations.

⊗ n-C9 to n-C12 Aliphatic Hydrocarbons range data excludes the method target analyte concentrations and the concentration for the n-C9 to n-C10 Aromatic Hydrocarbons range.

‡ Analyte elutes in the n-C5 to n-C8 Aliphatic Hydrocarbons range.

* Analyte elutes in the n-C9 to n-C12 Aliphatic Hydrocarbons range.

**Massachusetts DEP VPH Method
Volatile Petroleum Hydrocarbons by GC/PID/FID**

Field ID: FF-2
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-10
Sampled: 03-29-06 14:15
Received: 03-30-06 17:29
Analyzed: 04-07-06 18:56
Analyst: TA

QC Batch ID: VG1-2425-W
Instrument ID: GC-1 HP 5890
Sample Volume: 5 mL
Dilution Factor: 1

VPH Ranges	Concentration	Notes	Units	Reporting Limit
n-C5 to n-C8 Aliphatic Hydrocarbons [†] [⊖]	BRL		ug/L	20
n-C9 to n-C12 Aliphatic Hydrocarbons [†] [⊗]	BRL		ug/L	20
n-C9 to n-C10 Aromatic Hydrocarbons [†]	BRL		ug/L	20

Unadjusted n-C5 to n-C8 Aliphatic Hydrocarbons [†]	BRL		ug/L	20
Unadjusted n-C9 to n-C12 Aliphatic Hydrocarbons [†]	BRL		ug/L	20

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
1634-04-4	Methyl tert-butyl Ether [⌘]	BRL		ug/L	5
71-43-2	Benzene [⌘]	BRL		ug/L	1
108-88-3	Toluene [⌘]	BRL		ug/L	5
100-41-4	Ethylbenzene [†]	BRL		ug/L	5
108-38-3 and 106-42-3	meta-Xylene and para-Xylene [†]	BRL		ug/L	5
95-47-6	ortho-Xylene [†]	BRL		ug/L	5
91-20-3	Naphthalene	BRL		ug/L	5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
2,5-Dibromotoluene (PID)	50	51	103 %	70 - 130 %
2,5-Dibromotoluene (FID)	50	49	98 %	70 - 130 %

QA/QC Certification	
1. Were all QA/QC procedures required by the method followed?	Yes
2. Were all performance/acceptance standards for the required QA/QC procedures achieved?	Yes
3. Were any significant modifications made to the method, as specified in Section 11.3.2.1?	No
Method non-conformances indicated above are detailed below on this data report, or in the accompanying project narrative and project quality control report. Release of this data is authorized by the accompanying signed project cover letter. The accompanying cover letter, project narrative and quality control report are considered part of this data report.	

Method Reference: Method for the Determination of Volatile Petroleum Hydrocarbons, MA DEP (Revision 1.1, 2004).

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

[†] Hydrocarbon range data excludes concentrations of any surrogate(s) and/or internal standards eluting in that range.

[⊖] n-C5 to n-C8 Aliphatic Hydrocarbons range data excludes the method target analyte concentrations.

[⊗] n-C9 to n-C12 Aliphatic Hydrocarbons range data excludes the method target analyte concentrations and the concentration for the n-C9 to n-C10 Aromatic Hydrocarbons range.

[⌘] Analyte elutes in the n-C5 to n-C8 Aliphatic Hydrocarbons range.

[‡] Analyte elutes in the n-C9 to n-C12 Aliphatic Hydrocarbons range.

Massachusetts DEP VPH Method Volatile Petroleum Hydrocarbons by GC/PID/FID

Field ID: FF-4
Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Matrix: Aqueous
Container: 40 mL VOA Vial
Preservation: HCl/Cool

Laboratory ID: 93058-11
Sampled: 03-29-06 15:45
Received: 03-30-06 17:29
Analyzed: 04-07-06 19:37
Analyst: TA

QC Batch ID: VG1-2425-W
Instrument ID: GC-1 HP 5890
Sample Volume: 5 mL
Dilution Factor: 1

VPH Ranges	Concentration	Notes	Units	Reporting Limit
n-C5 to n-C8 Aliphatic Hydrocarbons [†] [⊖]	BRL		ug/L	20
n-C9 to n-C12 Aliphatic Hydrocarbons [†] [⊗]	BRL		ug/L	20
n-C9 to n-C10 Aromatic Hydrocarbons [†]	BRL		ug/L	20
Unadjusted n-C5 to n-C8 Aliphatic Hydrocarbons [†]	BRL		ug/L	20
Unadjusted n-C9 to n-C12 Aliphatic Hydrocarbons [†]	BRL		ug/L	20

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
1634-04-4	Methyl tert-butyl Ether [⌘]	BRL		ug/L	5
71-43-2	Benzene [⌘]	BRL		ug/L	1
108-88-3	Toluene [⌘]	BRL		ug/L	5
100-41-4	Ethylbenzene [†]	BRL		ug/L	5
108-38-3 and 106-42-3	meta-Xylene and para-Xylene [†]	BRL		ug/L	5
95-47-6	ortho-Xylene [†]	BRL		ug/L	5
91-20-3	Naphthalene	BRL		ug/L	5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
2,5-Dibromotoluene (PID)	50	53	105 %	70 - 130 %
2,5-Dibromotoluene (FID)	50	49	98 %	70 - 130 %

QA/QC Certification	
1. Were all QA/QC procedures required by the method followed?	Yes
2. Were all performance/acceptance standards for the required QA/QC procedures achieved?	Yes
3. Were any significant modifications made to the method, as specified in Section 11.3.2.1?	No
Method non-conformances indicated above are detailed below on this data report, or in the accompanying project narrative and project quality control report. Release of this data is authorized by the accompanying signed project cover letter. The accompanying cover letter, project narrative and quality control report are considered part of this data report.	

Method Reference: Method for the Determination of Volatile Petroleum Hydrocarbons, MA DEP (Revision 1.1, 2004).

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

† Hydrocarbon range data excludes concentrations of any surrogate(s) and/or internal standards eluting in that range.

⊖ n-C5 to n-C8 Aliphatic Hydrocarbons range data excludes the method target analyte concentrations.

⊗ n-C9 to n-C12 Aliphatic Hydrocarbons range data excludes the method target analyte concentrations and the concentration for the n-C9 to n-C10 Aromatic Hydrocarbons range.

⌘ Analyte elutes in the n-C5 to n-C8 Aliphatic Hydrocarbons range.

‡ Analyte elutes in the n-C9 to n-C12 Aliphatic Hydrocarbons range.

Project Narrative

Project: Nantais/4169
Client: Bennett & O'Reilly, Inc.

Lab ID: 93058
Received: 03-30-06 17:29

A. Documentation and Client Communication

The following documentation discrepancies, and client changes or amendments were noted for this project:

1. No documentation discrepancies, changes, or amendments were noted.

B. Method Modifications, Non-Conformances and Observations

The sample(s) in this project were analyzed by the references analytical method(s), and no method modifications, non-conformances or analytical issues were noted, except as indicated below:

1. No method modifications, non-conformances or analytical issues were noted.

GROUNDWATER ANALYTICAL

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Project Name: **NANTAIS**
Firm: **Bennett + O'Reilly**
Project Number: **4169**
Address: **265 1817 ST
1593 MAIN ST**
City/State/Zip: **BROOKFIELD 02631**
Project Manager: **DEC**
Telephone: **508 896 6630**

CHAIN-OF-CUSTODY RECORD AND WORK ORDER

TURNAROUND
☒ STANDARD (10 Business Days)
☐ PRIORITY (5 Business Days)
☐ RUSH (Rush requires Rush Authorization Number)
Please Email to: _____
Please FAX to: _____
BILLING
Purchase Order No.: **4169**
☒ Third Party Billing
☐ GWA Order

No 109713

ANALYSIS REQUEST

Parameters	Standard	Method	Notes
Asbestos (Total)	1001	1001	
Asbestos (Individual)	1002	1002	
Barium	1003	1003	
Beryllium	1004	1004	
Bismuth	1005	1005	
Boron	1006	1006	
Bromine	1007	1007	
Cadmium	1008	1008	
Calcium	1009	1009	
Chromium	1010	1010	
Copper	1011	1011	
Fluoride	1012	1012	
Iron	1013	1013	
Lead	1014	1014	
Manganese	1015	1015	
Mercury	1016	1016	
Molybdenum	1017	1017	
Nickel	1018	1018	
Nitrate	1019	1019	
Nitrite	1020	1020	
Selenium	1021	1021	
Silver	1022	1022	
Sulfate	1023	1023	
Sulfide	1024	1024	
Titanium	1025	1025	
Tungsten	1026	1026	
Vanadium	1027	1027	
Zinc	1028	1028	

CHAIN-OF-CUSTODY RECORD

NOTE: All samples submitted subject to Standard Terms and Conditions on reverse hereof.

Relinquished by: **[Signature]** Date: **12/25/03** Time: **1:30 PM**
Received by: **[Signature]** Date: **12/25/03** Time: **1:30 PM**
Relinquished by: **[Signature]** Date: **12/25/03** Time: **1:30 PM**
Received by: **[Signature]** Date: **12/25/03** Time: **1:30 PM**

DATA QUALITY OBJECTIVES

Project Specific QC
Many regulatory programs and EPA methods require project specific QC. Project specific QC includes Sample Duplicates, Matrix Spikes, and/or Matrix Spike Duplicates. Laboratory QC is not project specific unless prearranged. Project specific QC samples are charged on a per sample basis. Each MS, MSD, and Sample Duplicate requires an additional sample aliquot.

Regulatory Program
State: ☒ CT ☐ MA ☐ NY ☐ RI ☐ VT
Standard: ☒ MGP GW-1/S-1 ☐ PWS Form ☐ ME ☐ MGP GW-2/S-2 ☐ MWRA ☐ NY STARS ☐ NH ☐ Drinking Water ☐ RI ☐ Wastewater ☐ VT ☐ Dredge Material

REMARKS / SPECIAL INSTRUCTIONS

MA DEP MCP Data Enhancement Affirmation
YES ☒ NO ☐ MCP Data Certification is required.
YES ☒ NO ☐ MCP Drinking Water Sample Required.
(Require collection of contingent duplicate sample. Trip blanks are also required. (VOC sample collected))
Signature: **[Signature]** Date: **12/25/03** Page: **31**

Quality Assurance/Quality Control

A. Program Overview

Groundwater Analytical conducts an active Quality Assurance program to ensure the production of high quality, valid data. This program closely follows the guidance provided by *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, US EPA QAMS-005/80 (1980), and *Test Methods for Evaluating Solid Waste*, US EPA, SW-846, Update III (1996).

Quality Control protocols include written Standard Operating Procedures (SOPs) developed for each analytical method. SOPs are derived from US EPA methodologies and other established references. Standards are prepared from commercially obtained reference materials of certified purity, and documented for traceability.

Quality Assessment protocols for most organic analyses include a minimum of one laboratory control sample, one method blank, one matrix spike sample, and one sample duplicate for each sample preparation batch. All samples, standards, blanks, laboratory control samples, matrix spikes and sample duplicates are spiked with internal standards and surrogate compounds. All instrument sequences begin with an initial calibration verification standard and a blank; and excepting GC/MS sequences, all sequences close with a continuing calibration standard. GC/MS systems are tuned to appropriate ion abundance criteria daily, or for each 12 hour operating period, whichever is more frequent.

Quality Assessment protocols for most inorganic analyses include a minimum of one laboratory control sample, one method blank, one matrix spike sample, and one sample duplicate for each sample preparation batch. Standard curves are derived from one reagent blank and four concentration levels. Curve validity is verified by standard recoveries within plus or minus ten percent of the curve.

B. Definitions

Batches are used as the basic unit for Quality Assessment. A Batch is defined as twenty or fewer samples of the same matrix which are prepared together for the same analysis, using the same lots of reagents and the same techniques or manipulations, all within the same continuum of time, up to but not exceeding 24 hours.

Laboratory Control Samples are used to assess the accuracy of the analytical method. A Laboratory Control Sample consists of reagent water or sodium sulfate spiked with a group of target analytes representative of the method analytes. Accuracy is defined as the degree of agreement of the measured value with the true or expected value. Percent Recoveries for the Laboratory Control Samples are calculated to assess accuracy.

Method Blanks are used to assess the level of contamination present in the analytical system. Method Blanks consist of reagent water or an aliquot of sodium sulfate. Method Blanks are taken through all the appropriate steps of an analytical method. Sample data reported is not corrected for blank contamination.

Surrogate Compounds are used to assess the effectiveness of an analytical method in dealing with each sample matrix. Surrogate Compounds are organic compounds which are similar to the target analytes of interest in chemical behavior, but which are not normally found in environmental samples. Percent Recoveries are calculated for each Surrogate Compound.

Quality Control Report Laboratory Control Samples

Category: MA DEP VPH
QC Batch ID: VG1-2425-W
Matrix: Aqueous
Units: ug/L

LCS
Instrument ID: GC-1 HP 5890
Analyzed: 04-07-06 09:47
Analyst: TA

LCSD
Instrument ID: GC-1 HP 5890
Analyzed: 04-07-06 10:27
Analyst: TA

CAS Number	Analyte	LCS			LCS Duplicate				QC Limits	
		Spiked	Measured	Recovery	Spiked	Measured	Recovery	RPD	Spike	RPD
109-66-0	n- Pentane	50	51	101 %	50	54	108 %	6 %	70 - 130 %	25%
107-83-5	2-Methylpentane	50	48	95 %	50	51	102 %	6 %	70 - 130 %	25%
540-84-1	2,2,4-Trimethylpentane	50	48	95 %	50	51	101 %	6 %	70 - 130 %	25%
n/a	Aliphatic Group 1	150	150	100 %	150	160	107 %	6 %	70 - 130 %	25%
111-84-2	n- Nonane	50	46	93 %	50	49	97 %	5 %	70 - 130 %	25%
124-18-5	n- Decane	50	49	99 %	50	51	101 %	3 %	70 - 130 %	25%
1678-93-9	n- Butylcyclohexane	50	49	98 %	50	51	103 %	5 %	70 - 130 %	25%
n/a	Aliphatic Group 2	150	140	93 %	150	150	100 %	7 %	70 - 130 %	25%
1634-04-4	Methyl tert-butyl Ether	50	43	85 %	50	44	88 %	3 %	70 - 130 %	25%
71-43-2	Benzene	50	50	101 %	50	52	104 %	4 %	70 - 130 %	25%
108-88-3	Toluene	50	51	102 %	50	53	105 %	3 %	70 - 130 %	25%
100-41-4	Ethylbenzene	50	53	107 %	50	56	112 %	4 %	70 - 130 %	25%
108-38-3 and 106-42-3	meta- Xylene and para- Xylene	100	110	110 %	100	110	110 %	0 %	70 - 130 %	25%
95-47-6	ortho- Xylene	50	53	106 %	50	55	110 %	4 %	70 - 130 %	25%
95-63-6	1,2,4-Trimethylbenzene	50	54	108 %	50	56	113 %	4 %	70 - 130 %	25%
91-20-3	Naphthalene	50	49	97 %	50	50	100 %	3 %	70 - 130 %	25%
n/a	Aromatic Group	450	460	102 %	450	480	107 %	4 %	70 - 130 %	25%
QC Surrogate Compound		Spiked	Measured	Recovery	Spiked	Measured	Recovery		QC Limits	
2,5-Dibromotoluene (PID)		50	54	108 %	50	51	102 %		70 - 130 %	
2,5-Dibromotoluene (FID)		50	50	101 %	50	49	98 %		70 - 130 %	

Method Reference: Method for the Determination of Volatile Petroleum Hydrocarbons, MA DEP (Revision 1.1, 2004).

Report Notations: All calculations performed prior to rounding. Quality Control Limits are defined by the methodology, or alternatively based upon the historical average recovery plus or minus three standard deviation units.

**Quality Control Report
Method Blank**

Category: MA DEP VPH
QC Batch ID: VG1-2425-W
Matrix: Aqueous

Instrument ID: GC-1 HP 5890
Analyzed: 04-07-06 11:08
Analyst: TA

VPH Ranges	Concentration	Notes	Units	Reporting Limit
n-C5 to n-C8 Aliphatic Hydrocarbons [†] ⊖	BRL		ug/L	20
n-C9 to n-C12 Aliphatic Hydrocarbons [†] ⊗	BRL		ug/L	20
n-C9 to n-C10 Aromatic Hydrocarbons [†]	BRL		ug/L	20
Unadjusted n-C5 to n-C8 Aliphatic Hydrocarbons [†]	BRL		ug/L	20
Unadjusted n-C9 to n-C12 Aliphatic Hydrocarbons [†]	BRL		ug/L	20

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
1634-04-4	Methyl tert-butyl Ether [‡]	BRL		ug/L	5
71-43-2	Benzene [‡]	BRL		ug/L	1
108-88-3	Toluene [‡]	BRL		ug/L	5
100-41-4	Ethylbenzene [†]	BRL		ug/L	5
108-38-3 and 106-42-3	<i>meta</i> -Xylene and <i>para</i> -Xylene [†]	BRL		ug/L	5
95-47-6	<i>ortho</i> -Xylene [†]	BRL		ug/L	5
91-20-3	Naphthalene	BRL		ug/L	5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
2,5-Dibromotoluene (PID)	50	53	105 %	70 - 130 %
2,5-Dibromotoluene (FID)	50	49	99 %	70 - 130 %

Method Reference: Method for the Determination of Volatile Petroleum Hydrocarbons, MA DEP (Revision 1.1, 2004).

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

[†] Hydrocarbon range data excludes concentrations of any surrogate(s) and/or internal standards eluting in that range.

⊖ n-C5 to n-C8 Aliphatic Hydrocarbons range data excludes the method target analyte concentrations.

⊗ n-C9 to n-C12 Aliphatic Hydrocarbons range data excludes the method target analyte concentrations and the concentration for the n-C9 to n-C10 Aromatic Hydrocarbons range.

[‡] Analyte elutes in the n-C5 to n-C8 Aliphatic Hydrocarbons range.

[‡] Analyte elutes in the n-C9 to n-C12 Aliphatic Hydrocarbons range.

Quality Control Report Laboratory Control Sample

Category: EPA Method 524.2
QC Batch ID: VM7-2088-W
Matrix: Aqueous
Units: ug/L

Instrument ID: MS-7 Agilent 6890
Analyzed: 04-06-06 21:19
Analyst: CM

Page: 1 of 2

CAS Number	Analyte	Spiked	Measured	Recovery	QC Limits
75-71-8	Dichlorodifluoromethane	5.0	4.3	86 %	70 - 130 %
74-87-3	Chloromethane	5.0	4.3	87 %	70 - 130 %
75-01-4	Vinyl Chloride	5.0	4.3	87 %	70 - 130 %
74-83-9	Bromomethane	5.0	4.4	89 %	70 - 130 %
75-00-3	Chloroethane	5.0	4.6	91 %	70 - 130 %
75-69-4	Trichlorofluoromethane	5.0	4.7	94 %	70 - 130 %
75-35-4	1,1-Dichloroethene	5.0	4.5	89 %	70 - 130 %
75-09-2	Methylene Chloride	5.0	4.5	91 %	70 - 130 %
156-60-5	trans-1,2-Dichloroethene	5.0	4.4	87 %	70 - 130 %
1634-04-4	Methyl tert-butyl Ether (MTBE)	5.0	4.5	89 %	70 - 130 %
75-34-3	1,1-Dichloroethane	5.0	4.7	94 %	70 - 130 %
594-20-7	2,2-Dichloropropane	5.0	4.2	83 %	70 - 130 %
156-59-2	cis-1,2-Dichloroethene	5.0	4.6	91 %	70 - 130 %
74-97-5	Bromochloromethane	5.0	5.1	101 %	70 - 130 %
67-66-3	Chloroform	5.0	4.8	97 %	70 - 130 %
71-55-6	1,1,1-Trichloroethane	5.0	4.3	86 %	70 - 130 %
56-23-5	Carbon Tetrachloride	5.0	4.1	82 %	70 - 130 %
563-58-6	1,1-Dichloropropene	5.0	4.1	82 %	70 - 130 %
71-43-2	Benzene	5.0	4.5	89 %	70 - 130 %
107-06-2	1,2-Dichloroethane	5.0	5.3	106 %	70 - 130 %
79-01-6	Trichloroethene	5.0	4.3	86 %	70 - 130 %
78-87-5	1,2-Dichloropropane	5.0	4.5	91 %	70 - 130 %
74-95-3	Dibromomethane	5.0	5.1	101 %	70 - 130 %
75-27-4	Bromodichloromethane	5.0	5.1	102 %	70 - 130 %
10061-01-5	cis-1,3-Dichloropropene	5.0	4.2	84 %	70 - 130 %
108-88-3	Toluene	5.0	4.4	88 %	70 - 130 %
10061-02-6	trans-1,3-Dichloropropene	5.0	4	80 %	70 - 130 %
79-00-5	1,1,2-Trichloroethane	5.0	4.9	98 %	70 - 130 %
127-18-4	Tetrachloroethene	5.0	4.1	81 %	70 - 130 %
142-28-9	1,3-Dichloropropane	5.0	5.1	101 %	70 - 130 %
124-48-1	Dibromochloromethane	5.0	4.6	93 %	70 - 130 %
106-93-4	1,2-Dibromoethane	5.0	4.6	93 %	70 - 130 %
108-90-7	Chlorobenzene	5.0	4.4	88 %	70 - 130 %
630-20-6	1,1,1,2-Tetrachloroethane	5.0	4.3	87 %	70 - 130 %
100-41-4	Ethylbenzene	5.0	4.3	86 %	70 - 130 %
108-38-3/106-42-3	meta-Xylene and para-Xylene	10	8.5	85 %	70 - 130 %
95-47-6	ortho-Xylene	5.0	4.5	90 %	70 - 130 %
100-42-5	Styrene	5.0	4.4	87 %	70 - 130 %
75-25-2	Bromoform	5.0	4.2	84 %	70 - 130 %
98-82-8	Isopropylbenzene	5.0	4.2	85 %	70 - 130 %
108-86-1	Bromobenzene	5.0	4.6	91 %	70 - 130 %
79-34-5	1,1,2,2-Tetrachloroethane	5.0	4.9	98 %	70 - 130 %
96-18-4	1,2,3-Trichloropropane	5.0	5.7	114 %	70 - 130 %
103-65-1	n-Propylbenzene	5.0	4.4	87 %	70 - 130 %
95-49-8	2-Chlorotoluene	5.0	4.5	90 %	70 - 130 %
108-67-8	1,3,5-Trimethylbenzene	5.0	4.4	87 %	70 - 130 %
106-43-4	4-Chlorotoluene	5.0	4.5	89 %	70 - 130 %
98-06-6	tert-Butylbenzene	5.0	4.2	84 %	70 - 130 %
95-63-6	1,2,4-Trimethylbenzene	5.0	4.4	88 %	70 - 130 %

**Quality Control Report
Laboratory Control Sample**

Category: EPA Method 524.2
QC Batch ID: VM7-2088-W
Matrix: Aqueous
Units: ug/L

Instrument ID: MS-7 Agilent 6890
Analyzed: 04-06-06 21:19
Analyst: CM

Page: 2 of 2

CAS Number	Analyte	Spiked	Measured	Recovery	QC Limits
135-98-8	sec-Butylbenzene	5.0	4.2	84 %	70 - 130 %
541-73-1	1,3-Dichlorobenzene	5.0	4.3	86 %	70 - 130 %
99-87-6	4-Isopropyltoluene	5.0	4.2	84 %	70 - 130 %
106-46-7	1,4-Dichlorobenzene	5.0	4.5	90 %	70 - 130 %
95-50-1	1,2-Dichlorobenzene	5.0	4.5	89 %	70 - 130 %
104-51-8	n-Butylbenzene	5.0	4.2	84 %	70 - 130 %
96-12-8	1,2-Dibromo-3-chloropropane	5.0	5.2	104 %	70 - 130 %
120-82-1	1,2,4-Trichlorobenzene	5.0	4	80 %	70 - 130 %
87-68-3	Hexachlorobutadiene	5.0	4.3	85 %	70 - 130 %
91-20-3	Naphthalene	5.0	4	79 %	70 - 130 %
87-61-6	1,2,3-Trichlorobenzene	5.0	4.5	90 %	70 - 130 %

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	11	109 %	70 - 130 %
4-Bromofluorobenzene	10	11	108 %	70 - 130 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: All calculations performed prior to rounding. Quality Control Limits are defined by the methodology, or alternatively based upon the historical average recovery plus or minus three standard deviation units.

Quality Control Report Method Blank

Category: EPA Method 524.2
QC Batch ID: VM7-2088-W
Matrix: Aqueous

Instrument ID: MS-5 HP 6890
Analyzed: 04-06-06 21:48
Analyst: CM

Page: 1 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
75-71-8	Dichlorodifluoromethane	BRL		ug/L	0.5
74-87-3	Chloromethane	BRL		ug/L	0.5
75-01-4	Vinyl Chloride	BRL		ug/L	0.5
74-83-9	Bromomethane	BRL		ug/L	0.5
75-00-3	Chloroethane	BRL		ug/L	0.5
75-69-4	Trichlorofluoromethane	BRL		ug/L	0.5
75-35-4	1,1-Dichloroethene	BRL		ug/L	0.5
75-09-2	Methylene Chloride	BRL		ug/L	0.5
156-60-5	trans- 1,2-Dichloroethene	BRL		ug/L	0.5
1634-04-4	Methyl tert- butyl Ether (MTBE)	BRL		ug/L	0.5
75-34-3	1,1-Dichloroethane	BRL		ug/L	0.5
594-20-7	2,2-Dichloropropane	BRL		ug/L	0.5
156-59-2	cis- 1,2-Dichloroethene	BRL		ug/L	0.5
74-97-5	Bromochloromethane	BRL		ug/L	0.5
67-66-3	Chloroform	BRL		ug/L	0.5
71-55-6	1,1,1-Trichloroethane	BRL		ug/L	0.5
56-23-5	Carbon Tetrachloride	BRL		ug/L	0.5
563-58-6	1,1-Dichloropropene	BRL		ug/L	0.5
71-43-2	Benzene	BRL		ug/L	0.5
107-06-2	1,2-Dichloroethane	BRL		ug/L	0.5
79-01-6	Trichloroethene	BRL		ug/L	0.5
78-87-5	1,2-Dichloropropane	BRL		ug/L	0.5
74-95-3	Dibromomethane	BRL		ug/L	0.5
75-27-4	Bromodichloromethane	BRL		ug/L	0.5
10061-01-5	cis- 1,3-Dichloropropene	BRL		ug/L	0.5
108-88-3	Toluene	BRL		ug/L	0.5
10061-02-6	trans- 1,3-Dichloropropene	BRL		ug/L	0.5
79-00-5	1,1,2-Trichloroethane	BRL		ug/L	0.5
127-18-4	Tetrachloroethene	BRL		ug/L	0.5
142-28-9	1,3-Dichloropropane	BRL		ug/L	0.5
124-48-1	Dibromochloromethane	BRL		ug/L	0.5
106-93-4	1,2-Dibromoethane	BRL		ug/L	0.5
108-90-7	Chlorobenzene	BRL		ug/L	0.5
630-20-6	1,1,1,2-Tetrachloroethane	BRL		ug/L	0.5
100-41-4	Ethylbenzene	BRL		ug/L	0.5
108-38-3/106-42-3	meta- Xylene and para- Xylene	BRL		ug/L	0.5
95-47-6	ortho- Xylene	BRL		ug/L	0.5
100-42-5	Styrene	BRL		ug/L	0.5
75-25-2	Bromoform	BRL		ug/L	0.5
98-82-8	Isopropylbenzene	BRL		ug/L	0.5
108-86-1	Bromobenzene	BRL		ug/L	0.5
79-34-5	1,1,2,2-Tetrachloroethane	BRL		ug/L	0.5
96-18-4	1,2,3-Trichloropropane	BRL		ug/L	0.5
103-65-1	n-Propylbenzene	BRL		ug/L	0.5
95-49-8	2-Chlorotoluene	BRL		ug/L	0.5
108-67-8	1,3,5-Trimethylbenzene	BRL		ug/L	0.5
106-43-4	4-Chlorotoluene	BRL		ug/L	0.5
98-06-6	tert- Butylbenzene	BRL		ug/L	0.5
95-63-6	1,2,4-Trimethylbenzene	BRL		ug/L	0.5

**Quality Control Report
Method Blank**

Category: EPA Method 524.2
QC Batch ID: VM7-2088-W
Matrix: Aqueous

Instrument ID: MS-5 HP 6890
Analyzed: 04-06-06 21:48
Analyst: CM

Page: 2 of 2

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
135-98-8	sec-Butylbenzene	BRL		ug/L	0.5
541-73-1	1,3-Dichlorobenzene	BRL		ug/L	0.5
99-87-6	4-Isopropyltoluene	BRL		ug/L	0.5
106-46-7	1,4-Dichlorobenzene	BRL		ug/L	0.5
95-50-1	1,2-Dichlorobenzene	BRL		ug/L	0.5
104-51-8	n-Butylbenzene	BRL		ug/L	0.5
96-12-8	1,2-Dibromo-3-chloropropane	BRL		ug/L	0.5
120-82-1	1,2,4-Trichlorobenzene	BRL		ug/L	0.5
87-68-3	Hexachlorobutadiene	BRL		ug/L	0.5
91-20-3	Naphthalene	BRL		ug/L	0.5
87-61-6	1,2,3-Trichlorobenzene	BRL		ug/L	0.5

QC Surrogate Compound	Spiked	Measured	Recovery	QC Limits
1,2-Dichlorobenzene-d ₄	10	9.9	99 %	80 - 120 %
4-Bromofluorobenzene	10	9.2	92 %	80 - 120 %

Method Reference: Methods for the Determination of Organic Compounds in Drinking Water, Supplement III, US EPA, EPA-600/R-95/131 (1995). Method Revision 4.1.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

Certifications and Approvals

Groundwater Analytical maintains environmental laboratory certification in a variety of states.
Copies of our current certificates may be obtained from our website:

<http://www.groundwateranalytical.com/qualifications.htm>

CONNECTICUT, Department of Health Services, PH-0586

Categories: Potable Water, Wastewater, Solid Waste and Soil
http://www.dph.state.ct.us/BRS/Environmental_Lab/OutStateLabList.htm

FLORIDA, Department of Health, Bureau of Laboratories, E87643

Categories: SDWA, CWA, RCRA/CERCLA
<http://www.floridadep.org/labs/qa/dohforms.htm>

MAINE, Department of Human Services, MA103

Categories: Drinking Water and Wastewater
<http://www.state.me.us/dhs/eng/water/Compliance.htm>

MASSACHUSETTS, Department of Environmental Protection, M-MA-103

Categories: Potable Water and Non-Potable Water
<http://www.state.ma.us/dep/bspt/wes/files/certlabs.pdf>

NEW HAMPSHIRE, Department of Environmental Services, 202703

Categories: Drinking Water and Wastewater
<http://www.des.state.nh.us/asp/NHELAP/labsview.asp>

NEW YORK, Department of Health, 11754

Categories: Potable Water, Non-Potable Water and Solid Waste
<http://www.wadsworth.org/labcert/elap/comm.html>

PENNSYLVANIA, Department of Environmental Protection, 68-665

Environmental Laboratory Registration (Non-drinking water and Non-wastewater)
<http://www.dep.state.pa.us/Labs/Registered/>

RHODE ISLAND, Department of Health, 54

Categories: Surface Water, Air, Wastewater, Potable Water, Sewage
http://www.healthri.org/labs/labsCT_MA.htm

U.S. Department of Agriculture, Soil Permit, S-53921

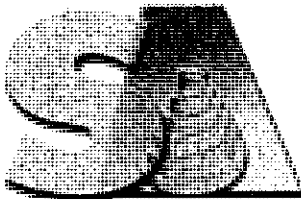
Foreign soil import permit

VERMONT, Department of Environmental Conservation, Water Supply Division

Category: Drinking Water
<http://www.vermontdrinkingwater.org/wsops/labtable.PDF>



Report Date:
02-May-06 15:03



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project 91-204082.02

- ☐ Final Report
☐ Re-Issued Report
☒ Revised Report

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SA41503-01	Manhole 1	Stormwater	01-Mar-06 08:20	02-Mar-06 15:25
SA41503-02	Manhole 2	Stormwater	01-Mar-06 08:30	02-Mar-06 15:25
SA41503-03	131 Main St	Drinking Water	01-Mar-06 11:10	02-Mar-06 15:25
SA41503-04	DCW-3	Ground Water	01-Mar-06 15:00	02-Mar-06 15:25
SA41503-05	DCW-5	Ground Water	01-Mar-06 09:50	02-Mar-06 15:25
SA41503-06	DCW-6	Ground Water	01-Mar-06 10:00	02-Mar-06 15:25
SA41503-07	DCW-8	Ground Water	01-Mar-06 11:40	02-Mar-06 15:25
SA41503-08	DCW-9	Ground Water	01-Mar-06 12:15	02-Mar-06 15:25
SA41503-09	DCW-10	Ground Water	01-Mar-06 13:05	02-Mar-06 15:25
SA41503-10	KEI-4	Ground Water	01-Mar-06 09:30	02-Mar-06 15:25
SA41503-11	ECS-1	Ground Water	01-Mar-06 10:31	02-Mar-06 15:25
SA41503-12	ECS-7	Ground Water	01-Mar-06 15:50	02-Mar-06 15:25
SA41503-13	ECS-10	Oil	01-Mar-06 11:35	02-Mar-06 15:25
SA41503-14	DCW-7	Oil	01-Mar-06 10:45	02-Mar-06 15:25
SA41503-15	Trip Blank	Aqueous	01-Mar-06 00:00	02-Mar-06 15:25
SA41503-16	DCW-4	Ground Water	01-Mar-06 13:40	02-Mar-06 15:25
SA41503-17	ERW-3	Ground Water	01-Mar-06 13:05	02-Mar-06 15:25
SA41503-18	ECS-4	Ground Water	01-Mar-06 13:55	02-Mar-06 15:25

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 51 pages of analytical data plus Chain of Custody document(s).

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USDA # S-51435
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Authorized by

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

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ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

CASE NARRATIVE:

The data set for work order SA41503 complies with internal QC criteria for the methods performed. The samples were received @ 4.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

Petroleum Product Forensic Study Report

1) FORENSIC APPROACH

Per ECS's request, an evaluation of two oil samples SA41503-13 (ECS-10) and SA41503-14 (DCW-7) was conducted in order to identify the petroleum hydrocarbon pattern and the approximate age of the petroleum product.

Both oil samples can be described as a viscous fluid with the consistency of fuel oil. ECS-10 is light brown and DCW-7 is dark brown in color. The forensic samples were analyzed by high-resolution capillary gas chromatography GC/FID TPH technique following modified SW846 Method 8100 to determine the type or types of parent products associated with this sample. In addition, a capillary gas chromatography equipped with mass spectrometry GC/MS (Spectrum's forensic system) was utilized following the modified SW846 8270C Method for the determination and characterization of separate extractable petroleum hydrocarbon fractions.

Tentatively Identified Compounds were verified for the GC/MS analyses. To further support this forensic evaluation, methods to determine both organic lead (tetramethyl and tetraethyl lead compounds) content and Polycyclic Aromatic Hydrocarbons (PAHs) were conducted.

For comparison and verification purposes, Spectrum analyzed several quality control samples including petroleum standards within the forensic samples batch. The following details the standards analyzed:

- 100 µg/L aliphatic hydrocarbon ranging from C9 to C36
- Fresh #2 fuel oil product
- Five (5) years old #2 Fuel Oil
- Fresh gasoline product

2) OVERVIEW OF SAMPLE HANDLING AND ANALYTICAL PROCEDURES

Two (2) oil samples from the Eagle Gas-Carver, MA site were received at the laboratory on March 02, 2006 via Spectrum's courier service. Each oil sample was contained in a single VOA vial and received at 4 degrees Celsius (see attached chain of custody). Field sample identifications and the assigned laboratory numbers are as listed below:

Sample ID	Matrix	Lab. ID#
ECS-10	Oil	SA41503-13
DCW-7	Oil	SA41503-14

A one-gram aliquot was obtained from each sample and petroleum standards to be analyzed according to the stated forensic techniques. Each aliquot was extracted with 10 ml of methylene chloride solvent following SW846 3550B ultrasonic method. A 0.5 µg/L quantity of the sample extract was then injected into Spectrum's forensic GC/MS system for analysis.

Both forensic oil samples were analyzed by high resolution, capillary gas chromatography (GC) system equipped with 30-meter DB5 IS column (0.53 mm I.D, 1.5 µm film thickness) and a flame ionization detector (FID) for the determination of the extractable

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BRL = Below Reporting Limit

Page 2 of 51

petroleum hydrocarbons. A new Perkin Elmer gas chromatography-auto-system (X-Cel) was utilized. As described above, the GC/FID analysis procedure was performed according to modified SW846 8100 method. The method conditions along with specific fingerprinting criteria are defined in Spectrum's Standard Operating Procedure (SOP) for Total Petroleum Hydrocarbons. In addition, the sample extracts were analyzed via a GC/MS equipped with a high-resolution capillary column using an on-column (ZB-1, 60 m length, .32 mm I.D., and 3.0 um film thickness) injection technique under a temperature program developed for various petroleum distillates (gasoline, fuel oil and motor oil fractions). A Hewlett Packard gas chromatograph HP GC 5890 equipped with mass selective detector 5972 was utilized. The MS was operated under the scan mode from m/z 35 to m/z 350. The GC/MS systems include the total ion GC fingerprint trace and the mass spectrum of each peak. Based on the mass spectrum of each peak, the peak identification was determined by the combination of NIST98 mass spectra library search and the author's best knowledge. The area counts of each total ion peak were integrated by HP Chemstation software. The compound concentration was calculated using peak area and described as the percentage of each compound in the sample. Both semi-volatile organic analyses and organic lead analyses were conducted using a state of the art gas chromatograph (GC-HP 6890)/mass spectrometer (HP 5973MS). The method conditions are described in the respective Spectrum SOP. In addition, a sulfur analysis was performed using SW846 6010B method to further provide a high degree of certainty to the forensic sample release time.

The following terms used to support this professional opinion for each individual sample were referenced from "Introduction to Environmental Forensic", edited by Brian L. Murphy and Robert D. Morrison, Chapter 6.

Unweathered = A sample that does not appear to have been altered in the environment (Degree of weathering: could be approximately 0%).

Slightly weathered = a sample in which only the most susceptible compounds appear to have been reduced relative to less susceptible compounds (Degree of weathering: could be approximately in the range of 5-25%).

Moderately weathered = A sample in which a substantial portion of the resolved compounds have been lost or reduced (Degree of weathering: could be approximately in the range of 25-50 %)

Severely weathered = A sample in which most of the volatile and semi-volatile compounds are lost, no n-alkanes are present, even the isoprenoids appear substantially depleted or absent. (Degree of weathering: could be approximately over 50%)

5) SUMMARY

The two oil samples (ECS-10/SA41503-13 and DCW-7/SA41503-14) are fresh or slightly weathered petroleum hydrocarbon product. The petroleum pattern resembles with a high degree of certainty to #2 fuel oil or diesel fuel oil. However, the first forensic sample (ECS-10) may contain a light petroleum fraction that resembles a possible gasoline source. This concentration of the light fraction could be estimated less than 10% of the total petroleum hydrocarbon detected in ECS-10. It was noticed that a significant concentration of MTBE was detected on this sample with an estimated percentage of 0.05% by weight. This estimate was calculated using the percent ratio of all petroleum constituents which are present in the oil sample (ECS-10).

B. The fuel oil #2 pattern detected in both forensic samples (ECS-10 and DCW-7) exhibits high degree of similarity and could be related from the same source.

C. Based on the available information discussed above, the fuel oil #2 release time detected in both forensic samples (ECS-10 and DCW-7) can be estimated to be recent and may be less than five years old oil. Detailed site conditions that could affect the weathering of the sample should be carefully studied to more accurately determine the age of the sample.

6) REFERENCES

Murphy, et al. Introduction to Environmental Forensic, 2002

Kaplan, et al. Forensic Environmental Geochemistry: differentiation of fuel-types, their source and release time. 1997.

Kamplepp, et al. Light non-aqueous phase liquid hydrocarbon weathering at some JP-4 fuel release site. 200.

EPA Office of Solid Waste and Emergency Response, EPA 510-F-97-014, 1998.

Schmidt, et al. A Technique for Estimating the Age of Regular/Mid-Grade Gasoline Released to the Subsurface since the Early 1970's. 102.

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Page 3 of 51

Sample Identification**Manhole 1**

SA41503-01

Client Project #

91-204082.02

Matrix

Stormwater

Collection Date/Time

01-Mar-06 08:20

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsVH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	95.6			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	92.0			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.32	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.32	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.32	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.32	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	59.4			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	57.5			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	70.0			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	86.6			40-140 %			"	"	"	"	"

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Page 4 of 51

Sample Identification

Manhole 2
SA41503-02

Client Project #

91-204082.02

Matrix

Stormwater

Collection Date/Time

01-Mar-06 08:30

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsEPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	1	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	1	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	90.4	70-130 %	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	87.6	70-130 %	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.26	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.26	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.26	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.26	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	62.2	40-140 %	"	"	"	"
84-15-1 Ortho-Terphenyl	64.1	40-140 %	"	"	"	"
580-13-2 2-Bromonaphthalene	86.0	40-140 %	"	"	"	"
321-60-8 2-Fluorobiphenyl	85.3	40-140 %	"	"	"	"

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Page 5 of 51

Sample Identification131 Main St
SA41503-03Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

01-Mar-06 11:10

Received

02-Mar-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>
Volatile Organic Compounds											
1.2 Purgeable Organic Compounds											
Prepared by method SW846 5030 Water MS											
67-64-1	Acetone	BRL		µg/l	10.0	1	EPA 524.2	06-Mar-06	06-Mar-06	6030283	RLJ
107-13-1	Acrylonitrile	BRL		µg/l	1.0	1	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	0.5	1	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	0.5	1	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	0.5	1	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	0.5	1	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
96-12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
124-48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	0.5	1	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
99-87-6	4-Isopropyltoluene	BRL		µg/l	0.5	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	2.3		µg/l	0.5	1	"	"	"	"	"
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	0.5	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	0.5	1	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
90-101-4	Styrene	BRL		µg/l	0.5	1	"	"	"	"	"

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Page 6 of 51

Sample Identification

131 Main St

SA41503-03

Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

01-Mar-06 11:10

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
4.2 Purgeable Organic Compounds											
Prepared by method SW846 5030 Water MS											
630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	0.5	1	EPA 524.2	06-Mar-06	06-Mar-06	6030283	RLJ
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
127-18-4	Tetrachloroethene	0.8		µg/l	0.5	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	0.5	1	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-01-6	Trichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	0.5	1	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	0.5	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
95-47-8	o-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	10.0	1	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
75-65-0	Tert-Butanol / butyl alcohol	BRL		µg/l	10.0	1	"	"	"	"	"
Surrogate recoveries:											
99-00-4	4-Bromofluorobenzene	95.8			70-130 %		"	"	"	"	"
7-26-5	Toluene-d8	99.8			70-130 %		"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	87.0			70-130 %		"	"	"	"	"
1868-53-7	Dibromofluoromethane	84.0			70-130 %		"	"	"	"	"
524.2 Purgeable Organic Compounds											
Prepared by method SW846 5030 Water MS											
								SA41503-03RE1			
67-64-1	Acetone	BRL		µg/l	10.0	1	EPA 524.2	07-Mar-06	07-Mar-06	6030362	RLJ
107-13-1	Acrylonitrile	BRL		µg/l	1.0	1	"	"	"	"	"
71-43-2	Benzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-86-1	Bromobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
74-97-5	Bromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-27-4	Bromodichloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-25-2	Bromoform	BRL		µg/l	0.5	1	"	"	"	"	"
74-83-9	Bromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
78-93-3	2-Butanone (MEK)	BRL		µg/l	10.0	1	"	"	"	"	"
104-51-8	n-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
135-98-8	sec-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
98-06-6	tert-Butylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-15-0	Carbon disulfide	BRL		µg/l	0.5	1	"	"	"	"	"
56-23-5	Carbon tetrachloride	BRL		µg/l	0.5	1	"	"	"	"	"
108-90-7	Chlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-00-3	Chloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
67-66-3	Chloroform	BRL		µg/l	0.5	1	"	"	"	"	"
74-87-3	Chloromethane	BRL		µg/l	0.5	1	"	"	"	"	"
95-49-8	2-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
106-43-4	4-Chlorotoluene	BRL		µg/l	0.5	1	"	"	"	"	"
12-8	1,2-Dibromo-3-chloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
48-1	Dibromochloromethane	BRL		µg/l	0.5	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 51

Sample Identification131 Main St
SA41503-03Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

01-Mar-06 11:10

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
4.2 Purgeable Organic Compounds											
Prepared by method SW846 5030 Water MS										SA41503-03RE1	
106-93-4	1,2-Dibromoethane (EDB)	BRL		µg/l	0.5	1	EPA 524.2	07-Mar-06	07-Mar-06	6030362	RLJ
74-95-3	Dibromomethane	BRL		µg/l	0.5	1	"	"	"	"	"
95-50-1	1,2-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
541-73-1	1,3-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
106-46-7	1,4-Dichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-71-8	Dichlorodifluoromethane (Freon12)	BRL		µg/l	0.5	1	"	"	"	"	"
75-34-3	1,1-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
107-06-2	1,2-Dichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
75-35-4	1,1-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-59-2	cis-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
156-60-5	trans-1,2-Dichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
78-87-5	1,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
142-28-9	1,3-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
594-20-7	2,2-Dichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
563-58-6	1,1-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-01-5	cis-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
10061-02-6	trans-1,3-Dichloropropene	BRL		µg/l	0.5	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
87-68-3	Hexachlorobutadiene	BRL		µg/l	0.5	1	"	"	"	"	"
591-78-6	2-Hexanone (MBK)	BRL		µg/l	10.0	1	"	"	"	"	"
98-82-8	Isopropylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
99-87-6	4-Isopropyltoluene	BRL		µg/l	0.5	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	2.6		µg/l	0.5	1	"	"	"	"	"
10-10-1	4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0	1	"	"	"	"	"
75-09-2	Methylene chloride	BRL		µg/l	0.5	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	0.5	1	"	"	"	"	"
103-65-1	n-Propylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
100-42-5	Styrene	BRL		µg/l	0.5	1	"	"	"	"	"
630-20-6	1,1,1,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-34-5	1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
127-18-4	Tetrachloroethene	0.9		µg/l	0.5	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	0.5	1	"	"	"	"	"
87-61-6	1,2,3-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
120-82-1	1,2,4-Trichlorobenzene	BRL		µg/l	0.5	1	"	"	"	"	"
71-55-6	1,1,1-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-00-5	1,1,2-Trichloroethane	BRL		µg/l	0.5	1	"	"	"	"	"
79-01-6	Trichloroethene	BRL		µg/l	0.5	1	"	"	"	"	"
75-69-4	Trichlorofluoromethane (Freon 11)	BRL		µg/l	0.5	1	"	"	"	"	"
96-18-4	1,2,3-Trichloropropane	BRL		µg/l	0.5	1	"	"	"	"	"
95-63-6	1,2,4-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
108-67-8	1,3,5-Trimethylbenzene	BRL		µg/l	0.5	1	"	"	"	"	"
75-01-4	Vinyl chloride	BRL		µg/l	0.5	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	0.5	1	"	"	"	"	"
109-99-9	Tetrahydrofuran	BRL		µg/l	10.0	1	"	"	"	"	"
994-05-8	Tert-amyl methyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
637-92-3	Ethyl tert-butyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
108-20-3	Di-isopropyl ether	BRL		µg/l	0.5	1	"	"	"	"	"
75-55-0	Tert-Butanol / butyl alcohol	BRL		µg/l	10.0	1	"	"	"	"	"

Irrigate recoveries:

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 51

Sample Identification131 Main St
SA41503-03Client Project #

91-204082.02

Matrix

Drinking Water

Collection Date/Time

01-Mar-06 11:10

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds4.2 Purgeable Organic Compounds

SA41503-03RE1

Prepared by method SW846 5030 Water MS

460-00-4	4-Bromofluorobenzene	95.8		70-130 %			EPA 524.2	07-Mar-06	07-Mar-06	6030362	RLJ
2037-26-5	Toluene-d8	101		70-130 %			"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	89.2		70-130 %			"	"	"	"	"
1869-53-7	Dibromofluoromethane	85.8		70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL	mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL	µg/l	5.43	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL	µg/l	5.43	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL	µg/l	5.43	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL	µg/l	5.43	1	"	"	"	"	"

Surrogate recoveries:

36-33-2	1-Chlorooctadecane	32.2	S-GC	40-140 %			"	"	"	"	"
5-1	Ortho-Terphenyl	57.5		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	48.5		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	78.6		40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 51

Sample Identification

DCW-3

SA41503-04

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 15:00

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3 Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6 o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	94.6	70-130 %	"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	92.4	70-130 %	"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL		µg/l	5.49	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL		µg/l	5.49	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL		µg/l	5.49	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL		µg/l	5.49	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	47.7	40-140 %	"	"	"	"	"
84-15-1 Ortho-Terphenyl	56.6	40-140 %	"	"	"	"	"
580-13-2 2-Bromonaphthalene	63.6	40-140 %	"	"	"	"	"
321-60-8 2-Fluorobiphenyl	84.8	40-140 %	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 51

Sample IdentificationDCW-5
SA41503-05Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 09:50

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	21.8			µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	5	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	5	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	101			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	97.2			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.21	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.21	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.21	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.21	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	59.3			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	73.3			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	63.5			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	86.1			40-140 %			"	"	"	"	"

Semivolatile Organic Compounds by GCMS

Filtration	Completed			N/A		1	EPA 200.7	07-Mar-06	07-Mar-06	6030339	WG

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 51

Sample IdentificationDCW-6
SA41503-06Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 10:00

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
	C9-C12 Aliphatic Hydrocarbons	0.130		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	0.254		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	0.385		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	8.6		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	30.1		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	13.2		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	6.8		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	98.8			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	95.8			70-130 %		"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	0.5		mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	0.8		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	0.8		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	1.4		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	1.4		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	11.2		µg/l	5.95	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	8.62		µg/l	5.95	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.95	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.95	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	46.4			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	57.1			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	74.6			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	75.6			40-140 %		"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0237		mg/l	0.0100	1	SW846 6010B	09-Mar-06	10-Mar-06	6030528	RE
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	09-Mar-06	09-Mar-06	6030509	YP
General Chemistry Parameters											
14797-55-8	Nitrate as N	0.100		mg/l	0.100	1	EPA 300.0	02-Mar-06 13:00	02-Mar-06	6030188	Alex
08-79-8	Sulfate as SO4	17.2		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 51

Sample Identification

DCW-8

SA41503-07

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 11:40

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	100			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	98.6			70-130 %		"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.32	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.32	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.32	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.32	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	57.9			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	65.2			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	61.0			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	96.0			40-140 %		"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	BRL		mg/l	0.0100	1	SW846 6010B	09-Mar-06	10-Mar-06	6030528	RE
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	09-Mar-06	09-Mar-06	6030509	YP
General Chemistry Parameters											
14797-55-8	Nitrate as N	1.09		mg/l	0.100	1	EPA 300.0	02-Mar-06 13:00	02-Mar-06	6030188	Alex
108-79-8	Sulfate as SO4	10.6		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 51

Sample Identification

DCW-9

SA41503-08

Client Project

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 12:15

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
PH Aliphatic/Aromatic Carbon Ranges											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
VPH Target Analytes											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
96-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
Surrogate recoveries:											
615-59-8	2,5-Dibromotoluene (FID)	101		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	97.6		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
EPH Aliphatic/Aromatic Ranges											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
EPH Diesel Target PAH Analytes											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.26	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.26	1	"	"	"	"	"
Surrogate recoveries:											
3386-33-2	1-Chlorooctadecane	34.6	S-GC	40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	55.3		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	78.1		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	85.7		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0158		mg/l	0.0100	1	SW846 6010B	09-Mar-06	10-Mar-06	6030528	RE
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	09-Mar-06	09-Mar-06	6030509	YP
General Chemistry Parameters											
14797-55-8	Nitrate as N	1.06		mg/l	0.100	1	EPA 300.0	02-Mar-06 13:00	02-Mar-06	6030188	Alex
108-79-8	Sulfate as SO4	24.0		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 14 of 51

Sample Identification

DCW-10

SA41503-09

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 13:05

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	93.0		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	90.2		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.26	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.26	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	56.8		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	52.9		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	71.0		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	80.8		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0405		mg/l	0.0100	1	SW846 6010B	09-Mar-06	10-Mar-06	6030528	RE
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	09-Mar-06	09-Mar-06	6030509	YP
General Chemistry Parameters											
14797-55-8	Nitrate as N	1.10		mg/l	0.100	1	EPA 300.0	02-Mar-06 13:00	02-Mar-06	6030188	Alex
808-79-8	Sulfate as SO4	19.2		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 15 of 51

Sample Identification**KEI-4**

SA41503-10

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 09:30

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds**PH Aliphatic/Aromatic Carbon Ranges**

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	5	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	5	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

460-00-4 4-Bromofluorobenzene				70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (GCMS)				70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (FID)	92.0			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	86.4			70-130 %			"	"	"	"	"

Extractable Petroleum Hydrocarbons**PH Aliphatic/Aromatic Ranges**

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.75	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.75	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.75	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.75	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	40.2			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	49.0			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	81.5			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	88.7			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 16 of 51

Sample Identification

ECS-1

SA41503-11

Client Project

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 10:31

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	0.499		mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	09-Mar-06	13-Mar-06	6030634	jrO
	C9-C12 Aliphatic Hydrocarbons	0.441		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	0.787		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	0.726		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	1.23		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	77.4		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	98.1		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	167		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	14.4		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	29.9		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	6.9		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	93.2		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	83.4		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	0.3		mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	0.9		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	1.0		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	1.2		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	1.3		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	59.5		µg/l	5.10	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	57.7		µg/l	5.10	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.10	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.10	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	44.9		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	53.1		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	53.7		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	81.4		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	119		mg/l	0.0100	1	SW846 6010B	09-Mar-06	10-Mar-06	6030528	RE
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	09-Mar-06	09-Mar-06	6030509	YP
General Chemistry Parameters											
14797-55-8	Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	02-Mar-06 13:00	02-Mar-06	6030188	Alex
808-79-8	Sulfate as SO4	6.50		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 17 of 51

Sample IdentificationECS-7
SA41503-12Client Project #
91-204082.02Matrix
Ground WaterCollection Date/Time
01-Mar-06 15:50Received
02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	08-Mar-06	08-Mar-06	6030407	MaR
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	BRL			µg/l	5.0	5	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	5	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	99.2	70-130 %	"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	94.6	70-130 %	"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.32	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.32	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.32	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.32	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	40.8	40-140 %	"	"	"	"
84-15-1 Ortho-Terphenyl	60.5	40-140 %	"	"	"	"
580-13-2 2-Bromonaphthalene	76.5	40-140 %	"	"	"	"
321-60-8 2-Fluorobiphenyl	79.8	40-140 %	"	"	"	"

Soluble Metals by EPA 6000/7000 Series Methods

7439-89-6 Iron	3.76	mg/l	0.0100	1	SW846 6010B	09-Mar-06	10-Mar-06	6030528	RE

Soluble Metals by EPA 200 Series Methods

Filtration	Lab Filtered	N/A		1	EPA 200.7/3005A	09-Mar-06	09-Mar-06	6030509	YP

General Chemistry Parameters

14797-55-8 Nitrate as N	0.300	mg/l	0.100	1	EPA 300.0	02-Mar-06 13:00	02-Mar-06	6030188	Alex
5008-79-8 Sulfate as SO4	10.8	mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 18 of 51

Sample Identification

ECS-10

SA41503-13

Client Project #

91-204082.02

Matrix

Oil

Collection Date/Time

01-Mar-06 11:35

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds

Volatile Organic Aromatics by SW846 8260B

I-02

Prepared by method SW846 5030 Soil (high level)

71-43-2	Benzene	101,000		µg/kg	74300	100000	SW 846 8260B	24-Apr-06	24-Apr-06	6041423	EK
100-41-4	Ethylbenzene	172,000		µg/kg	149000	100000	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	96,600		µg/kg	74300	100000	"	"	"	"	"
108-88-3	Toluene	372,000		µg/kg	149000	100000	"	"	"	"	"
1330-20-7	m,p-Xylene	876,000		µg/kg	297000	100000	"	"	"	"	"
95-47-6	o-Xylene	370,000		µg/kg	149000	100000	"	"	"	"	"

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	97.0			70-130 %		"	"	"	"	"
2037-26-5	Toluene-d8	95.7			70-130 %		"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	88.7			70-130 %		"	"	"	"	"
1868-53-7	Dibromofluoromethane	85.7			70-130 %		"	"	"	"	"

Extractable Petroleum HydrocarbonsForensic Petroleum Evaluation

Prepared by method SW846 3550B

8006-61-9	Gasoline	<10%		mg/kg	19200	1	+SW846 8100Mod.	03-Mar-06	15-Mar-06	6030170	MB
68476-30-2	Fuel Oil #2	>90%		mg/kg	19200	1	"	"	"	"	"
68476-31-3	Fuel Oil #4	BRL		mg/kg	19200	1	"	"	"	"	"
68553-00-4	Fuel Oil #6	BRL		mg/kg	19200	1	"	"	"	"	"
M09800000	Motor Oil	BRL		mg/kg	19200	1	"	"	"	"	"
8032-32-4	Ligroin	BRL		mg/kg	19200	1	"	"	"	"	"
J00100000	Aviation Fuel	BRL		mg/kg	19200	1	"	"	"	"	"
	Unidentified	BRL		mg/kg	19200	1	"	"	"	"	"
	Other Oil	BRL		mg/kg	19200	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	1,000,000		mg/kg	19200	1	"	"	"	"	"

TPH 8100 by GC

Prepared by method SW846 3550B

8006-61-9	Gasoline	BRL		mg/kg	19200	1	"	03-Mar-06	06-Mar-06	6030155	JD
68476-30-2	Fuel Oil #2	1,000,000		mg/kg	19200	1	"	"	"	"	"
68476-31-3	Fuel Oil #4	BRL		mg/kg	19200	1	"	"	"	"	"
68553-00-4	Fuel Oil #6	BRL		mg/kg	19200	1	"	"	"	"	"
M09800000	Motor Oil	BRL		mg/kg	19200	1	"	"	"	"	"
8032-32-4	Ligroin	BRL		mg/kg	19200	1	"	"	"	"	"
J00100000	Aviation Fuel	BRL		mg/kg	19200	1	"	"	"	"	"
	Unidentified	BRL		mg/kg	19200	1	"	"	"	"	"
	Other Oil	BRL		mg/kg	19200	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	1,000,000		mg/kg	19200	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	44.1			40-140 %		"	"	"	"	"

Total Metals by EPA 200 Series Methods

7704-34-9	Sulfur	60.8		mg/kg	3.44	1	EPA 200.7	03-Apr-06	04-Apr-06	6031755	RE

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 19 of 51

Sample Identification

DCW-7

SA41503-14

Client Project #

91-204082.02

Matrix

Oil

Collection Date/Time

01-Mar-06 10:45

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds

Volatile Organic Aromatics by SW846 8260B

1-02,
R-05

Prepared by method SW846 5030 Soil (high level)

71-43-2	Benzene	BRL		µg/kg	39900	50000	SW 846 8260B	25-Apr-06	25-Apr-06	6041501	EK
100-41-4	Ethylbenzene	285,000		µg/kg	79700	50000	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/kg	39900	50000	"	"	"	"	"
108-88-3	Toluene	BRL		µg/kg	79700	50000	"	"	"	"	"
1330-20-7	m,p-Xylene	803,000		µg/kg	159000	50000	"	"	"	"	"
95-47-6	o-Xylene	402,000		µg/kg	79700	50000	"	"	"	"	"

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	94.0		70-130 %			"	"	"	"	"
2037-26-5	Toluene-d8	93.7		70-130 %			"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	84.0		70-130 %			"	"	"	"	"
1868-53-7	Dibromofluoromethane	85.7		70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsForensic Petroleum Evaluation

Prepared by method SW846 3550B

8006-61-9	Gasoline	BRL		mg/kg	16300	1	+SW846 8100Mod.	03-Mar-06	15-Mar-06	6030170	MB
68476-30-2	Fuel Oil #2	1,000,000		mg/kg	16300	1	"	"	"	"	"
68476-31-3	Fuel Oil #4	BRL		mg/kg	16300	1	"	"	"	"	"
68553-00-4	Fuel Oil #6	BRL		mg/kg	16300	1	"	"	"	"	"
M09800000	Motor Oil	BRL		mg/kg	16300	1	"	"	"	"	"
8032-32-4	Ligroin	BRL		mg/kg	16300	1	"	"	"	"	"
J00100000	Aviation Fuel	BRL		mg/kg	16300	1	"	"	"	"	"
	Unidentified	BRL		mg/kg	16300	1	"	"	"	"	"
	Other Oil	BRL		mg/kg	16300	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	1,000,000		mg/kg	16300	1	"	"	"	"	"

TPH 8100 by GC

Prepared by method SW846 3550B

8006-61-9	Gasoline	BRL		mg/kg	16300	1	"	03-Mar-06	06-Mar-06	6030155	JD
68476-30-2	Fuel Oil #2	1,000,000		mg/kg	16300	1	"	"	"	"	"
68476-31-3	Fuel Oil #4	BRL		mg/kg	16300	1	"	"	"	"	"
68553-00-4	Fuel Oil #6	BRL		mg/kg	16300	1	"	"	"	"	"
M09800000	Motor Oil	BRL		mg/kg	16300	1	"	"	"	"	"
8032-32-4	Ligroin	BRL		mg/kg	16300	1	"	"	"	"	"
J00100000	Aviation Fuel	BRL		mg/kg	16300	1	"	"	"	"	"
	Unidentified	BRL		mg/kg	16300	1	"	"	"	"	"
	Other Oil	BRL		mg/kg	16300	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	1,000,000		mg/kg	16300	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	49.1		40-140 %			"	"	"	"	"

Total Metals by EPA 200 Series Methods

7704-34-9	Sulfur	62.5		mg/kg	3.74	1	EPA 200.7	03-Apr-06	04-Apr-06	6031755	RE

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 20 of 51

Sample Identification

Trip Blank
SA41503-15

Client Project #

91-204082.02

Matrix

Aqueous

Collection Date/Time

01-Mar-06 00:00

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev. 1.1	07-Mar-06	08-Mar-06	6030379	jrO
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	109		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	95.2		70-130 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 21 of 51

Sample IdentificationDCW-4
SA41503-16**Client Project #**

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 13:40

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds**PH Aliphatic/Aromatic Carbon Ranges**

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.300	20	+MADEP 5/2004 Rev. 1.1	07-Mar-06	08-Mar-06	6030379	jrO
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.100	20	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	0.188			mg/l	0.100	20	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	1.85			mg/l	0.300	20	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.278			mg/l	0.100	20	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	20.0	20	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	20.0	20	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	1,630		µg/l	20.0	20	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	20.0	20	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	20.0	20	"	"	"	"	"
1330-20-7	m,p-Xylene	84.6		µg/l	40.0	20	"	"	"	"	"
95-47-6	o-Xylene	46.5		µg/l	20.0	20	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	114			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	98.4			70-130 %		"	"	"	"	"

Extractable Petroleum Hydrocarbons**EPH Aliphatic/Aromatic Ranges**

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	0.5			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	0.5			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	0.5			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	0.5			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	7.12		µg/l	6.25	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	6.25	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	6.25	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	6.25	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	40.3			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	45.1			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	68.6			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	86.0			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 22 of 51

Sample Identification

ERW-3

SA41503-17

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 13:05

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	0.869			mg/l	0.150	10	+MADEP 5/2004 Rev. 1.1	07-Mar-06	08-Mar-06	6030379	jrO
C9-C12 Aliphatic Hydrocarbons	0.813			mg/l	0.0500	10	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	1.45			mg/l	0.0500	10	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	3.35			mg/l	0.150	10	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	2.26			mg/l	0.0500	10	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	17.6			µg/l	10.0	10	"	"	"	"	"
100-41-4 Ethylbenzene	32.8			µg/l	10.0	10	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	1,230			µg/l	10.0	10	"	"	"	"	"
91-20-3 Naphthalene	69.3			µg/l	10.0	10	"	"	"	"	"
108-88-3 Toluene	59.2			µg/l	10.0	10	"	"	"	"	"
1330-20-7 m,p-Xylene	739			µg/l	20.0	10	"	"	"	"	"
95-47-6 o-Xylene	404			µg/l	10.0	10	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	95.0			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	84.6			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	0.4			mg/l	0.2	1	+MADEP 5/2004 R	07-Mar-06	10-Mar-06	6030339	JD
C19-C36 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	0.8			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	0.8			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	1.1			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	1.2			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	22.6			µg/l	5.38	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	11.8			µg/l	5.38	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.38	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.38	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	53.2			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	51.9			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	64.7			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	72.8			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 23 of 51

Sample IdentificationECS-4
SA41503-18Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

01-Mar-06 13:55

Received

02-Mar-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic CompoundsVPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.750	50	+MADEP 5/2004 Rev. 1.1	07-Mar-06	08-Mar-06	6030379	jrO
C9-C12 Aliphatic Hydrocarbons	1.29			mg/l	0.250	50	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	1.51			mg/l	0.250	50	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	6.00			mg/l	0.750	50	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	2.81			mg/l	0.250	50	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	352			µg/l	50.0	50	"	"	"	"	"
100-41-4 Ethylbenzene	127			µg/l	50.0	50	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	4,760			µg/l	50.0	50	"	"	"	"	"
91-20-3 Naphthalene	153			µg/l	50.0	50	"	"	"	"	"
108-88-3 Toluene	127			µg/l	50.0	50	"	"	"	"	"
1330-20-7 m,p-Xylene	184			µg/l	100	50	"	"	"	"	"
95-47-6 o-Xylene	96.7			µg/l	50.0	50	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	107			70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	91.0			70-130 %			"	"	"	"	"

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	1.7			mg/l	0.2	1	+MADEP 5/2004 R	08-Mar-06	11-Mar-06	6030406	JD
C19-C36 Aliphatic Hydrocarbons	0.6			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	2.1			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	2.3			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	4.4			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	4.5			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	63.4			µg/l	6.10	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	68.0			µg/l	6.10	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	6.10	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	6.10	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	52.6			40-140 %			"	"	"	"	"
84-15-1 Ortho-Terphenyl	42.1			40-140 %			"	"	"	"	"
580-13-2 2-Bromonaphthalene	78.1			40-140 %			"	"	"	"	"
321-60-8 2-Fluorobiphenyl	79.7			40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 24 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030283 - SW846 5030 Water MS										
Blank (6030283-BLK1)										
Prepared & Analyzed: 06-Mar-06										
Acetone	BRL		µg/l	10.0						
Acrylonitrile	BRL		µg/l	1.0						
Benzene	BRL		µg/l	0.5						
Bromobenzene	BRL		µg/l	0.5						
Bromochloromethane	BRL		µg/l	0.5						
Bromodichloromethane	BRL		µg/l	0.5						
Bromoform	BRL		µg/l	0.5						
Bromomethane	BRL		µg/l	0.5						
2-Butanone (MEK)	BRL		µg/l	10.0						
n-Butylbenzene	BRL		µg/l	0.5						
sec-Butylbenzene	BRL		µg/l	0.5						
tert-Butylbenzene	BRL		µg/l	0.5						
Carbon disulfide	BRL		µg/l	0.5						
Carbon tetrachloride	BRL		µg/l	0.5						
Chlorobenzene	BRL		µg/l	0.5						
Chloroethane	BRL		µg/l	0.5						
Chloroform	BRL		µg/l	0.5						
Chloromethane	BRL		µg/l	0.5						
2-Chlorotoluene	BRL		µg/l	0.5						
4-Chlorotoluene	BRL		µg/l	0.5						
1,2-Dibromo-3-chloropropane	BRL		µg/l	0.5						
Dibromochloromethane	BRL		µg/l	0.5						
1,2-Dibromoethane (EDB)	BRL		µg/l	0.5						
Dibromomethane	BRL		µg/l	0.5						
1,2-Dichlorobenzene	BRL		µg/l	0.5						
1,3-Dichlorobenzene	BRL		µg/l	0.5						
1,4-Dichlorobenzene	BRL		µg/l	0.5						
Dichlorodifluoromethane (Freon12)	BRL		µg/l	0.5						
1,1-Dichloroethane	BRL		µg/l	0.5						
1,2-Dichloroethane	BRL		µg/l	0.5						
1,1-Dichloroethene	BRL		µg/l	0.5						
cis-1,2-Dichloroethene	BRL		µg/l	0.5						
trans-1,2-Dichloroethene	BRL		µg/l	0.5						
1,2-Dichloropropane	BRL		µg/l	0.5						
1,3-Dichloropropane	BRL		µg/l	0.5						
2,2-Dichloropropane	BRL		µg/l	0.5						
1,1-Dichloropropene	BRL		µg/l	0.5						
cis-1,3-Dichloropropene	BRL		µg/l	0.5						
trans-1,3-Dichloropropene	BRL		µg/l	0.5						
Ethylbenzene	BRL		µg/l	0.5						
Hexachlorobutadiene	BRL		µg/l	0.5						
2-Hexanone (MBK)	BRL		µg/l	10.0						
Isopropylbenzene	BRL		µg/l	0.5						
4-Isopropyltoluene	BRL		µg/l	0.5						
Methyl tert-butyl ether	BRL		µg/l	0.5						
4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0						
Methylene chloride	BRL		µg/l	0.5						
Naphthalene	BRL		µg/l	0.5						
n-Propylbenzene	BRL		µg/l	0.5						
Styrene	BRL		µg/l	0.5						
1,1,1,2-Tetrachloroethane	BRL		µg/l	0.5						
1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5						
Tetrachloroethene	BRL		µg/l	0.5						
Toluene	BRL		µg/l	0.5						
1,2,3-Trichlorobenzene	BRL		µg/l	0.5						

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* Reportable Detection Limit

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Page 25 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030283 - SW846 5030 Water MS										
Blank (6030283-BLK1)										
Prepared & Analyzed: 06-Mar-06										
1,2,4-Trichlorobenzene	BRL		µg/l	0.5						
1,1,1-Trichloroethane	BRL		µg/l	0.5						
1,1,2-Trichloroethane	BRL		µg/l	0.5						
Trichloroethene	BRL		µg/l	0.5						
Trichlorofluoromethane (Freon 11)	BRL		µg/l	0.5						
1,2,3-Trichloropropane	BRL		µg/l	0.5						
1,2,4-Trimethylbenzene	BRL		µg/l	0.5						
1,3,5-Trimethylbenzene	BRL		µg/l	0.5						
Vinyl chloride	BRL		µg/l	0.5						
m,p-Xylene	BRL		µg/l	0.5						
o-Xylene	BRL		µg/l	0.5						
Tetrahydrofuran	BRL		µg/l	10.0						
Tert-amyl methyl ether	BRL		µg/l	0.5						
Ethyl tert-butyl ether	BRL		µg/l	0.5						
Di-isopropyl ether	BRL		µg/l	0.5						
Tert-Butanol / butyl alcohol	BRL		µg/l	10.0						
Surrogate: 4-Bromofluorobenzene	48.1		µg/l		50.0		96.2	70-130		
Surrogate: Toluene-d8	50.4		µg/l		50.0		101	70-130		
Surrogate: 1,2-Dichloroethane-d4	43.8		µg/l		50.0		87.6	70-130		
Surrogate: Dibromofluoromethane	42.2		µg/l		50.0		84.4	70-130		
LCS (6030283-BS1)										
Prepared & Analyzed: 06-Mar-06										
Acetone	20.8		µg/l		20.0		104	70-130		
Acrylonitrile	19.6		µg/l		20.0		98.0	70-130		
Benzene	18.1		µg/l		20.0		90.5	80-120		
Bromobenzene	20.0		µg/l		20.0		100	80-120		
Bromochloromethane	16.9		µg/l		20.0		84.5	80-120		
Bromodichloromethane	24.3	QC-2	µg/l		20.0		122	80-120		
Bromoform	26.0	QC-2	µg/l		20.0		130	80-120		
Bromomethane	21.0		µg/l		20.0		105	80-120		
2-Butanone (MEK)	16.1		µg/l		20.0		80.5	70-130		
n-Butylbenzene	19.0		µg/l		20.0		95.0	80-120		
sec-Butylbenzene	19.3		µg/l		20.0		96.5	80-120		
tert-Butylbenzene	19.1		µg/l		20.0		95.5	80-120		
Carbon disulfide	20.4		µg/l		20.0		102	70-130		
Carbon tetrachloride	23.9		µg/l		20.0		120	80-120		
Chlorobenzene	19.8		µg/l		20.0		99.0	80-120		
Chloroethane	19.7		µg/l		20.0		98.5	80-120		
Chloroform	16.6		µg/l		20.0		83.0	80-120		
Chloromethane	23.6		µg/l		20.0		118	80-120		
2-Chlorotoluene	18.8		µg/l		20.0		94.0	80-120		
4-Chlorotoluene	19.2		µg/l		20.0		96.0	80-120		
1,2-Dibromo-3-chloropropane	21.0		µg/l		20.0		105	80-120		
Dibromochloromethane	25.4	QC-2	µg/l		20.0		127	80-120		
1,2-Dibromoethane (EDB)	20.0		µg/l		20.0		100	80-120		
Dibromomethane	20.4		µg/l		20.0		102	80-120		
1,2-Dichlorobenzene	19.9		µg/l		20.0		99.5	80-120		
1,3-Dichlorobenzene	20.0		µg/l		20.0		100	80-120		
1,4-Dichlorobenzene	19.1		µg/l		20.0		95.5	80-120		
Dichlorodifluoromethane (Freon12)	23.5		µg/l		20.0		118	80-120		
1,1-Dichloroethane	17.4		µg/l		20.0		87.0	80-120		
1,2-Dichloroethane	17.0		µg/l		20.0		85.0	80-120		
1,1-Dichloroethene	17.1		µg/l		20.0		85.5	80-120		
trans-1,2-Dichloroethene	16.9		µg/l		20.0		84.5	80-120		
cis-1,2-Dichloroethene	15.3	QC-2	µg/l		20.0		76.5	80-120		

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* Reportable Detection Limit

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Page 26 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030283 - SW846 5030 Water MS										
CS (6030283-BS1)										
Prepared & Analyzed: 06-Mar-06										
1,2-Dichloropropane	21.0		µg/l		20.0		105	80-120		
1,3-Dichloropropane	19.7		µg/l		20.0		98.5	80-120		
2,2-Dichloropropane	17.4		µg/l		20.0		87.0	80-120		
1,1-Dichloropropene	16.1		µg/l		20.0		80.5	80-120		
cis-1,3-Dichloropropene	20.7		µg/l		20.0		104	80-120		
trans-1,3-Dichloropropene	19.7		µg/l		20.0		98.5	80-120		
Ethylbenzene	20.0		µg/l		20.0		100	80-120		
Hexachlorobutadiene	19.2		µg/l		20.0		96.0	80-120		
2-Hexanone (MBK)	18.9		µg/l		20.0		94.5	70-130		
Isopropylbenzene	19.2		µg/l		20.0		96.0	80-120		
4-Isopropyltoluene	19.4		µg/l		20.0		97.0	80-120		
Methyl tert-butyl ether	16.5		µg/l		20.0		82.5	80-120		
4-Methyl-2-pentanone (MIBK)	19.6		µg/l		20.0		98.0	70-130		
Methylene chloride	18.1		µg/l		20.0		90.5	80-120		
Naphthalene	20.3		µg/l		20.0		102	80-120		
n-Propylbenzene	19.8		µg/l		20.0		99.0	80-120		
Styrene	19.9		µg/l		20.0		99.5	80-120		
1,1,1,2-Tetrachloroethane	23.3		µg/l		20.0		116	80-120		
1,1,2,2-Tetrachloroethane	20.9		µg/l		20.0		104	80-120		
Tetrachloroethene	18.6		µg/l		20.0		93.0	80-120		
Toluene	18.9		µg/l		20.0		94.5	80-120		
1,2,3-Trichlorobenzene	20.4		µg/l		20.0		102	80-120		
1,2,4-Trichlorobenzene	18.4		µg/l		20.0		92.0	80-120		
1,1,1-Trichloroethane	18.8		µg/l		20.0		94.0	80-120		
1,1,2-Trichloroethane	20.2		µg/l		20.0		101	80-120		
Trichloroethene	19.0		µg/l		20.0		95.0	80-120		
Trichlorofluoromethane (Freon 11)	20.0		µg/l		20.0		100	80-120		
1,2,3-Trichloropropane	21.1		µg/l		20.0		106	80-120		
1,2,4-Trimethylbenzene	19.4		µg/l		20.0		97.0	80-120		
1,3,5-Trimethylbenzene	18.8		µg/l		20.0		94.0	80-120		
Vinyl chloride	24.0		µg/l		20.0		120	80-120		
m,p-Xylene	39.0		µg/l		40.0		97.5	80-120		
o-Xylene	20.0		µg/l		20.0		100	80-120		
Tetrahydrofuran	16.7		µg/l		20.0		83.5	70-130		
Tert-amyl methyl ether	18.8		µg/l		20.0		94.0	70-130		
Ethyl tert-butyl ether	18.8		µg/l		20.0		94.0	70-130		
Di-isopropyl ether	17.2		µg/l		20.0		86.0	70-130		
Tert-Butanol / butyl alcohol	155		µg/l		200		77.5	70-130		
Surrogate: 4-Bromofluorobenzene	50.9		µg/l		50.0		102	70-130		
Surrogate: Toluene-d8	50.3		µg/l		50.0		101	70-130		
Surrogate: 1,2-Dichloroethane-d4	43.1		µg/l		50.0		86.2	70-130		
Surrogate: Dibromofluoromethane	42.6		µg/l		50.0		85.2	70-130		
Matrix Spike (6030283-MS1) Source: SA41378-01										
Prepared & Analyzed: 06-Mar-06										
Benzene	18.2		µg/l		20.0	BRL	91.0	80-120		
Chlorobenzene	21.0		µg/l		20.0	BRL	105	80-120		
1,1-Dichloroethene	19.1		µg/l		20.0	BRL	95.5	80-120		
Toluene	19.4		µg/l		20.0	BRL	97.0	80-120		
Trichloroethene	20.5		µg/l		20.0	BRL	102	80-120		
Surrogate: 4-Bromofluorobenzene	49.7		µg/l		50.0		99.4	70-130		
Surrogate: Toluene-d8	49.6		µg/l		50.0		99.2	70-130		
Surrogate: 1,2-Dichloroethane-d4	43.5		µg/l		50.0		87.0	70-130		
Surrogate: Dibromofluoromethane	42.0		µg/l		50.0		84.0	70-130		
Matrix Spike Dup (6030283-MSD1) Source: SA41378-01										

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 27 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030283 - SW846 5030 Water MS										
Prepared & Analyzed: 06-Mar-06										
Benzene	18.2		µg/l		20.0	BRL	91.0	80-120	0.00	20
Chlorobenzene	21.1		µg/l		20.0	BRL	106	80-120	0.948	20
1,1-Dichloroethene	19.0		µg/l		20.0	BRL	95.0	80-120	0.525	20
Toluene	19.9		µg/l		20.0	BRL	99.5	80-120	2.54	20
Trichloroethene	21.1		µg/l		20.0	BRL	106	80-120	3.85	20
Surrogate: 4-Bromofluorobenzene	49.2		µg/l		50.0		98.4	70-130		
Surrogate: Toluene-d8	49.5		µg/l		50.0		99.0	70-130		
Surrogate: 1,2-Dichloroethane-d4	43.5		µg/l		50.0		87.0	70-130		
Surrogate: Dibromofluoromethane	41.8		µg/l		50.0		83.6	70-130		

Batch 6030362 - SW846 5030 Water MS

Blank (6030362-BLK1)

Prepared & Analyzed: 07-Mar-06

Acetone	BRL		µg/l	10.0
Acrylonitrile	BRL		µg/l	1.0
Benzene	BRL		µg/l	0.5
Bromobenzene	BRL		µg/l	0.5
Bromochloromethane	BRL		µg/l	0.5
Bromodichloromethane	BRL		µg/l	0.5
Bromoform	BRL		µg/l	0.5
Bromomethane	BRL		µg/l	0.5
2-Butanone (MEK)	BRL		µg/l	10.0
n-Butylbenzene	BRL		µg/l	0.5
sec-Butylbenzene	BRL		µg/l	0.5
tert-Butylbenzene	BRL		µg/l	0.5
Carbon disulfide	BRL		µg/l	0.5
Carbon tetrachloride	BRL		µg/l	0.5
Chlorobenzene	BRL		µg/l	0.5
Chloroethane	BRL		µg/l	0.5
Chloroform	BRL		µg/l	0.5
Chloromethane	BRL		µg/l	0.5
2-Chlorotoluene	BRL		µg/l	0.5
4-Chlorotoluene	BRL		µg/l	0.5
1,2-Dibromo-3-chloropropane	BRL		µg/l	0.5
Dibromochloromethane	BRL		µg/l	0.5
1,2-Dibromoethane (EDB)	BRL		µg/l	0.5
Dibromomethane	BRL		µg/l	0.5
1,2-Dichlorobenzene	BRL		µg/l	0.5
1,3-Dichlorobenzene	BRL		µg/l	0.5
1,4-Dichlorobenzene	BRL		µg/l	0.5
Dichlorodifluoromethane (Freon12)	BRL		µg/l	0.5
1,1-Dichloroethane	BRL		µg/l	0.5
1,2-Dichloroethane	BRL		µg/l	0.5
1,1-Dichloroethene	BRL		µg/l	0.5
cis-1,2-Dichloroethene	BRL		µg/l	0.5
trans-1,2-Dichloroethene	BRL		µg/l	0.5
1,2-Dichloropropane	BRL		µg/l	0.5
1,3-Dichloropropane	BRL		µg/l	0.5
2,2-Dichloropropane	BRL		µg/l	0.5
1,1-Dichloropropene	BRL		µg/l	0.5
cis-1,3-Dichloropropene	BRL		µg/l	0.5
trans-1,3-Dichloropropene	BRL		µg/l	0.5
Ethylbenzene	BRL		µg/l	0.5
Hexachlorobutadiene	BRL		µg/l	0.5
2-Hexanone (MBK)	BRL		µg/l	10.0
Isopropylbenzene	BRL		µg/l	0.5
Isopropyltoluene	BRL		µg/l	0.5

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030362 - SW846 5030 Water MS										
Blank (6030362-BLK1)										
Prepared & Analyzed: 07-Mar-06										
Methyl tert-butyl ether	BRL		µg/l	0.5						
4-Methyl-2-pentanone (MIBK)	BRL		µg/l	10.0						
Methylene chloride	BRL		µg/l	0.5						
Naphthalene	BRL		µg/l	0.5						
n-Propylbenzene	BRL		µg/l	0.5						
Styrene	BRL		µg/l	0.5						
1,1,1,2-Tetrachloroethane	BRL		µg/l	0.5						
1,1,2,2-Tetrachloroethane	BRL		µg/l	0.5						
Tetrachloroethene	BRL		µg/l	0.5						
Toluene	BRL		µg/l	0.5						
1,2,3-Trichlorobenzene	BRL		µg/l	0.5						
1,2,4-Trichlorobenzene	BRL		µg/l	0.5						
1,1,1-Trichloroethane	BRL		µg/l	0.5						
1,1,2-Trichloroethane	BRL		µg/l	0.5						
Trichloroethene	BRL		µg/l	0.5						
Trichlorofluoromethane (Freon 11)	BRL		µg/l	0.5						
1,2,3-Trichloropropane	BRL		µg/l	0.5						
1,2,4-Trimethylbenzene	BRL		µg/l	0.5						
1,3,5-Trimethylbenzene	BRL		µg/l	0.5						
Vinyl chloride	BRL		µg/l	0.5						
m,p-Xylene	BRL		µg/l	0.5						
o-Xylene	BRL		µg/l	0.5						
Tetrahydrofuran	BRL		µg/l	10.0						
Tert-amyl methyl ether	BRL		µg/l	0.5						
Ethyl tert-butyl ether	BRL		µg/l	0.5						
i-Isopropyl ether	BRL		µg/l	0.5						
tert-Butanol / butyl alcohol	BRL		µg/l	10.0						
Surrogate: 4-Bromofluorobenzene	48.8		µg/l		50.0		97.6	70-130		
Surrogate: Toluene-d8	50.1		µg/l		50.0		100	70-130		
Surrogate: 1,2-Dichloroethane-d4	43.8		µg/l		50.0		87.6	70-130		
Surrogate: Dibromofluoromethane	43.2		µg/l		50.0		86.4	70-130		
LCS (6030362-BS1)										
Prepared & Analyzed: 07-Mar-06										
Acetone	35.2	QC-2	µg/l		20.0		176	70-130		
Acrylonitrile	19.6		µg/l		20.0		98.0	70-130		
Benzene	18.8		µg/l		20.0		94.0	80-120		
Bromobenzene	20.6		µg/l		20.0		103	80-120		
Bromochloromethane	17.2		µg/l		20.0		86.0	80-120		
Bromodichloromethane	24.4	QC-2	µg/l		20.0		122	80-120		
Bromoform	23.4		µg/l		20.0		117	80-120		
Bromomethane	23.9		µg/l		20.0		120	80-120		
2-Butanone (MEK)	22.2		µg/l		20.0		111	70-130		
n-Butylbenzene	21.5		µg/l		20.0		108	80-120		
sec-Butylbenzene	20.5		µg/l		20.0		102	80-120		
tert-Butylbenzene	20.0		µg/l		20.0		100	80-120		
Carbon disulfide	22.1		µg/l		20.0		110	70-130		
Carbon tetrachloride	23.9		µg/l		20.0		120	80-120		
Chlorobenzene	20.7		µg/l		20.0		104	80-120		
Chloroethane	20.9		µg/l		20.0		104	80-120		
Chloroform	17.2		µg/l		20.0		86.0	80-120		
Chloromethane	25.4	QC-2	µg/l		20.0		127	80-120		
2-Chlorotoluene	20.2		µg/l		20.0		101	80-120		
4-Chlorotoluene	20.5		µg/l		20.0		102	80-120		
1,2-Dibromo-3-chloropropane	18.8		µg/l		20.0		94.0	80-120		
1,1-Dibromochloromethane	24.2	QC-2	µg/l		20.0		121	80-120		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 29 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030362 - SW846 5030 Water MS										
CS (6030362-BS1)										
Prepared & Analyzed: 07-Mar-06										
1,2-Dibromoethane (EDB)	20.2		µg/l		20.0		101	80-120		
Dibromomethane	20.7		µg/l		20.0		104	80-120		
1,2-Dichlorobenzene	20.4		µg/l		20.0		102	80-120		
1,3-Dichlorobenzene	20.6		µg/l		20.0		103	80-120		
1,4-Dichlorobenzene	20.2		µg/l		20.0		101	80-120		
Dichlorodifluoromethane (Freon12)	27.0	QC-2	µg/l		20.0		135	80-120		
1,1-Dichloroethane	18.3		µg/l		20.0		91.5	80-120		
1,2-Dichloroethane	17.2		µg/l		20.0		86.0	80-120		
1,1-Dichloroethene	18.2		µg/l		20.0		91.0	80-120		
cis-1,2-Dichloroethene	18.3		µg/l		20.0		91.5	80-120		
trans-1,2-Dichloroethene	16.4		µg/l		20.0		82.0	80-120		
1,2-Dichloropropane	21.4		µg/l		20.0		107	80-120		
1,3-Dichloropropane	19.7		µg/l		20.0		98.5	80-120		
2,2-Dichloropropane	17.4		µg/l		20.0		87.0	80-120		
1,1-Dichloropropene	17.3		µg/l		20.0		86.5	80-120		
cis-1,3-Dichloropropene	20.6		µg/l		20.0		103	80-120		
trans-1,3-Dichloropropene	19.0		µg/l		20.0		95.0	80-120		
Ethylbenzene	20.9		µg/l		20.0		104	80-120		
Hexachlorobutadiene	20.8		µg/l		20.0		104	80-120		
2-Hexanone (MBK)	23.8		µg/l		20.0		119	70-130		
Isopropylbenzene	20.6		µg/l		20.0		103	80-120		
4-Isopropyltoluene	21.0		µg/l		20.0		105	80-120		
Methyl tert-butyl ether	16.5		µg/l		20.0		82.5	80-120		
4-Methyl-2-pentanone (MIBK)	18.6		µg/l		20.0		93.0	70-130		
Methylene chloride	18.6		µg/l		20.0		93.0	80-120		
n-Phthalene	20.3		µg/l		20.0		102	80-120		
n-Propylbenzene	21.1		µg/l		20.0		106	80-120		
Styrene	20.6		µg/l		20.0		103	80-120		
1,1,1,2-Tetrachloroethane	23.1		µg/l		20.0		116	80-120		
1,1,2,2-Tetrachloroethane	19.8		µg/l		20.0		99.0	80-120		
Tetrachloroethene	20.6		µg/l		20.0		103	80-120		
Toluene	19.8		µg/l		20.0		99.0	80-120		
1,2,3-Trichlorobenzene	20.6		µg/l		20.0		103	80-120		
1,2,4-Trichlorobenzene	19.4		µg/l		20.0		97.0	80-120		
1,1,1-Trichloroethane	18.6		µg/l		20.0		93.0	80-120		
1,1,2-Trichloroethane	20.2		µg/l		20.0		101	80-120		
Trichloroethene	20.3		µg/l		20.0		102	80-120		
Trichlorofluoromethane (Freon 11)	21.9		µg/l		20.0		110	80-120		
1,2,3-Trichloropropane	20.6		µg/l		20.0		103	80-120		
1,2,4-Trimethylbenzene	20.5		µg/l		20.0		102	80-120		
1,3,5-Trimethylbenzene	20.0		µg/l		20.0		100	80-120		
Vinyl chloride	23.9		µg/l		20.0		120	80-120		
m,p-Xylene	40.5		µg/l		40.0		101	80-120		
o-Xylene	20.8		µg/l		20.0		104	80-120		
Tetrahydrofuran	16.1		µg/l		20.0		80.5	70-130		
Tert-amyl methyl ether	19.4		µg/l		20.0		97.0	70-130		
Ethyl tert-butyl ether	18.4		µg/l		20.0		92.0	70-130		
Di-isopropyl ether	17.9		µg/l		20.0		89.5	70-130		
Tert-Butanol / butyl alcohol	149		µg/l		200		74.5	70-130		
Surrogate: 4-Bromofluorobenzene	49.8		µg/l		50.0		99.6	70-130		
Surrogate: Toluene-d8	50.6		µg/l		50.0		101	70-130		
Surrogate: 1,2-Dichloroethane-d4	42.8		µg/l		50.0		85.6	70-130		
Surrogate: Dibromofluoromethane	42.9		µg/l		50.0		85.8	70-130		

Matrix Spike (6030362-MS1)

Source: SA41425-15RE1

Prepared & Analyzed: 07-Mar-06

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 30 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030362 - SW846 5030 Water MS										
Matrix Spike (6030362-MS1) Source: SA41425-15RE1										
Prepared & Analyzed: 07-Mar-06										
Benzene	18.3		µg/l		20.0	BRL	91.5	80-120		
Chlorobenzene	21.0		µg/l		20.0	BRL	105	80-120		
1,1-Dichloroethene	19.5		µg/l		20.0	BRL	97.5	80-120		
Toluene	19.6		µg/l		20.0	BRL	98.0	80-120		
Trichloroethene	20.5		µg/l		20.0	BRL	102	80-120		
Surrogate: 4-Bromofluorobenzene	48.0		µg/l		50.0		96.0	70-130		
Surrogate: Toluene-d8	49.6		µg/l		50.0		99.2	70-130		
Surrogate: 1,2-Dichloroethane-d4	44.2		µg/l		50.0		88.4	70-130		
Surrogate: Dibromofluoromethane	42.3		µg/l		50.0		84.6	70-130		
Matrix Spike Dup (6030362-MSD1) Source: SA41425-15RE1										
Prepared & Analyzed: 07-Mar-06										
Benzene	18.6		µg/l		20.0	BRL	93.0	80-120	1.63	20
Chlorobenzene	21.2		µg/l		20.0	BRL	106	80-120	0.948	20
1,1-Dichloroethene	18.7		µg/l		20.0	BRL	93.5	80-120	4.19	20
Toluene	19.9		µg/l		20.0	BRL	99.5	80-120	1.52	20
Trichloroethene	20.5		µg/l		20.0	BRL	102	80-120	0.00	20
Surrogate: 4-Bromofluorobenzene	47.3		µg/l		50.0		94.6	70-130		
Surrogate: Toluene-d8	49.3		µg/l		50.0		98.6	70-130		
Surrogate: 1,2-Dichloroethane-d4	44.1		µg/l		50.0		88.2	70-130		
Surrogate: Dibromofluoromethane	42.1		µg/l		50.0		84.2	70-130		
Batch 6030379 - VPH										
Blank (6030379-BLK1)										
Prepared & Analyzed: 07-Mar-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	54.8		µg/l		50.0		110	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	47.2		µg/l		50.0		94.4	70-130		
LCS (6030379-BS1)										
Prepared: 07-Mar-06 Analyzed: 08-Mar-06										
C5-C8 Aliphatic Hydrocarbons	150		mg/l		140		107	70-130		
C9-C12 Aliphatic Hydrocarbons	58.2		mg/l		55.2		105	70-130		
C9-C10 Aromatic Hydrocarbons	41.9		mg/l		40.0		105	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	254		mg/l		280		90.7	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	100		mg/l		84.8		118	70-130		
Benzene	14.7		µg/l		20.0		73.5	70-130		
Ethylbenzene	14.4		µg/l		20.0		72.0	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030379 - VPH										
CS (6030379-BS1)										
Prepared: 07-Mar-06 Analyzed: 08-Mar-06										
Methyl tert-butyl ether	15.4		µg/l		20.0		77.0	70-130		
Naphthalene	17.5		µg/l		20.0		87.5	70-130		
Toluene	14.5		µg/l		20.0		72.5	70-130		
m,p-Xylene	29.6		µg/l		40.0		74.0	70-130		
o-Xylene	15.3		µg/l		20.0		76.5	70-130		
2-Methylpentane	15.4		µg/l		20.0		77.0	70-130		
n-Nonane	15.8		µg/l		20.0		79.0	70-130		
n-Pentane	14.2		µg/l		20.0		71.0	70-130		
1,2,4-Trimethylbenzene	16.0		µg/l		20.0		80.0	70-130		
2,2,4-Trimethylpentane	17.4		µg/l		20.0		87.0	70-130		
n-Butylcyclohexane	17.9		µg/l		20.0		89.5	70-130		
n-Decane	16.3		µg/l		20.0		81.5	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	54.0		µg/l		50.0		108	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.0		µg/l		50.0		90.0	70-130		
LCS Dup (6030379-BSD1)										
Prepared & Analyzed: 07-Mar-06										
C5-C8 Aliphatic Hydrocarbons	133		mg/l		140		95.0	70-130	11.9	25
C9-C12 Aliphatic Hydrocarbons	60.3		mg/l		55.2		109	70-130	3.74	25
C9-C10 Aromatic Hydrocarbons	40.5		mg/l		40.0		101	70-130	3.88	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	254		mg/l		280		90.7	70-130	0.00	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	101		mg/l		84.8		119	70-130	0.844	25
Benzene	16.5		µg/l		20.0		82.5	70-130	11.5	25
Ethylbenzene	17.0		µg/l		20.0		85.0	70-130	16.6	25
Methyl tert-butyl ether	17.3		µg/l		20.0		86.5	70-130	11.6	25
Naphthalene	19.9		µg/l		20.0		99.5	70-130	12.8	25
Toluene	17.1		µg/l		20.0		85.5	70-130	16.5	25
m,p-Xylene	34.6		µg/l		40.0		86.5	70-130	15.6	25
o-Xylene	18.1		µg/l		20.0		90.5	70-130	16.8	25
2-Methylpentane	20.1	QR-02	µg/l		20.0		100	70-130	26.0	25
n-Nonane	18.8		µg/l		20.0		94.0	70-130	17.3	25
n-Pentane	16.9		µg/l		20.0		84.5	70-130	17.4	25
1,2,4-Trimethylbenzene	18.1		µg/l		20.0		90.5	70-130	12.3	25
2,2,4-Trimethylpentane	20.1		µg/l		20.0		100	70-130	13.9	25
n-Butylcyclohexane	19.5		µg/l		20.0		97.5	70-130	8.56	25
n-Decane	17.2		µg/l		20.0		86.0	70-130	5.37	25
Surrogate: 2,5-Dibromotoluene (FID)	58.5		µg/l		50.0		117	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	47.5		µg/l		50.0		95.0	70-130		
Duplicate (6030379-DUP1) Source: SA41533-01										
Prepared: 07-Mar-06 Analyzed: 08-Mar-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.0136			1.46	50
C9-C12 Aliphatic Hydrocarbons	0.0319		mg/l	0.0250		0.0331			3.69	50
C9-C10 Aromatic Hydrocarbons	0.0369		mg/l	0.0250		0.0361			2.19	50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.0136			1.46	50
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.0687		mg/l	0.0250		0.0692			0.725	50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	5.1		µg/l	5.0		5.1			0.00	50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	58.2		µg/l		50.0		116	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	50.8		µg/l		50.0		102	70-130		
Matrix Spike (6030379-MS1) Source: SA41533-01										

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 32 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030379 - VPH										
Prepared: 07-Mar-06 Analyzed: 08-Mar-06										
Benzene	14.7		µg/l		20.0	BRL	73.5	70-130		
Ethylbenzene	14.1		µg/l		20.0	BRL	70.5	70-130		
Methyl tert-butyl ether	16.5		µg/l		20.0	BRL	82.5	70-130		
Naphthalene	23.7		µg/l		20.0	5.09	93.0	70-130		
Toluene	14.3		µg/l		20.0	BRL	71.5	70-130		
m,p-Xylene	28.0		µg/l		40.0	BRL	70.0	70-130		
o-Xylene	14.5		µg/l		20.0	BRL	72.5	70-130		
2-Methylpentane	14.9		µg/l		20.0	BRL	74.5	70-130		
n-Nonane	16.1		µg/l		20.0	BRL	80.5	70-130		
n-Pentane	14.1		µg/l		20.0	BRL	70.5	70-130		
1,2,4-Trimethylbenzene	14.2		µg/l		20.0	BRL	71.0	70-130		
2,2,4-Trimethylpentane	16.6		µg/l		20.0	BRL	83.0	70-130		
n-Butylcyclohexane	20.6		µg/l		20.0	0.528	100	70-130		
n-Decane	19.8		µg/l		20.0	0.0	99.0	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	52.8		µg/l		50.0		106	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	43.3		µg/l		50.0		86.6	70-130		

Batch 6030407 - VPH

Blank (6030407-BLK1)

Prepared & Analyzed: 08-Mar-06

C5-C8 Aliphatic Hydrocarbons	BRL	mg/l	0.0750							
C9-C12 Aliphatic Hydrocarbons	BRL	mg/l	0.0250							
C9-C10 Aromatic Hydrocarbons	BRL	mg/l	0.0250							
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	mg/l	0.0750							
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	mg/l	0.0250							
Benzene	BRL	µg/l	5.0							
Ethylbenzene	BRL	µg/l	5.0							
Methyl tert-butyl ether	BRL	µg/l	5.0							
Naphthalene	BRL	µg/l	5.0							
Toluene	BRL	µg/l	5.0							
m,p-Xylene	BRL	µg/l	10.0							
o-Xylene	BRL	µg/l	5.0							
2-Methylpentane	BRL	µg/l	5.0							
n-Nonane	BRL	µg/l	10.0							
n-Pentane	BRL	µg/l	10.0							
1,2,4-Trimethylbenzene	BRL	µg/l	5.0							
2,2,4-Trimethylpentane	BRL	µg/l	5.0							
n-Butylcyclohexane	BRL	µg/l	5.0							
n-Decane	BRL	µg/l	5.0							
Surrogate: 2,5-Dibromotoluene (FID)	46.7	µg/l			50.0		93.4	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.5	µg/l			50.0		91.0	70-130		

LCS (6030407-BS1)

Prepared & Analyzed: 08-Mar-06

C5-C8 Aliphatic Hydrocarbons	128	mg/l			140		91.4	70-130		
C9-C12 Aliphatic Hydrocarbons	52.9	mg/l			55.2		95.8	70-130		
C9-C10 Aromatic Hydrocarbons	32.7	mg/l			40.0		81.8	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	251	mg/l			280		89.6	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	85.6	mg/l			84.8		101	70-130		
Benzene	17.0	µg/l			20.0		85.0	70-130		
Ethylbenzene	17.6	µg/l			20.0		88.0	70-130		
Methyl tert-butyl ether	19.0	µg/l			20.0		95.0	70-130		
Naphthalene	17.8	µg/l			20.0		89.0	70-130		
Toluene	17.3	µg/l			20.0		86.5	70-130		
m,p-Xylene	35.1	µg/l			40.0		87.8	70-130		
o-Xylene	17.6	µg/l			20.0		88.0	70-130		
2-Methylpentane	15.0	µg/l			20.0		75.0	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 33 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030407 - VPH										
CS (6030407-BS1)										
Prepared & Analyzed: 08-Mar-06										
n-Nonane	16.1		µg/l		20.0		80.5	70-130		
n-Pentane	14.0		µg/l		20.0		70.0	70-130		
1,2,4-Trimethylbenzene	18.7		µg/l		20.0		93.5	70-130		
2,2,4-Trimethylpentane	18.0		µg/l		20.0		90.0	70-130		
n-Butylcyclohexane	18.1		µg/l		20.0		90.5	70-130		
n-Decane	16.8		µg/l		20.0		84.0	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	45.1		µg/l		50.0		90.2	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	42.9		µg/l		50.0		85.8	70-130		
LCS Dup (6030407-BSD1)										
Prepared & Analyzed: 08-Mar-06										
C5-C8 Aliphatic Hydrocarbons	122		mg/l		140		87.1	70-130	4.82	25
C9-C12 Aliphatic Hydrocarbons	48.5		mg/l		55.2		87.9	70-130	8.60	25
C9-C10 Aromatic Hydrocarbons	38.7		mg/l		40.0		96.8	70-130	16.8	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	251		mg/l		280		89.6	70-130	0.00	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	87.1		mg/l		84.8		103	70-130	1.96	25
Benzene	17.6		µg/l		20.0		88.0	70-130	3.47	25
Ethylbenzene	18.4		µg/l		20.0		92.0	70-130	4.44	25
Methyl tert-butyl ether	19.5		µg/l		20.0		97.5	70-130	2.60	25
Naphthalene	19.9		µg/l		20.0		99.5	70-130	11.1	25
Toluene	17.9		µg/l		20.0		89.5	70-130	3.41	25
m,p-Xylene	36.8		µg/l		40.0		92.0	70-130	4.67	25
o-Xylene	18.6		µg/l		20.0		93.0	70-130	5.52	25
2-Methylpentane	15.2		µg/l		20.0		76.0	70-130	1.32	25
n-Nonane	16.7		µg/l		20.0		83.5	70-130	3.66	25
n-Pentane	14.0		µg/l		20.0		70.0	70-130	0.00	25
1,2,4-Trimethylbenzene	19.6		µg/l		20.0		98.0	70-130	4.70	25
2,2,4-Trimethylpentane	17.5		µg/l		20.0		87.5	70-130	2.82	25
n-Butylcyclohexane	17.8		µg/l		20.0		89.0	70-130	1.67	25
n-Decane	18.3		µg/l		20.0		91.5	70-130	8.55	25
Surrogate: 2,5-Dibromotoluene (FID)	48.9		µg/l		50.0		97.8	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	47.0		µg/l		50.0		94.0	70-130		
Duplicate (6030407-DUP1) Source: SA41519-02										
Prepared & Analyzed: 08-Mar-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		0.00632			9.97	50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		0.00716			13.3	50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	51.8		µg/l		50.0		104	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	49.9		µg/l		50.0		99.8	70-130		
Matrix Spike (6030407-MS1) Source: SA41519-02										
Prepared & Analyzed: 08-Mar-06										
Benzene	18.3		µg/l		20.0	BRL	91.5	70-130		
Ethylbenzene	18.9		µg/l		20.0	BRL	94.5	70-130		
Methyl tert-butyl ether	19.3		µg/l		20.0	BRL	96.5	70-130		
Naphthalene	19.5		µg/l		20.0	BRL	97.5	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030407 - VPH										
Matrix Spike (6030407-MS1) Source: SA41519-02										
Prepared & Analyzed: 08-Mar-06										
Toluene	18.4		µg/l		20.0	BRL	92.0	70-130		
m,p-Xylene	37.9		µg/l		40.0	BRL	94.8	70-130		
o-Xylene	18.8		µg/l		20.0	BRL	94.0	70-130		
2-Methylpentane	18.3		µg/l		20.0	BRL	91.5	70-130		
n-Nonane	18.3		µg/l		20.0	BRL	91.5	70-130		
n-Pentane	16.4		µg/l		20.0	BRL	82.0	70-130		
1,2,4-Trimethylbenzene	20.0		µg/l		20.0	BRL	100	70-130		
2,2,4-Trimethylpentane	19.7		µg/l		20.0	BRL	98.5	70-130		
n-Butylcyclohexane	20.2		µg/l		20.0	0.0	101	70-130		
n-Decane	18.6		µg/l		20.0	0.0	93.0	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	49.8		µg/l		50.0		99.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	47.8		µg/l		50.0		95.6	70-130		
Batch 6030634 - VPH										
Blank (6030634-BLK1)										
Prepared & Analyzed: 13-Mar-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	53.5		µg/l		50.0		107	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	46.0		µg/l		50.0		92.0	70-130		
LCS (6030634-BS1)										
Prepared & Analyzed: 13-Mar-06										
C5-C8 Aliphatic Hydrocarbons	124		mg/l		140		88.6	70-130		
C9-C12 Aliphatic Hydrocarbons	58.4		mg/l		55.2		106	70-130		
C9-C10 Aromatic Hydrocarbons	41.9		mg/l		40.0		105	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	236		mg/l		280		84.3	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	100		mg/l		84.8		118	70-130		
Benzene	16.8		µg/l		20.0		84.0	70-130		
Ethylbenzene	15.4		µg/l		20.0		77.0	70-130		
Methyl tert-butyl ether	15.0		µg/l		20.0		75.0	70-130		
Naphthalene	16.7		µg/l		20.0		83.5	70-130		
Toluene	16.2		µg/l		20.0		81.0	70-130		
m,p-Xylene	32.1		µg/l		40.0		80.2	70-130		
o-Xylene	16.3		µg/l		20.0		81.5	70-130		
2-Methylpentane	23.3		µg/l		20.0		116	70-130		
n-Nonane	19.9		µg/l		20.0		99.5	70-130		
n-Pentane	24.6		µg/l		20.0		123	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 35 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030634 - VPH										
CS (6030634-BS1)										
Prepared & Analyzed: 13-Mar-06										
1,2,4-Trimethylbenzene	16.8		µg/l		20.0		84.0	70-130		
2,2,4-Trimethylpentane	21.1		µg/l		20.0		106	70-130		
n-Butylcyclohexane	18.8		µg/l		20.0		94.0	70-130		
n-Decane	19.2		µg/l		20.0		96.0	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	48.1		µg/l		50.0		96.2	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	40.0		µg/l		50.0		80.0	70-130		
LCS Dup (6030634-BSD1)										
Prepared & Analyzed: 13-Mar-06										
C5-C8 Aliphatic Hydrocarbons	124		mg/l		140		88.6	70-130	0.00	25
C9-C12 Aliphatic Hydrocarbons	59.4		mg/l		55.2		108	70-130	1.87	25
C9-C10 Aromatic Hydrocarbons	41.1		mg/l		40.0		103	70-130	1.92	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	237		mg/l		280		84.6	70-130	0.355	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	100		mg/l		84.8		118	70-130	0.00	25
Benzene	16.5		µg/l		20.0		82.5	70-130	1.80	25
Ethylbenzene	15.4		µg/l		20.0		77.0	70-130	0.00	25
Methyl tert-butyl ether	17.1		µg/l		20.0		85.5	70-130	13.1	25
Naphthalene	17.9		µg/l		20.0		89.5	70-130	6.94	25
Toluene	16.3		µg/l		20.0		81.5	70-130	0.615	25
m,p-Xylene	31.6		µg/l		40.0		79.0	70-130	1.51	25
o-Xylene	16.1		µg/l		20.0		80.5	70-130	1.23	25
2-Methylpentane	21.4		µg/l		20.0		107	70-130	8.07	25
n-Nonane	19.3		µg/l		20.0		96.5	70-130	3.06	25
n-Pentane	24.5		µg/l		20.0		122	70-130	0.816	25
1,2,4-Trimethylbenzene	16.5		µg/l		20.0		82.5	70-130	1.80	25
2,2,4-Trimethylpentane	22.3		µg/l		20.0		112	70-130	5.50	25
n-Butylcyclohexane	18.9		µg/l		20.0		94.5	70-130	0.531	25
n-Decane	17.6		µg/l		20.0		88.0	70-130	8.70	25
Surrogate: 2,5-Dibromotoluene (FID)	49.6		µg/l		50.0		99.2	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	40.1		µg/l		50.0		80.2	70-130		
Duplicate (6030634-DUP1) Source: SA41725-07										
Prepared & Analyzed: 13-Mar-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	49.3		µg/l		50.0		98.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	42.3		µg/l		50.0		84.6	70-130		
Matrix Spike (6030634-MS1) Source: SA41725-07										
Prepared & Analyzed: 13-Mar-06										
Benzene	17.0		µg/l		20.0	BRL	85.0	70-130		
Ethylbenzene	16.6		µg/l		20.0	BRL	83.0	70-130		
Methyl tert-butyl ether	17.3		µg/l		20.0	BRL	86.5	70-130		
Naphthalene	18.6		µg/l		20.0	0.887	88.6	70-130		
Toluene	16.5		µg/l		20.0	BRL	82.5	70-130		
m,p-Xylene	33.6		µg/l		40.0	BRL	84.0	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 36 of 51

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	Limit
Batch 6030634 - VPH										
Matrix Spike (6030634-MS1) Source: SA41725-07										
Prepared & Analyzed: 13-Mar-06										
o-Xylene	17.0		µg/l		20.0	BRL	85.0	70-130		
2-Methylpentane	21.7		µg/l		20.0	BRL	108	70-130		
n-Nonane	19.5		µg/l		20.0	BRL	97.5	70-130		
n-Pentane	25.5		µg/l		20.0	BRL	128	70-130		
1,2,4-Trimethylbenzene	17.6		µg/l		20.0	BRL	88.0	70-130		
2,2,4-Trimethylpentane	22.4		µg/l		20.0	BRL	112	70-130		
n-Butylcyclohexane	20.0		µg/l		20.0	0.0	100	70-130		
n-Decane	20.8		µg/l		20.0	0.0	104	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	51.6		µg/l		50.0		103	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	40.7		µg/l		50.0		81.4	70-130		
Batch 6041423 - SW846 5030 Soil (high level)										
Blank (6041423-BLK1)										
Prepared & Analyzed: 24-Apr-06										
Benzene	BRL		µg/kg	1.0						
Ethylbenzene	BRL		µg/kg	1.0						
Methyl tert-butyl ether	BRL		µg/kg	1.0						
Toluene	BRL		µg/kg	1.0						
m,p-Xylene	BRL		µg/kg	2.0						
o-Xylene	BRL		µg/kg	1.0						
Chlorobenzene	BRL		µg/kg	1.0						
1,1-Dichloroethene	BRL		µg/kg	1.0						
Trichloroethene	BRL		µg/kg	1.0						
Surrogate: 4-Bromofluorobenzene	28.6		µg/kg		30.0		95.3	70-130		
Surrogate: Toluene-d8	28.6		µg/kg		30.0		95.3	70-130		
Surrogate: 1,2-Dichloroethane-d4	26.1		µg/kg		30.0		87.0	70-130		
Surrogate: Dibromofluoromethane	27.3		µg/kg		30.0		91.0	70-130		
LCS (6041423-BS1)										
Prepared & Analyzed: 24-Apr-06										
Benzene	24.2		µg/kg		20.0		121	70-130		
Ethylbenzene	22.3		µg/kg		20.0		112	70-130		
Methyl tert-butyl ether	19.3		µg/kg		20.0		96.5	70-130		
Toluene	21.7		µg/kg		20.0		108	70-130		
m,p-Xylene	46.0		µg/kg		40.0		115	70-130		
o-Xylene	22.4		µg/kg		20.0		112	70-130		
Surrogate: 4-Bromofluorobenzene	28.9		µg/kg		30.0		96.3	70-130		
Surrogate: Toluene-d8	29.4		µg/kg		30.0		98.0	70-130		
Surrogate: 1,2-Dichloroethane-d4	24.7		µg/kg		30.0		82.3	70-130		
Surrogate: Dibromofluoromethane	25.5		µg/kg		30.0		85.0	70-130		
LCS Dup (6041423-BSD1)										
Prepared & Analyzed: 24-Apr-06										
Benzene	23.3		µg/kg		20.0		116	70-130	4.22	25
Ethylbenzene	22.2		µg/kg		20.0		111	70-130	0.897	25
Methyl tert-butyl ether	19.8		µg/kg		20.0		99.0	70-130	2.56	25
Toluene	20.4		µg/kg		20.0		102	70-130	5.71	25
m,p-Xylene	45.8		µg/kg		40.0		114	70-130	0.873	25
o-Xylene	23.0		µg/kg		20.0		115	70-130	2.64	25
Surrogate: 4-Bromofluorobenzene	28.6		µg/kg		30.0		95.3	70-130		
Surrogate: Toluene-d8	28.1		µg/kg		30.0		93.7	70-130		
Surrogate: 1,2-Dichloroethane-d4	25.2		µg/kg		30.0		84.0	70-130		
Surrogate: Dibromofluoromethane	24.9		µg/kg		30.0		83.0	70-130		
Batch 6041501 - SW846 5030 Soil (high level)										
Blank (6041501-BLK1)										

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	Limit
Batch 6041501 - SW846 5030 Soil (high level)										
Prepared & Analyzed: 25-Apr-06										
Benzene	BRL		µg/kg	1.0						
Ethylbenzene	BRL		µg/kg	1.0						
Methyl tert-butyl ether	BRL		µg/kg	1.0						
Toluene	BRL		µg/kg	1.0						
m,p-Xylene	BRL		µg/kg	2.0						
o-Xylene	BRL		µg/kg	1.0						
Chlorobenzene	BRL		µg/kg	1.0						
1,1-Dichloroethene	BRL		µg/kg	1.0						
Trichloroethene	BRL		µg/kg	1.0						
Surrogate: 4-Bromofluorobenzene	26.9		µg/kg		30.0		89.7	70-130		
Surrogate: Toluene-d8	30.0		µg/kg		30.0		100	70-130		
Surrogate: 1,2-Dichloroethane-d4	26.0		µg/kg		30.0		86.7	70-130		
Surrogate: Dibromofluoromethane	27.2		µg/kg		30.0		90.7	70-130		
LCS (6041501-BS1)										
Prepared & Analyzed: 25-Apr-06										
Benzene	22.7		µg/kg		20.0		114	70-130		
Ethylbenzene	21.4		µg/kg		20.0		107	70-130		
Methyl tert-butyl ether	20.1		µg/kg		20.0		100	70-130		
Toluene	20.6		µg/kg		20.0		103	70-130		
m,p-Xylene	43.4		µg/kg		40.0		108	70-130		
o-Xylene	21.9		µg/kg		20.0		110	70-130		
Surrogate: 4-Bromofluorobenzene	28.5		µg/kg		30.0		95.0	70-130		
Surrogate: Toluene-d8	29.0		µg/kg		30.0		96.7	70-130		
Surrogate: 1,2-Dichloroethane-d4	24.1		µg/kg		30.0		80.3	70-130		
Surrogate: Dibromofluoromethane	25.3		µg/kg		30.0		84.3	70-130		
LCS Dup (6041501-BSD1)										
Prepared & Analyzed: 25-Apr-06										
Benzene	22.9		µg/kg		20.0		114	70-130	0.00	25
Ethylbenzene	21.1		µg/kg		20.0		106	70-130	0.939	25
Methyl tert-butyl ether	18.7		µg/kg		20.0		93.5	70-130	6.72	25
Toluene	20.6		µg/kg		20.0		103	70-130	0.00	25
m,p-Xylene	42.9		µg/kg		40.0		107	70-130	0.930	25
o-Xylene	21.9		µg/kg		20.0		110	70-130	0.00	25
Surrogate: 4-Bromofluorobenzene	28.2		µg/kg		30.0		94.0	70-130		
Surrogate: Toluene-d8	28.6		µg/kg		30.0		95.3	70-130		
Surrogate: 1,2-Dichloroethane-d4	23.2		µg/kg		30.0		77.3	70-130		
Surrogate: Dibromofluoromethane	23.2		µg/kg		30.0		77.3	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 38 of 51

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030155 - SW846 3550B										
Blank (6030155-BLK1)										
Prepared: 03-Mar-06 Analyzed: 07-Mar-06										
Gasoline	BRL		mg/kg	133						
Fuel Oil #2	BRL		mg/kg	133						
Fuel Oil #4	BRL		mg/kg	133						
Fuel Oil #6	BRL		mg/kg	133						
Motor Oil	BRL		mg/kg	133						
Ligroin	BRL		mg/kg	133						
Aviation Fuel	BRL		mg/kg	133						
Unidentified	BRL		mg/kg	133						
Other Oil	BRL		mg/kg	133						
Total Petroleum Hydrocarbons	BRL		mg/kg	133						
Surrogate: 1-Chlorooctadecane	3.95		mg/kg		3.33		119	40-140		
LCS (6030155-BS1)										
Prepared: 03-Mar-06 Analyzed: 07-Mar-06										
Fuel Oil #2	796		mg/kg	13.3	667		119	40-140		
Duplicate (6030155-DUP1) Source: SA41279-01										
Prepared: 03-Mar-06 Analyzed: 07-Mar-06										
Gasoline	BRL		mg/kg	1920		BRL				50
Fuel Oil #2	BRL		mg/kg	1920		BRL				50
Fuel Oil #4	BRL		mg/kg	1920		BRL				50
Fuel Oil #6	BRL		mg/kg	1920		BRL				50
Motor Oil	BRL		mg/kg	1920		BRL				50
Ligroin	BRL		mg/kg	1920		BRL				50
Aviation Fuel	BRL		mg/kg	1920		BRL				50
Unidentified	2560		mg/kg	1920		2880			11.8	50
Other Oil	Calculated as		mg/kg	1920		BRL				50
Total Petroleum Hydrocarbons	2560		mg/kg	1920		2880			11.8	50
Surrogate: 1-Chlorooctadecane	29.2	S-02	mg/kg		4.81		607	40-140		
Batch 6030339 - SW846 3510C										
Blank (6030339-BLK1)										
Prepared: 07-Mar-06 Analyzed: 10-Mar-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.50						
2-Methylnaphthalene	BRL		µg/l	2.50						
Acenaphthene	BRL		µg/l	2.50						
Phenanthrene	BRL		µg/l	2.50						
Anthracene	BRL		µg/l	2.50						
Pyrene	BRL		µg/l	2.50						
Chrysene	BRL		µg/l	2.50						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	24.9		µg/l		50.0		49.8	40-140		
Surrogate: Ortho-Terphenyl	25.5		µg/l		50.0		51.0	40-140		
Surrogate: 2-Bromonaphthalene	30.1		µg/l		40.0		75.2	40-140		
Surrogate: 2-Fluorobiphenyl	30.9		µg/l		40.0		77.2	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 39 of 51

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030339 - SW846 3510C										
CS (6030339-BS1)										
Prepared: 07-Mar-06 Analyzed: 10-Mar-06										
C9-C18 Aliphatic Hydrocarbons	0.338		mg/l	0.2	0.600		56.3	40-140		
C19-C36 Aliphatic Hydrocarbons	0.649		mg/l	0.2	0.800		81.1	40-140		
C11-C22 Aromatic Hydrocarbons	1.18		mg/l	0.2	1.70		69.4	40-140		
Naphthalene	42.2		µg/l	2.50	100		42.2	40-140		
2-Methylnaphthalene	48.1		µg/l	2.50	100		48.1	40-140		
Acenaphthene	55.2		µg/l	2.50	100		55.2	40-140		
Phenanthrene	65.8		µg/l	2.50	100		65.8	40-140		
Anthracene	63.7		µg/l	2.50	100		63.7	40-140		
Pyrene	70.6		µg/l	2.50	100		70.6	40-140		
Chrysene	64.7		µg/l	2.50	100		64.7	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
Surrogate: 1-Chlorooctadecane	31.4		µg/l		50.0		62.8	40-140		
Surrogate: Ortho-Terphenyl	32.0		µg/l		50.0		64.0	40-140		
Surrogate: 2-Bromonaphthalene	28.0		µg/l		40.0		70.0	40-140		
Surrogate: 2-Fluorobiphenyl	31.6		µg/l		40.0		79.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (60303)										
Prepared: 07-Mar-06 Analyzed: 10-Mar-06										
C9-C18 Aliphatic Hydrocarbons	0.321		mg/l	0.2	0.600		53.5	40-140		
C19-C36 Aliphatic Hydrocarbons	0.484		mg/l	0.2	0.800		60.5	40-140		
C11-C22 Aromatic Hydrocarbons	1.44		mg/l	0.2	1.70		84.7	40-140		
Naphthalene	61.9		µg/l	2.50	100		61.9	40-140		
2-Methylnaphthalene	66.3		µg/l	2.50	100		66.3	40-140		
Acenaphthene	70.7		µg/l	2.50	100		70.7	40-140		
Phenanthrene	74.3		µg/l	2.50	100		74.3	40-140		
Anthracene	72.9		µg/l	2.50	100		72.9	40-140		
Pyrene	80.1		µg/l	2.50	100		80.1	40-140		
Chrysene	81.1		µg/l	2.50	100		81.1	40-140		
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		
Surrogate: 1-Chlorooctadecane	29.8		µg/l		50.0		59.6	40-140		
Surrogate: Ortho-Terphenyl	34.5		µg/l		50.0		69.0	40-140		
Surrogate: 2-Bromonaphthalene	28.3		µg/l		40.0		70.8	40-140		
Surrogate: 2-Fluorobiphenyl	31.5		µg/l		40.0		78.8	40-140		
LCS Dup (6030339-BSD1)										
Prepared: 07-Mar-06 Analyzed: 10-Mar-06										
C9-C18 Aliphatic Hydrocarbons	0.325		mg/l	0.2	0.600		54.2	40-140	3.80	25
C19-C36 Aliphatic Hydrocarbons	0.619		mg/l	0.2	0.800		77.4	40-140	4.67	25
C11-C22 Aromatic Hydrocarbons	1.31		mg/l	0.2	1.70		77.1	40-140	10.5	25
Naphthalene	50.1		µg/l	2.50	100		50.1	40-140	17.1	20
2-Methylnaphthalene	57.4		µg/l	2.50	100		57.4	40-140	17.6	20
Acenaphthene	62.7		µg/l	2.50	100		62.7	40-140	12.7	20
Phenanthrene	71.4		µg/l	2.50	100		71.4	40-140	8.16	20
Anthracene	67.8		µg/l	2.50	100		67.8	40-140	6.24	20
Pyrene	74.9		µg/l	2.50	100		74.9	40-140	5.91	20
Chrysene	72.0		µg/l	2.50	100		72.0	40-140	10.7	20
Naphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l		100			0-200		200
Surrogate: 1-Chlorooctadecane	27.0		µg/l		50.0		54.0	40-140		
Surrogate: Ortho-Terphenyl	35.0		µg/l		50.0		70.0	40-140		
Surrogate: 2-Bromonaphthalene	26.2		µg/l		40.0		65.5	40-140		
Surrogate: 2-Fluorobiphenyl	37.4		µg/l		40.0		93.5	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 40 of 51

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit

Batch 6030339 - SW846 3510C

Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		

Batch 6030406 - SW846 3510C

Blank (6030406-BLK1)

Prepared: 08-Mar-06 Analyzed: 10-Mar-06

C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						

LCS Dup (6030406-BSD1)

Prepared: 08-Mar-06 Analyzed: 10-Mar-06

C9-C18 Aliphatic Hydrocarbons	0.236	QC-1	mg/l	0.2	0.600		39.3	40-140		25
C19-C36 Aliphatic Hydrocarbons	0.361		mg/l	0.2	0.800		45.1	40-140		25
C11-C22 Aromatic Hydrocarbons	1.35		mg/l	0.2	1.70		79.4	40-140		25

Total Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit

Batch 6031755 - EPA 200 Series

Blank (6031755-BLK1)

Prepared: 03-Apr-06 Analyzed: 04-Apr-06

Sulfur	BRL		mg/kg	7.50						

LCS (6031755-BL1)

Prepared: 03-Apr-06 Analyzed: 04-Apr-06

Sulfur	133		mg/kg	7.50	125		106	85-115		

Duplicate (6031755-DUP1) Source: SA42634-01

Prepared: 03-Apr-06 Analyzed: 04-Apr-06

Sulfur	370	QR-05	mg/kg	6.55		4970			172	35

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* Reportable Detection Limit

BRL = Below Reporting Limit

Soluble Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030528 - SW846 3005A										
Blank (6030528-BLK1)										
Prepared: 09-Mar-06 Analyzed: 10-Mar-06										
Iron	BRL		mg/l	0.0100						
LCS (6030528-BS1)										
Prepared: 09-Mar-06 Analyzed: 10-Mar-06										
Iron	1.01		mg/l	0.0100	1.00		101	85-115		
LCS Dup (6030528-BSD1)										
Prepared: 09-Mar-06 Analyzed: 10-Mar-06										
Iron	1.03		mg/l	0.0100	1.00		103	85-115	1.96	20
Duplicate (6030528-DUP1) Source: SA41503-07										
Prepared: 09-Mar-06 Analyzed: 10-Mar-06										
Iron	BRL		mg/l	0.0100		BRL				20
Matrix Spike (6030528-MS1) Source: SA41503-08										
Prepared: 09-Mar-06 Analyzed: 10-Mar-06										
Iron	1.02		mg/l	0.0100	1.00	0.0158	100	75-125		
Matrix Spike Dup (6030528-MSD1) Source: SA41503-08										
Prepared: 09-Mar-06 Analyzed: 10-Mar-06										
Iron	1.02		mg/l	0.0100	1.00	0.0158	100	75-125	0.00	20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 42 of 51

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030188 - General Preparation										
Blank (6030188-BLK1)										
Prepared & Analyzed: 02-Mar-06										
Sulfate as SO ₄	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
Blank (6030188-BLK2)										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
LCS (6030188-BS1)										
Prepared & Analyzed: 02-Mar-06										
Sulfate as SO ₄	19.1		mg/l	1.00	20.0		95.5	90-110		
Nitrate as N	1.93		mg/l	0.100	2.00		96.5	90-110		
LCS (6030188-BS2)										
Prepared & Analyzed: 02-Mar-06										
Sulfate as SO ₄	3.87		mg/l	1.00	4.00		96.8	90-110		
Nitrate as N	0.390		mg/l	0.100	0.400		97.5	90-110		
LCS (6030188-BS3)										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	19.1		mg/l	1.00	20.0		95.5	90-110		
Nitrate as N	1.93		mg/l	0.100	2.00		96.5	90-110		
LCS (6030188-BS4)										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	3.93		mg/l	1.00	4.00		98.2	90-110		
Nitrate as N	0.400		mg/l	0.100	0.400		100	90-110		
Duplicate (6030188-DUP1) Source: SA41503-12										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	10.8		mg/l	1.00		10.8			0.00	20
Nitrate as N	0.300		mg/l	0.100		0.300			0.00	20
Duplicate (6030188-DUP2) Source: SA41507-02										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	5.43		mg/l	1.00		5.41			0.369	20
Nitrate as N	5.15		mg/l	0.100		5.12			0.584	20
Matrix Spike (6030188-MS1) Source: SA41503-12										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	14.3		mg/l	1.00	4.00	10.8	87.5	80-120		
Nitrate as N	0.730		mg/l	0.100	0.400	0.300	108	80-120		
Matrix Spike (6030188-MS2) Source: SA41507-02										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	9.89		mg/l	1.00	4.00	5.41	112	80-120		
Nitrate as N	5.54		mg/l	0.100	0.400	5.12	105	80-120		
Matrix Spike Dup (6030188-MSD1) Source: SA41503-12										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	14.3		mg/l	1.00	4.00	10.8	87.5	80-120	0.00	20
Nitrate as N	0.720		mg/l	0.100	0.400	0.300	105	80-120	1.38	20
Matrix Spike Dup (6030188-MSD2) Source: SA41507-02										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO ₄	9.88		mg/l	1.00	4.00	5.41	112	80-120	0.101	20
Nitrate as N	5.54		mg/l	0.100	0.400	5.12	105	80-120	0.00	20
Reference (6030188-SRM1)										

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* Reportable Detection Limit

BRL = Below Reporting Limit

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6030188 - General Preparation										
Prepared & Analyzed: 02-Mar-06										
Sulfate as SO4	23.7		mg/l	1.00	25.0		94.8	90-110		
Nitrate as N	2.40		mg/l	0.100	2.50		96.0	90-110		
Reference (6030188-SRM2)										
Prepared & Analyzed: 02-Mar-06										
Sulfate as SO4	4.77		mg/l	1.00	5.00		95.4	90-110		
Nitrate as N	0.500		mg/l	0.100	0.500		100	90-110		
Reference (6030188-SRM3)										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO4	23.6		mg/l	1.00	25.0		94.4	90-110		
Nitrate as N	2.38		mg/l	0.100	2.50		95.2	90-110		
Reference (6030188-SRM4)										
Prepared: 02-Mar-06 Analyzed: 03-Mar-06										
Sulfate as SO4	4.82		mg/l	1.00	5.00		96.4	90-110		
Nitrate as N	0.500		mg/l	0.100	0.500		100	90-110		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 44 of 51

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit

Batch 0603043

Calibration Check (0603043-CCV1)

C9-C18 Aliphatic Hydrocarbons	2.05805E+08	2.09197E+08	1.65	25.00
C19-C36 Aliphatic Hydrocarbons	1.93046E+08	1.60781E+08	-11.8	25.00
C11-C22 Aromatic Hydrocarbons	23605.9	18.0646	2.35	25.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0603053				
Calibration Check (0603053-CCV1)				
C9-C18 Aliphatic Hydrocarbons	2.05805E+08	2.09917E+08	2.00	25.00
C19-C36 Aliphatic Hydrocarbons	1.93046E+08	1.50875E+08	-17.2	25.00
C11-C22 Aromatic Hydrocarbons	23605.9	18.8564	6.47	25.00
Naphthalene	9.30739	10.2967	10.6	20.00
2-Methylnaphthalene	5.69985	6.56095	15.1	20.00
Acenaphthene	5.24615	5.59194	6.59	20.00
Phenanthrene	7.41243	7.26975	-1.92	20.00
Anthracene	7.475	6.79269	-9.13	20.00
Pyrene	6.88038	7.4851	8.79	20.00
Chrysene	5.48696	5.99546	9.27	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit

Batch 0603056

Calibration Check (0603056-CCV1)

C9-C18 Aliphatic Hydrocarbons	1.20456E+08	9.1724E+07	-23.9	25.00
C19-C36 Aliphatic Hydrocarbons	8.25294E+07	5.5283E+07	-14.5	25.00
C11-C22 Aromatic Hydrocarbons	21565.4	15.1292	-1.18	25.00
Naphthalene	5.37854	4.91295	-8.66	20.00
2-Methylnaphthalene	3.828	3.51921	-8.07	20.00
Acenaphthene	3.84941	3.45094	-10.4	20.00
Phenanthrene	5.88951	5.29651	-10.1	20.00
Anthracene	6.00337	5.39924	-10.1	20.00
Pyrene	6.25273	5.60728	-10.3	20.00
Chrysene	5.40581	4.62582	-14.4	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 47 of 51

Notes and Definitions

*TPH Calculated as

__RE Reanalysis for data confirmation.

☒ Comp Completed

I-02 This result was analyzed outside of the EPA recommended holding time.

LF Lab Filtered

QC-1 Analyte out of acceptance range.

QC-2 Analyte out of acceptance range in QC spike but no reportable concentration present in sample.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

QR-05 RPD out of acceptance range.

R-05 The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.

S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.

S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

Z-1 <10%

Z-1a >90%

☒ BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit
dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Interpretation of Total Petroleum Hydrocarbon Report

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from analyses of various petroleum products. Possible match categories are as follows:

- Gasoline - includes regular, unleaded, premium, etc.
- Fuel Oil #2 - includes home heating oil, #2 fuel oil, and diesel
- Fuel Oil #4 - includes #4 fuel oil
- Fuel Oil #6 - includes #6 fuel oil and bunker "C" oil
- Motor Oil - includes virgin and waste automobile oil
- Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha
- Aviation Fuel - includes kerosene, Jet A and JP-4
- Other Oil - includes lubricating and cutting oil, and silicon oil

At times, the unidentified petroleum product is quantified using a calibration that most closely approximates the distribution of compounds in the sample. When this occurs, the result is qualified as *TPH (Calculated as).

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

The following outlines the condition of all VPH samples contained within this report upon laboratory receipt.

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Sample Preservative	Aqueous (acid-preserved)	☐ N/A	☒ pH ≤ 2	☐ pH > 2
	Soil or Sediment	☒ N/A		ml Methanol/g soil ☐ 1:1 +/-25% ☐ Other:
		☐ Samples not received in Methanol or air-tight container ☐ Samples received in Methanol: ☐ covering soil/sediment ☐ not covering soil/sediment		
Temperature	☐ Received on ice ☒ Received at 4 ± 2 °C ☐ Other: °C			

Were all QA/QC procedures followed as required by the VPH method? Yes ☒ No ☐
 Were any significant modifications made to the VPH method as specified in section 11.3? No *see below
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐
 * Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GCMS using all QC criteria specified in the method

The following outlines the condition of all EPH samples contained within this report upon laboratory receipt.

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Aqueous Preservative	☐ N/A	☒ pH ≤ 2	☐ pH > 2	☐ pH adjusted to <2 in lab
Temperature	☐ Received on ice ☒ Received at 4 ± 2 °C ☐ Other: °C			

Were all QA/QC procedures followed as required by the EPH method? Yes ☒ No ☐
 Were any significant modifications made to the EPH method as specified in Section 11.3? No
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Authorized by:



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:This form provides certifications for the following Spectrum Analytical, Inc. work order #: SA41503 STORM WATER

Matrix	☒ Groundwater	☐ Soil/Sediment	☒ Drinking Water	☒ Other <u>OIL</u>	
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☒ 6010B	☐ 7470A/1A
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020	☐ 9014M ²
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³	☐ 7196A

1 List Release Tracking Number (RTN), if known

2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method

3 S - SW-846 Methods 7000 Series List individual method and analyte

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☐ Yes ☒ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Date: 5/2/2006

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit



SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 34

Report To: ECS

Duburn MA

Invoice To: ECS, Agawam

Project Mgr.: Klinger

P.O. No.: 03-045

RQN: _____

Project No.: 91-204082.02

Site Name: EAGLE GAS

Location: Carver

State: MA

Sampler(s): Steve Dabson, Akacawon

Project No.: 91-204082.02

Site Name: EAGLE GAS

Location: Carver

Sampler(s): Steve Dabson, Akacawon

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9= _____ 10= _____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=Composite X2= _____ X3= _____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix
41503-01	~~131 Main St.~~ 131 Main St.	3/1/06	8:20	G	2a
-02	~~131 Main St.~~ 131 Main St.	3/1/06	8:30	G	2a
-03	~~131 Main St.~~ 131 Main St.	3/1/06	11:10	G	2a
-04	~~131 Main St.~~ 131 Main St.	3/1/06	3:00	G	2a
-05	~~131 Main St.~~ 131 Main St.	3/1/06	9:50	G	2a
-06	~~131 Main St.~~ 131 Main St.	3/1/06	10:00	G	2a

Containers:

of VOA Vials

of Amber Glass

of Clear Glass

of Plastic

EPH w/ 4 at Targets

VPH w/ 4 at Targets

524.2

Fe (Dissolved)

Nitrate

Sulfate

QA Reporting Notes:

(check if needed)

State specific reporting standards
If applicable, please list below.

☒ Provide MCP CAM Report
Were all field QC requirements met
as per MA DEP CAM Section 2.0?
☒ Yes ☐ No
(Response required for CAM report)

Note: Filter Iron
in Lab -

Lab to filter for EPH

☐ Fax results when available to ()

☒ E-mail to Klinger

EDD Format _____

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C 4

Relinquished by:

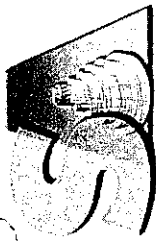
Received by:

Date:

Time:

3/1/06 9:58

3/2/06 3:25



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HARBOR TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 3 of 24

Special Handling:

- ☒ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____
- ☐ All TATs subject to laboratory approval.
- Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS Auburn

Invoice To: ECS Agawam

Project No.: 91-204082.02

Site Name: EAGLE GAS

Location: Carver

State: MA

Project Mgr.: Klingman

P.O. No.: 03-0451 RQN: _____

Sampler(s): Steve Anderson, Mike Anderson

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=C.HCL 10=_____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix
4153-13	~~SW-1~~ 3/1/06	3/1/06	11:35	G	SW
14	~~SW-2~~ 3/1/06	3/1/06	11:35	G	SW
15	~~SW-3~~ 3/1/06	3/1/06	11:35	G	SW
16	~~SW-4~~ 3/1/06	3/1/06	11:35	G	SW
17	~~SW-5~~ 3/1/06	3/1/06	11:35	G	SW
	trip blank				
	DCW-4	3/1/06	1:40	G	GW
	DCW-5	3/1/06	1:45	G	GW
	DCW-6	3/1/06	1:05	G	GW
	DCW-7	3/1/06	1:05	G	GW

Containers:

of VOA Vials
of Amber Glass
of Clear Glass
of Plastic

Analyses:

1. 10.00
2. 10.00
3. 10.00
4. 10.00
5. 10.00
6. 10.00
7. 10.00
8. 10.00
9. 10.00
10. 10.00
11. 10.00
12. 10.00
13. 10.00
14. 10.00
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87. 10.00
88. 10.00
89. 10.00
90. 10.00
91. 10.00
92. 10.00
93. 10.00
94. 10.00
95. 10.00
96. 10.00
97. 10.00
98. 10.00
99. 10.00
100. 10.00

QA Reporting Notes:

(check if needed)

State specific reporting standards
If applicable, please list below.

Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☒ Yes ☐ No
(Response required for CAM report)

☐ Fax results when available to ()

☒ E-mail to Klingman

EDD Format _____

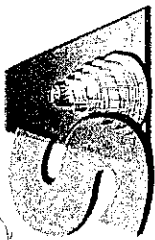
Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C 4

Relinquished by:

Received by:

Date: _____

Time: _____



SPECTRUM ANALYTICAL, INC.
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HARBOR TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 4 of 21

Special Handling:

- ☒ Standard TAT - 7 to 10 business days
☐ Rush TAT - Date Needed: _____
• All TATs subject to laboratory approval.
• Min. 24-hour notification needed for rushes.
• Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS

Invoice To: ECS - Agawam

Project No.: 91-204082-03

Project Mgr.: K. Hight

Site Name: Agawam

Project Mgr.: K. Hight

Location: MA

State: MA

Sampler(s): DA, SH

P.O. No.: 03-045

RQN: _____

I=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=_____ 10=_____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:
41503-18	ECS-4	3/1/06	1:55

Matrix Type

Preservative

of VOA Vials

of Amber Glass

of Clear Glass

of Plastic

Containers:

Analyses:

QA Reporting Notes:
(check if needed)

State specific reporting standards
If applicable, please list below.

☒ Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☒ Yes ☐ No
(Response required for CAM report)

☐ Fax results when available to ()

☐ E-mail to _____

EDD Format _____

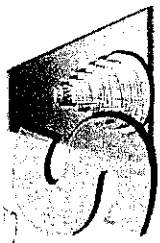
Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C _____

Relinquished by:

Received by:

Date:

Time:



SPECTRUM ANALYTICAL, INC.
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HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 4/26/06
- All TATs subject to laboratory approval.
- Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS Project No.: 91-204082-02
AUBURN Site Name: BALE GAS
Project Mgr: Chuck Klingler Location: Carver State: MA
P.O. No.: 03-0474 Sampler(s): AK, SH, DA

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Matrix Type
SA4503-13	FCS-10	3/1/06	11:35	0
SA4503-14	DW-7	3/1/06	10:45	0

Containers:

of VOA Vials
of Amber Glass
of Clear Glass
of Plastic

Analyses:

8260
M+BE : BTEX
ONLY

QA Reporting Notes:

(check if needed)

- State specific reporting standards
If applicable, please list below.
- ☐ Provide MCP CAM Report
- Were all field QC requirements met
as per MADEP CAM Section 2.0?
- ☐ Yes ☐ No
- (Response required for CAM report)

Spectrum has
samples in-house

Retinquished by:

CGL

☐ Fax results when available to ()

☒ E-mail to cklingler@ecsconsult.com

EDD Format

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C

Received by:

Date:

Time:

Submittal of this form does not constitute a request for sample pick-up. If courier service is necessary, please contact the Quality Services Department to arrange for pick-up at least 24 hours prior to the desired pick-up date.

This commitment is contingent upon routine working conditions and instrument performance.

LABORATORY APPROVAL BY: _____

* Samples must be received in the laboratory by 3:00 PM in order to meet requested TAT. Please take appropriate measures to ensure that samples are received within this timeframe.

# OF SAMPLES	MATRIX	ANALYSIS
2	OIL	8260 for M+BE & BTEX

DATE OF SAMPLE RECEIPT: 4/26/06 DATE RESULTS NEEDED: 4/26/06
 DOES THIS PROJECT ALLOW FOR 25% RUSH SURCHARGE? YES ☐ NO ☒ (PLEASE CHECK ONE)

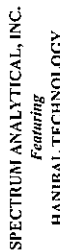
DATE: 4/19/06
 COMPANY: ECS Marin, Auburn, MA
 CONTACT PERSON: Chuck K.
 PROJECT NUMBER: 91-204082.02
 SITE LOCATION: Garner MA

RUSH ANALYSIS REQUEST TRANSMITTAL

Note: A minimum of 24-hour notification is required for rush analysis.

SPECTRUM ANALYTICAL, INC.
 Featuring
 HANIBAL TECHNOLOGY



Page 1 of 1

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
☒ Rush TAT - Date Needed: 4/26/66
 • All TATs subject to laboratory approval.
 • Min. 24-hour notification needed for rushes.
 • Samples disposed of after 60 days unless otherwise instructed.

Report To: <u>ECS</u>	Invoice To: <u>ECS</u>

AGBURN

Project Manager: Chuck Klingler

Invoice To: ELS

Aggiam

P.O. NO. 03-0774 RON:

Project No.: 91-204082.02

Site Name: EAGLE GAS

Location: Cover

Sampler(s): AK 514 DA

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9= 10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW= Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:

 $\overline{K_I}$

Mat

SA41503-13	FCS-10	3/1/06	11:35
SAV503-14	DCW-7	3/1/06	10:45

SA41503-13	FCS-10	3/1/06	11:35
SA41503-14	DCW-7	3/1/06	10:45

☐ Fax results when available to (____)

☒ E-mail to cklingbe@ccsconsult.com
EDD Format _____

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C

Relinquished by:

Received by:

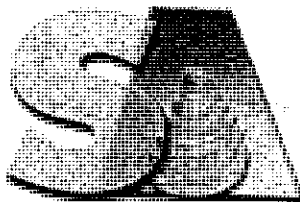
Date: _____ Time: _____

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C

11 Almgren Drive • Agawam, Massachusetts 01001 • 413-789-9018 • Fax 413-789-4076 • www.spectrum-analytical.com



Report Date:
25-Jan-06 15:41



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project #: 91-204082

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

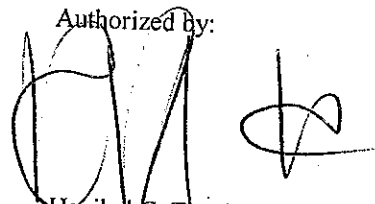
Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SA39751-01	SW-Outfall	Surface Water	18-Jan-06 09:30	19-Jan-06 14:05
SA39751-02	MH1	Surface Water	18-Jan-06 12:00	19-Jan-06 14:05
SA39751-03	MH2	Surface Water	18-Jan-06 12:30	19-Jan-06 14:05
SA39751-04	MH3	Surface Water	18-Jan-06 13:00	19-Jan-06 14:05

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.
Please note that this report contains 16 pages of analytical data plus Chain of Custody document(s).
This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc.

Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:


Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

CASE NARRATIVE:

The data set for work order SA39751 complies with internal QC criteria for the methods performed. The samples were received @ 3.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification

W-Outfall

SA39751-01

Client Project #

91-204082

Matrix

Surface Water

Collection Date/Time

18-Jan-06 09:30

Received

19-Jan-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	23-Jan-06	23-Jan-06	6011089	MaR
C9-C12 Aliphatic Hydrocarbons	0.0296			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	0.0518			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.0814			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	8.5			µg/l	5.0	5	"	"	"	"	"
106-88-3 Toluene	BRL			µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	5.0	5	"	"	"	"	"
95-47-8 o-Xylene	BRL			µg/l	10.0	5	"	"	"	"	"
	BRL			µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	99.8						"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	85.2				70-130 %		"	"	"	"	"
					70-130 %		"	"	"	"	"

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	3.0			mg/l	0.2	1	+MADEP 5/2004 R	20-Jan-06	24-Jan-06	6010993	JD
C19-C36 Aliphatic Hydrocarbons	1.7			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	1.7			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	1.7			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	6.4			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	6.4			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.49	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	9.45			µg/l	5.49	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.49	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.49	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	109				40-140 %		"	"	"	"	"
84-15-1 Ortho-Terphenyl	65.2				40-140 %		"	"	"	"	"
580-13-2 2-Bromonaphthalene	45.9				40-140 %		"	"	"	"	"
321-60-8 2-Fluorobiphenyl	93.9				40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Sample Identification

SA39751-02

Client Project #
91-204082

Matrix
Surface Water

Collection Date/Time
18-Jan-06 12:00

Received
19-Jan-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	20-Jan-06	20-Jan-06	6010999	MaR
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	105			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	93.4			70-130 %		"	"	"	"	"

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL			mg/l	0.2	1	+MADEP 5/2004 R	20-Jan-06	24-Jan-06	6010993	JD
C19-C36 Aliphatic Hydrocarbons	0.2			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	0.2			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	0.2			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	5.38	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.38	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.38	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.38	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	56.7			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	58.9			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	64.7			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	92.1			40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Sample Identification

PH2

SA39751-03

Client Project #

91-204082

Matrix

Surface Water

Collection Date/Time

18-Jan-06 12:30

Received

19-Jan-06

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>Flag</u>	<u>Units</u>	<u>*RDL</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>

Volatile Organic Compounds

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	20-Jan-06	20-Jan-06	6010999	MaR
C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	98.2		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	85.8		70-130 %			"	"	"	"	"

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	0.9			mg/l	0.2	1	+MADEP 5/2004 R	20-Jan-06	24-Jan-06	6010993	JD
C19-C36 Aliphatic Hydrocarbons	0.4			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	0.8			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	0.8			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	2.1			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	2.1			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.68	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.68	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	47.9		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	53.5		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	59.8		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	78.7		40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Sample Identification

H3

SA39751-04

Client Project #

91-204082

Matrix

Surface Water

Collection Date/Time

18-Jan-06 13:00

Received

19-Jan-06

AS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Volatile Organic Compounds

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	+MADEP 5/2004 Rev. 1.1	23-Jan-06	23-Jan-06	6011089	MaR
C9-C12 Aliphatic Hydrocarbons	0.0271			mg/l	0.0250	5	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	0.0407			mg/l	0.0250	5	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL			mg/l	0.0750	5	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.0678			mg/l	0.0250	5	"	"	"	"	"

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL			µg/l	5.0	5	"	"	"	"	"
100-41-4 Ethylbenzene	BRL			µg/l	5.0	5	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL			µg/l	5.0	5	"	"	"	"	"
91-20-3 Naphthalene	10.0			µg/l	5.0	5	"	"	"	"	"
108-88-3 Toluene	BRL			µg/l	5.0	5	"	"	"	"	"
1330-20-7 m,p-Xylene	BRL			µg/l	10.0	5	"	"	"	"	"
95-47-6 o-Xylene	BRL			µg/l	5.0	5	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	78.6				70-130 %		"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	68.2	S-GC			70-130 %		"	"	"	"	"

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	3.6			mg/l	0.2	1	+MADEP 5/2004 R	20-Jan-06	24-Jan-06	6010993	JD
C19-C36 Aliphatic Hydrocarbons	1.7			mg/l	0.2	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	2.2			mg/l	0.2	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	2.2			mg/l	0.2	1	"	"	"	"	"
Total Petroleum Hydrocarbons	7.5			mg/l	0.2	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	7.5			mg/l	0.2	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL			µg/l	5.43	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL			µg/l	5.43	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL			µg/l	5.43	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL			µg/l	5.43	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	54.9				40-140 %		"	"	"	"	"
84-15-1 Ortho-Terphenyl	63.2				40-140 %		"	"	"	"	"
580-13-2 2-Bromonaphthalene	47.6				40-140 %		"	"	"	"	"
321-60-8 2-Fluorobiphenyl	89.0				40-140 %		"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6010999 - VPH										
Blank (6010999-BLK1)										
Prepared & Analyzed: 20-Jan-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	60.8		µg/l		50.0		122	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	55.7		µg/l		50.0		111	70-130		
LCS (6010999-BS1)										
Prepared & Analyzed: 20-Jan-06										
C5-C8 Aliphatic Hydrocarbons	144		mg/l		140		103	70-130		
C9-C12 Aliphatic Hydrocarbons	56.6		mg/l		55.0		103	70-130		
C9-C10 Aromatic Hydrocarbons	48.7		mg/l		40.0		122	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	280		mg/l		280		100	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	105		mg/l		85.0		124	70-130		
Benzene	18.8		µg/l		20.0		94.0	70-130		
Ethylbenzene	19.8		µg/l		20.0		99.0	70-130		
Methyl tert-butyl ether	18.4		µg/l		20.0		92.0	70-130		
Naphthalene	20.1		µg/l		20.0		100	70-130		
Toluene	19.6		µg/l		20.0		98.0	70-130		
m,p-Xylene	39.6		µg/l		40.0		99.0	70-130		
o-Xylene	20.0		µg/l		20.0		100	70-130		
2-Methylpentane	22.1		µg/l		20.0		110	70-130		
n-Nonane	22.4		µg/l		20.0		112	70-130		
n-Pentane	23.8		µg/l		20.0		119	70-130		
1,2,4-Trimethylbenzene	20.3		µg/l		20.0		102	70-130		
2,2,4-Trimethylpentane	24.3		µg/l		20.0		122	70-130		
n-Butylcyclohexane	23.9		µg/l		20.0		120	70-130		
n-Decane	21.8		µg/l		20.0		109	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	64.4		µg/l		50.0		129	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	55.9		µg/l		50.0		112	70-130		
LCS Dup (6010999-BSD1)										
Prepared & Analyzed: 20-Jan-06										
C5-C8 Aliphatic Hydrocarbons	142		mg/l		140		101	70-130	1.96	25
C9-C12 Aliphatic Hydrocarbons	55.7		mg/l		55.0		101	70-130	1.96	25
C9-C10 Aromatic Hydrocarbons	48.5		mg/l		40.0		121	70-130	0.823	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	279		mg/l		280		99.6	70-130	0.401	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	104		mg/l		85.0		122	70-130	1.63	25
Benzene	18.8		µg/l		20.0		94.0	70-130	0.00	25
Ethylbenzene	19.8		µg/l		20.0		99.0	70-130	0.00	25
Methyl tert-butyl ether	18.9		µg/l		20.0		94.5	70-130	2.68	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6010999 - VPH										
LCS Dup (6010999-BSD1)										
Prepared & Analyzed: 20-Jan-06										
Naphthalene	19.9		µg/l		20.0		99.5	70-130	0.501	25
Toluene	19.6		µg/l		20.0		98.0	70-130	0.00	25
m,p-Xylene	39.4		µg/l		40.0		98.5	70-130	0.506	25
o-Xylene	19.8		µg/l		20.0		99.0	70-130	1.01	25
2-Methylpentane	21.5		µg/l		20.0		108	70-130	1.83	25
n-Nonane	21.5		µg/l		20.0		108	70-130	3.64	25
n-Pentane	21.9		µg/l		20.0		110	70-130	7.86	25
1,2,4-Trimethylbenzene	20.5		µg/l		20.0		102	70-130	0.00	25
2,2,4-Trimethylpentane	23.5		µg/l		20.0		118	70-130	3.33	25
n-Butylcyclohexane	22.8		µg/l		20.0		114	70-130	5.13	25
n-Decane	22.3		µg/l		20.0		112	70-130	2.71	25
Surrogate: 2,5-Dibromotoluene (FID)	58.1		µg/l		50.0		116	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	49.2		µg/l		50.0		98.4	70-130		
Duplicate (6010999-DUP1) Source: SA39754-03										
Prepared & Analyzed: 20-Jan-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.00987			10.8	50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		0.00592			4.49	50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.0209			1.43	50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		0.00693			2.48	50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	10.2		µg/l	5.0		9.7			5.03	50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	54.2		µg/l		50.0		108	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	48.2		µg/l		50.0		96.4	70-130		
Matrix Spike (6010999-MS1) Source: SA39754-03										
Prepared & Analyzed: 20-Jan-06										
Benzene	17.8		µg/l		20.0	BRL	89.0	70-130		
Ethylbenzene	17.7		µg/l		20.0	BRL	88.5	70-130		
Methyl tert-butyl ether	28.8		µg/l		20.0	9.69	95.6	70-130		
Naphthalene	18.3		µg/l		20.0	BRL	91.5	70-130		
Toluene	17.8		µg/l		20.0	BRL	89.0	70-130		
m,p-Xylene	35.2		µg/l		40.0	0.810	86.0	70-130		
o-Xylene	17.6		µg/l		20.0	0.501	85.5	70-130		
2-Methylpentane	22.3		µg/l		20.0	BRL	112	70-130		
n-Nonane	21.1		µg/l		20.0	BRL	106	70-130		
n-Pentane	22.8		µg/l		20.0	BRL	114	70-130		
1,2,4-Trimethylbenzene	18.4		µg/l		20.0	0.786	88.1	70-130		
2,2,4-Trimethylpentane	24.1		µg/l		20.0	BRL	120	70-130		
n-Butylcyclohexane	22.9		µg/l		20.0	0.0	114	70-130		
n-Decane	23.6		µg/l		20.0	0.0	118	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	41.3		µg/l		50.0		82.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	35.7		µg/l		50.0		71.4	70-130		
Batch 6011089 - VPH										
Blank (6011089-BLK1)										
Prepared & Analyzed: 23-Jan-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6011089 - VPH										
Blank (6011089-BLK1)										
Prepared & Analyzed: 23-Jan-06										
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	5.0						
o-Xylene	BRL		µg/l	10.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	5.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	10.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	58.6		µg/l		50.0		117	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	53.7		µg/l		50.0		107	70-130		
LCS (6011089-BS1)										
Prepared & Analyzed: 23-Jan-06										
C5-C8 Aliphatic Hydrocarbons	147		mg/l		140		105	70-130		
C9-C12 Aliphatic Hydrocarbons	63.6		mg/l		55.0		116	70-130		
C9-C10 Aromatic Hydrocarbons	42.9		mg/l		40.0		107	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	281		mg/l		280		100	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	107		mg/l		85.0		126	70-130		
Benzene	19.3		µg/l		20.0		96.5	70-130		
Ethylbenzene	19.1		µg/l		20.0		95.5	70-130		
Methyl tert-butyl ether	18.5		µg/l		20.0		92.5	70-130		
Naphthalene	18.5		µg/l		20.0		92.5	70-130		
Toluene	19.5		µg/l		20.0		97.5	70-130		
m,p-Xylene	38.2		µg/l		40.0		95.5	70-130		
o-Xylene	19.1		µg/l		20.0		95.5	70-130		
2-Methylpentane	24.1		µg/l		20.0		120	70-130		
n-Nonane	23.3		µg/l		20.0		116	70-130		
n-Pentane	26.0		µg/l		20.0		130	70-130		
1,2,4-Trimethylbenzene	19.6		µg/l		20.0		98.0	70-130		
2,2,4-Trimethylpentane	25.0		µg/l		20.0		125	70-130		
n-Butylcyclohexane	23.8		µg/l		20.0		119	70-130		
n-Decane	23.7		µg/l		20.0		118	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	52.0		µg/l		50.0		104	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	44.6		µg/l		50.0		89.2	70-130		
LCS Dup (6011089-BSD1)										
Prepared & Analyzed: 23-Jan-06										
C5-C8 Aliphatic Hydrocarbons	153		mg/l		140		109	70-130	3.74	25
C9-C12 Aliphatic Hydrocarbons	64.2		mg/l		55.0		117	70-130	0.858	25
C9-C10 Aromatic Hydrocarbons	42.4		mg/l		40.0		106	70-130	0.939	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	289		mg/l		280		103	70-130	2.96	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	107		mg/l		85.0		126	70-130	0.00	25
Benzene	19.5		µg/l		20.0		97.5	70-130	1.03	25
Ethylbenzene	19.6		µg/l		20.0		98.0	70-130	2.58	25
Methyl tert-butyl ether	18.9		µg/l		20.0		94.5	70-130	2.14	25
Naphthalene	20.1		µg/l		20.0		100	70-130	7.79	25
Toluene	19.8		µg/l		20.0		99.0	70-130	1.53	25
Xylene	38.9		µg/l		40.0		97.2	70-130	1.76	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6011089 - VPH										
LCS Dup (6011089-BSD1)										
Prepared & Analyzed: 23-Jan-06										
o-Xylene	19.6		µg/l		20.0		98.0	70-130	2.58	25
2-Methylpentane	23.5		µg/l		20.0		118	70-130	1.68	25
n-Nonane	23.1		µg/l		20.0		116	70-130	0.00	25
n-Pentane	25.8		µg/l		20.0		129	70-130	0.772	25
1,2,4-Trimethylbenzene	20.1		µg/l		20.0		100	70-130	2.02	25
2,2,4-Trimethylpentane	25.2		µg/l		20.0		126	70-130	0.797	25
n-Butylcyclohexane	23.8		µg/l		20.0		119	70-130	0.00	25
n-Decane	22.0		µg/l		20.0		110	70-130	7.02	25
Surrogate: 2,5-Dibromotoluene (FID)	54.8		µg/l		50.0		110	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	46.5		µg/l		50.0		93.0	70-130		
Duplicate (6011089-DUP1) Source: SA39786-01										
Prepared & Analyzed: 23-Jan-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	50.3		µg/l		50.0		101	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	44.1		µg/l		50.0		88.2	70-130		
Matrix Spike (6011089-MS1) Source: SA39786-01										
Prepared & Analyzed: 23-Jan-06										
Benzene	18.8		µg/l		20.0	BRL	94.0	70-130		
Ethylbenzene	18.9		µg/l		20.0	BRL	94.5	70-130		
Methyl tert-butyl ether	17.6		µg/l		20.0	BRL	88.0	70-130		
Naphthalene	17.2		µg/l		20.0	BRL	86.0	70-130		
Toluene	19.1		µg/l		20.0	BRL	95.5	70-130		
m,p-Xylene	37.9		µg/l		40.0	BRL	94.8	70-130		
o-Xylene	18.9		µg/l		20.0	BRL	94.5	70-130		
2-Methylpentane	24.9		µg/l		20.0	BRL	124	70-130		
n-Nonane	24.6		µg/l		20.0	BRL	123	70-130		
n-Pentane	26.0		µg/l		20.0	BRL	130	70-130		
1,2,4-Trimethylbenzene	19.5		µg/l		20.0	BRL	97.5	70-130		
2,2,4-Trimethylpentane	25.6		µg/l		20.0	BRL	128	70-130		
n-Butylcyclohexane	24.6		µg/l		20.0	0.0	123	70-130		
n-Decane	25.4		µg/l		20.0	0.0	127	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	54.7		µg/l		50.0		109	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.8		µg/l		50.0		91.6	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 16

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6010993 - SW846 3510C										
Blank (6010993-BLK1)										
Prepared: 20-Jan-06 Analyzed: 23-Jan-06										
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2						
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2						
Naphthalene	BRL		µg/l	2.50						
2-Methylnaphthalene	BRL		µg/l	2.50						
Acenaphthene	BRL		µg/l	2.50						
Phenanthrene	BRL		µg/l	2.50						
Anthracene	BRL		µg/l	2.50						
Pyrene	BRL		µg/l	2.50						
Chrysene	BRL		µg/l	2.50						
n-Hexadecane	0.00		µg/l							
n-Tetradecane	0.00		µg/l							
n-Eicosane	0.00		µg/l							
n-Nonadecane	0.00		µg/l							
n-Octacosane	0.00		µg/l							
Naphthalene (aliphatic fraction)	0.00		µg/l							
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l							
Surrogate: 1-Chlorooctadecane	12.9		µg/l		25.0		51.6	40-140		
Surrogate: Ortho-Terphenyl	18.3		µg/l		25.0		73.2	40-140		
Surrogate: 2-Bromonaphthalene	23.3		µg/l		40.0		58.2	40-140		
Surrogate: 2-Fluorobiphenyl	29.1		µg/l		40.0		72.8	40-140		
LCS (6010993-BS1)										
Prepared: 20-Jan-06 Analyzed: 23-Jan-06										
C9-C18 Aliphatic Hydrocarbons	0.269		mg/l	0.2	0.600		44.8	40-140		
C19-C36 Aliphatic Hydrocarbons	0.472		mg/l	0.2	0.800		59.0	40-140		
C11-C22 Aromatic Hydrocarbons	1.30		mg/l	0.2	1.70		76.5	40-140		
Naphthalene	30.1	QC-1	µg/l	2.50	100		30.1	40-140		
2-Methylnaphthalene	36.1	QC-1	µg/l	2.50	100		36.1	40-140		
Acenaphthene	47.8		µg/l	2.50	100		47.8	40-140		
Phenanthrene	57.0		µg/l	2.50	100		57.0	40-140		
Anthracene	57.6		µg/l	2.50	100		57.6	40-140		
Pyrene	65.9		µg/l	2.50	100		65.9	40-140		
Chrysene	73.1		µg/l	2.50	100		73.1	40-140		
Naphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200		
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200		
5-alpha-Androstane	25.0		µg/l		25.0		58.9	0-200		
5-alpha-Androstane	25.0		mg/l		0.0250		58.9	0-200		
Surrogate: 1-Chlorooctadecane	26.0		µg/l		50.0		52.0	40-140		
Surrogate: Ortho-Terphenyl	28.2		µg/l		50.0		56.4	40-140		
Surrogate: 2-Bromonaphthalene	24.0		µg/l		40.0		60.0	40-140		
Surrogate: 2-Fluorobiphenyl	29.9		µg/l		40.0		74.8	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (60109)										
Prepared: 20-Jan-06 Analyzed: 23-Jan-06										
C9-C18 Aliphatic Hydrocarbons	0.312		mg/l	0.2	0.600		52.0	40-140		
C19-C36 Aliphatic Hydrocarbons	0.500		mg/l	0.2	0.800		62.5	40-140		
C11-C22 Aromatic Hydrocarbons	1.27		mg/l	0.2	1.70		74.7	40-140		
Naphthalene	50.2		µg/l	2.50	100		50.2	40-140		
2-Methylnaphthalene	52.5		µg/l	2.50	100		52.5	40-140		
Acenaphthene	56.0		µg/l	2.50	100		56.0	40-140		
Phenanthrene	63.2		µg/l	2.50	100		63.2	40-140		
Anthracene	60.7		µg/l	2.50	100		60.7	40-140		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 16

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6010993 - SW846 3510C										
Fractionation Check Standard (60109)										
Prepared: 20-Jan-06 Analyzed: 23-Jan-06										
Pyrene	65.0		µg/l	2.50	100		65.0	40-140		
Chrysene	71.1		µg/l	2.50	100		71.1	40-140		
Naphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200		
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200		
5-alpha-Androstane	25.0		µg/l		25.0		92.1	0-200		
5-alpha-Androstane	25.0		mg/l		0.0250		92.1	0-200		
Surrogate: 1-Chlorooctadecane	27.6		µg/l		50.0		55.2	40-140		
Surrogate: Ortho-Terphenyl	31.0		µg/l		50.0		62.0	40-140		
Surrogate: 2-Bromonaphthalene	20.8		µg/l		40.0		52.0	40-140		
Surrogate: 2-Fluorobiphenyl	27.4		µg/l		40.0		68.5	40-140		
LCS Dup (6010993-BSD1)										
Prepared: 20-Jan-06 Analyzed: 23-Jan-06										
C9-C18 Aliphatic Hydrocarbons	0.259		mg/l	0.2	0.600		43.2	40-140	3.64	25
C19-C36 Aliphatic Hydrocarbons	0.458		mg/l	0.2	0.800		57.2	40-140	3.10	25
C11-C22 Aromatic Hydrocarbons	1.30		mg/l	0.2	1.70		76.5	40-140	0.00	25
Naphthalene	40.4	QR-05	µg/l	2.50	100		40.4	40-140	29.2	20
2-Methylnaphthalene	44.0		µg/l	2.50	100		44.0	40-140	19.7	20
Acenaphthene	53.6		µg/l	2.50	100		53.6	40-140	11.4	20
Phenanthrene	62.4		µg/l	2.50	100		62.4	40-140	9.05	20
Anthracene	63.0		µg/l	2.50	100		63.0	40-140	8.96	20
Pyrene	67.9		µg/l	2.50	100		67.9	40-140	2.99	20
Chrysene	74.7		µg/l	2.50	100		74.7	40-140	2.17	20
Naphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200	0.00	200
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200	0.00	200
Surrogate: 1-Chlorooctadecane	25.1		µg/l		50.0		50.2	40-140		
Surrogate: Ortho-Terphenyl	30.5		µg/l		50.0		61.0	40-140		
Surrogate: 2-Bromonaphthalene	25.9		µg/l		40.0		64.8	40-140		
Surrogate: 2-Fluorobiphenyl	29.8		µg/l		40.0		74.5	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 16

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0601177				
Calibration Check (0601177-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.8244E+08	1.49386E+08	-5.00	25.00
C19-C36 Aliphatic Hydrocarbons	1.22285E+08	1.14154E+08	-6.65	25.00
C11-C22 Aromatic Hydrocarbons	17562.4	16.0138	8.24	25.00
Naphthalene	4.67838	4.20342	-10.2	20.00
2-Methylnaphthalene	3.43044	3.12816	-8.81	20.00
Acenaphthene	3.4297	3.20024	-6.69	20.00
Phenanthrene	5.61088	5.44242	-3.00	20.00
Anthracene	5.68957	5.69061	0.0183	20.00
Pyrene	6.41645	6.44946	0.514	20.00
Chrysene	5.82773	6.13966	5.35	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 16

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0601184				
Calibration Check (0601184-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.8244E+08	1.49444E+08	-5.00	25.00
C19-C36 Aliphatic Hydrocarbons	1.22285E+08	1.17502E+08	-3.91	25.00
C11-C22 Aromatic Hydrocarbons	17562.4	17.8751	21.8	25.00
Naphthalene	4.67838	5.30176	13.3	20.00
2-Methylnaphthalene	3.43044	3.71316	8.24	20.00
Acenaphthene	3.4297	3.63103	5.87	20.00
Phenanthrene	5.61088	5.60863	-0.0401	20.00
Anthracene	5.68957	5.48458	-3.60	20.00
Pyrene	6.41645	6.40297	-0.210	20.00
Chrysene	5.82773	5.78147	-0.794	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 16

Notes and Definitions

QC-1 Analyte out of acceptance range.

QR-05 RPD out of acceptance range.

S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

Were any significant modifications made to the VPH method as specified in section 11.3? No *see below

* Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GCMS using all QC criteria specified in the method



Were any significant modifications made to the EPH method as specified in Section 11.3? No

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

OR 

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:

This form provides certifications for the following Spectrum Analytical, Inc. work order #: SA39751

Matrix	☐ Groundwater	☐ Soil/Sediment	☐ Drinking Water	☒ Other <i>Surface Water</i>	
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☐ 6010B	☐ 7470A/1A
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020	☐ 9014M ²
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³	☐ 7196A

1 List Release Tracking Number (RTN), if known

2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method

3 S - SW-846 Methods 7000 Series List individual method and analyte

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☒ Yes ☐ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

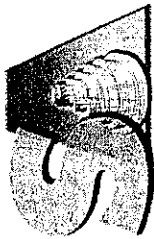
Date: 1/25/2006

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 16 of 16



SPECTRUM ANALYTICAL, INC.

Featuring
HARIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 1-25-06
- All TATs subject to laboratory approval.
- Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ELS, Auburn
27 Midstate Drive Suite 218

Invoice To: ELS, Auburn

Project No.: 91-204082

60000019

Site Name: Eagle Gas

STD

Location: 131 Main St. Carver

P.O. No.: 03-0421 RQN:

State: MA

Sampler(s): A. Kaczonka

QA Reporting Notes:
(check if needed)

State specific reporting standards
If applicable, please list below:

☒ Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☒ Yes ☐ No
(Response required for CAM report)

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=H₂O 10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id: Sample Id: Date: Time: Matrix

39751-01 SW-Offfall 1-18-06 9:30 6 SW 293

↓ -02 MAH1 12:00 6 SW 31

↓ -03 MAH2 12:30 6 SW 31

↓ -04 MAH3 1:00 6 SW 31

☐ Fax results when available to ()

☒ E-mail to cklingers@elsconsult.com

EDD Format

Condition upon receipt: ☒ Iced ☐ Ambient ☐ °C 30

Relinquished by: Caron Kaczonka

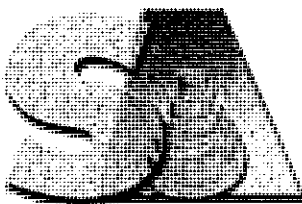
Received by: 1/18/06 9:14

1-18-06 4:30

1/19/06 2:05



Report Date:
05-Jan-06 17:04



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project #: 91-204082.02

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Container</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA39103-01	AS-1	Summa canister	Air	02-Jan-06 11:26	03-Jan-06 13:10
SA39103-02	AS-2	Summa canister	Air	02-Jan-06 11:24	03-Jan-06 13:10
SA39103-03	AS-3	Summa canister	Air	02-Jan-06 11:22	03-Jan-06 13:10
SA39103-04	AS-4	Summa canister	Air	02-Jan-06 11:25	03-Jan-06 13:10

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 6 pages of analytical data plus Chain of Custody document(s).

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Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

CASE NARRATIVE:

The data set for work order SA39103 complies with internal QC criteria for the methods performed. The samples were received @ 17.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM.

ENVIRONMENTAL ANALYSES

Sample Identification

AS-1
SA39103-01

Client Project

91-204082.02

Matrix

Air

Collection Date/Time

02-Jan-06 11:26

Received

03-Jan-06

CAS No.	Analyte(s)	Result	Units	*RDL	Result ug/m ³	*RDL	Flag	Method Ref.	Analyzed	Batch	Analyst
Quality Analyses											
<u>APH Targets</u>											
91-20-3	Naphthalene	BRL		2.40	BRL	12.6		Modified MA APH	05-Jan-06	6010119	WB
91-57-6	2-Methylnaphthalene	BRL		3.20	BRL	18.6		"	"	"	"
<u>APH Carbon chains</u>											
	C5-C8 Aliphatic Hydrocarbons				BRL	50.0		"	"	"	"
	C9-C12 Aliphatic Hydrocarbons				BRL	90.0		"	"	"	"
	C9-C10 Aromatic Hydrocarbons				BRL	50.0		"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons				BRL	50.0		"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons				BRL	90.0		"	"	"	"
<u>APH Targets</u>											
106-89-0	1,3-Butadiene	BRL		1.00	BRL	2.2		EPA TO-15	"	"	"
1634-04-4	Methyl tert-butyl ether		1.70	0.500		6.1	1.8	"	"	"	"
71-43-2	Benzene	BRL		0.500	BRL	1.6		"	"	"	"
108-88-3	Toluene		0.670	0.500		2.5	1.9	"	"	"	"
100-41-4	Ethylbenzene	BRL		0.500	BRL	2.2		"	"	"	"
1330-20-7	m,p-Xylene	BRL		0.500	BRL	2.2		"	"	"	"
95-47-6	o-Xylene	BRL		0.500	BRL	2.2		"	"	"	"
<u>Surrogate recoveries:</u>											
460-00-4	4-Bromofluorobenzene		92.8			75-125 %		"	"	"	"

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Sample IdentificationAS-2
SA39103-02Client Project #

91-204082.02

Matrix

Air

Collection Date/Time

02-Jan-06 11:24

Received

03-Jan-06

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result Units</i>	<i>*RDL</i>	<i>Result ug/m³</i>	<i>*RDL</i>	<i>Flag</i>	<i>Method Ref.</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
Quality Analyses										
<u>APH Targets</u>										
<i>ppbv</i>										
91-20-3	Naphthalene	BRL	2.40	BRL	12.6		Modified MA APH	05-Jan-06	6010119	WB
91-57-6	2-Methylnaphthalene	BRL	3.20	BRL	18.6		"	"	"	"
<u>APH Carbon chains</u>										
	C5-C8 Aliphatic Hydrocarbons			479	50.0		"	"	"	"
	C9-C12 Aliphatic Hydrocarbons			242	90.0		"	"	"	"
	C9-C10 Aromatic Hydrocarbons			184	50.0		"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons			821	50.0		"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons			426	90.0		"	"	"	"
<u>APH Targets</u>										
<i>ppbv</i>										
106-99-0	1,3-Butadiene	BRL	1.00	BRL	2.2		EPA TO-15	"	"	"
1634-04-4	Methyl tert-butyl ether	18.2	0.500	65.7	1.8		"	"	"	"
71-43-2	Benzene	1.67	0.500	5.3	1.6		"	"	"	"
108-88-3	Toluene	28.8	0.500	108.0	1.9		"	"	"	"
100-41-4	Ethylbenzene	3.23	0.500	14.0	2.2		"	"	"	"
1330-20-7	m,p-Xylene	9.31	0.500	40.4	2.2		"	"	"	"
95-47-6	o-Xylene	3.57	0.500	15.5	2.2		"	"	"	"
<u>Surrogate recoveries:</u>										
460-00-4	4-Bromofluorobenzene	94.4		75-125 %			"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 6

Sample IdentificationAS-3
SA39103-03Client Project #
91-204082.02Matrix
AirCollection Date/Time
02-Jan-06 11:22Received
03-Jan-06

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result Units</i>	<i>*RDL</i>	<i>Result ug/m³</i>	<i>*RDL</i>	<i>Flag</i>	<i>Method Ref.</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
Quality Analyses										
<u>APH Targets</u>										
		<u>ppbv</u>								
91-20-3	Naphthalene	BRL	2.40	BRL	12.6		Modified MA APH	05-Jan-06	6010119	WB
91-57-6	2-Methylnaphthalene	BRL	3.20	BRL	18.6		"	"	"	"
<u>APH Carbon chains</u>										
	C5-C8 Aliphatic Hydrocarbons			239	50.0		"	"	"	"
	C9-C12 Aliphatic Hydrocarbons			97.1	90.0		"	"	"	"
	C9-C10 Aromatic Hydrocarbons			53.5	50.0		"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons			382	50.0		"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons			151	90.0		"	"	"	"
<u>APH Targets</u>										
		<u>ppbv</u>								
106-99-0	1,3-Butadiene	BRL	1.00	BRL	2.2		EPA TO-15	"	"	"
1634-04-4	Methyl tert-butyl ether	12.2	0.500	44.0	1.8		"	"	"	"
71-43-2	Benzene	1.01	0.500	3.2	1.6		"	"	"	"
108-88-3	Toluene	10.4	0.500	39.1	1.9		"	"	"	"
100-41-4	Ethylbenzene	1.19	0.500	5.2	2.2		"	"	"	"
1330-20-7	m,p-Xylene	3.56	0.500	15.4	2.2		"	"	"	"
95-47-6	o-Xylene	1.38	0.500	6.0	2.2		"	"	"	"
<u>Surrogate recoveries:</u>										
460-00-4	4-Bromofluorobenzene	95.2		75-125 %			"	"	"	"

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Sample IdentificationAS-4
SA39103-04Client Project #

91-204082.02

Matrix

Air

Collection Date/Time

02-Jan-06 11:25

Received

03-Jan-06

CAS No.	Analyte(s)	Result Units	*RDL	Result ug/m ³	*RDL	Flag	Method Ref.	Analyzed	Batch	Analyst

Quality AnalysesTargets

91-20-3	Naphthalene	BRL	2.40	BRL	12.6		Modified MA APH	05-Jan-06	6010119	WB
91-57-6	2-Methylnaphthalene	BRL	3.20	BRL	18.6		"	"	"	"

APH Carbon chains

	C5-C8 Aliphatic Hydrocarbons			209	50.0		"	"	"	"
	C9-C12 Aliphatic Hydrocarbons			BRL	90.0		"	"	"	"
	C9-C10 Aromatic Hydrocarbons			55.6	50.0		"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons			371	50.0		"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons			121	90.0		"	"	"	"

APH Targets

106-99-0	1,3-Butadiene	BRL	1.00	BRL	2.2		EPA TO-15	"	"	"
1634-04-4	Methyl tert-butyl ether	11.8	0.500	42.6	1.8		"	"	"	"
71-43-2	Benzene	1.24	0.500	4.0	1.6		"	"	"	"
108-88-3	Toluene	13.0	0.500	48.9	1.9		"	"	"	"
100-41-4	Ethylbenzene	1.30	0.500	5.6	2.2		"	"	"	"
1330-20-7	m,p-Xylene	4.26	0.500	18.5	2.2		"	"	"	"
95-47-6	o-Xylene	1.43	0.500	6.2	2.2		"	"	"	"

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	94.4		75-125 %			"	"	"	"

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 6

Notes and Definitions

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown



SPECTRUM ANALYTICAL, INC.
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CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 1/5/06
- All TATs subject to laboratory approval.
- Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS Auburn

27 Madate Drive Site Q18

Auburn, MA

Invoice To: ECS Agawam

508 Silver Street

Agawam, MA

P.O. No. 03-0119 RQN: 1000010891

Project No.: 91-204082-02

Site Name: EALES GAS, INC.

Location: CARVER

Sampler(s): Paren K

State: MA

Project Mgr.: Klingler

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9= 10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= NA X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Preservative	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Containers:	Analyses:	QA Reporting Notes: (check if needed)
339103-01	AS-1	1-02-06	7:34-11:26	C	A	X1	1				APH-Summa	APH	State specific reporting standards If applicable, please list below: ☒ Provide MCP CAM Report Were all field QC requirements met as per MADRP CAM Section 2.0? ☒ Yes ☐ No (Response required for CAM report)
02	AS-2	7:33-11:24	7:33-11:24	C	A	↓	1						Analyze & report by 1/10/06 if possible!
03	AS-3	7:23-11:22	7:23-11:22	C	A	↓	1						
04	AS-4	7:28-11:25	7:28-11:25	C	A	↓	1						
	AS-1 = Summa	Canister #0470											
	AS-2 = Summa	Canister #0223											
	AS-3 = Summa	Canister #0233											
	AS-4 = Summa	Canister #1381											

☐ Fax results when available to ()

E-mail to Chingler@ECSconsult.com

EDD Format

Condition upon receipt: ☐ Iced ☒ Ambient ☐ °C 17c

Relinquished by:

Received by:

Date:

Time:

Caron M. Agawam

ECS

1/3/06

07/3/06 10:01

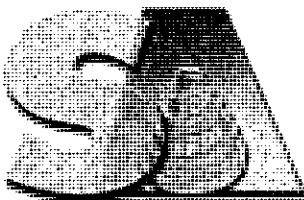
Joe

1/3/06

110



Report Date:
13-Jan-06 16:10



SPECTRUM ANALYTICAL, INC.

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HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: Eagle Gas - Carver, MA
Project #: 91-204082.02

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA39106-01	MH2	Ground Water	30-Dec-05 09:00	03-Jan-06 13:11
SA39106-02	SW1	Ground Water	30-Dec-05 15:05	03-Jan-06 13:11
SA39106-03	SW2	Ground Water	30-Dec-05 15:20	03-Jan-06 13:11

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met

Please note that this report contains 14 pages of analytical data plus Chain of Custody document(s).

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New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

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ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification

MH2

SA39106-01

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

30-Dec-05 09:00

Received

03-Jan-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	05-Jan-06	06-Jan-06	6010144	jro
	C9-C12 Aliphatic Hydrocarbons	0.0324		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	0.0573		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	5.5		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	102			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	85.4			70-130 %		"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	0.9		mg/l	0.2	1	+MADEP 5/2004 R	05-Jan-06	05-Jan-06	6010135	SM
	C19-C36 Aliphatic Hydrocarbons	0.4		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	0.5		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	0.5		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	1.8		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	1.8		mg/l	0.2	1	"	"	"	"	"
<u>EPH Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	6.41	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	6.41	1	"	"	"	"	"
208-98-8	Acenaphthylene	BRL		µg/l	6.41	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	6.41	1	"	"	"	"	"
86-73-7	Fluorene	BRL		µg/l	6.41	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	6.41	1	"	"	"	"	"
120-12-7	Anthracene	BRL		µg/l	6.41	1	"	"	"	"	"
206-44-0	Fluoranthene	BRL		µg/l	6.41	1	"	"	"	"	"
129-00-0	Pyrene	BRL		µg/l	6.41	1	"	"	"	"	"
56-55-3	Benzo (a) anthracene	BRL		µg/l	6.41	1	"	"	"	"	"
218-01-8	Chrysene	BRL		µg/l	6.41	1	"	"	"	"	"
205-99-2	Benzo (b) fluoranthene	BRL		µg/l	6.41	1	"	"	"	"	"
207-08-9	Benzo (k) fluoranthene	BRL		µg/l	6.41	1	"	"	"	"	"
50-32-8	Benzo (a) pyrene	BRL		µg/l	6.41	1	"	"	"	"	"
193-39-5	Indeno (1,2,3-cd) pyrene	BRL		µg/l	6.41	1	"	"	"	"	"
53-70-3	Dibenzo (a,h) anthracene	BRL		µg/l	6.41	1	"	"	"	"	"
91-24-2	Benzo (g,h,i) perylene	BRL		µg/l	6.41	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 14

Sample Identification

MH2

SA39106-01

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

30-Dec-05 09:00

Received

03-Jan-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Extractable Petroleum HydrocarbonsEPH Target PAH Analytes

Prepared by method SW846 3510C

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	46.2		40-140 %			+MADEP 5/2004 R	05-Jan-06	05-Jan-06	6010135	SM
84-15-1	Ortho-Terphenyl	61.6		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	58.9		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	74.1		40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 14

Sample Identification

SW1

SA39106-02

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

30-Dec-05 15:05

Received

03-Jan-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	05-Jan-06	06-Jan-06	6010144	jro
	C9-C12 Aliphatic Hydrocarbons	0.319		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	0.258		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	0.577		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	27.4		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	104		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	87.0		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	0.8		mg/l	0.2	1	+MADEP 5/2004 R	05-Jan-06	05-Jan-06	6010135	SM
	C19-C36 Aliphatic Hydrocarbons	0.7		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	0.6		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	0.6		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	2.0		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	2.0		mg/l	0.2	1	"	"	"	"	"
<u>EPH Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.26	1	"	"	"	"	"
208-98-8	Acenaphthylene	BRL		µg/l	5.26	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.26	1	"	"	"	"	"
86-73-7	Fluorene	BRL		µg/l	5.26	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.26	1	"	"	"	"	"
120-12-7	Anthracene	BRL		µg/l	5.26	1	"	"	"	"	"
206-44-0	Fluoranthene	BRL		µg/l	5.26	1	"	"	"	"	"
129-00-0	Pyrene	BRL		µg/l	5.26	1	"	"	"	"	"
56-55-3	Benzo (a) anthracene	BRL		µg/l	5.26	1	"	"	"	"	"
218-01-9	Chrysene	BRL		µg/l	5.26	1	"	"	"	"	"
205-99-2	Benzo (b) fluoranthene	BRL		µg/l	5.26	1	"	"	"	"	"
207-08-9	Benzo (k) fluoranthene	BRL		µg/l	5.26	1	"	"	"	"	"
50-32-8	Benzo (a) pyrene	BRL		µg/l	5.26	1	"	"	"	"	"
193-39-5	Indeno (1,2,3-cd) pyrene	BRL		µg/l	5.26	1	"	"	"	"	"
53-70-3	Dibenzo (a,h) anthracene	BRL		µg/l	5.26	1	"	"	"	"	"
91-24-2	Benzo (g,h,i) perylene	BRL		µg/l	5.26	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 14

Sample Identification

SW1

SA39I06-02

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

30-Dec-05 15:05

Received

03-Jan-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Extractable Petroleum HydrocarbonsEPH Target PAH Analytes

Prepared by method SW846 3510C

Surrogate recoveries:

3396-33-2	1-Chlorooctadecane	46.6		40-140 %			+MADEP 5/2004 R	05-Jan-06	05-Jan-06	6010135	SM
84-15-1	Ortho-Terphenyl	63.3		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	51.5		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	67.0		40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 14

Sample Identification

SW2

SA39106-03

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

30-Dec-05 15:20

Received

03-Jan-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	05-Jan-06	06-Jan-06	6010144	jro
	C9-C12 Aliphatic Hydrocarbons	0.0438		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	0.0258		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	0.0696		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	103			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	85.0			70-130 %		"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	05-Jan-06	05-Jan-06	6010135	SM
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.75	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.75	1	"	"	"	"	"
208-96-8	Acenaphthylene	BRL		µg/l	5.75	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.75	1	"	"	"	"	"
86-73-7	Fluorene	BRL		µg/l	5.75	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.75	1	"	"	"	"	"
120-12-7	Anthracene	BRL		µg/l	5.75	1	"	"	"	"	"
206-44-0	Fluoranthene	BRL		µg/l	5.75	1	"	"	"	"	"
129-00-0	Pyrene	BRL		µg/l	5.75	1	"	"	"	"	"
56-55-3	Benzo (a) anthracene	BRL		µg/l	5.75	1	"	"	"	"	"
218-01-9	Chrysene	BRL		µg/l	5.75	1	"	"	"	"	"
205-99-2	Benzo (b) fluoranthene	BRL		µg/l	5.75	1	"	"	"	"	"
207-08-9	Benzo (k) fluoranthene	BRL		µg/l	5.75	1	"	"	"	"	"
50-32-8	Benzo (a) pyrene	BRL		µg/l	5.75	1	"	"	"	"	"
193-39-5	Indeno (1,2,3-cd) pyrene	BRL		µg/l	5.75	1	"	"	"	"	"
53-70-3	Dibenzo (a,h) anthracene	BRL		µg/l	5.75	1	"	"	"	"	"
31-24-2	Benzo (g,h,i) perylene	BRL		µg/l	5.75	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 14

Sample Identification

SW2

SA39106-03

Client Project #

91-204082.02

Matrix

Ground Water

Collection Date/Time

30-Dec-05 15:20

Received

03-Jan-06

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst

Extractable Petroleum HydrocarbonsEPH Target PAH Analytes

Prepared by method SW846 3510C

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	60.3		40-140 %			+MADEP 5/2004 R	05-Jan-06	05-Jan-06	6010135	SM
84-15-1	Ortho-Terphenyl	62.3		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	71.3		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	65.9		40-140 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 14

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	Limit
Batch 6010144 - VPH										
Blank (6010144-BLK1)										
Prepared & Analyzed: 05-Jan-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
2-Methylpentane	BRL		µg/l	5.0						
n-Nonane	BRL		µg/l	10.0						
n-Pentane	BRL		µg/l	10.0						
1,2,4-Trimethylbenzene	BRL		µg/l	5.0						
2,2,4-Trimethylpentane	BRL		µg/l	5.0						
n-Butylcyclohexane	BRL		µg/l	5.0						
n-Decane	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	49.9		µg/l		50.0		99.8	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	42.0		µg/l		50.0		84.0	70-130		
LCS (6010144-BS1)										
Prepared & Analyzed: 05-Jan-06										
C5-C8 Aliphatic Hydrocarbons	137		mg/l		140		97.9	70-130		
C9-C12 Aliphatic Hydrocarbons	60.1		mg/l		55.0		109	70-130		
C9-C10 Aromatic Hydrocarbons	31.4		mg/l		40.0		78.5	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	244		mg/l		280		87.1	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	91.5		mg/l		85.0		108	70-130		
Benzene	15.1		µg/l		20.0		75.5	70-130		
Ethylbenzene	14.7		µg/l		20.0		73.5	70-130		
Methyl tert-butyl ether	15.9		µg/l		20.0		79.5	70-130		
Naphthalene	16.6		µg/l		20.0		83.0	70-130		
Toluene	15.5		µg/l		20.0		77.5	70-130		
m,p-Xylene	30.2		µg/l		40.0		75.5	70-130		
o-Xylene	15.0		µg/l		20.0		75.0	70-130		
2-Methylpentane	16.9		µg/l		20.0		84.5	70-130		
n-Nonane	16.1		µg/l		20.0		80.5	70-130		
n-Pentane	18.8		µg/l		20.0		94.0	70-130		
1,2,4-Trimethylbenzene	15.5		µg/l		20.0		77.5	70-130		
2,2,4-Trimethylpentane	19.2		µg/l		20.0		96.0	70-130		
n-Butylcyclohexane	17.5		µg/l		20.0		87.5	70-130		
n-Decane	15.4		µg/l		20.0		77.0	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	48.3		µg/l		50.0		96.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	38.4		µg/l		50.0		76.8	70-130		
LCS Dup (6010144-BSD1)										
Prepared & Analyzed: 05-Jan-06										
C5-C8 Aliphatic Hydrocarbons	136		mg/l		140		97.1	70-130	0.821	25
C9-C12 Aliphatic Hydrocarbons	60.9		mg/l		55.0		111	70-130	1.82	25
C9-C10 Aromatic Hydrocarbons	30.5		mg/l		40.0		76.2	70-130	2.97	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	256		mg/l		280		91.4	70-130	4.82	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	91.4		mg/l		85.0		108	70-130	0.00	25
Benzene	17.3		µg/l		20.0		86.5	70-130	13.6	25
Ethylbenzene	16.6		µg/l		20.0		83.0	70-130	12.1	25
Methyl tert-butyl ether	17.5		µg/l		20.0		87.5	70-130	9.58	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	Limit
Batch 6010144 - VPH										
LCS Dup (6010144-BSD1)										
Prepared & Analyzed: 05-Jan-06										
Naphthalene	16.3		µg/l		20.0		81.5	70-130	1.82	25
Toluene	17.8		µg/l		20.0		89.0	70-130	13.8	25
m,p-Xylene	33.4		µg/l		40.0		83.5	70-130	10.1	25
o-Xylene	17.1		µg/l		20.0		85.5	70-130	13.1	25
2-Methylpentane	19.6		µg/l		20.0		98.0	70-130	14.8	25
n-Nonane	19.0		µg/l		20.0		95.0	70-130	16.5	25
n-Pentane	20.0		µg/l		20.0		100	70-130	6.19	25
1,2,4-Trimethylbenzene	17.8		µg/l		20.0		89.0	70-130	13.8	25
2,2,4-Trimethylpentane	19.9		µg/l		20.0		99.5	70-130	3.58	25
n-Butylcyclohexane	18.8		µg/l		20.0		94.0	70-130	7.16	25
n-Decane	15.6		µg/l		20.0		78.0	70-130	1.29	25
Surrogate: 2,5-Dibromotoluene (FID)	52.3		µg/l		50.0		105	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.9		µg/l		50.0		83.8	70-130		
Duplicate (6010144-DUP1) Source: SA39087-01										
Prepared & Analyzed: 05-Jan-06										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	48.9		µg/l		50.0		97.8	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.7		µg/l		50.0		83.4	70-130		
Matrix Spike (6010144-MS1) Source: SA39124-03										
Prepared: 05-Jan-06 Analyzed: 06-Jan-06										
Benzene	16.3		µg/l		20.0	BRL	81.5	70-130		
Ethylbenzene	16.3		µg/l		20.0	BRL	81.5	70-130		
Methyl tert-butyl ether	16.2		µg/l		20.0	BRL	81.0	70-130		
Naphthalene	17.4		µg/l		20.0	BRL	87.0	70-130		
Toluene	16.5		µg/l		20.0	BRL	82.5	70-130		
m,p-Xylene	33.0		µg/l		40.0	BRL	82.5	70-130		
o-Xylene	16.3		µg/l		20.0	BRL	81.5	70-130		
2-Methylpentane	18.1		µg/l		20.0	BRL	90.5	70-130		
n-Nonane	20.7		µg/l		20.0	BRL	104	70-130		
n-Pentane	19.4		µg/l		20.0	BRL	97.0	70-130		
1,2,4-Trimethylbenzene	17.3		µg/l		20.0	BRL	86.5	70-130		
2,2,4-Trimethylpentane	22.2		µg/l		20.0	BRL	111	70-130		
n-Butylcyclohexane	21.7		µg/l		20.0	0.0	108	70-130		
n-Decane	22.3		µg/l		20.0	0.0	112	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	52.1		µg/l		50.0		104	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.8		µg/l		50.0		83.6	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 6010135 - SW846 3510C									
Blank (6010135-BLK1)									
Prepared & Analyzed: 05-Jan-06									
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2					
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2					
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2					
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2					
Naphthalene	BRL		µg/l	2.50					
2-Methylnaphthalene	BRL		µg/l	2.50					
Acenaphthylene	BRL		µg/l	2.50					
Acenaphthene	BRL		µg/l	2.50					
Fluorene	BRL		µg/l	2.50					
Phenanthrene	BRL		µg/l	2.50					
Anthracene	BRL		µg/l	2.50					
Fluoranthene	BRL		µg/l	2.50					
Pyrene	BRL		µg/l	2.50					
Benzo (a) anthracene	BRL		µg/l	2.50					
Chrysene	BRL		µg/l	2.50					
Benzo (b) fluoranthene	BRL		µg/l	2.50					
Benzo (k) fluoranthene	BRL		µg/l	2.50					
Benzo (a) pyrene	BRL		µg/l	2.50					
Indeno (1,2,3-cd) pyrene	BRL		µg/l	2.50					
Dibenzo (a,h) anthracene	BRL		µg/l	2.50					
Benzo (g,h,i) perylene	BRL		µg/l	2.50					
n-Hexadecane	0.00		µg/l						
n-Tetradecane	0.00		µg/l						
n-Eicosane	0.00		µg/l						
n-Nonadecane	0.00		µg/l						
n-Octacosane	0.00		µg/l						
Naphthalene (aliphatic fraction)	0.00		µg/l						
2-Methylnaphthalene (aliphatic fraction)	0.00		µg/l						
Surrogate: 1-Chlorooctadecane	22.3		µg/l		50.0		44.6	40-140	
Surrogate: Ortho-Terphenyl	29.8		µg/l		50.0		59.6	40-140	
Surrogate: 2-Bromonaphthalene	34.1		µg/l		40.0		85.2	40-140	
Surrogate: 2-Fluorobiphenyl	33.3		µg/l		40.0		83.2	40-140	
LCS (6010135-BS1)									
Prepared & Analyzed: 05-Jan-06									
C9-C18 Aliphatic Hydrocarbons	0.305		mg/l	0.2	0.600		50.8	40-140	
C19-C36 Aliphatic Hydrocarbons	0.630		mg/l	0.2	0.800		78.8	40-140	
C11-C22 Aromatic Hydrocarbons	1.21		mg/l	0.2	1.70		71.2	40-140	
Naphthalene	37.2	QC-1	µg/l	2.50	100		37.2	40-140	
2-Methylnaphthalene	41.1		µg/l	2.50	100		41.1	40-140	
Acenaphthylene	51.4		µg/l	2.50	100		51.4	40-140	
Acenaphthene	50.4		µg/l	2.50	100		50.4	40-140	
Fluorene	56.1		µg/l	2.50	100		56.1	40-140	
Phenanthrene	59.7		µg/l	2.50	100		59.7	40-140	
Anthracene	63.2		µg/l	2.50	100		63.2	40-140	
Fluoranthene	67.5		µg/l	2.50	100		67.5	40-140	
Pyrene	66.0		µg/l	2.50	100		66.0	40-140	
Benzo (a) anthracene	62.3		µg/l	2.50	100		62.3	40-140	
Chrysene	64.0		µg/l	2.50	100		64.0	40-140	
Benzo (b) fluoranthene	64.8		µg/l	2.50	100		64.8	40-140	
Benzo (k) fluoranthene	57.1		µg/l	2.50	100		57.1	40-140	
Benzo (a) pyrene	61.6		µg/l	2.50	100		61.6	40-140	
Indeno (1,2,3-cd) pyrene	64.0		µg/l	2.50	100		64.0	40-140	
Dibenzo (a,h) anthracene	63.7		µg/l	2.50	100		63.7	40-140	
Benzo (g,h,i) perylene	64.5		µg/l	2.50	100		64.5	40-140	
Naphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 6010135 - SW846 3510C										
LCS (6010135-BS1)										
Prepared & Analyzed: 05-Jan-06										
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200		
5-alpha-Androstane	25.0		µg/l		25.0		152	0-200		
5-alpha-Androstane	25.0		mg/l		0.0250		152	0-200		
Surrogate: 1-Chlorooctadecane	36.1		µg/l		50.0		72.2	40-140		
Surrogate: Ortho-Terphenyl	32.6		µg/l		50.0		65.2	40-140		
Surrogate: 2-Bromonaphthalene	28.4		µg/l		40.0		71.0	40-140		
Surrogate: 2-Fluorobiphenyl	29.2		µg/l		40.0		73.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		
Fractionation Check Standard (601013)										
Prepared & Analyzed: 05-Jan-06										
C9-C18 Aliphatic Hydrocarbons	0.321		mg/l	0.2	0.600		53.5	40-140		
C19-C36 Aliphatic Hydrocarbons	0.555		mg/l	0.2	0.800		69.4	40-140		
C11-C22 Aromatic Hydrocarbons	1.13		mg/l	0.2	1.70		66.5	40-140		
Naphthalene	49.1		µg/l	2.50	100		49.1	40-140		
2-Methylnaphthalene	50.2		µg/l	2.50	100		50.2	40-140		
Acenaphthylene	56.6		µg/l	2.50	100		56.6	40-140		
Acenaphthene	54.1		µg/l	2.50	100		54.1	40-140		
Fluorene	58.4		µg/l	2.50	100		58.4	40-140		
Phenanthrene	58.0		µg/l	2.50	100		58.0	40-140		
Anthracene	62.5		µg/l	2.50	100		62.5	40-140		
Fluoranthene	64.2		µg/l	2.50	100		64.2	40-140		
Pyrene	62.2		µg/l	2.50	100		62.2	40-140		
Benzo (a) anthracene	60.3		µg/l	2.50	100		60.3	40-140		
Chrysene	61.3		µg/l	2.50	100		61.3	40-140		
Benzo (b) fluoranthene	70.7		µg/l	2.50	100		70.7	40-140		
Benzo (k) fluoranthene	52.3		µg/l	2.50	100		52.3	40-140		
Benzo (a) pyrene	62.8		µg/l	2.50	100		62.8	40-140		
Indeno (1,2,3-cd) pyrene	62.5		µg/l	2.50	100		62.5	40-140		
Dibenzo (a,h) anthracene	62.2		µg/l	2.50	100		62.2	40-140		
Benzo (g,h,i) perylene	61.7		µg/l	2.50	100		61.7	40-140		
Naphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200		
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200		
5-alpha-Androstane	25.0		µg/l		25.0		145	0-200		
5-alpha-Androstane	25.0		mg/l		0.0250		145	0-200		
Surrogate: 1-Chlorooctadecane	35.9		µg/l		50.0		71.8	40-140		
Surrogate: Ortho-Terphenyl	31.9		µg/l		50.0		63.8	40-140		
Surrogate: 2-Bromonaphthalene	28.6		µg/l		40.0		71.5	40-140		
Surrogate: 2-Fluorobiphenyl	28.5		µg/l		40.0		71.2	40-140		
LCS Dup (6010135-BSD1)										
Prepared & Analyzed: 05-Jan-06										
C9-C18 Aliphatic Hydrocarbons	0.287		mg/l	0.2	0.600		47.8	40-140	6.09	25
C19-C36 Aliphatic Hydrocarbons	0.550		mg/l	0.2	0.800		68.8	40-140	13.6	25
C11-C22 Aromatic Hydrocarbons	1.47		mg/l	0.2	1.70		86.5	40-140	19.4	25
Naphthalene	45.0		µg/l	2.50	100		45.0	40-140	19.0	20
2-Methylnaphthalene	48.0		µg/l	2.50	100		48.0	40-140	15.5	20
Acenaphthylene	61.4		µg/l	2.50	100		61.4	40-140	17.7	20
Acenaphthene	60.9		µg/l	2.50	100		60.9	40-140	18.9	20
Fluorene	66.8		µg/l	2.50	100		66.8	40-140	17.4	20
Phenanthrene	71.1		µg/l	2.50	100		71.1	40-140	17.4	20
Anthracene	75.0		µg/l	2.50	100		75.0	40-140	17.1	20
Fluoranthene	79.3		µg/l	2.50	100		79.3	40-140	16.1	20
Pyrene	78.8		µg/l	2.50	100		78.8	40-140	17.7	20
Benzo (a) anthracene	75.6		µg/l	2.50	100		75.6	40-140	19.3	20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 14

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limits	RPD	RPD Limit
Batch 6010135 - SW846 3510C										
LCS Dup (6010135-BSD1)										
Prepared & Analyzed: 05-Jan-06										
Chrysene	77.5		µg/l	2.50	100		77.5	40-140	19.1	20
Benzo (b) fluoranthene	79.2		µg/l	2.50	100		79.2	40-140	20.0	20
Benzo (k) fluoranthene	72.7	QR-02	µg/l	2.50	100		72.7	40-140	24.0	20
Benzo (a) pyrene	76.8	QR-02	µg/l	2.50	100		76.8	40-140	22.0	20
Indeno (1,2,3-cd) pyrene	80.9	QR-02	µg/l	2.50	100		80.9	40-140	23.3	20
Dibenzo (a,h) anthracene	80.8	QR-02	µg/l	2.50	100		80.8	40-140	23.7	20
Benzo (g,h,i) perylene	81.5	QR-02	µg/l	2.50	100		81.5	40-140	23.3	20
Naphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200	0.00	200
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200	0.00	200
Surrogate: 1-Chlorooctadecane	32.3		µg/l		50.0		64.6	40-140		
Surrogate: Ortho-Terphenyl	39.1		µg/l		50.0		78.2	40-140		
Surrogate: 2-Bromonaphthalene	36.8		µg/l		40.0		92.0	40-140		
Surrogate: 2-Fluorobiphenyl	36.8		µg/l		40.0		92.0	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Notes and Definitions

QC-1 Analyte out of acceptance range.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

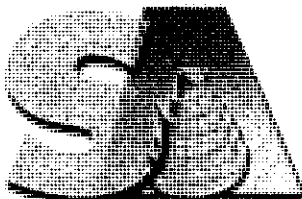
Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

* Yes, if PID and FID surrogate recoveries are listed as *n/a*, then that sample was run via GCMS using all QC criteria specified in the method

Page 14 of 14



Report Date:
05-Apr-06 13:35



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: 131 Main St - Carver, MA
Project #: 91-204 082.02

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA37884-01	DCW-1	Ground Water	30-Nov-05 12:00	01-Dec-05 16:20
SA37884-02	DCW-8	Ground Water	30-Nov-05 14:38	01-Dec-05 16:20
SA37884-03	DCW-9	Ground Water	30-Nov-05 11:10	01-Dec-05 16:20
SA37884-04	DCW-10	Ground Water	30-Nov-05 14:00	01-Dec-05 16:20
SA37884-05	ECS-1	Ground Water	30-Nov-05 13:25	01-Dec-05 16:20
SA37884-06	ECS-7	Ground Water	30-Nov-05 15:25	01-Dec-05 16:20
SA37884-07	SW Outfall	Ground Water	30-Nov-05 15:20	01-Dec-05 16:20
SA37884-08	KEI-4	Ground Water	30-Nov-05 16:35	01-Dec-05 16:20
SA37884-09	Trip Blank	Ground Water	30-Nov-05 08:00	01-Dec-05 16:20

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 36 pages of analytical data plus Chain of Custody document(s).

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USDA # S-51435
Vermont # VT-11393



Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

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ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

CASE NARRATIVE:

The data set for work order SA37884 complies with internal QC criteria for the methods performed. The samples were received @ 4.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

Sample SA37884-02 and -06 were originally scheduled for nitrate analysis via EPA method 300.0 by December 2nd, 2005. During the sample analysis, the analyst became aware of a quality issue in the batch. In order to assure regulatory hold times were met, a portion of the samples was preserved with H₂SO₄. The Lachat method (10-107-04-1-B) was substituted for EPA method 300.0. The resulting data was reported along with the qualified method 300.0 nitrate data. The data may be slightly elevated due to the nitrite contribution; however, nitrite values are typically minimal in samples other than domestic wastewater.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

Sample Identification

DCW-1

SA37884-01

Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 12:00

Received

01-Dec-05

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	7.13		mg/l	3.00	200	+MADEP 5/2004 Rev 1.1	05-Dec-05	06-Dec-05	5120261	MaR
	C9-C12 Aliphatic Hydrocarbons	63.2		mg/l	1.00	200	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	64.7		mg/l	1.00	200	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	56.0		mg/l	3.00	200	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	128		mg/l	1.00	200	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	200	200	"	"	"	"	"
100-41-4	Ethylbenzene	1,610		µg/l	200	200	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	37,400		µg/l	200	200	"	"	"	"	"
91-20-3	Naphthalene	3,920		µg/l	200	200	"	"	"	"	"
108-88-3	Toluene	1,220		µg/l	200	200	"	"	"	"	"
1330-20-7	m,p-Xylene	5,900		µg/l	400	200	"	"	"	"	"
95-47-6	o-Xylene	2,500		µg/l	200	200	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	124			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	94.8			70-130 %		"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	3.9		mg/l	0.2	1	+MADEP 5/2004 R	02-Dec-05	07-Dec-05	5120096	JD
	C19-C36 Aliphatic Hydrocarbons	1.9		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	3.5		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	3.6		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	9.2		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	9.4		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	117		µg/l	5.88	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	60.2		µg/l	5.88	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.88	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.88	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	98.6			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	53.7			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	61.6			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	55.6			40-140 %		"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	2.12		mg/l	0.0100	1	SW846 6010B	08-Dec-05	08-Dec-05	5120506	JLC
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	08-Dec-05	08-Dec-05	5120514	YP
General Chemistry Parameters											
	Nitrate as N	0.150		mg/l	0.100	1	EPA 300.0	01-Dec-05 19:00	02-Dec-05	5120146	AW
4806-79-8	Sulfate as SO4	54.4		mg/l	1.00	1	"	"	"	"	Alex

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 36

Sample Identification

DCW-1

SA37884-01

Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 12:00

Received

01-Dec-05

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
MBAS										
MBAS	BRL		mg/l	0.05		SM5540 E/425.1		02-Dec-05	'[none]'	CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 36

Sample Identification

DCW-8
SA37884-02

Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 14:38

Received

01-Dec-05

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	02-Dec-05	03-Dec-05	5120133	MaR
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	96.6			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	86.8			70-130 %		"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	02-Dec-05	07-Dec-05	5120096	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.32	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.32	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.32	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.32	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	44.0			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	46.8			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	60.1			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	55.4			40-140 %		"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	BRL		mg/l	0.0100	1	SW846 6010B	08-Dec-05	08-Dec-05	5120506	JLC
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	08-Dec-05	08-Dec-05	5120514	YP
General Chemistry Parameters											
	Nitrate/Nitrite as N	1.12		mg/l	0.0300	2	10-107-04-1-B	08-Dec-05	08-Dec-05	5120512	AW
	Nitrate as N	1.12	1-02	mg/l	0.100	1	EPA 300.0	05-Dec-05 10:30	06-Dec-05	5120314	AI

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 36

Sample Identification

DCW-8

SA37884-02

Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 14:38

Received

01-Dec-05

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
General Chemistry Parameters										
4808-79-8 Sulfate as SO4	8.52		mg/l	1.00	1	EPA 300.0	05-Dec-05	06-Dec-05	5120314	AI
MBAS										
MBAS	BRL		mg/l	0.05		SM5540 E/425.1		02-Dec-05	{none}	CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 36

Sample Identification

DCW-9
SA37884-03

Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 11:10

Received

01-Dec-05

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	02-Dec-05	06-Dec-05	5120133	SS
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	106			70-130 %		"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	94.0			70-130 %		"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	02-Dec-05	07-Dec-05	5120096	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.68	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.68	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	49.8			40-140 %		"	"	"	"	"
84-15-1	Ortho-Terphenyl	58.5			40-140 %		"	"	"	"	"
580-13-2	2-Bromonaphthalene	77.8			40-140 %		"	"	"	"	"
321-60-8	2-Fluorobiphenyl	74.7			40-140 %		"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	BRL		mg/l	0.0100	1	SW846 6010B	08-Dec-05	08-Dec-05	5120506	JLC
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	08-Dec-05	08-Dec-05	5120514	YP
General Chemistry Parameters											
	Nitrate as N	1.10		mg/l	0.100	1	EPA 300.0	01-Dec-05 19:00	02-Dec-05	5120146	Alex
4808-79-8	Sulfate as SO4	23.1		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 36

Sample Identification

DCW-9

SA37884-03

Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 11:10

Received

01-Dec-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
MBAS	MBAS	BRL		mg/l	0.05		SM5540 E/425.1		02-Dec-05	'[none]'	CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 36

Sample IdentificationDCW-10
SA37884-04Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 14:00

Received

01-Dec-05

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	02-Dec-05	03-Dec-05	5120133	MaR
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	103		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	93.6		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	02-Dec-05	08-Dec-05	5120096	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.49	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.49	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.49	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.49	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	49.2		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	48.5		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	61.8		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	57.0		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0143		mg/l	0.0100	1	SW846 6010B	08-Dec-05	08-Dec-05	5120506	JLC
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	08-Dec-05	08-Dec-05	5120514	YP
General Chemistry Parameters											
	Nitrate as N	1.13		mg/l	0.100	1	EPA 300.0	01-Dec-05 19:00	02-Dec-05	5120146	Alex
1808-79-8	Sulfate as SO4	13.6		mg/l	1.00	1	"	06-Dec-05	07-Dec-05	5120441	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 36

Sample Identification

DCW-10
SA37884-04

Client Project #
91-204 082.02

Matrix
Ground Water

Collection Date/Time
30-Nov-05 14:00

Received
01-Dec-05

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
MBAS										
MBAS	BRL		mg/l	0.05		SM5540 E/425.1		02-Dec-05	'[none]'	CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 36

Sample IdentificationECS-1
SA37884-05Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 13:25

Received

01-Dec-05

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>IPH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	0.508		mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	05-Dec-05	06-Dec-05	5120261	MaR
	C9-C12 Aliphatic Hydrocarbons	0.370		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	0.827		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	0.720		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	1.20		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	63.5		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	106		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	5.1		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	182		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	7.1		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	30.6		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	96.6		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	86.8		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	02-Dec-05	08-Dec-05	5120096	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	0.7		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	0.8		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	0.8		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	0.9		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	61.1		µg/l	5.56	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	29.1		µg/l	5.56	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.56	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.56	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	57.6		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	52.7		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	93.9		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	62.8		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	87.6		mg/l	0.0100	1	SW846 6010B	08-Dec-05	08-Dec-05	5120506	JLC
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	08-Dec-05	08-Dec-05	5120514	YP
General Chemistry Parameters											
	Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	01-Dec-05 19:00	02-Dec-05	5120146	Alex
4808-79-8	Sulfate as SO4	10.3		mg/l	1.00	1	"	06-Dec-05	07-Dec-05	5120441	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 36

Sample Identification

ECS-1
SA37884-05

Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 13:25

Received

01-Dec-05

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
MBAS	0.19		mg/l	0.05		SM5540 E/425.1		02-Dec-05	'[none]'	CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 36

Sample IdentificationECS-7
SA37884-06Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 15:25

Received

01-Dec-05

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	02-Dec-05	03-Dec-05	5120133	MaR
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	97.4		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	86.2		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	02-Dec-05	08-Dec-05	5120096	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.38	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.38	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.38	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.38	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	56.7		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	42.0		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	53.7		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	51.4		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0413		mg/l	0.0100	1	SW846 6010B	08-Dec-05	08-Dec-05	5120506	JLC
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	08-Dec-05	08-Dec-05	5120514	YP
General Chemistry Parameters											
	Nitrate/Nitrite as N	0.0679		mg/l	0.0150	1	10-107-04-1-B	08-Dec-05	08-Dec-05	5120512	AW
	Nitrate as N	BRL	I-02	mg/l	0.100	1	EPA 300.0	07-Dec-05 18:00	08-Dec-05	5120473	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 36

Sample IdentificationECS-7
SA37884-06Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 15:25

Received

01-Dec-05

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
General Chemistry Parameters										
4808-79-8 Sulfate as SO4	26.1		mg/l	1.00	1	EPA 300.0	05-Dec-05	06-Dec-05	5120314	AI
MBAS										
MBAS	BRL		mg/l	0.05		SM5540 E/425.1		02-Dec-05	'[none]'	CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 14 of 36

Sample IdentificationSW Outfall
SA37884-07Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 15:20

Received

01-Dec-05

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>PH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	+MADEP 5/2004 Rev 1.1	05-Dec-05	06-Dec-05	5120261	MaR
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	5	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	5	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	5	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	5	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	5	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	5	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	5	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	5	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	5	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	101		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	91.8		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	0.7		mg/l	0.2	1	+MADEP 5/2004 R	02-Dec-05	08-Dec-05	5120096	JD
	C19-C36 Aliphatic Hydrocarbons	0.9		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	0.9		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	0.9		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	2.5		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	2.5		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.68	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.68	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.68	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	67.6		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	58.8		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	69.0		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	55.2		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.0765		mg/l	0.0100	1	SW846 6010B	08-Dec-05	08-Dec-05	5120506	JLC
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	08-Dec-05	08-Dec-05	5120514	YP
General Chemistry Parameters											
	Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	01-Dec-05 19:00	02-Dec-05	5120146	Alex
4808-79-8	Sulfate as SO4	BRL		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 15 of 36

Sample IdentificationSW Outfall
SA37884-07Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 15:20

Received

01-Dec-05

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>
MBAS	BRL		mg/l	0.05		SM5540 E/425.1		02-Dec-05	'[none]'	CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 16 of 36

Sample IdentificationKEI-4
SA37884-08Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 16:35

Received

01-Dec-05

CAS No.	Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Volatile Organic Compounds											
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>											
Prepared by method VPH											
	C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	02-Dec-05	03-Dec-05	5120133	MaR
	C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
<u>VPH Target Analytes</u>											
Prepared by method VPH											
71-43-2	Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3	Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3	Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
95-47-6	o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
615-59-8	2,5-Dibromotoluene (FID)	112		70-130 %			"	"	"	"	"
615-59-8	2,5-Dibromotoluene (PID)	98.8		70-130 %			"	"	"	"	"
Extractable Petroleum Hydrocarbons											
<u>EPH Aliphatic/Aromatic Ranges</u>											
Prepared by method SW846 3510C											
	C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	+MADEP 5/2004 R	02-Dec-05	08-Dec-05	5120096	JD
	C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
	Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2	1	"	"	"	"	"
<u>EPH Diesel Target PAH Analytes</u>											
Prepared by method SW846 3510C											
91-20-3	Naphthalene	BRL		µg/l	5.49	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL		µg/l	5.49	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL		µg/l	5.49	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL		µg/l	5.49	1	"	"	"	"	"
<u>Surrogate recoveries:</u>											
3386-33-2	1-Chlorooctadecane	65.0		40-140 %			"	"	"	"	"
84-15-1	Ortho-Terphenyl	52.1		40-140 %			"	"	"	"	"
580-13-2	2-Bromonaphthalene	68.6		40-140 %			"	"	"	"	"
321-60-8	2-Fluorobiphenyl	57.7		40-140 %			"	"	"	"	"
Soluble Metals by EPA 6000/7000 Series Methods											
7439-89-6	Iron	0.105		mg/l	0.0100	1	SW846 6010B	08-Dec-05	08-Dec-05	5120506	JLC
Soluble Metals by EPA 200 Series Methods											
	Filtration	Lab Filtered		N/A		1	EPA 200.7/3005A	08-Dec-05	08-Dec-05	5120514	YP
General Chemistry Parameters											
	Nitrate as N	BRL		mg/l	0.100	1	EPA 300.0	01-Dec-05 19:00	02-Dec-05	5120146	Alex
14808-79-8	Sulfate as SO4	19.6		mg/l	1.00	1	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 17 of 36

Sample IdentificationKEI-4
SA37884-08Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 16:35

Received

01-Dec-05

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>

MBAS

MBAS	BRL		mg/l	0.05		SM5540 E/425.1		02-Dec-05	'[none]'	CT007

Sample IdentificationTrip Blank
SA37884-09Client Project #

91-204 082.02

Matrix

Ground Water

Collection Date/Time

30-Nov-05 08:00

Received

01-Dec-05

<i>CAS No. Analyte(s)</i>	<i>Result</i>	<i>Flag</i>	<i>Units</i>	<i>*RDL</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>

Volatile Organic CompoundsVPH Aliphatic/Aromatic Carbon Ranges

PH

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	+MADEP 5/2004 Rev 1.1	02-Dec-05	06-Dec-05	5120133	SS
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750	1	"	"	"	"	"
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250	1	"	"	"	"	"

VPH Target Analytes

PH

Prepared by method VPH

71-43-2 Benzene	BRL		µg/l	5.0	1	"	"	"	"	"
100-41-4 Ethylbenzene	BRL		µg/l	5.0	1	"	"	"	"	"
1634-04-4 Methyl tert-butyl ether	BRL		µg/l	5.0	1	"	"	"	"	"
91-20-3 Naphthalene	BRL		µg/l	5.0	1	"	"	"	"	"
108-88-3 Toluene	BRL		µg/l	5.0	1	"	"	"	"	"
130-20-7 m,p-Xylene	BRL		µg/l	10.0	1	"	"	"	"	"
135-47-6 o-Xylene	BRL		µg/l	5.0	1	"	"	"	"	"

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	109		70-130 %			"	"	"	"	"
615-59-8 2,5-Dibromotoluene (PID)	94.6		70-130 %			"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 18 of 36

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 5120133 - VPH									
Blank (5120133-BLK1)									
Prepared: 02-Dec-05 Analyzed: 06-Dec-05									
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750					
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250					
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250					
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750					
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250					
Benzene	BRL		µg/l	5.0					
Ethylbenzene	BRL		µg/l	5.0					
Methyl tert-butyl ether	BRL		µg/l	5.0					
Naphthalene	BRL		µg/l	5.0					
Toluene	BRL		µg/l	5.0					
m,p-Xylene	BRL		µg/l	10.0					
o-Xylene	BRL		µg/l	5.0					
Surrogate: 2,5-Dibromotoluene (FID)	54.0		µg/l		50.0		108	70-130	
Surrogate: 2,5-Dibromotoluene (PID)	46.2		µg/l		50.0		92.4	70-130	
LCS (5120133-BS1)									
Prepared & Analyzed: 02-Dec-05									
C5-C8 Aliphatic Hydrocarbons	153		mg/l		140		109	70-130	
C9-C12 Aliphatic Hydrocarbons	62.0		mg/l		55.0		113	70-130	
C9-C10 Aromatic Hydrocarbons	35.1		mg/l		40.0		87.8	70-130	
Unadjusted C5-C8 Aliphatic Hydrocarbons	266		mg/l		280		95.0	70-130	
Unadjusted C9-C12 Aliphatic Hydrocarbons	97.1		mg/l		85.0		114	70-130	
Benzene	18.3		µg/l		20.0		91.5	70-130	
Ethylbenzene	19.8		µg/l		20.0		99.0	70-130	
Methyl tert-butyl ether	18.7		µg/l		20.0		93.5	70-130	
Naphthalene	19.3		µg/l		20.0		96.5	70-130	
Toluene	18.3		µg/l		20.0		91.5	70-130	
m,p-Xylene	38.2		µg/l		40.0		95.5	70-130	
o-Xylene	18.7		µg/l		20.0		93.5	70-130	
2-Methylpentane	23.9		µg/l		20.0		120	70-130	
n-Nonane	21.2		µg/l		20.0		106	70-130	
n-Pentane	24.4		µg/l		20.0		122	70-130	
1,2,4-Trimethylbenzene	20.3		µg/l		20.0		102	70-130	
2,2,4-Trimethylpentane	22.0		µg/l		20.0		110	70-130	
n-Butylcyclohexane	22.6		µg/l		20.0		113	70-130	
n-Decane	23.5		µg/l		20.0		118	70-130	
Surrogate: 2,5-Dibromotoluene (FID)	55.9		µg/l		50.0		112	70-130	
Surrogate: 2,5-Dibromotoluene (PID)	46.5		µg/l		50.0		93.0	70-130	
LCS Dup (5120133-BSD1)									
Prepared & Analyzed: 02-Dec-05									
C5-C8 Aliphatic Hydrocarbons	134		mg/l		140		95.7	70-130	25
C9-C12 Aliphatic Hydrocarbons	55.9		mg/l		55.0		102	70-130	25
C9-C10 Aromatic Hydrocarbons	37.8		mg/l		40.0		94.5	70-130	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	259		mg/l		280		92.5	70-130	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	93.6		mg/l		85.0		110	70-130	25
Benzene	18.6		µg/l		20.0		93.0	70-130	25
Ethylbenzene	17.6		µg/l		20.0		88.0	70-130	25
Methyl tert-butyl ether	18.2		µg/l		20.0		91.0	70-130	25
Naphthalene	16.9		µg/l		20.0		84.5	70-130	25
Toluene	18.8		µg/l		20.0		94.0	70-130	25
m,p-Xylene	35.4		µg/l		40.0		88.5	70-130	25
o-Xylene	16.3		µg/l		20.0		81.5	70-130	25
2-Methylpentane	23.3		µg/l		20.0		116	70-130	25
n-Nonane	19.4		µg/l		20.0		97.0	70-130	25
n-Pentane	24.5		µg/l		20.0		122	70-130	25

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 19 of 36

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120133 - VPH										
LCS Dup (5120133-BSD1)										
Prepared & Analyzed: 02-Dec-05										
1,2,4-Trimethylbenzene	17.7		µg/l		20.0		88.5	70-130	14.2	25
2,2,4-Trimethylpentane	21.2		µg/l		20.0		106	70-130	3.70	25
n-Butylcyclohexane	21.1		µg/l		20.0		106	70-130	6.39	25
n-Decane	23.9		µg/l		20.0		120	70-130	1.68	25
Surrogate: 2,5-Dibromotoluene (FID)	47.6		µg/l		50.0		95.2	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	40.0		µg/l		50.0		80.0	70-130		
Duplicate (5120133-DUP1) Source: SA37622-01										
Prepared & Analyzed: 02-Dec-05										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		BRL				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	51.6		µg/l		50.0		103	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	44.6		µg/l		50.0		89.2	70-130		
Matrix Spike (5120133-MS1) Source: SA37622-01 PH										
Prepared & Analyzed: 02-Dec-05										
Benzene	18.0		µg/l		20.0	BRL	90.0	70-130		
Ethylbenzene	17.7		µg/l		20.0	BRL	88.5	70-130		
Methyl tert-butyl ether	16.3		µg/l		20.0	BRL	81.5	70-130		
Naphthalene	17.7		µg/l		20.0	BRL	88.5	70-130		
Toluene	18.1		µg/l		20.0	BRL	90.5	70-130		
m,p-Xylene	37.0		µg/l		40.0	BRL	92.5	70-130		
o-Xylene	17.3		µg/l		20.0	BRL	86.5	70-130		
2-Methylpentane	21.9		µg/l		20.0	BRL	110	70-130		
n-Nonane	19.0		µg/l		20.0	BRL	95.0	70-130		
n-Pentane	22.9		µg/l		20.0	BRL	114	70-130		
1,2,4-Trimethylbenzene	18.5		µg/l		20.0	BRL	92.5	70-130		
2,2,4-Trimethylpentane	19.2		µg/l		20.0	BRL	96.0	70-130		
n-Butylcyclohexane	20.6		µg/l		20.0	0.0	103	70-130		
n-Decane	20.9		µg/l		20.0	0.0	104	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	51.3		µg/l		50.0		103	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	42.7		µg/l		50.0		85.4	70-130		
Batch 5120261 - VPH										
Blank (5120261-BLK1)										
Prepared & Analyzed: 05-Dec-05										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250						
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750						
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250						
Benzene	BRL		µg/l	5.0						
Ethylbenzene	BRL		µg/l	5.0						
Methyl tert-butyl ether	BRL		µg/l	5.0						
Naphthalene	BRL		µg/l	5.0						
Toluene	BRL		µg/l	5.0						

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* Reportable Detection Limit

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Page 20 of 36

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120261 - VPH										
Blank (5120261-BLK1)										
Prepared & Analyzed: 05-Dec-05										
m,p-Xylene	BRL		µg/l	10.0						
o-Xylene	BRL		µg/l	5.0						
Surrogate: 2,5-Dibromotoluene (FID)	45.3		µg/l		50.0		90.6	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	40.6		µg/l		50.0		81.2	70-130		
LCS (5120261-BS1)										
Prepared & Analyzed: 05-Dec-05										
C5-C8 Aliphatic Hydrocarbons	122		mg/l		140		87.1	70-130		
C9-C12 Aliphatic Hydrocarbons	55.9		mg/l		55.0		102	70-130		
C9-C10 Aromatic Hydrocarbons	38.2		mg/l		40.0		95.5	70-130		
Unadjusted C5-C8 Aliphatic Hydrocarbons	254		mg/l		280		90.7	70-130		
Unadjusted C9-C12 Aliphatic Hydrocarbons	94.1		mg/l		85.0		111	70-130		
Benzene	18.9		µg/l		20.0		94.5	70-130		
Ethylbenzene	18.4		µg/l		20.0		92.0	70-130		
Methyl tert-butyl ether	18.6		µg/l		20.0		93.0	70-130		
Naphthalene	22.7		µg/l		20.0		114	70-130		
Toluene	19.6		µg/l		20.0		98.0	70-130		
m,p-Xylene	38.6		µg/l		40.0		96.5	70-130		
o-Xylene	18.3		µg/l		20.0		91.5	70-130		
2-Methylpentane	22.3		µg/l		20.0		112	70-130		
n-Nonane	20.5		µg/l		20.0		102	70-130		
n-Pentane	22.4		µg/l		20.0		112	70-130		
1,2,4-Trimethylbenzene	20.5		µg/l		20.0		102	70-130		
2,2,4-Trimethylpentane	22.2		µg/l		20.0		111	70-130		
n-Butylcyclohexane	22.0		µg/l		20.0		110	70-130		
n-Decane	20.8		µg/l		20.0		104	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	53.5		µg/l		50.0		107	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	46.3		µg/l		50.0		92.6	70-130		
LCS Dup (5120261-BSD1)										
Prepared & Analyzed: 05-Dec-05										
C5-C8 Aliphatic Hydrocarbons	123		mg/l		140		87.9	70-130	0.914	25
C9-C12 Aliphatic Hydrocarbons	55.8		mg/l		55.0		101	70-130	0.985	25
C9-C10 Aromatic Hydrocarbons	38.6		mg/l		40.0		96.5	70-130	1.04	25
Unadjusted C5-C8 Aliphatic Hydrocarbons	254		mg/l		280		90.7	70-130	0.00	25
Unadjusted C9-C12 Aliphatic Hydrocarbons	94.4		mg/l		85.0		111	70-130	0.00	25
Benzene	19.1		µg/l		20.0		95.5	70-130	1.05	25
Ethylbenzene	18.2		µg/l		20.0		91.0	70-130	1.09	25
Methyl tert-butyl ether	19.1		µg/l		20.0		95.5	70-130	2.65	25
Naphthalene	19.0		µg/l		20.0		95.0	70-130	18.2	25
Toluene	17.8		µg/l		20.0		89.0	70-130	9.63	25
m,p-Xylene	37.9		µg/l		40.0		94.8	70-130	1.78	25
o-Xylene	18.7		µg/l		20.0		93.5	70-130	2.16	25
2-Methylpentane	22.2		µg/l		20.0		111	70-130	0.897	25
n-Nonane	19.7		µg/l		20.0		98.5	70-130	3.49	25
n-Pentane	22.1		µg/l		20.0		110	70-130	1.80	25
1,2,4-Trimethylbenzene	19.0		µg/l		20.0		95.0	70-130	7.11	25
2,2,4-Trimethylpentane	20.2		µg/l		20.0		101	70-130	9.43	25
n-Butylcyclohexane	21.5		µg/l		20.0		108	70-130	1.83	25
n-Decane	22.5		µg/l		20.0		112	70-130	7.41	25
Surrogate: 2,5-Dibromotoluene (FID)	50.9		µg/l		50.0		102	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	45.2		µg/l		50.0		90.4	70-130		
Duplicate (5120261-DUP1) Source: SA37841-01										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.00559				50

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* Reportable Detection Limit

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120261 - VPH										
Duplicate (5120261-DUP1) Source: SA37841-01										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
C9-C10 Aromatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL		mg/l	0.0750		0.00559				50
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL		mg/l	0.0250		BRL				50
Benzene	BRL		µg/l	5.0		BRL				50
Ethylbenzene	BRL		µg/l	5.0		BRL				50
Methyl tert-butyl ether	BRL		µg/l	5.0		BRL				50
Naphthalene	BRL		µg/l	5.0		BRL				50
Toluene	BRL		µg/l	5.0		BRL				50
m,p-Xylene	BRL		µg/l	10.0		BRL				50
o-Xylene	BRL		µg/l	5.0		BRL				50
Surrogate: 2,5-Dibromotoluene (FID)	52.8		µg/l		50.0		106	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	48.3		µg/l		50.0		96.6	70-130		
Matrix Spike (5120261-MS1) Source: SA37841-01										
Prepared & Analyzed: 05-Dec-05										
Benzene	16.9		µg/l		20.0	BRL	84.5	70-130		
Ethylbenzene	15.9		µg/l		20.0	BRL	79.5	70-130		
Methyl tert-butyl ether	20.6		µg/l		20.0	BRL	103	70-130		
Naphthalene	17.7		µg/l		20.0	BRL	88.5	70-130		
Toluene	17.4		µg/l		20.0	BRL	87.0	70-130		
m,p-Xylene	32.2		µg/l		40.0	BRL	80.5	70-130		
o-Xylene	16.6		µg/l		20.0	BRL	83.0	70-130		
2-Methylpentane	19.3		µg/l		20.0	BRL	96.5	70-130		
n-Nonane	17.8		µg/l		20.0	BRL	89.0	70-130		
n-Pentane	18.9		µg/l		20.0	BRL	94.5	70-130		
1,2,4-Trimethylbenzene	18.5		µg/l		20.0	BRL	92.5	70-130		
2,2,4-Trimethylpentane	18.6		µg/l		20.0	BRL	93.0	70-130		
n-Butylcyclohexane	18.8		µg/l		20.0	0.0	94.0	70-130		
n-Decane	19.2		µg/l		20.0	0.0	96.0	70-130		
Surrogate: 2,5-Dibromotoluene (FID)	46.7		µg/l		50.0		93.4	70-130		
Surrogate: 2,5-Dibromotoluene (PID)	41.7		µg/l		50.0		83.4	70-130		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 22 of 36

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 5120096 - SW846 3510C									
Blank (5120096-BLK1)									
Prepared: 02-Dec-05 Analyzed: 06-Dec-05									
C9-C18 Aliphatic Hydrocarbons	BRL		mg/l	0.2					
C19-C36 Aliphatic Hydrocarbons	BRL		mg/l	0.2					
C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2					
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL		mg/l	0.2					
Total Petroleum Hydrocarbons	BRL		mg/l	0.2					
Unadjusted Total Petroleum Hydrocarbons	BRL		mg/l	0.2					
Naphthalene	BRL		µg/l	2.50					
2-Methylnaphthalene	BRL		µg/l	2.50					
Acenaphthene	BRL		µg/l	2.50					
Phenanthrene	BRL		µg/l	2.50					
Surrogate: 1-Chlorooctadecane	25.6		µg/l		50.0	51.2	40-140		
Surrogate: Ortho-Terphenyl	25.7		µg/l		50.0	51.4	40-140		
Surrogate: 2-Bromonaphthalene	27.9		µg/l		40.0	69.8	40-140		
Surrogate: 2-Fluorobiphenyl	22.2		µg/l		40.0	55.5	40-140		
LCS (5120096-BS1)									
Prepared: 02-Dec-05 Analyzed: 06-Dec-05									
C9-C18 Aliphatic Hydrocarbons	0.284		mg/l	0.2	0.600	47.3	40-140		
C19-C36 Aliphatic Hydrocarbons	0.517		mg/l	0.2	0.800	64.6	40-140		
C11-C22 Aromatic Hydrocarbons	1.17		mg/l	0.2	1.70	68.8	40-140		
Naphthalene	43.3		µg/l	2.50	100	43.3	40-140		
2-Methylnaphthalene	45.4		µg/l	2.50	100	45.4	40-140		
Acenaphthene	51.7		µg/l	2.50	100	51.7	40-140		
Phenanthrene	55.7		µg/l	2.50	100	55.7	40-140		
Anthracene	70.8		µg/l	2.50	100	70.8	40-140		
Pyrene	67.7		µg/l	2.50	100	67.7	40-140		
Chrysene	72.0		µg/l	2.50	100	72.0	40-140		
Naphthalene (aliphatic fraction)	0.000100		µg/l		100	0.000100	0-200		
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100	0.000100	0-200		
Surrogate: 1-Chlorooctadecane	29.2		µg/l		50.0	58.4	40-140		
Surrogate: Ortho-Terphenyl	30.3		µg/l		50.0	60.6	40-140		
Surrogate: 2-Bromonaphthalene	31.9		µg/l		40.0	79.8	40-140		
Surrogate: 2-Fluorobiphenyl	26.2		µg/l		40.0	65.5	40-140		
Naphthalene Breakthrough	0.00		%				0-5		
2-Methylnaphthalene Breakthrough	0.00		%				0-5		
Fractionation Check Standard (512009)									
Prepared: 02-Dec-05 Analyzed: 06-Dec-05									
C9-C18 Aliphatic Hydrocarbons	0.254		mg/l	0.2	0.600	42.3	40-140		
C19-C36 Aliphatic Hydrocarbons	0.412		mg/l	0.2	0.800	51.5	40-140		
C11-C22 Aromatic Hydrocarbons	2.06		mg/l	0.2	1.70	121	40-140		
Naphthalene	53.9		µg/l	2.50	100	53.9	40-140		
2-Methylnaphthalene	57.6		µg/l	2.50	100	57.6	40-140		
Acenaphthene	59.0		µg/l	2.50	100	59.0	40-140		
Phenanthrene	54.8		µg/l	2.50	100	54.8	40-140		
Anthracene	70.1		µg/l	2.50	100	70.1	40-140		
Pyrene	64.8		µg/l	2.50	100	64.8	40-140		
Chrysene	68.7		µg/l	2.50	100	68.7	40-140		
Naphthalene (aliphatic fraction)	0.000100		µg/l		100	0.000100	0-200		
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100	0.000100	0-200		
Surrogate: 1-Chlorooctadecane	26.9		µg/l		50.0	53.8	40-140		
Surrogate: Ortho-Terphenyl	30.1		µg/l		50.0	60.2	40-140		
Surrogate: 2-Bromonaphthalene	27.5		µg/l		40.0	68.8	40-140		
Surrogate: 2-Fluorobiphenyl	26.9		µg/l		40.0	67.2	40-140		
LCS Dup (5120096-BSD1)									
Prepared: 02-Dec-05 Analyzed: 06-Dec-05									

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* Reportable Detection Limit

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Page 23 of 36

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120096 - SW846 3510C										
LCS Dup (5120096-BSD1)										
Prepared: 02-Dec-05 Analyzed: 06-Dec-05										
C9-C18 Aliphatic Hydrocarbons	0.282		mg/l	0.2	0.600		47.0	40-140	0.636	25
C19-C36 Aliphatic Hydrocarbons	0.450		mg/l	0.2	0.800		56.2	40-140	13.9	25
C11-C22 Aromatic Hydrocarbons	1.02		mg/l	0.2	1.70		60.0	40-140	13.7	25
Naphthalene	36.8	QC-1	µg/l	2.50	100		36.8	40-140	16.2	20
2-Methylnaphthalene	40.9		µg/l	2.50	100		40.9	40-140	10.4	20
Acenaphthene	45.5		µg/l	2.50	100		45.5	40-140	12.8	20
Phenanthrene	48.3		µg/l	2.50	100		48.3	40-140	14.2	20
Anthracene	65.6		µg/l	2.50	100		65.6	40-140	7.62	20
Pyrene	63.1		µg/l	2.50	100		63.1	40-140	7.03	20
Chrysene	69.5		µg/l	2.50	100		69.5	40-140	3.53	20
Naphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200	0.00	200
2-Methylnaphthalene (aliphatic fraction)	0.000100		µg/l		100		0.000100	0-200	0.00	200
Surrogate: 1-Chlorooctadecane	27.7		µg/l		50.0		55.4	40-140		
Surrogate: Ortho-Terphenyl	27.4		µg/l		50.0		54.8	40-140		
Surrogate: 2-Bromonaphthalene	27.9		µg/l		40.0		69.8	40-140		
Surrogate: 2-Fluorobiphenyl	24.6		µg/l		40.0		61.5	40-140		
Naphthalene Breakthrough	0.00		%					0-5		
2-Methylnaphthalene Breakthrough	0.00		%					0-5		

Soluble Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120506 - SW846 3005A										
Blank (5120506-BLK1)										
Prepared & Analyzed: 08-Dec-05										
Iron	BRL		mg/l	0.0100						
LCS (5120506-BS1)										
Prepared & Analyzed: 08-Dec-05										
Iron	1.05		mg/l	0.0100	1.00		105	85-115		
LCS Dup (5120506-BSD1)										
Prepared & Analyzed: 08-Dec-05										
Iron	1.06		mg/l	0.0100	1.00		106	85-115	0.948	20
Duplicate (5120506-DUP1) Source: SA37884-02										
Prepared & Analyzed: 08-Dec-05										
Iron	BRL		mg/l	0.0100		BRL				20
Matrix Spike (5120506-MS1) Source: SA37884-01										
Prepared & Analyzed: 08-Dec-05										
Iron	2.44		mg/l	0.0100	0.400	2.12	80.0	75-125		
Matrix Spike Dup (5120506-MSD1) Source: SA37884-01										
Prepared & Analyzed: 08-Dec-05										
Iron	2.46		mg/l	0.0100	0.400	2.12	85.0	75-125	0.816	20

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 24 of 36

Soluble Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit

Batch 5120514 - General Prep-Metal

Blank (5120514-BLK1)

Prepared & Analyzed: 08-Dec-05

Filtration

Lab Filtered

N/A

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Page 25 of 36

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Batch 5120146 - General Preparation									
Blank (5120146-BLK1)									
Prepared & Analyzed: 01-Dec-05									
Sulfate as SO ₄	BRL		mg/l	1.00					
Nitrate as N	BRL		mg/l	0.100					
Blank (5120146-BLK2)									
Prepared: 01-Dec-05 Analyzed: 02-Dec-05									
Sulfate as SO ₄	BRL		mg/l	1.00					
Nitrate as N	BRL		mg/l	0.100					
LCS (5120146-BS1)									
Prepared & Analyzed: 01-Dec-05									
Sulfate as SO ₄	18.9		mg/l	1.00	20.0		94.5	90-110	
Nitrate as N	2.03		mg/l	0.100	2.00		102	90-110	
LCS (5120146-BS2)									
Prepared & Analyzed: 01-Dec-05									
Sulfate as SO ₄	3.89		mg/l	1.00	4.00		97.2	90-110	
Nitrate as N	0.430		mg/l	0.100	0.400		108	90-110	
LCS (5120146-BS3)									
Prepared: 01-Dec-05 Analyzed: 02-Dec-05									
Sulfate as SO ₄	18.8		mg/l	1.00	20.0		94.0	90-110	
Nitrate as N	2.06		mg/l	0.100	2.00		103	90-110	
LCS (5120146-BS4)									
Prepared: 01-Dec-05 Analyzed: 02-Dec-05									
Sulfate as SO ₄	3.85		mg/l	1.00	4.00		96.2	90-110	
Nitrate as N	0.420		mg/l	0.100	0.400		105	90-110	
Duplicate (5120146-DUP1) Source: SA37820-04									
Prepared & Analyzed: 01-Dec-05									
Sulfate as SO ₄	14.7		mg/l	1.00		15.0		2.02	20
Nitrate as N	1.16		mg/l	0.100		1.16		0.00	20
Duplicate (5120146-DUP2) Source: SA37851-06									
Prepared: 01-Dec-05 Analyzed: 02-Dec-05									
Nitrate as N	0.420		mg/l	0.100		0.410		2.41	20
Matrix Spike (5120146-MS1) Source: SA37820-04									
Prepared & Analyzed: 01-Dec-05									
Sulfate as SO ₄	18.1	QM-07	mg/l	1.00	4.00	15.0	77.5	80-120	
Nitrate as N	1.45	QM-07	mg/l	0.100	0.400	1.16	72.5	80-120	
Matrix Spike (5120146-MS2) Source: SA37851-06									
Prepared: 01-Dec-05 Analyzed: 02-Dec-05									
Nitrate as N	0.860		mg/l	0.100	0.400	0.410	112	80-120	
Matrix Spike Dup (5120146-MSD1) Source: SA37820-04									
Prepared & Analyzed: 01-Dec-05									
Sulfate as SO ₄	18.2		mg/l	1.00	4.00	15.0	80.0	80-120	0.551
Nitrate as N	1.55		mg/l	0.100	0.400	1.16	97.5	80-120	6.67
Matrix Spike Dup (5120146-MSD2) Source: SA37851-06									
Prepared: 01-Dec-05 Analyzed: 02-Dec-05									
Nitrate as N	0.840		mg/l	0.100	0.400	0.410	108	80-120	2.35
Reference (5120146-SRM1)									
Prepared & Analyzed: 01-Dec-05									
Sulfate as SO ₄	23.6		mg/l	1.00	25.0		94.4	90-110	
Nitrate as N	2.51		mg/l	0.100	2.50		100	90-110	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 26 of 36

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120146 - General Preparation										
<u>Reference (5120146-SRM2)</u>										
Prepared & Analyzed: 01-Dec-05										
Sulfate as SO ₄	5.08		mg/l	1.00	5.00		102	90-110		
Nitrate as N	0.500		mg/l	0.100	0.500		100	90-110		
<u>Reference (5120146-SRM3)</u>										
Prepared: 01-Dec-05 Analyzed: 02-Dec-05										
Sulfate as SO ₄	22.7		mg/l	1.00	25.0		90.8	90-110		
Nitrate as N	2.53		mg/l	0.100	2.50		101	90-110		
<u>Reference (5120146-SRM4)</u>										
Prepared: 01-Dec-05 Analyzed: 02-Dec-05										
Sulfate as SO ₄	4.76		mg/l	1.00	5.00		95.2	90-110		
Nitrate as N	0.480		mg/l	0.100	0.500		96.0	90-110		
Batch 5120314 - General Preparation										
<u>Blank (5120314-BLK1)</u>										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
<u>Blank (5120314-BLK2)</u>										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	BRL		mg/l	1.00						
Nitrate as N	BRL		mg/l	0.100						
<u>LCS (5120314-BS1)</u>										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	19.5		mg/l	1.00	20.0		97.5	90-110		
Nitrate as N	2.00		mg/l	0.100	2.00		100	90-110		
<u>LCS (5120314-BS2)</u>										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	4.11		mg/l	1.00	4.00		103	90-110		
Nitrate as N	0.440		mg/l	0.100	0.400		110	90-110		
<u>LCS (5120314-BS3)</u>										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	19.9		mg/l	1.00	20.0		99.5	90-110		
Nitrate as N	2.05		mg/l	0.100	2.00		102	90-110		
<u>LCS (5120314-BS4)</u>										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	3.89		mg/l	1.00	4.00		97.2	90-110		
Nitrate as N	0.400		mg/l	0.100	0.400		100	90-110		
<u>Duplicate (5120314-DUP1)</u> Source: SA37806-01										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	46.2		mg/l	1.00		45.2			2.19	20
<u>Duplicate (5120314-DUP2)</u> Source: SA37967-02										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	37.1		mg/l	1.00		36.9			0.541	20
<u>Duplicate (5120314-DUP4)</u> Source: SA37884-02										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	8.58		mg/l	1.00		8.52			0.702	20
Nitrate as N	1.10		mg/l	0.100		1.12			1.80	20
<u>Duplicate (5120314-DUP5)</u> Source: SA37967-03										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										

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* Reportable Detection Limit

BRL = Below Reporting Limit

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120314 - General Preparation										
Duplicate (5120314-DUP5) Source: SA37967-03										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	30.4		mg/l	1.00		29.5			3.01	20
Matrix Spike (5120314-MS1) Source: SA37806-01										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	50.0		mg/l	1.00	4.00	45.2	120	80-120		
Matrix Spike (5120314-MS2) Source: SA37967-02										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	41.0		mg/l	1.00	4.00	36.9	102	80-120		
Matrix Spike (5120314-MS4) Source: SA37884-02										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	12.6		mg/l	1.00	4.00	8.52	102	80-120		
Nitrate as N	1.49		mg/l	0.100	0.400	1.12	92.5	80-120		
Matrix Spike (5120314-MS5) Source: SA37967-03										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	34.1		mg/l	1.00	4.00	29.5	115	80-120		
Matrix Spike Dup (5120314-MSD1) Source: SA37806-01										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	50.1	QM-4X	mg/l	1.00	4.00	45.2	122	80-120	0.200	20
Matrix Spike Dup (5120314-MSD2) Source: SA37967-02										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	41.0		mg/l	1.00	4.00	36.9	102	80-120	0.00	20
Matrix Spike Dup (5120314-MSD4) Source: SA37884-02										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	11.6	QM-07	mg/l	1.00	4.00	8.52	77.0	80-120	8.26	20
Nitrate as N	1.40	QC-1	mg/l	0.100	0.400	1.12	70.0	80-120	6.23	20
Matrix Spike Dup (5120314-MSD5) Source: SA37967-03										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	33.3		mg/l	1.00	4.00	29.5	95.0	80-120	2.37	20
Reference (5120314-SRM1)										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	24.0		mg/l	1.00	25.0		96.0	90-110		
Nitrate as N	2.48		mg/l	0.100	2.50		99.2	90-110		
Reference (5120314-SRM2)										
Prepared & Analyzed: 05-Dec-05										
Sulfate as SO ₄	5.32		mg/l	1.00	5.00		106	90-110		
Nitrate as N	0.500		mg/l	0.100	0.500		100	90-110		
Reference (5120314-SRM3)										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	24.5		mg/l	1.00	25.0		98.0	90-110		
Nitrate as N	2.58		mg/l	0.100	2.50		103	90-110		
Reference (5120314-SRM4)										
Prepared: 05-Dec-05 Analyzed: 06-Dec-05										
Sulfate as SO ₄	4.69		mg/l	1.00	5.00		93.8	90-110		
Nitrate as N	0.520		mg/l	0.100	0.500		104	90-110		
Batch 5120441 - General Preparation										
Blank (5120441-BLK1)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 28 of 36

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120441 - General Preparation										
Blank (5120441-BLK1)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	BRL		mg/l	1.00						
Blank (5120441-BLK2)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	BRL		mg/l	1.00						
LCS (5120441-BS1)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	19.0		mg/l	1.00	20.0		95.0	90-110		
LCS (5120441-BS2)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	3.81		mg/l	1.00	4.00		95.2	90-110		
LCS (5120441-BS3)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	18.3		mg/l	1.00	20.0		91.5	90-110		
LCS (5120441-BS4)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	3.68		mg/l	1.00	4.00		92.0	90-110		
Duplicate (5120441-DUP1) Source: SA38099-09										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	55.1		mg/l	1.00		55.2			0.181	20
Matrix Spike (5120441-MS1) Source: SA38099-09										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	58.9		mg/l	1.00	4.00	55.2	92.5	80-120		
Matrix Spike Dup (5120441-MSD1) Source: SA38099-09										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	58.9		mg/l	1.00	4.00	55.2	92.5	80-120	0.00	20
Reference (5120441-SRM1)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	23.4		mg/l	1.00	25.0		93.6	90-110		
Reference (5120441-SRM2)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	4.71		mg/l	1.00	5.00		94.2	90-110		
Reference (5120441-SRM3)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	22.4	QL-01	mg/l	1.00	25.0		89.6	90-110		
Reference (5120441-SRM4)										
Prepared: 06-Dec-05 Analyzed: 07-Dec-05										
Sulfate as SO4	4.51		mg/l	1.00	5.00		90.2	90-110		
Batch 5120473 - General Preparation										
Blank (5120473-BLK1)										
Prepared & Analyzed: 07-Dec-05										
Nitrate as N	BRL		mg/l	0.100						
Blank (5120473-BLK2)										
Prepared: 07-Dec-05 Analyzed: 08-Dec-05										
Nitrate as N	BRL		mg/l	0.100						
LCS (5120473-BS1)										

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 29 of 36

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 5120473 - General Preparation										
Prepared & Analyzed: 07-Dec-05										
Nitrate as N	2.02		mg/l	0.100	2.00		101	90-110		
LCS (5120473-BS2)										
Prepared & Analyzed: 07-Dec-05										
Nitrate as N	0.390		mg/l	0.100	0.400		97.5	90-110		
LCS (5120473-BS3)										
Prepared: 07-Dec-05 Analyzed: 08-Dec-05										
Nitrate as N	1.85		mg/l	0.100	2.00		92.5	90-110		
LCS (5120473-BS4)										
Prepared: 07-Dec-05 Analyzed: 08-Dec-05										
Nitrate as N	0.400		mg/l	0.100	0.400		100	90-110		
Duplicate (5120473-DUP1) Source: SA38086-04										
Prepared & Analyzed: 07-Dec-05										
Nitrate as N	2.84		mg/l	0.100		2.83			0.353	20
Duplicate (5120473-DUP2) Source: SA37847-02										
Prepared: 07-Dec-05 Analyzed: 08-Dec-05										
Nitrate as N	0.110		mg/l	0.100		0.110			0.00	20
Matrix Spike (5120473-MS1) Source: SA38086-04										
Prepared & Analyzed: 07-Dec-05										
Nitrate as N	3.21		mg/l	0.100	0.400	2.83	95.0	80-120		
Matrix Spike (5120473-MS2) Source: SA37847-02										
Prepared: 07-Dec-05 Analyzed: 08-Dec-05										
Nitrate as N	0.510		mg/l	0.100	0.400	0.110	100	80-120		
Matrix Spike Dup (5120473-MSD1) Source: SA38086-04										
Prepared & Analyzed: 07-Dec-05										
Nitrate as N	3.24		mg/l	0.100	0.400	2.83	102	80-120	0.930	20
Matrix Spike Dup (5120473-MSD2) Source: SA37847-02										
Prepared: 07-Dec-05 Analyzed: 08-Dec-05										
Nitrate as N	0.510		mg/l	0.100	0.400	0.110	100	80-120	0.00	20
Reference (5120473-SRM1)										
Prepared & Analyzed: 07-Dec-05										
Nitrate as N	2.33		mg/l	0.100	2.50		93.2	90-110		
Reference (5120473-SRM2)										
Prepared & Analyzed: 07-Dec-05										
Nitrate as N	0.510		mg/l	0.100	0.500		102	90-110		
Reference (5120473-SRM3)										
Prepared: 07-Dec-05 Analyzed: 08-Dec-05										
Nitrate as N	2.40		mg/l	0.100	2.50		96.0	90-110		
Reference (5120473-SRM4)										
Prepared: 07-Dec-05 Analyzed: 08-Dec-05										
Nitrate as N	0.490		mg/l	0.100	0.500		98.0	90-110		
Batch 5120512 - General Preparation										
Blank (5120512-BLK1)										
Prepared & Analyzed: 08-Dec-05										
Nitrate/Nitrite as N	BRL		mg/l	0.0150						
LCS (5120512-BS1)										
Prepared & Analyzed: 08-Dec-05										

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 30 of 36

General Chemistry Parameters - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	Limit	RPD	Limit
Batch 5120512 - General Preparation										
<u>LCS (5120512-BS1)</u>										
Prepared & Analyzed: 08-Dec-05										
Nitrate/Nitrite as N	0.381		mg/l	0.0150	0.400		95.2	90-110		
<u>Duplicate (5120512-DUP1)</u>										
Source: SA37847-02										
Prepared & Analyzed: 08-Dec-05										
Nitrate/Nitrite as N	0.0900		mg/l	0.0150		0.0848			5.95	20
<u>Matrix Spike (5120512-MS1)</u>										
Source: SA37847-02										
Prepared & Analyzed: 08-Dec-05										
Nitrate/Nitrite as N	0.464		mg/l	0.0150	0.400	0.0848	94.8	80-120		
<u>Reference (5120512-SRM1)</u>										
Prepared & Analyzed: 08-Dec-05										
Nitrate/Nitrite as N	8.83		mg/l	0.150	9.23		95.7	90-111		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0512043				
Calibration Check (0512043-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.87539E+08	1.63227E+08	-13.0	25.00
C19-C36 Aliphatic Hydrocarbons	1.4791E+08	1.24554E+08	-15.8	25.00
C11-C22 Aromatic Hydrocarbons	16870.2	16.0171	7.65	25.00
Naphthalene	4.41995	4.48459	1.46	20.00
2-Methylnaphthalene	3.27182	3.22514	-1.43	20.00
Acenaphthene	3.29074	3.36283	2.19	20.00
Phenanthrene	4.51346	4.60063	1.93	20.00
Anthracene	5.42438	5.96977	10.1	20.00
Pyrene	5.81992	6.77609	16.4	20.00
Chrysene	5.74607	6.42007	11.7	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0512061				
Calibration Check (0512061-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.87539E+08	1.61009E+08	-14.1	25.00
C19-C36 Aliphatic Hydrocarbons	1.4791E+08	1.21871E+08	-17.6	25.00
C11-C22 Aromatic Hydrocarbons	16870.2	16.837	12.9	25.00
Naphthalene	4.41995	4.52798	2.44	20.00
2-Methylnaphthalene	3.27182	3.24371	-0.859	20.00
Acenaphthene	3.29074	3.29397	0.0982	20.00
Phenanthrene	4.51346	4.89552	8.46	20.00
Anthracene	5.42438	5.57713	2.82	20.00
Pyrene	5.81992	6.70058	15.1	20.00
Chrysene	5.74607	6.80867	18.5	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Notes and Definitions

I-02 This result was analyzed outside of the EPA recommended holding time

LF Lab Filtered

PH Insufficient preservative to reduce the sample pH to less than 2.

QC-1 Analyte out of acceptance range.

QL-01 Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

QM-4X The spike recovery was outside of QC acceptance limits for the MS, MSD and/or PS due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
June O'Connor
Nicole Brown

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Page 34 of 36

* Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GCMS using all OC criteria specified in the method

Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No

Authorized by:

10/12/20

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:

This form provides certifications for the following Spectrum Analytical, Inc work order #: SA37884

Matrix	☒ Groundwater	☐ Soil/Sediment	☐ Drinking Water	☐ Other
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☒ 6010B
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³

¹ List Release Tracking Number (RTN), if known² M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method³ S - SW-846 Methods 7000 Series List individual method and analyte*An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status*

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☐ Yes ☒ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Date: 4/5/2006

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* Reportable Detection Limit

BRL = Below Reporting Limit



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CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:
☐ Standard TAT - 7 to 10 business days
☒ Rush TAT - Date Needed: 12-8-05
All TATs subject to laboratory approval.
Min. 24-hour notification needed for rushes.
Samples disposed of after 60 days unless otherwise instructed.

Report To: EC5

Invoice To: EC5

Project No.: 71-204082.02

27 Middle Ave, Suite 218
Auburn, MA 01501

27 Middle Ave, Suite 218
Auburn, MA 01501
10015017184

Site Name: _____
Location: 131 Main St City: Calver State: MA
Sampler(s): Akaznaka, E. Madalski

Project Mgr.: Chuck Klingler

P.O. No.: P03-0396 RQN: STD Price

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=_____ 10=_____

Containers:

Analyses:

QA Reporting Notes:
(check if needed)

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Preservative	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	VPH w/t. targets	EPH w/diesel targets	Dissolved Iron	Nitrates/Sulfates	MBAS	State specific reporting standards If applicable, please list below.	Provide MCP CAM Report Were all field QC requirements met as per MADEP CAM Section 2.0? ☒ Yes ☐ No (Response required for CAM report)
37884-01	DCW-1	11-30-05	12:00	G	GW	2	3	1		2	X	X	X	X	X	Filter For Assured Fe	
02	DCW-8		2:38	G	GW	2	3	1		2	X	X	X	X	X		
03	DCW-9		11:10	G	GW	1	3	1		2	X	X	X	X	X		
04	DCW-10		2:00	G	GW	2	3	1		2	X	X	X	X	X		
05	ELC-1		1:25	G	GW	2	3	1		2	X	X	X	X	X		
06	ELC-7		3:25	G	GW	2	3	1		2	X	X	X	X	X		
07	SW Outfall		3:20	G	GW	2	3	1		2	X	X	X	X	X		
08	KE7-4		4:35	G	GW	2	3	1		2	X	X	X	X	X		
09	Tip Blank		8:00	G	GW	2	3	1		2	X	X	X	X	X		

Relinquished by:

Received by:

Date:

Time:

☐ Fax results when available to () _____
☒ E-mail to cklingler@ecsconsult.com

EDD Format _____

Condition upon receipt: ☐ Iced ☐ Ambient ☒ 21

Caron Macaruba

Substrate

12/1/05 10:15

Caron Macaruba

WZ

12/1/05 11:30



SPECTRUI ANALYTICAL, INC.
Featuring
HAMBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Special Handling:

- ☐ Standard TAT - 7 to 10 business days
- ☒ Rush TAT - Date Needed: 12-8-05
- All TATs subject to laboratory approval.
- Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: EC5

27 Midstate Drive, Suite 218
Auburn, MA 01501

Invoice To: EC5

27 Midstate Drive, Suite 218
Auburn, MA 01501
12/1/05

Project No.: 71-204082.02

Site Name:

Location: 131 Main St. Carver

State: MA

Project Mgr.: Chuck Klingler

P.O. No.: PA3-0396 RONT: 510 Price

Sampler(s): A. Kuzubsky, E. Madolski

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9= 10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Preservative	# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analyses:	QA Reporting Notes: (check if needed)
37884-01	DCW-1	11-30-05	12:00	G	GW	2	3	1			VPH w/ targets EPH w/ diesel targets Dissolved Iron Nitrates/Sulfates MBAS	State specific reporting standards If applicable, please list below.
-02	DCW-8		2:38	G	GW	2	3	1				Provide MCP CAM Report Were all field QC requirements met as per MADEP CAM Section 2.0? ☒ Yes ☐ No (Response required for CAM report)
-03	DCW-9		11:10	G	GW	2	3	1				Filter for Dissolved Fe
-04	DCW-10		2:00	G	GW	2	3	1				
-05	ELS-1		1:25	G	GW	2	3	1				
-06	ELS-7		3:25	G	GW	2	3	1				
-07	SW Outfall		3:20	G	GW	2	3	1				
-08	KEI-4		4:35	G	GW	2	3	1				
-09	Tip Blank		8:00	G	GW	2	3	1				

☐ Fax results when available to ()

☒ E-mail to CKlingler@ecsconsult.com

EDD Format

Condition upon receipt: ☐ Iced ☐ Ambient DC

Relinquished by:

Received by:

Date:

Time:

Daron Nagasaka

Substrate

12/1/05 10:18

Chuck Klingler

WZ

12/1/05 10:30



Date: 11/30/05

Company Name: ECSMARIN, Auburn XAA, 508-832-6022

Contact Person: Chuck

Date Supplies Needed: w/ 12/1 pickup

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

SAMPLE CONTAINER REQUEST

STOCK	# CONTAINERS NEEDED	*PRESERVATIVE
Containers for Aqueous Samples:		
40ml Amber Vials (VOC)		HCl
40ml Amber Vials (EDB by 504)		Na ₂ S ₂ O ₃
1L Amber Glass	3 cases	HCL
1L Plastic	3 cases	—
500ml Plastic	3 cases	—
250ml Plastic		
100ml Sterile Plastic (Coliforms)		Na ₂ S ₂ O ₃
Containers for Solid Samples:		
2oz. Clear Soil Jars		
8oz. Amber Soil Jar	3 cases	—
4oz. Amber Soil Jar	3 cases	—
20ml Clear Vial		NaHSO ₄
40ml Clear Vial		CH ₃ OH
40ml Clear Vial		Not preserved
Containers for Air Samples:		
1L Tedlar Bag		
6L Summa Canister		
Other Supplies:		
Chains of Custody		
Sample Labels	✓	

* Please note laboratory preservation if needed.

Received by: _____ Date: _____
ENVIRONMENTAL ANALYSES



SPECTRUM ANALYTICAL, INC.

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HANIBAL TECHNOLOGY

RUSH ANALYSIS REQUEST TRANSMITTAL

Note: A minimum of 24-hour notification is required for rush analysis.

DATE: 11-30-05
COMPANY: FCS Marin, Auburn, MA
CONTACT PERSON: Chuck
PROJECT NUMBER: 91-204082
SITE LOCATION: Carver MA

DOES THIS PROJECT ALLOW FOR 25% RUSH SURCHARGE? YES ☐ NO ☒ (PLEASE CHECK ONE)

DATE OF SAMPLE RECEIPT
IN THE LABORATORY*: 12-1-05 DATE RESULTS NEEDED: 12-8-05

# OF SAMPLES	MATRIX	ANALYSIS
<u>12</u>	<u>GW</u>	<u>VPH, EPH, MBAS</u>
<u>7</u>	<u>GW</u>	<u>dissolved iron, Sulfate, Nitrate</u>

** Samples must be received in the laboratory by 3:00 PM in order to meet requested TAT. Please take appropriate measures to ensure that samples are received within this timeframe.*

LABORATORY APPROVAL BY: _____

This commitment is contingent upon routine working conditions and instrument performance.

Submittal of this form does not constitute a request for sample pick-up. If courier service is necessary, please contact the Quality Services Department to arrange for pick-up at least 24 hours prior to the desired pick-up date.



SPECTRUM ANALYTICAL INC.
Featuring
HANIBAL TECHNOLOGY

RUSH ANALYSIS REQUEST TRANSMITTAL

Note: A minimum of 24-hour notification is required for rush analysis.

DATE: 11-30-05
COMPANY: ECS Marin, Auburn, MA
CONTACT PERSON: Chuck
PROJECT NUMBER: 91-204082
SITE LOCATION: Carver MA

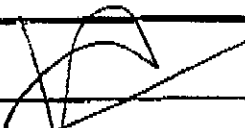
DOES THIS PROJECT ALLOW FOR 25% RUSH SURCHARGE? YES ☐ NO ☒ (PLEASE CHECK ONE)

DATE OF SAMPLE RECEIPT
IN THE LABORATORY*: plus 12-1-05

DATE RESULTS NEEDED: 12-8-05

# OF SAMPLES	MATRIX	ANALYSIS
12	GW	VPH, EPH, MBAS
7	GW	discharged wv, Sulfate, Nitrate

* Samples must be received in the laboratory by 3:00 PM in order to meet requested TAT. Please take appropriate measures to ensure that samples are received within this timeframe.

LABORATORY APPROVAL BY: 

This commitment is contingent upon routine working conditions and instrument performance.

Submission of this form does not constitute a request for sample pick-up. If courier service is necessary, please contact the Quality Services Department to arrange for pick-up at least 24 hours prior to the desired pick-up date.

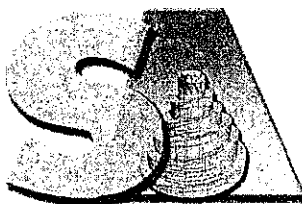
11 Almgren Drive • Agawam, Massachusetts 01001 • 800-789-9115 • FAX 413-789-4076

10

10

10

Report Date:
03-Nov-05 16:25



SPECTRUM ANALYTICAL, INC.

Featuring
HANIBAL TECHNOLOGY

Laboratory Report

☒ Final Report
☐ Re-Issued Report
☐ Revised Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: 131 Main Street-Carver, MA
Project #: 91-204082.00

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA36465-01	131 Main St	Drinking Water	28-Oct-05 10:00	31-Oct-05 15:30
SA36465-02	131 Dup	Drinking Water	28-Oct-05 10:00	31-Oct-05 15:30
SA36465-03	MH-1	Ground Water	28-Oct-05 12:00	31-Oct-05 15:30
SA36465-04	MH-2	Ground Water	28-Oct-05 12:20	31-Oct-05 15:30
SA36465-05	134 Main St	Drinking Water	28-Oct-05 00:00	31-Oct-05 15:30
SA36465-06	134 Dup	Drinking Water	28-Oct-05 00:00	31-Oct-05 15:30

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 24 pages of analytical data plus Chain of Custody document(s).

This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc.

Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

CASE NARRATIVE:

The data set for work order SA36465 complies with internal QC criteria for the methods performed. The samples were received @ 4.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

ENVIRONMENTAL ANALYSES

Sample Identification131 Main St
SA36465-01Client Project #

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 10:00

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag
Volatile Organic Compounds										
24.2 Purgeable Organic Compounds										
				Prepared by method SW846 5030 Water MS						
67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
24-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
6-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
34-04-4	Methyl tert-butyl ether	2.7	0.5 µg/l	1	"	"	"	"	"	VOC11

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 24

Sample Identification131 Main St
SA36465-01**Client Project #**

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 10:00

Received

31-Oct-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Volatile Organic Compounds										
<u>24.2 Purgeable Organic Compounds</u>										
Prepared by method SW846 5030 Water MS										
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	2.2	0.5 µg/l	1	"	"	"	"	"	VOC11
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
94-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	
<i>Surrogate recoveries:</i>										
460-00-4	4-Bromofluorobenzene	93.2	70-130 %		"	"	"	"	"	
2037-26-5	Toluene-d8	98.2	70-130 %		"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	108	70-130 %		"	"	"	"	"	
1868-53-7	Dibromofluoromethane	104	70-130 %		"	"	"	"	"	
Extractable Petroleum Hydrocarbons										
<u>EPH Aliphatic/Aromatic Ranges</u>										
Prepared by method SW846 3510C										
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD	
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
<u>EPH Diesel Target PAH Analytes</u>										
Prepared by method SW846 3510C										
20-3	Naphthalene	BRL	5.38 µg/l	1	"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 24

Sample Identification131 Main St
SA36465-01Client Project #

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 10:00

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-57-6	2-Methylnaphthalene	BRL	5.38 µg/l	1	+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD	
83-32-9	Acenaphthene	BRL	5.38 µg/l	1	"	"	"	"	"	
85-01-8	Phenanthrene	BRL	5.38 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	55.2	40-140 %		"	"	"	"	"	
84-15-1	Ortho-Terphenyl	61.3	40-140 %		"	"	"	"	"	
580-13-2	2-Bromonaphthalene	79.5	40-140 %		"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	70.0	40-140 %		"	"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 24

Sample Identification131 Dup
SA36465-02Client Project #

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 10:00

Received

31-Oct-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Volatile Organic Compounds										
<u>24.2 Purgeable Organic Compounds</u>										
Prepared by method SW846 5030 Water MS										
67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
124-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
96-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
634-04-4	Methyl tert-butyl ether	2.8	0.5 µg/l	1	"	"	"	"	"	VOC11

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 24

Sample Identification131 Dup
SA36465-02Client Project #

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 10:00

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds**24.2 Purgeable Organic Compounds**

Prepared by method SW846 5030 Water MS

108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	2.2	0.5 µg/l	1	"	"	"	"	"	VOC11
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
994-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	91.0	70-130 %	"	"	"	"	"
2037-26-5	Toluene-d8	99.2	70-130 %	"	"	"	"	"
17060-07-0	1,2-Dichloroethane-d4	109	70-130 %	"	"	"	"	"
1868-53-7	Dibromofluoromethane	103	70-130 %	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 24

Sample Identification

MH-1
SA36465-03

Client Project #

91-204082.00

Matrix

Ground Water

Collection Date/Time

28-Oct-05 12:00

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD	
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL	5.49 µg/l	1	"	"	"	"	"	
91-57-6 2-Methylnaphthalene	BRL	5.49 µg/l	1	"	"	"	"	"	
83-32-9 Acenaphthene	BRL	5.49 µg/l	1	"	"	"	"	"	
85-01-8 Phenanthrene	BRL	5.49 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	54.5	40-140 %	"	"	"	"	"	"	
84-15-1 Ortho-Terphenyl	59.0	40-140 %	"	"	"	"	"	"	
580-13-2 2-Bromonaphthalene	70.9	40-140 %	"	"	"	"	"	"	
321-60-8 2-Fluorobiphenyl	71.4	40-140 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 24

Sample Identification

MH-2

SA36465-04

Client Project #

91-204082.00

Matrix

Ground Water

Collection Date/Time

28-Oct-05 12:20

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	6.1	0.2 mg/l	1	+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD	
C19-C36 Aliphatic Hydrocarbons	2.4	0.2 mg/l	1	"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	4.0	0.2 mg/l	1	"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	4.1	0.2 mg/l	1	"	"	"	"	"	
Total Petroleum Hydrocarbons	12.5	0.2 mg/l	1	"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	12.6	0.2 mg/l	1	"	"	"	"	"	

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	19.9	5.32 µg/l	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	52.0	5.32 µg/l	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL	5.32 µg/l	1	"	"	"	"	"
85-01-8	Phenanthrene	9.60	5.32 µg/l	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	67.9	40-140 %	"	"	"	"	"	"
84-15-1	Ortho-Terphenyl	64.1	40-140 %	"	"	"	"	"	"
580-13-2	2-Bromonaphthalene	81.7	40-140 %	"	"	"	"	"	"
321-60-8	2-Fluorobiphenyl	73.7	40-140 %	"	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 24

Sample Identification134 Main St
SA36465-05Client Project #

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 00:00

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds4.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
124-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
106-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
134-04-4	Methyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 24

Sample Identification134 Main St
SA36465-05Client Project #

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 00:00

Received

31-Oct-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>

Volatile Organic Compounds24.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
994-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	92.2	70-130 %	"	"	"	"	"	"	
2037-26-5	Toluene-d8	99.4	70-130 %	"	"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	108	70-130 %	"	"	"	"	"	"	
1868-53-7	Dibromofluoromethane	102	70-130 %	"	"	"	"	"	"	

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	01-Nov-05	03-Nov-05	5110001	JD	
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

1-20-3	Naphthalene	BRL	5.43 µg/l	1	"	"	02-Nov-05	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 24

Sample Identification134 Main St
SA36465-05Client Project #

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 00:00

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-57-6	2-Methylnaphthalene	BRL	5.43 µg/l	1	+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD	
83-32-9	Acenaphthene	BRL	5.43 µg/l	1	"	"	"	"	"	"
85-01-8	Phenanthrene	BRL	5.43 µg/l	1	"	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	51.0	40-140 %		"	"	"	"	"	
84-15-1	Ortho-Terphenyl	53.2	40-140 %		"	"	"	"	"	
580-13-2	2-Bromonaphthalene	80.5	40-140 %		"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	67.4	40-140 %		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 24

Sample Identification

134 Dup
SA36465-06

Client Project

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 00:00

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag
Volatile Organic Compounds										
<u>24.2 Purgeable Organic Compounds</u>										
Prepared by method SW846 5030 Water MS										
67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
124-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
106-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon 12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
634-04-4	Methyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 24

Sample Identification

134 Dup
SA36465-06

Client Project

91-204082.00

Matrix

Drinking Water

Collection Date/Time

28-Oct-05 00:00

Received

31-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds

24.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
94-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	90.6	70-130 %	"	"	"	"	"	"	
2037-26-5	Toluene-d8	98.8	70-130 %	"	"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	107	70-130 %	"	"	"	"	"	"	
1868-53-7	Dibromofluoromethane	104	70-130 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 24

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
Blank (5110062-BLK1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
Acetone	BRL	10.0 µg/l							
Acrylonitrile	BRL	1.0 µg/l							
Benzene	BRL	0.5 µg/l							
Bromobenzene	BRL	0.5 µg/l							
Bromochloromethane	BRL	0.5 µg/l							
Bromodichloromethane	BRL	0.5 µg/l							
Bromoform	BRL	0.5 µg/l							
Bromomethane	BRL	0.5 µg/l							
2-Butanone (MEK)	BRL	10.0 µg/l							
n-Butylbenzene	BRL	0.5 µg/l							
sec-Butylbenzene	BRL	0.5 µg/l							
tert-Butylbenzene	BRL	0.5 µg/l							
Carbon disulfide	BRL	0.5 µg/l							
Carbon tetrachloride	BRL	0.5 µg/l							
Chlorobenzene	BRL	0.5 µg/l							
Chloroethane	BRL	0.5 µg/l							
Chloroform	BRL	0.5 µg/l							
Chloromethane	BRL	0.5 µg/l							
2-Chlorotoluene	BRL	0.5 µg/l							
4-Chlorotoluene	BRL	0.5 µg/l							
1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l							
Dibromochloromethane	BRL	0.5 µg/l							
1,2-Dibromoethane (EDB)	BRL	0.5 µg/l							
Dibromomethane	BRL	0.5 µg/l							
1,2-Dichlorobenzene	BRL	0.5 µg/l							
1,3-Dichlorobenzene	BRL	0.5 µg/l							
1,4-Dichlorobenzene	BRL	0.5 µg/l							
Dichlorodifluoromethane (Freon 12)	BRL	0.5 µg/l							
1,1-Dichloroethane	BRL	0.5 µg/l							
1,2-Dichloroethane	BRL	0.5 µg/l							
1,1-Dichloroethene	BRL	0.5 µg/l							
cis-1,2-Dichloroethene	BRL	0.5 µg/l							
trans-1,2-Dichloroethene	BRL	0.5 µg/l							
1,2-Dichloropropane	BRL	0.5 µg/l							
1,3-Dichloropropane	BRL	0.5 µg/l							
2,2-Dichloropropane	BRL	0.5 µg/l							
1,1-Dichloropropene	BRL	0.5 µg/l							
cis-1,3-Dichloropropene	BRL	0.5 µg/l							
trans-1,3-Dichloropropene	BRL	0.5 µg/l							
Ethylbenzene	BRL	0.5 µg/l							
Hexachlorobutadiene	BRL	0.5 µg/l							
2-Hexanone (MBK)	BRL	10.0 µg/l							
Isopropylbenzene	BRL	0.5 µg/l							
4-Isopropyltoluene	BRL	0.5 µg/l							
Methyl tert-butyl ether	BRL	0.5 µg/l							
4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l							
Methylene chloride	BRL	0.5 µg/l							
Naphthalene	BRL	0.5 µg/l							
n-Propylbenzene	BRL	0.5 µg/l							
Styrene	BRL	0.5 µg/l							
1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l							
1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l							
Tetrachloroethene	BRL	0.5 µg/l							
Toluene	BRL	0.5 µg/l							

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
Blank (5110062-BLK1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
1,2,3-Trichlorobenzene	BRL	0.5 µg/l							
1,2,4-Trichlorobenzene	BRL	0.5 µg/l							
1,1,1-Trichloroethane	BRL	0.5 µg/l							
1,1,2-Trichloroethane	BRL	0.5 µg/l							
Trichloroethene	BRL	0.5 µg/l							
Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l							
1,2,3-Trichloropropane	BRL	0.5 µg/l							
1,2,4-Trimethylbenzene	BRL	0.5 µg/l							
1,3,5-Trimethylbenzene	BRL	0.5 µg/l							
Vinyl chloride	BRL	0.5 µg/l							
m,p-Xylene	BRL	0.5 µg/l							
o-Xylene	BRL	0.5 µg/l							
Tetrahydrofuran	BRL	10.0 µg/l							
Tert-amyl methyl ether	BRL	0.5 µg/l							
Ethyl tert-butyl ether	BRL	0.5 µg/l							
Di-isopropyl ether	BRL	0.5 µg/l							
Tert-Butanol / butyl alcohol	BRL	10.0 µg/l							
<i>Surrogate: 4-Bromofluorobenzene</i>	46.0	µg/l	50.0		92.0	70-130			
<i>Surrogate: Toluene-d8</i>	49.0	µg/l	50.0		98.0	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	52.9	µg/l	50.0		106	70-130			
<i>Surrogate: Dibromofluoromethane</i>	51.0	µg/l	50.0		102	70-130			
LCS (5110062-BS1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
Acetone	16.0	µg/l	20.0		80.0	70-130			
Acrylonitrile	17.1	µg/l	20.0		85.5	70-130			
Benzene	18.2	µg/l	20.0		91.0	80-120			
Bromobenzene	19.6	µg/l	20.0		98.0	80-120			
Bromochloromethane	18.8	µg/l	20.0		94.0	80-120			
Bromodichloromethane	18.7	µg/l	20.0		93.5	80-120			
Bromoform	20.4	µg/l	20.0		102	80-120			
Bromomethane	24.0	µg/l	20.0		120	80-120			
2-Butanone (MEK)	16.8	µg/l	20.0		84.0	70-130			
n-Butylbenzene	16.2	µg/l	20.0		81.0	80-120			
sec-Butylbenzene	17.4	µg/l	20.0		87.0	80-120			
tert-Butylbenzene	17.5	µg/l	20.0		87.5	80-120			
Carbon disulfide	16.4	µg/l	20.0		82.0	70-130			
Carbon tetrachloride	17.1	µg/l	20.0		85.5	80-120			
Chlorobenzene	19.0	µg/l	20.0		95.0	80-120			
Chloroethane	18.2	µg/l	20.0		91.0	80-120			
Chloroform	17.4	µg/l	20.0		87.0	80-120			
Chloromethane	21.1	µg/l	20.0		106	80-120			
2-Chlorotoluene	21.2	µg/l	20.0		106	80-120			
4-Chlorotoluene	20.4	µg/l	20.0		102	80-120			
1,2-Dibromo-3-chloropropane	18.8	µg/l	20.0		94.0	80-120			
Dibromochloromethane	18.4	µg/l	20.0		92.0	80-120			
1,2-Dibromoethane (EDB)	18.9	µg/l	20.0		94.5	80-120			
Dibromomethane	18.0	µg/l	20.0		90.0	80-120			
1,2-Dichlorobenzene	19.2	µg/l	20.0		96.0	80-120			
1,3-Dichlorobenzene	21.1	µg/l	20.0		106	80-120			
1,4-Dichlorobenzene	18.5	µg/l	20.0		92.5	80-120			
Dichlorodifluoromethane (Freon 12)	20.7	µg/l	20.0		104	80-120			
1,1-Dichloroethane	17.5	µg/l	20.0		87.5	80-120			
1,2-Dichloroethane	18.5	µg/l	20.0		92.5	80-120			
1,1-Dichloroethene	15.8	µg/l	20.0		79.0	80-120			QC-1
cis-1,2-Dichloroethene	18.8	µg/l	20.0		94.0	80-120			

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 15 of 24

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
LCS (5110062-BS1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
trans-1,2-Dichloroethene	16.7	µg/l	20.0		83.5	80-120			
1,2-Dichloropropane	17.9	µg/l	20.0		89.5	80-120			
1,3-Dichloropropane	18.7	µg/l	20.0		93.5	80-120			
2,2-Dichloropropane	14.1	µg/l	20.0		70.5	80-120			QC-2
1,1-Dichloropropene	17.6	µg/l	20.0		88.0	80-120			
cis-1,3-Dichloropropene	18.1	µg/l	20.0		90.5	80-120			
trans-1,3-Dichloropropene	18.4	µg/l	20.0		92.0	80-120			
Ethylbenzene	19.3	µg/l	20.0		96.5	80-120			
Hexachlorobutadiene	17.7	µg/l	20.0		88.5	80-120			
2-Hexanone (MBK)	16.7	µg/l	20.0		83.5	70-130			
Isopropylbenzene	19.1	µg/l	20.0		95.5	80-120			
4-Isopropyltoluene	19.5	µg/l	20.0		97.5	80-120			
Methyl tert-butyl ether	19.1	µg/l	20.0		95.5	80-120			
4-Methyl-2-pentanone (MIBK)	17.8	µg/l	20.0		89.0	70-130			
Methylene chloride	18.6	µg/l	20.0		93.0	80-120			
Naphthalene	18.3	µg/l	20.0		91.5	80-120			
n-Propylbenzene	19.2	µg/l	20.0		96.0	80-120			
Styrene	17.7	µg/l	20.0		88.5	80-120			
1,1,1,2-Tetrachloroethane	18.8	µg/l	20.0		94.0	80-120			
1,1,2,2-Tetrachloroethane	18.1	µg/l	20.0		90.5	80-120			
Tetrachloroethene	17.2	µg/l	20.0		86.0	80-120			
Toluene	17.3	µg/l	20.0		86.5	80-120			
1,2,3-Trichlorobenzene	19.2	µg/l	20.0		96.0	80-120			
1,2,4-Trichlorobenzene	18.2	µg/l	20.0		91.0	80-120			
1,1,1-Trichloroethane	17.5	µg/l	20.0		87.5	80-120			
1,1,2-Trichloroethane	18.8	µg/l	20.0		94.0	80-120			
Trichloroethene	18.8	µg/l	20.0		94.0	80-120			
Trichlorofluoromethane (Freon 11)	17.0	µg/l	20.0		85.0	80-120			
1,2,3-Trichloropropane	19.4	µg/l	20.0		97.0	80-120			
1,2,4-Trimethylbenzene	17.8	µg/l	20.0		89.0	80-120			
1,3,5-Trimethylbenzene	17.5	µg/l	20.0		87.5	80-120			
Vinyl chloride	19.0	µg/l	20.0		95.0	80-120			
m,p-Xylene	40.0	µg/l	40.0		100	80-120			
o-Xylene	20.8	µg/l	20.0		104	80-120			
Tetrahydrofuran	18.7	µg/l	20.0		93.5	70-130			
Tert-amyl methyl ether	19.2	µg/l	20.0		96.0	70-130			
Ethyl tert-butyl ether	19.9	µg/l	20.0		99.5	70-130			
Di-isopropyl ether	19.0	µg/l	20.0		95.0	70-130			
Tert-Butanol / butyl alcohol	180	µg/l	200		90.0	70-130			
Surrogate: 4-Bromofluorobenzene	52.5	µg/l	50.0		105	70-130			
Surrogate: Toluene-d8	50.4	µg/l	50.0		101	70-130			
Surrogate: 1,2-Dichloroethane-d4	48.0	µg/l	50.0		96.0	70-130			
Surrogate: Dibromofluoromethane	48.8	µg/l	50.0		97.6	70-130			
LCS Dup (5110062-BSD1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
Acetone	19.3	µg/l	20.0		96.5	70-130	18.7	30	
Acrylonitrile	18.2	µg/l	20.0		91.0	70-130	6.23	30	
Benzene	19.1	µg/l	20.0		95.5	80-120	4.83	20	
Bromobenzene	20.3	µg/l	20.0		102	80-120	4.00	20	
Bromochloromethane	19.7	µg/l	20.0		98.5	80-120	4.68	20	
Bromodichloromethane	19.8	µg/l	20.0		99.0	80-120	5.71	20	
Bromoform	20.3	µg/l	20.0		102	80-120	0.00	20	
Bromomethane	26.8	µg/l	20.0		134	80-120	11.0	20	QC-1
2-Butanone (MEK)	18.4	µg/l	20.0		92.0	70-130	9.09	30	
n-Butylbenzene	17.1	µg/l	20.0		85.5	80-120	5.41	20	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 16 of 24

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
LCS Dup (5110062-BSD1) Prepared: 01-Nov-05 Analyzed: 03-Nov-05									
sec-Butylbenzene	18.8	µg/l	20.0		94.0	80-120	7.73	20	
tert-Butylbenzene	18.9	µg/l	20.0		94.5	80-120	7.69	20	
Carbon disulfide	18.1	µg/l	20.0		90.5	70-130	9.86	30	
Carbon tetrachloride	18.9	µg/l	20.0		94.5	80-120	10.0	20	
Chlorobenzene	19.8	µg/l	20.0		99.0	80-120	4.12	20	
Chloroethane	19.4	µg/l	20.0		97.0	80-120	6.38	20	
Chloroform	18.7	µg/l	20.0		93.5	80-120	7.20	20	
Chloromethane	21.9	µg/l	20.0		110	80-120	3.70	20	
2-Chlorotoluene	22.2	µg/l	20.0		111	80-120	4.61	20	
4-Chlorotoluene	21.1	µg/l	20.0		106	80-120	3.85	20	
1,2-Dibromo-3-chloropropane	19.5	µg/l	20.0		97.5	80-120	3.66	20	
Dibromochloromethane	18.8	µg/l	20.0		94.0	80-120	2.15	20	
1,2-Dibromoethane (EDB)	19.2	µg/l	20.0		96.0	80-120	1.57	20	
Dibromomethane	18.7	µg/l	20.0		93.5	80-120	3.81	20	
1,2-Dichlorobenzene	19.8	µg/l	20.0		99.0	80-120	3.08	20	
1,3-Dichlorobenzene	22.0	µg/l	20.0		110	80-120	3.70	20	
1,4-Dichlorobenzene	19.3	µg/l	20.0		96.5	80-120	4.23	20	
Dichlorodifluoromethane (Freon 12)	22.7	µg/l	20.0		114	80-120	9.17	20	
1,1-Dichloroethane	18.6	µg/l	20.0		93.0	80-120	6.09	20	
1,2-Dichloroethane	19.0	µg/l	20.0		95.0	80-120	2.67	20	
1,1-Dichloroethene	17.2	µg/l	20.0		86.0	80-120	8.48	20	
cis-1,2-Dichloroethene	20.2	µg/l	20.0		101	80-120	7.18	20	
trans-1,2-Dichloroethene	18.1	µg/l	20.0		90.5	80-120	8.05	20	
1,2-Dichloropropane	18.9	µg/l	20.0		94.5	80-120	5.43	20	
1,3-Dichloropropane	19.8	µg/l	20.0		99.0	80-120	5.71	20	
2,2-Dichloropropane	15.6	µg/l	20.0		78.0	80-120	10.1	20	QC-2
1,1-Dichloropropene	19.3	µg/l	20.0		96.5	80-120	9.21	20	
cis-1,3-Dichloropropene	18.8	µg/l	20.0		94.0	80-120	3.79	20	
trans-1,3-Dichloropropene	18.9	µg/l	20.0		94.5	80-120	2.68	20	
Ethylbenzene	20.7	µg/l	20.0		104	80-120	7.48	20	
Hexachlorobutadiene	19.2	µg/l	20.0		96.0	80-120	8.13	20	
2-Hexanone (MBK)	17.2	µg/l	20.0		86.0	70-130	2.95	30	
Isopropylbenzene	20.4	µg/l	20.0		102	80-120	6.58	20	
4-Isopropyltoluene	20.8	µg/l	20.0		104	80-120	6.45	20	
Methyl tert-butyl ether	20.1	µg/l	20.0		100	80-120	4.60	20	
4-Methyl-2-pentanone (MIBK)	18.2	µg/l	20.0		91.0	70-130	2.22	30	
Methylene chloride	19.3	µg/l	20.0		96.5	80-120	3.69	20	
Naphthalene	19.0	µg/l	20.0		95.0	80-120	3.75	20	
n-Propylbenzene	20.4	µg/l	20.0		102	80-120	6.06	20	
Styrene	18.4	µg/l	20.0		92.0	80-120	3.88	20	
1,1,1,2-Tetrachloroethane	19.7	µg/l	20.0		98.5	80-120	4.68	20	
1,1,2,2-Tetrachloroethane	18.3	µg/l	20.0		91.5	80-120	1.10	20	
Tetrachloroethene	18.9	µg/l	20.0		94.5	80-120	9.42	20	
Toluene	18.7	µg/l	20.0		93.5	80-120	7.78	20	
1,2,3-Trichlorobenzene	20.3	µg/l	20.0		102	80-120	6.06	20	
1,2,4-Trichlorobenzene	19.4	µg/l	20.0		97.0	80-120	6.38	20	
1,1,1-Trichloroethane	18.5	µg/l	20.0		92.5	80-120	5.56	20	
1,1,2-Trichloroethane	19.6	µg/l	20.0		98.0	80-120	4.17	20	
Trichloroethene	20.6	µg/l	20.0		103	80-120	9.14	20	
Trichlorofluoromethane (Freon 11)	19.2	µg/l	20.0		96.0	80-120	12.2	20	
1,2,3-Trichloropropane	19.7	µg/l	20.0		98.5	80-120	1.53	20	
1,2,4-Trimethylbenzene	19.0	µg/l	20.0		95.0	80-120	6.52	20	
1,3,5-Trimethylbenzene	18.5	µg/l	20.0		92.5	80-120	5.56	20	
Vinyl chloride	21.5	µg/l	20.0		108	80-120	12.8	20	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 17 of 24

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
CS Dup (5110062-BSD1) Prepared: 01-Nov-05 Analyzed: 03-Nov-05									
m,p-Xylene	42.2	µg/l	40.0		106	80-120	5.83	20	
o-Xylene	22.1	µg/l	20.0		110	80-120	5.61	20	
Tetrahydrofuran	19.2	µg/l	20.0		96.0	70-130	2.64	30	
Tert-amyl methyl ether	19.2	µg/l	20.0		96.0	70-130	0.00	30	
Ethyl tert-butyl ether	20.3	µg/l	20.0		102	70-130	2.48	30	
Di-isopropyl ether	19.8	µg/l	20.0		99.0	70-130	4.12	30	
Tert-Butanol / butyl alcohol	192	µg/l	200		96.0	70-130	6.45	30	
Surrogate: 4-Bromofluorobenzene	52.5	µg/l	50.0		105	70-130			
Surrogate: Toluene-d8	50.3	µg/l	50.0		101	70-130			
Surrogate: 1,2-Dichloroethane-d4	48.7	µg/l	50.0		97.4	70-130			
Surrogate: Dibromofluoromethane	49.3	µg/l	50.0		98.6	70-130			
Matrix Spike (5110062-MS1) Source: SA36349-02 Prepared: 01-Nov-05 Analyzed: 03-Nov-05									
Benzene	13.4	µg/l	15.0	BRL	89.3	80-120			
Chlorobenzene	14.0	µg/l	15.0	BRL	93.3	80-120			
1,1-Dichloroethene	14.7	µg/l	15.0	BRL	98.0	80-120			
Toluene	13.2	µg/l	15.0	BRL	88.0	80-120			
Trichloroethene	13.6	µg/l	15.0	BRL	90.7	80-120			
Surrogate: 4-Bromofluorobenzene	45.6	µg/l	50.0		91.2	70-130			
Surrogate: Toluene-d8	48.6	µg/l	50.0		97.2	70-130			
Surrogate: 1,2-Dichloroethane-d4	53.2	µg/l	50.0		106	70-130			
Surrogate: Dibromofluoromethane	49.9	µg/l	50.0		99.8	70-130			
Matrix Spike Dup (5110062-MSD1) Source: SA36349-02 Prepared: 01-Nov-05 Analyzed: 03-Nov-05									
Benzene	13.7	µg/l	15.0	BRL	91.3	80-120	2.21	20	
Chlorobenzene	13.8	µg/l	15.0	BRL	92.0	80-120	1.40	20	
1,1-Dichloroethene	15.1	µg/l	15.0	BRL	101	80-120	3.02	20	
Toluene	13.2	µg/l	15.0	BRL	88.0	80-120	0.00	20	
Trichloroethene	14.3	µg/l	15.0	BRL	95.3	80-120	4.95	20	
Surrogate: 4-Bromofluorobenzene	45.6	µg/l	50.0		91.2	70-130			
Surrogate: Toluene-d8	49.4	µg/l	50.0		98.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	53.8	µg/l	50.0		108	70-130			
Surrogate: Dibromofluoromethane	51.2	µg/l	50.0		102	70-130			

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0511011 - 5110001									
Calibration Check (0511011-CCV1)			Prepared & Analyzed: 01-Nov-05						
C9-C18 Aliphatic Hydrocarbons	0.505	mg/l	0.600		84.2	75-125			
C19-C36 Aliphatic Hydrocarbons	0.722	mg/l	0.800		90.2	75-125			
C11-C22 Aromatic Hydrocarbons	1.87	mg/l	1.70		110	75-125			
Naphthalene	108	µg/l	100		108	80-120			
2-Methylnaphthalene	107	µg/l	100		107	80-120			
Acenaphthene	104	µg/l	100		104	80-120			
Phenanthrene	110	µg/l	100		110	80-120			
Anthracene	111	µg/l	100		111	80-120			
Pyrene	111	µg/l	100		111	80-120			
Chrysene	107	µg/l	100		107	80-120			
Batch 5110001 - SW846 3510C									
Blank (5110001-BLK1)			Prepared: 01-Nov-05 Analyzed: 02-Nov-05						
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l							
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l							
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l							
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l							
Total Petroleum Hydrocarbons	BRL	0.2 mg/l							
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l							
Naphthalene	BRL	2.50 µg/l							
2-Methylnaphthalene	BRL	2.50 µg/l							
Acenaphthene	BRL	2.50 µg/l							
Phenanthrene	BRL	2.50 µg/l							
Surrogate: 1-Chlorooctadecane	26.8	µg/l	50.0		53.6	40-140			
Surrogate: Ortho-Terphenyl	25.6	µg/l	50.0		51.2	40-140			
Surrogate: 2-Bromonaphthalene	27.6	µg/l	40.0		69.0	40-140			
Surrogate: 2-Fluorobiphenyl	26.5	µg/l	40.0		66.2	40-140			
LCS (5110001-BS1)			Prepared: 01-Nov-05 Analyzed: 02-Nov-05						
C9-C18 Aliphatic Hydrocarbons	0.248	0.2 mg/l	0.600		41.3	40-140			
C19-C36 Aliphatic Hydrocarbons	0.399	0.2 mg/l	0.800		49.9	40-140			
C11-C22 Aromatic Hydrocarbons	1.15	0.2 mg/l	1.70		67.6	40-140			
Naphthalene	35.7	2.50 µg/l	100		35.7	40-140			QC-1
2-Methylnaphthalene	39.7	2.50 µg/l	100		39.7	40-140			QC-1
Acenaphthene	42.5	2.50 µg/l	100		42.5	40-140			
Phenanthrene	51.2	2.50 µg/l	100		51.2	40-140			
Anthracene	54.8	2.50 µg/l	100		54.8	40-140			
Pyrene	52.4	2.50 µg/l	100		52.4	40-140			
Chrysene	51.3	2.50 µg/l	100		51.3	40-140			
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
Surrogate: 1-Chlorooctadecane	22.7	µg/l	50.0		45.4	40-140			
Surrogate: Ortho-Terphenyl	24.3	µg/l	50.0		48.6	40-140			
Surrogate: 2-Bromonaphthalene	32.6	µg/l	40.0		81.5	40-140			
Surrogate: 2-Fluorobiphenyl	27.0	µg/l	40.0		67.5	40-140			
Naphthalene Breakthrough	0.00	%				0-5			
2-Methylnaphthalene Breakthrough	0.00	%				0-5			
Fractionation Check Standard (5110001-BS2)			Prepared & Analyzed: 01-Nov-05						
C9-C18 Aliphatic Hydrocarbons	0.288	0.2 mg/l	0.600		48.0	40-140			
C19-C36 Aliphatic Hydrocarbons	0.539	0.2 mg/l	0.800		67.4	40-140			
C11-C22 Aromatic Hydrocarbons	1.23	0.2 mg/l	1.70		72.4	40-140			
Naphthalene	54.0	2.50 µg/l	100		54.0	40-140			
2-Methylnaphthalene	58.0	2.50 µg/l	100		58.0	40-140			

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110001 - SW846 3510C									
Fractionation Check Standard (5110001-BS2)					Prepared & Analyzed: 01-Nov-05				
Acenaphthene	62.2	2.50 µg/l	100		62.2	40-140			
Phenanthrene	73.6	2.50 µg/l	100		73.6	40-140			
Anthracene	74.6	2.50 µg/l	100		74.6	40-140			
Pyrene	74.6	2.50 µg/l	100		74.6	40-140			
Chrysene	75.0	2.50 µg/l	100		75.0	40-140			
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
Surrogate: 1-Chlorooctadecane	27.2	µg/l	50.0		54.4	40-140			
Surrogate: Ortho-Terphenyl	33.4	µg/l	50.0		66.8	40-140			
Surrogate: 2-Bromonaphthalene	33.9	µg/l	40.0		84.8	40-140			
Surrogate: 2-Fluorobiphenyl	27.2	µg/l	40.0		68.0	40-140			
LCS Dup (5110001-BSD1)					Prepared: 01-Nov-05 Analyzed: 02-Nov-05				
C9-C18 Aliphatic Hydrocarbons	0.242	0.2 mg/l	0.600		40.3	40-140	2.45	25	
C19-C36 Aliphatic Hydrocarbons	0.494	0.2 mg/l	0.800		61.8	40-140	21.3	25	
C11-C22 Aromatic Hydrocarbons	1.10	0.2 mg/l	1.70		64.7	40-140	4.38	25	
Naphthalene	42.4	2.50 µg/l	100		42.4	40-140	17.2	20	
2-Methylnaphthalene	42.9	2.50 µg/l	100		42.9	40-140	7.75	20	
Acenaphthene	49.1	2.50 µg/l	100		49.1	40-140	14.4	20	
Phenanthrene	61.5	2.50 µg/l	100		61.5	40-140	18.3	20	
Anthracene	63.1	2.50 µg/l	100		63.1	40-140	14.1	20	
Pyrene	61.4	2.50 µg/l	100		61.4	40-140	15.8	20	
Chrysene	56.7	2.50 µg/l	100		56.7	40-140	10.0	20	
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200	0.00	200	
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200	0.00	200	
Surrogate: 1-Chlorooctadecane	26.2	µg/l	50.0		52.4	40-140			
Surrogate: Ortho-Terphenyl	28.9	µg/l	50.0		57.8	40-140			
Surrogate: 2-Bromonaphthalene	30.7	µg/l	40.0		76.8	40-140			
Surrogate: 2-Fluorobiphenyl	25.2	µg/l	40.0		63.0	40-140			
Naphthalene Breakthrough	0.00	%				0-5			
2-Methylnaphthalene Breakthrough	0.00	%				0-5			

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0511011				
Calibration Check (0511011-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.87539E+08	1.57215E+08	-16.2	25.00
C19-C36 Aliphatic Hydrocarbons	1.4791E+08	1.33513E+08	-9.73	25.00
C11-C22 Aromatic Hydrocarbons	16870.2	16.3975	10.0	25.00
Naphthalene	4.41995	4.77375	8.00	20.00
2-Methylnaphthalene	3.27182	3.51316	7.38	20.00
Acenaphthene	3.29074	3.40739	3.54	20.00
Phenanthrene	4.51346	4.98618	10.5	20.00
Anthracene	5.42438	6.0119	10.8	20.00
Pyrene	5.81992	6.4367	10.6	20.00
Chrysene	5.74607	6.12525	6.60	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 21 of 24

Notes and Definitions

QC-1 Analyte out of acceptance range.

QC-2 Analyte out of acceptance range in QC spike but no reportable concentration present in sample.

VOC11 Analyte presence was confirmed by duplicate analysis.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

The following outlines the condition of all EPH samples contained within this report upon laboratory receipt.

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Aqueous Preservative	☐ N/A	☒ pH ≤ 2	☐ pH > 2	☐ pH adjusted to < 2 in lab Comment:
Temperature	☐ Received on ice	☒ Received at 4 ± 2 °C	☐ Other:	°C

Were all QA/QC procedures followed as required by the EPH method? Yes ☒ No ☐
 Were any significant modifications made to the EPH method as specified in Section 11.3? No ☒
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Authorized by:



Hanibal C. Tayeh, Ph.D.
 President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:

This form provides certifications for the following Spectrum Analytical, Inc. work order #: SA36465

Matrix	☒ Groundwater	☐ Soil/Sediment	☒ Drinking Water	☐ Other
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☐ 6010B
	☐ 8270C	☐ 8081A	☐ VPH	☐ 6020
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³
				☐ 7470A/1A
				☐ 9014M ²
				☐ 7196A

1 List Release Tracking Number (RTN), if known

2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method

3 S - SW-846 Methods 7000 Series List individual method and analyte

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☒ Yes ☐ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

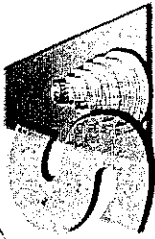
Date: 11/3/2005

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 24 of 24



SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page _____ of _____

Report To: ECS - Auburn
27A Midstate Drive Suite 208
Auburn, MA 01501

Invoice To: ECS - Agawam
1055 Hill St

Project No.: 91-204082-00
Site Name: 131 Main Street
Location: Southbridge State: MA
Sampler(s): S. Saine / E. Nadalski

Project Mgr.: Chuck Klingler

P.O. No.: _____ RQN: _____

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9= _____ 10= _____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= _____ X2= _____ X3= _____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix
360465-01	131 Main St	10/28/05	10:00	DW	DW
-02	131 DUP		10:00	DW	DW
-03	MH-1		12:00	GW	GW
-04	MH-2		12:20	GW	GW
-05	134 Main St			DW	DW
-06	134 DUP	10/28/05		DW	DW

Containers:

of VOA Vials

of Amber Glass

of Clear Glass

of Plastic

Analyses:

QA Reporting Notes:
(check if needed)

State specific reporting standards
If applicable, please list below.

☒ Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☒ Yes ☐ No
(Response required for CAM report)

☒ Fax results when available to () _____

☒ E-mail to cklingler@eescanusa.com

EDD Format _____

Condition upon receipt: ☐ Iced ☐ Ambient ☒ °C _____

Relinquished by:

Received by:

Time:

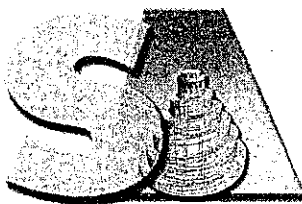
Date:

Chuck Klingler
10/31/05 12:25 PM
E. Nadalski 10/31/05 15:30

Ref:



Report Date:
03-Nov-05 16:07



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: 131 Main St - Carver, MA
Project #: 91-204 082.00

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA36410-01	SW-1	Surface Water	27-Oct-05 12:05	28-Oct-05 13:15
SA36410-02	SW-2	Surface Water	27-Oct-05 11:45	28-Oct-05 13:15
SA36410-03	SW-3	Surface Water	27-Oct-05 11:50	28-Oct-05 13:15
SA36410-04	SS-1	Soil	27-Oct-05 12:00	28-Oct-05 13:15
SA36410-05	Trip Blank	Aqueous	27-Oct-05 08:00	28-Oct-05 13:15
SA36410-06	133 Main St	Drinking Water	27-Oct-05 14:30	28-Oct-05 13:15
SA36410-07	133 Main Dup	Drinking Water	27-Oct-05 14:30	28-Oct-05 13:15

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

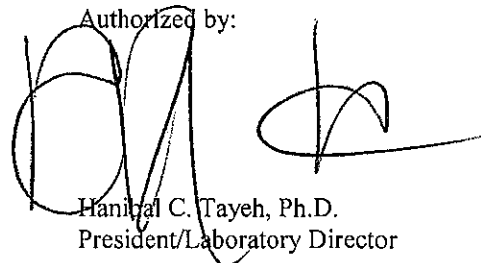
Please note that this report contains 27 pages of analytical data plus Chain of Custody document(s).

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Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:


Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

CASE NARRATIVE:

The data set for work order SA36410 complies with internal QC criteria for the methods performed. The samples were received @ 4.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although they may still be within the recommended 70%-130% recovery range, a range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will narrate any non-conformances and issues relating to quality control samples and/or sample analysis/matrix.

Sample IdentificationSW-1
SA36410-01Client Project #

91-204 082.00

Matrix

Surface Water

Collection Date/Time

27-Oct-05 12:05

Received

28-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	11.4	0.2 mg/l	1	+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD
C19-C36 Aliphatic Hydrocarbons	7.3	0.2 mg/l	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	8.2	0.2 mg/l	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	8.2	0.2 mg/l	1	"	"	"	"	"
Total Petroleum Hydrocarbons	26.9	0.2 mg/l	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	26.9	0.2 mg/l	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL	5.32 µg/l	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	10.6	5.32 µg/l	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL	5.32 µg/l	1	"	"	"	"	"
85-01-8	Phenanthrene	19.2	5.32 µg/l	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	60.9	40-140 %	"	"	"	"	"	"
84-15-1	Ortho-Terphenyl	60.3	40-140 %	"	"	"	"	"	"
580-13-2	2-Bromonaphthalene	95.1	40-140 %	"	"	"	"	"	"
321-60-8	2-Fluorobiphenyl	76.5	40-140 %	"	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 27

Sample Identification

SW-2
SA36410-02Client Project #
91-204 082.00Matrix
Surface WaterCollection Date/Time
27-Oct-05 11:45Received
28-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum Hydrocarbons

PH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	BRL	5.75 µg/l	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL	5.75 µg/l	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL	5.75 µg/l	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL	5.75 µg/l	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	51.7	40-140 %	"	"	"	"	"	"
84-15-1 Ortho-Terphenyl	55.7	40-140 %	"	"	"	"	"	"
580-13-2 2-Bromonaphthalene	74.6	40-140 %	"	"	"	"	"	"
321-60-8 2-Fluorobiphenyl	64.6	40-140 %	"	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 27

Sample IdentificationSW-3
SA36410-03Client Project #

91-204 082.00

Matrix

Surface Water

Collection Date/Time

27-Oct-05 11:50

Received

28-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL	5.49 µg/l	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL	5.49 µg/l	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL	5.49 µg/l	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL	5.49 µg/l	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	48.6	40-140 %	"	"	"	"	"
84-15-1	Ortho-Terphenyl	62.1	40-140 %	"	"	"	"	"
580-13-2	2-Bromonaphthalene	79.1	40-140 %	"	"	"	"	"
321-60-8	2-Fluorobiphenyl	76.4	40-140 %	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 27

Sample Identification

SS-1
SA36410-04

Client Project #

91-204 082.00

Matrix

Soil

Collection Date/Time

27-Oct-05 12:00

Received

28-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3545A

C9-C18 Aliphatic Hydrocarbons	1,330	71.2 mg/kg dry	1	+MADEP 5/2004 R	01-Nov-05	01-Nov-05	5110002	JD
C19-C36 Aliphatic Hydrocarbons	1,260	71.2 mg/kg dry	1	"	"	"	"	"
C11-C22 Aromatic Hydrocarbons	1,250	71.2 mg/kg dry	1	"	"	"	"	"
Unadjusted C11-C22 Aromatic Hydrocarbons	1,250	71.2 mg/kg dry	1	"	"	"	"	"
Total Petroleum Hydrocarbons	3,830	71.2 mg/kg dry	1	"	"	"	"	"
Unadjusted Total Petroleum Hydrocarbons	3,840	71.2 mg/kg dry	1	"	"	"	"	"

EPH Diesel Target PAH Analytes

Prepared by method SW846 3545A

91-20-3 Naphthalene	BRL	355 µg/kg dry	1	"	"	"	"	"
91-57-6 2-Methylnaphthalene	BRL	355 µg/kg dry	1	"	"	"	"	"
83-32-9 Acenaphthene	BRL	355 µg/kg dry	1	"	"	"	"	"
85-01-8 Phenanthrene	BRL	355 µg/kg dry	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	43.3	40-140 %	"	"	"	"	"	"
84-15-1 Ortho-Terphenyl	64.8	40-140 %	"	"	"	"	"	"
580-13-2 2-Bromonaphthalene	78.2	40-140 %	"	"	"	"	"	"
321-60-8 2-Fluorobiphenyl	64.6	40-140 %	"	"	"	"	"	"

General Chemistry Parameters

% Solids	42.6	%	1	SM2540 G Mod.	31-Oct-05	31-Oct-05	5101888	BD

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 27

Sample Identification

Trip Blank

SA36410-05

Client Project #

91-204 082.00

Matrix

Aqueous

Collection Date/Time

27-Oct-05 08:00

Received

28-Oct-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Volatiles Organic Compounds										
24.2 Purgeable Organic Compounds										
Prepared by method SW846 5030 Water MS										
67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	02-Nov-05	03-Nov-05	5110062	RJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
124-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
36-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
534-04-4	Methyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 27

Sample Identification

Trip Blank
SA36410-05

Client Project #

91-204 082.00

Matrix

Aqueous

Collection Date/Time

27-Oct-05 08:00

Received

28-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds24.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	02-Nov-05	03-Nov-05	5110062	RJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
994-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	90.6	70-130 %	"	"	"	"	"	"	
2037-26-5	Toluene-d8	99.0	70-130 %	"	"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	111	70-130 %	"	"	"	"	"	"	
1868-53-7	Dibromofluoromethane	103	70-130 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 27

Sample Identification

133 Main St

SA36410-06

Client Project #

91-204 082.00

Matrix

Drinking Water

Collection Date/Time

27-Oct-05 14:30

Received

28-Oct-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Volatile Organic Compounds										
24.2 Purgeable Organic Compounds										
				Prepared by method SW846 5030 Water MS						
67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
24-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
96-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
34-04-4	Methyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 27

Sample Identification133 Main St
SA36410-06Client Project #

91-204 082.00

Matrix

Drinking Water

Collection Date/Time

27-Oct-05 14:30

Received

28-Oct-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Volatile Organic Compounds										
<u>24.2 Purgeable Organic Compounds</u>										
Prepared by method SW846 5030 Water MS										
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
29-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
994-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	
<u>Surrogate recoveries:</u>										
460-00-4	4-Bromofluorobenzene	91.2	70-130 %		"	"	"	"	"	
2037-26-5	Toluene-d8	99.6	70-130 %		"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	112	70-130 %		"	"	"	"	"	
1868-53-7	Dibromofluoromethane	103	70-130 %		"	"	"	"	"	
Extractable Petroleum Hydrocarbons										
<u>EPH Aliphatic/Aromatic Ranges</u>										
Prepared by method SW846 3510C										
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD	
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
<u>EPH Diesel Target PAH Analytes</u>										
Prepared by method SW846 3510C										
1-20-3	Naphthalene	BRL	5.32 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 27

Sample Identification133 Main St
SA36410-06Client Project #

91-204 082.00

Matrix

Drinking Water

Collection Date/Time

27-Oct-05 14:30

Received

28-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Diesel Target PAH Analytes

Prepared by method SW846 3510C

91-57-6	2-Methylnaphthalene	BRL	5.32 µg/l	1	+MADEP 5/2004 R	01-Nov-05	02-Nov-05	5110001	JD	
83-32-9	Acenaphthene	BRL	5.32 µg/l	1	"	"	"	"	"	
85-01-8	Phenanthrene	BRL	5.32 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	62.0	40-140 %		"	"	"	"	"	
84-15-1	Ortho-Terphenyl	69.5	40-140 %		"	"	"	"	"	
580-13-2	2-Bromonaphthalene	84.0	40-140 %		"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	69.5	40-140 %		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 27

Sample Identification

133 Main Dup

SA36410-07

Client Project #

91-204 082.00

Matrix

Drinking Water

Collection Date/Time

27-Oct-05 14:30

Received

28-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds24.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
74-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
76-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
634-04-4	Methyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 27

Sample Identification

133 Main Dup

SA36410-07

Client Project #

91-204 082.00

Matrix

Drinking Water

Collection Date/Time

27-Oct-05 14:30

Received

28-Oct-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds24.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	01-Nov-05	03-Nov-05	5110062	RJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
994-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	91.2	70-130 %	"	"	"	"	"	"	
2037-26-5	Toluene-d8	100	70-130 %	"	"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	113	70-130 %	"	"	"	"	"	"	
1868-53-7	Dibromofluoromethane	105	70-130 %	"	"	"	"	"	"	

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* Reportable Detection Limit

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Page 13 of 27

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
Blank (5110062-BLK1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
Acetone	BRL	10.0 µg/l							
Acrylonitrile	BRL	1.0 µg/l							
Benzene	BRL	0.5 µg/l							
Bromobenzene	BRL	0.5 µg/l							
Bromochloromethane	BRL	0.5 µg/l							
Bromodichloromethane	BRL	0.5 µg/l							
Bromoform	BRL	0.5 µg/l							
Bromomethane	BRL	0.5 µg/l							
2-Butanone (MEK)	BRL	10.0 µg/l							
n-Butylbenzene	BRL	0.5 µg/l							
sec-Butylbenzene	BRL	0.5 µg/l							
tert-Butylbenzene	BRL	0.5 µg/l							
Carbon disulfide	BRL	0.5 µg/l							
Carbon tetrachloride	BRL	0.5 µg/l							
Chlorobenzene	BRL	0.5 µg/l							
Chloroethane	BRL	0.5 µg/l							
Chloroform	BRL	0.5 µg/l							
Chloromethane	BRL	0.5 µg/l							
2-Chlorotoluene	BRL	0.5 µg/l							
4-Chlorotoluene	BRL	0.5 µg/l							
1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l							
Dibromochloromethane	BRL	0.5 µg/l							
1,2-Dibromoethane (EDB)	BRL	0.5 µg/l							
Dibromomethane	BRL	0.5 µg/l							
1,2-Dichlorobenzene	BRL	0.5 µg/l							
1,3-Dichlorobenzene	BRL	0.5 µg/l							
1,4-Dichlorobenzene	BRL	0.5 µg/l							
Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l							
1,1-Dichloroethane	BRL	0.5 µg/l							
1,2-Dichloroethane	BRL	0.5 µg/l							
1,1-Dichloroethene	BRL	0.5 µg/l							
cis-1,2-Dichloroethene	BRL	0.5 µg/l							
trans-1,2-Dichloroethene	BRL	0.5 µg/l							
1,2-Dichloropropane	BRL	0.5 µg/l							
1,3-Dichloropropane	BRL	0.5 µg/l							
2,2-Dichloropropane	BRL	0.5 µg/l							
1,1-Dichloropropene	BRL	0.5 µg/l							
cis-1,3-Dichloropropene	BRL	0.5 µg/l							
trans-1,3-Dichloropropene	BRL	0.5 µg/l							
Ethylbenzene	BRL	0.5 µg/l							
Hexachlorobutadiene	BRL	0.5 µg/l							
2-Hexanone (MBK)	BRL	10.0 µg/l							
Isopropylbenzene	BRL	0.5 µg/l							
4-Isopropyltoluene	BRL	0.5 µg/l							
Methyl tert-butyl ether	BRL	0.5 µg/l							
4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l							
Methylene chloride	BRL	0.5 µg/l							
Naphthalene	BRL	0.5 µg/l							
n-Propylbenzene	BRL	0.5 µg/l							
Styrene	BRL	0.5 µg/l							
1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l							
1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l							
Tetrachloroethene	BRL	0.5 µg/l							
Toluene	BRL	0.5 µg/l							

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
Blank (5110062-BLK1)									
					Prepared: 01-Nov-05 Analyzed: 03-Nov-05				
1,2,3-Trichlorobenzene	BRL	0.5 µg/l							
1,2,4-Trichlorobenzene	BRL	0.5 µg/l							
1,1,1-Trichloroethane	BRL	0.5 µg/l							
1,1,2-Trichloroethane	BRL	0.5 µg/l							
Trichloroethene	BRL	0.5 µg/l							
Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l							
1,2,3-Trichloropropane	BRL	0.5 µg/l							
1,2,4-Trimethylbenzene	BRL	0.5 µg/l							
1,3,5-Trimethylbenzene	BRL	0.5 µg/l							
Vinyl chloride	BRL	0.5 µg/l							
m,p-Xylene	BRL	0.5 µg/l							
o-Xylene	BRL	0.5 µg/l							
Tetrahydrofuran	BRL	10.0 µg/l							
Tert-amyl methyl ether	BRL	0.5 µg/l							
Ethyl tert-butyl ether	BRL	0.5 µg/l							
Di-isopropyl ether	BRL	0.5 µg/l							
Tert-Butanol / butyl alcohol	BRL	10.0 µg/l							
<i>Surrogate: 4-Bromofluorobenzene</i>	46.0	µg/l	50.0		92.0	70-130			
<i>Surrogate: Toluene-d8</i>	49.0	µg/l	50.0		98.0	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	52.9	µg/l	50.0		106	70-130			
<i>Surrogate: Dibromofluoromethane</i>	51.0	µg/l	50.0		102	70-130			
LCS (5110062-BS1)									
					Prepared: 01-Nov-05 Analyzed: 03-Nov-05				
Acetone	16.0	µg/l	20.0		80.0	70-130			
Acrylonitrile	17.1	µg/l	20.0		85.5	70-130			
Benzene	18.2	µg/l	20.0		91.0	80-120			
Bromobenzene	19.6	µg/l	20.0		98.0	80-120			
Bromochloromethane	18.8	µg/l	20.0		94.0	80-120			
Bromodichloromethane	18.7	µg/l	20.0		93.5	80-120			
Bromoform	20.4	µg/l	20.0		102	80-120			
Bromomethane	24.0	µg/l	20.0		120	80-120			
2-Butanone (MEK)	16.8	µg/l	20.0		84.0	70-130			
n-Butylbenzene	16.2	µg/l	20.0		81.0	80-120			
sec-Butylbenzene	17.4	µg/l	20.0		87.0	80-120			
tert-Butylbenzene	17.5	µg/l	20.0		87.5	80-120			
Carbon disulfide	16.4	µg/l	20.0		82.0	70-130			
Carbon tetrachloride	17.1	µg/l	20.0		85.5	80-120			
Chlorobenzene	19.0	µg/l	20.0		95.0	80-120			
Chloroethane	18.2	µg/l	20.0		91.0	80-120			
Chloroform	17.4	µg/l	20.0		87.0	80-120			
Chloromethane	21.1	µg/l	20.0		106	80-120			
2-Chlorotoluene	21.2	µg/l	20.0		106	80-120			
4-Chlorotoluene	20.4	µg/l	20.0		102	80-120			
1,2-Dibromo-3-chloropropane	18.8	µg/l	20.0		94.0	80-120			
Dibromochloromethane	18.4	µg/l	20.0		92.0	80-120			
1,2-Dibromoethane (EDB)	18.9	µg/l	20.0		94.5	80-120			
Dibromomethane	18.0	µg/l	20.0		90.0	80-120			
1,2-Dichlorobenzene	19.2	µg/l	20.0		96.0	80-120			
1,3-Dichlorobenzene	21.1	µg/l	20.0		106	80-120			
1,4-Dichlorobenzene	18.5	µg/l	20.0		92.5	80-120			
Dichlorodifluoromethane (Freon 12)	20.7	µg/l	20.0		104	80-120			
1,1-Dichloroethane	17.5	µg/l	20.0		87.5	80-120			
1,2-Dichloroethane	18.5	µg/l	20.0		92.5	80-120			
1,1-Dichloroethene	15.8	µg/l	20.0		79.0	80-120			QC-1
cis-1,2-Dichloroethene	18.8	µg/l	20.0		94.0	80-120			

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* Reportable Detection Limit

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Page 15 of 27

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
LCS (5110062-BS1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
trans-1,2-Dichloroethene	16.7	µg/l	20.0		83.5	80-120			
1,2-Dichloropropane	17.9	µg/l	20.0		89.5	80-120			
1,3-Dichloropropane	18.7	µg/l	20.0		93.5	80-120			
2,2-Dichloropropane	14.1	µg/l	20.0		70.5	80-120			QC-2
1,1-Dichloropropene	17.6	µg/l	20.0		88.0	80-120			
cis-1,3-Dichloropropene	18.1	µg/l	20.0		90.5	80-120			
trans-1,3-Dichloropropene	18.4	µg/l	20.0		92.0	80-120			
Ethylbenzene	19.3	µg/l	20.0		96.5	80-120			
Hexachlorobutadiene	17.7	µg/l	20.0		88.5	80-120			
2-Hexanone (MBK)	16.7	µg/l	20.0		83.5	70-130			
Isopropylbenzene	19.1	µg/l	20.0		95.5	80-120			
4-Isopropyltoluene	19.5	µg/l	20.0		97.5	80-120			
Methyl tert-butyl ether	19.1	µg/l	20.0		95.5	80-120			
4-Methyl-2-pentanone (MIBK)	17.8	µg/l	20.0		89.0	70-130			
Methylene chloride	18.6	µg/l	20.0		93.0	80-120			
Naphthalene	18.3	µg/l	20.0		91.5	80-120			
n-Propylbenzene	19.2	µg/l	20.0		96.0	80-120			
Styrene	17.7	µg/l	20.0		88.5	80-120			
1,1,1,2-Tetrachloroethane	18.8	µg/l	20.0		94.0	80-120			
1,1,2,2-Tetrachloroethane	18.1	µg/l	20.0		90.5	80-120			
Tetrachloroethene	17.2	µg/l	20.0		86.0	80-120			
Toluene	17.3	µg/l	20.0		86.5	80-120			
1,2,3-Trichlorobenzene	19.2	µg/l	20.0		96.0	80-120			
1,2,4-Trichlorobenzene	18.2	µg/l	20.0		91.0	80-120			
1,1,1-Trichloroethane	17.5	µg/l	20.0		87.5	80-120			
1,1,2-Trichloroethane	18.8	µg/l	20.0		94.0	80-120			
Trichloroethene	18.8	µg/l	20.0		94.0	80-120			
Trichlorofluoromethane (Freon 11)	17.0	µg/l	20.0		85.0	80-120			
1,2,3-Trichloropropane	19.4	µg/l	20.0		97.0	80-120			
1,2,4-Trimethylbenzene	17.8	µg/l	20.0		89.0	80-120			
1,3,5-Trimethylbenzene	17.5	µg/l	20.0		87.5	80-120			
Vinyl chloride	19.0	µg/l	20.0		95.0	80-120			
m,p-Xylene	40.0	µg/l	40.0		100	80-120			
o-Xylene	20.8	µg/l	20.0		104	80-120			
Tetrahydrofuran	18.7	µg/l	20.0		93.5	70-130			
Tert-amyl methyl ether	19.2	µg/l	20.0		96.0	70-130			
Ethyl tert-butyl ether	19.9	µg/l	20.0		99.5	70-130			
Di-isopropyl ether	19.0	µg/l	20.0		95.0	70-130			
Tert-Butanol / butyl alcohol	180	µg/l	200		90.0	70-130			
Surrogate: 4-Bromofluorobenzene	52.5	µg/l	50.0		105	70-130			
Surrogate: Toluene-d8	50.4	µg/l	50.0		101	70-130			
Surrogate: 1,2-Dichloroethane-d4	48.0	µg/l	50.0		96.0	70-130			
Surrogate: Dibromofluoromethane	48.8	µg/l	50.0		97.6	70-130			
LCS Dup (5110062-BS1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
Acetone	19.3	µg/l	20.0		96.5	70-130	18.7	30	
Acrylonitrile	18.2	µg/l	20.0		91.0	70-130	6.23	30	
Benzene	19.1	µg/l	20.0		95.5	80-120	4.83	20	
Bromobenzene	20.3	µg/l	20.0		102	80-120	4.00	20	
Bromochloromethane	19.7	µg/l	20.0		98.5	80-120	4.68	20	
Bromodichloromethane	19.8	µg/l	20.0		99.0	80-120	5.71	20	
Bromoform	20.3	µg/l	20.0		102	80-120	0.00	20	
Bromomethane	26.8	µg/l	20.0		134	80-120	11.0	20	QC-1
2-Butanone (MEK)	18.4	µg/l	20.0		92.0	70-130	9.09	30	
n-Butylbenzene	17.1	µg/l	20.0		85.5	80-120	5.41	20	

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* Reportable Detection Limit

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Page 16 of 27

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
LCS Dup (5110062-BSD1)			Prepared: 01-Nov-05 Analyzed: 03-Nov-05						
sec-Butylbenzene	18.8	µg/l	20.0		94.0	80-120	7.73	20	
tert-Butylbenzene	18.9	µg/l	20.0		94.5	80-120	7.69	20	
Carbon disulfide	18.1	µg/l	20.0		90.5	70-130	9.86	30	
Carbon tetrachloride	18.9	µg/l	20.0		94.5	80-120	10.0	20	
Chlorobenzene	19.8	µg/l	20.0		99.0	80-120	4.12	20	
Chloroethane	19.4	µg/l	20.0		97.0	80-120	6.38	20	
Chloroform	18.7	µg/l	20.0		93.5	80-120	7.20	20	
Chloromethane	21.9	µg/l	20.0		110	80-120	3.70	20	
2-Chlorotoluene	22.2	µg/l	20.0		111	80-120	4.61	20	
4-Chlorotoluene	21.1	µg/l	20.0		106	80-120	3.85	20	
1,2-Dibromo-3-chloropropane	19.5	µg/l	20.0		97.5	80-120	3.66	20	
Dibromochloromethane	18.8	µg/l	20.0		94.0	80-120	2.15	20	
1,2-Dibromoethane (EDB)	19.2	µg/l	20.0		96.0	80-120	1.57	20	
Dibromomethane	18.7	µg/l	20.0		93.5	80-120	3.81	20	
1,2-Dichlorobenzene	19.8	µg/l	20.0		99.0	80-120	3.08	20	
1,3-Dichlorobenzene	22.0	µg/l	20.0		110	80-120	3.70	20	
1,4-Dichlorobenzene	19.3	µg/l	20.0		96.5	80-120	4.23	20	
Dichlorodifluoromethane (Freon 12)	22.7	µg/l	20.0		114	80-120	9.17	20	
1,1-Dichloroethane	18.6	µg/l	20.0		93.0	80-120	6.09	20	
1,2-Dichloroethane	19.0	µg/l	20.0		95.0	80-120	2.67	20	
1,1-Dichloroethene	17.2	µg/l	20.0		86.0	80-120	8.48	20	
cis-1,2-Dichloroethene	20.2	µg/l	20.0		101	80-120	7.18	20	
trans-1,2-Dichloroethene	18.1	µg/l	20.0		90.5	80-120	8.05	20	
1,2-Dichloropropane	18.9	µg/l	20.0		94.5	80-120	5.43	20	
1,3-Dichloropropane	19.8	µg/l	20.0		99.0	80-120	5.71	20	
2,2-Dichloropropane	15.6	µg/l	20.0		78.0	80-120	10.1	20	QC-2
1,1-Dichloropropene	19.3	µg/l	20.0		96.5	80-120	9.21	20	
cis-1,3-Dichloropropene	18.8	µg/l	20.0		94.0	80-120	3.79	20	
trans-1,3-Dichloropropene	18.9	µg/l	20.0		94.5	80-120	2.68	20	
Ethylbenzene	20.7	µg/l	20.0		104	80-120	7.48	20	
Hexachlorobutadiene	19.2	µg/l	20.0		96.0	80-120	8.13	20	
2-Hexanone (MBK)	17.2	µg/l	20.0		86.0	70-130	2.95	30	
Isopropylbenzene	20.4	µg/l	20.0		102	80-120	6.58	20	
4-Isopropyltoluene	20.8	µg/l	20.0		104	80-120	6.45	20	
Methyl tert-butyl ether	20.1	µg/l	20.0		100	80-120	4.60	20	
4-Methyl-2-pentanone (MIBK)	18.2	µg/l	20.0		91.0	70-130	2.22	30	
Methylene chloride	19.3	µg/l	20.0		96.5	80-120	3.69	20	
Naphthalene	19.0	µg/l	20.0		95.0	80-120	3.75	20	
n-Propylbenzene	20.4	µg/l	20.0		102	80-120	6.06	20	
Styrene	18.4	µg/l	20.0		92.0	80-120	3.88	20	
1,1,1,2-Tetrachloroethane	19.7	µg/l	20.0		98.5	80-120	4.68	20	
1,1,2,2-Tetrachloroethane	18.3	µg/l	20.0		91.5	80-120	1.10	20	
Tetrachloroethene	18.9	µg/l	20.0		94.5	80-120	9.42	20	
Toluene	18.7	µg/l	20.0		93.5	80-120	7.78	20	
1,2,3-Trichlorobenzene	20.3	µg/l	20.0		102	80-120	6.06	20	
1,2,4-Trichlorobenzene	19.4	µg/l	20.0		97.0	80-120	6.38	20	
1,1,1-Trichloroethane	18.5	µg/l	20.0		92.5	80-120	5.56	20	
1,1,2-Trichloroethane	19.6	µg/l	20.0		98.0	80-120	4.17	20	
Trichloroethene	20.6	µg/l	20.0		103	80-120	9.14	20	
Trichlorofluoromethane (Freon 11)	19.2	µg/l	20.0		96.0	80-120	12.2	20	
1,2,3-Trichloropropane	19.7	µg/l	20.0		98.5	80-120	1.53	20	
1,2,4-Trimethylbenzene	19.0	µg/l	20.0		95.0	80-120	6.52	20	
1,3,5-Trimethylbenzene	18.5	µg/l	20.0		92.5	80-120	5.56	20	
Vinyl chloride	21.5	µg/l	20.0		108	80-120	12.8	20	

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* Reportable Detection Limit

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Page 17 of 27

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110062 - SW846 5030 Water MS									
LCS Dup (5110062-BSD1)					Prepared: 01-Nov-05 Analyzed: 03-Nov-05				
m,p-Xylene	42.2	µg/l	40.0		106	80-120	5.83	20	
o-Xylene	22.1	µg/l	20.0		110	80-120	5.61	20	
Tetrahydrofuran	19.2	µg/l	20.0		96.0	70-130	2.64	30	
Tert-amyl methyl ether	19.2	µg/l	20.0		96.0	70-130	0.00	30	
Ethyl tert-butyl ether	20.3	µg/l	20.0		102	70-130	2.48	30	
Di-isopropyl ether	19.8	µg/l	20.0		99.0	70-130	4.12	30	
Tert-Butanol / butyl alcohol	192	µg/l	200		96.0	70-130	6.45	30	
Surrogate: 4-Bromofluorobenzene	52.5	µg/l	50.0		105	70-130			
Surrogate: Toluene-d8	50.3	µg/l	50.0		101	70-130			
Surrogate: 1,2-Dichloroethane-d4	48.7	µg/l	50.0		97.4	70-130			
Surrogate: Dibromofluoromethane	49.3	µg/l	50.0		98.6	70-130			
Matrix Spike (5110062-MS1)					Source: SA36349-02 Prepared: 01-Nov-05 Analyzed: 03-Nov-05				
Benzene	13.4	µg/l	15.0	BRL	89.3	80-120			
Chlorobenzene	14.0	µg/l	15.0	BRL	93.3	80-120			
1,1-Dichloroethene	14.7	µg/l	15.0	BRL	98.0	80-120			
Toluene	13.2	µg/l	15.0	BRL	88.0	80-120			
Trichloroethene	13.6	µg/l	15.0	BRL	90.7	80-120			
Surrogate: 4-Bromofluorobenzene	45.6	µg/l	50.0		91.2	70-130			
Surrogate: Toluene-d8	48.6	µg/l	50.0		97.2	70-130			
Surrogate: 1,2-Dichloroethane-d4	53.2	µg/l	50.0		106	70-130			
Surrogate: Dibromofluoromethane	49.9	µg/l	50.0		99.8	70-130			
Matrix Spike Dup (5110062-MSD1)					Source: SA36349-02 Prepared: 01-Nov-05 Analyzed: 03-Nov-05				
Benzene	13.7	µg/l	15.0	BRL	91.3	80-120	2.21	20	
Chlorobenzene	13.8	µg/l	15.0	BRL	92.0	80-120	1.40	20	
1,1-Dichloroethene	15.1	µg/l	15.0	BRL	101	80-120	3.02	20	
Toluene	13.2	µg/l	15.0	BRL	88.0	80-120	0.00	20	
Trichloroethene	14.3	µg/l	15.0	BRL	95.3	80-120	4.95	20	
Surrogate: 4-Bromofluorobenzene	45.6	µg/l	50.0		91.2	70-130			
Surrogate: Toluene-d8	49.4	µg/l	50.0		98.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	53.8	µg/l	50.0		108	70-130			
Surrogate: Dibromofluoromethane	51.2	µg/l	50.0		102	70-130			

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Page 18 of 27

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 0511011 - 5110001									
Calibration Check (0511011-CCV1)			Prepared & Analyzed: 01-Nov-05						
C9-C18 Aliphatic Hydrocarbons	0.505	mg/l	0.600		84.2	75-125			
C19-C36 Aliphatic Hydrocarbons	0.722	mg/l	0.800		90.2	75-125			
C11-C22 Aromatic Hydrocarbons	1.87	mg/l	1.70		110	75-125			
Naphthalene	108	µg/l	100		108	80-120			
2-Methylnaphthalene	107	µg/l	100		107	80-120			
Acenaphthene	104	µg/l	100		104	80-120			
Phenanthrene	110	µg/l	100		110	80-120			
Anthracene	111	µg/l	100		111	80-120			
Pyrene	111	µg/l	100		111	80-120			
Chrysene	107	µg/l	100		107	80-120			
Batch 0511016 - 5110002									
Calibration Check (0511016-CCV1)			Prepared & Analyzed: 01-Nov-05						
C9-C18 Aliphatic Hydrocarbons	0.505	mg/kg wet	0.600		84.2	75-125			
C19-C36 Aliphatic Hydrocarbons	0.722	mg/kg wet	0.800		90.2	75-125			
C11-C22 Aromatic Hydrocarbons	1.87	mg/kg wet	1.70		110	75-125			
Naphthalene	108	µg/kg wet	100		108	80-120			
2-Methylnaphthalene	107	µg/kg wet	100		107	80-120			
Acenaphthene	104	µg/kg wet	100		104	80-120			
Phenanthrene	110	µg/kg wet	100		110	80-120			
Anthracene	111	µg/kg wet	100		111	80-120			
Pyrene	111	µg/kg wet	100		111	80-120			
Chrysene	107	µg/kg wet	100		107	80-120			
Batch 5110001 - SW846 3510C									
Blank (5110001-BLK1)			Prepared: 01-Nov-05 Analyzed: 02-Nov-05						
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l							
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l							
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l							
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l							
Total Petroleum Hydrocarbons	BRL	0.2 mg/l							
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l							
Naphthalene	BRL	2.50 µg/l							
2-Methylnaphthalene	BRL	2.50 µg/l							
Acenaphthene	BRL	2.50 µg/l							
Phenanthrene	BRL	2.50 µg/l							
Surrogate: 1-Chlorooctadecane	26.8	µg/l	50.0		53.6	40-140			
Surrogate: Ortho-Terphenyl	25.6	µg/l	50.0		51.2	40-140			
Surrogate: 2-Bromonaphthalene	27.6	µg/l	40.0		69.0	40-140			
Surrogate: 2-Fluorobiphenyl	26.5	µg/l	40.0		66.2	40-140			
LCS (5110001-BS1)			Prepared: 01-Nov-05 Analyzed: 02-Nov-05						
C9-C18 Aliphatic Hydrocarbons	0.248	0.2 mg/l	0.600		41.3	40-140			
C19-C36 Aliphatic Hydrocarbons	0.399	0.2 mg/l	0.800		49.9	40-140			
C11-C22 Aromatic Hydrocarbons	1.15	0.2 mg/l	1.70		67.6	40-140			
Naphthalene	35.7	2.50 µg/l	100		35.7	40-140			QC-1
2-Methylnaphthalene	39.7	2.50 µg/l	100		39.7	40-140			QC-1
Acenaphthene	42.5	2.50 µg/l	100		42.5	40-140			
Phenanthrene	51.2	2.50 µg/l	100		51.2	40-140			
Anthracene	54.8	2.50 µg/l	100		54.8	40-140			
Pyrene	52.4	2.50 µg/l	100		52.4	40-140			
Chrysene	51.3	2.50 µg/l	100		51.3	40-140			
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 19 of 27

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110001 - SW846 3510C									
LCS (5110001-BS1) Prepared: 01-Nov-05 Analyzed: 02-Nov-05									
Surrogate: 1-Chlorooctadecane	22.7	µg/l	50.0		45.4	40-140			
Surrogate: Ortho-Terphenyl	24.3	µg/l	50.0		48.6	40-140			
Surrogate: 2-Bromonaphthalene	32.6	µg/l	40.0		81.5	40-140			
Surrogate: 2-Fluorobiphenyl	27.0	µg/l	40.0		67.5	40-140			
Naphthalene Breakthrough	0.00	%				0-5			
2-Methylnaphthalene Breakthrough	0.00	%				0-5			
Fractionation Check Standard (5110001-BS2) Prepared & Analyzed: 01-Nov-05									
C9-C18 Aliphatic Hydrocarbons	0.288	0.2 mg/l	0.600		48.0	40-140			
C19-C36 Aliphatic Hydrocarbons	0.539	0.2 mg/l	0.800		67.4	40-140			
C11-C22 Aromatic Hydrocarbons	1.23	0.2 mg/l	1.70		72.4	40-140			
Naphthalene	54.0	2.50 µg/l	100		54.0	40-140			
2-Methylnaphthalene	58.0	2.50 µg/l	100		58.0	40-140			
Acenaphthene	62.2	2.50 µg/l	100		62.2	40-140			
Phenanthrene	73.6	2.50 µg/l	100		73.6	40-140			
Anthracene	74.6	2.50 µg/l	100		74.6	40-140			
Pyrene	74.6	2.50 µg/l	100		74.6	40-140			
Chrysene	75.0	2.50 µg/l	100		75.0	40-140			
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
Surrogate: 1-Chlorooctadecane	27.2	µg/l	50.0		54.4	40-140			
Surrogate: Ortho-Terphenyl	33.4	µg/l	50.0		66.8	40-140			
Surrogate: 2-Bromonaphthalene	33.9	µg/l	40.0		84.8	40-140			
Surrogate: 2-Fluorobiphenyl	27.2	µg/l	40.0		68.0	40-140			
LCS Dup (5110001-BSD1) Prepared: 01-Nov-05 Analyzed: 02-Nov-05									
C9-C18 Aliphatic Hydrocarbons	0.242	0.2 mg/l	0.600		40.3	40-140	2.45	25	
C19-C36 Aliphatic Hydrocarbons	0.494	0.2 mg/l	0.800		61.8	40-140	21.3	25	
C11-C22 Aromatic Hydrocarbons	1.10	0.2 mg/l	1.70		64.7	40-140	4.38	25	
Naphthalene	42.4	2.50 µg/l	100		42.4	40-140	17.2	20	
2-Methylnaphthalene	42.9	2.50 µg/l	100		42.9	40-140	7.75	20	
Acenaphthene	49.1	2.50 µg/l	100		49.1	40-140	14.4	20	
Phenanthrene	61.5	2.50 µg/l	100		61.5	40-140	18.3	20	
Anthracene	63.1	2.50 µg/l	100		63.1	40-140	14.1	20	
Pyrene	61.4	2.50 µg/l	100		61.4	40-140	15.8	20	
Chrysene	56.7	2.50 µg/l	100		56.7	40-140	10.0	20	
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200	0.00	200	
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200	0.00	200	
Surrogate: 1-Chlorooctadecane	26.2	µg/l	50.0		52.4	40-140			
Surrogate: Ortho-Terphenyl	28.9	µg/l	50.0		57.8	40-140			
Surrogate: 2-Bromonaphthalene	30.7	µg/l	40.0		76.8	40-140			
Surrogate: 2-Fluorobiphenyl	25.2	µg/l	40.0		63.0	40-140			
Naphthalene Breakthrough	0.00	%				0-5			
2-Methylnaphthalene Breakthrough	0.00	%				0-5			
Batch 5110002 - SW846 3545A									
Blank (5110002-BLK1) Prepared & Analyzed: 01-Nov-05									
C9-C18 Aliphatic Hydrocarbons	BRL	13.4 mg/kg wet							
C19-C36 Aliphatic Hydrocarbons	BRL	13.4 mg/kg wet							
C11-C22 Aromatic Hydrocarbons	BRL	13.4 mg/kg wet							
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	13.4 mg/kg wet							
Total Petroleum Hydrocarbons	BRL	13.4 mg/kg wet							
Unadjusted Total Petroleum Hydrocarbons	BRL	13.4 mg/kg wet							
Naphthalene	BRL	66.5 µg/kg wet							

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5110002 - SW846 3545A									
Blank (5110002-BLK1)									
Prepared & Analyzed: 01-Nov-05									
2-Methylnaphthalene	BRL	66.5 µg/kg wet							
Acenaphthene	BRL	66.5 µg/kg wet							
Phenanthrene	BRL	66.5 µg/kg wet							
Surrogate: 1-Chlorooctadecane	1160	µg/kg wet	1670		69.5	40-140			
Surrogate: Ortho-Terphenyl	1240	µg/kg wet	1670		74.3	40-140			
Surrogate: 2-Bromonaphthalene	1750	µg/kg wet	2670		65.5	40-140			
Surrogate: 2-Fluorobiphenyl	1750	µg/kg wet	2670		65.5	40-140			
LCS (5110002-BS1)									
Prepared & Analyzed: 01-Nov-05									
C9-C18 Aliphatic Hydrocarbons	19.8	13.4 mg/kg wet	40.0		49.5	40-140			
C19-C36 Aliphatic Hydrocarbons	42.1	13.4 mg/kg wet	53.3		79.0	40-140			
C11-C22 Aromatic Hydrocarbons	101	13.4 mg/kg wet	113		89.4	40-140			
Naphthalene	3680	66.5 µg/kg wet	6670		55.2	40-140			
2-Methylnaphthalene	4120	66.5 µg/kg wet	6670		61.8	40-140			
Acenaphthene	4790	66.5 µg/kg wet	6670		71.8	40-140			
Phenanthrene	6120	66.5 µg/kg wet	6670		91.8	40-140			
Anthracene	5860	66.5 µg/kg wet	6670		87.9	40-140			
Pyrene	6190	66.5 µg/kg wet	6670		92.8	40-140			
Chrysene	6140	66.5 µg/kg wet	6670		92.1	40-140			
Naphthalene (aliphatic fraction)	0.00667	µg/kg wet	6670		0.000100	0-200			
2-Methylnaphthalene (aliphatic fraction)	0.00667	µg/kg wet	6670		0.000100	0-200			
Surrogate: 1-Chlorooctadecane	2260	µg/kg wet	3330		67.9	40-140			
Surrogate: Ortho-Terphenyl	2730	µg/kg wet	3330		82.0	40-140			
Surrogate: 2-Bromonaphthalene	1570	µg/kg wet	2670		58.8	40-140			
Surrogate: 2-Fluorobiphenyl	1750	µg/kg wet	2670		65.5	40-140			
Naphthalene Breakthrough	0.00	%				0-5			
2-Methylnaphthalene Breakthrough	0.00	%				0-5			
Fractionation Check Standard (5110002-BS2)									
Prepared & Analyzed: 01-Nov-05									
C9-C18 Aliphatic Hydrocarbons	19.2	13.4 mg/kg wet	40.0		48.0	40-140			
C19-C36 Aliphatic Hydrocarbons	35.9	13.4 mg/kg wet	53.3		67.4	40-140			
C11-C22 Aromatic Hydrocarbons	82.0	13.4 mg/kg wet	113		72.6	40-140			
Naphthalene	3600	66.5 µg/kg wet	6670		54.0	40-140			
2-Methylnaphthalene	3860	66.5 µg/kg wet	6670		57.9	40-140			
Acenaphthene	4140	66.5 µg/kg wet	6670		62.1	40-140			
Phenanthrene	4910	66.5 µg/kg wet	6670		73.6	40-140			
Anthracene	4970	66.5 µg/kg wet	6670		74.5	40-140			
Pyrene	4980	66.5 µg/kg wet	6670		74.7	40-140			
Chrysene	5000	66.5 µg/kg wet	6670		75.0	40-140			
Naphthalene (aliphatic fraction)	0.00667	µg/kg wet	6670		0.000100	0-200			
2-Methylnaphthalene (aliphatic fraction)	0.00667	µg/kg wet	6670		0.000100	0-200			
Surrogate: 1-Chlorooctadecane	1810	µg/kg wet	3330		54.4	40-140			
Surrogate: Ortho-Terphenyl	2230	µg/kg wet	3330		67.0	40-140			
Surrogate: 2-Bromonaphthalene	2260	µg/kg wet	2670		84.6	40-140			
Surrogate: 2-Fluorobiphenyl	1810	µg/kg wet	2670		67.8	40-140			
LCS Dup (5110002-BSD1)									
Prepared & Analyzed: 01-Nov-05									
C9-C18 Aliphatic Hydrocarbons	25.3	13.4 mg/kg wet	40.0		63.2	40-140	24.3	25	
C19-C36 Aliphatic Hydrocarbons	44.5	13.4 mg/kg wet	53.3		83.5	40-140	5.54	25	
C11-C22 Aromatic Hydrocarbons	118	13.4 mg/kg wet	113		104	40-140	15.1	25	
Naphthalene	4150	66.5 µg/kg wet	6670		62.2	40-140	11.9	30	
2-Methylnaphthalene	4830	66.5 µg/kg wet	6670		72.4	40-140	15.8	30	
Acenaphthene	5810	66.5 µg/kg wet	6670		87.1	40-140	19.3	30	
Phenanthrene	7860	66.5 µg/kg wet	6670		118	40-140	25.0	30	
Anthracene	7600	66.5 µg/kg wet	6670		114	40-140	25.9	30	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag

Batch 5110002 - SW846 3545A

LCS Dup (5110002-BSD1)

Prepared & Analyzed: 01-Nov-05

Pyrene	7750	66.5 µg/kg wet	6670		116	40-140	22.2	30	
Chrysene	7670	66.5 µg/kg wet	6670		115	40-140	22.1	30	
Naphthalene (aliphatic fraction)	0.00667	µg/kg wet	6670		0.000100	0-200	0.00	200	
2-Methylnaphthalene (aliphatic fraction)	0.00667	µg/kg wet	6670		0.000100	0-200	0.00	200	
Surrogate: 1-Chlorooctadecane	2510	µg/kg wet	3330		75.4	40-140			
Surrogate: Ortho-Terphenyl	3550	µg/kg wet	3330		107	40-140			
Surrogate: 2-Bromonaphthalene	1550	µg/kg wet	2670		58.1	40-140			
Surrogate: 2-Fluorobiphenyl	1860	µg/kg wet	2670		69.7	40-140			
Naphthalene Breakthrough	0.00	%				0-5			
2-Methylnaphthalene Breakthrough	0.00	%				0-5			

General Chemistry Parameters - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag

Batch 5101888 - General Preparation

Duplicate (5101888-DUP1)

Source: SA36071-06

Prepared & Analyzed: 31-Oct-05

% Solids	76.3	%		77.4			1.43	20	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 22 of 27

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0511011				
Calibration Check (0511011-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.87539E+08	1.57215E+08	-16.2	25.00
C19-C36 Aliphatic Hydrocarbons	1.4791E+08	1.33513E+08	-9.73	25.00
C11-C22 Aromatic Hydrocarbons	16870.2	16.3975	10.0	25.00
Naphthalene	4.41995	4.77375	8.00	20.00
2-Methylnaphthalene	3.27182	3.51316	7.38	20.00
Acenaphthene	3.29074	3.40739	3.54	20.00
Phenanthrene	4.51346	4.98618	10.5	20.00
Anthracene	5.42438	6.0119	10.8	20.00
Pyrene	5.81992	6.4367	10.6	20.00
Chrysene	5.74607	6.12525	6.60	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 23 of 27

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0511016				
Calibration Check (0511016-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.87539E+08	1.57715E+08	-15.9	25.00
C19-C36 Aliphatic Hydrocarbons	1.4791E+08	1.33513E+08	-9.73	25.00
C11-C22 Aromatic Hydrocarbons	16870.2	16.3975	10.0	25.00
Naphthalene	4.41995	4.77375	8.00	20.00
2-Methylnaphthalene	3.27182	3.51316	7.38	20.00
Acenaphthene	3.29074	3.40739	3.54	20.00
Phenanthrene	4.51346	4.98618	10.5	20.00
Anthracene	5.42438	6.0119	10.8	20.00
Pyrene	5.81992	6.4367	10.6	20.00
Chrysene	5.74607	6.12525	6.60	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Notes and Definitions

QC-1 Analyte out of acceptance range.

QC-2 Analyte out of acceptance range in QC spike but no reportable concentration present in sample.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

The following outlines the condition of all EPH samples contained within this report upon laboratory receipt.

Matrix	☒ Aqueous	☒ Soil	☐ Sediment	☒ Other <u>Surface water</u>	
Containers	☒ Satisfactory	☐ Broken	☐ Leaking		
Aqueous Preservative	☐ N/A	☒ pH $\leq$ 2	☐ pH $>$ 2	☐ pH adjusted to $<$ 2 in lab	Comment:
Temperature	☐ Received on ice		☒ Received at 4 ± 2 °C	☐ Other:	°C

Were all QA/QC procedures followed as required by the EPH method? Yes No

Were any significant modifications made to the EPH method as specified in Section 11.3? No

Were all performance/acceptance standards for required QA/QC procedures achieved? Yes No

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Authorized by:



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:

This form provides certifications for the following Spectrum Analytical, Inc. work order #: SA36410

Matrix	☐ Groundwater	☒ Soil/Sediment	☒ Drinking Water	☒ Other <i>Surface Water</i>
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☐ 6010B
	☐ 8270C	☐ 8081A	☐ VPH	☐ 6020
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³

- 1 List Release Tracking Number (RTN), if known
2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method
3 S - SW-846 Methods 7000 Series List individual method and analyte

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☒ Yes ☐ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



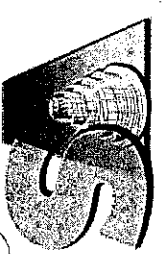
Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Date: 11/3/2005

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* Reportable Detection Limit

BRL = Below Reporting Limit



SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

TAKE OFF HOLD STAYS

10/28/05 5:18

Special Handling:
☐ Standard TAT - 10 business days
☒ Rush TAT - Date Needed: 11/2/05
 All TATs subject to laboratory approval.
 Min. 24-hour notification needed for rushes.
 Samples disposed of after 60 days unless otherwise instructed.

Report To: ECS Agawam
27 North St Dr
Agawam, MA 01501

Project Mgr.: Chuck Klingler

Invoice To: ECS Agawam
588 Silver St
Agawam, MA 01501

P.O. No.: _____ RQN: _____

Project No.: 91-7041 082.00

Site Name: Agawam, MA 131 Main St

Location: Agawam, MA State: MA

Sampler(s): LN155

Project No.: 91-7041 082.00

Site Name: Agawam, MA 131 Main St

Location: Agawam, MA State: MA

Sampler(s): LN155

Containers:				Analyses:		QA Reporting Notes: (check if needed)
# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	3PH + 4 PAH:	524.2	
Preservative	Type	Matrix				
G=Grab C=Composite	Sample Id:	Date:	Time:			
	S101	10/27/05	12:05	G SW	1	
	S102		11:45	G SW	1	
	S103		11:50	G SW	1	
	S104		12:00	G SO	1	
	trip blank		8:00	ACI 1		
	133 Main St		2:30	G DW	2	
	133 Main Dr		2:30	G DW	2	
	A51		2:05	C A		
	A52		2:02	C A		
	A53		2:04	C A		

Relinquished by: E. Klingler

Received by: [Signature]

Date: 10/28/05

Time: 11:50

☐ Fax results when available to ()

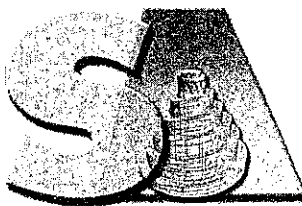
☒ E-mail to cklingler@ecs.com

EDD Format _____

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C _____



Report Date:
03-Nov-05 16:14



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
27A Midstate Drive, Suite 218
Auburn, MA 01501
Attn: Chuck Klingler

Project: 131 Main St - Carver, MA
Project #: 91-204 082.00

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Container</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA36410-08	AS1	Summa canister	Air	27-Oct-05 14:05	28-Oct-05 13:15
SA36410-09	AS2	Summa canister	Air	27-Oct-05 14:02	28-Oct-05 13:15
SA36410-10	AS3	Summa canister	Air	27-Oct-05 14:04	28-Oct-05 13:15

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 6 pages of analytical data plus Chain of Custody document(s).

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Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:


Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

ENVIRONMENTAL ANALYSES

11 Almgren Drive • Agawam, Massachusetts 01001 • Operational Building & Sample Receiving
830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

Sample Identification

ASI

SA36410-08

Client Project #

91-204 082.00

Matrix

Air

Collection Date/Time

27-Oct-05 14:05

Received

28-Oct-05

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result Units</u>	<u>*RDL</u>	<u>Result ug/m³</u>	<u>*RDL</u>	<u>Method Ref.</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>	<u>Flag</u>

Air Quality AnalysesTargetsppbv

91-20-3	Naphthalene	BRL	2.40	BRL	12.6	Modified MA APH	01-Nov-05	5110127	WB	
91-57-6	2-Methylnaphthalene	BRL	3.20	BRL	18.6	"	"	"	"	

APH Carbon chainsug/m³ Air

C5-C8 Aliphatic Hydrocarbons				245	50.0	"	"	"	"	
C9-C12 Aliphatic Hydrocarbons				BRL	90.0	"	"	"	"	
C9-C10 Aromatic Hydrocarbons				BRL	50.0	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons				330	50.0	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons				BRL	90.0	"	"	"	"	

APH Targetsppbv

106-99-0	1,3-Butadiene	BRL	1.00	BRL	2.2	EPA TO-15	"	"	"	
1634-04-4	Methyl tert-butyl ether	12.8	0.500	46.2	1.8	"	"	"	"	
71-43-2	Benzene	1.35	0.500	4.3	1.6	"	"	"	"	
108-88-3	Toluene	3.55	0.500	13.4	1.9	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.500	BRL	2.2	"	"	"	"	
1330-20-7	m,p-Xylene	1.28	0.500	5.6	2.2	"	"	"	"	
95-47-6	o-Xylene	BRL	0.500	BRL	2.2	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	96.8	75-125 %			"	"	"	"	

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 6

Sample IdentificationAS2
SA36410-09Client Project #
91-204 082.00Matrix
AirCollection Date/Time
27-Oct-05 14:02Received
28-Oct-05

CAS No.	Analyte(s)	Result Units	*RDL	Result ug/m ³	*RDL	Method Ref.	Analyzed	Batch	Analyst	Flag

Quality AnalysesTargets

91-20-3	Naphthalene	BRL	4.80	BRL	25.1	Modified MA APH	01-Nov-05	5110127	WB	
91-57-6	2-Methylnaphthalene	BRL	6.40	BRL	37.2	"	"	"	"	

APH Carbon chainsug/m³ Air

C5-C8 Aliphatic Hydrocarbons				1690	100	"	"	"	"	
C9-C12 Aliphatic Hydrocarbons				BRL	180	"	"	"	"	
C9-C10 Aromatic Hydrocarbons				BRL	100	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons				2310	100	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons				BRL	180	"	"	"	"	

APH Targetsppbv

106-99-0	1,3-Butadiene	BRL	2.00	BRL	4.4	EPA TO-15	"	"	"	
1634-04-4	Methyl tert-butyl ether	85.0	1.00	307.0	3.6	"	"	"	"	
71-43-2	Benzene	6.42	1.00	20.5	3.2	"	"	"	"	
108-88-3	Toluene	29.9	1.00	113.0	3.8	"	"	"	"	
100-41-4	Ethylbenzene	2.44	1.00	10.6	4.3	"	"	"	"	
1330-20-7	m,p-Xylene	7.12	1.00	30.9	4.3	"	"	"	"	
95-47-6	o-Xylene	2.36	1.00	10.2	4.3	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	96.8	75-125 %			"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 6

Sample IdentificationAS3
SA36410-10Client Project #

91-204 082.00

Matrix

Air

Collection Date/Time

27-Oct-05 14:04

Received

28-Oct-05

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result Units</u>	<u>*RDL</u>	<u>Result ug/m³</u>	<u>*RDL</u>	<u>Method Ref.</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>	<u>Flag</u>
<u>Air Quality Analyses</u>										
<u>Targets</u>										
91-20-3	Naphthalene	BRL	2.40	BRL	12.6	Modified MA APH	01-Nov-05	5110127	WB	
91-57-6	2-Methylnaphthalene	BRL	3.20	BRL	18.6	"	"	"	"	
<u>APH Carbon chains</u>										
				<u>ug/m³ Air</u>						
C5-C8 Aliphatic Hydrocarbons				444	50.0	"	"	"	"	
C9-C12 Aliphatic Hydrocarbons				BRL	90.0	"	"	"	"	
C9-C10 Aromatic Hydrocarbons				BRL	50.0	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons				668	50.0	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons				BRL	90.0	"	"	"	"	
<u>APH Targets</u>										
106-99-0	1,3-Butadiene	BRL	1.00	BRL	2.2	EPA TO-15	"	"	"	
1634-04-4	Methyl tert-butyl ether	26.0	0.500	93.8	1.8	"	"	"	"	
71-43-2	Benzene	2.03	0.500	6.5	1.6	"	"	"	"	
108-88-3	Toluene	13.2	0.500	49.7	1.9	"	"	"	"	
100-41-4	Ethylbenzene	1.11	0.500	4.8	2.2	"	"	"	"	
1330-20-7	m,p-Xylene	3.28	0.500	14.2	2.2	"	"	"	"	
95-47-6	o-Xylene	1.17	0.500	5.1	2.2	"	"	"	"	
<u>Surrogate recoveries:</u>										
460-00-4	4-Bromofluorobenzene	97.6	75-125 %							

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 6

Air Quality Analyses - Quality Control

Analyte(s)	Result	*RDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag

Batch 5110127 - General Air Prep

Prepared & Analyzed: 01-Nov-05

Blank (5110127-BLK1)

C5-C8 Aliphatic Hydrocarbons	BRL	50.0	µg/m³ Air
C9-C12 Aliphatic Hydrocarbons	BRL	90.0	µg/m³ Air
C9-C10 Aromatic Hydrocarbons	BRL	50.0	µg/m³ Air
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	50.0	µg/m³ Air
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	90.0	µg/m³ Air
1,3-Butadiene	BRL	1.00	ppbv
Methyl tert-butyl ether	BRL	0.500	ppbv
Benzene	BRL	0.500	ppbv
Toluene	BRL	0.500	ppbv
Ethylbenzene	BRL	0.500	ppbv
m,p-Xylene	BRL	0.500	ppbv
o-Xylene	BRL	0.500	ppbv
Naphthalene	BRL	2.40	ppbv
2-Methylnaphthalene	BRL	3.20	ppbv

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Notes and Definitions

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown



SPECTRUM ANALYTICAL, INC.
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HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 1

Report To: ECS Auburn

27 midstate Dr

Auburn, MA 01501

Project Mgr.: Chuck Klingler

Invoice To: ECS Agawam

588 Silver St

Agawam, MA 01001

P.O. No.: RQN:

Project No.: 91-204 082-00

Site Name: Carver, MA 131 main St

Location: Carver, MA State: MA

Sampler(s): LN, SS

1=Na₂SO₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9= 10=

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1= X2= X3=

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix
01 SW1	10/27/05	12:05		G	SW HCL
02 SW2		11:45		G	SW HCL
03 SW3		11:50		G	SW HCL
04 SS1		12:00		G	SO
05 trip blank		8:00			HCL
06 133 main St		2:30		G	DW HCL 2
07 133 main Dup		2:30		G	DW HCL 2
08 AS1		2:05		C	A
09 AS2		2:02		C	A
10 AS3		2:04		C	A

Containers:

of VOA Vials
of Amber Glass
of Clear Glass
of Plastic

Analyses:

State specific reporting standards
If applicable, please list below.

☒ Provide MCP CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☒ Yes ☐ No
(Response required for CAM report)

QA Reporting Notes:
(check if needed)

incorrectly measured
see phone log
per current day
insufficient volume

☐ Fax results when available to ()

☒ E-mail to cklingler@ecsconsult.com

EDD Format

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C

Relinquished by:

Received by:

Date:

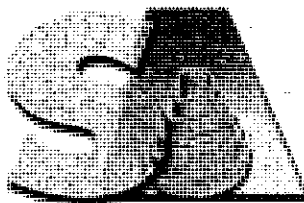
Time:

10/28/05 11:50

10/28/05 13:05



Report Date:
12-Sep-05 15:19



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Laboratory Report

Environmental Compliance Services
588 Silver Street
Agawam, MA 01001
Attn: Christopher Parent

Project: Eagle Gas - Carver, MA
Project #: 91-204082

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA33134-01	MW-A	Ground Water	24-Aug-05 09:25	26-Aug-05 11:42
SA33134-02	DCW-2	Ground Water	24-Aug-05 10:15	26-Aug-05 11:42
SA33134-03	DCW-3	Ground Water	24-Aug-05 11:00	26-Aug-05 11:42
SA33134-04	DCW-4	Ground Water	24-Aug-05 11:40	26-Aug-05 11:42
SA33134-05	DCW-6	Ground Water	24-Aug-05 12:15	26-Aug-05 11:42
SA33134-06	DCW-8	Ground Water	24-Aug-05 12:45	26-Aug-05 11:42
SA33134-07	DCW-9	Ground Water	24-Aug-05 14:30	26-Aug-05 11:42
SA33134-08	DCW-10	Ground Water	24-Aug-05 13:45	26-Aug-05 11:42
SA33134-09	EOW-2	Ground Water	25-Aug-05 10:05	26-Aug-05 11:42
SA33134-10	ERW-1	Ground Water	25-Aug-05 12:40	26-Aug-05 11:42
SA33134-11	ERW-2	Ground Water	25-Aug-05 13:45	26-Aug-05 11:42
SA33134-12	ERW-4	Ground Water	25-Aug-05 12:30	26-Aug-05 11:42
SA33134-13	BP-2	Ground Water	24-Aug-05 15:05	26-Aug-05 11:42
SA33134-14	131 Main St	Ground Water	25-Aug-05 15:12	26-Aug-05 11:42
SA33134-15	132 Main St	Ground Water	25-Aug-05 14:44	26-Aug-05 11:42

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 47 pages of analytical data plus Chain of Custody document(s).

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New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

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ENVIRONMENTAL ANALYSES

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830 Silver Street • Agawam, Massachusetts 01001 • Administrative Offices, Volatile & Air Departments
1-800-789-9115 • 413-789-9018 • Fax 413-789-4076

CASE NARRATIVE:

The data set for work order SA33134 complies with internal QC criteria for the methods performed.

The samples were received @ 0.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although recovery may still be within the recommended 70%-130% range, the analytical range has been set based on historical control limits.

Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will note any exceedance levels and items specific to sample analysis/matrix.

Sample IdentificationMW-A
SA33134-01**Client Project #**

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 09:25

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic CompoundsVPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	5	+MADEP 5/2004 Rev. 1.1	05-Sep-05	05-Sep-05	5090250	SS		
C9-C12 Aliphatic Hydrocarbons	0.134	0.0250 mg/l	5	"	"	"	"	"		
C9-C10 Aromatic Hydrocarbons	0.215	0.0250 mg/l	5	"	"	"	"	"		
Unadjusted C5-C8 Aliphatic Hydrocarbons	1.61	0.0750 mg/l	5	"	"	"	"	"		
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.349	0.0250 mg/l	5	"	"	"	"	"		

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	17.4	5.0 µg/l	5	"	"	"	"	"	
100-41-4	Ethylbenzene	58.7	5.0 µg/l	5	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	2,300	5.0 µg/l	5	"	"	"	"	"	E
91-20-3	Naphthalene	22.0	5.0 µg/l	5	"	"	"	"	"	
108-88-3	Toluene	BRL	5.0 µg/l	5	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	10.0 µg/l	5	"	"	"	"	"	
95-47-6	o-Xylene	BRL	5.0 µg/l	5	"	"	"	"	"	

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	120	70-130 %	"	"	"	"	"	"	
615-59-8	2,5-Dibromotoluene (PID)	113	70-130 %	"	"	"	"	"	"	

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

SA33134-01RE1

C5-C8 Aliphatic Hydrocarbons	BRL	0.375 mg/l	25	+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS		
C9-C12 Aliphatic Hydrocarbons	BRL	0.125 mg/l	25	"	"	"	"	"		
C9-C10 Aromatic Hydrocarbons	0.187	0.125 mg/l	25	"	"	"	"	"		
Unadjusted C5-C8 Aliphatic Hydrocarbons	1.68	0.375 mg/l	25	"	"	"	"	"		
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.301	0.125 mg/l	25	"	"	"	"	"		

VPH Target Analytes

Prepared by method VPH

SA33134-01RE1

71-43-2	Benzene	BRL	25.0 µg/l	25	"	"	"	"	"	
100-41-4	Ethylbenzene	46.4	25.0 µg/l	25	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	1,940	25.0 µg/l	25	"	"	"	"	"	
91-20-3	Naphthalene	BRL	25.0 µg/l	25	"	"	"	"	"	
108-88-3	Toluene	BRL	25.0 µg/l	25	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	50.0 µg/l	25	"	"	"	"	"	
95-47-6	o-Xylene	BRL	25.0 µg/l	25	"	"	"	"	"	

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	104	70-130 %	"	"	"	"	"	"	
615-59-8	2,5-Dibromotoluene (PID)	99.0	70-130 %	"	"	"	"	"	"	

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD		

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit BRL = Below Reporting Limit

Page 3 of 47

Sample Identification

MW-A
SA33134-01

Client Project

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 09:25

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
C11-C22 Aromatic Hydrocarbons	0.2	0.2 mg/l	1	"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	0.2	0.2 mg/l	1	"	"	"	"	"	
Total Petroleum Hydrocarbons	0.2	0.2 mg/l	1	"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	0.2	0.2 mg/l	1	"	"	"	"	"	

EPH Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	10.5	1.00 µg/l	1	"	"	"	"	"	
91-57-6 2-Methylnaphthalene	BRL	1.00 µg/l	1	"	"	"	"	"	
208-96-8 Acenaphthylene	BRL	1.00 µg/l	1	"	"	"	"	"	
83-32-9 Acenaphthene	BRL	1.00 µg/l	1	"	"	"	"	"	
86-73-7 Fluorene	BRL	1.00 µg/l	1	"	"	"	"	"	
85-01-8 Phenanthrene	BRL	1.00 µg/l	1	"	"	"	"	"	
120-12-7 Anthracene	BRL	1.00 µg/l	1	"	"	"	"	"	
206-44-0 Fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	
129-00-0 Pyrene	BRL	1.00 µg/l	1	"	"	"	"	"	
56-55-3 Benzo (a) anthracene	BRL	1.00 µg/l	1	"	"	"	"	"	
218-01-9 Chrysene	BRL	1.00 µg/l	1	"	"	"	"	"	
205-99-2 Benzo (b) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	
207-08-9 Benzo (k) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	
123-32-8 Benzo (a) pyrene	BRL	0.200 µg/l	1	"	"	"	"	"	
193-39-5 Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"	
53-70-3 Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"	
191-24-2 Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2 1-Chlorooctadecane	54.8	40-140 %	"	"	"	"	"	"	
84-15-1 Ortho-Terphenyl	60.8	40-140 %	"	"	"	"	"	"	
580-13-2 2-Bromonaphthalene	77.9	40-140 %	"	"	"	"	"	"	
321-60-8 2-Fluorobiphenyl	79.4	40-140 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 47

Sample Identification

DCW-2

SA33134-02

Client Project

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 10:15

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1	+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS	
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"	
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons	0.703	0.0750 mg/l	1	"	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"	

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL	5.0 µg/l	1	"	"	"	"	"
100-41-4	Ethylbenzene	BRL	5.0 µg/l	1	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	1,240	5.0 µg/l	1	"	"	"	"	E
91-20-3	Naphthalene	BRL	5.0 µg/l	1	"	"	"	"	"
108-88-3	Toluene	BRL	5.0 µg/l	1	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL	10.0 µg/l	1	"	"	"	"	"
95-47-6	o-Xylene	BRL	5.0 µg/l	1	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	98.4	70-130 %	"	"	"	"	"	
615-59-8	2,5-Dibromotoluene (PID)	92.4	70-130 %	"	"	"	"	"	

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

SA33134-02RE1

C5-C8 Aliphatic Hydrocarbons	BRL	0.375 mg/l	25	+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS	
C9-C12 Aliphatic Hydrocarbons	BRL	0.125 mg/l	25	"	"	"	"	"	
C9-C10 Aromatic Hydrocarbons	BRL	0.125 mg/l	25	"	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons	0.692	0.375 mg/l	25	"	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.125 mg/l	25	"	"	"	"	"	

VPH Target Analytes

Prepared by method VPH

SA33134-02RE1

71-43-2	Benzene	BRL	25.0 µg/l	25	"	"	"	"	"
100-41-4	Ethylbenzene	BRL	25.0 µg/l	25	"	"	"	"	"
1634-04-4	Methyl tert-butyl ether	1,260	25.0 µg/l	25	"	"	"	"	"
91-20-3	Naphthalene	BRL	25.0 µg/l	25	"	"	"	"	"
108-88-3	Toluene	BRL	25.0 µg/l	25	"	"	"	"	"
1330-20-7	m,p-Xylene	BRL	50.0 µg/l	25	"	"	"	"	"
95-47-6	o-Xylene	BRL	25.0 µg/l	25	"	"	"	"	"

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	103	70-130 %	"	"	"	"	"	
615-59-8	2,5-Dibromotoluene (PID)	95.2	70-130 %	"	"	"	"	"	

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 5 of 47

Sample Identification

DCW-2

SA33134-02

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 10:15

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	

EPH Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	BRL	1.00 µg/l	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL	1.00 µg/l	1	"	"	"	"	"
208-96-8	Acenaphthylene	BRL	1.00 µg/l	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL	1.00 µg/l	1	"	"	"	"	"
86-73-7	Fluorene	BRL	1.00 µg/l	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL	1.00 µg/l	1	"	"	"	"	"
120-12-7	Anthracene	BRL	1.00 µg/l	1	"	"	"	"	"
206-44-0	Fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"
129-00-0	Pyrene	BRL	1.00 µg/l	1	"	"	"	"	"
56-55-3	Benzo (a) anthracene	BRL	1.00 µg/l	1	"	"	"	"	"
218-01-9	Chrysene	BRL	1.00 µg/l	1	"	"	"	"	"
205-99-2	Benzo (b) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"
207-08-9	Benzo (k) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"
207-32-8	Benzo (a) pyrene	BRL	0.200 µg/l	1	"	"	"	"	"
193-39-5	Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	47.9	40-140 %	"	"	"	"	"
84-15-1	Ortho-Terphenyl	53.4	40-140 %	"	"	"	"	"
580-13-2	2-Bromonaphthalene	67.2	40-140 %	"	"	"	"	"
321-60-8	2-Fluorobiphenyl	67.0	40-140 %	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 6 of 47

Sample IdentificationDCW-3
SA33134-03Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 11:00

Received

26-Aug-05

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>*RDL/Units</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>	<u>Flag</u>
Volatile Organic Compounds										
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>			Prepared by method VPH							
C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1	+MADEP	05-Sep-05	06-Sep-05	5090250	SS		
				5/2004 Rev. 1.1						
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"		
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"		
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1	"	"	"	"	"		
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"		
<u>VPH Target Analytes</u>			Prepared by method VPH							
71-43-2 Benzene	BRL	5.0 µg/l	1	"	"	"	"	"		
100-41-4 Ethylbenzene	BRL	5.0 µg/l	1	"	"	"	"	"		
1634-04-4 Methyl tert-butyl ether	BRL	5.0 µg/l	1	"	"	"	"	"		
91-20-3 Naphthalene	BRL	5.0 µg/l	1	"	"	"	"	"		
108-88-3 Toluene	BRL	5.0 µg/l	1	"	"	"	"	"		
1330-20-7 m,p-Xylene	BRL	10.0 µg/l	1	"	"	"	"	"		
95-47-6 o-Xylene	BRL	5.0 µg/l	1	"	"	"	"	"		
<u>Surrogate recoveries:</u>										
615-59-8 2,5-Dibromotoluene (FID)	110	70-130 %		"	"	"	"	"		
615-59-8 2,5-Dibromotoluene (PID)	100	70-130 %		"	"	"	"	"		
Extractable Petroleum Hydrocarbons										
<u>EPH Aliphatic/Aromatic Ranges</u>			Prepared by method SW846 3510C							
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP	02-Sep-05	03-Sep-05	5090102	JD		
				5/2004 R						
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"		
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"		
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"		
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"		
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"		
<u>EPH Target PAH Analytes</u>			Prepared by method SW846 3510C							
91-20-3 Naphthalene	BRL	1.00 µg/l	1	"	"	"	"	"		
91-57-6 2-Methylnaphthalene	BRL	1.00 µg/l	1	"	"	"	"	"		
208-96-8 Acenaphthylene	BRL	1.00 µg/l	1	"	"	"	"	"		
83-32-9 Acenaphthene	BRL	1.00 µg/l	1	"	"	"	"	"		
86-73-7 Fluorene	BRL	1.00 µg/l	1	"	"	"	"	"		
85-01-8 Phenanthrene	BRL	1.00 µg/l	1	"	"	"	"	"		
120-12-7 Anthracene	BRL	1.00 µg/l	1	"	"	"	"	"		
206-44-0 Fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"		
129-00-0 Pyrene	BRL	1.00 µg/l	1	"	"	"	"	"		
56-55-3 Benzo (a) anthracene	BRL	1.00 µg/l	1	"	"	"	"	"		
218-01-9 Chrysene	BRL	1.00 µg/l	1	"	"	"	"	"		
205-99-2 Benzo (b) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"		
7-08-9 Benzo (k) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 7 of 47

Sample Identification

DCW-3

SA33134-03

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 11:00

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Target PAH Analytes

Prepared by method SW846 3510C

50-32-8	Benzo (a) pyrene	BRL	0.200 µg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
193-39-5	Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	56.7	40-140 %	"	"	"	"	"	"	
84-15-1	Ortho-Terphenyl	61.2	40-140 %	"	"	"	"	"	"	
580-13-2	2-Bromonaphthalene	83.6	40-140 %	"	"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	82.9	40-140 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 8 of 47

Sample Identification

DCW-4
SA33134-04

Client Project

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 11:40

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1	+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS		
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"		
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"		
Unadjusted C5-C8 Aliphatic Hydrocarbons	0.521	0.0750 mg/l	1	"	"	"	"	"		
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.0265	0.0250 mg/l	1	"	"	"	"	"		

VPH Target Analytes

Prepared by method VPH

71-43-2	Benzene	BRL	5.0 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	5.0 µg/l	1	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	638	5.0 µg/l	1	"	"	"	"	"	E
91-20-3	Naphthalene	BRL	5.0 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	5.0 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	10.0 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	6.3	5.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	122	70-130 %	"	"	"	"	"	"	
615-59-8	2,5-Dibromotoluene (PID)	117	70-130 %	"	"	"	"	"	"	

VPH Aliphatic/Aromatic Carbon Ranges

Prepared by method VPH

SA33134-04RE1

C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	5	+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS		
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	5	"	"	"	"	"		
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	5	"	"	"	"	"		
Unadjusted C5-C8 Aliphatic Hydrocarbons	0.515	0.0750 mg/l	5	"	"	"	"	"		
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	5	"	"	"	"	"		

VPH Target Analytes

Prepared by method VPH

SA33134-04RE1

71-43-2	Benzene	BRL	5.0 µg/l	5	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	5.0 µg/l	5	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	599	5.0 µg/l	5	"	"	"	"	"	
91-20-3	Naphthalene	BRL	5.0 µg/l	5	"	"	"	"	"	
108-88-3	Toluene	BRL	5.0 µg/l	5	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	10.0 µg/l	5	"	"	"	"	"	
95-47-6	o-Xylene	BRL	5.0 µg/l	5	"	"	"	"	"	

Surrogate recoveries:

615-59-8	2,5-Dibromotoluene (FID)	108	70-130 %	"	"	"	"	"	"	
615-59-8	2,5-Dibromotoluene (PID)	101	70-130 %	"	"	"	"	"	"	

Extractable Petroleum Hydrocarbons

EPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD		

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 9 of 47

Sample Identification

DCW-4

SA33134-04

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 11:40

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsEPH Aliphatic/Aromatic Ranges

Prepared by method SW846 3510C

C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
C11-C22 Aromatic Hydrocarbons	0.2	0.2 mg/l	1	"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	0.2	0.2 mg/l	1	"	"	"	"	"	
Total Petroleum Hydrocarbons	0.2	0.2 mg/l	1	"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	0.2	0.2 mg/l	1	"	"	"	"	"	

EPH Target PAH Analytes

Prepared by method SW846 3510C

91-20-3	Naphthalene	2.04	1.00 µg/l	1	"	"	"	"	"
91-57-6	2-Methylnaphthalene	BRL	1.00 µg/l	1	"	"	"	"	"
208-96-8	Acenaphthylene	BRL	1.00 µg/l	1	"	"	"	"	"
83-32-9	Acenaphthene	BRL	1.00 µg/l	1	"	"	"	"	"
86-73-7	Fluorene	BRL	1.00 µg/l	1	"	"	"	"	"
85-01-8	Phenanthrene	BRL	1.00 µg/l	1	"	"	"	"	"
120-12-7	Anthracene	BRL	1.00 µg/l	1	"	"	"	"	"
206-44-0	Fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"
129-00-0	Pyrene	BRL	1.00 µg/l	1	"	"	"	"	"
56-55-3	Benzo (a) anthracene	BRL	1.00 µg/l	1	"	"	"	"	"
218-01-9	Chrysene	1.55	1.00 µg/l	1	"	"	"	"	"
205-99-2	Benzo (b) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"
207-08-9	Benzo (k) fluoranthene	1.29	1.00 µg/l	1	"	"	"	"	"
200-32-8	Benzo (a) pyrene	1.05	0.200 µg/l	1	"	"	"	"	"
193-39-5	Indeno (1,2,3-cd) pyrene	0.753	0.500 µg/l	1	"	"	"	"	"
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	47.8	40-140 %	"	"	"	"	"
84-15-1	Ortho-Terphenyl	57.8	40-140 %	"	"	"	"	"
580-13-2	2-Bromonaphthalene	76.7	40-140 %	"	"	"	"	"
321-60-8	2-Fluorobiphenyl	74.7	40-140 %	"	"	"	"	"

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 10 of 47

Sample IdentificationDCW-6
SA33134-05**Client Project #**

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 12:15

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds**VPH Aliphatic/Aromatic Carbon Ranges**

Prepared by method VPH

C5-C8 Aliphatic Hydrocarbons	0.0934	0.0750 mg/l	1	+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS	
C9-C12 Aliphatic Hydrocarbons	0.212	0.0250 mg/l	1	"	"	"	"	"	
C9-C10 Aromatic Hydrocarbons	0.486	0.0250 mg/l	1	"	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons	0.253	0.0750 mg/l	1	"	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons	0.698	0.0250 mg/l	1	"	"	"	"	"	

VPH Target Analytes

Prepared by method VPH

71-43-2 Benzene	BRL	5.0 µg/l	1	"	"	"	"	"	
100-41-4 Ethylbenzene	19.1	5.0 µg/l	1	"	"	"	"	"	
1634-04-4 Methyl tert-butyl ether	44.7	5.0 µg/l	1	"	"	"	"	"	
91-20-3 Naphthalene	70.7	5.0 µg/l	1	"	"	"	"	"	
108-88-3 Toluene	BRL	5.0 µg/l	1	"	"	"	"	"	
1330-20-7 m,p-Xylene	67.9	10.0 µg/l	1	"	"	"	"	"	
95-47-6 o-Xylene	25.5	5.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

615-59-8 2,5-Dibromotoluene (FID)	124	70-130 %	"	"	"	"	"	"	
615-59-8 2,5-Dibromotoluene (PID)	119	70-130 %	"	"	"	"	"	"	

Extractable Petroleum Hydrocarbons**EPH Aliphatic/Aromatic Ranges**

Prepared by method SW846 3510C

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	0.4	0.2 mg/l	1	"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	0.5	0.2 mg/l	1	"	"	"	"	"	
Total Petroleum Hydrocarbons	0.4	0.2 mg/l	1	"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	0.5	0.2 mg/l	1	"	"	"	"	"	

EPH Target PAH Analytes

Prepared by method SW846 3510C

91-20-3 Naphthalene	32.5	1.00 µg/l	1	"	"	"	"	"	
91-57-6 2-Methylnaphthalene	23.4	1.00 µg/l	1	"	"	"	"	"	
208-96-8 Acenaphthylene	BRL	1.00 µg/l	1	"	"	"	"	"	
83-32-9 Acenaphthene	BRL	1.00 µg/l	1	"	"	"	"	"	
86-73-7 Fluorene	BRL	1.00 µg/l	1	"	"	"	"	"	
85-01-8 Phenanthrene	BRL	1.00 µg/l	1	"	"	"	"	"	
120-12-7 Anthracene	BRL	1.00 µg/l	1	"	"	"	"	"	
206-44-0 Fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	
129-00-0 Pyrene	BRL	1.00 µg/l	1	"	"	"	"	"	
56-55-3 Benzo (a) anthracene	BRL	1.00 µg/l	1	"	"	"	"	"	
218-01-9 Chrysene	BRL	1.00 µg/l	1	"	"	"	"	"	
205-99-2 Benzo (b) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	
7-08-9 Benzo (k) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 11 of 47

Sample Identification

DCW-6

SA33134-05

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 12:15

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsEPH Target PAH Analytes

Prepared by method SW846 3510C

50-32-8	Benzo (a) pyrene	BRL	0.200 µg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
193-39-5	Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	56.1	40-140 %	"	"	"	"	"	"	
84-15-1	Ortho-Terphenyl	71.0	40-140 %	"	"	"	"	"	"	
580-13-2	2-Bromonaphthalene	85.4	40-140 %	"	"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	83.3	40-140 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 12 of 47

Sample Identification

DCW-8

SA33134-06

Client Project

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 12:45

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag
Volatile Organic Compounds										
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>										
				Prepared by method VPH						
C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1		+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS	
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1		"	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
<u>VPH Target Analytes</u>										
				Prepared by method VPH						
71-43-2 Benzene	BRL	5.0 µg/l	1		"	"	"	"	"	
100-41-4 Ethylbenzene	BRL	5.0 µg/l	1		"	"	"	"	"	
1634-04-4 Methyl tert-butyl ether	10.7	5.0 µg/l	1		"	"	"	"	"	
91-20-3 Naphthalene	BRL	5.0 µg/l	1		"	"	"	"	"	
108-88-3 Toluene	BRL	5.0 µg/l	1		"	"	"	"	"	
1330-20-7 m,p-Xylene	BRL	10.0 µg/l	1		"	"	"	"	"	
95-47-6 o-Xylene	BRL	5.0 µg/l	1		"	"	"	"	"	
<u>Surrogate recoveries:</u>										
615-59-8 2,5-Dibromotoluene (FID)	104	70-130 %			"	"	"	"	"	
615-59-8 2,5-Dibromotoluene (PID)	96.4	70-130 %			"	"	"	"	"	
Extractable Petroleum Hydrocarbons										
<u>EPH Aliphatic/Aromatic Ranges</u>										
				Prepared by method SW846 3510C						
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
<u>EPH Target PAH Analytes</u>										
				Prepared by method SW846 3510C						
91-20-3 Naphthalene	BRL	1.00 µg/l	1		"	"	"	"	"	
91-57-6 2-Methylnaphthalene	BRL	1.00 µg/l	1		"	"	"	"	"	
208-96-8 Acenaphthylene	BRL	1.00 µg/l	1		"	"	"	"	"	
83-32-9 Acenaphthene	BRL	1.00 µg/l	1		"	"	"	"	"	
86-73-7 Fluorene	BRL	1.00 µg/l	1		"	"	"	"	"	
85-01-8 Phenanthrene	BRL	1.00 µg/l	1		"	"	"	"	"	
120-12-7 Anthracene	BRL	1.00 µg/l	1		"	"	"	"	"	
206-44-0 Fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	
129-00-0 Pyrene	BRL	1.00 µg/l	1		"	"	"	"	"	
56-55-3 Benzo (a) anthracene	BRL	1.00 µg/l	1		"	"	"	"	"	
218-01-9 Chrysene	BRL	1.00 µg/l	1		"	"	"	"	"	
205-99-2 Benzo (b) fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	
7-08-9 Benzo (k) fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 13 of 47

Sample Identification

DCW-8

SA33134-06

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 12:45

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsPH Target PAH Analytes

Prepared by method SW846 3510C

50-32-8	Benzo (a) pyrene	BRL	0.200 µg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
193-39-5	Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	59.9	40-140 %	"	"	"	"	"	"	
84-15-1	Ortho-Terphenyl	75.7	40-140 %	"	"	"	"	"	"	
580-13-2	2-Bromonaphthalene	68.7	40-140 %	"	"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	68.7	40-140 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 14 of 47

Sample Identification

DCW-9

SA33134-07

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 14:30

Received

26-Aug-05

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>*RDL/Units</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>	<u>Flag</u>
Volatile Organic Compounds										
<u>1</u> <u>VPH Aliphatic/Aromatic Carbon Ranges</u>										
				Prepared by method VPH						
C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1		+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS	
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1		"	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
<u>VPH Target Analytes</u>										
				Prepared by method VPH						
71-43-2 Benzene	BRL	5.0 µg/l	1		"	"	"	"	"	
100-41-4 Ethylbenzene	BRL	5.0 µg/l	1		"	"	"	"	"	
1634-04-4 Methyl tert-butyl ether	BRL	5.0 µg/l	1		"	"	"	"	"	
91-20-3 Naphthalene	BRL	5.0 µg/l	1		"	"	"	"	"	
108-88-3 Toluene	BRL	5.0 µg/l	1		"	"	"	"	"	
1330-20-7 m,p-Xylene	BRL	10.0 µg/l	1		"	"	"	"	"	
95-47-6 o-Xylene	BRL	5.0 µg/l	1		"	"	"	"	"	
<u>Surrogate recoveries:</u>										
615-59-8 2,5-Dibromotoluene (FID)	130	70-130 %			"	"	"	"	"	
615-59-8 2,5-Dibromotoluene (PID)	125	70-130 %			"	"	"	"	"	
Extractable Petroleum Hydrocarbons										
<u>5</u> <u>EPH Aliphatic/Aromatic Ranges</u>										
				Prepared by method SW846 3510C						
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
<u>EPH Target PAH Analytes</u>										
				Prepared by method SW846 3510C						
91-20-3 Naphthalene	BRL	1.00 µg/l	1		"	"	"	"	"	
91-57-6 2-Methylnaphthalene	BRL	1.00 µg/l	1		"	"	"	"	"	
208-96-8 Acenaphthylene	BRL	1.00 µg/l	1		"	"	"	"	"	
83-32-9 Acenaphthene	BRL	1.00 µg/l	1		"	"	"	"	"	
86-73-7 Fluorene	BRL	1.00 µg/l	1		"	"	"	"	"	
85-01-8 Phenanthrene	BRL	1.00 µg/l	1		"	"	"	"	"	
120-12-7 Anthracene	BRL	1.00 µg/l	1		"	"	"	"	"	
206-44-0 Fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	
129-00-0 Pyrene	BRL	1.00 µg/l	1		"	"	"	"	"	
56-55-3 Benzo (a) anthracene	BRL	1.00 µg/l	1		"	"	"	"	"	
218-01-9 Chrysene	BRL	1.00 µg/l	1		"	"	"	"	"	
205-99-2 Benzo (b) fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	
7-08-9 Benzo (k) fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 15 of 47

Sample Identification

DCW-9

SA33134-07

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 14:30

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsEPH Target PAH Analytes

Prepared by method SW846 3510C

50-32-8	Benzo (a) pyrene	BRL	0.200 µg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
193-39-5	Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	53.4	40-140 %		"	"	"	"	"	
84-15-1	Ortho-Terphenyl	54.0	40-140 %		"	"	"	"	"	
580-13-2	2-Bromonaphthalene	63.9	40-140 %		"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	61.5	40-140 %		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 16 of 47

Sample IdentificationDCW-10
SA33134-08Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 13:45

Received

26-Aug-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Volatile Organic Compounds										
<u>YPH Aliphatic/Aromatic Carbon Ranges</u>			Prepared by method VPH							
C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1		+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS	
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1		"	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
<u>YPH Target Analytes</u>			Prepared by method VPH							
71-43-2 Benzene	BRL	5.0 µg/l	1		"	"	"	"	"	
100-41-4 Ethylbenzene	BRL	5.0 µg/l	1		"	"	"	"	"	
1634-04-4 Methyl tert-butyl ether	BRL	5.0 µg/l	1		"	"	"	"	"	
91-20-3 Naphthalene	BRL	5.0 µg/l	1		"	"	"	"	"	
108-88-3 Toluene	BRL	5.0 µg/l	1		"	"	"	"	"	
1330-20-7 m,p-Xylene	BRL	10.0 µg/l	1		"	"	"	"	"	
95-47-6 o-Xylene	BRL	5.0 µg/l	1		"	"	"	"	"	
<u>Surrogate recoveries:</u>										
615-59-8 2,5-Dibromotoluene (FID)	122	70-130 %			"	"	"	"	"	
615-59-8 2,5-Dibromotoluene (PID)	115	70-130 %			"	"	"	"	"	
Extractable Petroleum Hydrocarbons										
<u>EPH Aliphatic/Aromatic Ranges</u>			Prepared by method SW846 3510C							
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
<u>EPH Target PAH Analytes</u>			Prepared by method SW846 3510C							
91-20-3 Naphthalene	BRL	1.00 µg/l	1		"	"	"	"	"	
91-57-6 2-Methylnaphthalene	BRL	1.00 µg/l	1		"	"	"	"	"	
208-96-8 Acenaphthylene	BRL	1.00 µg/l	1		"	"	"	"	"	
83-32-9 Acenaphthene	BRL	1.00 µg/l	1		"	"	"	"	"	
86-73-7 Fluorene	BRL	1.00 µg/l	1		"	"	"	"	"	
85-01-8 Phenanthrene	BRL	1.00 µg/l	1		"	"	"	"	"	
120-12-7 Anthracene	BRL	1.00 µg/l	1		"	"	"	"	"	
206-44-0 Fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	
129-00-0 Pyrene	BRL	1.00 µg/l	1		"	"	"	"	"	
56-55-3 Benzo (a) anthracene	BRL	1.00 µg/l	1		"	"	"	"	"	
218-01-9 Chrysene	BRL	1.00 µg/l	1		"	"	"	"	"	
205-99-2 Benzo (b) fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	
17-08-9 Benzo (k) fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 17 of 47

Sample Identification

DCW-10

SA33134-08

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 13:45

Received

26-Aug-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Extractable Petroleum Hydrocarbons										
<u>PH Target PAH Analytes</u>										
Prepared by method SW846 3510C										
50-32-8	Benzo (a) pyrene	BRL	0.200 µg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
193-39-5	Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"	
<u>Surrogate recoveries:</u>										
3386-33-2	1-Chlorooctadecane	52.5	40-140 %		"	"	"	"	"	
84-15-1	Ortho-Terphenyl	55.3	40-140 %		"	"	"	"	"	
580-13-2	2-Bromonaphthalene	67.2	40-140 %		"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	64.6	40-140 %		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 18 of 47

Sample Identification

EOW-2

SA33134-09

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 10:05

Received

26-Aug-05

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>*RDL/Units</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>	<u>Flag</u>
Volatile Organic Compounds										
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>										
				Prepared by method VPH						
C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1		+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS	
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1		"	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1		"	"	"	"	"	
<u>VPH Target Analytes</u>										
				Prepared by method VPH						
71-43-2 Benzene	BRL	5.0 µg/l	1		"	"	"	"	"	
100-41-4 Ethylbenzene	BRL	5.0 µg/l	1		"	"	"	"	"	
1634-04-4 Methyl tert-butyl ether	17.7	5.0 µg/l	1		"	"	"	"	"	
91-20-3 Naphthalene	BRL	5.0 µg/l	1		"	"	"	"	"	
108-88-3 Toluene	BRL	5.0 µg/l	1		"	"	"	"	"	
1330-20-7 m,p-Xylene	BRL	10.0 µg/l	1		"	"	"	"	"	
95-47-6 o-Xylene	BRL	5.0 µg/l	1		"	"	"	"	"	
<u>Surrogate recoveries:</u>										
615-59-8 2,5-Dibromotoluene (FID)	120	70-130 %			"	"	"	"	"	
615-59-8 2,5-Dibromotoluene (PID)	105	70-130 %			"	"	"	"	"	
Extractable Petroleum Hydrocarbons										
<u>EPH Aliphatic/Aromatic Ranges</u>										
				Prepared by method SW846 3510C						
C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1		+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
C19-C36 Aliphatic Hydrocarbons	0.2	0.2 mg/l	1		"	"	"	"	"	
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1		"	"	"	"	"	
Total Petroleum Hydrocarbons	0.2	0.2 mg/l	1		"	"	"	"	"	
Unadjusted Total Petroleum Hydrocarbons	0.2	0.2 mg/l	1		"	"	"	"	"	
<u>EPH Target PAH Analytes</u>										
				Prepared by method SW846 3510C						
91-20-3 Naphthalene	BRL	1.00 µg/l	1		"	"	"	"	"	
91-57-6 2-Methylnaphthalene	BRL	1.00 µg/l	1		"	"	"	"	"	
208-96-8 Acenaphthylene	BRL	1.00 µg/l	1		"	"	"	"	"	
83-32-9 Acenaphthene	BRL	1.00 µg/l	1		"	"	"	"	"	
86-73-7 Fluorene	BRL	1.00 µg/l	1		"	"	"	"	"	
85-01-8 Phenanthrene	BRL	1.00 µg/l	1		"	"	"	"	"	
120-12-7 Anthracene	BRL	1.00 µg/l	1		"	"	"	"	"	
206-44-0 Fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	
129-00-0 Pyrene	BRL	1.00 µg/l	1		"	"	"	"	"	
56-55-3 Benzo (a) anthracene	BRL	1.00 µg/l	1		"	"	"	"	"	
218-01-9 Chrysene	BRL	1.00 µg/l	1		"	"	"	"	"	
205-99-2 Benzo (b) fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	
17-08-9 Benzo (k) fluoranthene	BRL	1.00 µg/l	1		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 19 of 47

Sample Identification

EOW-2

SA33134-09

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 10:05

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsEPH Target PAH Analytes

Prepared by method SW846 3510C

50-32-8	Benzo (a) pyrene	0.271	0.200 µg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
193-39-5	Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	50.9	40-140 %		"	"	"	"	"	
84-15-1	Ortho-Terphenyl	60.1	40-140 %		"	"	"	"	"	
580-13-2	2-Bromonaphthalene	71.9	40-140 %		"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	71.9	40-140 %		"	"	"	"	"	

Subcontracted Analyses

MBAS	0.22	0.05 mg/l	SM5540 E/425.1	26-Aug-05	[none]	CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 20 of 47

Sample Identification

ERW-1

SA33134-10

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 12:40

Received

26-Aug-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>

Subcontracted Analyses

MBAS

0.18

0.05 mg/l

SM5540
E/425.1

26-Aug-05 [none] CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 21 of 47

Sample Identification

ERW-2

SA33134-11

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 13:45

Received

26-Aug-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>

Subcontracted Analyses

MBAS

0.14

0.05 mg/l

SM5540
E/425.1

26-Aug-05 [none] CT007

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 22 of 47

Sample Identification

ERW-4

SA33134-12

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 12:30

Received

26-Aug-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Subcontracted Analyses										
	MBAS	0.10	0.05 mg/l		SM5540 E/425.1		26-Aug-05	[none]	CT007	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 23 of 47

Sample Identification

BP-2
SA33134-13

Client Project

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 15:05

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag
Volatile Organic Compounds										
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>			Prepared by method VPH							
	C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1	+MADEP 5/2004 Rev. 1.1	05-Sep-05	06-Sep-05	5090250	SS	
	C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"	
	C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"	
	Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l	1	"	"	"	"	"	
	Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l	1	"	"	"	"	"	
<u>VPH Target Analytes</u>			Prepared by method VPH							
71-43-2	Benzene	BRL	5.0 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	5.0 µg/l	1	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	12.3	5.0 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	5.0 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	5.0 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	10.0 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	5.0 µg/l	1	"	"	"	"	"	
<u>Surrogate recoveries:</u>										
615-59-8	2,5-Dibromotoluene (FID)	111	70-130 %		"	"	"	"	"	
615-59-8	2,5-Dibromotoluene (PID)	107	70-130 %		"	"	"	"	"	
Extractable Petroleum Hydrocarbons										
<u>EPH Aliphatic/Aromatic Ranges</u>			Prepared by method SW846 3510C							
	C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
	C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
	C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
	Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
	Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
	Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l	1	"	"	"	"	"	
<u>EPH Target PAH Analytes</u>			Prepared by method SW846 3510C							
91-20-3	Naphthalene	BRL	1.00 µg/l	1	"	"	"	"	"	
91-57-6	2-Methylnaphthalene	BRL	1.00 µg/l	1	"	"	"	"	"	
208-96-8	Acenaphthylene	BRL	1.00 µg/l	1	"	"	"	"	"	
83-32-9	Acenaphthene	BRL	1.00 µg/l	1	"	"	"	"	"	
86-73-7	Fluorene	BRL	1.00 µg/l	1	"	"	"	"	"	
85-01-8	Phenanthrene	BRL	1.00 µg/l	1	"	"	"	"	"	
120-12-7	Anthracene	BRL	1.00 µg/l	1	"	"	"	"	"	
206-44-0	Fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	
129-00-0	Pyrene	BRL	1.00 µg/l	1	"	"	"	"	"	
56-55-3	Benzo (a) anthracene	BRL	1.00 µg/l	1	"	"	"	"	"	
218-01-9	Chrysene	BRL	1.00 µg/l	1	"	"	"	"	"	
205-99-2	Benzo (b) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	
97-08-9	Benzo (k) fluoranthene	BRL	1.00 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 24 of 47

Sample Identification

BP-2

SA33134-13

Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

24-Aug-05 15:05

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Extractable Petroleum HydrocarbonsEPH Target PAH Analytes

Prepared by method SW846 3510C

50-32-8	Benzo (a) pyrene	BRL	0.200 µg/l	1	+MADEP 5/2004 R	02-Sep-05	03-Sep-05	5090102	JD	
193-39-5	Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l	1	"	"	"	"	"	
53-70-3	Dibenzo (a,h) anthracene	BRL	0.500 µg/l	1	"	"	"	"	"	
191-24-2	Benzo (g,h,i) perylene	BRL	1.00 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

3386-33-2	1-Chlorooctadecane	57.7	40-140 %		"	"	"	"	"	
84-15-1	Ortho-Terphenyl	60.6	40-140 %		"	"	"	"	"	
580-13-2	2-Bromonaphthalene	73.3	40-140 %		"	"	"	"	"	
321-60-8	2-Fluorobiphenyl	71.8	40-140 %		"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 25 of 47

Sample Identification131 Main St
SA33134-14Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 15:12

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds524.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	01-Sep-05	01-Sep-05	5090057	RLJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
124-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
106-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	3.4	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 26 of 47

Sample Identification131 Main St
SA33134-14Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 15:12

Received

26-Aug-05

<i>CAS No.</i>	<i>Analyte(s)</i>	<i>Result</i>	<i>*RDL/Units</i>	<i>Dilution</i>	<i>Method Ref.</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Batch</i>	<i>Analyst</i>	<i>Flag</i>
Volatile Organic Compounds										
524.2 Purgeable Organic Compounds										
				Prepared by method SW846 5030 Water MS						
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	01-Sep-05	01-Sep-05	5090057	RLJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	2.0	0.5 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
994-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	
<i>Surrogate recoveries:</i>										
460-00-4	4-Bromofluorobenzene	96.0	70-130 %		"	"	"	"	"	
2037-26-5	Toluene-d8	102	70-130 %		"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	104	70-130 %		"	"	"	"	"	
1868-53-7	Dibromofluoromethane	101	70-130 %		"	"	"	"	"	
524.2 Purgeable Organic Compounds										
				Prepared by method SW846 5030 Water MS				SA33134-14RE1		
67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	08-Sep-05	08-Sep-05	5090499	RLJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 27 of 47

Sample Identification

131 Main St
SA33134-14

Client Project

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 15:12

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag
Volatile Organic Compounds										
24.2 Purgeable Organic Compounds										
				Prepared by method SW846 5030 Water MS			SA33134-14RE1			
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	EPA 524.2	08-Sep-05	08-Sep-05	5090499	RLJ	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
124-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
106-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon 12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
12-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	3.1	0.5 µg/l	1	"	"	"	"	"	VOC11
108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	2.0	0.5 µg/l	1	"	"	"	"	"	VOC11
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 28 of 47

Sample Identification131 Main St
SA33134-14Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 15:12

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds**524.2 Purgeable Organic Compounds**

Prepared by method SW846 5030 Water MS

SA33134-14RE1

79-01-6	Trichloroethene	BRL	0.5 µg/l	1	EPA 524.2	08-Sep-05	08-Sep-05	5090499	RLJ	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
109-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
994-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	95.6	70-130 %	"	"	"	"	"	"	
2037-26-5	Toluene-d8	102	70-130 %	"	"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	99.8	70-130 %	"	"	"	"	"	"	
1868-53-7	Dibromofluoromethane	107	70-130 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 29 of 47

Sample Identification132 Main St
SA33134-15Client Project #

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 14:44

Received

26-Aug-05

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>*RDL/Units</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>	<u>Flag</u>
Volatile Organic Compounds										
<u>24.2 Purgeable Organic Compounds</u>										
Prepared by method SW846 5030 Water MS										
67-64-1	Acetone	BRL	10.0 µg/l	1	EPA 524.2	01-Sep-05	01-Sep-05	5090057	RLJ	
107-13-1	Acrylonitrile	BRL	1.0 µg/l	1	"	"	"	"	"	
71-43-2	Benzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-86-1	Bromobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
74-97-5	Bromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-27-4	Bromodichloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-25-2	Bromoform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-83-9	Bromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
78-93-3	2-Butanone (MEK)	BRL	10.0 µg/l	1	"	"	"	"	"	
104-51-8	n-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
135-98-8	sec-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
98-06-6	tert-Butylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-15-0	Carbon disulfide	BRL	0.5 µg/l	1	"	"	"	"	"	
56-23-5	Carbon tetrachloride	BRL	0.5 µg/l	1	"	"	"	"	"	
108-90-7	Chlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-00-3	Chloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
67-66-3	Chloroform	BRL	0.5 µg/l	1	"	"	"	"	"	
74-87-3	Chloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-49-8	2-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-43-4	4-Chlorotoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
96-12-8	1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
124-48-1	Dibromochloromethane	BRL	0.5 µg/l	1	"	"	"	"	"	
106-93-4	1,2-Dibromoethane (EDB)	BRL	0.5 µg/l	1	"	"	"	"	"	
74-95-3	Dibromomethane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-50-1	1,2-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
541-73-1	1,3-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
106-46-7	1,4-Dichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-71-8	Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l	1	"	"	"	"	"	
75-34-3	1,1-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
107-06-2	1,2-Dichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
75-35-4	1,1-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-59-2	cis-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
156-60-5	trans-1,2-Dichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
78-87-5	1,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
142-28-9	1,3-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
594-20-7	2,2-Dichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
563-58-6	1,1-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-01-5	cis-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
10061-02-6	trans-1,3-Dichloropropene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-68-3	Hexachlorobutadiene	BRL	0.5 µg/l	1	"	"	"	"	"	
591-78-6	2-Hexanone (MBK)	BRL	10.0 µg/l	1	"	"	"	"	"	
98-82-8	Isopropylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-87-6	4-Isopropyltoluene	BRL	0.5 µg/l	1	"	"	"	"	"	
134-04-4	Methyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 30 of 47

Sample Identification

132 Main St
SA33134-15

Client Project

91-204082

Matrix

Ground Water

Collection Date/Time

25-Aug-05 14:44

Received

26-Aug-05

CAS No.	Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag

Volatile Organic Compounds

524.2 Purgeable Organic Compounds

Prepared by method SW846 5030 Water MS

108-10-1	4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l	1	EPA 524.2	01-Sep-05	01-Sep-05	5090057	RLJ	
75-09-2	Methylene chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
91-20-3	Naphthalene	BRL	0.5 µg/l	1	"	"	"	"	"	
103-65-1	n-Propylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
100-42-5	Styrene	BRL	0.5 µg/l	1	"	"	"	"	"	
630-20-6	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-34-5	1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
127-18-4	Tetrachloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-88-3	Toluene	BRL	0.5 µg/l	1	"	"	"	"	"	
87-61-6	1,2,3-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
120-82-1	1,2,4-Trichlorobenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
71-55-6	1,1,1-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-00-5	1,1,2-Trichloroethane	BRL	0.5 µg/l	1	"	"	"	"	"	
79-01-6	Trichloroethene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-69-4	Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l	1	"	"	"	"	"	
96-18-4	1,2,3-Trichloropropane	BRL	0.5 µg/l	1	"	"	"	"	"	
95-63-6	1,2,4-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
108-67-8	1,3,5-Trimethylbenzene	BRL	0.5 µg/l	1	"	"	"	"	"	
75-01-4	Vinyl chloride	BRL	0.5 µg/l	1	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
95-47-6	o-Xylene	BRL	0.5 µg/l	1	"	"	"	"	"	
99-99-9	Tetrahydrofuran	BRL	10.0 µg/l	1	"	"	"	"	"	
99-05-8	Tert-amyl methyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
637-92-3	Ethyl tert-butyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
108-20-3	Di-isopropyl ether	BRL	0.5 µg/l	1	"	"	"	"	"	
75-65-0	Tert-Butanol / butyl alcohol	BRL	10.0 µg/l	1	"	"	"	"	"	

Surrogate recoveries:

460-00-4	4-Bromofluorobenzene	95.6	70-130 %	"	"	"	"	"	"	
2037-26-5	Toluene-d8	103	70-130 %	"	"	"	"	"	"	
17060-07-0	1,2-Dichloroethane-d4	104	70-130 %	"	"	"	"	"	"	
1868-53-7	Dibromofluoromethane	102	70-130 %	"	"	"	"	"	"	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 31 of 47

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090057 - SW846 5030 Water MS									
Blank (5090057-BLK1)			Prepared & Analyzed: 01-Sep-05						
Acetone	BRL	10.0 µg/l							
Acrylonitrile	BRL	1.0 µg/l							
Benzene	BRL	0.5 µg/l							
Bromobenzene	BRL	0.5 µg/l							
Bromochloromethane	BRL	0.5 µg/l							
Bromodichloromethane	BRL	0.5 µg/l							
Bromoform	BRL	0.5 µg/l							
Bromomethane	BRL	0.5 µg/l							
2-Butanone (MEK)	BRL	10.0 µg/l							
n-Butylbenzene	BRL	0.5 µg/l							
sec-Butylbenzene	BRL	0.5 µg/l							
tert-Butylbenzene	BRL	0.5 µg/l							
Carbon disulfide	BRL	0.5 µg/l							
Carbon tetrachloride	BRL	0.5 µg/l							
Chlorobenzene	BRL	0.5 µg/l							
Chloroethane	BRL	0.5 µg/l							
Chloroform	BRL	0.5 µg/l							
Chloromethane	BRL	0.5 µg/l							
2-Chlorotoluene	BRL	0.5 µg/l							
4-Chlorotoluene	BRL	0.5 µg/l							
1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l							
Dibromochloromethane	BRL	0.5 µg/l							
1,2-Dibromoethane (EDB)	BRL	0.5 µg/l							
Dibromomethane	BRL	0.5 µg/l							
1,2-Dichlorobenzene	BRL	0.5 µg/l							
1,3-Dichlorobenzene	BRL	0.5 µg/l							
1,4-Dichlorobenzene	BRL	0.5 µg/l							
Dichlorodifluoromethane (Freon12)	BRL	0.5 µg/l							
1,1-Dichloroethane	BRL	0.5 µg/l							
1,2-Dichloroethane	BRL	0.5 µg/l							
1,1-Dichloroethene	BRL	0.5 µg/l							
cis-1,2-Dichloroethene	BRL	0.5 µg/l							
trans-1,2-Dichloroethene	BRL	0.5 µg/l							
1,2-Dichloropropane	BRL	0.5 µg/l							
1,3-Dichloropropane	BRL	0.5 µg/l							
2,2-Dichloropropane	BRL	0.5 µg/l							
1,1-Dichloropropene	BRL	0.5 µg/l							
cis-1,3-Dichloropropene	BRL	0.5 µg/l							
trans-1,3-Dichloropropene	BRL	0.5 µg/l							
Ethylbenzene	BRL	0.5 µg/l							
Hexachlorobutadiene	BRL	0.5 µg/l							
2-Hexanone (MBK)	BRL	10.0 µg/l							
Isopropylbenzene	BRL	0.5 µg/l							
4-Isopropyltoluene	BRL	0.5 µg/l							
Methyl tert-butyl ether	BRL	0.5 µg/l							
4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l							
Methylene chloride	BRL	0.5 µg/l							
Naphthalene	BRL	0.5 µg/l							
n-Propylbenzene	BRL	0.5 µg/l							
Styrene	BRL	0.5 µg/l							
1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l							
1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l							
Tetrachloroethene	BRL	0.5 µg/l							
Toluene	BRL	0.5 µg/l							

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090057 - SW846 5030 Water MS									
Blank (5090057-BLK1)			Prepared & Analyzed: 01-Sep-05						
1,2,3-Trichlorobenzene	BRL	0.5 µg/l							
1,2,4-Trichlorobenzene	BRL	0.5 µg/l							
1,1,1-Trichloroethane	BRL	0.5 µg/l							
1,1,2-Trichloroethane	BRL	0.5 µg/l							
Trichloroethene	BRL	0.5 µg/l							
Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l							
1,2,3-Trichloropropane	BRL	0.5 µg/l							
1,2,4-Trimethylbenzene	BRL	0.5 µg/l							
1,3,5-Trimethylbenzene	BRL	0.5 µg/l							
Vinyl chloride	BRL	0.5 µg/l							
m,p-Xylene	BRL	0.5 µg/l							
o-Xylene	BRL	0.5 µg/l							
Tetrahydrofuran	BRL	10.0 µg/l							
Tert-amyl methyl ether	BRL	0.5 µg/l							
Ethyl tert-butyl ether	BRL	0.5 µg/l							
Di-isopropyl ether	BRL	0.5 µg/l							
Tert-Butanol / butyl alcohol	BRL	10.0 µg/l							
Surrogate: 4-Bromofluorobenzene	48.2	µg/l	50.0		96.4	70-130			
Surrogate: Toluene-d8	50.7	µg/l	50.0		101	70-130			
Surrogate: 1,2-Dichloroethane-d4	51.7	µg/l	50.0		103	70-130			
Surrogate: Dibromofluoromethane	50.1	µg/l	50.0		100	70-130			
LCS (5090057-BS1)			Prepared & Analyzed: 01-Sep-05						
Acetone	14.1	µg/l	20.0		70.5	70-130			
Acrylonitrile	21.8	µg/l	20.0		109	70-130			
Benzene	20.4	µg/l	20.0		102	80-120			
Bromobenzene	21.5	µg/l	20.0		108	80-120			
Bromochloromethane	19.2	µg/l	20.0		96.0	80-120			
Bromodichloromethane	21.1	µg/l	20.0		106	80-120			
Bromoform	18.7	µg/l	20.0		93.5	80-120			
Bromomethane	20.8	µg/l	20.0		104	80-120			
2-Butanone (MEK)	15.8	µg/l	20.0		79.0	70-130			
n-Butylbenzene	16.9	µg/l	20.0		84.5	80-120			
sec-Butylbenzene	21.3	µg/l	20.0		106	80-120			
tert-Butylbenzene	21.8	µg/l	20.0		109	80-120			
Carbon disulfide	19.9	µg/l	20.0		99.5	70-130			
Carbon tetrachloride	20.9	µg/l	20.0		104	80-120			
Chlorobenzene	21.0	µg/l	20.0		105	80-120			
Chloroethane	21.5	µg/l	20.0		108	80-120			
Chloroform	20.9	µg/l	20.0		104	80-120			
Chloromethane	23.2	µg/l	20.0		116	80-120			
2-Chlorotoluene	21.9	µg/l	20.0		110	80-120			
4-Chlorotoluene	21.6	µg/l	20.0		108	80-120			
1,2-Dibromo-3-chloropropane	17.8	µg/l	20.0		89.0	80-120			
Dibromochloromethane	22.6	µg/l	20.0		113	80-120			
1,2-Dibromoethane (EDB)	20.7	µg/l	20.0		104	80-120			
Dibromomethane	20.2	µg/l	20.0		101	80-120			
1,2-Dichlorobenzene	19.6	µg/l	20.0		98.0	80-120			
1,3-Dichlorobenzene	22.8	µg/l	20.0		114	80-120			
1,4-Dichlorobenzene	19.6	µg/l	20.0		98.0	80-120			
Dichlorodifluoromethane (Freon12)	23.6	µg/l	20.0		118	80-120			
1,1-Dichloroethane	20.6	µg/l	20.0		103	80-120			
1,2-Dichloroethane	19.7	µg/l	20.0		98.5	80-120			
1,1-Dichloroethene	20.5	µg/l	20.0		102	80-120			
trans-1,2-Dichloroethene	20.2	µg/l	20.0		101	80-120			

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* Reportable Detection Limit

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090057 - SW846 5030 Water MS									
LCS (5090057-BS1)			Prepared & Analyzed: 01-Sep-05						
trans-1,2-Dichloroethene	20.8	µg/l	20.0		104	80-120			
1,2-Dichloropropane	19.8	µg/l	20.0		99.0	80-120			
1,3-Dichloropropane	20.7	µg/l	20.0		104	80-120			
2,2-Dichloropropane	17.8	µg/l	20.0		89.0	80-120			
1,1-Dichloropropene	18.9	µg/l	20.0		94.5	80-120			
cis-1,3-Dichloropropene	19.0	µg/l	20.0		95.0	80-120			
trans-1,3-Dichloropropene	19.2	µg/l	20.0		96.0	80-120			
Ethylbenzene	20.6	µg/l	20.0		103	80-120			
Hexachlorobutadiene	18.0	µg/l	20.0		90.0	80-120			
2-Hexanone (MBK)	14.6	µg/l	20.0		73.0	70-130			
Isopropylbenzene	20.4	µg/l	20.0		102	80-120			
4-Isopropyltoluene	19.7	µg/l	20.0		98.5	80-120			
Methyl tert-butyl ether	20.5	µg/l	20.0		102	80-120			
4-Methyl-2-pentanone (MIBK)	16.8	µg/l	20.0		84.0	70-130			
Methylene chloride	22.3	µg/l	20.0		112	80-120			
Naphthalene	18.7	µg/l	20.0		93.5	80-120			
n-Propylbenzene	21.2	µg/l	20.0		106	80-120			
Styrene	20.5	µg/l	20.0		102	80-120			
1,1,1,2-Tetrachloroethane	21.5	µg/l	20.0		108	80-120			
1,1,2,2-Tetrachloroethane	22.4	µg/l	20.0		112	80-120			
Tetrachloroethene	20.1	µg/l	20.0		100	80-120			
Toluene	19.3	µg/l	20.0		96.5	80-120			
1,2,3-Trichlorobenzene	19.3	µg/l	20.0		96.5	80-120			
1,2,4-Trichlorobenzene	18.7	µg/l	20.0		93.5	80-120			
1,1,1-Trichloroethane	19.7	µg/l	20.0		98.5	80-120			
1,1,2-Trichloroethane	21.0	µg/l	20.0		105	80-120			
Trichloroethene	19.3	µg/l	20.0		96.5	80-120			
Trichlorofluoromethane (Freon 11)	20.9	µg/l	20.0		104	80-120			
1,2,3-Trichloropropane	21.6	µg/l	20.0		108	80-120			
1,2,4-Trimethylbenzene	21.3	µg/l	20.0		106	80-120			
1,3,5-Trimethylbenzene	21.0	µg/l	20.0		105	80-120			
Vinyl chloride	23.5	µg/l	20.0		118	80-120			
m,p-Xylene	43.1	µg/l	40.0		108	80-120			
o-Xylene	22.8	µg/l	20.0		114	80-120			
Tetrahydrofuran	19.9	µg/l	20.0		99.5	70-130			
Tert-amyl methyl ether	22.3	µg/l	20.0		112	70-130			
Ethyl tert-butyl ether	19.6	µg/l	20.0		98.0	70-130			
Di-isopropyl ether	20.2	µg/l	20.0		101	70-130			
Tert-Butanol / butyl alcohol	192	µg/l	200		96.0	70-130			
Surrogate: 4-Bromofluorobenzene	53.1	µg/l	50.0		106	70-130			
Surrogate: Toluene-d8	51.2	µg/l	50.0		102	70-130			
Surrogate: 1,2-Dichloroethane-d4	49.8	µg/l	50.0		99.6	70-130			
Surrogate: Dibromofluoromethane	49.5	µg/l	50.0		99.0	70-130			
Matrix Spike (5090057-MS1)			Source: SA33195-07		Prepared & Analyzed: 01-Sep-05				
Benzene	16.5	µg/l	20.0	BRL	82.5	80-120			
Chlorobenzene	18.6	µg/l	20.0	BRL	93.0	80-120			
1,1-Dichloroethene	15.6	µg/l	20.0	BRL	78.0	80-120			QM-07
Toluene	16.7	µg/l	20.0	BRL	83.5	80-120			
Trichloroethene	16.4	µg/l	20.0	BRL	82.0	80-120			
Surrogate: 4-Bromofluorobenzene	48.2	µg/l	50.0		96.4	70-130			
Surrogate: Toluene-d8	50.2	µg/l	50.0		100	70-130			
Surrogate: 1,2-Dichloroethane-d4	51.1	µg/l	50.0		102	70-130			
Surrogate: Dibromofluoromethane	49.2	µg/l	50.0		98.4	70-130			

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* Reportable Detection Limit

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090057 - SW846 5030 Water MS									
Matrix Spike Dup (5090057-MSD1)		Source: SA33195-07		Prepared & Analyzed: 01-Sep-05					
Benzene	16.6	µg/l	20.0	BRL	83.0	80-120	0.604	20	QM-07
Chlorobenzene	19.0	µg/l	20.0	BRL	95.0	80-120	2.13	20	
1,1-Dichloroethene	15.4	µg/l	20.0	BRL	77.0	80-120	1.29	20	
Toluene	17.0	µg/l	20.0	BRL	85.0	80-120	1.78	20	
Trichloroethene	16.6	µg/l	20.0	BRL	83.0	80-120	1.21	20	
Surrogate: 4-Bromofluorobenzene	48.4	µg/l	50.0		96.8	70-130			
Surrogate: Toluene-d8	50.0	µg/l	50.0		100	70-130			
Surrogate: 1,2-Dichloroethane-d4	51.1	µg/l	50.0		102	70-130			
Surrogate: Dibromofluoromethane	49.4	µg/l	50.0		98.8	70-130			
Batch 5090250 - VPH									
Blank (5090250-BLK1)		Prepared: 05-Sep-05 Analyzed: 06-Sep-05							
C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l							
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l							
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l							
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l							
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l							
Benzene	BRL	5.0 µg/l							
Ethylbenzene	BRL	5.0 µg/l							
Methyl tert-butyl ether	BRL	5.0 µg/l							
Naphthalene	BRL	5.0 µg/l							
Toluene	BRL	5.0 µg/l							
m,p-Xylene	BRL	10.0 µg/l							
o-Xylene	BRL	5.0 µg/l							
Surrogate: 2,5-Dibromotoluene (FID)	53.0	µg/l	50.0		106	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	48.6	µg/l	50.0		97.2	70-130			
LCS (5090250-BS1)		Prepared & Analyzed: 05-Sep-05							
C5-C8 Aliphatic Hydrocarbons	126	mg/l	140		90.0	70-130			
C9-C12 Aliphatic Hydrocarbons	57.0	mg/l	55.0		104	70-130			
C9-C10 Aromatic Hydrocarbons	38.0	mg/l	40.0		95.0	70-130			
Unadjusted C5-C8 Aliphatic Hydrocarbons	261	mg/l	280		93.2	70-130			
Unadjusted C9-C12 Aliphatic Hydrocarbons	95.0	mg/l	85.0		112	70-130			
Benzene	19.3	µg/l	20.0		96.5	70-130			
Ethylbenzene	18.7	µg/l	20.0		93.5	70-130			
Methyl tert-butyl ether	18.9	µg/l	20.0		94.5	70-130			
Naphthalene	19.6	µg/l	20.0		98.0	70-130			
Toluene	19.7	µg/l	20.0		98.5	70-130			
m,p-Xylene	37.9	µg/l	40.0		94.8	70-130			
o-Xylene	19.8	µg/l	20.0		99.0	70-130			
2-Methylpentane	20.3	µg/l	20.0		102	70-130			
n-Nonane	20.2	µg/l	20.0		101	70-130			
n-Pentane	21.6	µg/l	20.0		108	70-130			
1,2,4-Trimethylbenzene	20.1	µg/l	20.0		100	70-130			
2,2,4-Trimethylpentane	22.0	µg/l	20.0		110	70-130			
n-Butylcyclohexane	18.9	µg/l	20.0		94.5	70-130			
n-Decane	16.3	µg/l	20.0		81.5	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	67.5	µg/l	50.0		135	70-130			S-GC
Surrogate: 2,5-Dibromotoluene (PID)	63.0	µg/l	50.0		126	70-130			
LCS Dup (5090250-BSD1)		Prepared & Analyzed: 05-Sep-05							
C5-C8 Aliphatic Hydrocarbons	116	mg/l	140		82.9	70-130	8.21	25	

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* Reportable Detection Limit

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Page 35 of 47

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090250 - VPH									
LCS Dup (5090250-BSD1)									
				Prepared & Analyzed: 05-Sep-05					
C9-C12 Aliphatic Hydrocarbons	59.2	mg/l	55.0		108	70-130	3.77	25	
C9-C10 Aromatic Hydrocarbons	32.1	mg/l	40.0		80.2	70-130	16.9	25	
Unadjusted C5-C8 Aliphatic Hydrocarbons	240	mg/l	280		85.7	70-130	8.38	25	
Unadjusted C9-C12 Aliphatic Hydrocarbons	91.3	mg/l	85.0		107	70-130	4.57	25	
Benzene	17.8	µg/l	20.0		89.0	70-130	8.09	25	
Ethylbenzene	17.1	µg/l	20.0		85.5	70-130	8.94	25	
Methyl tert-butyl ether	19.2	µg/l	20.0		96.0	70-130	1.57	25	
Naphthalene	18.2	µg/l	20.0		91.0	70-130	7.41	25	
Toluene	17.9	µg/l	20.0		89.5	70-130	9.57	25	
m,p-Xylene	34.6	µg/l	40.0		86.5	70-130	9.16	25	
o-Xylene	18.0	µg/l	20.0		90.0	70-130	9.52	25	
2-Methylpentane	17.1	µg/l	20.0		85.5	70-130	17.6	25	
n-Nonane	17.4	µg/l	20.0		87.0	70-130	14.9	25	
n-Pentane	17.8	µg/l	20.0		89.0	70-130	19.3	25	
1,2,4-Trimethylbenzene	18.6	µg/l	20.0		93.0	70-130	7.25	25	
2,2,4-Trimethylpentane	18.2	µg/l	20.0		91.0	70-130	18.9	25	
n-Butylcyclohexane	17.4	µg/l	20.0		87.0	70-130	8.26	25	
n-Decane	17.1	µg/l	20.0		85.5	70-130	4.79	25	
Surrogate: 2,5-Dibromotoluene (FID)	52.0	µg/l	50.0		104	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	47.2	µg/l	50.0		94.4	70-130			
Duplicate (5090250-DUP1)									
				Source: SA33134-07	Prepared: 05-Sep-05 Analyzed: 06-Sep-05				
C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l		BRL				50	
C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l		BRL				50	
C9-C10 Aromatic Hydrocarbons	BRL	0.0250 mg/l		BRL				50	
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.0750 mg/l		BRL				50	
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.0250 mg/l		BRL				50	
Benzene	BRL	5.0 µg/l		BRL				50	
Ethylbenzene	BRL	5.0 µg/l		BRL				50	
Methyl tert-butyl ether	BRL	5.0 µg/l		BRL				50	
Naphthalene	BRL	5.0 µg/l		BRL				50	
Toluene	BRL	5.0 µg/l		BRL				50	
m,p-Xylene	BRL	10.0 µg/l		BRL				50	
o-Xylene	BRL	5.0 µg/l		BRL				50	
Surrogate: 2,5-Dibromotoluene (FID)	50.3	µg/l	50.0		101	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	44.9	µg/l	50.0		89.8	70-130			
Matrix Spike (5090250-MS1)									
				Source: SA33134-07	Prepared: 05-Sep-05 Analyzed: 06-Sep-05				
Benzene	19.4	µg/l	20.0	BRL	97.0	70-130			
Ethylbenzene	19.0	µg/l	20.0	BRL	95.0	70-130			
Methyl tert-butyl ether	20.4	µg/l	20.0	BRL	102	70-130			
Naphthalene	18.4	µg/l	20.0	BRL	92.0	70-130			
Toluene	19.3	µg/l	20.0	BRL	96.5	70-130			
m,p-Xylene	38.8	µg/l	40.0	BRL	97.0	70-130			
o-Xylene	19.7	µg/l	20.0	BRL	98.5	70-130			
2-Methylpentane	20.7	µg/l	20.0	BRL	104	70-130			
n-Nonane	19.6	µg/l	20.0	BRL	98.0	70-130			
n-Pentane	21.4	µg/l	20.0	BRL	107	70-130			
1,2,4-Trimethylbenzene	20.6	µg/l	20.0	BRL	103	70-130			
2,2,4-Trimethylpentane	22.5	µg/l	20.0	BRL	112	70-130			
n-Butylcyclohexane	19.5	µg/l	20.0	0.0	97.5	70-130			
n-Decane	18.0	µg/l	20.0	0.0	90.0	70-130			

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag

Batch 5090250 - VPH

Matrix Spike (5090250-MS1)

Source: SA33134-07

Prepared: 05-Sep-05 Analyzed: 06-Sep-05

Surrogate: 2,5-Dibromotoluene (FID)	48.1	µg/l	50.0		96.2	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	41.9	µg/l	50.0		83.8	70-130			

Batch 5090499 - SW846 5030 Water MS

Blank (5090499-BLK1)

Prepared & Analyzed: 08-Sep-05

Acetone	BRL	10.0 µg/l
Acrylonitrile	BRL	1.0 µg/l
Benzene	BRL	0.5 µg/l
Bromobenzene	BRL	0.5 µg/l
Bromochloromethane	BRL	0.5 µg/l
Bromodichloromethane	BRL	0.5 µg/l
Bromoform	BRL	0.5 µg/l
Bromomethane	BRL	0.5 µg/l
2-Butanone (MEK)	BRL	10.0 µg/l
n-Butylbenzene	BRL	0.5 µg/l
sec-Butylbenzene	BRL	0.5 µg/l
tert-Butylbenzene	BRL	0.5 µg/l
Carbon disulfide	BRL	0.5 µg/l
Carbon tetrachloride	BRL	0.5 µg/l
Chlorobenzene	BRL	0.5 µg/l
Chloroethane	BRL	0.5 µg/l
Chloroform	BRL	0.5 µg/l
Chloromethane	BRL	0.5 µg/l
2-Chlorotoluene	BRL	0.5 µg/l
4-Chlorotoluene	BRL	0.5 µg/l
1,2-Dibromo-3-chloropropane	BRL	0.5 µg/l
Dibromochloromethane	BRL	0.5 µg/l
1,2-Dibromoethane (EDB)	BRL	0.5 µg/l
Dibromomethane	BRL	0.5 µg/l
1,2-Dichlorobenzene	BRL	0.5 µg/l
1,3-Dichlorobenzene	BRL	0.5 µg/l
1,4-Dichlorobenzene	BRL	0.5 µg/l
Dichlorodifluoromethane (Freon 12)	BRL	0.5 µg/l
1,1-Dichloroethane	BRL	0.5 µg/l
1,2-Dichloroethane	BRL	0.5 µg/l
1,1-Dichloroethene	BRL	0.5 µg/l
cis-1,2-Dichloroethene	BRL	0.5 µg/l
trans-1,2-Dichloroethene	BRL	0.5 µg/l
1,2-Dichloropropane	BRL	0.5 µg/l
1,3-Dichloropropane	BRL	0.5 µg/l
2,2-Dichloropropane	BRL	0.5 µg/l
1,1-Dichloropropene	BRL	0.5 µg/l
cis-1,3-Dichloropropene	BRL	0.5 µg/l
trans-1,3-Dichloropropene	BRL	0.5 µg/l
Ethylbenzene	BRL	0.5 µg/l
Hexachlorobutadiene	BRL	0.5 µg/l
2-Hexanone (MBK)	BRL	10.0 µg/l
Isopropylbenzene	BRL	0.5 µg/l
4-Isopropyltoluene	BRL	0.5 µg/l
Methyl tert-butyl ether	BRL	0.5 µg/l
4-Methyl-2-pentanone (MIBK)	BRL	10.0 µg/l
Methylene chloride	BRL	0.5 µg/l
Naphthalene	BRL	0.5 µg/l
n-Propylbenzene	BRL	0.5 µg/l

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090499 - SW846 5030 Water MS									
Blank (5090499-BLK1)			Prepared & Analyzed: 08-Sep-05						
Styrene	BRL	0.5 µg/l							
1,1,1,2-Tetrachloroethane	BRL	0.5 µg/l							
1,1,2,2-Tetrachloroethane	BRL	0.5 µg/l							
Tetrachloroethene	BRL	0.5 µg/l							
Toluene	BRL	0.5 µg/l							
1,2,3-Trichlorobenzene	BRL	0.5 µg/l							
1,2,4-Trichlorobenzene	BRL	0.5 µg/l							
1,1,1-Trichloroethane	BRL	0.5 µg/l							
1,1,2-Trichloroethane	BRL	0.5 µg/l							
Trichloroethene	BRL	0.5 µg/l							
Trichlorofluoromethane (Freon 11)	BRL	0.5 µg/l							
1,2,3-Trichloropropane	BRL	0.5 µg/l							
1,2,4-Trimethylbenzene	BRL	0.5 µg/l							
1,3,5-Trimethylbenzene	BRL	0.5 µg/l							
Vinyl chloride	BRL	0.5 µg/l							
m,p-Xylene	BRL	0.5 µg/l							
o-Xylene	BRL	0.5 µg/l							
Tetrahydrofuran	BRL	10.0 µg/l							
Tert-amyl methyl ether	BRL	0.5 µg/l							
Ethyl tert-butyl ether	BRL	0.5 µg/l							
Di-isopropyl ether	BRL	0.5 µg/l							
Tert-Butanol / butyl alcohol	BRL	10.0 µg/l							
Surrogate: 4-Bromofluorobenzene	48.0	µg/l	50.0		96.0	70-130			
Surrogate: Toluene-d8	50.7	µg/l	50.0		101	70-130			
Surrogate: 1,2-Dichloroethane-d4	49.1	µg/l	50.0		98.2	70-130			
Surrogate: Dibromofluoromethane	53.8	µg/l	50.0		108	70-130			
LCS (5090499-BS1)			Prepared & Analyzed: 08-Sep-05						
Acetone	13.9	µg/l	20.0		69.5	70-130			QC-I
Acrylonitrile	20.7	µg/l	20.0		104	70-130			
Benzene	20.5	µg/l	20.0		102	80-120			
Bromobenzene	20.5	µg/l	20.0		102	80-120			
Bromochloromethane	20.0	µg/l	20.0		100	80-120			
Bromodichloromethane	21.7	µg/l	20.0		108	80-120			
Bromoform	21.0	µg/l	20.0		105	80-120			
Bromomethane	20.3	µg/l	20.0		102	80-120			
2-Butanone (MEK)	16.5	µg/l	20.0		82.5	70-130			
n-Butylbenzene	17.1	µg/l	20.0		85.5	80-120			
sec-Butylbenzene	20.4	µg/l	20.0		102	80-120			
tert-Butylbenzene	20.4	µg/l	20.0		102	80-120			
Carbon disulfide	20.1	µg/l	20.0		100	70-130			
Carbon tetrachloride	21.9	µg/l	20.0		110	80-120			
Chlorobenzene	21.3	µg/l	20.0		106	80-120			
Chloroethane	21.0	µg/l	20.0		105	80-120			
Chloroform	20.4	µg/l	20.0		102	80-120			
Chloromethane	24.0	µg/l	20.0		120	80-120			
2-Chlorotoluene	20.8	µg/l	20.0		104	80-120			
4-Chlorotoluene	20.7	µg/l	20.0		104	80-120			
1,2-Dibromo-3-chloropropane	19.0	µg/l	20.0		95.0	80-120			
Dibromochloromethane	23.9	µg/l	20.0		120	80-120			
1,2-Dibromoethane (EDB)	20.1	µg/l	20.0		100	80-120			
Dibromomethane	20.2	µg/l	20.0		101	80-120			
1,2-Dichlorobenzene	19.2	µg/l	20.0		96.0	80-120			
1,3-Dichlorobenzene	21.7	µg/l	20.0		108	80-120			
1,4-Dichlorobenzene	19.5	µg/l	20.0		97.5	80-120			

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090499 - SW846 5030 Water MS									
LCS (5090499-BS1)			Prepared & Analyzed: 08-Sep-05						
Dichlorodifluoromethane (Freon12)	25.1	µg/l	20.0		126	80-120			QC-1
1,1-Dichloroethane	19.8	µg/l	20.0		99.0	80-120			
1,2-Dichloroethane	18.6	µg/l	20.0		93.0	80-120			
1,1-Dichloroethene	20.0	µg/l	20.0		100	80-120			
cis-1,2-Dichloroethene	20.7	µg/l	20.0		104	80-120			
trans-1,2-Dichloroethene	19.9	µg/l	20.0		99.5	80-120			
1,2-Dichloropropane	19.7	µg/l	20.0		98.5	80-120			
1,3-Dichloropropane	20.1	µg/l	20.0		100	80-120			
2,2-Dichloropropane	18.7	µg/l	20.0		93.5	80-120			
1,1-Dichloropropene	18.2	µg/l	20.0		91.0	80-120			
cis-1,3-Dichloropropene	19.1	µg/l	20.0		95.5	80-120			
trans-1,3-Dichloropropene	19.2	µg/l	20.0		96.0	80-120			
Ethylbenzene	20.0	µg/l	20.0		100	80-120			
Hexachlorobutadiene	18.2	µg/l	20.0		91.0	80-120			
2-Hexanone (MBK)	13.2	µg/l	20.0		66.0	70-130			QC-1
Isopropylbenzene	19.3	µg/l	20.0		96.5	80-120			
4-Isopropyltoluene	19.5	µg/l	20.0		97.5	80-120			
Methyl tert-butyl ether	19.0	µg/l	20.0		95.0	80-120			
4-Methyl-2-pentanone (MIBK)	15.3	µg/l	20.0		76.5	70-130			
Methylene chloride	19.9	µg/l	20.0		99.5	80-120			
Naphthalene	17.8	µg/l	20.0		89.0	80-120			
n-Propylbenzene	19.9	µg/l	20.0		99.5	80-120			
Styrene	20.0	µg/l	20.0		100	80-120			
1,1,1,2-Tetrachloroethane	22.9	µg/l	20.0		114	80-120			
1,1,2,2-Tetrachloroethane	22.2	µg/l	20.0		111	80-120			
Tetrachloroethene	20.0	µg/l	20.0		100	80-120			
Toluene	19.0	µg/l	20.0		95.0	80-120			
1,2,3-Trichlorobenzene	18.9	µg/l	20.0		94.5	80-120			
1,2,4-Trichlorobenzene	18.1	µg/l	20.0		90.5	80-120			
1,1,1-Trichloroethane	19.4	µg/l	20.0		97.0	80-120			
1,1,2-Trichloroethane	21.0	µg/l	20.0		105	80-120			
Trichloroethene	19.1	µg/l	20.0		95.5	80-120			
Trichlorofluoromethane (Freon 11)	20.5	µg/l	20.0		102	80-120			
1,2,3-Trichloropropane	20.6	µg/l	20.0		103	80-120			
1,2,4-Trimethylbenzene	20.1	µg/l	20.0		100	80-120			
1,3,5-Trimethylbenzene	19.9	µg/l	20.0		99.5	80-120			
Vinyl chloride	23.7	µg/l	20.0		118	80-120			
m,p-Xylene	42.5	µg/l	40.0		106	80-120			
o-Xylene	21.7	µg/l	20.0		108	80-120			
Tetrahydrofuran	18.3	µg/l	20.0		91.5	70-130			
Tert-amyl methyl ether	22.3	µg/l	20.0		112	70-130			
Ethyl tert-butyl ether	18.5	µg/l	20.0		92.5	70-130			
Di-isopropyl ether	19.4	µg/l	20.0		97.0	70-130			
Tert-Butanol / butyl alcohol	172	µg/l	200		86.0	70-130			
Surrogate: 4-Bromofluorobenzene	52.2	µg/l	50.0		104	70-130			
Surrogate: Toluene-d8	51.0	µg/l	50.0		102	70-130			
Surrogate: 1,2-Dichloroethane-d4	46.6	µg/l	50.0		93.2	70-130			
Surrogate: Dibromofluoromethane	51.5	µg/l	50.0		103	70-130			
Matrix Spike (5090499-MS1)			Source: SA33613-03		Prepared & Analyzed: 08-Sep-05				
Benzene	15.1	µg/l	15.0	BRL	101	80-120			
Chlorobenzene	17.8	µg/l	15.0	BRL	119	80-120			
1,1-Dichloroethene	12.8	µg/l	15.0	BRL	85.3	80-120			
Toluene	15.3	µg/l	15.0	BRL	102	80-120			
Trichloroethene	15.0	µg/l	15.0	BRL	100	80-120			

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* Reportable Detection Limit

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Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag

Batch 5090499 - SW846 5030 Water MS

Matrix Spike (5090499-MS1)

Source: SA33613-03

Prepared & Analyzed: 08-Sep-05

Surrogate: 4-Bromofluorobenzene	47.9	µg/l	50.0		95.8	70-130			
Surrogate: Toluene-d8	49.9	µg/l	50.0		99.8	70-130			
Surrogate: 1,2-Dichloroethane-d4	48.0	µg/l	50.0		96.0	70-130			
Surrogate: Dibromofluoromethane	51.6	µg/l	50.0		103	70-130			

Matrix Spike Dup (5090499-MSD1)

Source: SA33613-03

Prepared & Analyzed: 08-Sep-05

Benzene	15.1	µg/l	15.0	BRL	101	80-120	0.00	20	
Chlorobenzene	17.7	µg/l	15.0	BRL	118	80-120	0.844	20	
1,1-Dichloroethene	12.6	µg/l	15.0	BRL	84.0	80-120	1.54	20	
Toluene	15.3	µg/l	15.0	BRL	102	80-120	0.00	20	
Trichloroethene	14.9	µg/l	15.0	BRL	99.3	80-120	0.702	20	
Surrogate: 4-Bromofluorobenzene	47.8	µg/l	50.0		95.6	70-130			
Surrogate: Toluene-d8	50.3	µg/l	50.0		101	70-130			
Surrogate: 1,2-Dichloroethane-d4	48.3	µg/l	50.0		96.6	70-130			
Surrogate: Dibromofluoromethane	52.2	µg/l	50.0		104	70-130			

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* Reportable Detection Limit

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Page 40 of 47

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag

Batch 0509007 - 5090102

Calibration Check (0509007-CCV1)

Prepared & Analyzed: 02-Sep-05

C9-C18 Aliphatic Hydrocarbons	0.531	mg/l	0.600		88.5	75-125			
C19-C36 Aliphatic Hydrocarbons	0.640	mg/l	0.800		80.0	75-125			
C11-C22 Aromatic Hydrocarbons	1.52	mg/l	1.70		89.4	75-125			
Naphthalene	86.9	µg/l	100		86.9	80-120			
2-Methylnaphthalene	87.7	µg/l	100		87.7	80-120			
Acenaphthylene	83.4	µg/l	100		83.4	80-120			
Acenaphthene	82.9	µg/l	100		82.9	80-120			
Fluorene	80.7	µg/l	100		80.7	80-120			
Phenanthrene	89.7	µg/l	100		89.7	80-120			
Anthracene	80.1	µg/l	100		80.1	80-120			
Fluoranthene	88.9	µg/l	100		88.9	80-120			
Pyrene	87.8	µg/l	100		87.8	80-120			
Benzo (a) anthracene	104	µg/l	100		104	80-120			
Chrysene	93.1	µg/l	100		93.1	80-120			
Benzo (b) fluoranthene	117	µg/l	100		117	80-120			
Benzo (k) fluoranthene	111	µg/l	100		111	80-120			
Benzo (a) pyrene	113	µg/l	100		113	80-120			
Indeno (1,2,3-cd) pyrene	118	µg/l	100		118	80-120			
Dibenzo (a,h) anthracene	118	µg/l	100		118	80-120			
Benzo (g,h,i) perylene	118	µg/l	100		118	80-120			

Batch 0509018 - 5090102

Calibration Check (0509018-CCV1)

Prepared & Analyzed: 03-Sep-05

C9-C18 Aliphatic Hydrocarbons	0.500	mg/l	0.600		83.3	75-125			
C19-C36 Aliphatic Hydrocarbons	0.669	mg/l	0.800		83.6	75-125			
C11-C22 Aromatic Hydrocarbons	1.90	mg/l	1.70		112	75-125			
Naphthalene	106	µg/l	100		106	80-120			
2-Methylnaphthalene	105	µg/l	100		105	80-120			
Acenaphthylene	109	µg/l	100		109	80-120			
Acenaphthene	104	µg/l	100		104	80-120			
Fluorene	108	µg/l	100		108	80-120			
Phenanthrene	109	µg/l	100		109	80-120			
Anthracene	103	µg/l	100		103	80-120			
Fluoranthene	97.9	µg/l	100		97.9	80-120			
Pyrene	97.9	µg/l	100		97.9	80-120			
Benzo (a) anthracene	93.7	µg/l	100		93.7	80-120			
Chrysene	97.6	µg/l	100		97.6	80-120			
Benzo (b) fluoranthene	90.4	µg/l	100		90.4	80-120			
Benzo (k) fluoranthene	115	µg/l	100		115	80-120			
Benzo (a) pyrene	101	µg/l	100		101	80-120			
Indeno (1,2,3-cd) pyrene	109	µg/l	100		109	80-120			
Dibenzo (a,h) anthracene	108	µg/l	100		108	80-120			
Benzo (g,h,i) perylene	110	µg/l	100		110	80-120			

Batch 5090102 - SW846 3510C

Blank (5090102-BLK1)

Prepared & Analyzed: 02-Sep-05

C9-C18 Aliphatic Hydrocarbons	BRL	0.2 mg/l
C19-C36 Aliphatic Hydrocarbons	BRL	0.2 mg/l
C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l
Unadjusted C11-C22 Aromatic Hydrocarbons	BRL	0.2 mg/l
Total Petroleum Hydrocarbons	BRL	0.2 mg/l
Unadjusted Total Petroleum Hydrocarbons	BRL	0.2 mg/l
Naphthalene	BRL	1.00 µg/l
2-Methylnaphthalene	BRL	1.00 µg/l

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* Reportable Detection Limit

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Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090102 - SW846 3510C									
Blank (5090102-BLK1)									
Prepared & Analyzed: 02-Sep-05									
Acenaphthylene	BRL	1.00 µg/l							
Acenaphthene	BRL	1.00 µg/l							
Fluorene	BRL	1.00 µg/l							
Phenanthrene	BRL	1.00 µg/l							
Anthracene	BRL	1.00 µg/l							
Fluoranthene	BRL	1.00 µg/l							
Pyrene	BRL	1.00 µg/l							
Benzo (a) anthracene	BRL	1.00 µg/l							
Chrysene	BRL	1.00 µg/l							
Benzo (b) fluoranthene	BRL	1.00 µg/l							
Benzo (k) fluoranthene	BRL	1.00 µg/l							
Benzo (a) pyrene	BRL	0.200 µg/l							
Indeno (1,2,3-cd) pyrene	BRL	0.500 µg/l							
Dibenzo (a,h) anthracene	BRL	0.500 µg/l							
Benzo (g,h,i) perylene	BRL	1.00 µg/l							
Surrogate: 1-Chlorooctadecane	26.4	µg/l	50.0		52.8	40-140			
Surrogate: Ortho-Terphenyl	27.5	µg/l	50.0		55.0	40-140			
Surrogate: 2-Bromonaphthalene	28.4	µg/l	40.0		71.0	40-140			
Surrogate: 2-Fluorobiphenyl	26.6	µg/l	40.0		66.5	40-140			
LCS (5090102-BS1)									
Prepared & Analyzed: 02-Sep-05									
C9-C18 Aliphatic Hydrocarbons	0.241	0.2 mg/l	0.600		40.2	40-140			
C19-C36 Aliphatic Hydrocarbons	0.410	0.2 mg/l	0.800		51.2	40-140			
C11-C22 Aromatic Hydrocarbons	1.24	0.2 mg/l	1.70		72.9	40-140			
Naphthalene	49.3	1.00 µg/l	100		49.3	40-140			
2-Methylnaphthalene	49.2	1.00 µg/l	100		49.2	40-140			
Acenaphthylene	56.9	1.00 µg/l	100		56.9	40-140			
Acenaphthene	57.6	1.00 µg/l	100		57.6	40-140			
Fluorene	61.3	1.00 µg/l	100		61.3	40-140			
Phenanthrene	73.4	1.00 µg/l	100		73.4	40-140			
Anthracene	63.5	1.00 µg/l	100		63.5	40-140			
Fluoranthene	75.4	1.00 µg/l	100		75.4	40-140			
Pyrene	74.2	1.00 µg/l	100		74.2	40-140			
Benzo (a) anthracene	88.8	1.00 µg/l	100		88.8	40-140			
Chrysene	75.5	1.00 µg/l	100		75.5	40-140			
Benzo (b) fluoranthene	88.7	1.00 µg/l	100		88.7	40-140			
Benzo (k) fluoranthene	86.5	1.00 µg/l	100		86.5	40-140			
Benzo (a) pyrene	83.3	0.200 µg/l	100		83.3	40-140			
Indeno (1,2,3-cd) pyrene	89.9	0.500 µg/l	100		89.9	40-140			
Dibenzo (a,h) anthracene	87.1	0.500 µg/l	100		87.1	40-140			
Benzo (g,h,i) perylene	85.0	1.00 µg/l	100		85.0	40-140			
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
Surrogate: 1-Chlorooctadecane	30.2	µg/l	50.0		60.4	40-140			
Surrogate: Ortho-Terphenyl	32.2	µg/l	50.0		64.4	40-140			
Surrogate: 2-Bromonaphthalene	26.1	µg/l	40.0		65.2	40-140			
Surrogate: 2-Fluorobiphenyl	29.2	µg/l	40.0		73.0	40-140			
Naphthalene Breakthrough	0.00	%				0-5			
2-Methylnaphthalene Breakthrough	0.00	%				0-5			
Fractionation Check Standard (5090102-BS2)									
Prepared: 02-Sep-05 Analyzed: 03-Sep-05									
C9-C18 Aliphatic Hydrocarbons	0.337	0.2 mg/l	0.600		56.2	40-140			
C19-C36 Aliphatic Hydrocarbons	0.519	0.2 mg/l	0.800		64.9	40-140			
C11-C22 Aromatic Hydrocarbons	1.39	0.2 mg/l	1.70		81.8	40-140			
Naphthalene	57.5	1.00 µg/l	100		57.5	40-140			

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 42 of 47

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090102 - SW846 3510C									
Fractionation Check Standard (5090102-BS2)					Prepared: 02-Sep-05 Analyzed: 03-Sep-05				
2-Methylnaphthalene	63.1	1.00 µg/l	100		63.1	40-140			
Acenaphthylene	71.6	1.00 µg/l	100		71.6	40-140			
Acenaphthene	71.0	1.00 µg/l	100		71.0	40-140			
Fluorene	74.6	1.00 µg/l	100		74.6	40-140			
Phenanthrene	87.9	1.00 µg/l	100		87.9	40-140			
Anthracene	73.2	1.00 µg/l	100		73.2	40-140			
Fluoranthene	85.6	1.00 µg/l	100		85.6	40-140			
Pyrene	83.3	1.00 µg/l	100		83.3	40-140			
Benzo (a) anthracene	98.2	1.00 µg/l	100		98.2	40-140			
Chrysene	81.4	1.00 µg/l	100		81.4	40-140			
Benzo (b) fluoranthene	92.0	1.00 µg/l	100		92.0	40-140			
Benzo (k) fluoranthene	88.6	1.00 µg/l	100		88.6	40-140			
Benzo (a) pyrene	94.5	0.200 µg/l	100		94.5	40-140			
Indeno (1,2,3-cd) pyrene	94.1	0.500 µg/l	100		94.1	40-140			
Dibenzo (a,h) anthracene	96.9	0.500 µg/l	100		96.9	40-140			
Benzo (g,h,i) perylene	96.6	1.00 µg/l	100		96.6	40-140			
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200			
Surrogate: 1-Chlorooctadecane	37.4	µg/l	50.0		74.8	40-140			
Surrogate: Ortho-Terphenyl	37.7	µg/l	50.0		75.4	40-140			
Surrogate: 2-Bromonaphthalene	25.1	µg/l	40.0		62.8	40-140			
Surrogate: 2-Fluorobiphenyl	29.8	µg/l	40.0		74.5	40-140			
LCS Dup (5090102-BSD1)					Prepared & Analyzed: 02-Sep-05				
C9-C18 Aliphatic Hydrocarbons	0.247	0.2 mg/l	0.600		41.2	40-140	2.46	25	
C19-C36 Aliphatic Hydrocarbons	0.408	0.2 mg/l	0.800		51.0	40-140	0.391	25	
C11-C22 Aromatic Hydrocarbons	1.08	0.2 mg/l	1.70		63.5	40-140	13.8	25	
Naphthalene	42.3	1.00 µg/l	100		42.3	40-140	15.3	20	
2-Methylnaphthalene	42.9	1.00 µg/l	100		42.9	40-140	13.7	20	
Acenaphthylene	51.0	1.00 µg/l	100		51.0	40-140	10.9	20	
Acenaphthene	51.7	1.00 µg/l	100		51.7	40-140	10.8	20	
Fluorene	54.8	1.00 µg/l	100		54.8	40-140	11.2	20	
Phenanthrene	65.2	1.00 µg/l	100		65.2	40-140	11.8	20	
Anthracene	58.6	1.00 µg/l	100		58.6	40-140	8.03	20	
Fluoranthene	64.3	1.00 µg/l	100		64.3	40-140	15.9	20	
Pyrene	61.1	1.00 µg/l	100		61.1	40-140	19.4	20	
Benzo (a) anthracene	71.8	1.00 µg/l	100		71.8	40-140	21.2	20	QR-02
Chrysene	65.6	1.00 µg/l	100		65.6	40-140	14.0	20	
Benzo (b) fluoranthene	75.5	1.00 µg/l	100		75.5	40-140	16.1	20	
Benzo (k) fluoranthene	67.6	1.00 µg/l	100		67.6	40-140	24.5	20	QR-02
Benzo (a) pyrene	66.9	0.200 µg/l	100		66.9	40-140	21.8	20	QR-02
Indeno (1,2,3-cd) pyrene	67.9	0.500 µg/l	100		67.9	40-140	27.9	20	QR-02
Dibenzo (a,h) anthracene	65.8	0.500 µg/l	100		65.8	40-140	27.9	20	QR-02
Benzo (g,h,i) perylene	65.7	1.00 µg/l	100		65.7	40-140	25.6	20	QR-02
Naphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200	0.00	200	
2-Methylnaphthalene (aliphatic fraction)	0.000100	µg/l	100		0.000100	0-200	0.00	200	
Surrogate: 1-Chlorooctadecane	27.6	µg/l	50.0		55.2	40-140			
Surrogate: Ortho-Terphenyl	28.3	µg/l	50.0		56.6	40-140			
Surrogate: 2-Bromonaphthalene	23.4	µg/l	40.0		58.5	40-140			
Surrogate: 2-Fluorobiphenyl	29.3	µg/l	40.0		73.2	40-140			
Naphthalene Breakthrough	0.00	%				0-5			
2-Methylnaphthalene Breakthrough	0.00	%				0-5			

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Extractable Petroleum Hydrocarbons - CCV Evaluation Report

Analyte	Average RF	CCRF	% D	Limit
Batch 0509007				
Calibration Check (0509007-CCV1)				
C9-C18 Aliphatic Hydrocarbons	1.87539E+08	1.65882E+08	-11.5	25.00
C19-C36 Aliphatic Hydrocarbons	1.4791E+08	1.18307E+08	-20.0	25.00
C11-C22 Aromatic Hydrocarbons	15638.6	12.2131	-10.6	25.00
Naphthalene	5.22473	4.54079	-13.1	20.00
2-Methylnaphthalene	3.55185	3.11573	-12.3	20.00
Acenaphthylene	4.91471	4.09709	-16.6	20.00
Acenaphthene	3.49241	2.89374	-17.1	20.00
Fluorene	3.92898	3.16979	-19.3	20.00
Phenanthrene	4.67095	4.19087	-10.3	20.00
Anthracene	6.14219	4.91803	-19.9	20.00
Fluoranthene	5.54679	4.92982	-11.1	20.00
Pyrene	5.75259	5.04806	-12.2	20.00
Benzo (a) anthracene	4.05607	4.21734	3.98	20.00
Chrysene	5.28608	4.92138	-6.90	20.00
Benzo (b) fluoranthene	3.21847	3.77152	17.2	20.00
Benzo (k) fluoranthene	4.31076	4.79848	11.3	20.00
Benzo (a) pyrene	3.45674	3.92286	13.5	20.00
Indeno (1,2,3-cd) pyrene	3.2367	3.834	18.5	20.00
Dibenzo (a,h) anthracene	2.63109	3.10758	18.1	20.00
Benzo (g,h,i) perylene	2.70855	3.20236	18.2	20.00

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 44 of 47

Notes and Definitions

__RE Reanalysis for data confirmation.

E The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).

QC-1 Analyte out of acceptance range.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

VOC11 Analyte presence was confirmed by duplicate analysis.

BRL Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit

dry Sample results reported on a dry weight basis

NR Not Reported

RPD Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 45 of 47

The following outlines the condition of all VPH samples contained within this report upon laboratory receipt.

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Sample Preservative	Aqueous (acid-preserved)	☐ N/A	☒ pH ≤ 2	☐ pH > 2
	Soil or Sediment	☒ N/A		ml Methanol/g soil ☐ 1:1 +/-25% ☐ Other:
		☐ Samples not received in Methanol or air-tight container		
		☐ Samples received in Methanol: ☐ covering soil/sediment ☐ not covering soil/sediment		
		☐ Samples received in air-tight container:		
Temperature	☒ Received on ice	☐ Received at 4 ± 2 °C	☒ Other:	°C

Were all QA/QC procedures followed as required by the VPH method? Yes ☒ No ☐
 Were any significant modifications made to the VPH method as specified in section 11.3? No ☒ *see below
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐
 * Yes, if PID and FID surrogate recoveries are listed as n/a, then that sample was run via GCMS using all QC criteria specified in the method

The following outlines the condition of all EPH samples contained within this report upon laboratory receipt.

Matrix	☒ Aqueous	☐ Soil	☐ Sediment	☐ Other
Containers	☒ Satisfactory	☐ Broken	☐ Leaking	
Aqueous Preservative	☐ N/A	☒ pH ≤ 2	☐ pH > 2	☐ pH adjusted to <2 in lab
Temperature	☒ Received on ice	☐ Received at 4 ± 2 °C	☒ Other:	°C

Were all QA/QC procedures followed as required by the EPH method? Yes ☒ No ☐
 Were any significant modifications made to the EPH method as specified in Section 11.3? No ☒
 Were all performance/acceptance standards for required QA/QC procedures achieved? Yes ☒ No ☐

I attest that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Authorized by:



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:

This form provides certifications for the following Spectrum Analytical, Inc. work order #: SA33134

Matrix	☒ Groundwater	☐ Soil/Sediment	☐ Drinking Water	☐ Other
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☐ 6010B
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020
	☐ 8082	☐ 8021B	☒ EPH	☐ 7000S ³

1 List Release Tracking Number (RTN), if known

2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method

3 S - SW-846 Methods 7000 Series List individual method and analyte

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☒ Yes ☐ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

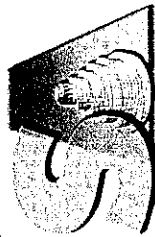
Date: 9/12/2005

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 47 of 47



SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

CHAIN OF CUSTODY RECORD

Page 1 of 2

Report To: ECS-agawam

Invoice To: ECS

Project Mgr.: Chris Parent

P.O. No.: _____

Sampler(s): B.B.

RQN: _____

1=Na₂S₂O₃ 2=HCl 3=H₂SO₄ 4=HNO₃ 5=NaOH 6=Ascorbic Acid
7=CH₃OH 8=NaHSO₄ 9=Ice 10=unpreserved

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=_____ X2=_____ X3=_____

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Containers:				Analyses:				QA Reporting Notes: (check if needed)
						# of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic					
SA33134-01	MIN-A	8/24/05	9:25am	G	GW	2	1	1	1	X	X	X	PL	State specific reporting standards If applicable, please list below. <u>Provide MCP-CAM Report</u> Were all field QC requirements met as per MADEP CAM Section 2.0? ☒ Yes ☐ No (Response required for CAM report) <u>Do not analyze drums</u> <u>to hold some evidence</u> <u>See phone log.</u>
02	DCW-2		10:15am			2	1	1	1	X	X	X	PL	
03	OCW-3		11:00am			2	1	1	1	X	X	X	PL	
04	DCW-4		11:40am			2	1	1	1	X	X	X		
05	DCW-6		12:15pm			2	1	1	1	X	X	X		
06	BCW-8		12:45pm			2	1	1	1	X	X	X		
07	DCW-9		2:30pm			2	1	1	1	X	X	X		
08	BCW-10		1:45pm			2	1	1	1	X	X	X		
09	ECW-2	8/25/05	10:05am			2	1	1	1	X	X	X		
10	ERW-1	8/25/05	12:40pm			2	1	1	1	X	X	X		

☒ Fax results when available to (413) 789-2776
☒ E-mail to CParent@ECSconsult.com

Relinquished by: William D. B.

Received by: Paul Miley

Date: 8/26/05

Time: 1142

EDD Format

Condition upon receipt: ☒ Dred ☐ Ambient ☐ OC 0

Special Handling:

- ☒ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: _____
- ☐ All TATs subject to laboratory approval.
- ☐ Min. 24-hour notification needed for rushes.
- ☐ Samples disposed of after 60 days unless otherwise instructed.

Project No.: 91-007030

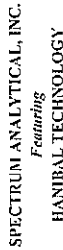
Site Name: Eagle Gas

Location: Carver

State: MA

QA Reporting Notes:
(check if needed)

State specific reporting standards
If applicable, please list below.
Provide MCP-CAM Report
Were all field QC requirements met
as per MADEP CAM Section 2.0?
☒ Yes ☐ No
(Response required for CAM report)

Page 6 of 8

HS

P.O. No.:

RQN:

Sampler(s): Qd

Project No.: 91-204082

Endo Cas

Site Name: W. of J. C. 300

Location: Carver

22

Sampler(s): Q4

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SL=Sludge A=Air
X1= X2= X3=

X1=	X2=	X3=

8

	G=Grab	C=Composite
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[illegible]

Lab Id:	Sample Id:	Date:	Time:

[illegible]

5334.1	EW-2	9/25/05	1:45pm

17-MAY-1985 05:13:30 am

13	BB-3	6/21/8	200

13	08	26/10/20	3.00pm
14	08	26/10/20	3.00pm
15	08	26/10/20	3.00pm
16	08	26/10/20	3.00pm
17	08	26/10/20	3.00pm
18	08	26/10/20	3.00pm
19	08	26/10/20	3.00pm
20	08	26/10/20	3.00pm
21	08	26/10/20	3.00pm
22	08	26/10/20	3.00pm
23	08	26/10/20	3.00pm
24	08	26/10/20	3.00pm
25	08	26/10/20	3.00pm
26	08	26/10/20	3.00pm
27	08	26/10/20	3.00pm
28	08	26/10/20	3.00pm
29	08	26/10/20	3.00pm
30	08	26/10/20	3.00pm
31	08	26/10/20	3.00pm

143 Main St. 8/25/05 3:12 pm

15137 Main St. 8/25/05 @ 4:40pm

11/11/2019

[illegible][illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

[illegible]

JEAL 03L 001

☒ Fax results when available to (43) 781-3776

E-mail to Parent@Decima.com

[illegible]

EDD Format

Case No.	Subject	Age	Sex	Occupation	Religion	Marital Status	Education	Income	Assets	Liabilities	Net Worth	Comments
1	John Doe	45	M	Teacher	Catholic	Married	High School	\$30,000	\$100,000	\$20,000	\$90,000	Good
2	Jane Smith	35	F	Nurse	Protestant	Single	College	\$25,000	\$50,000	\$10,000	\$40,000	Fair
3	Robert Brown	55	M	Engineer	Jewish	Married	College	\$40,000	\$150,000	\$30,000	\$120,000	Excellent
4	Mary White	60	F	Retired	Methodist	Widowed	High School	\$15,000	\$30,000	\$5,000	\$25,000	Poor
5	David Green	25	M	Student	Muslim	Single	College	\$10,000	\$20,000	\$2,000	\$18,000	Fair

Condition upon receipt: ☒ Used ☐ Ambient 0

1

11 Almgren Drive • Agawam, Massachusetts

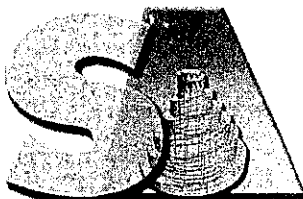
11 Almgren Drive • Agawam, Massachusetts 01001 • 413-789-9018 • Fax 413-789-4076 • www.spectrum-analytical.com

①

②

③

Report Date:
14-Sep-05 14:02



SPECTRUM ANALYTICAL, INC.

Featuring

HANIBAL TECHNOLOGY

Laboratory Report

- ☒ Final Report
☐ Re-Issued Report
☐ Revised Report

Environmental Compliance Services
588 Silver Street
Agawam, MA 01001
Attn: Christopher Parent

Project: Eagle Gas - Carver, MA
Project #: 91-204082

<u>Laboratory ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Sampled</u>	<u>Date Received</u>
SA33385-01	ECS-1 5'	Soil	22-Aug-05 11:10	31-Aug-05 16:50
SA33385-02	ECS-1 10'	Soil	22-Aug-05 11:18	31-Aug-05 16:50
SA33385-03	ECS-1 15'	Soil	22-Aug-05 11:25	31-Aug-05 16:50

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. All applicable NELAC requirements have been met.

Please note that this report contains 9 pages of analytical data plus Chain of Custody document(s).

This report may not be reproduced, except in full, without written approval from Spectrum Analytical, Inc.

Massachusetts Certification # M-MA138/MA1110
Connecticut # PH-0777
Florida # E87600/E87936
Maine # MA138
New Hampshire # 2538/2972
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393



Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Spectrum Analytical, Inc. is a NELAC accredited laboratory organization and meets NELAC testing standards. Use of the NELAC logo however does not insure that Spectrum is currently accredited for the specific method indicated. Please refer to our "Quality" webpage at www.spectrum-analytical.com for a full listing of our current certifications.

CASE NARRATIVE:

The data set for work order SA33385 complies with internal QC criteria for the methods performed. The samples were received @ 5.0 degrees Celsius. An infrared thermometer with a tolerance of +/- 2.0 degrees Celsius was used immediately upon receipt of the samples.

MADEP has published a list of analytical methods (CAM) which provides a series of recommended protocols for the acquisition, analysis and reporting of analytical data in support of MCP decisions. "Presumptive Certainty" can be established only for those methods published by the MADEP in the MCP CAM. The compounds and/or elements reported were specifically requested by the client on the Chain of Custody and in some cases may not include the full analyte list as defined in the method.

According to WSC-CAM 5/2004 Rev.4, Table 11 A-1, recovery for some VOC analytes have been deemed potentially difficult. Although recovery may still be within the recommended 70%-130% range, the analytical range has been set based on historical control limits. Please refer to "Notes and Definitions" for all sample/analyte qualifiers. Qualifiers will note any exceedance levels and items specific to sample analysis/matrix.

ENVIRONMENTAL ANALYSES

Sample Identification

ECS-1' 5'

SA33385-01

Client Project #

91-204082

Matrix

Soil

Collection Date/Time

22-Aug-05 11:10

Received

31-Aug-05

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>*RDL/Units</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>	<u>Flag</u>
Volatile Organic Compounds										
	VOC Extraction	Field extracted	N/A	1	VOC	31-Aug-05	31-Aug-05	5090016	BD	
VPH Aliphatic/Aromatic Carbon Ranges										
Prepared by method VPH										
	C5-C8 Aliphatic Hydrocarbons	52.6	5.15 mg/kg dry	250	+MADEP 5/2004 Rev. 1.1	08-Sep-05	09-Sep-05	5090501	SS	R-05
	C9-C12 Aliphatic Hydrocarbons	238	1.72 mg/kg dry	250	"	"	"	"	"	
	C9-C10 Aromatic Hydrocarbons	293	1.72 mg/kg dry	250	"	"	"	"	"	
	Unadjusted C5-C8 Aliphatic Hydrocarbons	57.0	5.15 mg/kg dry	250	"	"	"	"	"	
	Unadjusted C9-C12 Aliphatic Hydrocarbons	531	1.72 mg/kg dry	250	"	"	"	"	"	
VPH Target Analytes										
Prepared by method VPH										
71-43-2	Benzene	BRL	343 µg/kg dry	250	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	343 µg/kg dry	250	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	BRL	343 µg/kg dry	250	"	"	"	"	"	
91-20-3	Naphthalene	15,900	343 µg/kg dry	250	"	"	"	"	"	
108-88-3	Toluene	BRL	343 µg/kg dry	250	"	"	"	"	"	
1330-20-7	m,p-Xylene	2,390	686 µg/kg dry	250	"	"	"	"	"	
95-47-6	o-Xylene	1,820	343 µg/kg dry	250	"	"	"	"	"	
Surrogate recoveries:										
615-59-8	2,5-Dibromotoluene (FID)	68.0	70-130 %		"	"	"	"	"	S-04
615-59-8	2,5-Dibromotoluene (PID)	75.8	70-130 %		"	"	"	"	"	
General Chemistry Parameters										
	% Solids	82.9	%	1	SM2540 G Mod.	10-Sep-05	10-Sep-05	5090621	BD	

This laboratory report is not valid without an authorized signature on the cover page.

* Reportable Detection Limit

BRL = Below Reporting Limit

Page 2 of 9

Sample IdentificationECS-1 10'
SA33385-02Client Project #
91-204082Matrix
SoilCollection Date/Time
22-Aug-05 11:18Received
31-Aug-05

CAS No. , Analyte(s)	Result	*RDL/Units	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst	Flag
Volatile Organic Compounds									
VOC Extraction	Field extracted	N/A	1	VOC	31-Aug-05	31-Aug-05	5090016	BD	
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>									
				Prepared by method VPH					
C5-C8 Aliphatic Hydrocarbons	12.4	1.07 mg/kg dry	50	+MADEP 5/2004 Rev. 1.1	08-Sep-05	09-Sep-05	5090501	SS	
C9-C12 Aliphatic Hydrocarbons	39.4	0.357 mg/kg dry	50	"	"	"	"	"	
C9-C10 Aromatic Hydrocarbons	41.0	0.357 mg/kg dry	50	"	"	"	"	"	
Unadjusted C5-C8 Aliphatic Hydrocarbons	12.7	1.07 mg/kg dry	50	"	"	"	"	"	
Unadjusted C9-C12 Aliphatic Hydrocarbons	80.4	0.357 mg/kg dry	50	"	"	"	"	"	
<u>VPH Target Analytes</u>									
				Prepared by method VPH					
71-43-2 Benzene	BRL	71.4 µg/kg dry	50	"	"	"	"	"	
100-41-4 Ethylbenzene	BRL	71.4 µg/kg dry	50	"	"	"	"	"	
1634-04-4 Methyl tert-butyl ether	BRL	71.4 µg/kg dry	50	"	"	"	"	"	
91-20-3 Naphthalene	2,920	71.4 µg/kg dry	50	"	"	"	"	"	
108-88-3 Toluene	BRL	71.4 µg/kg dry	50	"	"	"	"	"	
1330-20-7 m,p-Xylene	220	143 µg/kg dry	50	"	"	"	"	"	
95-47-6 o-Xylene	BRL	71.4 µg/kg dry	50	"	"	"	"	"	
<u>Surrogate recoveries:</u>									
615-59-8 2,5-Dibromotoluene (FID)	71.4	70-130 %		"	"	"	"	"	
615-59-8 2,5-Dibromotoluene (PID)	79.4	70-130 %		"	"	"	"	"	
General Chemistry Parameters									
% Solids	80.0	%	1	SM2540 G Mod.	10-Sep-05	10-Sep-05	5090621	BD	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 3 of 9

Sample IdentificationECS-1 '15'
SA33385-03Client Project #
91-204082Matrix
SoilCollection Date/Time
22-Aug-05 11:25Received
31-Aug-05

<u>CAS No.</u>	<u>Analyte(s)</u>	<u>Result</u>	<u>*RDL/Units</u>	<u>Dilution</u>	<u>Method Ref.</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Batch</u>	<u>Analyst</u>	<u>Flag</u>
Volatile Organic Compounds										
	VOC Extraction	Field extracted	N/A	1	VOC	31-Aug-05	31-Aug-05	5090016	BD	
<u>VPH Aliphatic/Aromatic Carbon Ranges</u>										
Prepared by method VPH										
	C5-C8 Aliphatic Hydrocarbons	4.19	1.04 mg/kg dry	50	+MADEP 5/2004 Rev. 1.1	08-Sep-05	09-Sep-05	5090501	SS	
	C9-C12 Aliphatic Hydrocarbons	21.5	0.345 mg/kg dry	50	"	"	"	"	"	
	C9-C10 Aromatic Hydrocarbons	17.6	0.345 mg/kg dry	50	"	"	"	"	"	
	Unadjusted C5-C8 Aliphatic Hydrocarbons	4.26	1.04 mg/kg dry	50	"	"	"	"	"	
	Unadjusted C9-C12 Aliphatic Hydrocarbons	39.1	0.345 mg/kg dry	50	"	"	"	"	"	
<u>VPH Target Analytes</u>										
Prepared by method VPH										
71-43-2	Benzene	BRL	69.0 µg/kg dry	50	"	"	"	"	"	
100-41-4	Ethylbenzene	BRL	69.0 µg/kg dry	50	"	"	"	"	"	
1634-04-4	Methyl tert-butyl ether	BRL	69.0 µg/kg dry	50	"	"	"	"	"	
91-20-3	Naphthalene	1,170	69.0 µg/kg dry	50	"	"	"	"	"	
108-88-3	Toluene	BRL	69.0 µg/kg dry	50	"	"	"	"	"	
1330-20-7	m,p-Xylene	BRL	138 µg/kg dry	50	"	"	"	"	"	
95-47-6	o-Xylene	BRL	69.0 µg/kg dry	50	"	"	"	"	"	
<u>Surrogate recoveries:</u>										
615-59-8	2,5-Dibromotoluene (FID)	81.8	70-130 %		"	"	"	"	"	
615-59-8	2,5-Dibromotoluene (PID)	82.2	70-130 %		"	"	"	"	"	
General Chemistry Parameters										
	% Solids	80.9	%	1	SM2540 G Mod.	10-Sep-05	10-Sep-05	5090621	BD	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Page 4 of 9

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090501 - VPH									
Blank (5090501-BLK1)									
Prepared: 08-Sep-05 Analyzed: 09-Sep-05									
C5-C8 Aliphatic Hydrocarbons	BRL	0.750 mg/kg wet							
C9-C12 Aliphatic Hydrocarbons	BRL	0.250 mg/kg wet							
C9-C10 Aromatic Hydrocarbons	BRL	0.250 mg/kg wet							
Unadjusted C5-C8 Aliphatic Hydrocarbons	BRL	0.750 mg/kg wet							
Unadjusted C9-C12 Aliphatic Hydrocarbons	BRL	0.250 mg/kg wet							
Benzene	BRL	50.0 µg/kg wet							
Ethylbenzene	BRL	50.0 µg/kg wet							
Methyl tert-butyl ether	BRL	50.0 µg/kg wet							
Naphthalene	BRL	50.0 µg/kg wet							
Toluene	BRL	50.0 µg/kg wet							
m,p-Xylene	BRL	100 µg/kg wet							
o-Xylene	BRL	50.0 µg/kg wet							
Surrogate: 2,5-Dibromotoluene (FID)	49.4	µg/kg wet	50.0		98.8	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	46.4	µg/kg wet	50.0		92.8	70-130			
LCS (5090501-BS1)									
Prepared: 08-Sep-05 Analyzed: 09-Sep-05									
C5-C8 Aliphatic Hydrocarbons	147	mg/kg wet	140		105	70-130			
C9-C12 Aliphatic Hydrocarbons	61.3	mg/kg wet	55.0		111	70-130			
C9-C10 Aromatic Hydrocarbons	35.9	mg/kg wet	40.0		89.8	70-130			
Unadjusted C5-C8 Aliphatic Hydrocarbons	278	mg/kg wet	280		99.3	70-130			
Unadjusted C9-C12 Aliphatic Hydrocarbons	97.2	mg/kg wet	85.0		114	70-130			
Benzene	18.9	µg/kg wet	20.0		94.5	70-130			
Ethylbenzene	18.2	µg/kg wet	20.0		91.0	70-130			
Methyl tert-butyl ether	18.8	µg/kg wet	20.0		94.0	70-130			
Naphthalene	19.0	µg/kg wet	20.0		95.0	70-130			
Toluene	18.7	µg/kg wet	20.0		93.5	70-130			
m,p-Xylene	37.0	µg/kg wet	40.0		92.5	70-130			
o-Xylene	19.0	µg/kg wet	20.0		95.0	70-130			
2-Methylpentane	20.8	µg/kg wet	20.0		104	70-130			
n-Nonane	20.3	µg/kg wet	20.0		102	70-130			
n-Pentane	23.9	µg/kg wet	20.0		120	70-130			
1,2,4-Trimethylbenzene	19.5	µg/kg wet	20.0		97.5	70-130			
2,2,4-Trimethylpentane	23.6	µg/kg wet	20.0		118	70-130			
n-Butylcyclohexane	21.5	µg/kg wet	20.0		108	70-130			
n-Decane	23.2	µg/kg wet	20.0		116	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	53.9	µg/kg wet	50.0		108	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	49.3	µg/kg wet	50.0		98.6	70-130			
LCS Dup (5090501-BSD1)									
Prepared: 08-Sep-05 Analyzed: 09-Sep-05									
C5-C8 Aliphatic Hydrocarbons	151	mg/kg wet	140		108	70-130	2.82	25	
C9-C12 Aliphatic Hydrocarbons	62.9	mg/kg wet	55.0		114	70-130	2.67	25	
C9-C10 Aromatic Hydrocarbons	32.2	mg/kg wet	40.0		80.5	70-130	10.9	25	
Unadjusted C5-C8 Aliphatic Hydrocarbons	277	mg/kg wet	280		98.9	70-130	0.404	25	
Unadjusted C9-C12 Aliphatic Hydrocarbons	95.0	mg/kg wet	85.0		112	70-130	1.77	25	
Benzene	18.0	µg/kg wet	20.0		90.0	70-130	4.88	25	
Ethylbenzene	17.3	µg/kg wet	20.0		86.5	70-130	5.07	25	
Methyl tert-butyl ether	19.2	µg/kg wet	20.0		96.0	70-130	2.11	25	
Naphthalene	18.2	µg/kg wet	20.0		91.0	70-130	4.30	25	
Toluene	18.0	µg/kg wet	20.0		90.0	70-130	3.81	25	
m,p-Xylene	35.4	µg/kg wet	40.0		88.5	70-130	4.42	25	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Volatile Organic Compounds - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090501 - VPH									
LCS Dup (5090501-BSD1)									
				Prepared: 08-Sep-05 Analyzed: 09-Sep-05					
o-Xylene	17.8	µg/kg wet	20.0		89.0	70-130	6.52	25	
2-Methylpentane	20.3	µg/kg wet	20.0		102	70-130	1.94	25	
n-Nonane	17.9	µg/kg wet	20.0		89.5	70-130	13.1	25	
n-Pentane	23.1	µg/kg wet	20.0		116	70-130	3.39	25	
1,2,4-Trimethylbenzene	18.3	µg/kg wet	20.0		91.5	70-130	6.35	25	
2,2,4-Trimethylpentane	21.3	µg/kg wet	20.0		106	70-130	10.7	25	
n-Butylcyclohexane	18.9	µg/kg wet	20.0		94.5	70-130	13.3	25	
n-Decane	18.5	µg/kg wet	20.0		92.5	70-130	22.5	25	
Surrogate: 2,5-Dibromotoluene (FID)	45.9	µg/kg wet	50.0		91.8	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	40.6	µg/kg wet	50.0		81.2	70-130			
Duplicate (5090501-DUP1)									
				Source: SA33385-03	Prepared: 08-Sep-05 Analyzed: 09-Sep-05				
C5-C8 Aliphatic Hydrocarbons	4.53	1.04 mg/kg dry		4.19			7.80	50	
C9-C12 Aliphatic Hydrocarbons	15.9	0.345 mg/kg dry		21.5			29.9	50	
C9-C10 Aromatic Hydrocarbons	23.1	0.345 mg/kg dry		17.6			27.0	50	
Unadjusted C5-C8 Aliphatic Hydrocarbons	4.62	1.04 mg/kg dry		4.26			8.11	50	
Unadjusted C9-C12 Aliphatic Hydrocarbons	38.9	0.345 mg/kg dry		39.1			0.513	50	
Benzene	BRL	69.0 µg/kg dry		BRL				50	
Ethylbenzene	BRL	69.0 µg/kg dry		BRL				50	
Methyl tert-butyl ether	BRL	69.0 µg/kg dry		BRL				50	
Naphthalene	1200	69.0 µg/kg dry		1170			2.53	50	
Toluene	BRL	69.0 µg/kg dry		BRL				50	
m,p-Xylene	BRL	138 µg/kg dry		69.0			18.2	50	
o-Xylene	BRL	69.0 µg/kg dry		BRL				50	
Surrogate: 2,5-Dibromotoluene (FID)	41.9	µg/kg dry	50.0		83.8	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	43.2	µg/kg dry	50.0		86.4	70-130			
Matrix Spike (5090501-MS1)									
				Source: SA33702-04	Prepared: 08-Sep-05 Analyzed: 09-Sep-05				
Benzene	15.9	µg/kg dry	20.0	BRL	79.5	70-130			
Ethylbenzene	15.6	µg/kg dry	20.0	BRL	78.0	70-130			
Methyl tert-butyl ether	16.0	µg/kg dry	20.0	BRL	80.0	70-130			
Naphthalene	16.5	µg/kg dry	20.0	BRL	82.5	70-130			
Toluene	15.7	µg/kg dry	20.0	BRL	78.5	70-130			
m,p-Xylene	31.9	µg/kg dry	40.0	BRL	79.8	70-130			
o-Xylene	16.1	µg/kg dry	20.0	BRL	80.5	70-130			
2-Methylpentane	19.2	µg/kg dry	20.0	BRL	96.0	70-130			
n-Nonane	18.1	µg/kg dry	20.0	BRL	90.5	70-130			
n-Pentane	20.6	µg/kg dry	20.0	BRL	103	70-130			
1,2,4-Trimethylbenzene	17.2	µg/kg dry	20.0	BRL	86.0	70-130			
2,2,4-Trimethylpentane	20.3	µg/kg dry	20.0	BRL	102	70-130			
n-Butylcyclohexane	17.5	µg/kg dry	20.0	0.0	87.5	70-130			
n-Decane	16.7	µg/kg dry	20.0	0.0	83.5	70-130			
Surrogate: 2,5-Dibromotoluene (FID)	48.9	µg/kg dry	50.0		97.8	70-130			
Surrogate: 2,5-Dibromotoluene (PID)	41.5	µg/kg dry	50.0		83.0	70-130			

General Chemistry Parameters - Quality Control

Analyte(s)	Result	*RDL Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch 5090621 - General Preparation									
Duplicate (5090621-DUP1)									
				Source: SA33873-02	Prepared & Analyzed: 10-Sep-05				
% Solids	54.5	%		56.0			2.71	20	

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* Reportable Detection Limit

BRL = Below Reporting Limit

Notes and Definitions

R-05	The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.
S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
vext2	Field extracted
BRL	Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and

Validated by:
Hanibal C. Tayeh, Ph.D.
Nicole Brown



Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

MADEP MCP ANALYTICAL METHOD REPORT CERTIFICATION FORM

MADEP RTN ¹:

This form provides certifications for the following Spectrum Analytical, Inc. work order #: SA33385

Matrix	☐ Groundwater	☒ Soil/Sediment	☐ Drinking Water	☐ Other
MCP SW-846 Methods Used	☐ 8260B	☐ 8151A	☐ 8330	☐ 6010B
	☐ 8270C	☐ 8081A	☒ VPH	☐ 6020
	☐ 8082	☐ 8021B	☐ EPH	☐ 7000S ³

1 List Release Tracking Number (RTN), if known

2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method

3 S - SW-846 Methods 7000 Series List individual method and analyte

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain of Custody documentation for the data set?	☒ Yes ☐ No
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	☒ Yes ☐ No
C	Does the data included in this report meet all the analytical requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
D	<u>VPH and EPH methods only</u> : Was the VPH or EPH method conducted without significant modifications (see Section 11.3 of respective methods)?	☒ Yes ☐ No

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all analytical QC performance standards and recommendations for the specified methods achieved?	☒ Yes ☐ No
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	☒ Yes ☐ No

All negative responses are addressed in a case narrative on the cover page of this report.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.



Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Date: 9/14/2005

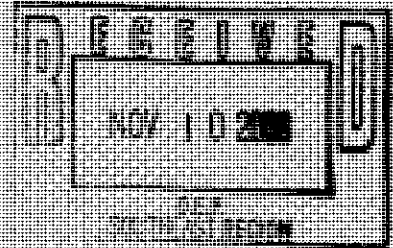
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* Reportable Detection Limit

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Page 9 of 9

SCANNED



PHASE II COMPREHENSIVE SITE
ASSESSMENT
EAGLE GAS INC.
131 MAIN STREET
CARVER, MASSACHUSETTS
RTN# 4-17582,
RELATED RTN#4-17825
VOLUME 2 OF 2

PREPARED FOR:

EAGLE GAS, INC.
NAJIB BADAQUI
131 MAIN STREET
CARVER, MASSACHUSETTS

FILE NO. 91-204092.00
NOVEMBER 2005

PREPARED BY:

ecs

MIDSTATE OFFICE PARK 27A MIDSTATE DRIVE SUITE 218 AUBURN, MA 01501
508.832.6022 FAX: 508.832.4603 WWW.ECSCONSULT.COM

APPENDIX H

Properties of Contaminants of Concern

	Equivalent Carbon	CAS	MP(°C)	Solubility ¹	VP	HC	Density	DV	KV	K _{ow}	K _{oc}	B	Rfd	Transformation Products
C5-C8 Aliphatics														
TPH Working Group	EC 5-6	NA	ND	3.6E+01	2.66E+02	3.4E+01	ND	ND	ND	ND	2.9	ND	ND	ND
TPH Working Group	EC>6-8	NA	ND	5.4E+00	4.79E+01	5.1E+01	ND	ND	ND	ND	3.6	ND	ND	ND
MADEP	6.5	NA	ND	1.1E+01	7.60E+01	5.4E+01	<1	ND	ND	<4	3.35	N-P	ND	ND
C9-C12 Aliphatics														
TPH Working Group	EC>8-10	NA	ND	4.3E-01	4.79E+00	8.2E+01	ND	ND	ND	ND	4.5	ND	ND	ND
TPH Working Group	EC>10-12	NA	ND	3.4E-02	4.79E-01	1.3E+02	ND	ND	ND	ND	5.4	ND	ND	ND
MADEP	10.5	NA	ND	7.0E-02	6.60E-01	6.5E+01	<1	ND	ND	<4	5.17	N-P	ND	ND
C9-C10 Aromatics														
TPH Working Group	EC>8-10	NA	ND	6.5E+01	4.79E+00	4.9E-01	ND	ND	ND	ND	3.2	ND	ND	ND
MADEP	9.5	NA	ND	5.1E+01	2.20E+00	3.3E-01	<1	ND	ND	<4	3.25	N-P	ND	ND
C9-C18 Aliphatics														
TPH Working Group	EC>8-10	NA	ND	4.3E-01	4.79E+00	8.2E+01	ND	ND	ND	ND	4.5	ND	ND	ND
TPH Working Group	EC>10-12	NA	ND	3.4E-02	4.79E-01	1.3E+02	ND	ND	ND	ND	5.4	ND	ND	ND
TPH Working Group	EC>12-16	NA	ND	7.6E-04	3.65E-02	5.4E+02	ND	ND	ND	ND	6.7	ND	ND	ND
TPH Working Group	EC>16-21	NA	ND	1.3E-06	5.78E-03	6.4E+03	ND	ND	ND	ND	9.0	ND	ND	ND
MADEP	12	NA	ND	1.0E-02	1.06E-01	6.9E+01	<1	ND	ND	<4	5.83	N-P	ND	ND
C19-C36 Aliphatics														
TPH Working Group	EC>16-21	NA	ND	1.3E-06	5.78E-03	6.4E+03	ND	ND	ND	ND	9.0	ND	ND	ND
MADEP	immobile	NA	NA	NA	NA	NA	<1	ND	ND	NA	NA	P	ND	ND
C11-C22 Aromatics														
TPH Working Group	EC>10-12	NA	ND	2.5E+01	4.79E-01	1.4E-01	ND	ND	ND	ND	3.4	ND	ND	ND
TPH Working Group	EC>12-16	NA	ND	5.8E+00	3.65E-02	5.4E-02	ND	ND	ND	ND	3.7	ND	ND	ND
TPH Working Group	EC>16-21	NA	ND	5.1E-01	5.78E-03	1.3E-02	ND	ND	ND	ND	4.2	ND	ND	ND
TPH Working Group	EC>21-35	NA	ND	6.6E-03	3.34E-06	6.8E-04	ND	ND	ND	ND	5.1	ND	ND	ND
MADEP	14	NA	ND	5.8E+00	2.43E-02	3.0E-02	<1	ND	ND	<4	3.70	N-P	ND	ND
Volatile Organics														
methyl-tertiary-butylether (MtBE)	1634-04-4	-109	4.80E+04	2.45E+02	ND	0.731	ND	ND	ND	ND	ND	N	5.20E-03	t-butanol
acetone	67-64-1	-94.6	4.41E+02	1.80E+02	3.46E+00	0.7899	ND	ND	ND	-0.24	-0.43	N-P	1.00E-01	None Known
2-butanone (MEK)	78-93-3	-86.9	2.68E+02	9.26E+01	1.98E+00	0.8054	ND	ND	ND	0.26	1.47	N-P	5.00E-02	peroxyacetyl nitrate, methyl nitrate
1,2 dibromoethane (EDB)	106-93-4	9.8	4.32E+03	1.74E+01	ND	2.172	ND	ND	ND	1.76	1.56	N-P	8.50E+01	ethylene, bromide ions, ethylene glycol
Volatile Aromatics														
benzene	71-43-2	5.5	1.78E+03	7.60E+01	5.43E-03	0.8765	0.6468	0.7379	2.13	1.81	N-P,D	5.00E-03	cis-benzene glycol	
toluene	108-88-3	-95.1	5.15E+02	2.20E+01	6.61E-03	0.8669	0.58	0.669	2.73	2.41	N-P,D	2.00E-01	cis-2,3-dihydroxyl-1-methylcyclohexa-1,4-diene	
ethylbenzene	100-41-4	-94.97	1.52E+02	7.00E+00	7.90E-03	0.867	0.678	0.782	3.15	2.83	D,A	1.00E-01	ND	
m-xylene	108-38-3	-47.9	2.00E+02	9.00E+00	6.91E-03	0.8642	0.608	0.717	3.2	2.84	N-P	2.00E+00	3-methyl-benzyl alcohol	
o-xylene	95-47-6	-25.2	1.70E+02	7.00E+00	4.94E-03	0.88	0.802	0.932	3.12	2.84	N-P	2.00E+00	ND	
p-xylene	106-42-3	13.3	1.98E+02	9.00E+00	7.01E-03	0.861	0.635	0.753	3.15	2.84	N-P	2.00E+00	4-methylbenzyl alcohol	
Semi-Volatiles														
naphthalene	91-20-3	80.2	3.10E+01	1.70E+03*	1.27E-03	1.162	NA	NA	3.3	3.11	D	4.00E-02	1-naphthol, cis-1,2-dihydroxyl-1,2-dihydronaphthalene	
Halogenated Semi-Volatiles														
PCB	12674-11-2	ND	5.70E-02	9.03E-04	7.50E+02	1.33	NA	NA	5.88	5.51	P	2.0E-05	bioaccumulates	

Properties of Contaminants of Concern

Non-Halogenated Semi-Volatiles (PAHs)

dibenzo (a,h) anthracene	53-70-3	262-265	2.49E-03*	2.78E-12*	1.70E+00*	1.282	NA	NA	6.80	6.52	ND	4.00E-02	ND
acenaphthene	83-32-9	96.2	3.88E+00*	2.79E+02	1.46E+01	1.225	NA	NA	3.92	3.7	D	ND	No data found
anthracene	120-12-7	216.3	7.5E-02*	3.40E+02	1.40E+02	1.25	NA	NA	4.45	4.1	A	ND	No data found
1,2-dichloroethane	107-06-2	-35.3	8.80E+03	8.35E+01	1.00E+01	1.2528	ND	ND	1.48	1.279	B	ND	carbon dioxide, 2-chloroethanol, vinyl chloride, ethylene glycol, 1,2-dithiolane
fluoranthene	206-44-0	107	2.65E-01*	1.00E-02	6.50E-06	1.252	NA	NA	4.9	4.58	A,N	4.00E-02	No data found
fluorene	86-73-7	116.7	1.90E+00*	2.98E+02	2.10E+01	1.203	NA	NA	4.18	3.9	A	ND	No data found
2-methylnaphthalene	91-57-6	34.58	2.54E+01*	6.80E-02*	5.06E-02*	1.0058	NA	NA	3.86	3.93	ND	4.00E-02	No data found
phenanthrene	85-01-8	100	1.18E+00	2.01E-04*	3.98E-05*	0.98	NA	NA	4.46	4.1	D	4.00E-02	catechol
pyrene	129-00-0	150	1.48E-01*	6.67E-06*	1.20E-05*	1.271	NA	NA	4.88	4.58	D,N	ND	No data found
sec-butylbenzene	135-98-8	-75.5	1.71E+02	1.73E+02	1.14E+00*	0.8621	ND	ND	4.24	2.95	ND	ND	No data found
isopropylbenzene	98-82-8	-96	4.83E+01*	1.52E+02	5.03E+00	0.8618	ND	ND	3.51	3.45	ND	ND	No data found
4-isopropylbenzene	98-82-8	-96	4.83E+01*	1.52E+02	5.03E+00	0.8618	ND	ND	3.51	3.45	ND	ND	No data found
n-propylbenzene	103-65-1	-99.5	6.02E+01*	1.59E+02	8.37E+00	0.862	ND	ND	3.69	2.87	ND	ND	phenyl acetic acid
1,2,4-trimethylbenzene	95-63-6	-43.8	5.19E+01*	1.69E+02	5.7E+00*	0.8758	ND	ND	3.78	3.57	NP	ND	3,4-dimethylbenzoic acid, glyoxal, methylglyoxal and biacetyl
1,3,5-trimethylbenzene	108-67-8	-44.7	9.77E+01*	1.65E+02	5.71E+00	0.8652	ND	ND	3.41	2.82	ND	ND	3,5-dimethylbenzoic acid, glyoxal, methylglyoxal and biacetyl
benzo(a)anthracene	56-55-3	167.0	1.40E-02	1.16E-09	4.50E-06	1.174	NA	NA	5.61	6.14	A	4.0E-02	3,4-, 8-9, and 10,11-dihydrois
benzo(b)fluoranthene	205-99-2	167.0	1.40E-02	5.00E-07	1.19E-05	ND	NA	NA	6.57	5.74	ND	4.0E-02	No data found
benzo(k)fluoranthene	207-08-9	217	4.30E-03	9.59E-11	3.94E-05	ND	NA	NA	6.06	5.74	ND	ND	No data found
benzo(a)pyrene	50-32-8	179	3.8E-03	5.49E-09	1.8E-05	ND	NA	NA	6.06	6.74	ND	ND	No data found
chrysene	218-01-9	254.0	6.00E-03	6.30E-09	1.05E-06	1.274	NA	NA	5.61	5.30	A,N	4.0E-02	quinones

Inorganics

lead	7439-92-1	327.4	Neg	1.74E+03	NA	11.34	NA	NA	NA	NA	P	7.50E-04	bioaccumulates
barium	7440-39-3	725	ND	1.14E+03	ND	3.51	ND	ND	ND	ND	ND	ND	No data found
cadmium	7440-43-9	320.9	Neg	NA	NA	8.642	NA	NA	NA	NA	P	5.0E-05	bioaccumulates
chromium	7440-47-3	1900.00	Neg	NA	NA	7.14	NA	NA	NA	NA	P	5.0E-03	bioaccumulates

Notes: VP = vapor point (mm Hg) at 25°C HC = Henry's Constant D = density (g/cm³) DV=dynamic viscosity MP = melting point
KV = kinematic viscosity K_{ow} = Octanol/Water Partition Coefficient (log) K_{oc} = Organic Carbon Partition Coefficient (log)
B = biodegradation potential Rfd = Chronic Oral reference dose (mg/Kg/day) Solubility in water (mg/L). Values at 20°C unless otherwise noted. *value at 25°C.
NA = not applicable ND = No data found Neg = Negligible

Biodegradation Notes: P = persistent N-P= non persistent A = significant degradation with gradual adaption
B = slow to moderate activity attending significant volatilization rate D = significant degradation with rapid adaption
N = not significantly degraded-precluded by extensive volatilization rate T = significant degradation with gradual adaption

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APPENDIX I

1.0 INTRODUCTION

On behalf of Eagle Gas, Inc. (Eagle), Environmental Compliance Services, Inc. (ECS), has prepared this Massachusetts Contingency Plan Method 3 Site Risk Characterization for a release of diesel fuel on the property at 131 Main Street in the Town of Carver, Massachusetts (the Site property, Figure 1). This risk characterization includes a brief description and history of the Site property and of releases associated with the Site property, a discussion of the nature and extent of residual contamination associated with the release, and an evaluation of potential risks to human health, the public welfare and safety, and the environment posed by conditions within the Disposal Site Area.

Conditions within the Disposal Site Area have been evaluated in a MCP Method 3 Risk Characterization. Potential exposure of Site workers, utility workers, construction workers, visitors, trespassers, and passersby, and current and potential future residents to residual contamination present within the Disposal Site Area has been evaluated. Conditions on the Site have been evaluated in terms of Imminent Hazard and Condition of Substantial Release Migration, and with respect to risk of harm to the public welfare and safety and the environment. It is concluded that conditions within the Disposal Site Area with respect to the release in question do not present a condition of No Significant Risk of harm to human health, now and for the reasonably foreseeable future. It is further concluded that a condition of No Significant Risk of harm to the public welfare or safety does not exist with respect to conditions associated with the release in question, due to the local presence of separate-phase petroleum on the water table. Current conditions within the Disposal Site Area constitute No Significant Risk of harm to the environment. It is therefore concluded that conditions with respect to the release in question do not present a condition of No Significant Risk of harm and that further remedial response actions are required.

2.0 BACKGROUND

2.1 SITE DESCRIPTION

The Site property is described in detail in Section 2.2 in the accompanying Phase II Comprehensive Site Assessment report (Phase II). The Site property is located on the western side of Main Street (State Route 58) in the central part of the Town of Carver, Massachusetts (Figure 1). Properties in the vicinity of the Site property are primarily residential (Figures 2 and 3). The Site property is improved with a wood-frame, slab-on-grade structure with a partial second story in the north. The footprint of the building is approximately 2,273 square feet. The ground floor of the building is occupied by service bays in the south and the office, reception, and bathroom areas in the north. An apartment is located on the second floor above the northern portion of the building (approximately 1,049 square feet footprint). The building is heated with fuel oil, stored in an above ground storage tank located west of the building. Waste oil is stored in an above ground storage tank within the bay area comprising the southern part of the building. The building is serviced by private drinking water and septic systems. Three five thousand gallon underground storage tanks for gasoline are located in the southern part of the Site property adjacent to Main Street. One four thousand gallon underground storage tank for diesel fuel is located in the northern part of the Site property adjacent to Main Street. The underground storage tank for diesel fuel located in the northern part of the property was formerly filled remotely via a line which extends from north to south across the property from the underground diesel tank to the vicinity of the underground gasoline storage tanks in the southern part of the Site property. This remote fill line for the underground diesel fuel storage tank has been

identified as the former source of the diesel fuel release on the Site property which is the subject of this report.

The Site property, and all developed properties in the vicinity of the Site property utilize private on-site water supplies and private on-site septic systems. On the Site property at 131 Main Street the existing water supply well is located in the southwestern corner of the Site building approximately 93 feet southwest of the former source area (Figure 2). A former water supply well on the property at 131 Main Street was located approximately 140 feet southwest of the former source area and approximately 43 feet southwest of the Site building.

Private water supply wells are also located on the residential properties east, southeast, and south of the Site property (Figure 3). A former water supply well was located approximately 130 feet east of the former source area on the residential property at 132 Main Street, east of the Site property. The current water supply well on this property is a bedrock well located approximately 200 feet east of the former source area on the Site property. A former water supply well on the property at 133 Main Street, south of the Site property, was located approximately 285 feet south of the former source area on the Site property. The current water supply well on this property is situated approximately 350 feet southwest of the former source area on the Site property. The private supply for the residence at 134 Main Street, southeast of the Site property¹, is located approximately 315 feet southeast of the former source area on the Site property in the southeastern corner of the basement of the residence. Based on available data, which consists of the analyses of between 2 and 8 samples from each location collected since December, 2004, no impacts to drinking water on or in the vicinity of the Site property associated with the release of diesel fuel which is the subject of this report have occurred.

The Site property was first developed as a petroleum dispensing facility circa 1940, according to available historical information. Two abandoned 1,000 gallon underground storage tanks, formerly used for gasoline, are situated beneath the northern part of the service station building. According to available information, these were closed in place in 1978.

The release which is the subject of this report was discovered in January 2003, during groundwater assessment activities related to a previously identified release of gasoline (Release Tracking Number (RTN) #4-13333)¹. At that time, a lens of separate-phase petroleum, subsequently determined to be diesel fuel, was detected in existing groundwater monitoring well BP-5RR, situated east of the central part of the Site property (Figure 2). The underground storage tank system was tightness tested on January 16, 2003. MADEP issued a Notice of Responsibility (NOR) for the release of diesel fuel on January 21, 2003 (RTN #4-17582). The remote fill line associated with the diesel underground storage tank was subsequently identified as the probable source of the release. Use of this line was subsequently discontinued.

In May 2003, petroleum impacts were observed at the outfall of the municipal storm water drainage system at South Meadow Brook, approximately 650 feet south of the former source area (Figure 3). MADEP issued an additional NOR (RTN #4-17825) for this release condition.

This report addresses both release tracking numbers (RTN #4-17582 and RTN #4-17825) associated with the release of diesel fuel on the Site property.

¹ RTN #4-13333 was assigned to a release of gasoline detected in September, 1997, during a groundwater sampling event.

The Disposal Site Area defined for this release of diesel fuel on the Site property (RTN #417582 and RTN #17825) consists of a polygonal area comprising approximately 3,000 square feet in the vicinity of the former source area at the Site property, the interior of the municipal surface water drainage line beneath Main Street extending south from the Site property (estimated at approximately 1,300 square feet area), and a small area near the outfall of the surface water drainage line at South Meadow Brook (approximately 200 square feet in area). In the vicinity of the former source area and the Site property, the Disposal Site Area consists of a roughly rectangular area approximately 40 feet long in a north-south direction and approximately 68 feet long in an east-west direction (Figure 3).

The northern boundary of the Disposal Site Area in the vicinity of the former source area is defined to the north by the absence of significant contamination in groundwater at wells DCW-5 and DCW-6. The absence of significant impacts to groundwater at the locations of wells DCW-9, BP-1, DCW-10, and BP-2 approximately define the eastern boundary of the Disposal Site Area (shown on Figure 3 as coinciding with the location of the eastern limb of the recovery trench beneath Main Street). The presence of very low or trace concentrations of extractable petroleum hydrocarbons in groundwater from wells MW-A and KEI-5, located in the southern part of the Site property, define the southern boundary of the Disposal Site Area in the immediate vicinity of the release area². The western boundary of the Disposal Site Area in the vicinity of the former source area is defined by the absence of significant contamination in groundwater from well DCW-8, west of the service station building.

Evidence indicates that contamination related to the diesel fuel release at the Site property migrates south from the vicinity of the Site property via the municipal storm water drainage system beneath Main Street. The release to surface water associated with the release to the subsurface which occurred on the Site property was assigned a separate Release Tracking Number (RTN #4-17825) by MADEP. The storm water drainage system in the vicinity of the Site property discharges to surface water in South Meadow Brook, at a point approximately 650 feet south of the former source area. Surface water at the outfall, and sediment in the immediate vicinity of the outfall, have been impacted by the release which is the subject of this report. The municipal storm water drainage line between the former source area and the discharge point at South Meadow Brook, the outfall at South Meadow Brook, and surface water and sediment in the immediate vicinity of the outfall, are therefore included in the Disposal Site Area defined for the diesel fuel release. Available evidence provides no indication of impacts to groundwater or soil associated with the release in question along the length of the surface water drainage line between that portion of the Disposal Site Area at the Site property and the outfall³.

The Disposal Site Area defined with respect to RTN #4-17582 and RTN #4-17825, indicated on Figure 3, does not include any domestic drinking water supplies on or in the vicinity of the Site

² Repeated analyses of groundwater from well MW-A, located south of the underground gasoline storage tanks on the Site property, indicates the presence of variable concentrations of MTBE and other constituents characteristic of gasoline. The absence, in groundwater at this location, of significant concentrations of constituents characteristic of diesel fuel, suggests the absence in this location of significant impacts associated with the release of diesel fuel which is the subject of this report. The boundaries of the Disposal Site Area defined for the release of diesel fuel are therefore defined excluding well MW-A.

³ For this reason, the Disposal Site Area is defined as the interior of the municipal surface water drainage line. The area in the vicinity of the surface water drainage line appears unimpacted by the release in question and is therefore excluded from the Disposal Site Area. The area impacted by the release within the municipal storm water drainage line is estimated at approximately 1,300 square feet (estimated on the basis of two square foot area per foot distance in the pipe). The impacted area in the vicinity of the outfall of the municipal surface water drainage line is conservatively estimated as an area approximately 20 feet long and 10 feet wide (approximately 200 square feet, when estimated as one-half of an ellipse with semi-major and semi-minor axes 20 and 10 feet long, respectively).

property, nor does it include the entire Site building. As discussed previously, available data provide no indication of impacts to existing drinking water supplies from the subject release, either on or in the vicinity of the Site property. These supplies are therefore considered to lie outside the Disposal Site Area defined for the release in question.

According to the Massachusetts Geographic Information System (MassGIS), the Disposal Site Area is situated within an area designated as a Sole Source Aquifer by the USEPA and a medium-yield Potentially Productive Aquifer by MADEP. The Disposal Site Area is located within 500 feet of an Interim Wellhead Protection Area defined around the community water supply for a commercial development north of the Disposal Site Area. The Disposal Site Area is not located within a Zone I or Zone II Wellhead Protection Area, or within the Zone A protection area around a Class A surface water used as a public water supply. Four non-community water supply wells are located within 500 feet of the Disposal Site Area (Figure 3). These wells are located on the Site property (131 Main Street) and on the residential properties at 132, 133, and 134 Main Street. Three former private water supply wells and one irrigation well are also located within approximately 500 feet of the Disposal Site Area (Figure 3). The Disposal Site Area extends to and includes a portion of South Meadow Brook, approximately 650 feet south of the former source area. South Meadow Brook flows to the south and is a tributary of the Weweantic River, which discharges to Buzzard's Bay in the vicinity of Wareham. The Weweantic River is considered a Class B (High Quality Warm Water) surface water between its source and Horseshoe Pond, downstream from the Disposal Site Area, and a Class SA (High Quality Shell Fishing) surface water downstream from Horseshoe Pond. Based on Priority Natural Resource Maps of the area prepared by MADEP and MassGIS, South Meadow Brook flows south from the vicinity of the Disposal Site Area, away from mapped or interim wellhead protection areas in the vicinity of the Disposal Site Area and therefore away from areas where induction of surface water to groundwater via pumping wells is likely. Available information indicates that water from South Meadow Brook is used for irrigation purposes.

2.2 REGULATORY BACKGROUND

The regulatory history and background of the Disposal Site is summarized in Section XX.

2.3 NATURE AND EXTENT OF CONTAMINATION

The nature and extent of residual contamination associated with the release in question is described in detail in the Phase II report.

The Disposal Site Area defined for the release of diesel fuel which is the subject of this report consists of roughly rectangular area of approximately 3,000 square feet in the vicinity of the former source area, a portion of the municipal storm water drainage system beneath Main Street between the Site property and South Meadow Brook, approximately 650 feet south of the former source area, and a small area near the discharge point of the surface water drainage system at South Meadow Brook. In total, the Disposal Site Area is estimated to comprise approximately 4,500 square feet of land (approximately 0.1 acres), including commercial/residential land on the Site property, state or municipal right-of-way in the vicinity of the Site property, and private or public land in the vicinity of South Meadow Brook, south of the Site property. The boundaries of the Disposal Site Area are largely defined by the extent of impacts to groundwater, surface water, and sediment. Residual soil contamination is present between approximately 8 and 15 feet below the surface in the immediate vicinity of the former source area.

2.3.1 Identification of Current and Potential future Uses of the Disposal Site Area

The Disposal Site Area comprises the eastern part of the Site property and a portion of the state right-of-way for Main Street (State Route 58). The Disposal Site Area also includes the interior of a municipal storm water drainage line extending south from the Site property approximately 650 feet to a discharge point at South Meadow Brook, and a small area of sediment impact within the brook.

That part of the Disposal Site Area on private, commercial land (the Site property) is currently used for commercial and residential purposes. Future use of this portion of the Disposal Site Area appears most likely to be solely commercial. The current partial residential use of the Site property (the apartment on the second floor of the existing building) may be discontinued in the near future. No known restrictions on future use of the Site property exist, however: future commercial-only use, continued commercial/residential use, or exclusively residential use of the Site property and the portion of the Disposal Site Area within the boundaries of the Site property is therefore possible. That portion of the Disposal Site Area consisting of state right-of-way appears most likely to remain in use as a right-of-way for the reasonably foreseeable future. Similarly, that portion of the Disposal Site Area within the municipal storm water drainage line, and that portion of the Disposal Site Area at and near the outfall of the storm water drainage line appear most likely to remain in their current use for the reasonably foreseeable future. Regulations which control the development of wetland resources may currently restrict certain forms of development of that portion of the Disposal Site Area at and near the outfall of the storm water drainage line on South Meadow Brook⁴. Recreational use of that portion of the Disposal Site Area in the vicinity of the outfall of the storm water drainage line at South Meadow Brook is not known to be precluded by any restriction currently in effect.

The Disposal Site Area is therefore currently used for commercial and residential purposes, as a state transportation right-of-way, utility right-of-way, and wetland or undeveloped land. Future use of the Disposal Site Area appears most likely to be similar to the current use. Alternative commercial or residential development of that portion of the Disposal Site Area within the boundaries of the Site property is not known to be precluded. Alternative use -- including residential, commercial, or recreational use -- of the remaining portions of the Disposal Site Area, which include the state right-of-way along Main Street, the municipal storm water drainage line south of the Site property, and the area near the outlet of the that line, appears unlikely, but is not strictly precluded.

2.3.1.1 *Identification of Soil and Groundwater Categories*

2.3.1.1.1 *Soil*

Soil within the Disposal Site Area is characterized for current and potential future use according to criteria based on frequency and intensity of use, and accessibility as outlined at 310 CMR 40.0933. Under current

⁴ The effect of such regulations on potential future exposures in this portion of the Disposal Site Area is unclear. In order to adequately assess the potential effects of exposure to residual contamination in this portion of the Disposal Site Area, it is presumed that passersby, visitors, and trespassers within the Disposal Site Area, and potential future residents within (or in the vicinity of the Disposal Site Area) experience substantial exposure to sediment and impacted surface water in this area.

conditions, soil within that portion of the Disposal Site Area within the boundaries of the Site property may be used by adult workers on the Site property and utility repair personnel (adults), and by patrons, visitors, trespassers and passersby (adults and children), and residents. Under potential future conditions, soil within this portion of the Disposal Site Area may be used by all current users, construction workers, and potential future residents in alternative use (i.e., solely residential) on the Site property. Under current conditions soil within that portion of the Disposal Site Area within the boundaries of the state right-of-way, including that portion of the Disposal Site Area within the municipal storm water drainage system beneath Main Street is used primarily by utility workers. Passersby may also potentially experience limited exposure to soil within this portion of the Disposal Site Area. Within that portion of the Disposal Site Area near the outfall of the municipal storm water drainage system at South Meadow Brook, trespassers, passersby, and utility workers appear to be most likely potential receptors. Under potential future conditions, it is presumed that soil within all parts of the Disposal Site Area may be subject to use by all sensitive receptors outlined above, in addition to construction workers and potential future residents. No institutional controls on current or potential future uses of the Disposal Site Area are in place or currently anticipated.

2.3.1.1.2 Frequency of Use

Under current conditions, frequency of use of soil within that portion of the Disposal Site Area within the boundaries of the Site property by adults is characterized as high since adults work in the area on a regular and continuing basis and reside in the area. Frequency of use of soil within the Disposal Site Area by children is characterized as low under actual current conditions since no children currently reside, attend school or daycare, or are known to visit the Disposal Site Area in large numbers on a regular basis; however, a portion of the existing Site building is currently utilized for residential purposes: it is therefore possible that children may reside within this portion of the Disposal Site Area without any significant change in use of the area. For the purposes of this risk characterization, due to the current residential use of the Site property, it is presumed that the frequency of use of soil within that portion of the Disposal Site Area within the boundaries of the Site property by adults and children is high. Frequency of use of soil within this portion of the Disposal Site Area under current conditions by utility workers is characterized as low, since established utilities are present in the area. Under potential future conditions, frequency of use of this portion of the Disposal Site Area by construction workers is characterized as low and frequency of use of soil by potential future residents (adults and children) is characterized as high.

For those portions of the Disposal Site within the state right-of-way, including that portion of the Disposal Site Area within the storm water drainage line in the area between the Site property and the outfall to the south, frequency of use of soil under current conditions by Site workers/residents and passersby and trespassers is considered low, since no one resides or is employed in the area on a regular basis. Under potential future conditions, frequency of use of soil within this portion of the Disposal Site Area by utility workers and construction workers is considered low. High frequency use of soil within this portion of the Disposal Site Area may accompany future residential development of this part of the Disposal Site Area.

That portion of the Disposal Site Area in the vicinity of the outfall of the surface water drainage line beneath Main Street south of the Site property at South Meadow Brook, is subject to low frequency use by trespassers and passersby, and low frequency use by utility workers under current conditions. Under potential future conditions, soil within this portion of the Disposal Site Area may be subject to low frequency use by construction workers and high frequency use by potential future residents (adults and children).

2.3.1.1.3 Intensity of Use

Under current conditions, intensity of use of soil within that portion of the Disposal Site Area within the boundaries of the Site property by children and adults is considered high, due to the current residential use of the property. Intensity of use of soil within that portion of the Disposal Site Area within the public right-of-way for Main Street by adults and children (including visitors and trespassers) is characterized as low, since activities associated with these receptors within this portion of the Disposal Site Area which currently or are likely to occur have little potential to disturb soil (walking, trespassing, etc.). Soil within that portion of the Disposal Site Area within the boundaries of the Site property and that portion of the Disposal Site Area within the public right-of-way may be subject to high intensity use by utility workers under current conditions. Due to the nature of the exposure, soil and/or sediment within that portion of the Disposal Site Area in the vicinity of the outfall of the surface water drainage line is considered to be subject to high intensity use by children and adults under current conditions.

Under potential future conditions, which may include residential use, all portions of the Disposal Site Area may be subject to high intensity use by children and adults.

2.3.1.1.4 Accessibility

The portion of the Disposal Site Area within the boundaries of the Site property is completely paved. A portion of the Disposal Site Area within the boundaries of the Site property is covered by the existing slab-on-grade building. Much of the Disposal Site Area within the boundaries of the public right-of-way is paved. No pavement is present near the outfall of the surface water drainage line south of the Site property (approximately 4% of the Disposal Site Area). Within the limited portions of the Disposal Site Area where no pavement is present, under current conditions soils between the surface and three feet below grade are considered accessible, those between 3 and 15 feet below grade are considered potentially accessible, while those present more than 15 feet below grade are considered isolated. Such areas include the area in the vicinity of the outfall of the municipal surface water drainage system, south of the Site property. Within those portions of the Disposal Site Area where pavement is present (approximately 95% of the area, including the estimated area of the underground drainage line), which includes most of the Disposal Site Area, soils between the surface and 15 feet below grade are considered potentially accessible, while those present more than 15 feet below grade are considered isolated under current conditions. Soil present beneath existing buildings, including the existing Site building, are considered isolated under current conditions. Under potential future conditions, soil between the surface and 15 feet below grade within the entire Disposal Site Area is considered accessible, while that present more than 15 feet below grade is considered isolated.

2.3.1.2 Soil Categorization

Under current conditions, therefore, accessible and potentially accessible soil present between the surface and 15 feet below grade within that portion of the Disposal Site Area within the boundaries of the Site property may be subject to high frequency, low intensity use by Site workers, high frequency, high intensity use by residents, low frequency, low intensity use by passersby, patrons, and trespassers (including adults and children), and low frequency, high intensity use by adult utility repair personnel. Such soils are classified as Category S-1 soils on the basis of the current residential use. Within that portion of the Disposal Site Area within the public right-of-way, potentially accessible soils beneath pavement may be subject to low frequency, low intensity use by passersby, and trespassers (including adults and children), and low frequency, high intensity use by adult utility repair personnel. Such soils are classified as Category S-2 soils under current conditions. In that portion of the Disposal Site Area located in the vicinity of the outfall of the surface water drainage system beneath Main Street, accessible and potentially accessible soils, and sediments, may be subject to low frequency, high intensity use by adults and children, and are considered Category S-1 soils. Under potential future conditions, soils between the surface and 15 feet below

grade may be subject to high frequency, high intensity use by residents (adults and children) and are therefore considered Category S-1 soils. Soils present more than 15 feet below grade are considered isolated, Category S-3 soils under current and potential future conditions.

2.3.2 Groundwater

The Disposal Site Area is situated within a Sole Source Aquifer, within a Current Drinking Water Supply Area, within a medium-yield Potentially Productive Aquifer, and within 500 feet of the Interim Wellhead Protection Area defined around a community water supply and within 500 feet of established non-community water supplies. All groundwater on and in the vicinity of the Disposal Site Area is therefore considered Category GW-1 groundwater. Groundwater is present less than 15 feet below grade on and in the vicinity of the Disposal Site Area: within 30 feet of existing occupied structures, therefore, groundwater is also classified as Category GW-2 groundwater. All groundwater on and in the vicinity of the Disposal Site Area is considered a potential source of discharge to surface water: all groundwater on and in the vicinity of the Disposal Site Area is therefore also classified as Category GW-3 groundwater. Groundwater on and in the vicinity of the Disposal Site Area is therefore generally classified as Category GW-1/GW-3 groundwater. Within 30 feet of an existing building, groundwater is also classified as Category GW-2 groundwater.

2.4 CONTAMINANTS OF CONCERN

2.4.1 Basis for Selection of contaminants of Concern

Selection of potential contaminants of concern (COCs) in soil, sediment, groundwater, and surface water within the Disposal Site Area is based in part of the results of analysis of numerous samples of soil, sediment, groundwater and surface water within and in the vicinity of the Disposal Site Area and in part on knowledge of and assumptions regarding the nature of the release⁵. Selection of potential COCs in soil is based in part on the results of quantitative analysis of 14 soil samples for volatile petroleum hydrocarbons according to MA VPH 97-1 (as revised), one soil sample for volatile organic compounds according to USEPA Method 8260B, and 10 soil samples for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised)⁶. Potential COCs in sediment are

⁵ As discussed previously, the release which is the subject of this report consisted of diesel fuel released from an underground remote fill line formerly located in the eastern part of the Site property. A release of gasoline, prior to the diesel fuel release, occurred on the Site property and resulted in documented impacts to soil and groundwater. The prior release of gasoline on the Site property may have resulted in local impacts to drinking water on and in the vicinity of the Site property. The results of long term sampling and analysis of samples collected from domestic drinking water supplies on and in the vicinity of the Site property provides no evidence of impacts to drinking water associated with the diesel fuel release which is the subject of this report. Persistent low concentrations of tetrachloroethene, detected only in the on-Site drinking water supply, existed prior to the release of diesel fuel. Accordingly, the Disposal Site Area defined for the release in question does not include any domestic drinking water supplies on or in the vicinity of the Site property. However, in order to conservatively and comprehensively summarize and evaluate conditions in the vicinity of the Disposal Site, potential risks associated with current drinking water-related exposures are evaluated. Potential COCs in drinking water, based on the results of quantitative analyses of all samples collected since December, 2004 are therefore determined and potential risks associated with the associated exposures are evaluated. Furthermore, it has been determined that impacts characteristic of gasoline to interior air within the existing Site building constitute a background condition, associated with current Site operations, or are related to the previous release of gasoline which occurred on the Site. As a background condition associated with current Site operations, the concentrations of volatile organic compounds detected

⁶ For five of the ten soil samples submitted for analysis according to MA EPH 98-1 (as revised), reporting of fuel oil/diesel target analytes only was requested.

determined on the basis of 7 sediment samples submitted for quantitative analysis for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). Selection of potential COCs in groundwater is based on the results of analysis of groundwater samples from 24 locations within and in the vicinity of the Disposal Site Area. Seventy-seven groundwater samples from locations within and in the vicinity of the Disposal Site Area were submitted for analysis for volatile petroleum hydrocarbons according to MA VPH 97-12 (as revised), and 80 groundwater samples were submitted for analysis for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). Potential contaminants of concern in surface water were determined in part on the basis of the results of analysis of 25 samples submitted for analysis according to MA VPH 97-12 (as revised) and 27 samples submitted for analysis for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). Potential COCs in drinking water were determined in part on the basis of the results of analysis of 22 samples submitted for analysis for volatile organic compounds according to USEPA 524.2 or 8260B and 3 samples submitted for quantitative analysis for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). Potential COCs in air are determined in part on the basis of the results of analysis of seven air samples collected in the vicinity of and within the existing Site building.

2.4.2 Contaminants of Concern in Soil

Potential COCs in soil include all volatile petroleum hydrocarbon fractional ranges (detected in 5 to 9 of 14 samples analyzed), all volatile petroleum hydrocarbon target analytes (detected in 1 to 7 of 15 samples analyzed), all extractable petroleum hydrocarbons fractional ranges (detected in 5 to 6 of 10 samples analyzed), and the extractable petroleum hydrocarbon target compounds naphthalene, 2-methylnaphthalene, acenaphthene, and phenanthrene (each detected in 3 of 10 samples submitted for the appropriate analysis). Potential COCs in soil are summarized, with frequency of detection and maximum detection, in Table 1.

2.4.3 Contaminants of Concern in Sediment

Potential COCs in sediment include all extractable petroleum hydrocarbons fractional ranges (detected in 5 to 7 of 7 samples analyzed), and the extractable petroleum hydrocarbon target compounds 2-methylnaphthalene and phenanthrene (detected in 3 to 7 of 7 samples submitted for the appropriate analysis). No sediment samples were submitted for analysis for volatile petroleum hydrocarbons. Potential COCs in sediment are summarized, with frequency of detection and maximum detection, in Table 2.

2.4.4 Contaminants of Concern in Groundwater

Potential COCs in groundwater include all volatile petroleum hydrocarbon fractional ranges (detected in 11 to 18 of 77 samples submitted for the appropriate analysis) and all volatile petroleum hydrocarbon target compounds (detected in 10 to 32 of 77 samples submitted for analysis). Potential COCs in groundwater also include all extractable petroleum hydrocarbon fractional ranges (detected in 5 to 11 of 80 samples submitted for analysis) and the extractable petroleum hydrocarbons target compounds naphthalene and 2-methylnaphthalene (detected in 16 and 13, respectively, of the 74 samples submitted for the

appropriate analysis). Potential COCs in groundwater are summarized, with frequency of detection and maximum detection, in Table 3.

2.4.5 Contaminants of Concern in Surface Water

Samples of surface water were collected from the municipal surface water drainage system beneath Main Street north (relatively upstream) and south (relatively downstream) from the Site property. Samples of surface water were also collected from the outfall of the municipal surface water drainage system at South Meadow Brook, approximately 650 feet south of the Site property. Twenty-five samples of surface water from these various locations were submitted for analysis for volatile petroleum hydrocarbons and 27 samples were submitted for analysis for extractable petroleum hydrocarbons. One sample of surface water was analyzed for volatile organic compounds according to USEPA Method 8260B. Concentrations of volatile petroleum hydrocarbon fractional ranges were detected in 1 to 4 of the 25 samples submitted for analysis for volatile petroleum hydrocarbons according to MA VPH 97-12 (as revised). Concentrations of extractable petroleum hydrocarbon fractional ranges were detected in 11 to 13 of the 27 samples submitted for the appropriate analysis. Naphthalene was detected in 2 of 27 surface water samples, while 2-methylnaphthalene was detected in 4 of 27 samples submitted. Tetrachloroethene was not detected in the single sample submitted for the appropriate analysis. Potential COCs in surface water are summarized, with frequency of detection and maximum detection, in Table 4.

2.4.6 Contaminants of Concern in Drinking Water

Water samples from existing drinking water supplies were collected from four locations in the vicinity of the Disposal Site Area (the Site property at 131 Main Street, and the residential properties at 132, 133, and 134 Main Street. The results of quantitative analysis of drinking water samples collected on and in the vicinity of the Site property since December 2004 provide no evidence of impacts to existing domestic water supplies associated with the release in question. In order to provide a comprehensive evaluation of conditions on the Site, however, the potential effects of consumption of drinking water derived from the on-site production well are evaluated. Since December 2004, 8 samples from the on-site drinking water supply have been collected and submitted for analysis for volatile organic compounds according to USEPA Method 524.2 and one sample has been collected and submitted for quantitative analysis for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). Potential COCs in drinking water derived from the on-site production well include MTBE (detected in 8 of 8 samples collected) and trace concentrations of tetrachloroethene (detected in 7 of 8 samples) from this location. Potential COCs in drinking water are summarized, with frequency of detection and maximum detection, in Table 5⁷.

⁷ COCs in drinking water are limited to MTBE and tetrachloroethene for evaluation of current exposures only. As noted previously, the existing on-site drinking water well is not currently used for consumptive purposes, but functions as a well and is presumably used for bathing and washing, and may be used for cooking. For potential future exposures within the Disposal Site Area, however, which may include exposures associated with the unrestricted use of the groundwater resource for drinking water, potential risks are evaluated with respect to COCs in groundwater.

2.4.7 Contaminants of Concern in Air

It has been determined that the presence of concentrations of volatile aromatic compounds characteristic of gasoline in interior air within the existing on-site building is likely associated with the current use of the property as a gasoline station or with the prior documented release of gasoline on the Site. In order to provide a conservative and comprehensive evaluation of potential risks associated with the Site, potential COCs in ambient air detected within the existing Site building are evaluated for potential risk under current conditions. Potential COCs in air are determined, for the purposes of this risk characterization, on the basis of the results of analysis of seven samples of ambient air collected outside the existing service station building, within the first floor working area of the building, within the reception area in the building, and within the second floor living area of the building. On this basis potential COCs in air evaluated here include all Air Petroleum Hydrocarbon (APH) fractional ranges (detected in 2 to 6 of the 7 samples), and benzene (detected in 6 of 7 samples), toluene (detected in 7 of 7 samples), ethylbenzene (detected in 5 of 7 samples), xylenes (detected in 6 of 7 samples), and MTBE (detected in 7 of 7 samples). Potential COCs in air are summarized, with frequency of detection and maximum detection, in Table 6.

2.4.8 Background Concentrations

Background concentrations are those concentrations chemicals, attributable to natural or anthropogenic sources, which would be present at the Disposal Site in the absence of the release(s). Background concentrations of certain metals in soil have been established by the Office of Research and Standards, MADEP (MADEP/ORS, 1995. *Guidance for Disposal Site Risk Characterization, In Support of the Massachusetts Contingency Plan*, BWSC/ORS #141-95). Anthropogenic background concentrations of certain metals and polycyclic aromatic hydrocarbons in soil have been published (MADEP/ORS, 2002. *Anthropogenic Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil*). No promulgated standards for background concentrations in groundwater, sediment, or surface water exist. Background levels for certain volatile contaminants in interior air have been published (MADEP/ORS, 2003. *Development of MCP Risk-Based Levels for Soil and Groundwater*⁸).

The average and maximum concentrations of naphthalene, 2-methylnaphthalene, and phenanthrene detected locally in soil within the Disposal Site Area exceed promulgated background levels for clean, native soils: these compounds are therefore retained as Site COCs. The maximum concentration of acenaphthene detected in soil within the Disposal Site Area exceeds promulgated background levels for clean, native soil. The average concentration of acenaphthene detected in soil within the Disposal Site Area does not exceed the promulgated background level. Acenaphthene is therefore also retained as a Site COC.

The maximum concentrations of benzene and xylenes detected samples of ambient air collected within and in the vicinity of the Site building are below established background levels of those compounds established for interior air within private residences: benzene and xylenes are therefore excluded from consideration as Site COCs (Table 6). The maximum concentrations of toluene, ethylbenzene, MtBE, and the APH hydrocarbon fractional ranges

⁸ USEPA National Ambient Volatile Organic Compounds Database Update, 2/88, EPA/600/3-88/010(a) (Table V-2, page 40, 75th percentile value).

are above established background levels or recommended background levels for ambient air in private residences: these compounds are therefore retained for evaluation as Site COCs in air.

2.4.9 Summary: Contaminants of Concern

Site COCs in soil include all volatile petroleum hydrocarbon fractional ranges, all volatile petroleum hydrocarbon target analytes, all extractable petroleum hydrocarbons fractional ranges, and the extractable petroleum hydrocarbon target compounds naphthalene, 2-methylnaphthalene, acenaphthene, and phenanthrene. COCs in sediment include all extractable petroleum hydrocarbon fractional ranges and the extractable petroleum hydrocarbon target compounds 2-methylnaphthalene and phenanthrene. Site COCs in groundwater include all volatile petroleum hydrocarbon fractional ranges, all volatile petroleum hydrocarbon target compounds, all extractable petroleum hydrocarbon fractional ranges, and the extractable petroleum hydrocarbons target compounds naphthalene and 2-methylnaphthalene. COCs in surface water include all volatile petroleum hydrocarbon fractional ranges, all extractable petroleum hydrocarbon fractional ranges, and the extractable petroleum hydrocarbon target compounds naphthalene and 2-methylnaphthalene.

COCs in drinking water derived from the on-site production well and in ambient air within the existing on-Site building are evaluated, although the presence of these compounds in drinking water and ambient air is unrelated to the release which is the subject of this report. COCs in drinking water from the on-site production well include MTBE and tetrachloroethene. COCs in air include all hydrocarbon fractional ranges aliphatic petroleum hydrocarbons in the C₅ to C₈ range, and toluene, ethylbenzene, and MTBE.

2.4.10 Toxicity Profiles

Toxicity profiles for Site COCs are summarized in Table 7. Brief toxicological profiles of Site COCs are included in Exhibit A.

2.4.11 Identification of Applicable or Suitably Analogous Standards

Applicable or suitable analogous standards are formally promulgated standards intended to protect human health and the environment from adverse effects of hazardous agents. Such standards are media-specific. There are no applicable or suitably analogous standards available for Site COCs in soil, sediment, or air. The Disposal Site Area is situated within an area considered a Sole Source Aquifer and a Potentially Productive Aquifer, Medium yield: federal and state drinking water standards therefore apply to groundwater on the Site. Groundwater impacted by the release on the Site appears to discharge to surface water in South Meadow Brook via the municipal surface water drainage system beneath Main Street. South Meadow Brook is not considered a Class A surface water and is not utilized as a drinking water source. Federal Ambient Water Quality Criteria promulgated under the Clean Water Act (40 CFR 131) are presumed to apply to surface water potentially impacted by the discharge of groundwater derived from the Site.

3.0 DOSE RESPONSE ASSESSMENT

The dose-response assessment summarizes and provides a means of quantitatively estimating the effects of human exposure to contaminants. Values which reflect the applied dose of a contaminant are compared to empirically derived values of dose which levels which result in no adverse effect in sensitive human receptors or an acceptably low probability of adverse effects. The primary source of these empirical values is the Integrated Risk Information System (IRIS) database maintained by USEPA, which provides an extensive list of peer-reviewed dose-response information. Other sources include the National Center for Environmental Assessment, which provides provisional values of certain dose-response factors, Health Effects Summary Tables (HEAST, FY 1997 Update, EPA-540-R-97-036) and Risk-Based Concentration (RBC) tables published by USEPA, the Agency for Toxic Substances and Disease Registry (ATSDR), and the Massachusetts DEP, which specifically provides dose response information for volatile and extractable petroleum hydrocarbon fractions. The IRIS database includes peer-reviewed summaries of toxicological studies, describes the most significant studies, the doses administered, and the nature of the effects observed. The IRIS database in many cases provides, based on a conservative review of the available published studies, estimates of numerical values which relate dose and effect. Other sources of dose-response information may provide less definitive or provisional estimates of the same values.

Dose-response information is quantified, for oral exposures, in terms of the Reference Dose (RfD) or Cancer Slope Factor (CSF) for threshold and non-threshold effects, respectively. For inhalation exposures, the analogous values are the Reference Concentration (RfC) and Inhalation Unit Risk (UR). These values are numerical estimates, based on laboratory or epidemiological studies, of the potential effects of exposure to sensitive human populations. Dose-Response information for the Contaminants of Concern is summarized in Table 7. Brief summaries of toxicological information for Site COCs are included in Exhibit A.

3.1 Dose-Response Information for Non-Carcinogenic Compounds

Reference Dose values are developed from the findings of laboratory studies on animals and epidemiological studies on affected human populations for non-carcinogenic (threshold) effects. The RfD value is an estimate, based on such studies modified by uncertainty factors associated with the nature of the study and factors which account for intra-species variation if applicable, which represents the threshold dose which does not pose a significant risk of adverse effects in sensitive humans. RfD values are expressed as the dose of the compound (in milligrams) per kilogram receptor body weight, per day (mg/Kg/day). Reference Concentrations (RfCs) are the analogous values for inhalation threshold effects, expressed as concentrations (milligrams per cubic meter (mg/m³)).

3.2 Dose-Response Information for Carcinogenic Compounds

For carcinogenic compounds every non-zero exposure is believed to be associated with some incremental increased risk. Dose-response factors for carcinogenic compounds are derived from the largest linear slope of the dose-response curve as determined in laboratory or epidemiological studies (Cancer Slope Factor, reciprocal milligrams per kilogram per day (mg/Kg/day)⁻¹). Inhalation Unit Risks (UR), expressed in terms of reciprocal concentrations (1/microgram per cubic meter (μg/m³)⁻¹), represent the incremental increase in cancer risk associated with lifetime exposure to the compound a concentration of 1 μg/m³.

3.3 Relative Absorption Factors

Relative Absorption Factors (RAFs) are used to adjust the value of the dose received under field conditions to that received in the laboratory studies upon which most toxicity values are based. RAFs are specific to the chemical, the matrix, and the route of administration. RAFs for COCs summarized in Table 7 were adopted from DEP guidance (MADEP, 1992, 1995).

4.0 EXPOSURE ASSESSMENT

4.1 DISPOSAL SITE SETTING AND SENSITIVE RECEPTORS

The Disposal Site Area defined for the release of diesel fuel which is the subject of this report consists of roughly rectangular area of approximately 3,000 square feet in the vicinity of the former source area, a portion of the municipal storm water drainage system beneath Main Street between the Site property and South Meadow Brook, approximately 650 feet south of the former source area, and a small area near the discharge point of the surface water drainage system at South Meadow Brook. In total, the Disposal Site Area is estimated to comprise approximately 4,500 square feet of land (approximately 0.1 acres), including commercial/residential land on the Site property, state or municipal right-of-way in the vicinity of the Site property, and private or public land in the vicinity of South Meadow Brook, south of the Site property. The boundaries of the Disposal Site Area are largely defined by the extent of impacts to groundwater, surface water, and sediment. Residual soil contamination is present between approximately 8 and 15 feet below the surface in the immediate vicinity of the former source area.

The Site property is currently used for commercial and residential purposes. A gasoline station is operated on the Site property. The underground storage tank system is comprised of three underground storage tanks for gasoline located in the southern part of the Site property, one underground storage tank for diesel fuel located in the northern part of the Site property, and dispensers situated in the east-central part of the Site property. The Site building, located in the west-central portion of the Site property, consists of a slab-on-grade two story wood-frame structure. The ground floor of the structure is used for commercial purposes associated with the gasoline station. The second floor of the structure is currently used for residential purposes. Developed properties abutting and in the vicinity of the Site property consist of single family residential properties. No schools or institutions are known to be located within 500 feet of the Site property. The Site property, and all properties in the vicinity of the Site property, utilize private drinking water supply wells completed in bedrock or in overburden, and on-site sanitary sewage disposal. The Disposal Site Area and the area in the vicinity of the Disposal Site Area is designated a Sole Source Aquifer by USEPA and a Potential Productive Aquifer, Medium Yield by MADEP. No surface water is present on or in the immediate vicinity of the Site property. Impacts associated with the release which is the subject of this report have been observed in surface water located approximately 650 feet south of the former source area, in South Meadow Brook, a Class B water.

4.2 POTENTIAL HUMAN RECEPTORS

Potential sensitive receptors to residual contamination within the Disposal Site Area under current conditions include workers within the Disposal Site Area, patrons, visitors, trespassers, and passersby within the Disposal Site Area, and utility workers within the Disposal Site Area, which includes a portion of the Site property and the interior of a municipal surface water drainage line

beneath Main Street in the area between the Disposal Site Area and South Meadow Brook, approximately 650 feet to the south⁹. Under current conditions, the single adult Site worker resides in the apartment in the partial second floor of the Site building. Evaluation of potential exposures for this receptor therefore certain additional exposures associated with residential use of the property. Potential sensitive receptors under possible future conditions include all current receptors, potential future residents within the Disposal Site Area, and construction workers. Potential human receptors under current and potential future Site conditions, their ages and generalized physical characteristics, the locations of potential exposure points, the types of exposure, media, and potential exposure routes are summarized in Table 8. Exposure assumptions are summarized in Table 9 and are discussed briefly below.

4.2.1 Site Workers

Current Site workers may receive exposure via incidental ingestion of and dermal contact with soil and inhalation and ingestion of fugitive dust derived from soil within the Disposal Site Area. Site workers are presumed to receive exposure to volatile organic compounds present in ambient air within the existing Site building, and to trace levels of contaminants present in the on-site drinking water supply¹⁰. Site workers are not presumed to receive significant exposure associated with ingestion or dermal contact with sediment or surface water¹¹. Site workers are modeled as females between the ages of 18 and 25 with a median body weight of 57.1 kilograms (kg) who may be present on the Site for 11 years. Exposure occurs for 8 hours a day for 240 days a year (five days a week for 48 weeks, with two weeks of vacation and two weeks of holidays and other time off).

4.2.1.1 *Soil Ingestion:*

Site workers are presumed to ingest 50 milligrams (mg) of soil per day (per exposure event) on the Site. All soil is presumed to derive from the Disposal Site Area.

⁹ Available data provides no indications of releases to soil or groundwater from the municipal storm water drainage line in the area between the Site property and the discharge of the line at South Meadow Brook, 650 feet south of the Site. Evidence suggests that groundwater, including impacted groundwater in the vicinity of the Site property, discharges to the underground municipal storm water drainage line, but that water within the storm water drainage line does not discharge to groundwater in the area south of the Site property.

¹⁰ Concentrations of volatile organic compounds characteristic of gasoline have been detected during two rounds of sampling ambient within the existing Site building. The presence of volatile organic compounds in interior air within the existing Site building is attributed to current Site operations and is therefore considered a background condition. Potential exposure to the observed concentrations of volatile organic compound vapors within the existing Site building is nevertheless evaluated here, in order to provide a comprehensive and conservative evaluation of potential risks presented by conditions within the Disposal Site Area. Due to current conditions, in which the single adult Site worker also resides within the existing Site building, this receptor is presumed to receive certain additional exposures, specifically to interior air and to drinking water. As noted previously, low concentrations of MTBE and tetrachloroethene have been detected in the on-site drinking water supply. The presence of these compounds in drinking water from the on-site production well predates the release of diesel fuel which is the subject of this report and are considered to be unrelated to the release in question. Furthermore, under current conditions, the on-site drinking water well is not used for consumptive purposes, according to available information. However, because exposure via drinking water-related pathways is possible for current Site workers, such exposures are evaluated here with respect to the observed contaminant concentrations in the on-site product well. Potential future Site workers are presumed to experience all drinking water-related exposures.

¹¹ Such exposure is presumed to occur only remote from the Site property, near the outfall of the municipal surface water drainage system at South Meadow Brook, approximately 650 feet south of the Site property.

4.2.1.2 Soil Dermal Contact:

Site workers are presumed to be exposed to soil via dermal contact at a rate of 0.03 milligrams per square centimeter (mg/cm^2) during exposure events¹². Approximately 30% of their total body area (hands, forearms, lower legs, and feet) is exposed (approximately 5,040 square centimeters (cm^2), median value for adult female, *Guidance for Disposal Site Risk Characterization In Support of the Massachusetts Contingency Plan*. MADEP/ORS, 1995, #141-95, Appendix B). All soil is presumed to derive from the Disposal Site Area.

4.2.1.3 Ingestion/Inhalation of Fugitive Dust:

Site workers may be exposed to fugitive dust derived from the release area on the Site. The concentration of fugitive dust (entirely derived from Site soils) is presumed to be 60 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$ —corresponding to a construction environment) at a ventilation rate of 3.6 cubic meters per hour (m^3/hr) for 8 hours per day for 240 days per year. Inhalation and ingestion of fugitive dust derived from the site is modeled to accommodate particles which are inhaled (inhalation exposure) and those which are inhaled and subsequently ingested (inhalation-gastro-intestinal (GI) exposure)¹³. All respirable particles are presumed to derive from the Disposal Site Area.

4.2.1.4 Inhalation of Contaminant Vapors in Interior Spaces:

Potential exposure under current conditions to volatile organic compound vapors detected in interior air within the existing Site building is evaluated. The presence of volatile organic compounds in interior air within the building is attributed to current operations on the Site and is not associated with the release in question. Concentrations of volatile organic compounds in interior air within the existing Site building are therefore considered a background condition which by definition presents No Significant Risk of harm to human health. Nevertheless, in order to conservatively evaluate conditions within the Disposal Site Area with respect to potential harm to human health, the potential effects of exposure to volatile organic compounds in interior air within the existing Site building are evaluated. Potential exposure point concentrations within the existing Site building are based on the results of the sampling round conducted in January, 2006, which is presumed to best represent potential worst-case conditions with respect to interior air within the existing structure. Current Site workers are presumed to be exposed to contaminant vapors for 8 hours per day at levels represented by the observed contaminant concentrations in the office/reception area on the ground floor of the

¹² MADEP ORS, February, 2002. Draft Technical Update: Weighted Skin-Soil Adherence Factors. The value used here is for outdoor commercial/industrial workers.

¹³ MADEP ORS, February, 2002. Draft Technical Update: Characterization of Risks Due to Inhalation of Particulates by Construction Workers. According to this guidance: 100% of respirable particulate mass is equal to or less than 30 microns in diameter ($\leq\text{PM}-30$) (DEP, 1997); 40% of total respiratory particulate mass is equal to or less than 10 microns in diameter ($\leq\text{PM}-10$); 100% of inhaled particulates greater than 10 microns but less than or equal to 30 microns are swallowed; 50% of inhaled particulates equal to or less than 10 microns are swallowed (DEP, 1997), and; 50% of inhaled particulates equal to or less than 10 microns enters the lungs (DEP, 1997). The concentration, based on these assumptions, of respirable particulates which enter the gastro-intestinal system is therefore twice the PM_{10} , while the concentration of respirable particulates which are inhaled and enter the lungs, is 0.5 times PM_{10} .

existing Site building, and for 16 hours per day at levels represented by the observed contaminant concentrations in the second floor apartment in the Site building. Such exposure is presumed to occur for 365 days per year.

4.2.1.5 Ingestion of Drinking Water:

Current and potential future Site workers may be exposed to contamination via ingestion of drinking water produced from the existing groundwater production well on the Site property or from wells which may be installed within the Disposal Site Area. Site workers are presumed to ingest two liters per day of drinking water derived from groundwater while on Site, 365 days per year for 30 years. Potential exposure point concentrations under current conditions are estimated from the average concentrations of Site COCs detected in samples of water from the on-site production well. Potential exposure point concentrations under future possible conditions are represented by the estimated exposure point concentrations in groundwater in the vicinity of monitoring wells DCW-1, DCW-2, ECS-1, and ECS-4 – representing current worst-case conditions with respect to groundwater quality on the Site property.

4.2.1.6 Dermal Contact with Drinking Water:

Current and potential future Site workers are presumed to be potentially exposed to contamination via dermal contact with water produced from the existing production well on the Site property or from other production wells which may be installed on the Site¹⁴. Exposure is presumed to occur during a daily shower in water produced on Site. Body surface area (skin area available for contact) is presumed to be 16,900 cm² (adult female Site worker). Estimates of the absorbed dose per event are based on a two layer model described in USEPA 2004 (*Risk Assessment Guidance for Superfund (RAGS) Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment*. Chapter 3, Section 3.1)), and follows the implementation in *Proposed GW-1 Standards*, MADEP: Fall, 2004, and MADEP/ORS, August, 2004: *Method 3 Risk Assessment for Chemicals in Drinking Water Short form 2004*. Assumptions regarding shower frequency and duration are consistent with those of MADEP/ORS August, 2004. Under current conditions, potential exposure to water represented by the results of analysis of samples from the existing Site water supply is presumed to exist. Under potential future conditions, similar exposure, and potential exposures to alternative sources of water, represented by the results of analysis of groundwater samples from wells DCW-1, DCW-2, ECS-1, and ECS-4 – representing worst-case current conditions with respect to groundwater quality on the Site property – are evaluated.

¹⁴ According to available information, the existing drinking water supply on the Site property is not used as drinking water – bottled water being provided. It appears unclear, however, whether cooking, washing, or bathing, or other activities which may involve ingestion, dermal contact, or inhalation of vapors derived from water from the on-site production well, occur on the Site. For the purposes of this risk characterization, it is presumed that all exposure pathways typically associated with drinking water (ingestion, dermal contact, and inhalation during showering or bathing) current exist for the Site worker.

4.2.1.7 Inhalation of Vapors Derived from Drinking Water:

Current and potential future Site workers may be exposed to contamination through inhalation of vapors derived from groundwater used for drinking and bathing. Exposure is presumed to occur predominately during a daily shower in water produced from groundwater within the Disposal Site Area. Assumptions regarding shower duration and time within the shower room, the size and ventilation of the shower room, water temperature, droplet size and fall time and other parameters are those of MADEP/ORS. 2004. *Proposed GW-1 Standards*, and MADEP/ORS, August, 2004: *Method 3 Risk Assessment for Chemicals in Drinking Water Shortform 2004*. Potential exposure point concentrations are derived according to the Foster and Chrostowski shower model¹⁵. For on-site exposures under current conditions, potential exposure point concentrations estimated from repeated analyses of samples from the on-site groundwater production well are derived. To evaluate potential future conditions, source contaminant concentrations represented by current estimated exposure point concentrations for groundwater in wells DCW-1, DCW-2, ECS-1, and ECS-4 are used.

4.2.2. Utility Workers

Under current conditions, utility workers may be exposed to residual contamination in subsurface soils within the Disposal Site Area during repair or replacement of existing underground utilities. Utility workers are presumed to receive exposure from incidental ingestion of soil, dermal contact with soil, ingestion and inhalation of fugitive dust derived from soil within the Disposal Site Area, and via direct contact with groundwater and inhalation of contaminant vapors derived from groundwater in trenches or excavations within the Disposal Site Area. Utility workers are not presumed to receive significant exposure via drinking water-related pathways, or via exposure to sediment or surface water¹⁶. Utility workers are modeled as females between the ages of 18 and 25 with a median body weight of 57.1 kg. Body surface area is assumed to be 16,900 cm² (MADEP 141-95, 1995, Appendix B). All exposure within the Disposal Site Area is presumed to occur during one day within the Disposal Site Area (ibid., Appendix B).

4.2.2.1 Soil Ingestion:

Utility workers are presumed to ingest 100 mg of soil per day¹⁷ during their exposure. All soil is presumed to derive from the Disposal Site Area.

¹⁵ Foster, S.A. and P.C. Chrostowski. 1986. *Integrated Household Exposure Model for Use of Tap Water Contaminated with Volatile Organic Chemicals*. 79th Annual Meeting of the Air Pollution Control Association. Minneapolis, MN.), and Foster, S.A. and P.C. Chrostowski, 1987. *Inhalation Exposures to Volatile Organic Contaminants in the Shower*. Presentation at the 80th Annual Meeting of the Air Pollution Control Association. New York, NY. June 21-26, 1987.

¹⁶ Strictly, utility workers may experience limited exposure to surface water within the municipal drainage system beneath Main Street or at the outfall of that system at South Meadow Brook during repairs to that system. It is presumed that the potential effects of such exposure are conservatively modeled by the estimated exposures associated with exposure to groundwater and vapors in excavations and trenches within the Disposal Site Area.

¹⁷ MADEP/ORS, 2002. Draft Technical Update. Calculation of an Enhanced Soil Ingestion Rate.

4.2.2.2 Soil Dermal Contact:

Dermal contact with contamination is presumed to occur at the rate of 0.29 mg/cm^2 for an exposed skin surface of approximately 30% of the total body surface area: $5,040 \text{ cm}^2$ -- hands, forearms, lower legs, and feet¹⁸. All soil is presumed to derive from the Disposal Site Area

4.2.2.3 Ingestion/Inhalation of Fugitive Dust:

Utility workers are presumed to inhale and/or ingest airborne particles at a concentration of $60 \text{ } \mu\text{g/m}^3$ at a ventilation rate of $3.6 \text{ m}^3/\text{hr}$ for 8 hours per day on the day on which exposure occurs. All respirable particles are presumed to derive from the Disposal Site Area. Inhalation and inhalation/ingestion of fugitive dust is modeled as described above.

4.2.2.4 Direct Contact with Groundwater:

Utility workers are presumed to receive limited direct contact exposure to contaminated groundwater during the performance of deep excavations within the Disposal Site Area. It is presumed that utility workers may receive exposure on 5% of their skin area (hands, forearms, and feet -- approximately 845 cm^2) for one 8 hour period during their one day on the Site. Potential exposure point concentrations for this exposure are derived from the estimated exposure point concentrations in groundwater at wells DCW-1, DCW-2, ECS-1, and ECS-4 -- representing worst-case conditions with respect to groundwater quality within the Disposal Site Area¹⁹.

4.2.2.5 Inhalation of Contaminant Vapors During Trenching:

Utility workers may also receive limited exposure via inhalation of contaminant vapors derived from groundwater and/or saturated soils during the performance of deep excavations on the Site. Exposure is presumed to occur once for 8 hours during their single day on the Site. Vapor exposure point concentrations in trenches are estimated as air emissions from a quiescent impoundment following methodology outlined below. Estimated exposure point concentrations in groundwater at wells DCW-1, DCW-2, ECS-1, and ECS-4 -- representing current worst-case conditions with respect to groundwater quality within the Disposal Site Area -- are considered potential contaminant source concentrations²⁰.

¹⁸ MADEP/ORS, 2002. Weighted Skin-Soil Adherence Factors. Draft Technical Update.

¹⁹ Potential exposure point concentrations for dermal contact with groundwater and inhalation of vapors derived from groundwater in trenches are derived from observed dissolved contaminant concentrations in groundwater in the vicinity of the release area. Note that separate-phase product is present locally in the vicinity of the release area and therefore, potential exposure of utility and construction workers to separate phase product, via direct contact or via inhalation in trenches, is possible. Such exposure is assumed to present a significant risk of harm to human health, but is not explicitly evaluated here. Also note that, under a possible exposure scenario of repair of the underground storm water drainage line in the area between the Site property and the discharge point at South Meadow Brook south of the Site property, utility workers may be exposed to contaminant concentrations present in water within the storm water drainage line. Modeled exposures to contaminant concentrations represented by groundwater samples from the release area are presumed to conservatively represent such exposure.

²⁰ See note above with respect to the potential for direct contact and inhalation exposures associated with the presence of separate-phase petroleum in trenches.

4.2.3 Construction Workers

Construction workers are considered potential sensitive receptors to contamination within the Disposal Site Area under possible future conditions. Construction workers are modeled as females between the ages of 18 and 25 with a median body weight of 57.1 kg. Skin surface area is assumed to be 16,900 cm². Construction workers are presumed to receive exposure from incidental ingestion of and dermal contact with soil, and via ingestion and inhalation of fugitive dust derived from soil within the Disposal Site Area. Construction workers are presumed to potentially receive significant exposure to groundwater via direct contact and via inhalation of vapors in deep excavations within the Disposal Site Area²¹. Construction workers are not presumed to receive significant exposure via drinking water-related pathways. All exposure occurs during 130 days on the Site (5 days a week for 26 weeks) during one year.

4.2.3.1 Soil Ingestion:

Construction workers are presumed to ingest 100 mg of soil per day during the period on the Site²². All soil is presumed to derive from the Disposal Site Area.

4.2.3.2 Soil Dermal Contact

Soil adherence rate for construction workers is 0.29 mg/cm²²³. Approximately 30%, or 5,040 cm² of the body is presumed to be exposed (hands, forearms, lower legs, and feet). All soil is presumed to derive from the Disposal Site Area.

4.2.3.3 Ingestion/Inhalation of Fugitive Dust

Construction workers are presumed to inhale and inhale/ingest airborne particles present at a concentration of 60 µg/m³ at a rate of 3.6 m³/hr for 8 hours per day on the days on which exposure occurs. All respirable particles are presumed to derive from the Disposal Site Area. The concentration of respirable particles is allocated between inhalation and ingestion as described above.

4.2.3.4 Dermal Contact with Groundwater:

Construction workers may experience limited direct contact exposure to contaminated groundwater during the performance of deep excavations within the Disposal Site Area. It is presumed that construction workers may receive exposure on 5% of their skin area (hands, forearms, and feet -- approximately 845 cm²) for ten four hour periods. Potential exposure point concentrations are based on the estimated exposure point concentrations in groundwater at wells DCW-1, DCW-2, ECS-1, and ECS-4.

²¹ As noted above, it is not unrealistic to assume that construction workers may locally experience direct contact exposure to separate-phase product present locally in the subsurface within the release area. Such exposure assumed to present significant risk of harm to human health, but is not explicitly evaluated here.

²² MADEP/ORS, 2002. Draft Technical Update. Calculation of an Enhanced Soil Ingestion Rate.

²³ MADEP/ORS, 2002. Weighted Skin-Soil Adherence Factors. Draft Technical Update.

4.2.3.5 *Inhalation of Contaminant Vapors During Trenching:*

Construction workers are presumed to experience limited exposure via inhalation of contaminant vapors derived from groundwater and/or saturated soils during the performance of excavations within the Disposal Site Area. Exposure point concentrations are estimated as described for the similar exposure of utility workers. Exposure is presumed to occur 5 days a week for three weeks during the 130 day period construction workers are expected to be present on the Site (15 events).

4.2.4 Passersby/Trespassers, Visitors, and Patrons

Passersby, trespassers, or other visitors to the Disposal Site Area may receive limited exposure to contamination in soil and groundwater within the Disposal Site Area. Exposure to soil is presumed to occur via incidental ingestion, dermal contact, and ingestion and inhalation of fugitive dust. Potential exposure to contaminated surface water and sediment is presumed to occur in the vicinity of the outfall of the surface water drainage system beneath Main Street, which discharges at South Meadow Brook, approximately 650 feet south of the Site property. No significant exposure via drinking water-related pathways is presumed to occur. To accommodate the varying body weights of younger and older individuals in this receptor group, these receptors are divided into three age groups (6 to 13 years, 13 to 18 years, and 18 to 31 years of age) with appropriate median body weights (USEPA, 1989). Exposure periods for these groups are 7, 5, and 11 years, respectively. Potential exposure of these receptors to soil on the Site property is presumed to occur 62 times a year (2 days per week during the period between April and October)²⁴. To conservatively estimate potential exposures associated with impacted sediment and surface water at the outfall of the municipal drainage system at South Meadow Brook, these receptors are presumed to experience exposure there during 122 4-hour events each year.

4.2.4.1 *Soil Ingestion:*

Passersby/Trespassers are presumed to ingest 50 mg of soil per day (per exposure event) on the Site, entirely derived from the Disposal Site Area.

4.2.4.2 *Soil Dermal Contact:*

Passersby/Trespassers are presumed to be exposed to soil via dermal contact at a rate of 0.14 mg/cm² during exposure events²⁵. Approximately 30% of their total body area (hands, forearms, lower legs, and feet) is exposed (between approximately 3,280 cm² and 5,260 cm²). All soil is presumed to derive from the Disposal Site Area.

²⁴ MADEP, 1995: Draft Commercial/Industrial Shortform; Exposure Scenarios

²⁵ MADEP/ORS, 2002. Weighted Skin-Soil Adherence Factors. Draft Technical Update. A skin-soil adherence rate of 0.14 mg/cm² is recommended for the typical trespasser.

4.2.4.3 *Ingestion/Inhalation of Fugitive Dust:*

Passersby and trespassers may be exposed to contamination by inhalation and inhalation/ingestion of fugitive dust derived from the Disposal Site Area on the Site. Inhalation rates vary according to age group from 1.5 to 2.4 m³/hr. Inhalation and ingestion of fugitive dust derived from the site is modeled to accommodate suspended airborne particles (less than 30 µm) which are inhaled to the lungs or inhaled and subsequently ingested. The concentration of respirable particles in the air is presumed to be 60 µg/m³ (corresponding to an excavation/construction scenario, Appendix B in MADEP 141-95, 1995). The duration of the exposure period for both inhalation and ingestion exposures for visitors and trespassers is presumed to be 4 hours per day on days these receptors are present on the Site. All dust is presumed to be derived from the Disposal Site Area.

4.2.4.4 *Dermal Contact with Surface Water/Groundwater:*

Passersby and trespassers are presumed to potentially experience limited direct contact exposure to contaminated surface water near the outfall of the municipal surface water drainage system at South Meadow Brook south of the Site property. In order to conservatively evaluate this potential exposure, it is presumed that South Meadow Brook constitutes an attractive hazard for trespassers including children. These receptors are therefore presumed to receive exposure via dermal contact with surface water within this portion of the Disposal Site Area for 122 4 hour periods per year, during which exposure to contaminated groundwater occurs via dermal contact over approximately 5% of their body surface area (hands, forearms, and feet)²⁶. Potential exposure point concentrations in groundwater for such exposure are based on concentrations in surface water samples collected at the outfall of the municipal surface water drainage system at South Meadow Brook²⁷.

4.2.4.5 *Incidental Ingestion of Sediment:*

Passersby and trespassers (adults and children) are conservatively assumed to receive significant exposure to contaminated sediments at the outfall of the municipal surface water drainage system at South Meadow Brook, south of the Site property. Child and adult receptors are presumed to ingest 100 mg and 50 mg of sediment per exposure event on the Site, respectively²⁸. This exposure is presumed to occur each day the receptor is present on the Site (estimated at 62 events per year).

²⁶ Based on the nature of the stream, however, swimming-related exposures are not presumed to occur. These receptors are therefore not presumed to experience significant exposure under these conditions via ingestion or inhalation of vapors, or to receive exposure via dermal contact over more than a relatively small fraction of their body, in a typical case.

²⁷ Casual exposure to contaminant concentrations represented by the results of analysis of samples of water obtained from manholes in the surface water drainage line between the Site property and the outfall at South Meadow Brook is not considered realistic for these receptors. Potential exposures point concentrations for this exposure of trespassers and visitors is therefore evaluated on the basis of the concentrations observed in water samples obtained only at the outfall of the system at the point of discharge to surface water at South Meadow Brook.

²⁸ MADEP 1995. Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan, Interim Final Policy #WSC/ORS-95-141, July 1995. Appendix B.

4.2.4.6 Dermal Contact with Sediment:

Passersby and trespassers are presumed to be exposed to sediment via dermal contact at a rate of 1.0 mg/cm² exposed skin surface area during exposure events²⁹. For these receptors, skin surface exposures for sediment are similar to those for soil. Exposure frequency is the same as that for ingestion of sediment.

4.2.5 Potential Future Residents

Current and potential future exposures associated with residential use of the Disposal Site Area are modeled in part following MADEP guidance (MADEP/ORS 1992, *Documentation for the Risk Assessment Shortform Residential Scenario*). For the purposes of evaluating potential exposures to soil, current and potential future residents on the Site are modeled as three groups of individuals: those between the ages of 1 and 6 years of age who experience subchronic threshold effects exposures; individuals between the ages of 6 and 18, who experience chronic, threshold effects exposures, and individuals between the ages of 0 and 30, who are evaluated for non-threshold effects. Median body weights, body surface areas, and ventilation rates vary according to age group. Soil ingestion rates and soil dermal contact rates are calculated as normalized median values incorporating indoor and outdoor exposures for each age group following MADEP (1992). Current and potential future residents are presumed to receive exposure to soils within the Disposal Site Area via incidental ingestion and dermal contact with soil indoors and outdoors, ingestion and inhalation of fugitive dust derived from Site soils, and from consumption of produce grown in soil within the Disposal Site Area. Current and potential future residents within the Disposal Site Area are presumed to receive exposure via drinking water-related pathways. For current on-site residents, potential exposure point concentrations for drinking water-related pathways are represented by the observed contaminant concentrations in the existing water supply on the Site property. For potential future residents on the Site property, potential exposure point concentrations for drinking water-related pathways are represented by the estimated exposure point concentrations in groundwater in the vicinity of wells DCW-1, DCW-2, ECS-1, and ECS-4. Current and potential future residents on the Site property are also presumed to receive exposure via inhalation of contaminant vapors in interior air. Potential future residents on the Site property, and current and potential residents in the vicinity of the Site property, are presumed to receive limited exposure to surface water and sediment near the outfall of the surface water drainage system at South Meadow Brook south of the Site property.

4.2.5.1 Soil Ingestion:

Residents between the ages of 1 and 6 are presumed to ingest an average of 58 mg of soil per day for 365 days of exposure per year³⁰. Residents in the 6 to 18 and over 18 age groups ingest soil at an average rate of 21 mg/day over a 365 day per year exposure. All soil is presumed to derive from the Disposal Site.

²⁹ Ibid.

³⁰ Median soil ingestion value for the age group (MADEP, 1992, *Documentation for the Risk Assessment Shortform Residential Scenario*). This value includes 212 days per year of indoor only exposure (contamination derived from indoor dust, where daily intake ranges from 8.8 mg/day to 31.3 mg/day) and 153 days during which both indoor and outdoor exposure occurs (with an ingestion rate of 100 mg/day).

4.2.5.2 Soil Dermal Contact:

For the 1 to 6 age group, exposure via this route is assumed to occur at the median value for this age group of 432 mg/day³¹. For the 6 to 18 age group, the equivalent exposure rate is 901 mg/day. For the over 18 age group, exposure occurs at the rate of 618 mg/day. Exposure rates incorporate restricted exposure indoors during the winter and less restricted indoor and outdoor exposure during the summer. All soil is derived from the Disposal Site.

4.2.5.3 Ingestion/Inhalation of Fugitive Dust:

Potential future residents on the site are presumed to inhale and ingest airborne particles less than 30 μm in size according to the proportions discussed above. Ventilation rates are adjusted according to age group. Exposure is presumed to occur for 4 hours a day for young children and 6 hours a day for older children and adults during the summer months, 153 days per year. All fugitive dust derives from the Disposal Site.

4.2.5.4 Ingestion of Drinking Water:

Current and potential future residents on and in the vicinity of the Site may be exposed to contamination via ingestion of drinking water produced from the existing production well on the Site property or from alternative private drinking water sources within the Disposal Site Area. Potential future residents are presumed to ingest one or two liters per day of drinking water derived from groundwater depending on age. Potential exposure point concentrations in drinking water for current residents are derived from the results of analysis of samples collected from the existing on-site production well. Exposure point concentrations in drinking water for potential future residents are based on the observed concentrations of Site COCs in the existing production well on the Site property, and on the estimated exposure point concentrations in groundwater at monitoring wells DCW-1, DCW-2, ECS-1, and ECS-4.

4.2.5.5 Dermal Contact with Drinking Water:

Current and potential future Site workers may be exposed to contamination through dermal contact with drinking water produced from wells within the Disposal Site Area. Exposure is presumed to occur primarily during a daily shower in water produced on Site. Body surface area is based on median values for the age group: (7,130 cm^2 for 1- to 8-year olds, 12,800 cm^2 for 8- to 15-year olds, and 16,731 cm^2 for 16- to 30-year olds). Estimates of the absorbed dose per event follow the MADEP/ORS implementation in *Proposed GW-1 Standards*. (Fall, 2004), and

³¹ MADEP 1992. *Documentation for the Risk Assessment Shortform Residential Scenario*. Incorporates indoor-only contact for restricted exposure during the winter months (October to April (212 days), approximately 5.5% of the body surface area with a contact rate of 0.056 mg/cm^2 , based on finger mouthing behavior studies, with 80% of the soil derived from the site); less restricted indoor exposure during the summer (months of May to September, between 46% and 55% body surface area exposed), and indoor and outdoor exposure at a contact rate of 0.51 mg/cm^2 during the months of May to September, when approximately 50% of the skin surface area is exposed for those under 18, and approximately 30% of the body surface area is exposed for those over 18. The resulting values incorporated here are the time-weighted annual average exposure for the three age groups, following MADEP guidance.

Method 3 Risk Assessment for Chemicals in Drinking Water Shortform 2004. (August, 2004), which are based on the two layer model described in USEPA 2004 (*Risk Assessment Guidance for Superfund (RAGS) Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment.* Chapter 3, Section 3.1)). Potential exposure point concentrations are based on the estimated exposure point concentrations at the existing groundwater production well on the Site property, and in groundwater at wells DCW-1, DCW-2, ECS-1, and ECS-4.

4.2.5.6 Inhalation of Vapors Derived from Drinking Water:

Potential future residents within the Disposal Site Area may be exposed to contamination via inhalation of vapors derived from groundwater during bathing in water produced within the Disposal Site Area. Significant exposure is presumed to occur predominately during a daily shower in water produced on Site. Duration of exposure within the shower room is based on MADEP assumed values (1.1 hours per day for 1- to 8- and 8- to 15-year olds, 1.05 hours per day for 15- to 30-year olds). Potential exposure point concentrations in interior air within the shower room incorporate default values from and are derived following MADEP guidance (*Proposed GW-1 Standards.* (MADEP, Fall 2004) and *Method 3 Risk Assessment for Chemicals in Drinking Water Shortform 2004.* (MADEP/ORS, August, 2004)). The MADEP/ORS derivation follows that outlined in Foster, S.A. and P.C. Chrostowski. 1986. *Integrated Household Exposure Model for Use of Tap Water Contaminated with Volatile Organic Chemicals.* 79th Annual Meeting of the Air Pollution Control Association. Minneapolis, MN., and Foster, S.A. and P.C. Chrostowski. 1987. *Inhalation Exposures to Volatile Organic Contaminants in the Shower.* Presentation at the 80th Annual Meeting of APCA. New York, NY. June 21-26, 1987). Source contaminant concentrations are based on the estimated exposure point concentrations at the existing groundwater production well on the Site property, and in groundwater at wells DCW-1, DCW-2, ECS-1, and ECS-4.

4.2.5.7 Dermal Contact with Surface Water/Groundwater:

Current and potential future residents within the Disposal Site Area are presumed to experience limited direct contact exposure to contaminated surface water at the outfall of the municipal surface water drainage system at South Meadow Brook. It is presumed that potential future residents may receive exposure via dermal contact with surface water at the surface water outfall at South Meadow Brook during 122 events of 4 hours duration during each year. Contact with groundwater/surface water is presumed to occur over approximately 5% of these receptors' body surface area (hands, forearms, and feet). Exposures characteristic of swimming, including ingestion of water and more extensive dermal exposures, are not evaluated, given the nature of the surface water exposure in question. Potential exposure point concentrations for this pathway are represented by the estimated exposure point concentrations in surface water at the outfall.

4.2.5.8 Incidental Ingestion of Sediment:

Child and adult future potential residents are presumed to ingest 100 mg and 50 mg of sediment per exposure event on the Site, respectively³². This exposure is conservatively presumed to occur in addition to that derived from Site soil, and to occur at a rate similar to trespassers/passersby (62 days per year, representing two days per week during the months between April and October).

4.2.5.9 Dermal Contact with Sediment:

Potential future residents are presumed to be exposed to sediment via dermal contact at a rate of 1.0 mg/cm² exposed skin surface area during exposure events³³. Skin surface exposures and exposure rates for sediment are similar to those for soil. Exposure via dermal contact with sediment is considered an incremental risk in addition to that presented by exposure to Site Soils.

4.2.5.10 Ingestion of Home-Grown Produce:

Current and future residents within the Disposal Site Area may consume vegetables grown in Site soils and potentially receive exposure to residual contamination. Potential exposure via ingestion of home-grown produce is evaluated following MADEP guidance (MADEP, 1992) for three age groups: subchronic exposure for infants 1 to 2 years of age; chronic exposure for children 1 to 8 years of age, and chronic exposure for lifetime residents/adults between 0 and 30 years of age. For each contaminant of concern which is presumed to accumulate in garden produce and each receptor, a Hazard Index or Cancer Risk multiplier is derived, based on estimates of the amount of each type of vegetable consumed per day and a partition factor, which relates the concentration of contaminant of concern in the soil to the concentration in the consumed vegetable. These multipliers are used to adjust the concentrations of the contaminants of concern for comparison with RfDs and CSFs and evaluation of the incremental HI or ELCR resulting from the exposure. The derivation of these multipliers follows that outlined in guidance (MADEP, 1992) as modified by recent in guidance³⁴. Potential exposures to contamination via this pathway are evaluated for estimated exposure point concentrations in soil between the surface and 15 feet below grade within the Disposal Site Area.

4.3 QUANTIFICATION OF EXPOSURE TO POTENTIAL HUMAN RECEPTORS

4.3.1 Exposure Factors

Exposure factors are numerical estimates of values which describe the receptor, the route by which the receptor is exposed, the duration and frequency of exposure, and chemical

³² MADEP 1995. Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan, Interim Final Policy #WSC/ORS-95-141, July 1995. Appendix B.

³³ Ibid.

³⁴ Paul Locke, MADEP/ORS. Personal Communication, April, 2005. Review of published scientific data by ORS indicates substantially uncertainty regarding the potential for polycyclic aromatic hydrocarbons to accumulate in plants and contribute to exposure via this route. Accordingly, ORS is now recommending that potential exposure associated with consumption of home-grown produce be evaluated only for certain metals (arsenic, cadmium, chromium, lead, nickel, and zinc), polychlorinated biphenyls, and chlordane.

properties of the contaminants. Factors which describe the receptor, exposure route, and duration of exposure for potential sensitive receptors to contamination on the site for the current and possible future uses are summarized in Tables 8 and 9.

4.3.2 Exposure Point Concentrations

Exposure point concentrations are those concentrations of oils or hazardous materials present at locations or within environments within or potentially impacted by conditions within the Disposal Site Area.

4.3.2.1 *Soil:*

The MCP describes three exposure points for soil which shall be considered on each disposal site: Soil between the surface and three feet depth for exposure associated with surficial activities; soil between the surface and six feet depth for exposure associated with utility installation and repair, and; soil between the surface and fifteen feet depth for exposure associated with excavation, construction, and future residential development. Exposure point concentrations for current uses of the Disposal Site Area by Site workers and passersby/trespassers are therefore estimated from concentrations of Site COCs in soil between the surface and approximately three feet below grade. Exposure point concentrations for current uses of the Site by utility workers are estimated from concentrations of Site COCs in soil between the surface and approximately six feet below grade. Exposure point concentrations for potential future uses of the Disposal Site Area by construction workers and potential future residents are estimated from concentrations of Site COCs between the surface and approximately 15 feet below grade. Estimated exposure point concentrations in soil within each of the three depth intervals are based on the arithmetic average concentration of Site COCs in soil observed in soil samples from within the Disposal Site Area collected within, or approximately within, the appropriate depth interval. Site COCs in soil which are not detected above the reporting limit in individual samples are incorporated in the estimate of exposure point concentration as one-half the reporting limit. Estimated exposure point concentrations in soil within these three intervals are derived in Tables 10, 11, and 12, and are summarized in Table 13.

4.3.2.2 *Sediment:*

Potential exposure point concentrations in sediment in the vicinity of the outfall of the municipal surface water drainage system beneath Main Street at South Meadow Brook approximately 650 feet south of the Site property are based on the arithmetic average concentrations of Site COCs in samples of sediment collected from that area (Table 14). Site COCs in sediment which are not present above the reporting limit in individual samples are incorporated in the estimate of potential exposure point concentration as one-half the specified reporting limit.

4.3.2.3 *Groundwater:*

Potential exposure point concentrations in groundwater within the Disposal Site Area are conservatively based on the arithmetic average concentrations of Site COCs detected in groundwater monitoring wells DCW-1, DCW-2, ECS-1, and ECS-4 within the Disposal Site Area. Site COCs in groundwater which are not detected in individual samples are incorporated in the estimate of potential exposure point concentration as one-half the reporting limit. Potential exposure point concentrations in groundwater are summarized in Table 15.

4.3.2.4 *Surface Water:*

Potential exposure point concentrations in surface water are estimated as the arithmetic average of the concentrations of Site COCs in samples of surface water collected at the outfall of the municipal surface water drainage system at South Meadow Brook, south of the Site property (Table 16). Non-detects are included in the estimate of potential exposure point concentration as one-half the method detection limit.

4.3.2.5 *Drinking Water:*

Potential exposure point concentrations in drinking water are estimated as the arithmetic average concentrations of Site COCs detected in samples from the existing private groundwater supply on the Site property for evaluation of current exposures, and on the arithmetic average concentrations of Site COCs detected in groundwater at wells DCW-1, DCW-2, ECS-1, and ECS-4 for potential future exposures. Site COCs which are not detected in individual samples are incorporated in the estimated exposure point concentration as one-half the reporting limit obtained (Table 17).

4.3.2.6 *Interior Air:*

Estimated exposure point concentrations in interior air are based on the results of analysis of air samples collected within and in the immediate vicinity of the Site building in January, 2006. Estimated exposure point concentrations in interior air are summarized in Table 18.

4.4 AVERAGE DAILY DOSE

The average daily dose (ADD) is a quantitative estimate of the daily intake of a specific contaminant by a receptor, expressed in terms of milligrams of oil/hazardous material (OHM) per kilograms of body weight per day. The general form of the dose equation is:

$$ADD = \frac{(\text{Total Amount of OHM Contacted}) * (\text{Relative Absorption Factor})}{(\text{Body Weight}) * (\text{Averaging Period})}$$

The ADD depends on the total amount of OHM contacted – which depends on the concentration of the chemical in the media to which the exposure occurs (i.e., exposure point concentration), the exposure route (i.e., ingestion, dermal contact, etc.), and the number of exposure events during the

period of exposure; the Relative Absorption Factor (RAF) specific to the chemical and the exposure route³⁵, the body weight of the receptor, and the period over which the exposure is averaged.³⁶

The average daily exposure (ADE) is a quantitative estimate of the daily exposure to a gaseous or respirable contaminant by a receptor, expressed in terms of milligrams of OHM per cubic meter (mg/m³) or micrograms per cubic meter (µg/m³) of air inhaled. The general form of the dose equation is:

$$ADE = \frac{(\text{Concentration of OHM at Exposure Point}) * (\text{Duration of Exposure})}{(\text{Averaging Period})}$$

Average daily doses or exposures are calculated for each chemical and each potential receptor at each applicable exposure point. Numerical values representing potential exposure for each potential receptor by each exposure pathway are accumulated in factors which represent the rate of exposure for that receptor via a specific exposure pathway. The product of the concentration of a specific COC at the exposure point, the relative absorption factor (RAF), and exposure factor appropriate to the exposure pathway, equals the ADD for that COC via that exposure pathway. The ADD is compared to the reference dose (RfD) or cancer slope factor (CSF) to determine an estimate of the incremental risk associated with exposure to the COC by the receptor, via the modeled exposure pathway.

For gaseous contaminants, the concentration of the COC at the exposure point and the duration of the exposure, are the relevant factors. These are divided by the averaging period for the exposure to determine the average daily exposure (ADE) which is then compared to the reference concentration (RfC) or unit risk (UR) to determine an estimate of the incremental health effect resulting from the exposure.

To evaluate potential risks associated with possible future residential use of the Disposal Site Area, potential exposure to Site COCs via consumption of fruits and vegetables grown in Site soils containing residual levels of contamination is assessed. Potential exposure to Site COCs via consumption of home-grown produce is evaluated according to guidance in MADEP policy (WSC/ORS#141-95 and WSC/ORS#142-92. *Documentation for the Risk Assessment Shortform: Residential Scenario*. October, 1992). No significant accumulation of volatile organic compounds (including volatile aromatic compounds and volatile halogenated compounds) is presumed to occur in produce typically grown in home gardens: therefore no significant exposure to volatile organic compounds is presumed to occur via this pathway. Further recent guidance from ORS (pers. com. Paul Locke, MADEP/ORS, April 2005) indicates that significant uncertainty with respect to the potential for bioaccumulation of polycyclic aromatic hydrocarbons in home grown produce exists, and that therefore, potential exposures via this pathway should be evaluated only for certain metals (arsenic, cadmium, chromium, lead, nickel, and zinc), polychlorinated biphenyls, and chlordane.

³⁵ The Relative Absorption Factor (RAF) is the ratio between the absorption efficiency of a specific chemical via the route of exposure on the Site to the absorption efficiency via the route of exposure on which the reference dose or slope factor for the chemical is based. The absorption efficiency specific to an exposure route is the ratio of the administered dose (the dose applied to the exchange boundary of an organism) to the absorbed dose (the amount of the substance which actually penetrates the exchange boundary of an organism) (Risk Assessment Guidance for Superfund, Volume 1. Human Health Evaluation Manual (Part A). EPA/540/1-89/002. December, 1989. Appendix A).

³⁶ For threshold (non-cancer) risk, the averaging period is equivalent to the exposure period – the time interval between the initial and final exposures experienced by a receptor. For non-threshold (cancer) risks, the averaging period is a lifetime, here considered 70 years.

Potential exposure point concentrations, estimated from the concentrations of COCs in Site soils and plant uptake factors for common garden produce are combined with estimates of the rate of consumption of home-grown produce by each of the three classes of residential receptor (U.S. Department of Agriculture. *Food Consumption in the Northeast, Seasons and Year 1977 – 78*. United States Department of Agriculture Consumer Nutrition Division. Report H-7. August, 1983) to determine an exposure rate for each chemical of concern associated with consumption of each of a variety of home-grown produce. In practice, following guidance (MADEP, 1992), receptor consumption rates and plant uptake rates are combined with receptor-specific values for exposure duration, averaging period, and body weight, to derive factors specific to chemicals or classes of chemicals³⁷. The product of these factors and the estimated exposure point concentrations in soil results in an incremental risk associated with the chemical, which, summed for each class of receptor, provides the incremental risk associated with this exposure pathway.

Incremental non-cancer and cancer risks associated with exposure to each Site COC by each receptor at each exposure point are summed to provide an estimate of the total risk associated with exposure at that exposure point. Incremental risks associated with exposure at each potential exposure point are summed for each potential receptor to provide an estimate of the cumulative risk posed by Site conditions to that receptor. The cumulative risk for each receptor is compared to risk management criteria for non-cancer and cancer risks established by MADEP.

Generalized exposure assumptions used in this risk characterization are summarized in Table 8. Exposure factors are derived and summarized in Table 9. Estimated exposure point concentrations in soil, groundwater, sediment, and surface water are summarized in Table 19. The derivation of ADDs, ADEs, and incremental risks associated with soil exposures for each potential receptor via each modeled pathway are presented and summarized in Tables 20 through 31. ADDs and modeled incremental risks associated with potential exposures to sediment in the surface water drainage outfall area at South Meadow Brook are summarized in Tables 32 and 33. Modeled exposures and incremental risks associated with potential exposures to surface at this location are summarized in Table 34. Exposures and incremental risks associated with potential exposures to groundwater and vapors in trenches are summarized in Tables 35 and 36. Modeled exposures to interior air are summarized in Table 37. Estimated risks associated with drinking water-related exposures are summarized in Tables 38, 39, and 40. Estimates of potential exposure via consumption of home-grown produce are presented in Table 41. Cumulative risks associated with all modeled exposures for all modeled receptors are summarized in Table 42.

5.0 HUMAN HEALTH RISK CHARACTERIZATION

The findings of this risk characterization indicate that a condition of No Significant Risk to human health does not exist with respect to all modeled current and potential future conditions within and uses of the Disposal Site Area. The results of this evaluation indicate that modeled current and potential future exposures for Site workers and potential future residents result in significant risk of harm to human health. Modeled current and potential future exposures experienced by construction and utility workers, and passersby, trespassers, and visitors to the Disposal Site Area present No Significant Risk of harm to human health.

Site Workers: Current and potential future Site workers were evaluated for potential exposures to soil between the surface and three feet below grade (via ingestion, dermal contact, and inhalation and

³⁷ Following MADEP WSC/ORS #142-92: Subchronic or Chronic Hazard Index Multiplier (SHIM or CHIM) or Cancer Risk Multiplier (CRM)

ingestion of dust), to groundwater via drinking water-related pathways (ingestion, dermal contact, and inhalation of vapors during showering), and to air within the existing Site building via inhalation. Modeled exposures to soil for this receptor present no significant non-cancer or cancer risk. Modeled exposures to groundwater via drinking water-related pathways under current conditions (i.e., groundwater from the existing on-site drinking water supply) presents no significant non-cancer risk but does present significant cancer risk (specifically exposure via ingestion and dermal contact). Modeled potential future exposures to groundwater via drinking water-related pathways (presuming contaminant source concentrations represented by the estimated exposure point concentrations in wells DCW-1, DCW-2, ECS-1, and ECS-4) presents significant non-cancer and cancer risk.

Utility Workers: Modeled current and potential future exposures for this receptor present No Significant Risk of harm to human health. Modeled current and potential exposures to soil between the surface and 6 feet below grade (via ingestion, dermal contact, and inhalation/ingestion of dust), to sediment, and to groundwater via direct contact in trenches and via inhalation of vapors in trenches present No Significant Risk of harm to human health. For these receptors, modeled exposure via inhalation of contaminant vapors in trenches presents the most significant non-cancer risk. The most significant cancer risk, according to the modeled exposures, presented to these receptors is from dermal contact with groundwater in trenches.

Construction Workers: Modeled potential future exposures for construction workers within the Disposal Site Area present No Significant Risk of harm to human health. Construction workers are presumed to receive exposure from soil between the surface and 15 feet below grade, to groundwater via direct contact in excavations and to contaminant vapors within excavations. Modeled exposures to groundwater and to contaminant vapors in excavations present the most significant potential risk of harm to health for these receptors.

Passersby, Trespassers, and Visitors: Passersby, trespassers, and visitors are presumed to receive exposure to soil between the surface and 3 feet below grade with the Disposal Site Area via direct ingestion, dermal contact, and inhalation and ingestion of dust, and to sediment via ingestion and dermal contact. For these receptors, modeled exposure via dermal contact with soil is the most significant component of non-cancer risk, followed by direct ingestion of soil and direct ingestion of sediment.

Current and Potential Future Residents: Modeled potential exposures for current residents within the Disposal Site Area include exposures to soil between the surface and 15 feet below grade via ingestion, dermal contact, and inhalation or ingestion of dust, inhalation exposures within the existing Site building, and drinking water-related exposures. Current and potential future drinking water-related exposures are modeled. As described above, the current Site worker/resident is presumed to experience potential exposure to contaminant concentrations observed in the existing on-Site production well via drinking water-related pathways. Potential future exposures via drinking water related pathways within the Disposal Site Area are modeled on the basis of observed contaminant concentrations in existing groundwater monitoring wells DCW-1, DCW-2, ECS-1, and ECS-4. Under potential future conditions significant cancer and non-cancer risk is presented by potential exposures associated with ingestion and dermal contact with drinking water.

5.1.1 Comparison to Applicable or Suitably Analogous Public Health Standards

No applicable or suitably analogous public health standards exist for soil on the Site.

The Disposal Site is located within an area considered a Sole Source Aquifer and Current Drinking Water Supply Area: federal and state drinking water standards apply to groundwater on the Site. Maximum estimated exposure point concentrations in groundwater and maximum detected concentrations in groundwater are compared to Massachusetts Maximum Contaminant Levels (MMCLs) in Table 43. The maximum estimated exposure point concentrations of benzene (352 ug/L) and ethylbenzene (1,174 ug/L) in groundwater on the Site exceed MMCLs (5 ug/L and 700 ug/L, respectively). On this basis it is concluded that a condition of no significant risk of harm to human health does not exist with respect to conditions within the Disposal Site Area. It is noted that the estimated maximum exposure point concentrations in groundwater of volatile aliphatic petroleum hydrocarbons in the C₅ to C₈ and C₉ to C₁₂ range, volatile aromatic petroleum hydrocarbons in the C₉ to C₁₀ range, naphthalene, MTBE, extractable petroleum hydrocarbons in the C₉ to C₁₈ range, and extractable aromatic petroleum hydrocarbons in the C₁₁ to C₂₂ range exceed MADEP Office of Research and Standards Guidelines.

Federal Water Quality Criteria promulgated under the Clean Water Act (40 CFR 131) are presumed to apply to surface water potentially impacted by the discharge of groundwater originating within the Disposal Site Area. Groundwater originating within the former release area is presumed to enter the municipal storm water drainage system beneath Main Street in the vicinity of the Site property and migrate from there south to discharge to South Meadow Brook approximately 650 feet south of the former source area. For the purposes of this risk characterization, surface water is presumed to include only that water which discharges to surface water at South Meadow Brook: water within the municipal surface water drainage system, sampled through manholes in Main Street, is not considered surface water and is not compared to standards³⁸. Comparison of the results of analysis of surface water samples collected at and in the vicinity (upstream and downstream from) the outfall of the municipal surface water drainage system indicate that no detected concentrations of Site COCs in surface water exceed applicable standards for surface water.

5.1.2 Uncertainty Analysis

Uncertainty in the conclusions of the human health risk assessment derives from limitations and biases in the data collection procedures, the treatment of that data in evaluating exposure point concentrations, and assumptions concerning the means by which exposure occurs and the nature of potential receptors.

Selection of Site COCs in soil, sediment, groundwater, drinking water, surface water, and air within the Disposal Site Area and evaluation of the nature and extent of contamination associated with the release in question was based in part of the results of analysis of numerous samples of soil, sediment, groundwater, drinking water, surface water, and air from within and in the vicinity of the Disposal Site Area and in part on knowledge of and assumptions regarding the nature of the release. The nature of the release in question – diesel fuel – is well documented. The extent of release has been adequately determined by the results of numerous samples of soil and groundwater collected within and in the immediate vicinity of the Disposal Site Area.

³⁸ Such a comparison does not change the conclusions of this portion of the risk characterization, however: No concentrations of Site COCs detected in surface water at the outfall of the surface water drainage system at South Meadow Brook, or within the surface water drainage system, exceed Massachusetts Surface Water Standards or the National Recommended Ambient Water Quality Criteria.

The extent of the Disposal Site Area associated with the release of diesel fuel which is the subject of this report is defined on the basis of knowledge of the former source (the remote fill line which traverses the Site property from north to south) and the results of analysis of numerous groundwater and soil samples. Delineation of the extent of impacts associated with the release of diesel fuel is complicated slightly by the presence, on and in the vicinity of the Site property, of residual contamination associated with an historical release of gasoline, presumably from the underground storage tanks located in the southern part of the Site property from some part of the distribution system in the central and eastern parts of the Site property or, the abandoned underground storage tanks under the existing building. . The extent of impacts associated with the release of diesel fuel has been conservatively defined: it is therefore possible that areas where impacts to groundwater and soil associated largely or predominately with the historical release of gasoline have been included in the Disposal Site Area defined for the release in question. In this regard, it is noted that diesel fuel and gasoline share certain components – either as a result of manufacture or as contaminants introduced during manufacturing, storage, or transport. The delineation of the extent of impacts associated with the release of diesel fuel described here is intended to include areas where mixing of diesel and gasoline contaminants may have occurred, and thus conservatively define the extent of impacts associated with the release in question.

The selection of Site COCs for the release in question conservatively included all contaminants detected at significant concentrations in soil, sediment, groundwater, surface water, or air within or in the vicinity of the Disposal Site Area. Contaminants detected within the Disposal Site Area therefore include gasoline constituents and certain other compounds not likely to be present in significant concentrations at the source of the release³⁹. As Site COCs, these compounds are carried through the risk characterization and contribute significantly, to the estimates of potential risk presented by conditions within the Disposal Site Area. Evaluation of these conditions -- unrelated to the release in question -- imparts a very significant and conservative bias on the results of the risk characterization.

COCs in soil were selected in part on the basis of the results of quantitative analysis of 14 soil samples for volatile petroleum hydrocarbons according to MA VPH 97-1 (as revised), one soil sample for volatile organic compounds according to USEPA Method 8260B, and 10 soil samples for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). COCs in sediment were determined on the basis of 7 sediment samples submitted for quantitative analysis for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). Potential COCs in groundwater were determined on the basis of the results of analysis of groundwater samples collected repeatedly from 24 locations within and in the vicinity of the Disposal Site Area. Groundwater analyses used in part to determine Site COCs in groundwater include 77 samples submitted for analysis for volatile petroleum hydrocarbons according to MA VPH 97-12 (as revised) and 80 groundwater samples submitted for analysis for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). COCs in drinking water were determined in part on the basis of the results of analysis of 31 samples submitted for analysis for volatile organic compounds according to USEPA 524.2 or 8260B and 5 samples submitted for analysis for extractable petroleum hydrocarbons according to MA EPH 98-1 (as revised). Potential contaminants of concern in surface water were determined in part on the basis of the results of analysis of 25 samples submitted for analysis according to MA VPH 97-12 (as revised) and 27 samples submitted for analysis for extractable petroleum hydrocarbons according to MA EPH 98-

³⁹ Tetrachloroethene, detected at trace concentrations in certain samples from the on-site drinking water production well, an not likely to be associated with the diesel fuel release, is also considered a Site COC.

1 (as revised). Site COCs in air were determined in part on the basis of the results of analysis of seven air samples collected in the vicinity of and within the existing Site building.

Estimates of potential exposure point concentrations in soil, groundwater, sediment, and surface water were derived as the arithmetic average of the results of analysis of subsets of all available data⁴⁰. In large part, soil quality data represent worst-case conditions with respect to soil quality within the Disposal Site Area. The locations of soil borings and the depths of the intervals selected for quantitative analysis were determined in part on the basis of knowledge of the nature and extent of the release: In certain cases, those soil samples from a particular location which present, on the basis of qualitative screening, the greatest likelihood of containing high levels of contamination were selected for quantitative analysis, while other soil samples, which may represent much larger volumes of soil, but provide little or no indication of the presence of contamination via qualitative field screening techniques, were not submitted for quantitative analysis. Selection of those soil samples for quantitative analysis which represent worst-case conditions encountered in a limited number of subsurface explorations imparts a significant conservative bias on the results of the risk characterization. To some extent, the locations of groundwater monitoring wells installed within the Disposal Site Area similarly provides a worst-case estimate of conditions with respect to groundwater quality, and results in a similar conservative bias in the results of the risk characterization.

In this case, however, the local presence of significant separate-phase product on the water table in the subsurface may result in non-conservative estimates of potential risks to human health presented by conditions within the Disposal Site Area. The nature and extent of separate-phase product on the Site property is described in detail in the accompanying Phase II report and is briefly discussed below. It appears reasonable, however, to assume that worst-case conditions with respect to dissolved contamination in groundwater will be observed where groundwater is in contact with, and potentially mixed with, separate-phase product. It is also reasonable to assume that worst-case conditions with respect to soil contamination, where separate-phase product is present, are those areas where soils which may be saturated with petroleum are present. Typically, little or no quantitative data is developed describing conditions at or in the immediate vicinity of areas where separate-phase petroleum is present in the subsurface. In the absence of such data, evaluation of potential risks associated with exposure to such conditions is inadequate, and may substantially under-represent the potential risks associated with exposures which may realistically occur within the Disposal Site Area. In this case, conditions which represent an exceedance of an Upper Concentration Limit exist on the Site and preclude a finding of No Significant Risk, and require further remedial response actions. It is noted in this regard, however, that the presence of separate-phase petroleum locally on the Site may present risks of harm to human health which are not easily evaluated quantitatively in the risk characterization: the evaluation of potential risks presented here, without evaluation of those potential risks associated with exposure to separate-phase petroleum, may substantially underestimate risks presented by conditions which locally occur within the Disposal Site Area. Underestimation of potential risks associated with the local presence of separate-phase product on the water in the

⁴⁰ In general, for soil and groundwater, only those data points considered to represent conditions within the Disposal Site Area (i.e., where impacts associated with the release in question had been observed) were included within the estimate of potential exposure point concentration. Potential exposures to drinking water-related exposure pathways at locations outside the boundaries of the Disposal Site Area -- where no evidence of impacts associated with the release in question exists -- was evaluated for both current and potential future conditions. All drinking water supplies in the vicinity of the Disposal Site Area -- including the current and former supplies on the Site property -- lie outside the boundaries of the Disposal Site Area. In this case, therefore, the effects of potential exposures outside the boundaries of the Disposal Site Area were evaluated and incorporated in the cumulative estimate of potential risk associated with conditions on the Site.

shallow subsurface appears largely to apply only to certain potential receptors – specifically, construction and utility workers, who may be exposed to soil and groundwater in the subsurface where elevated concentrations of petroleum, or separate-phase product, is present. No evidence exists to suggest that such conditions may be casually accessible to other receptors, including Site workers, trespassers, visitors, and passersby, or current or potential future residents.

Potential sensitive receptors evaluated included current Site workers/residents, construction and utility workers, visitors, passersby, and trespassers within the Disposal Site Area, and potential future residents within and in the vicinity of the Disposal Site Area. Assumptions concerning the characteristics of potential receptors to contamination on the site are based predominately on guidance developed by MADEP and/or USEPA. The objective of this guidance is to permit an accurate assessment of the actual exposure and potential effects experienced by the more sensitive portion of the population of potential receptors. Certain of the assumptions used to characterize potential exposure may not apply to highly exposed or extremely sensitive individuals: in these cases, therefore, the assumed exposure parameters may underestimate the potential risks posed by conditions on the Site to certain receptors.

Uncertainties related to the nature of the assessment, choice of sampling locations, selection of samples for quantitative analysis and the nature of the analyses performed, selection and characterization of potential receptors, and assumptions regarding potential exposures to those receptors propagate through the risk characterization. In most aspects of this assessment, reason exists to believe that the treatment of these uncertainties in this risk characterization results in a conservative estimate of incremental risks presented by conditions within the Disposal Site Area. As noted here, however, the local presence of separate-phase petroleum in the subsurface within the Disposal Site Area presents potential risks to certain receptors which may not be adequately represented by the treatment of data here.

5.2 IMMEDIATE HAZARD, SUBSTANTIAL HAZARD, AND SUBSTANTIAL RELEASE MIGRATION EVALUATION

5.2.1 Imminent Hazard Evaluation

An Imminent Hazard Evaluation (IHE) per 310 CMR 40.0006 and 40.0951 -955 was performed. The IHE considered current uses of and potential exposures within the Disposal Site Area over a short period of time. Potential sensitive receptors considered in this IHE include current Site workers, utility workers, passersby, visitors, and trespassers within the Disposal Site Area, and residents in the vicinity of the Disposal Site Area. Exposure duration is set at 5 years or less for all receptors. For the purposes of the IHE, Site workers are presumed to experience exposure to soil via incidental ingestion, dermal contact, and inhalation/ingestion of dust, to ambient air within the Site building, and to drinking water-related exposures on the Site property. Site workers are not presumed to experience significant exposure to sediment, nor to groundwater via drinking water-related exposures (i.e., potential drinking water-related exposures modeled at groundwater exposure points (wells DCW-1, DCW-2, ECS-1, and ECS-4) are not considered current potential exposure points). Utility workers are presumed to experience exposure to soil, sediment⁴¹, and groundwater in trenches (via direct contact and via inhalation of vapors in trenches). Passersby, visitors, and trespassers are presumed to experience exposures to soil

⁴¹ Utility workers are considered to potentially receive certain exposure to sediment under current conditions in the vicinity of the outfall of the municipal drainage system to South Meadow Brook.

within the Disposal Site Area and to sediment at the outfall of the surface water drainage system at South Meadow Brook. Residents in the vicinity of the Disposal Site Area are presumed to experience exposure to sediment at the outfall of the surface water drainage system at South Meadow Brook.

The results of this evaluation indicate that, under the conditions and within the limited exposure duration modeled, an Imminent Hazard with respect to human health does not exist. No estimated threshold cumulative risk exceeds the risk management criterion of 10; no non-threshold risk exceeds the risk management criterion on 10^{-5} . Tables summarizing the findings of the IHE are included as Exhibit B. The results of this evaluation are summarized in Table B-20.

On the basis of available information, conditions within the Disposal Site Area do not constitute an Imminent Hazard to the environment. Criteria for evaluating an Imminent Hazard with respect to the environment include:

- (a) evidence of stressed biota attributable to the release at the disposal site, including, without limitation, fish kills or abiotic conditions; or
- (b) a release to the environment of oil or hazardous material which produces immediate or acute adverse impacts to freshwater or saltwater fish populations.

On the basis of available information, no evidence of stressed biota exists. No evidence of immediate or acute adverse impacts on freshwater fish populations as a result of the release in question exists. It is therefore concluded that conditions within the Disposal Site Area do not constitute an Imminent Hazard with respect to the environment.

On the basis of this evaluation, it is concluded that conditions on the Site do not present an Imminent Hazard to human health or the environment.

5.2.3 Substantial Release Migration Evaluation

Conditions indicative of Substantial Release Migration include the following:

- (a) releases that have resulted in the discharge of separate-phase oil and/or hazardous material to surface waters, subsurface structures, or underground utilities or conduits;
- (b) releases to the ground surface or to the vadose zone that, if not promptly removed or contained, are likely to significantly impact the underlying groundwater, or significantly exacerbate an existing condition of groundwater pollution;
- (c) releases to the groundwater that have migrated or are expected to migrate more than 200 feet per year;
- (d) releases to the groundwater that have been or are within one year likely to be detected in a public or private water supply well;
- (e) releases to the groundwater that have been or are within one year likely to be detected in a surface water body, wetland, or public water supply reservoir; or
- (f) releases to the groundwater that have resulted or are within one year likely to result in the discharge of vapors into school buildings or occupied residential dwellings.

Available evidence provides no indication that conditions (b) through (d) and (f) above currently exist on the Site or are likely to exist in the future. No residential, school, or institutional properties are located within the Disposal Site Area. No evidence exists to indicate that groundwater transport is likely to result in the migration of contamination to residential, school, or institutional properties or to areas where impacts to public or private water supplies may occur. Available historical data indicate that the release in question may have resulted in the discharge of separate-phase oil and dissolved contamination to surface water at the outfall of the municipal surface water drainage system at South Meadow Brook. Criteria (a) and (e) above may therefore be satisfied. On this basis, it is concluded that a Condition of Substantial Release Migration may exist or have existed with respect to current conditions within the Disposal Site Area associated with the release in question. Remedial response actions have been implemented to curtail the discharge of contamination to the underground utility, and to contain the discharge of contamination to surface water.

6.0 CHARACTERIZATION OF RISK OF HARM TO THE PUBLIC WELFARE AND TO SAFETY

The characterization of risk of harm to the public welfare consists of an evaluation of conditions associated with the release not specifically addressed in the human health risk characterization. These may include local nuisance conditions which may exist in association with the release or with remedial alternatives proposed to mitigate the release, and significant or potentially significant community effects resulting from conditions with respect to the release. A condition of No Significant Risk of Harm to public welfare with respect to the release in question exists or has been achieved if:

- 1) No nuisance conditions exist or will result from the release or the remedial alternative, including:
 - i) The breathing zone of ambient and indoor air are currently and will, in the reasonably foreseeable future, remain free from persistent, noxious odors,
 - ii) There is accessible drinking water that is and will, in the reasonably foreseeable future, remain free from noxious taste and odors; and
 - iii) Livestock is and will remain, in the reasonably foreseeable future, free from harmful effects.
- 2) No community that is currently affected and/or community for which it is reasonably foreseeable to conclude that it could be affected by the release experiences significant adverse impacts including loss of active or passive property use(s), and any non-pecuniary effects not otherwise considered in the human health risk characterization (including aesthetic concerns), and;
- 3) The requirements of 310 CMR 40.0996 concerning the Upper Concentration Limits are met.

No indications exist to suggest the current or possible future existence of nuisance conditions on or in the vicinity of the Site associated with the release in question. Neither the release, nor response actions performed since discovery of the release, appear to have resulted in significant loss of active or passive property uses or non-pecuniary effects not otherwise considered in the risk characterization. In this regard it is noted that replacement groundwater production wells and on certain properties in the vicinity of the Site property. No evidence of impacts to drinking water supplies on or in the vicinity of the Site property associated with the release in question has been observed. .

Maximum estimated exposure point concentrations in groundwater and soil within the Disposal Site Area are compared to Upper Concentration Limits at 310 CMR 40.0996(7) in Tables 43 and 44. Separate-phase

product is locally present on the water table within the former release area at thicknesses in excess of one-half inch. The presence of separate-phase product on the water table at thicknesses in excess of one-half inch constitutes an exceedance of a promulgated Upper Concentration Limit and is considered an unacceptable degradation of a natural resource. On this basis, it is concluded that a condition of No Significant Risk of harm to the public welfare does not exist at the current time with respect to the release in question.

The risk of harm to safety is evaluated according to criteria at 310 CMR 40.0960. A threat of physical harm or bodily injury to people relative to the release in question does not exist on the Site. The Disposal Site Area is currently maintained in a safe condition. No unstable containers, holes, or other dangerous structures associated with the release in question are known to be present within the Disposal Site Area. No threat of fire or explosion is known or presumed to exist as a result of the release in question. No uncontained corrosive or reactive materials are known to be present in the area. On the basis of this evaluation, it is concluded that conditions with respect to the release in question within the Disposal Site Area do not present a significant risk of harm to safety.

It is therefore concluded that current conditions with respect to the release in question present No Significant Risk of harm to the public safety but may present a condition of significant risk of harm to the public welfare via unacceptable degradation of a natural resource.

7.0 CHARACTERIZATION OF RISK OF HARM TO THE ENVIRONMENT

Evaluation of potential risks to the environment presented by the Site is performed in two stages. The objective of the first stage is to determine if there is current or potential future exposure of environmental receptors to contamination at or from the Disposal Site. If any current or potential future exposure to contamination at or from the Disposal Site is identified, then that exposure is further evaluated to determine whether a condition of "readily apparent harm" to environmental receptors exists. If no current or future exposure of environmental receptors to contamination at or from the Disposal Site is identified, then a condition of no significant risk of harm to environmental receptors exists and further evaluation is not required. If current or future exposure to environmental receptors is identified, and a condition of readily apparent harm exists, then a condition of no significant risk of harm to environmental receptors does not exist and further evaluation in a Stage II Ecological Risk Characterization is not required. Each current or potential future exposure identified which does not result in a condition of readily apparent harm is considered a potentially significant exposure pathway which must be further evaluated in a Stage II Ecological Risk Characterization unless it can be ruled out based on criteria established by MADEP.

Evidence of current or potential exposure to contamination present on or originating from the Site includes, but is not limited to, the following:

- 1.) Current or past visible physical evidence that oil and/or hazardous material at or from the disposal site has come to be located in surface soil, surface water, sediment or wetlands. Examples of such evidence include, without limitation, the presence of sheens from oil or hazardous material, non-aqueous phase liquids, oil, tar or other solid or semi-solid hazardous material in surface soil, surface water, sediment, or wetlands;
- 2.) Records or other evidence of current or past impacts of oil and/or hazardous material from the disposal site on wildlife, fish, shellfish, or other aquatic biota. Examples of such impacts include, without limitation, fish kills and abiotic conditions;
- 3.) Analytical data indicating the presence of oil and/or hazardous material attributable to the site in question in surface water or sediment (including wetlands);

- 4.) The potential for the transport of oil and/or hazardous material in the groundwater or surface runoff to such receptors as surface water or sediments (including wetlands) identified as Environmental Receptors; or
- 5.) The presence of oil and/or hazardous material at the disposal site within two feet of the ground surface and the potential for such contamination to result in exposure to wildlife.

If evidence of such current or potential future exposure is identified, then that exposure is further evaluated to determine if a condition of readily apparent harm exists. The following conditions constitute "readily apparent harm:"

- a) Visual evidence of stressed biota attributable to the release at the disposal site, including, without limitation, fish kills or abiotic conditions;
- b) The existence of oil and/or hazardous material attributable to the disposal site in concentrations which exceed Massachusetts Surface Water Standards promulgated in 314 CMR 4.00, which include USEPA Ambient Water Quality Criteria applied pursuant to 314 CMR 4.05(5)(e).
- c) Visible presence of oil, tar, or other non-aqueous phase hazardous material in soil within three feet of the ground surface over an area equal to or greater than two acres, or over an area equal to or greater than 1,000 square feet in sediment within one foot of the sediment surface.

If evidence of current or potential future exposure of environmental receptors to contamination at or originating from the Disposal Site in one or media is identified and is not associated with a condition of readily apparent harm, that current or potential future exposure pathway is further evaluated to determine if it could result in a potentially significant exposure. Current or potential future exposures identified may be ruled out as potentially significant exposures using the following criteria:

- i.) USEPA Ambient Water Quality Criteria and Massachusetts Surface Water Standards promulgated in 314 CMR 4.00;
- ii.) Environmental concentrations specifically adopted by the Department as screening criteria; or
- iii.) Site size, location, and/or landscape characteristics specifically adopted by the Department as screening criteria.

Current or potential future exposure pathways which can not be ruled out by these criteria must be further evaluated in a Stage II Ecological Risk Characterization, which involves evaluation of site-specific habitat and receptors, and the formulation, based on literature values or other research, of end points or standards specific to the receptors impacted or potentially impacted and the pathways involved.

Initial evaluation of Site conditions with respect to current or potential exposure of environmental receptors to contamination indicates that conditions 1 and 3, above exist with respect to the release in question (current or past visible physical evidence that oil and/or hazardous material at or from the disposal site has come to be located in surface soil, surface water, sediment or wetlands, and analytical data indicating the presence of oil and/or hazardous material attributable to the site in question in surface water or sediment (including wetlands)). Further evaluation in terms of the criteria for readily apparent harm (criteria (a), (b), and (c), above), indicates a condition of readily apparent harm does not exist with respect to the release in question. In the absence of a condition of readily apparent harm, the release is further evaluated to determine if a potentially significant exposure pathway exists. Repeated analyses of samples of surface water collected at the outfall of the surface water drainage line at South Meadow

Brook provide no indication of the presence of contaminant concentrations in excess of National Ambient Water Quality Criteria or Massachusetts Surface Water Standards at 314 CMR 4.00: impacts to surface water may therefore be ruled out as a potentially significant exposure pathway by criterion (i) above. The area of impacted sediment in the vicinity of the outfall at South Meadow Brook is conservatively estimated at 200 square feet and no evidence indicates or suggests that the area of contamination extends more than half-way across South Meadow Brook at the outfall (and is therefore likely to present a barrier to the migration of fish). On the basis of recent interim guidance published by the Office of Research and Standards, MADEP (*Area-Based Screening for Sediment Contamination: Technical Update*, ORS/MADEP, January, 2006), therefore, the area of sediment contamination at the outfall of the municipal storm water drainage line at South Meadow Brook does not represent a potentially significant exposure pathway. On these bases, residual contamination in surface water and residual contamination in sediment observed at the outfall of the storm water drainage line at South Meadow Brook are ruled out as potentially significant exposure pathways. It is therefore concluded that conditions with respect to the release in question do not present a significant risk of harm to the environment.

8.0 CONCLUSIONS OF THE RISK CHARACTERIZATION

Conditions within the Disposal Site Area have been evaluated in a MCP Method 3 Risk Characterization. Potential exposure of Site workers, utility workers, construction workers, visitors, trespassers, and passersby, and current and potential future residents within the Disposal Site Area to residual contamination present within the Disposal Site Area has been evaluated. Conditions on the Site have been evaluated in terms of Imminent Hazard and Condition of Substantial Release Migration, and with respect to risk of harm to the public welfare and safety and the environment. In order to conclude that a condition of No Significant Risk of harm to human health, the public welfare and safety, and the environment exists with respect to the release in question, now and for the reasonably foreseeable future, it is necessary to find that a condition of No Significant Risk of harm now and for the reasonably foreseeable future exists for each portion of the risk characterization: human health, public welfare and safety, and the environment. With respect to the release in question, it is concluded that a condition of No Significant Risk of harm to human health does not exist with respect to the release in question. It is also concluded that a condition of No Significant Risk of harm to the public welfare and safety does not exist with respect to the release in question, under current conditions. It is concluded that a condition of No Significant Risk of harm to environment exists with respect to the release in question. The findings of this risk characterization are therefore that a condition of No Significant Risk does not exist with respect to the release in question and that further response actions are necessary.

Table 1

	Contaminants of Concern in Soil (Disposal Site Area)					MADEP Background Concentration Natural Soils (MADEP/ORS, May, 2002)	MADEP Background Concentration Fill Material Containing Coal Ash (MADEP/ORS, May, 2002)
	No. Analyses (Disposal Site Area)	No. Detections (Disposal Site Area)	Maximum EPC mg/Kg	Maximum Detect mg/Kg	Location of Maximum Detect	mg/kg	mg/kg
Units							
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	14	9	138.65	537.0	Left UST	NA	NA
C9 to C12 Aliphatics	14	8	338.95	1,830.0	Left UST	NA	NA
C9 to C10 Aromatics	14	5	186.59	1,010.0	Left UST	NA	NA
Benzene	15	1	0.41	1.42	DCE	NA	NA
Toluene	15	2	2.87	15.0	DCE	NA	NA
Ethylbenzene	15	5	7.59	29.7	DCE	NA	NA
Xlenes	15	7	56.29	121.0	DCE	NA	NA
Naphthalene	15	7	16.63	62.8	DCE	NA	NA
MTBE	15	3	1.09	4.93	DCE	NA	NA
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	10	5	4,181.44	10,200.0	DCE	NA	NA
C19 to C36 Aliphatics	10	6	1,542.96	3,740.0	DCE	NA	NA
C11 to C22 Aromatics	10	5	1,744.76	3,560.0	DCE	NA	NA
Naphthalene	10	3	2.70	6.6	DCE	0.5	1
2-Methylnaphthalene	10	3	15.64	43.2	DCE	0.5	1
Acenaphthylene	5	0	NC (0.08)	NC (0)		0.5	1
Acenaphthene	10	3	0.47	1.27	DCE	0.5	2
Fluorene	5	0	NC (0.08)	NC (0)		1	2
Phenanthrene	10	3	3.59	9.51	DCE	3	20
Anthracene	5	0	NC (0.08)	NC (0)		1	4
Fluoranthene	5	0	NC (0.08)	NC (0)		4	10
Pyrene	5	0	NC (0.08)	NC (0)		4	20
Benzo(a)anthracene	5	0	NC (0.08)	NC (0)		2	9
Chrysene	5	0	NC (0.08)	NC (0)		2	7
Benzo(b)fluoranthene	5	0	NC (0.08)	NC (0)		2	8
Benzo(k)fluoranthene	5	0	NC (0.08)	NC (0)		1	4
Benzo(a)pyrene	5	0	NC (0.08)	NC (0)		2	7
Indeno(1,2,3-cd)pyrene	5	0	NC (0.08)	NC (0)		1	3
Dibenzo(a,h)anthracene	5	0	NC (0.08)	NC (0)		0.5	1
Benzo(g,h,i)perylene	5	0	NC (0.08)	NC (0)		1	3
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	0	0	0.00	0.0		NA	NA

Notes: Concentrations in milligrams per kilogram (mg/kg). EPC = Exposure Point Concentration.
NC = Not Calculated. NA = Not Available.
NC(3.96) = Estimated EPC or Maximum not used as an EPC.

Units	Contaminants of Concern in Sediment					Recommended Fresh Water Sediment Screening Values Consensus-Based TEC (MADEP/ORS, May, 2002, rev. 2006)
	No. Analyses (Disposal Site Area)	No. Detections (Disposal Site Area)	Maximum EPC	Maximum Detect	Location of Maximum Detect	
	mg/Kg	mg/Kg				mg/kg
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	0	0	NC (0)	NC (0)		NA
C9 to C12 Aliphatics	0	0	NC (0)	NC (0)		NA
C9 to C10 Aromatics	0	0	NC (0)	NC (0)		NA
Benzene	0	0	NC (0)	NC (0)		NA
Toluene	0	0	NC (0)	NC (0)		NA
Ethylbenzene	0	0	NC (0)	NC (0)		NA
Xylenes	0	0	NC (0)	NC (0)		NA
Naphthalene	0	0	NC (0)	NC (0)		NA
MTBE	0	0	NC (0)	NC (0)		NA
Extractable Petroleum Hydrocarbons						Note 1
C9 to C18 Aliphatics	7	5	619.29	1,800.0	ESE-3	NA
C19 to C36 Aliphatics	7	7	670.71	1,450.0	ESE-3	NA
C11 to C22 Aromatics	7	7	485.29	1,410.0	ESE-3	NA
Naphthalene	7	0	NC (0)	NC (0)		0.18
2-Methylnaphthalene	7	3	0.54	1.93	ESE-3	NA
Acenaphthylene	7	0	NC (0)	NC (0)		NA
Acenaphthene	7	0	NC (0)	NC (0)		NA
Fluorene	7	0	NC (0)	NC (0)		0.077
Phenanthrene	7	7	1.78	4.47	ESE-3	0.204
Anthracene	7	0	NC (0)	NC (0)		0.057
Fluoranthene	7	0	NC (0)	NC (0)		0.42
Pyrene	7	0	NC (0)	NC (0)		0.2
Benzo(a)anthracene	7	0	NC (0)	NC (0)		0.11
Chrysene	7	0	NC (0)	NC (0)		0.17
Benzo(b)fluoranthene	7	0	NC (0)	NC (0)		NA
Benzo(k)fluoranthene	7	0	NC (0)	NC (0)		NA
Benzo(a)pyrene	7	0	NC (0)	NC (0)		0.15
Indeno(1,2,3-cd)pyrene	7	0	NC (0)	NC (0)		NA
Dibenzo(a,h)anthracene	7	0	NC (0)	NC (0)		0.033
Benzo(g,h,i)perylene	7	0	NC (0)	NC (0)		NA

Notes: Concentrations in milligrams per kilogram (mg/kg). EPC = Exposure Point Concentration.
NC = Not Calculated. NA = Not Available.
NC(3.96) = Estimated EPC or Maximum not used as an EPC.

Table 3

Contaminants of Concern: Groundwater					
	No. of Analyses (Disposal Site Area)	No. of Detections (Disposal Site Area)	Average Concentration (Site Wide) ug/L	Maximum EPC (Site Wide) ug/L	Maximum Detect (Site Wide) ug/L
Units					
Volatile Petroleum Hydrocarbons					
C5 to C8 Aliphatics	77	11	293.9	3,760.0	7,130.0
C9 to C12 Aliphatics	77	18	1,292.7	27,383.3	63,200.0
C9 to C10 Aromatics	77	17	1,437.4	29,116.7	64,700.0
Benzene	77	12	14.5	352.0	352.0
Toluene	77	10	37.5	818.3	1,220.0
Ethylbenzene	77	16	60.8	1,174.7	1,610.0
Xylenes	77	16	327.3	7,356.7	11,140.0
Naphthalene	77	19	88.7	1,850.7	3,920.0
MTBE	77	32	1,236.6	24,843.3	37,400.0
Extractable Petroleum Hydrocarbons					
C9 to C18 Aliphatics	80	5	193.2	1,888.0	3,900.0
C19 to C36 Aliphatics	80	4	122.5	775.0	1,900.0
C11 to C22 Aromatics	80	11	211.9	2,100.0	3,500.0
Naphthalene	74	16	23.2	329.3	1,147.0
2-Methylnaphthalene	74	13	6.2	68.0	68.0
Acenaphthylene	74	0	NC	NC	NC
Acenaphthene	74	0	NC	NC	NC
Fluorene	74	0	NC	NC	NC
Phenanthrene	74	0	NC	NC	NC
Anthracene	74	0	NC	NC	NC
Fluoranthene	74	0	NC	NC	NC
Pyrene	74	0	NC	NC	NC
Benzo(a)anthracene	74	0	NC	NC	NC
Chrysene	74	0	NC	NC	NC
Benzo(b)fluoranthene	74	0	NC	NC	NC
Benzo(k)fluoranthene	74	0	NC	NC	NC
Benzo(a)pyrene	74	0	NC	NC	NC
Indeno(1,2,3-cd)pyrene	74	0	NC	NC	NC
Dibenzo(a,h)anthracene	74	0	NC	NC	NC
Benzo(c,h,i)perylene	74	0	NC	NC	NC
Volatile Chlorinated Hydrocarbons					
Tetrachloroethylene	1	0	0.5	NC	NC

Table 4

Contaminants of Concern: Surface Water

	No. of Analyses	No. of Detects	Average EPC in Surface Water ug/L	Maximum Estimated EPC in Surface Water ug/L	Maximum Detect in Surface Water ug/L	Ambient Water Quality Criteria (bold) Other Criteria (Italics) (ug/L)	Reference
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	25	1	30.0	45.0	75.0	390	1
C9 to C12 Aliphatics	25	4	27.3	66.4	319.0	1800	1
C9 to C10 Aromatics	25	4	25.5	60.0	258.0	430	1
Benzene	25	0	1.9	2.5	0.0	700	2b
Toluene	25	0	1.9	2.5	0.0	5000	2b
Ethylbenzene	25	0	1.9	2.5	0.0	43	2d
Xylenes	25	0	5.7	7.5	0.0	50000	3a
Naphthalene	25	4	4.2	7.7	27.4	7000	3c
MTBE	25	0	1.9	2.5	0.0	51450	2a
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	29	11	1,182.1	2,714.3	11,400.0	1800	1
C19 to C36 Aliphatics	29	13	690.3	1,757.1	7,300.0	2100	1
C11 to C22 Aromatics	29	11	789.7	1,857.1	8,200.0	300	1
Naphthalene	33	2	5.8	113.0	113.0	110.0	5a
2-Methylnaphthalene	33	4	145.5	4,658.0	4,658.0	300	3b
Acenaphthylene	29	0	NC (0)	NC (0)	NC (0)		6
Acenaphthene	33	1	3.3	41.4	41.4	23.0	2a
Fluorene	29	0	NC (0)	NC (0)	NC (0)	6.2	2a
Phenanthrene	33	3	5.6	73.9	73.9	6.3	4a
Anthracene	29	0	NC (0)	NC (0)	NC (0)	0.13	5b
Fluoranthene	29	0	NC (0)	NC (0)	NC (0)	6.16	2a
Pyrene	29	0	NC (0)	NC (0)	NC (0)	0.40	5b
Benzo(a)anthracene	29	0	NC (0)	NC (0)	NC (0)	1.0	5b
Chrysene	29	0	NC (0)	NC (0)	NC (0)	0.07	5b
Benzo(b)fluoranthene	29	0	NC (0)	NC (0)	NC (0)	0.42	5b
Benzo(k)fluoranthene	29	0	NC (0)	NC (0)	NC (0)	0.14	5b
Benzo(a)pyrene	29	0	NC (0)	NC (0)	NC (0)	5.0	5a
Indeno(1,2,3-cd)pyrene	29	0	NC (0)	NC (0)	NC (0)		6
Dibenzo(a,h)anthracene	29	0	NC (0)	NC (0)	NC (0)	0.04	5b
Benzo(g,h,i)perylene	29	0	NC (0)	NC (0)	NC (0)	0.02	5b
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	0	0	NC	NC	NC	500.0	5a

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 5

Contaminants of Concern
Drinking Water

	Drinking Water Summary					Massachusetts Maximum Contaminant Levels (MMCLs (310 CMR 22.000)) (Spring, 2004	Secondary Maximum Contaminant Levels (SMCLs (310 CMR 22.000)) (Spring, 2004	MADEP Office of Research and Standards Guidelines (MA ORSGLs) (Spring, 2004)
	No. of Analyses	No. of Detects	Average EPC in Drinking Water	Maximum Estimated EPC in Drinking Water	Maximum Detect in Drinking Water			
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	0	0	NC	NC	NC			300.0
C9 to C12 Aliphatics	0	0	NC	NC	NC			700.0
C9 to C10 Aromatics	0	0	NC	NC	NC			200.0
Benzene	22	0	NC	NC	NC	5.0		
Toluene	22	0	NC	NC	NC	1,000.0		
Ethylbenzene	22	0	NC	NC	NC	700.0		
Xylenes	22	0	NC	NC	NC	10,000.0		
Naphthalene	22	0	NC	NC	NC			
MTBE	22	8	1.4	3.5	5.0		20 - 40	70.0
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	3	0	NC	NC	NC			700.0
C19 to C36 Aliphatics	3	0	NC	NC	NC			14,000.0
C11 to C22 Aromatics	3	0	NC	NC	NC			200.0
Naphthalene	3	0	NC	NC	NC			140.0
2-Methylnaphthalene	3	0	NC	NC	NC			
Acenaphthylene	3	0	NC	NC	NC			
Acenaphthene	3	0	NC	NC	NC			
Fluorene	3	0	NC	NC	NC			
Phenanthrene	3	0	NC	NC	NC			
Anthracene	3	0	NC	NC	NC			
Fluoranthene	3	0	NC	NC	NC			
Pyrene	3	0	NC	NC	NC			
Benzo(a)anthracene	3	0	NC	NC	NC			
Chrysene	3	0	NC	NC	NC			
Benzo(b)fluoranthene	3	0	NC	NC	NC			
Benzo(k)fluoranthene	3	0	NC	NC	NC			
Benzo(a)pyrene	3	0	NC	NC	NC	0.2		
Indeno(1,2,3-cd)pyrene	3	0	NC	NC	NC			
Dibenzo(a,h)anthracene	3	0	NC	NC	NC			
Benzo(g,h,i)perylene	3	0	NC	NC	NC			
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	22	7	0.6	1.3	2.2	5.0		
Other Compounds								
Ethylene Dibromide (EDB)	22	0	NC	NC	NC	0.02		

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Table 6

Summary						MADEP Indoor Air Background (MADEP/ORS, 2003. Development of MCP Risk-Based Levels for Soil and Groundwater)	Stolwijk, 1990. Assessment of Population Exposure and Carcinogenic Risk Posed by Volatile Organic Compounds in Indoor Air.				Massachusetts Threshold Effects Limit (TEL) (24 hour average exposure limit) (MADEP/ORS, 1995)	Massachusetts Allowable Ambient Limit (AAL) (annual average concentration) (MADEP/ORS, 1995)
Sampling Statistics												
No. of Analyses	No. of Detections	Average	Maximum	Location of Maximum Detect			10 th %	50 th %	90 th %	98 th %		
					µg/m ³		µg/m ³	µg/m ³	µg/m ³	µg/m ³		
Air Petroleum Hydrocarbons (MADEP)												
Benzene	7	6	0.0	0.0	First Floor Office	21	2	10	20	30	1.74	0.12
Toluene	7	7	34.1	113.0	First Floor Office	28.65	30	65	150	250	80	20
Ethylbenzene	7	5	4.0	14.0	First Floor Office	9.62	4	10	20	--	300	300
Total Xylenes	7	6	0.0	0.0	First Floor Office	72.41	13	25	50	--	11.8	11.8
Naphthalene	7	0	NC	NC		5	--	2	5	--	14.25	14.25
2-Methylnaphthalene	7	0	NC	NC		1.74	--	--	--	--		
Methyl-tert-butyl ether	7	7	55.0	307.0	First Floor Office	NA	--	--	--	--	NA	NA
1,3-Butadiene	7	0	NC	NC		NA	--	--	--	--	1.2	0.003
C ₅ - C ₆ Aliphatics	7	6	302.8	1,690.0	First Floor Office	85	--	--	--	--	--	--
C ₉ - C ₁₂ Aliphatics	7	2	55.4	242.0	First Floor Office	90	--	--	--	--	--	--
C ₉ - C ₁₀ Aromatics	7	3	38.0	184.0	First Floor Office	80	--	--	--	--	--	--

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 7

Dose - Response Information:
Contaminants of Concern

OIL OR HAZARDOUS MATERIAL	Non-Cancer Oral										
	CASRN	Chronic Oral Reference Dose: RfD (or equivalent)	Reference	Subchronic Oral Reference Dose: RfD (or equivalent)	Reference	Review Date	Uncertainty Factor	Modifying Factor	Confidence Level	Study Information	Critical Effect
		mg/kg/day		mg/kg/day							
Volatile Aromatic Compounds											
Benzene	71-43-2						300	1	Medium	Human occupational	Decreased human lymphohemopoietic, immune, nervous systems
Toluene	108-88-3	2.00E-01	1	2.00E+00	2	Sep-04	1000	1	Medium	Oil gavage, rat	Rat: changes in liver and kidney weights
Ethylbenzene	100-41-4	1.00E-01	1	1.00E+00	2	Sep-04	1000	1	Low	Rat, subchronic to chronic oil gavage	Liver and kidney toxicity
Xylenes	1330-20-7	2.00E-01	1	2.00E-01	2	Sep-04	100	1	Medium	Rat, chronic, gavage	Hyperactivity, decreased body weight, increased mortality
Methyl tert-butyl ether	1634-04-4	1.00E-01	3	1.00E+00	4	Sep-04				IRIS: No data	
Naphthalene	91-20-3	2.00E-02	1	2.00E-02	1	Sep-04	3000	1	Low	Rat, subchronic oral	Decreased mean terminal body weight in males
Aliphatic Hydrocarbons											
C5 - C8 Aliphatic		6.00E-02	5	6.00E-01	5						
C9 - C12 Aliphatic		1.00E-01	5	1.00E+00	5						
C9 - C18 Aliphatic		1.00E-01	5	1.00E+00	5						
C19 - C36 Aliphatic		2.00E+00	5	2.00E+01	5						
Aromatic Hydrocarbons											
C9 - C10 Aromatic		3.00E-02	5	3.00E-01	5						
C11 - C22 Aromatic		3.00E-02	5	3.00E-01	5						
Semi-Volatile Hydrocarbons											
Acenaphthene	83-32-9	6.00E-02	1	6.00E-01	1,2	Apr-94	3000	1	Low	Mouse, gavage	Hepatotoxicity
Acenaphthylene	208-96-8	6.00E-02		6.00E-01						Not Available: IRIS	
2-Methylnaphthalene	915-7-6	2.00E-02	E	2.00E-02	2a						
Naphthalene	91-20-3	2.00E-02	1	2.00E-02	1	Sep-04	3000	1	Low	Rat, subchronic oral	Decreased mean terminal body weight in males
Phenanthrene	85-01-8	4.00E-02	2b	4.00E-02	2a					IRIS: No data.	
Chlorinated Hydrocarbons											
Tetrachloroethene	127-18-4	1.00E-02	1	1.00E-01	2	Mar-05	1000	1	Medium	Mouse, gavage, six weeks	Liver triglycerides and liver weight/body weight ratios were elevated. At higher doses hepatocellular necrosis and degeneration.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 7

Dose - Response Information:
Contaminants of Concern

OIL OR HAZARDOUS MATERIAL	Non-Cancer Inhalation									
	Chronic Inhalation Reference Exposure: RIC (or equivalent)	Reference	Subchronic Inhalation Reference Exposure: RIC (or equivalent)	Ref.	Review Date	Uncertainty Factor	Modification Factor	Confidence Level	Study Information	Critical Effect
	mg/m ³		mg/m ³							
Volatile Aromatic Compounds										
Benzene	3.0E-02	1	9.0E-02	4	Oct-92					
Toluene	4.00E-01	1	2.0E+03	2	Aug-92	300	1	Medium	Human, occupational	Human, occupational (neurological effects); Rat, inhalation, chronic (degeneration of nasal epithelium)
Ethylbenzene	1.00E+00	1	1.0E+03	2	Oct-92	300	1	Low	Rat and rabbit	Developmental toxicity
Xylenes	6.00E-02	2	3.0E+02	2	Oct-92				IRIS: Not available.	
Methyl tert-butyl ether	3.00E+00	1			Sep-93	100	1	Medium	Rat, chronic (24 month) study	Rat, inhalation (increased absolute and relative liver weight and increased severity of spontaneous renal lesions (females), increased prostration (females), swollen pericardial tissue (males))
Naphthalene	3.00E-03	1	3.0E+00	1	Sep-98	3000	1	Medium	Mouse, chronic inhalation	Nasal effects, hyperplasia and metaplasia in respiratory and olfactory epithelium, respectively
Aliphatic Hydrocarbons										
C5 - C8 Aliphatic	2.00E-01	7	#REF!	6a						
C9 - C12 Aliphatic	2.00E-01	7a	#REF!	6a						
C9 - C18 Aliphatic	2.00E-01	7a	#REF!	6a						
C19 - C36 Aliphatic	7.00E+00		NOT VOLATILE							
Aromatic Hydrocarbons										
C9 - C10 Aromatic	2.00E-02	7b	#REF!	6a						
C11 - C22 Aromatic	2.00E-02	3b	#REF!	6a						
Semi-Volatile Hydrocarbons										
Acenaphthene	2.10E-01								Not Available, IRIS	
Acenaphthylene	2.10E-01		NOT VOLATILE						Not Available, IRIS	
2-Methylnaphthalene	3.00E-03	3b	7.1E+01	3a						
Naphthalene	3.00E-03	1	3.0E+00	1	Sep-98	3000	1	Medium	Mouse, chronic inhalation	Nasal effects, hyperplasia and metaplasia in respiratory and olfactory epithelium, respectively
Phenanthrene	1.40E-01		NOT VOLATILE						Not Available, IRIS	
Chlorinated Hydrocarbons										
Tetrachloroethene	4.60E+00	3	NA	1						

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 7

Dose - Response Information:
Contaminants of Concern

OIL OR HAZARDOUS MATERIAL	Cancer Oral												
	Weight of Evidence Classification	Relative Potency Values	Oral Cancer Slope Factor	Reference	Review Date	Drinking Water Unit Risk	Reference	Review Date	Study Information	Critical Effect	Drinking Water Conc. At Specified Risk Levels	Concentration	Reference
			1/(mg/kg/day)			1/(ug/L)						(ug/L)	
Volatile Aromatic Compounds													
Benzene	A		5.50E-02	I		1.60E-03			Abundant human	Leukemia	E-4 (1 in 10,000) E-5 (1 in 100,000) E-6 (1 in 1,000,000)	1E2 - 1E3 1E1 - 1E2 1E0 - 1E1	
Toluene	D		NC			NC			No human, inadequate animal, no positive results in the majority of genotoxicity studies.				
Ethylbenzene	D		NC			NC			No human, no animal.				
Xylenes	D								No human, inadequate animal.	Rat chronic gavage study concluded no evidence of carcinogenicity.			
Methyl tert-butyl ether									IRIS: Not available.				
Naphthalene	C								IRIS: Not Available. No human, limited animal data (mice, inhalation)	Mouse, inhalation (decreased survival (2 year study), increased incidence of chronic inflammation of respiratory tract, metaplasia of olfactory epithelium, hyperplasia of respiratory epithelium in the nose)			1
Aliphatic Hydrocarbons													
C5 - C8 Aliphatic													
C9 - C12 Aliphatic													
C9 - C18 Aliphatic													
C19 - C36 Aliphatic													
Aromatic Hydrocarbons													
C9 - C10 Aromatic													
C11 - C22 Aromatic													
Semi-Volatile Hydrocarbons													
Acenaphthene	NA	NA							Not Available IRIS				
Acenaphthylene	D	NA							No human, inadequate animal	Mouse, skin painting (no tumors observed in lifetime study)			
2-Methylnaphthalene		NA											
Naphthalene	C	NA							No human, limited animal data (mice, inhalation)	Mouse, inhalation (decreased survival (2 year study), increased incidence of chronic inflammation of respiratory tract, metaplasia of olfactory epithelium, hyperplasia of respiratory epithelium in the nose)			1
Phenanthrene	D	NA							No human, inadequate animal (gavage in rat, skin painting in mice)	Tumors not observed in diet study (rat); tumors not observed in skin painting studies (mice).			1
Chlorinated Hydrocarbons													
Tetrachloroethene	C-B2		5.10E-02										

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 7

Dose - Response Information:
Contaminants of Concern

OIL OR HAZARDOUS MATERIAL	Cancer Inhalation						
	Inhalation Unit Risk	Rev. Date	Study Information	Critical Effect	Air Conc. At Specified Risk Levels		Reference
					Risk Level	Concentration	
					1/(ug/m ³)	1/(ug/m ³)	
Volatile Aromatic Compounds							
Benzene	7.80E-06	Jan-00	Abundant human	Leukemia	E-4 (1 in 10,000) E-5 (1 in 100,000) E-6 (1 in 1,000,000)	13.0 - 45 1.3 - 4.5 0.13 - 0.45	1
Toluene			No human, inadequate animal				
Ethylbenzene							
Xylenes							
Methyl tert-butyl ether							
Naphthalene							
Aliphatic Hydrocarbons							
C5 - C8 Aliphatic							
C9 - C12 Aliphatic							
C9 - C18 Aliphatic							
C19 - C36 Aliphatic							
Aromatic Hydrocarbons							
C9 - C10 Aromatic							
C11 - C22 Aromatic							
Semi-Volatile Hydrocarbons							
Acenaphthene			Not Available: IRIS				
Acenaphthylene			Not Available: IRIS, Classification inadequate animal				
2-Methylnaphthalene							
Naphthalene							
Phenanthrene							
Chlorinated Hydrocarbons							
Tetrachloroethene	5.50E-05	Jan-00					

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 7

Dose - Response Information:
Contaminants of Concern

OIL OR HAZARDOUS MATERIAL	Relative Absorption Factors																	
	Chronic Relative Absorption Factors									Subchronic Relative Absorption Factors								
	Soil Ingestion	References	Dermal Absorption	References	Water Ingestion	References	Vegetable Ingestion	References		Soil Ingestion	References	Dermal Absorption	References	Water Ingestion	References	Vegetable Ingestion	References	
Volatile Aromatic Compounds																		
Benzene	1	1	0.08	1	1	1	1	1	1	1	0.08	1	1	1	1	1	1	1
Toluene	1	1	0.12	1	1	1	1	1	1	1	0.12	1	1	1	1	1		
Ethylbenzene	1	1	0.2	1	1	1	1	1	1	1	0.2	1	1	1	1	1		
Xylenes	1	1	0.12	1	1	1	1	1	1	1	0.12	1	1	1	1	1		
Methyl tert-butyl ether	1	1	0.1	1	1	1	1	1	1	1	0.1	1	1	1	1	1		
Naphthalene	1	1	0.1	1	1	1	1	1	1	1	0.1	1	1	1	1	1		
Aliphatic Hydrocarbons																		
C5 - C8 Aliphatic	0.91	2	0.5	2	1	2	1	5	0.91	2	0.5	2	1	2	1	5		
C9 - C12 Aliphatic	0.91	2	0.2	2	1	2	1	5	0.91	2	0.2	2	1	2	1	5		
C9 - C18 Aliphatic	0.91	2	0.2	2	1	2	1	5	0.91	2	0.2	2	1	2	1	5		
C19 - C36 Aliphatic	0.91	2	0.1	2	1	2	1	5	0.91	2	0.1	2	1	2	1	5		
Aromatic Hydrocarbons																		
C9 - C10 Aromatic	0.91	2	0.18	2	0.91	2	0.91	5	0.91	2	0.18	2	0.91	2	0.91	5		
C11 - C22 Aromatic	0.91	2	0.18	2	0.91	2	0.91	5	0.91	2	0.18	2	0.91	2	0.91	5		
Semi-Volatile Hydrocarbons																		
Acenaphthene	1	1	0.2	1	1	1	1	1	1	1	0.2	1	1	1	1	1		
Acenaphthylene	0.91	1	0.18	1	0.91	1	0.91	1	0.91	1	0.18	1	0.91	1	0.91	1		
2-Methylnaphthalene	1	1	0.1	1	1	1	1	1	1	1	0.1	1	1	1	1	1		
Naphthalene	1	1	0.1	1	1	1	1	1	1	1	0.1	1	1	1	1	1		
Phenanthrene	0.91	1	0.18	1	0.91	1	0.91	1	0.91	1	0.18	1	0.91	1	0.91	1		
Chlorinated Hydrocarbons																		
Tetrachloroethene	1.00		0.10						1.00		0.10						1.00	

References

- 1 U.S. EPA, Integrated Risk Information System (IRIS). On-line search: August, 2003.
 - 1a The chronic oral RfD (from IRIS) has been used here as a subchronic oral RfD equivalent.
 - 1b The value for naphthalene from IRIS has been used here for 2-methylnaphthalene.
 - 1c The chronic RfD is set equal to that of acenaphthene based on structure.
 - 1d The chronic RfDs is set equal to that of fluoranthene based on structure.
 - 1e The subchronic RfDs is set equal to that of fluoranthene based on structure.
 - 1f This Cancer Slope Factor or Unit Risk for benzo(a)pyrene (from IRIS) has been applied to the seven PAH compounds which are designated category A, B1, B2 or C carcinogens.
- 2 U.S. EPA Health Effects Assessment Summary Tables (HEAST), Annual FY-1997. EPA 540-R-97-036
 - 2a The chronic oral RfD for naphthalene (from HEAST) has been used as the chronic RfD equivalent for all PAH compounds for which chronic RfDs are unavailable.
 - 2c The subchronic RfD is set equal to that of acenaphthene based on structure.
 - 2d This Cancer Slope Factor or Unit Risk was taken from a fact sheet distributed by the U.S. EPA Superfund Health Risk Technical Support C.

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Table 8

Generalized Exposure Assessment

Potential Receptor	Age (years)	Current/ Future Exposure	Subchronic/ Chronic	Effects Evaluated	Potential Exposure Point		Potential Exposure Routes
					Media	Location	
Site Worker	18 - 45	Current/Future	Chronic	Threshold/Nonthreshold	Soil	Disposal Site Area, 0- to 3-ft depth	Ingestion, dermal contact
					Groundwater	No Exposure	
					Dust	Disposal Site Area, 0- to 3-ft depth	Inhalation/ingestion, inhalation
					Sediment	No Exposure	
					Vapors	Interior of Existing Building	Inhalation
					Drinking Water	Existing DW Well, DCW-1, DCW-2, ECS-1, ECS-4	Ingestion, dermal contact, inhalation
Construction Worker (future exposure)	18+	Future	Subchronic	Threshold/Nonthreshold	Soil	Disposal Site Area, 0- to 15-ft depth	Ingestion, dermal contact
					Groundwater	Limited, in trenches	Dermal contact
					Dust	Disposal Site Area, 0- to 15-foot depth	Inhalation/ingestion, inhalation
					Sediment	No Exposure	
					Vapors	Limited, in trenches	Inhalation
Utility Worker	22+	Current	Subchronic	Threshold/Nonthreshold	Soil	Disposal Site Area, 0- to 6-ft depth	Ingestion, dermal contact
					Groundwater	Limited, in trenches	Dermal contact
					Dust	Disposal Site Area, 0- to 6-ft depth	Inhalation/ingestion, inhalation
					Sediment	Ravine Area	Ingestion, dermal contact
					Vapors	Limited, in trenches	Inhalation
Passerby/Trespasser	6 - 13 13 - 18 18 - 31	Current	Subchronic Subchronic Chronic	Threshold/Nonthreshold Threshold/Nonthreshold Threshold/Nonthreshold	Soil	Disposal Site Area, 0- to 3-ft depth	Ingestion, dermal contact
					Groundwater	No Exposure	
					Dust	Disposal Site Area, 0- to 3-ft depth	Inhalation/ingestion, inhalation
					Sediment	South Meadow Brook Outfall Area	Ingestion, dermal contact
					Vapors	No Exposure	
Resident	1 - 6 6 - 18 0 - 30	Future	Subchronic Chronic Chronic	Threshold Threshold Non-Threshold	Soil	Disposal Site Area, 0- to 15-ft depth	Ingestion, dermal contact
					Groundwater	No Exposure	
					Dust	Disposal Site Area, 0- to 15-ft Depth	Inhalation/ingestion, inhalation
					Sediment	South Meadow Brook Outfall Area	Ingestion, dermal contact
					Vapors	Existing Site Building	Inhalation
					Drinking Water	Existing DW Well, DCW-1, DCW-2, ECS-1, ECS-4	Ingestion, dermal contact, inhalation

Notes:

Table 9

Exposure Assumptions

		Receptor	Site Worker	References	Construction Worker	References	Utility Worker	References	Passerby/Trespasser (child)	References	Passerby/Trespasser (child)	References	Passerby/Trespasser (adult)	References	Resident (young child)	References	Resident (child)	References	Resident (adult)	References		
Variables	General Receptor Characteristics	Age (years)	18 - 45	1	18 +	1	22	1	6 - 13	1	13-18	1	18 - 31	1	1 - 6	4	6 - 18	4	0 - 30	4		
		Average Body Weight (BW) (Kg)	57.1	1	57.1	1	57.1	1	31.6	3	53.8	3	58.4	3	14	4	42	4	57.1	4		
		Exposure Period (EP) (years)	30	2	0.5	2	0.00274	2	7	3	5	3	13	3	5	4	12	4	30	4		
		Averaging Period (AP) (years)																				
		Non-cancer risk	30	2	0.5	2	0.00274	2	7	3	5	3	13	3	5	4	12	4	30	4		
	Cancer risk	75	1	75	1	75	1	75	1	75	1	75	1	75	1	75	1	75	1	75	1	
	Indoor Exposure (soil/dust)	Duration of Exposure Event (ED) (days/event)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		Frequency of Exposure (EF) (events/year)	236	3	0	3	0	3	0	0	0	0	0	0	151		151		151		151	
		Exposure Period (EP, years)	30	3	0.5	3	0.00274	3	7		5		13		5		12		30		30	
		Total No. of Exposure Events	7,080		0		0		0		0		0		755	4	1,812	4	4,530	4	4,530	4
	Outdoor Exposure (soil/dust)	Duration of Exposure Event (ED) (days/event)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		Frequency of Exposure (EF) (events/year)	129	3	260		365		62	3	62	3	62	3	214		214		214		214	
		Exposure Period (EP, years)	30	3	0.5	3	0.00274	3	7		5		13		5		12		30		30	
		Total No. of Exposure Events	3,870		130	3	1	3	434		310		806		1,070		2,568		6,420		6,420	
	Outdoor Exposure (Inhalation)	Duration of Exposure Event (ED) (days/event)	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		Frequency of Exposure (EF) (events/year)	173		260		365		62	3	62	3	62	3	214		214		214		214	
		Exposure Period (EP, years)	30	2	0.5	3	0.00274	3	7		5		13		5		12		30		30	
		Total No. of Exposure Events	5,190	3	130	3	1	3	434		310		806	3	1,070	4	2,568	4	6,420	4	6,420	4
	Ingestion (Outdoor Exposure)	Daily Soil Ingestion Rate (IR) (mg/day)	50	5	100	5	100	5	50	6	50	6	50	6	58	4	21	4	21	4	21	4
	Dermal Absorption (Outdoor Exposure)	Total Skin Surface Area (cm2)	16900	7	16900	7	16900	7	10937	7	16170	7	16150	7	7200	7	13100	7	16900	7	16900	7
		Fraction of Skin Exposed (unitless)	0.32	3	0.3	3	0.3	3	0.3	3	0.31	3	0.29	3	0.5	4	0.56	4	0.3	4	0.3	4
		Skin Surface Area in contact with soil (SA) (cm²/day)	5408		5070		5070		3281.1		5012.7		5263.5		3600		7336		5070		5070	
		Mass of Soil on Skin (AF) (mg/cm²)	0.03	8	0.29	8	0.29	8	0.14	8	0.14	8	0.14	8								
		Normalized Mass of Soil on Skin (Residential only, mg/day)													432	4	901	4	618	4	618	4
Ingestion/Inhalation of Fugitive Dust (>10um, Outdoor Exposure)	Concentration of Respirable Particles (RP) (ug/m³)	60	10	60	10	60	10	60	10	60	10	60	10	60	10	60	10	60	10	60	10	
	Proportion of Contaminated Resp. Part. (P) (unitless)	1	9	1	9	1	9	1	10	1	10	1	10	1	10	1	10	1	10	1	10	
	Ventilation Rate (VR) (m³/hour)	3.6	11	3.6	11	3.6	11	1.5	11	1.5	11	2.4	11	0.6	11	1.5	11	2.4	11	2.4	11	
	Ventilation Rate (VR _i) (m³/day)	20	11	20	11	20	11	8.3	11	8.3	11	13.3	11	3.3	11	8.3	11	13.3	11	13.3	11	
	Apportioning Factor (GI-Resp.) (unitless)	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9	
	Apportioning Factor (Resp.) (unitless)	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	
	Exposure Frequency (events/day)	1	10	1	10	1	10	1	10	1	10	1	10	1	10	1	10	1	10	1	10	
	Duration of Exposure Event (ED) (hours/event)	8	10	8	10	8	10	4	12	4	12	4	12	4	12	6	12	6	12	6	12	
	Ingestion of / Dermal Contact with Sediment	Duration of Exposure Event (ED) (days/event)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Frequency of Exposure (EF) (events/year)		10	12	10	12	1	12	62	12	62	12	62	12	122	12	122	12	122	12	122	12	
Exposure Period (EP, years)		30	2	0.5	2	1	2	7	2	5	2	13		5		12		30		30		
Total No. of Exposure Events		300		20	12	1	12	434	12	310	12	806	12	610	12	1484	12	3660	12	3660	12	
Daily Sediment Ingestion Rate (IR) (mg/day)		50	5	100	5	100	5	50	6	50	6	50	6	58	4	21	4	21	4	21	4	
Total Skin Surface Area (cm2)		16900	7	19400	7	19400	7	10937	7	16170	7	16150	7	7200	7	13100	7	16150	7	16150	7	
Fraction of Skin Exposed (unitless)		0.05	12	0.05	12	0.05	12	0.3	3	0.31	3	0.29	3	0.5	4	0.56	4	0.3	4	0.3	4	
Skin Surface Area in contact with soil (SA) (cm²/day)		845		970		970		3281.1		5012.7		5263.5		3600		7336		5445		5445		
Mass of Sediment on Skin (AF) (mg/cm2)		1	8	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1
Dermal Contact, Groundwater	Duration of Exposure Event (ED) (hours/event)	4	12	8	12	4	12	4	12	4	12	4	12	4	12	4	12	4	12	4	12	
	Frequency of Exposure (EF) (events/year)	10	12	20	12	1	12	62	12	62	12	62	12	122	14	122	14	122	14	122	14	
	Total Skin Surface Area (cm2)	16900	7	16900	7	16900	7	10937	7	16170	7	16150	7	7200	7	13100	7	16900	7	16900	7	
	Fraction of Skin Exposed (unitless)	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	
	Skin Surface Area in contact with groundwater (SA) (cm²)	845		845		845		546.85		808.5		907.5		360		655		845		845		

Table 9

		Receptor	Site Worker	References	Construction Worker	References	Utility Worker	References	Passerby/Tresp asser (child)	References	Passerby/Tresp asser (child)	References	Passerby/Tresp asser (adult)	References	Resident (young child)	References	Resident (child)	References	Resident (adult)	References
Age Daily Dose/Exposure Factor	Ingestion: Soil	Noncancer Ingestion for Soil (NCIs) (1/day)	3.09E-07		1.25E-06		1.75E-06		2.69E-07		1.58E-07		1.45E-07		4.14E-06		5.00E-07		3.68E-07	
		Cancer Ingestion for Soil (CIs) Factor (1/day)	1.24E-07		8.32E-09		6.40E-11		2.51E-08		1.05E-08		2.52E-08		2.76E-07		8.00E-08		1.47E-07	
	Soil Dermal Absorption	Noncancer Dermal for Soil (NCDs) Factor (1/day)	1.00E-06		1.83E-05		2.57E-05		2.47E-06		2.22E-06		2.14E-06		3.09E-05		2.15E-05		1.08E-05	
		Cancer Dermal for Soil (CDs) Factor (1/day)	4.02E-07		1.22E-07		9.41E-10		2.30E-07		1.48E-07		3.72E-07		2.06E-06		3.43E-06		4.33E-06	
	Inhalation of Dust (GI)	Noncancer Ingestion for Dust (NCId) (1/day)	2.87E-08		4.31E-08		6.05E-08		3.87E-09		2.27E-09		3.35E-09		1.21E-08		1.51E-08		1.77E-08	
		Cancer Ingestion for Dust (CId) Factor (1/day)	1.15E-08		2.87E-10		2.21E-12		3.61E-10		1.52E-10		5.81E-10		8.04E-10		2.41E-09		7.10E-09	
	Inhalation of Dust (Resp.)	Noncancer Inhalation for Soil (NCInhs) Factor (1/day)	7.17E-09		1.08E-08		1.51E-08		9.88E-10		5.68E-10		8.38E-10		3.02E-09		3.77E-09		4.44E-09	
		Cancer Part. Inh. for Soil (CInhs) Factor (1/day)	2.87E-09		7.19E-11		5.53E-13		9.03E-11		3.79E-11		1.45E-10		2.01E-10		6.03E-10		1.77E-09	
	Groundwater Dermal Absorption	Noncancer Dermal for GW (NCDgw) Factor ((hrs*L*mg)/(kg*days*ug))	1.62E-06		6.49E-06		1.62E-07		1.18E-05		1.02E-05		1.06E-05		3.44E-05		2.09E-05		1.98E-05	
		Cancer Dermal for GW (CDgw) Factor ((hrs*L*mg)/(kg*days*ug))	6.49E-07		4.32E-08		5.92E-12		1.10E-06		6.81E-07		1.83E-06		2.29E-06		3.34E-06		7.91E-06	
	Ingestion: Sediment	Noncancer Ingestion for Sediment (NCIsed) (1/day)	2.40E-08		1.92E-07		1.75E-08		2.69E-07		1.58E-07		1.45E-07		1.38E-06		1.67E-07		1.23E-07	
		Cancer Ingestion for Sediment (CIsed) Factor (1/day)	9.60E-09		1.28E-09		6.40E-11		2.51E-08		1.05E-08		2.52E-08		9.23E-08		2.67E-08		4.92E-08	
	Dermal Absorption: Sediment	Noncancer Dermal for Sediment (NCDsed) Factor (1/day)	4.05E-07		1.86E-06		1.70E-05		1.76E-05		1.58E-05		1.53E-05		8.59E-05		5.84E-05		3.19E-05	
		Cancer Dermal for Sediment (CDsed) Factor (1/day)	1.62E-07		1.24E-08		6.21E-10		1.65E-06		1.06E-06		2.65E-06		5.73E-06		9.34E-06		1.27E-05	

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Carver, Massachusetts

Table 9

Exposure Assumptions
Calculations

Exposure Factors			Units
Ingestion: Soil	NCIs CIs	$= \frac{IR(\text{mg/day}) * ED(\text{days}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 \text{ (yrs/day)}) * (1/1,000,000 \text{ (kg/mg)})}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Dermal Absorption: Soil	NCDs CDs	$= \frac{SA \text{ (cm}^2\text{/day)} * AF(\text{mg/cm}^2) * ED(\text{days}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 \text{ (yrs/day)}) * (1/1,000,000 \text{ (kg/mg)})}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Ingestion (Dust)	NCId CId	$= \frac{VR(\text{m}^3/\text{hr}) * RP(\text{ug/m}^3) * P * ED(\text{hr}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 \text{ (yrs/day)}) * (1/1,000,000,000 \text{ (kg/ug)})}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Inhalation (Dust)	NCInhs CInhs	$= \frac{VR(\text{m}^3/\text{hr}) * RP(\text{ug/m}^3) * P * ED(\text{hr}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 \text{ (yrs/day)}) * (1/1,000,000,000 \text{ (kg/ug)})}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Dermal Absorption (Groundwater)	NCDgw CDgw	$= \frac{SA(\text{cm}^2) * ED(\text{hrs}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 \text{ (yrs/day)}) * (1/1000 \text{ (l/cm}^3\text{)}) * (1/1000(\text{mg/ug)})}{BW(\text{kg}) * AP(\text{yrs})}$	$\frac{\text{hrs} * \text{mg} * \text{l}}{\text{kg} * \text{day} * \text{cm} * \text{ug}}$
Inhalation (Vapors, groundwater)	NCInhgw Cinhgw	$= \frac{ED(\text{hrs}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/24(\text{days/hr})) * (1/365(\text{yrs/day}))}{AP(\text{yrs})}$	unitless
Ingestion: Sediment	NCIsed CIsed	$= \frac{IR(\text{mg/day}) * ED(\text{days}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 \text{ (yrs/day)}) * (1/1,000,000 \text{ (kg/mg)})}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Dermal Absorption: Sediment	NCDsed Cdsed	$= \frac{SA \text{ (cm}^2\text{/day)} * AF(\text{mg/cm}^2) * ED(\text{days}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 \text{ (yrs/day)}) * (1/1,000,000 \text{ (kg/mg)})}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Drinking Water Ingestion	NCIngdw Cingdw	$= \frac{VI(\text{l/day}) * EF(1/\text{day}) * ED(\text{days}) * EP(\text{yrs}) * 1/1,000 \text{ (mg/ug)}}{BW(\text{kg}) * AP(\text{yrs})}$	$\frac{\text{l} * \text{mg}}{\text{ug} * \text{kg} * \text{day}}$
Dermal Absorption (showering/bathing)	NCDdw CDdw	= Equal to Ingestion times a factor related to the chemical-specific permeability constant (MADEP, 1995)	
Inhalation (showering/bathing)	NCInhdw Cinhdw	$= \frac{NCIngdw * BW \text{ (kg)} * (1\text{d}/24\text{hr})}{VR \text{ (m}^3\text{/hr)}}$	$\frac{\text{l} * \text{mg}}{\text{ug} * \text{m}^3}$

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 9

References
Exposure Assumptions

- 1 WSC/ORS 95-141, 1995. Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan.
- 2 WSC/ORS 95-141, 1995. Appendix B. Table B-1. Average of median body weights for females and males in receptor age group.
- 3 BWSC, 1996. DRAFT Commercial/Industrial Shortform, Exposure Scenarios.
- 4 WSC/ORS, 1992. Documentation for the Risk Assessment Short Form Residential Scenario.
- 5 BWSC/ORS, 2002. Calculation of an Enhanced Soil Ingestion Rate. DRAFT Technical Update.
- 6 WSC/ORS 95-141, 1995. Appendix B. Section C.
- 7 WSC/ORS 95-141, 1995. Appendix B. Table B-2.
- 8 BWSC/ORS, 2002. Weighted Skin Adherence Factors. DRAFT Technical Update.
- 9 BWSC/ORS, 2002. Characterization of Risks Due to Inhalation of Particulates by Construction Workers. DRAFT Technical Update.
- 10 WSC/ORS 95-141, 1995. Appendix B. Section F.
- 11 WSC/ORS 95-141, 1995. Appendix B. Section E. Table B-4.
- 12 Best Professional Judgement.
- 13 WSC/ORS 95-141, 1995. Appendix B. Section D.
- 14 Residential dermal contact with groundwater, presuming irrigation use of local groundwater. Exposure frequency is estimated as 4 hours per day for 122 days (daily during June, July, August, and September).
- 15 Development of MCP Risk-Based Levels for Soil and Groundwater. Paul Locke, MADEP/ORS, 2001.

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Table 10

Exposure Point Concentrations
Soil (0 to 3 feet)
Entire Disposal Site

Sample Designation	Left UST			Right UST			DCA			DCB			DCD			DCE		
Sampling Date	4/16/1998			4/16/1998			6/2/2003			6/2/2003			6/2/2003			6/2/2003		
Depth (feet)							5 - 10			5 - 10			5 - 10			5 - 10		
Methods	MA VPH 97-12			MA VPH 97-12			MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics	537	(0.750)	537.0	0.25	(0.600)	0.25				89.5	(4.500)	89.5	59.9	(19.500)	59.9	167	(19.500)	167.0
C9 to C12 Aliphatics	1830	(0.250)	1,830.0	0.338	(0.200)	0.338				81.8	(1.499)	81.8	BRL	(6.494)	3,246.8	216	(6.494)	216.0
C9 to C10 Aromatics	1010	(0.250)	1,010.0	BRL	(0.200)	0.0999				BRL	(1.499)	0.7493	BRL	(1.500)	0.75	BRL	(1.500)	0.75
Benzene	BRL	(1.000)	0.5	BRL	(0.100)	0.05				BRL	(0.500)	0.25	BRL	(0.500)	0.25	1.42	(0.500)	1.42
Toluene	BRL	(1.000)	0.5	BRL	(0.100)	0.05				3.86	(0.500)	3.86	BRL	(0.500)	0.25	15	(0.500)	15.0
Ethylbenzene	6.59	(1.000)	6.59	6.59	(0.100)	6.59				9.61	(0.500)	9.61	BRL	(0.500)	0.25	29.7	(0.500)	29.7
Xylenes	118.3	(2.000)	118.3	118.3	(0.200)	118.3				31.2	(1.000)	31.2	BRL	(1.000)	0.5	121	(1.000)	121.0
Naphthalene	9.15	(1.000)	9.15	9.15	(0.100)	9.15				18.9	(0.500)	18.9	BRL	(0.500)	0.25	62.8	(0.500)	62.8
MTBE	BRL	(1.000)	0.5	BRL	(0.100)	0.05				0.524	(0.500)	0.524	BRL	(0.500)	0.25	4.93	(0.500)	4.93
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics							2680	(10.000)	2,680.0	7960	(30.000)	7,960.0	62.2	(30.000)	62.2	10200	(30.000)	10,200.0
C19 to C36 Aliphatics							1080	(10.000)	1,080.0	2840	(30.000)	2,840.0	37.6	(30.000)	37.6	3740	(30.000)	3,740.0
C11 to C22 Aromatics							1610	(10.000)	1,610.0	3530	(30.000)	3,530.0	18.8	(30.000)	18.8	3560	(30.000)	3,560.0
Naphthalene							2.13	(0.050)	2.13	4.72	(0.157)	4.72	BRL	(0.050)	0.025	6.6	(0.050)	6.6
2-Methylnaphthalene							9.46	(0.050)	9.46	25.5	(0.157)	25.5	BRL	(0.050)	0.025	43.2	(0.050)	43.2
Acenaphthylene																		
Acenaphthene							0.284	(0.100)	0.284	0.717	(0.157)	0.717	BRL	(0.100)	0.05	1.27	(0.100)	1.27
Fluorene																		
Phenanthrene							2.17	(0.050)	2.17	6.24	(0.157)	6.24	BRL	(0.050)	0.025	9.51	(0.050)	9.51
Anthracene																		
Fluoranthene																		
Pyrene																		
Benzo(a)anthracene																		
Chrysene																		
Benzo(b)fluoranthene																		
Benzo(k)fluoranthene																		
Benzo(a)pyrene																		
Indeno(1,2,3-cd)pyrene																		
Dibenzo(a,h)anthracene																		
Benzo(g,h,i)perylene																		
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene																		

Notes: Concentrations in milligrams per kilogram (mg/kg).
BRL = Below Reporting Limit.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 10

Exposure Point Concentrations
Soil (0 to 3 feet)
Entire Disposal Site

Sample Designation	DCW-2			ECS-1			No. Analyses	No. Dectects	Average	Maximum Detect	Location of Maximum Detect
Sampling Date	6/2/2003			8/22/2005							
Depth (feet)	5 - 10			5							
Methods	MA VPH 97-12, EPH 98-1			MA VPH 97-12							
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC					
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	64.3	(19,500)	64.3	52.6	(0.750)	52.6	7	7	138.65	537.0	Left UST
C9 to C12 Aliphatics	BRL	(6,494)	3,246.8	238	(0.250)	238.0	7	5	338.95	1,830.0	Left UST
C9 to C10 Aromatics	BRL	(1,500)	0.75	293	(0.250)	293.0	7	2	186.59	1,010.0	Left UST
Benzene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	7	1	0.41	1.42	DCE
Toluene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	7	2	2.87	15.0	DCE
Ethylbenzene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	7	4	7.59	29.7	DCE
Xylenes	BRL	(1,000)	0.5	4.21	(0.686)	4.21	7	5	56.29	121.0	DCE
Naphthalene	BRL	(0.500)	0.25	15.9	(0.343)	15.9	7	5	16.63	62.8	DCE
MTBE	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	7	2	0.95	4.93	DCE
Extractable Petroleum Hydrocarb											
C9 to C18 Aliphatics	BRL	(10,000)	5.0				5	4	4,181.44	10,200.0	DCE
C19 to C36 Aliphatics	17.2	(10,000)	17.2				5	5	1,542.96	3,740.0	DCE
C11 to C22 Aromatics	BRL	(10,000)	5.0				5	4	1,744.76	3,560.0	DCE
Naphthalene	BRL	(0.050)	0.025				5	3	2.70	6.6	DCE
2-Methylnaphthalene	BRL	(0.050)	0.025				5	3	15.64	43.2	DCE
Acenaphthylene							0	0	NC	NC	
Acenaphthene	BRL	(0.100)	0.05				5	3	0.47	1.27	DCE
Fluorene							0	0	NC	NC	
Phenanthrene	BRL	(0.050)	0.025				5	3	3.59	9.51	DCE
Anthracene							0	0	NC	NC	
Fluoranthene							0	0	NC	NC	
Pyrene							0	0	NC	NC	
Benzo(a)anthracene							0	0	NC	NC	
Chrysene							0	0	NC	NC	
Benzo(b)fluoranthene							0	0	NC	NC	
Benzo(k)fluoranthene							0	0	NC	NC	
Benzo(a)pyrene							0	0	NC	NC	
Indeno(1,2,3-cd)pyrene							0	0	NC	NC	
Dibenzo(a,h)anthracene							0	0	NC	NC	
Benzo(g,h,i)perylene							0	0	NC	NC	
Volatile Chlorinated Hydrocarbon											
Tetrachloroethylene							0	0	NC	NC	

Notes: Concentrations in milligrams per kilogram (mg/kg).
BRL = Below Reporting Limit.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 11

Exposure Point Concentrations
Soil (0 to 6 feet)
Entire Disposal Site

Sample Designation	Left UST			Right UST			DCA			DCB			DCD			DCE		
Sampling Date	4/16/1998			4/16/1998			6/2/2003			6/2/2003			6/2/2003			6/2/2003		
Depth (feet)							5 - 10			5 - 10			5 - 10			5 - 10		
Methods	MA VPH 97-12			MA VPH 97-12			MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics	537	(0.750)	537.0	0.25	(0.600)	0.25				89.5	(4.500)	89.5	59.9	(19.500)	59.9	167	(19.500)	167.0
C9 to C12 Aliphatics	1830	(0.250)	1,830.0	0.338	(0.200)	0.338				81.8	(1.499)	81.8	BRL	(6.494)	3,246.8	216	(6.494)	216.0
C9 to C10 Aromatics	1010	(0.250)	1,010.0	BRL	(0.200)	0.0999				BRL	(1.499)	0.7493	BRL	(1.500)	0.75	BRL	(1.500)	0.75
Benzene	BRL	(1.000)	0.5	BRL	(0.100)	0.05				BRL	(0.500)	0.25	BRL	(0.500)	0.25	1.42	(0.500)	1.42
Toluene	BRL	(1.000)	0.5	BRL	(0.100)	0.05				3.86	(0.500)	3.86	BRL	(0.500)	0.25	15	(0.500)	15.0
Ethylbenzene	6.59	(1.000)	6.59	6.59	(0.100)	6.59				9.61	(0.500)	9.61	BRL	(0.500)	0.25	29.7	(0.500)	29.7
Xylenes	118.3	(2.000)	118.3	118.3	(0.200)	118.3				31.2	(1.000)	31.2	BRL	(1.000)	0.5	121	(1.000)	121.0
Naphthalene	9.15	(1.000)	9.15	9.15	(0.100)	9.15				18.9	(0.500)	18.9	BRL	(0.500)	0.25	62.8	(0.500)	62.8
MTBE	BRL	(1.000)	0.5	BRL	(0.100)	0.05				0.524	(0.500)	0.524	BRL	(0.500)	0.25	4.93	(0.500)	4.93
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics							2680	(10.000)	2,680.0	7960	(30.000)	7,960.0	62.2	(30.000)	62.2	10200	(30.000)	10,200.0
C19 to C36 Aliphatics							1080	(10.000)	1,080.0	2840	(30.000)	2,840.0	37.6	(30.000)	37.6	3740	(30.000)	3,740.0
C11 to C22 Aromatics							1610	(10.000)	1,610.0	3530	(30.000)	3,530.0	18.8	(30.000)	18.8	3560	(30.000)	3,560.0
Naphthalene							2.13	(0.050)	2.13	4.72	(0.157)	4.72	BRL	(0.050)	0.025	6.6	(0.050)	6.6
2-Methylnaphthalene							9.46	(0.050)	9.46	25.5	(0.157)	25.5	BRL	(0.050)	0.025	43.2	(0.050)	43.2
Acenaphthylene																		
Acenaphthene							0.284	(0.100)	0.284	0.717	(0.157)	0.717	BRL	(0.100)	0.05	1.27	(0.100)	1.27
Fluorene																		
Phenanthrene							2.17	(0.050)	2.17	6.24	(0.157)	6.24	BRL	(0.050)	0.025	9.51	(0.050)	9.51
Anthracene																		
Fluoranthene																		
Pyrene																		
Benzo(a)anthracene																		
Chrysene																		
Benzo(b)fluoranthene																		
Benzo(k)fluoranthene																		
Benzo(a)pyrene																		
Indeno(1,2,3-cd)pyrene																		
Dibenzo(a,h)anthracene																		
Benzo(g,h,i)perylene																		
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene																		

Notes: Concentrations in milligrams per kilogram (mg/kg).
BRL = Below Reporting Limit.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 11

Exposure Point Concentrations
Soil (0 to 6 feet)
Entire Disposal Site

Sample Designation	DCW-2			ECS-1			ECS-3			ECS-4			No. Analyses	No. Detects	Average	Maximum Detect	Location of Maximum Detect
Sampling Date	6/2/2003			8/22/2005			12/10/2004			12/10/2004							
Depth (feet)	5 - 10			5			7			6							
Methods	MA VPH 97-12, EPH 98-1			MA VPH 97-12			USEPA 8260			MA VPH 97-12, EPH 98-1							
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC					
Volatile Petroleum Hydrocarbons																	
C5 to C8 Aliphatics	64.3	(19,500)	64.3	52.6	(0.750)	52.6				BRL	(1,500)	0.75	8	7	121.41	537.0	Left UST
C9 to C12 Aliphatics	BRL	(6,494)	3,246.8	238	(0.250)	238.0				BRL	(0.500)	0.2498	8	5	296.61	1,830.0	Left UST
C9 to C10 Aromatics	BRL	(1,500)	0.75	293	(0.250)	293.0				BRL	(0.500)	0.2498	8	2	163.29	1,010.0	Left UST
Benzene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	BRL	(0.100)	0.05	BRL	(0.500)	0.25	9	1	0.35	1.42	DCE
Toluene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	BRL	(0.100)	0.05	BRL	(0.500)	0.25	9	2	2.26	15.0	DCE
Ethylbenzene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	0.142	(0.100)	0.142	BRL	(0.500)	0.25	9	5	5.95	29.7	DCE
Xylenes	BRL	(1,000)	0.5	4.21	(0.686)	4.21	0.784	(0.200)	0.784	BRL	(1,000)	0.5	9	6	43.92	121.0	DCE
Naphthalene	BRL	(0.500)	0.25	15.9	(0.343)	15.9	BRL	(1,000)	0.5	BRL	(0.500)	0.25	9	5	13.02	62.8	DCE
MTBE	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	3	(0.100)	3.0	BRL	(0.250)	0.125	9	3	1.09	4.93	DCE
Extractable Petroleum Hydrocarbons																	
C9 to C18 Aliphatics	BRL	(10,000)	5.0							BRL	(10,000)	5.0	6	4	3,485.37	10,200.0	DCE
C19 to C36 Aliphatics	17.2	(10,000)	17.2							BRL	(10,000)	5.0	6	5	1,286.63	3,740.0	DCE
C11 to C22 Aromatics	BRL	(10,000)	5.0							BRL	(10,000)	5.0	6	4	1,454.80	3,560.0	DCE
Naphthalene	BRL	(0.050)	0.025							BRL	(0.050)	0.025	6	3	2.25	6.6	DCE
2-Methylnaphthalene	BRL	(0.050)	0.025							BRL	(0.050)	0.025	6	3	13.04	43.2	DCE
Acenaphthylene										BRL	(0.050)	0.025	1	0	0.03	NC	
Acenaphthene	BRL	(0.100)	0.05							BRL	(0.100)	0.05	6	3	0.40	1.27	DCE
Fluorene										BRL	(0.050)	0.025	1	0	0.03	NC	
Phenanthrene	BRL	(0.050)	0.025							BRL	(0.050)	0.025	6	3	3.00	9.51	DCE
Anthracene										BRL	(0.050)	0.025	1	0	0.03	NC	
Fluoranthene										BRL	(0.050)	0.025	1	0	0.03	NC	
Pyrene										BRL	(0.050)	0.025	1	0	0.03	NC	
Benzo(a)anthracene										BRL	(0.050)	0.025	1	0	0.03	NC	
Chrysene										BRL	(0.050)	0.025	1	0	0.03	NC	
Benzo(b)fluoranthene										BRL	(0.050)	0.025	1	0	0.03	NC	
Benzo(k)fluoranthene										BRL	(0.050)	0.025	1	0	0.03	NC	
Benzo(a)pyrene										BRL	(0.050)	0.025	1	0	0.03	NC	
Indeno(1,2,3-cd)pyrene										BRL	(0.050)	0.025	1	0	0.03	NC	
Dibenzo(a,h)anthracene										BRL	(0.050)	0.025	1	0	0.03	NC	
Benzo(g,h,i)perylene										BRL	(0.050)	0.025	1	0	0.03	NC	
Volatile Chlorinated Hydrocarbons																	
Tetrachloroethylene													0	0	NC	NC	

Notes: Concentrations in milligrams per kilogram (mg/kg).
BRL = Below Reporting Limit.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 12

Exposure Point Concentrations
Soil: (0 to 15 Feet)
Disposal Site Area

Sample Designation	Left UST			Right UST			DCA			DCB			DCD			DCE		
Sampling Date	4/16/1998			4/16/1998			6/2/2003			6/2/2003			6/2/2003			6/2/2003		
Depth (feet)							5 - 10			5 - 10			5 - 10			5 - 10		
Methods	MA VPH 97-12			MA VPH 97-12			MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics	537	(0.750)	537.0	0.25	(0.600)	0.25				89.5	(4.500)	89.5	59.9	(19.500)	59.9	167	(19.500)	167.0
C9 to C12 Aliphatics	1830	(0.250)	1,830.0	0.338	(0.200)	0.338				81.8	(1.499)	81.8	BRL	(6.494)	3.2468	216	(6.494)	216.0
C9 to C10 Aromatics	1010	(0.250)	1,010.0	BRL	(0.200)	0.0999				BRL	(1.499)	0.7493	BRL	(1.500)	0.75	BRL	(1.500)	0.75
Benzene	BRL	(1.000)	0.5	BRL	(0.100)	0.05				BRL	(0.500)	0.25	BRL	(0.500)	0.25	1.42	(0.500)	1.42
Toluene	BRL	(1.000)	0.5	BRL	(0.100)	0.05				3.86	(0.500)	3.86	BRL	(0.500)	0.25	15	(0.500)	15.0
Ethylbenzene	6.59	(1.000)	6.59	6.59	(0.100)	6.59				9.61	(0.500)	9.61	BRL	(0.500)	0.25	29.7	(0.500)	29.7
Xylenes	118.3	(2.000)	118.3	118.3	(0.200)	118.3				31.2	(1.000)	31.2	BRL	(1.000)	0.5	121	(1.000)	121.0
Naphthalene	9.15	(1.000)	9.15	9.15	(0.100)	9.15				18.9	(0.500)	18.9	BRL	(0.500)	0.25	62.8	(0.500)	62.8
MTBE	BRL	(1.000)	0.5	BRL	(0.100)	0.05				0.524	(0.500)	0.524	BRL	(0.500)	0.25	4.93	(0.500)	4.93
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics							2680	(10.000)	2,680.0	7960	(30.000)	7,960.0	62.2	(30.000)	62.2	10200	(30.000)	10,200.0
C19 to C36 Aliphatics							1080	(10.000)	1,080.0	2840	(30.000)	2,840.0	37.6	(30.000)	37.6	3740	(30.000)	3,740.0
C11 to C22 Aromatics							1610	(10.000)	1,610.0	3530	(30.000)	3,530.0	18.8	(30.000)	18.8	3560	(30.000)	3,560.0
Naphthalene							2.13	(0.050)	2.13	4.72	(0.157)	4.72	BRL	(0.050)	0.025	6.6	(0.050)	6.6
2-Methylnaphthalene							9.46	(0.050)	9.46	25.5	(0.157)	25.5	BRL	(0.050)	0.025	43.2	(0.050)	43.2
Acenaphthylene																		
Acenaphthene							0.284	(0.100)	0.284	0.717	(0.157)	0.717	BRL	(0.100)	0.05	1.27	(0.100)	1.27
Fluorene																		
Phenanthrene							2.17	(0.050)	2.17	6.24	(0.157)	6.24	BRL	(0.050)	0.025	9.51	(0.050)	9.51
Anthracene																		
Fluoranthene																		
Pyrene																		
Benzo(a)anthracene																		
Chrysene																		
Benzo(b)fluoranthene																		
Benzo(k)fluoranthene																		
Benzo(a)pyrene																		
Indeno(1,2,3-cd)pyrene																		
Dibenzo(a,h)anthracene																		
Benzo(g,h,i)perylene																		
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene																		

Notes: Concentrations in milligrams per kilogram (mg/kg). BRL = Below Reporting Limit.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 12

Exposure Point Concentrations
Soil: (0 to 15 Feet)
Disposal Site Area

Sample Designation	DCW-2			ECS-1			ECS-1			ECS-1			EGS-1			EGS-3		
Sampling Date	6/2/2003			8/22/2005			8/22/2005			8/22/2005			12/10/2004			12/10/2004		
Depth (feet)	5 - 10			5			10			15			8			7		
Methods	MA VPH 97-12, EPH 98-1			MA VPH 97-12			MA VPH 97-12			MA VPH 97-12			MA VPH 97-12, EPH 98-1			USEPA 8260		
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics	64.3	(19,500)	64.3	52.6	(0.750)	52.6	12.4	(0.750)	12.4	4.19	(0.750)	4.19	BRL	(1,500)	0.75			
C9 to C12 Aliphatics	BRL	(6,494)	3,248	238	(0.250)	238.0	39.4	(0.250)	39.4	21.5	(0.250)	21.5	BRL	(0.500)	0.2498			
C9 to C10 Aromatics	BRL	(1,500)	0.75	293	(0.250)	293.0	41	(0.250)	41.0	17.6	(0.250)	17.6	BRL	(0.500)	0.2498			
Benzene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	BRL	(0.071)	0.0357	BRL	(0.069)	0.0345	BRL	(0.500)	0.25	BRL	(0.100)	0.05
Toluene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	BRL	(0.071)	0.0357	BRL	(0.069)	0.0345	BRL	(0.500)	0.25	BRL	(0.100)	0.05
Ethylbenzene	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	BRL	(0.071)	0.0357	BRL	(0.069)	0.0345	BRL	(0.500)	0.25	0.142	(0.100)	0.142
Xylenes	BRL	(1,000)	0.5	4.21	(0.686)	4.21	0.22	(0.143)	0.22	BRL	(0.207)	0.1035	BRL	(1,000)	0.5	0.784	(0.200)	0.784
Naphthalene	BRL	(0.500)	0.25	15.9	(0.343)	15.9	2.92	(0.071)	2.92	1.17	(0.069)	1.17	BRL	(0.500)	0.25	BRL	(1,000)	0.5
MTBE	BRL	(0.500)	0.25	BRL	(0.343)	0.1715	BRL	(0.071)	0.0357	BRL	(0.069)	0.0345	BRL	(0.500)	0.25	3	(0.100)	3.0
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics	BRL	(10,000)	5.0										BRL	(10,000)	5.0			
C19 to C36 Aliphatics	17.2	(10,000)	17.2										BRL	(10,000)	5.0			
C11 to C22 Aromatics	BRL	(10,000)	5.0										BRL	(10,000)	5.0			
Naphthalene	BRL	(0.050)	0.025										BRL	(0.050)	0.025			
2-Methylnaphthalene	BRL	(0.050)	0.025										BRL	(0.050)	0.025			
Acenaphthylene													BRL	(0.050)	0.025			
Acenaphthene	BRL	(0.100)	0.05										BRL	(0.100)	0.05			
Fluorene													BRL	(0.050)	0.025			
Phenanthrene	BRL	(0.050)	0.025										BRL	(0.050)	0.025			
Anthracene													BRL	(0.050)	0.025			
Fluoranthene													BRL	(0.050)	0.025			
Pyrene													BRL	(0.050)	0.025			
Benzo(a)anthracene													BRL	(0.050)	0.025			
Chrysene													BRL	(0.050)	0.025			
Benzo(b)fluoranthene													BRL	(0.050)	0.025			
Benzo(k)fluoranthene													BRL	(0.050)	0.025			
Benzo(a)pyrene													BRL	(0.050)	0.025			
Indeno(1,2,3-cd)pyrene													BRL	(0.050)	0.025			
Dibenzo(a,h)anthracene													BRL	(0.050)	0.025			
Benzo(g,h,i)perylene													BRL	(0.050)	0.025			
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene																		

Notes: Concentrations in milligrams per kilogram (mg/kg). BRL = Below Reporting Limit.

Relies on corrected old TPH values

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 12

Exposure Point Concentrations
Soil: (0 to 15 Feet)
Disposal Site Area

Sample Designation	EGS-4			EGS-7			EIS-1			EIS-2			No. Analyses	No. Detects	Average	Maximum Detect	Location of Maximum Detect
Sampling Date	12/10/2004			12/10/2004			12/16/2004			12/16/2004							
Depth (feet)	6			6													
Methods	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC					
Volatile Petroleum Hydrocarbons																	
C5 to C8 Aliphatics	BRL	(1.500)	0.75	BRL	(1.500)	0.75	BRL	(1.500)	0.75	BRL	(1.500)	0.75	14	9	70.78	537.0	Left UST
C9 to C12 Aliphatics	BRL	(0.500)	0.2498	BRL	(0.500)	0.2498	BRL	(0.500)	0.2498	6.68	(0.500)	6.68	14	8	174.37	1,830.0	Left UST
C9 to C10 Aromatics	BRL	(0.500)	0.2498	BRL	(0.500)	0.2498	BRL	(0.500)	0.2498	4.11	(0.500)	4.11	14	5	97.84	1,010.0	Left UST
Benzene	BRL	(0.500)	0.25	BRL	(0.500)	0.25	BRL	(0.500)	0.25	BRL	(0.500)	0.25	15	1	0.28	1.42	DCE
Toluene	BRL	(0.500)	0.25	BRL	(0.500)	0.25	BRL	(0.500)	0.25	BRL	(0.500)	0.25	15	2	1.43	15.0	DCE
Ethylbenzene	BRL	(0.500)	0.25	BRL	(0.500)	0.25	BRL	(0.500)	0.25	BRL	(0.500)	0.25	15	5	3.64	29.7	DCE
Xylenes	BRL	(1.000)	0.5	BRL	(1.000)	0.5	BRL	(1.000)	0.5	BRL	(1.000)	0.5	15	7	26.51	121.0	DCE
Naphthalene	BRL	(0.500)	0.25	BRL	(0.500)	0.25	BRL	(0.500)	0.25	BRL	(0.500)	0.25	15	7	8.15	62.8	DCE
MTBE	BRL	(0.250)	0.125	BRL	(0.250)	0.125	BRL	(0.250)	0.125	BRL	(0.250)	0.125	15	3	0.70	4.93	DCE
Extractable Petroleum Hydrocarbons																	
C9 to C18 Aliphatics	BRL	(10.000)	5.0	BRL	(10.000)	5.0	BRL	(10.000)	5.0	51	(10.000)	51.0	10	5	2,097.82	10,200.0	DCE
C19 to C36 Aliphatics	BRL	(10.000)	5.0	BRL	(10.000)	5.0	BRL	(10.000)	5.0	40.9	(10.000)	40.9	10	6	777.57	3,740.0	DCE
C11 to C22 Aromatics	BRL	(10.000)	5.0	BRL	(10.000)	5.0	BRL	(10.000)	5.0	24.1	(10.000)	24.1	10	5	876.79	3,560.0	DCE
Naphthalene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	10	3	1.36	6.6	DCE
2-Methylnaphthalene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	10	3	7.83	43.2	DCE
Acenaphthylene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Acenaphthene	BRL	(0.100)	0.05	BRL	(0.100)	0.05	BRL	(0.100)	0.05	BRL	(0.100)	0.05	10	3	0.26	1.27	DCE
Fluorene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Phenanthrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	10	3	1.81	9.51	DCE
Anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Benzo(a)anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Chrysene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Benzo(b)fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Benzo(k)fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Benzo(a)pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Indeno(1,2,3-cd)pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Dibenzo(a,h)anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Benzo(a,h,i)perylene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	5	0	0.03	NC	
Volatile Chlorinated Hydrocarbons																	
Tetrachloroethylene													0	0	NC	NC	

Notes: Concentrations in milligrams per kilogram (mg/kg). BRL = Below Reporting Limit.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 13

Summary of Exposure Point Concentrations in Soil

	Soil EPC (0 - 3 feet) Entire Disposal Site					Soil EPC (0 - 6 feet) Entire Disposal Site					Soil EPC (0 - 15 feet) Entire Disposal Site				
	No. Analyses	No. Detections	Average	Maximum Detect	Location of Maximum	No. Analyses	No. Detections	Average	Maximum Detect	Location of Maximum	No. Analyses	No. Detections	Average	Maximum Detect	Location of Maximum
Units			mg/Kg	mg/Kg				mg/Kg	mg/Kg				mg/Kg	mg/Kg	
Volatile Petroleum Hydrocarbons															
C5 to C8 Aliphatics	7	7	138.65	537.00	Left UST	8	7	121.41	537.00	Left UST	14	9	70.78	537.00	Left UST
C9 to C12 Aliphatics	7	5	338.95	1,830.00	Left UST	8	5	296.61	1,830.00	Left UST	14	8	174.37	1,830.00	Left UST
C9 to C10 Aromatics	7	2	186.59	1,010.00	Left UST	8	2	163.29	1,010.00	Left UST	14	5	97.84	1,010.00	Left UST
Benzene	7	1	0.41	1.42	DCE	9	1	0.35	1.42	DCE	15	1	0.28	1.42	DCE
Toluene	7	2	2.87	15.00	DCE	9	2	2.26	15.00	DCE	15	2	1.43	15.00	DCE
Ethylbenzene	7	4	7.59	29.70	DCE	9	5	5.95	29.70	DCE	15	5	3.64	29.70	DCE
Xylenes	7	5	56.29	121.00	DCE	9	6	43.92	121.00	DCE	15	7	26.51	121.00	DCE
Naphthalene	7	5	16.63	62.80	DCE	9	5	13.02	62.80	DCE	15	7	8.15	62.80	DCE
MTBE	7	2	0.95	4.93	DCE	9	3	1.09	4.93	DCE	15	3	0.70	4.93	DCE
Extractable Petroleum Hydrocarbons															
C9 to C18 Aliphatics	5	4	4,181.44	10,200.00	DCE	6	4	3,485.37	10,200.00	DCE	10	5	2,097.82	10,200.00	DCE
C19 to C36 Aliphatics	5	5	1,542.96	3,740.00	DCE	6	5	1,286.63	3,740.00	DCE	10	6	777.57	3,740.00	DCE
C11 to C22 Aromatics	5	4	1,744.76	3,560.00	DCE	6	4	1,454.80	3,560.00	DCE	10	5	876.79	3,560.00	DCE
Naphthalene	5	3	2.70	6.60	DCE	6	3	2.25	6.60	DCE	10	3	1.36	6.60	DCE
2-Methylnaphthalene	5	3	15.64	43.20	DCE	6	3	13.04	43.20	DCE	10	3	7.83	43.20	DCE
Acenaphthylene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Acenaphthene	5	3	0.47	1.27	DCE	6	3	0.40	1.27	DCE	10	3	0.26	1.27	DCE
Fluorene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Phenanthrene	5	3	3.59	9.51	DCE	6	3	3.00	9.51	DCE	10	3	1.81	9.51	DCE
Anthracene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Fluoranthene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Pyrene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Benzo(a)anthracene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Chrysene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Benzo(b)fluoranthene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Benzo(k)fluoranthene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Benzo(a)pyrene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Indeno(1,2,3-cd)pyrene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Dibenzo(a,h)anthracene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Benzo(g,h,i)perylene	0	0	NC	NC		1	0	NC	NC		5	0	NC	NC	
Volatile Chlorinated Hydrocarbons															
Tetrachloroethylene	0	0	NC	NC		0	0	NC	NC		0	0	NC	NC	

Notes: Concentrations in milligrams per kilogram (mg/kg).
NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 14

Estimated Exposure Point Concentrations in Sediment

Sample Designation	ESE-1			ESE-2			ESE-3			ESE-4			ESE-5		
Sampling Date	6/3/2004			6/3/2004			6/3/2004			6/3/2004			6/3/2004		
Depth (feet)															
Methods	MA EPH 98-1			MA EPH 98-1			MA EPH 98-1			MA EPH 98-1			MA EPH 98-1		
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC
Volatile Petroleum Hydrocarbons															
C5 to C8 Aliphatics															
C9 to C12 Aliphatics															
C9 to C10 Aromatics															
Benzene															
Toluene															
Ethylbenzene															
Xylenes															
Naphthalene															
MTBE															
Extractable Petroleum Hydrocarbons															
C9 to C18 Aliphatics	398	(30.000)	398.0	1480	(30.000)	1,480.0	1800	(30.000)	1,800.0	494	(30.000)	494.0	153	(30.000)	153.0
C19 to C36 Aliphatics	402	(30.000)	402.0	1240	(30.000)	1,240.0	1450	(30.000)	1,450.0	408	(30.000)	408.0	605	(30.000)	605.0
C11 to C22 Aromatics	316	(30.000)	316.0	826	(30.000)	826.0	1410	(30.000)	1,410.0	356	(30.000)	356.0	289	(30.000)	289.0
Naphthalene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
2-Methylnaphthalene	0.716	(0.050)	0.716	1.06	(0.050)	1.06	1.93	(0.050)	1.93	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Acenaphthylene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Acenaphthene	BRL	(0.100)	0.05	BRL	(0.100)	0.05	BRL	(0.100)	0.05	BRL	(0.100)	0.05	BRL	(0.100)	0.05
Fluorene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Phenanthrene	1.3	(0.050)	1.3	4.38	(0.050)	4.38	4.47	(0.050)	4.47	1.35	(0.050)	1.35	0.404	(0.050)	0.404
Anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Benzo(a)anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Chrysene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Benzo(b)fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Benzo(k)fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Benzo(a)pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Indeno(1,2,3-cd)pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Dibenzo(a,h)anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Benzo(g,h,i)perylene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025	BRL	(0.050)	0.025
Volatile Chlorinated Hydrocarbons															
Tetrachloroethylene															

Notes: Concentrations in milligrams per kilogram (mg/Kg). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 14

Estimated Exposure Point Concentrations in Sediment

Sample Designation	ESE-6			ESE-7			No. Analyses	No. Detects	Average	Maximum Detect	Location of Maximum
Sampling Date	6/3/2004			6/3/2004							
Depth (feet)											
Methods	MA EPH 98-1			MA EPH 98-1							
Units	mg/Kg	MDL	EPC	mg/Kg	MDL	EPC			mg/Kg	mg/Kg	
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics							0	0	NC	NC	
C9 to C12 Aliphatics							0	0	NC	NC	
C9 to C10 Aromatics							0	0	NC	NC	
Benzene							0	0	NC	NC	
Toluene							0	0	NC	NC	
Ethylbenzene							0	0	NC	NC	
Xylenes							0	0	NC	NC	
Naphthalene							0	0	NC	NC	
MTBE							0	0	NC	NC	
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	BRL	(10.000)	5.0	BRL	(10.000)	5.0	7	5	619.29	1,800.0	ESE-3
C19 to C36 Aliphatics	318	(10.000)	318.0	272	(10.000)	272.0	7	7	670.71	1,450.0	ESE-3
C11 to C22 Aromatics	97	(10.000)	97.0	103	(10.000)	103.0	7	7	485.29	1,410.0	ESE-3
Naphthalene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
2-Methylnaphthalene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	3	0.544	1.930	ESE-3
Acenaphthylene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Acenaphthene	BRL	(0.100)	0.05	BRL	(0.100)	0.05	7	0	NC	NC	
Fluorene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Phenanthrene	0.325	(0.050)	0.325	0.244	(0.050)	0.244	7	7	1.782	4.470	ESE-3
Anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Benzo(a)anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Chrysene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Benzo(b)fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Benzo(k)fluoranthene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Benzo(a)pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Indeno(1,2,3-cd)pyrene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Dibenzo(a,h)anthracene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Benzo(g,h,i)perylene	BRL	(0.050)	0.025	BRL	(0.050)	0.025	7	0	NC	NC	
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene							0	0	NC	NC	

Notes: Concentrations in milligrams per kilogram (mg/Kg). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	BP-1			BP-1			BP-1			BP-1			BP-1			BP-1		
Sampling Date	6/3/2004			7/20/2004			12/16/2004			3/3/2005			4/6/2005			6/8/2005		
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA EPH 98-1			MA VPH 97-12,			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics	BRL	(75.0)	37.5	BRL	(75.0)	37.5				BRL	(75.0)	37.5	BRL	(40.0)	20.0	BRL	(75.0)	37.5
C9 to C12 Aliphatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5				BRL	(25.0)	12.5	BRL	(15.0)	7.5	BRL	(25.0)	12.5
C9 to C10 Aromatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5				BRL	(25.0)	12.5	BRL	(55.0)	27.5	BRL	(25.0)	12.5
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Xylenes	BRL	(10.0)	5.0	BRL	(10.0)	5.0				BRL	(10.0)	5.0	BRL	(10.0)	5.0	BRL	(10.0)	5.0
Naphthalene	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(20.0)	10.0	BRL	(5.0)	2.5
MTBE	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(100.0)	50.0				BRL	(100.0)	50.0			
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(100.0)	50.0				BRL	(100.0)	50.0			
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(100.0)	50.0				BRL	(100.0)	50.0			
Naphthalene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
2-Methylnaphthalene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Acenaphthylene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Acenaphthene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Fluorene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Phenanthrene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Anthracene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Fluoranthene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Pyrene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Benzo(a)anthracene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Chrysene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Benzo(b)fluoranthene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Benzo(k)fluoranthene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Benzo(a)pyrene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Benzo(g,h,i)perylene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5			
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene																		

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	BP-1			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	5/31/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(75.0)	37.5	6	0	34.6	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	6	0	11.7	NC	
C9 to C10 Aromatics	BRL	(25.0)	12.5	6	0	15.0	NC	
Benzene	BRL	(5.0)	2.5	6	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	6	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	6	0	2.5	NC	
Xylenes	BRL	(10.0)	5.0	6	0	5.0	NC	
Naphthalene	BRL	(5.0)	2.5	6	0	3.8	NC	
MTBE	BRL	(5.0)	2.5	6	0	2.5	NC	
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	5	0	70.0	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	5	0	70.0	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	5	0	70.0	NC	
Naphthalene	BRL	(5.6)	2.8	4	0	1.1	NC	
2-Methylnaphthalene	BRL	(5.6)	2.8	4	0	1.1	NC	
Acenaphthylene	BRL	(5.6)	2.8	4	0	1.1	NC	
Acenaphthene	BRL	(5.6)	2.8	4	0	1.1	NC	
Fluorene	BRL	(5.6)	2.8	4	0	1.1	NC	
Phenanthrene	BRL	(5.6)	2.8	4	0	1.1	NC	
Anthracene	BRL	(5.6)	2.8	4	0	1.1	NC	
Fluoranthene	BRL	(5.6)	2.8	4	0	1.1	NC	
Pyrene	BRL	(5.6)	2.8	4	0	1.1	NC	
Benzo(a)anthracene	BRL	(5.6)	2.8	4	0	1.1	NC	
Chrysene	BRL	(5.6)	2.8	4	0	1.1	NC	
Benzo(b)fluoranthene	BRL	(5.6)	2.8	4	0	1.1	NC	
Benzo(k)fluoranthene	BRL	(5.6)	2.8	4	0	1.1	NC	
Benzo(a)pyrene	BRL	(5.6)	2.8	4	0	1.1	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.6)	2.8	4	0	1.1	NC	
Dibenzo(a,h)anthracene	BRL	(5.6)	2.8	4	0	1.1	NC	
Benzo(g,h,i)perylene	BRL	(5.6)	2.8	4	0	1.1	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	BP-2			BP-2			BP-2			BP-2			BP-2			BP-2			BP-2		
Sampling Date	6/3/2004			4/6/2005			12/16/2004			3/3/2005			4/6/2005			6/8/2005			8/24/2005		
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA EPH 98-1			MA VPH 97-12			MA VPH 97-12, EPH 98-1			MA VPH 97-12			MA VPH 97-12, EPH 98-1		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons																					
C5 to C8 Aliphatics	BRL	(40.0)	20.0	BRL	(40.0)	20.0				BRL	(75.0)	37.5	BRL	(40.0)	20.0	BRL	(75.0)	37.5	BRL	(75.0)	37.5
C9 to C12 Aliphatics	BRL	(15.0)	7.5	BRL	(15.0)	7.5				BRL	(25.0)	12.5	BRL	(15.0)	7.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5
C9 to C10 Aromatics	BRL	(55.0)	27.5	BRL	(55.0)	27.5				BRL	(25.0)	12.5	BRL	(55.0)	27.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Xylenes	BRL	(10.0)	5.0	BRL	(10.0)	5.0				BRL	(10.0)	5.0	BRL	(10.0)	5.0	BRL	(10.0)	5.0	BRL	(10.0)	5.0
Naphthalene	BRL	(20.0)	10.0	BRL	(20.0)	10.0				BRL	(5.0)	2.5	BRL	(20.0)	10.0	BRL	(5.0)	2.5	BRL	(5.0)	2.5
MTBE	16.8	(5.0)	16.8	92	(5.0)	92.0				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Extractable Petroleum Hydrocarbons																					
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0				BRL	(100.0)	50.0				BRL	(200.0)	100.0
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0				BRL	(100.0)	50.0				BRL	(200.0)	100.0
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0				BRL	(100.0)	50.0				BRL	(200.0)	100.0
Naphthalene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
2-Methylnaphthalene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Acenaphthylene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Acenaphthene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Fluorene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Phenanthrene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Anthracene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Fluoranthene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Pyrene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Benzo(a)anthracene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Chrysene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Benzo(b)fluoranthene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Benzo(k)fluoranthene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Benzo(a)pyrene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Benzo(g,h,i)perylene	BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5				BRL	(1.0)	0.5
Volatile Chlorinated Hydrocarbons																					
Tetrachloroethylene																					

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	BP-2			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	5/31/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(75.0)	37.5	7	0	30.0	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	7	0	10.4	NC	
C9 to C10 Aromatics	BRL	(25.0)	12.5	7	0	18.9	NC	
Benzene	BRL	(5.0)	2.5	7	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	7	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	7	0	2.5	NC	
Xylenes	BRL	(10.0)	5.0	7	0	5.0	NC	
Naphthalene	BRL	(5.0)	2.5	7	0	5.7	NC	
MTBE	BRL	(5.0)	2.5	7	2	17.3	92.0	April-05
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	6	0	66.7	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	6	0	66.7	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	6	0	66.7	NC	
Naphthalene	BRL	(5.7)	2.8	5	0	1.0	NC	
2-Methylnaphthalene	BRL	(5.7)	2.8	5	0	1.0	NC	
Acenaphthylene	BRL	(5.7)	2.8	5	0	1.0	NC	
Acenaphthene	BRL	(5.7)	2.8	5	0	1.0	NC	
Fluorene	BRL	(5.7)	2.8	5	0	1.0	NC	
Phenanthrene	BRL	(5.7)	2.8	5	0	1.0	NC	
Anthracene	BRL	(5.7)	2.8	5	0	1.0	NC	
Fluoranthene	BRL	(5.7)	2.8	5	0	1.0	NC	
Pyrene	BRL	(5.7)	2.8	5	0	1.0	NC	
Benzo(a)anthracene	BRL	(5.7)	2.8	5	0	1.0	NC	
Chrysene	BRL	(5.7)	2.8	5	0	1.0	NC	
Benzo(b)fluoranthene	BRL	(5.7)	2.8	5	0	1.0	NC	
Benzo(k)fluoranthene	BRL	(5.7)	2.8	5	0	1.0	NC	
Benzo(a)pyrene	BRL	(5.7)	2.8	5	0	1.0	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.7)	2.8	5	0	1.0	NC	
Dibenzo(a,h)anthracene	BRL	(5.7)	2.8	5	0	1.0	NC	
Benzo(g,h,i)perylene	BRL	(5.7)	2.8	5	0	1.0	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	BP-3			BP-3			BP-3			BP-3			BP-3			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	6/3/2004			7/20/2004			12/16/2004			3/3/2005			6/8/2005							
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	5	0	37.5	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	5	0	12.5	NC	
C9 to C10 Aromatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	5	0	12.5	NC	
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Xylenes	BRL	(10.0)	5.0	BRL	(10.0)	5.0	BRL	(10.0)	5.0	BRL	(10.0)	5.0	BRL	(10.0)	5.0	5	0	5.0	NC	
Naphthalene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
MTBE	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Extractable Petroleum Hydrocarbons																				
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	90.0	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	90.0	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	90.0	NC	
Naphthalene	BRL	(1.0)	0.5													1	0	0.5	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5													1	0	0.5	NC	
Acenaphthylene	BRL	(1.0)	0.5													1	0	0.5	NC	
Acenaphthene	BRL	(1.0)	0.5													1	0	0.5	NC	
Fluorene	BRL	(1.0)	0.5													1	0	0.5	NC	
Phenanthrene	BRL	(1.0)	0.5													1	0	0.5	NC	
Anthracene	BRL	(1.0)	0.5													1	0	0.5	NC	
Fluoranthene	BRL	(1.0)	0.5													1	0	0.5	NC	
Pyrene	BRL	(1.0)	0.5													1	0	0.5	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5													1	0	0.5	NC	
Chrysene	BRL	(1.0)	0.5													1	0	0.5	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5													1	0	0.5	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5													1	0	0.5	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5													1	0	0.5	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5													1	0	0.5	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5													1	0	0.5	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5													1	0	0.5	NC	
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene																0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	BP-4			BP-4			BP-4			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	6/12/2003			5/31/2006			10/17/2006							
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons														
C5 to C8 Aliphatics	BRL	(40.0)	20.0	BRL	(75.0)	37.5	BRL	(75.0)	37.5	3	0	31.7	NC	
C9 to C12 Aliphatics	BRL	(15.0)	7.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	3	0	10.8	NC	
C9 to C10 Aromatics	BRL	(55.0)	27.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	3	0	17.5	NC	
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Xylenes	BRL	(10.0)	5.0	BRL	(15.0)	7.5	BRL	(15.0)	7.5	3	0	6.7	NC	
Naphthalene	BRL	(20.0)	10.0	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	5.0	NC	
MTBE	15.3	(5.0)	15.3	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	1	6.8	15.3	June-03
Extractable Petroleum Hydrocarbo														
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
Naphthalene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Acenaphthylene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(5.0)	2.5	BRL	(5.4)	2.7	3	0	1.9	NC	
Volatile Chlorinated Hydrocarbons														
Tetrachloroethylene										0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-1			DCW-1			DCW-1			DCW-1			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum
Sampling Date	6/12/2003			6/3/2004			11/30/2005			5/31/2006							
Method(s)	MA VPH 97-12, EPH 98-1			MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																	
C5 to C8 Aliphatics	BRL	(800.0)	400.0				7130	(75.0)	7,130.0	BRL	(7500.0)	3,750.0	3	1	3,760.0	7,130.0	November-05
C9 to C12 Aliphatics	BRL	(300.0)	150.0				63200	(25.0)	63,200.0	18800	(2497.5)	18,800.0	3	2	27,383.3	63,200.0	November-05
C9 to C10 Aromatics	5650	(300.0)	5,650.0				64700	(25.0)	64,700.0	17000	(2497.5)	17,000.0	3	3	29,116.7	64,700.0	November-05
Benzene	9.4	(5.0)	9.4				BRL	(200.0)	100.0	BRL	(250.0)	125.0	3	1	78.1	9.4	June-03
Toluene	1110	(5.0)	1,110.0				1220	(200.0)	1,220.0	BRL	(250.0)	125.0	3	2	818.3	1,220.0	November-05
Ethylbenzene	1580	(5.0)	1,580.0				1610	(200.0)	1,610.0	334	(250.0)	334.0	3	3	1,174.7	1,610.0	November-05
Xylenes	11140	(10.0)	11,140.0				8400	(400.0)	8,400.0	2530	(500.0)	2,530.0	3	3	7,356.7	11,140.0	June-03
Naphthalene	442	(5.0)	442.0				3920	(200.0)	3,920.0	1190	(250.0)	1,190.0	3	3	1,850.7	3,920.0	November-05
MTBE	5930	(5.0)	5,930.0				37400	(200.0)	37,400.0	31200	(250.0)	31,200.0	3	3	24,843.3	37,400.0	November-05
Extractable Petroleum Hydrocarbons																	
C9 to C18 Aliphatics	702	(100.0)	702.0	BRL	(100.0)	50.0	3900	(200.0)	3,900.0	2900	(200.0)	2,900.0	4	3	1,888.0	3,900.0	November-05
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	1900	(200.0)	1,900.0	1100	(200.0)	1,100.0	4	2	775.0	1,900.0	November-05
C11 to C22 Aromatics	104	(100.0)	104.0	BRL	(100.0)	50.0	3500	(200.0)	3,500.0	2000	(200.0)	2,000.0	4	3	1,413.5	3,500.0	November-05
Naphthalene	88.2	(1.0)	88.2	BRL	(1.0)	0.5	1147	(5.9)	1,147.0	81.5	(5.4)	81.5	4	3	329.3	1,147.0	November-05
2-Methylnaphthalene	18.3	(1.0)	18.3	BRL	(1.0)	0.5	60.2	(5.9)	60.2	47.5	(5.4)	47.5	4	3	31.6	60.2	November-05
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.9)	2.9	BRL	(5.4)	2.7	4	0	1.7	NC	
Volatile Chlorinated Hydrocarbons																	
Tetrachloroethylene													0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-2			DCW-2			DCW-2			DCW-2			DCW-2		
Sampling Date	6/12/2003			6/3/2004			12/17/2004			4/6/2005			8/24/2005		
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons															
C5 to C8 Aliphatics	BRL	(40.0)	20.0	BRL	(40.0)	20.0	BRL	(40.0)	20.0	3380	(75.0)	3,380.0	BRL	(75.0)	37.5
C9 to C12 Aliphatics	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	223	(25.0)	223.0	BRL	(25.0)	12.5
C9 to C10 Aromatics	BRL	(55.0)	27.5	BRL	(55.0)	27.5	BRL	(55.0)	27.5	BRL	(55.0)	27.5	BRL	(25.0)	12.5
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Xylenes	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(10.0)	5.0	BRL	(10.0)	5.0
Naphthalene	BRL	(20.0)	10.0	BRL	(20.0)	10.0	BRL	(20.0)	10.0	BRL	(20.0)	10.0	BRL	(5.0)	2.5
MTBE	243	(5.0)	243.0	BRL	(5.0)	2.5	BRL	(5.0)	2.5	752	(5.0)	752.0	1240	(5.0)	1,240.0
Extractable Petroleum Hydrocarbons															
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0
Naphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
2-Methylnaphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Volatile Chlorinated Hydrocarbons															
Tetrachloroethylene															

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-2			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	5/31/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(375.0)	187.5	6	1	610.8	3,380.0	April-05
C9 to C12 Aliphatics	BRL	(124.9)	62.4	6	1	53.4	223.0	April-05
C9 to C10 Aromatics	BRL	(124.9)	62.4	6	0	30.8	NC	
Benzene	BRL	(12.5)	6.2	6	0	3.1	NC	
Toluene	BRL	(12.5)	6.2	6	0	3.1	NC	
Ethylbenzene	BRL	(12.5)	6.2	6	0	3.1	NC	
Xylenes	BRL	(24.9)	12.5	6	0	7.5	NC	
Naphthalene	BRL	(12.5)	6.2	6	0	8.1	NC	
MTBE	2230	(12.5)	2,230.0	6	4	745.0	2,230.0	May-06
Extractable Petroleum Hydrocarbo								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	6	0	66.7	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	6	0	66.7	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	6	0	66.7	NC	
Naphthalene	BRL	(5.0)	2.5	6	0	0.8	NC	
2-Methylnaphthalene	BRL	(5.0)	2.5	6	0	0.8	NC	
Acenaphthylene	BRL	(5.0)	2.5	6	0	0.8	NC	
Acenaphthene	BRL	(5.0)	2.5	6	0	0.8	NC	
Fluorene	BRL	(5.0)	2.5	6	0	0.8	NC	
Phenanthrene	BRL	(5.0)	2.5	6	0	0.8	NC	
Anthracene	BRL	(5.0)	2.5	6	0	0.8	NC	
Fluoranthene	BRL	(5.0)	2.5	6	0	0.8	NC	
Pyrene	BRL	(5.0)	2.5	6	0	0.8	NC	
Benzo(a)anthracene	BRL	(5.0)	2.5	6	0	0.8	NC	
Chrysene	BRL	(5.0)	2.5	6	0	0.8	NC	
Benzo(b)fluoranthene	BRL	(5.0)	2.5	6	0	0.8	NC	
Benzo(k)fluoranthene	BRL	(5.0)	2.5	6	0	0.8	NC	
Benzo(a)pyrene	BRL	(5.0)	2.5	6	0	0.8	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.0)	2.5	6	0	0.8	NC	
Dibenzo(a,h)anthracene	BRL	(5.0)	2.5	6	0	0.8	NC	
Benzo(g,h,i)perylene	BRL	(5.0)	2.5	6	0	0.8	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-3			DCW-3			DCW-3			DCW-3			DCW-3		
Sampling Date	6/12/2003			6/3/2004			12/17/2004			4/6/2005			8/25/2005		
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons															
C5 to C8 Aliphatics	BRL	(40.0)	20.0	BRL	(40.0)	20.0	BRL	(40.0)	20.0				BRL	(75.0)	37.5
C9 to C12 Aliphatics	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5				BRL	(25.0)	12.5
C9 to C10 Aromatics	BRL	(55.0)	27.5	BRL	(55.0)	27.5	BRL	(55.0)	27.5				BRL	(25.0)	12.5
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5
Xylenes	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5				BRL	(15.0)	7.5
Naphthalene	BRL	(20.0)	10.0	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5
MTBE	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5				BRL	(5.0)	2.5
Extractable Petroleum Hydrocarbons															
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0
Naphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
2-Methylnaphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Volatile Chlorinated Hydrocarbons															
Tetrachloroethylene															

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-3			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	3/1/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(75.0)	37.5	5	0	27.0	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	5	0	9.5	NC	
C9 to C10 Aromatics	BRL	(25.0)	12.5	5	0	21.5	NC	
Benzene	BRL	(5.0)	2.5	5	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	5	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	5	0	2.5	NC	
Xylenes	BRL	(15.0)	7.5	5	0	7.5	NC	
Naphthalene	BRL	(5.0)	2.5	5	0	4.0	NC	
MTBE	BRL	(5.0)	2.5	5	0	2.5	NC	
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	6	0	66.7	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	6	0	66.7	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	6	0	66.7	NC	
Naphthalene	BRL	(5.5)	2.7	6	0	0.9	NC	
2-Methylnaphthalene	BRL	(5.5)	2.7	6	0	0.9	NC	
Acenaphthylene	BRL	(5.5)	2.7	6	0	0.9	NC	
Acenaphthene	BRL	(5.5)	2.7	6	0	0.9	NC	
Fluorene	BRL	(5.5)	2.7	6	0	0.9	NC	
Phenanthrene	BRL	(5.5)	2.7	6	0	0.9	NC	
Anthracene	BRL	(5.5)	2.7	6	0	0.9	NC	
Fluoranthene	BRL	(5.5)	2.7	6	0	0.9	NC	
Pyrene	BRL	(5.5)	2.7	6	0	0.9	NC	
Benzo(a)anthracene	BRL	(5.5)	2.7	6	0	0.9	NC	
Chrysene	BRL	(5.5)	2.7	6	0	0.9	NC	
Benzo(b)fluoranthene	BRL	(5.5)	2.7	6	0	0.9	NC	
Benzo(k)fluoranthene	BRL	(5.5)	2.7	6	0	0.9	NC	
Benzo(a)pyrene	BRL	(5.5)	2.7	6	0	0.9	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.5)	2.7	6	0	0.9	NC	
Dibenzo(a,h)anthracene	BRL	(5.5)	2.7	6	0	0.9	NC	
Benzo(g,h,i)perylene	BRL	(5.5)	2.7	6	0	0.9	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-4			DCW-4			DCW-4			DCW-4			DCW-4			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum
Sampling Date	12/17/2004			4/6/2005			8/24/2005			3/1/2006			5/31/2006							
Method(s)	MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics				903	(75.0)	903.0	BRL	(75.0)	37.5	944	(300.0)	944.0	944	(75.0)	944.0	4	3	707.1	944.0	March-06
C9 to C12 Aliphatics				BRL	(15.0)	7.5	BRL	(25.0)	12.5	BRL	(99.9)	50.0	BRL	(25.0)	12.5	4	0	20.6	NC	
C9 to C10 Aromatics				BRL	(192.0)	96.0	BRL	(25.0)	12.5	BRL	(188.0)	94.0	BRL	(25.0)	12.5	4	0	53.7	NC	
Benzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(20.0)	10.0	BRL	(5.0)	2.5	4	0	4.4	NC	
Toluene				6.74	(5.0)	6.7	BRL	(5.0)	2.5	BRL	(20.0)	10.0	BRL	(5.0)	2.5	4	1	5.4	6.74	April-05
Ethylbenzene				9.72	(5.0)	9.7	BRL	(5.0)	2.5	BRL	(20.0)	10.0	BRL	(5.0)	2.5	4	1	6.2	9.72	April-05
Xylenes				176.1	(15.0)	176.1	BRL	(15.0)	7.5	131	(40.0)	131.0	BRL	(15.0)	7.5	4	2	80.5	176.1	April-05
Naphthalene				BRL	(20.0)	10.0	BRL	(5.0)	2.5	BRL	(20.0)	10.0	BRL	(5.0)	2.5	4	0	6.3	NC	
MTBE				1450	(5.0)	1,450.0	638	(5.0)	638.0	1630	(20.0)	1,630.0	594	(5.0)	594.0	4	4	1,078.0	1,630.0	March-06
Extractable Petroleum Hydrocarbo																				
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	200	(200.0)	200.0	500	(200.0)	500.0	BRL	(200.0)	100.0	5	2	180.0	500.0	March-06
Naphthalene	3.26	(1.0)	3.3	7.16	(1.0)	7.2	2.04	(1.0)	2.0	7.1	(6.3)	7.1	BRL	(5.4)	2.7	5	4	4.5	7.16	April-05
2-Methylnaphthalene	BRL	(1.0)	0.5	2.47	(1.0)	2.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	1	1.9	2.47	April-05
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.3)	3.1	BRL	(5.4)	2.7	5	0	1.5	NC	
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene																0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-5			DCW-5			DCW-5			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum
Sampling Date	4/6/2005			3/1/2006			10/17/2006							
Method(s)	MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons														
C5 to C8 Aliphatics				BRL	(75.0)	37.5	BRL	(75.0)	37.5	2	0	37.5	NC	
C9 to C12 Aliphatics				BRL	(25.0)	12.5	BRL	(25.0)	12.5	2	0	12.5	NC	
C9 to C10 Aromatics				BRL	(25.0)	12.5	BRL	(25.0)	12.5	2	0	12.5	NC	
Benzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	2	0	2.5	NC	
Toluene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	2	0	2.5	NC	
Ethylbenzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	2	0	2.5	NC	
Xylenes				BRL	(15.0)	7.5	BRL	(15.0)	7.5	2	0	7.5	NC	
Naphthalene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	2	0	2.5	NC	
MTBE				21.8	(5.0)	21.8	5.4	(5.0)	5.4	2	2	13.6	21.8	March-06
Extractable Petroleum Hydrocarbo														
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
Naphthalene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Acenaphthylene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(5.2)	2.6	BRL	(7.9)	4.0	3	0	2.4	NC	
Volatile Chlorinated Hydrocarbons														
Tetrachloroethylene										0	0	NC	NC	

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-6			DCW-6			DCW-6			DCW-6			DCW-6			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	12/17/2004			4/6/2005			8/24/2005			3/1/2006			5/31/2006							
Method(s)	MA VPH 97-12, EPH 98-1			MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics	BRL	(40.0)	20.0				93.4	(75.0)	93.4	BRL	(75.0)	37.5	BRL	(75.0)	37.5	4	1	47.1	93.4	August-05
C9 to C12 Aliphatics	BRL	(15.0)	7.5				212	(25.0)	212.0	130	(25.0)	130.0	83	(25.0)	83.0	4	3	108.1	212.0	August-05
C9 to C10 Aromatics	BRL	(55.0)	27.5				486	(25.0)	486.0	254	(25.0)	254.0	142	(25.0)	142.0	4	3	227.4	486.0	August-05
Benzene	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	0	2.5	NC	
Toluene	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5				19.1	(5.0)	19.1	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	1	6.7	19.1	August-05
Xylenes	BRL	(10.0)	5.0				93.4	(10.0)	93.4	20	(10.0)	20.0	BRL	(10.0)	5.0	4	2	30.9	93.4	August-05
Naphthalene	BRL	(20.0)	10.0				70.7	(5.0)	70.7	30.1	(5.0)	30.1	17.9	(5.0)	17.9	4	3	32.2	70.7	August-05
MTBE	30.6	(5.0)	30.6				44.7	(5.0)	44.7	8.6	(5.0)	8.6	37.3	(5.0)	37.3	4	4	30.3	44.7	August-05
Extractable Petroleum Hydrocarbons																				
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	400	(200.0)	400.0	800	(200.0)	800.0	BRL	(200.0)	100.0	5	2	280.0	800.0	March-06
Naphthalene	BRL	(1.0)	0.5	9.5	(1.0)	9.5	32.5	(1.0)	32.5	11.2	(6.0)	11.2	BRL	(5.6)	2.8	5	3	11.3	32.5	August-05
2-Methylnaphthalene	BRL	(1.0)	0.5	7.05	(1.0)	7.1	23.4	(1.0)	23.4	8.6	(6.0)	8.6	BRL	(5.6)	2.8	5	3	8.5	23.4	August-05
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(6.0)	3.0	BRL	(5.6)	2.8	5	0	1.5	NC	
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene																0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-8			DCW-8			DCW-8			DCW-8			DCW-8			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	12/17/2004			4/6/2005			8/24/2005			11/30/2005			3/1/2006							
Method(s)	MA EPH 98-1			MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics							BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	3	0	37.5	NC	
C9 to C12 Aliphatics							BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	3	0	12.5	NC	
C9 to C10 Aromatics							BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	3	0	12.5	NC	
Benzene							BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Toluene							BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Ethylbenzene							BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Xylenes							BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	3	0	7.5	NC	
Naphthalene							BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
MTBE							10.7	(5.0)	10.7	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	1	5.2	10.7	August-05
Extractable Petroleum Hydrocarbons																				
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
Naphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.3)	2.7	BRL	(5.3)	2.7	5	0	1.4	NC	
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene																0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-9			DCW-9			DCW-9			DCW-9			DCW-9			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum
Sampling Date	12/17/2004			4/6/2005			8/24/2005			11/30/2005			3/1/2006							
Method(s)	MA VPH 97-12, EPH 98-1, USEPA 8260, 200.7, 8081			MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics	BRL	(40.0)	20.0				BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	4	0	33.1	NC	
C9 to C12 Aliphatics	BRL	(15.0)	7.5				BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	4	0	11.2	NC	
C9 to C10 Aromatics	BRL	(55.0)	27.5				BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	4	0	16.2	NC	
Benzene	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	0	2.5	NC	
Toluene	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	0	2.5	NC	
Xylenes	BRL	(10.0)	5.0				BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	4	0	6.9	NC	
Naphthalene	BRL	(20.0)	10.0				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	0	4.4	NC	
MTBE	BRL	(5.0)	2.5				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	0	2.5	NC	
Extractable Petroleum Hydrocarbons																				
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	0	80.0	NC	
Naphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.7)	2.8	BRL	(5.3)	2.6	5	0	1.4	NC	
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene																0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	DCW-10			DCW-10			DCW-10			DCW-10			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	4/6/2005			8/24/2005			11/30/2005			3/1/2006							
Method(s)	MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																	
C5 to C8 Aliphatics				BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	3	0	37.5	NC	
C9 to C12 Aliphatics				BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	3	0	12.5	NC	
C9 to C10 Aromatics				BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	3	0	12.5	NC	
Benzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Toluene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Ethylbenzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Xylenes				BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	3	0	7.5	NC	
Naphthalene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
MTBE				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Extractable Petroleum Hydrocarbons																	
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	4	0	87.5	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	4	0	87.5	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	4	0	87.5	NC	
Naphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.5)	2.7	BRL	(5.3)	2.6	4	0	1.6	NC	
Volatile Chlorinated Hydrocarbons																	
Tetrachloromethylene													0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	ECS-1			ECS-1			ECS-1			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	11/30/2005			3/1/2006			5/31/2006							
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons														
C5 to C8 Aliphatics	508	(75.0)	508.0	499	(75.0)	499.0	332	(75.0)	332.0	3	3	446.3	508.0	November-05
C9 to C12 Aliphatics	499	(25.0)	499.0	441	(25.0)	441.0	355	(25.0)	355.0	3	3	431.7	499.0	November-05
C9 to C10 Aromatics	332	(25.0)	332.0	787	(25.0)	787.0	683	(25.0)	683.0	3	3	600.7	787.0	March-06
Benzene	63.5	(5.0)	63.5	77.4	(5.0)	77.4	62.5	(5.0)	62.5	3	3	67.8	77.4	May-06
Toluene	7.1	(5.0)	7.1	14.4	(5.0)	14.4	14.8	(5.0)	14.8	3	3	12.1	14.8	May-06
Ethylbenzene	106	(5.0)	106.0	98.1	(5.0)	98.1	94.2	(5.0)	94.2	3	3	99.4	106.0	November-05
Xylenes	30.6	(10.0)	30.6	36.8	(10.0)	36.8	19.4	(10.0)	19.4	3	3	28.9	36.8	March-06
Naphthalene	182	(5.0)	182.0	167	(5.0)	167.0	163	(5.0)	163.0	3	3	170.7	182.0	November-05
MTBE	5.1	(5.0)	5.1	BRL	(5.0)	2.5	14.8	(5.0)	14.8	3	2	7.5	14.8	May-06
Extractable Petroleum Hydrocarbo														
C9 to C18 Aliphatics	BRL	(200.0)	100.0	300	(200.0)	300.0	BRL	(200.0)	100.0	3	1	166.7	300.0	March-06
C19 to C36 Aliphatics	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	100.0	NC	
C11 to C22 Aromatics	700	(200.0)	700.0	900	(200.0)	900.0	400	(200.0)	400.0	3	3	666.7	900.0	March-06
Naphthalene	61.1	(5.6)	61.1	59.5	(5.1)	59.5	44.6	(5.4)	44.6	3	3	55.1	61.1	November-05
2-Methylnaphthalene	29.1	(5.6)	29.1	57.7	(5.1)	57.7	41.8	(5.4)	41.8	3	3	42.9	57.7	March-06
Acenaphthylene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Acenaphthene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Fluorene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Phenanthrene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Anthracene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Fluoranthene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Pyrene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Benzo(a)anthracene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Chrysene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Benzo(b)fluoranthene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Benzo(k)fluoranthene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Benzo(a)pyrene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Dibenzo(a,h)anthracene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Benzo(g,h,i)perylene	BRL	(5.6)	2.8	BRL	(5.1)	2.6	BRL	(5.4)	2.7	3	0	2.7	NC	
Volatile Chlorinated Hydrocarbons														
Tetrachloroethvlene										0	0	NC	NC	

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	ECS-4			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	3/1/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(750.0)	375.0	1	0	375.0	NC	
C9 to C12 Aliphatics	12900	(249.8)	12,900.0	1	1	12,900.0	12,900.0	
C9 to C10 Aromatics	15100	(249.8)	15,100.0	1	1	15,100.0	15,100.0	
Benzene	352	(5.0)	352.0	1	1	352.0	352.0	
Toluene	127	(5.0)	127.0	1	1	127.0	127.0	
Ethylbenzene	127	(5.0)	127.0	1	1	127.0	127.0	
Xylenes	280.7	(10.0)	280.7	1	1	280.7	280.7	
Naphthalene	153	(5.0)	153.0	1	1	153.0	153.0	
MTBE	4760	(5.0)	4,760.0	1	1	4,760.0	4,760.0	
Extractable Petroleum Hydrocarbo								
C9 to C18 Aliphatics	1700	(200.0)	1,700.0	1	1	1,700.0	1,700.0	
C19 to C36 Aliphatics	600	(200.0)	600.0	1	1	600.0	600.0	
C11 to C22 Aromatics	2100	(200.0)	2,100.0	1	1	2,100.0	2,100.0	
Naphthalene	63.4	(6.1)	63.4	1	1	63.4	63.4	
2-Methylnaphthalene	68	(6.1)	68.0	1	1	68.0	68.0	
Acenaphthylene	BRL	(6.1)	3.1	1	0	3.1	NC	
Acenaphthene	BRL	(6.1)	3.1	1	0	3.1	NC	
Fluorene	BRL	(6.1)	3.1	1	0	3.1	NC	
Phenanthrene	BRL	(6.1)	3.1	1	0	3.1	NC	
Anthracene	BRL	(6.1)	3.1	1	0	3.1	NC	
Fluoranthene	BRL	(6.1)	3.1	1	0	3.1	NC	
Pyrene	BRL	(6.1)	3.1	1	0	3.1	NC	
Benzo(a)anthracene	BRL	(6.1)	3.1	1	0	3.1	NC	
Chrysene	BRL	(6.1)	3.1	1	0	3.1	NC	
Benzo(b)fluoranthene	BRL	(6.1)	3.1	1	0	3.1	NC	
Benzo(k)fluoranthene	BRL	(6.1)	3.1	1	0	3.1	NC	
Benzo(a)pyrene	BRL	(6.1)	3.1	1	0	3.1	NC	
Indeno(1,2,3-cd)pyrene	BRL	(6.1)	3.1	1	0	3.1	NC	
Dibenzo(a,h)anthracene	BRL	(6.1)	3.1	1	0	3.1	NC	
Benzo(g,h,i)perylene	BRL	(6.1)	3.1	1	0	3.1	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	BRL	(1.0)	0.5	1	0	0.5	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	ECS-7			ECS-7			ECS-7			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	11/30/2005			3/1/2006			5/31/2006							
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons														
C5 to C8 Aliphatics	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	3	0	37.5	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	3	0	12.5	NC	
C9 to C10 Aromatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	3	0	12.5	NC	
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Xylenes	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	3	0	7.5	NC	
Naphthalene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
MTBE	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	3	0	2.5	NC	
Extractable Petroleum Hydrocarbo														
C9 to C18 Aliphatics	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	100.0	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	100.0	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	100.0	NC	
Naphthalene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
2-Methylnaphthalene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Acenaphthylene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Acenaphthene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Fluorene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Phenanthrene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Anthracene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Fluoranthene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Pyrene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Benzo(a)anthracene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Chrysene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Benzo(b)fluoranthene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Benzo(k)fluoranthene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Benzo(a)pyrene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Dibenzo(a,h)anthracene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Benzo(g,h,i)perylene	BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.5)	2.7	3	0	2.7	NC	
Volatile Chlorinated Hydrocarbons														
Tetrachloroethylene										0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	ECS-8			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum	EOW-2			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum
Sampling Date	5/31/2006								8/25/2005							
Method(s)	MA VPH 97-12, EPH 98-1								MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC						ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																
C5 to C8 Aliphatics	300	(75.0)	300.0	1	1	300.0	300.0		BRL	(75.0)	37.5	1	0	37.5	NC	
C9 to C12 Aliphatics	500	(25.0)	500.0	1	1	500.0	500.0		BRL	(25.0)	12.5	1	0	12.5	NC	
C9 to C10 Aromatics	1000	(25.0)	1,000.0	1	1	1,000.0	1,000.0		BRL	(25.0)	12.5	1	0	12.5	NC	
Benzene	35.2	(5.0)	35.2	1	1	35.2	35.2		BRL	(5.0)	2.5	1	0	2.5	NC	
Toluene	5.3	(5.0)	5.3	1	1	5.3	5.3		BRL	(5.0)	2.5	1	0	2.5	NC	
Ethylbenzene	51.1	(5.0)	51.1	1	1	51.1	51.1		BRL	(5.0)	2.5	1	0	2.5	NC	
Xylenes	86.3	(10.0)	86.3	1	1	86.3	86.3		BRL	(15.0)	7.5	1	0	7.5	NC	
Naphthalene	20.1	(5.0)	20.1	1	1	20.1	20.1		17.7	(5.0)	17.7	1	1	17.7	17.7	
MTBE	18.7	(5.0)	18.7	1	1	18.7	18.7		BRL	(5.0)	2.5	1	0	2.5	NC	
Extractable Petroleum Hydrocarbons																
C9 to C18 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC		BRL	(200.0)	100.0	1	0	100.0	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC		200	(200.0)	200.0	1	1	200.0	200.0	
C11 to C22 Aromatics	BRL	(200.0)	100.0	1	0	100.0	NC		BRL	(200.0)	100.0	1	0	100.0	NC	
Naphthalene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Acenaphthylene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Acenaphthene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Fluorene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Phenanthrene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Anthracene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Fluoranthene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Pyrene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Chrysene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	1	0	0.5	NC		BRL	(1.0)	0.5	1	0	0.5	NC	
Volatile Chlorinated Hydrocarbons																
Tetrachloroethylene				0	0	NC	NC					0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	ERW-3			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	3/1/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	869	(75.0)	869.0	1	1	869.0	869.0	
C9 to C12 Aliphatics	813	(25.0)	813.0	1	1	813.0	813.0	
C9 to C10 Aromatics	1450	(25.0)	1,450.0	1	1	1,450.0	1,450.0	
Benzene	17.6	(5.0)	17.6	1	1	17.6	17.6	
Toluene	59.2	(5.0)	59.2	1	1	59.2	59.2	
Ethylbenzene	33	(5.0)	33.0	1	1	33.0	33.0	
Xylenes	1143	(10.0)	1,143.0	1	1	1,143.0	1,143.0	
Naphthalene	69.3	(5.0)	69.3	1	1	69.3	69.3	
MTBE	1230	(5.0)	1,230.0	1	1	1,230.0	1,230.0	
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	1	0	100.0	NC	
Naphthalene	BRL	(5.0)	2.5	1	0	2.5	NC	
2-Methylnaphthalene	BRL	(5.0)	2.5	1	0	2.5	NC	
Acenaphthylene	BRL	(5.0)	2.5	1	0	2.5	NC	
Acenaphthene	BRL	(5.0)	2.5	1	0	2.5	NC	
Fluorene	BRL	(5.0)	2.5	1	0	2.5	NC	
Phenanthrene	BRL	(5.0)	2.5	1	0	2.5	NC	
Anthracene	BRL	(5.0)	2.5	1	0	2.5	NC	
Fluoranthene	BRL	(5.0)	2.5	1	0	2.5	NC	
Pyrene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(a)anthracene	BRL	(5.0)	2.5	1	0	2.5	NC	
Chrysene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(b)fluoranthene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(k)fluoranthene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(a)pyrene	BRL	(5.0)	2.5	1	0	2.5	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.0)	2.5	1	0	2.5	NC	
Dibenzo(a,h)anthracene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(g,h,i)perylene	BRL	(5.0)	2.5	1	0	2.5	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloromethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	MW-A			MW-A			MW-A			MW-A			No. of Analyses	No. of Dets	Average	Maximum	Date of Maximum
Sampling Date	5/21/2003			6/3/2004			8/24/2005			10/17/2006							
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																	
C5 to C8 Aliphatics	BRL	(40.0)	20.0	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	4	0	33.1	NC	
C9 to C12 Aliphatics	100	(15.0)	100.0	100	(25.0)	100.0	134	(25.0)	134.0	111	(25.0)	111.0	4	4	111.3	134.0	August-05
C9 to C10 Aromatics	961	(25.0)	961.0	252	(25.0)	252.0	215	(25.0)	215.0	171	(25.0)	171.0	4	4	399.8	961.0	May-03
Benzene	40.4	(5.0)	40.4	40.5	(5.0)	40.5	17.4	(5.0)	17.4	BRL	(5.0)	2.5	4	3	25.2	40.5	June-04
Toluene	22	(5.0)	22.0	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	4	1	7.4	22.0	May-03
Ethylbenzene	202	(5.0)	202.0	173	(5.0)	173.0	58.7	(5.0)	58.7	11.4	(5.0)	11.4	4	4	111.3	202.0	May-03
Xylenes	597	(15.0)	597.0	108	(15.0)	108.0	BRL	(15.0)	7.5	BRL	(15.0)	7.5	4	2	180.0	597.0	June-04
Naphthalene	25.2	(5.0)	25.2	37.1	(5.0)	37.1	22	(5.0)	22.0	11.1	(5.0)	11.1	4	4	23.9	37.1	August-05
MTBE	992	(5.0)	992.0	1730	(5.0)	1,730.0	2300	(5.0)	2,300.0	71.4	(5.0)	71.4	4	4	1,273.4	2,300.0	August-05
Extractable Petroleum Hydrocarbo																	
C9 to C18 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	4	0	75.0	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	4	0	75.0	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0	BRL	(100.0)	50.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	4	0	75.0	NC	
Naphthalene	8.21	(1.0)	8.2	BRL	(1.0)	0.5	10.5	(1.0)	10.5	BRL	(5.2)	2.6	4	2	5.5	10.5	August-05
2-Methylnaphthalene	1.3	(1.0)	1.3	12	(1.0)	12.0	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	2	4.1	12.0	June-04
Acenaphthylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Acenaphthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Fluorene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Phenanthrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Chrysene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(5.2)	2.6	4	0	1.0	NC	
Volatile Chlorinated Hydrocarbons																	
Tetrachloroethvlene													0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	MW-1			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	6/3/2004							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(40.0)	20.0	1	0	20.0	NC	
C9 to C12 Aliphatics	BRL	(15.0)	7.5	1	0	7.5	NC	
C9 to C10 Aromatics	BRL	(55.0)	27.5	1	0	27.5	NC	
Benzene	BRL	(5.0)	2.5	1	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	1	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	1	0	2.5	NC	
Xylenes	BRL	(10.0)	5.0	1	0	5.0	NC	
Naphthalene	BRL	(20.0)	10.0	1	0	10.0	NC	
MTBE	BRL	(5.0)	2.5	1	0	2.5	NC	
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	1	0	100.0	NC	
Naphthalene	BRL	(1.0)	0.5	1	0	0.5	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5	1	0	0.5	NC	
Acenaphthylene	BRL	(1.0)	0.5	1	0	0.5	NC	
Acenaphthene	BRL	(1.0)	0.5	1	0	0.5	NC	
Fluorene	BRL	(1.0)	0.5	1	0	0.5	NC	
Phenanthrene	BRL	(1.0)	0.5	1	0	0.5	NC	
Anthracene	BRL	(1.0)	0.5	1	0	0.5	NC	
Fluoranthene	BRL	(1.0)	0.5	1	0	0.5	NC	
Pyrene	BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5	1	0	0.5	NC	
Chrysene	BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5	1	0	0.5	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5	1	0	0.5	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5	1	0	0.5	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5	1	0	0.5	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation	KEI-4			KEI-4			KEI-4			KEI-4			KEI-4			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	6/3/2004			12/16/2004			6/8/2005			11/30/2005			3/1/2006							
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12			MA VPH 97-12			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	5	0	37.5	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	5	0	12.5	NC	
C9 to C10 Aromatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	5	0	12.5	NC	
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Xylenes	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	5	0	7.5	NC	
Naphthalene	BRL	(5.0)	2.5	5	(5.0)	5.0	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	1	3.0	5.0	December-04
MTBE	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Extractable Petroleum Hydrocarbons																				
C9 to C18 Aliphatics	BRL	(100.0)	50.0							BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
C19 to C36 Aliphatics	BRL	(100.0)	50.0							BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
C11 to C22 Aromatics	BRL	(100.0)	50.0							BRL	(200.0)	100.0	BRL	(200.0)	100.0	3	0	83.3	NC	
Naphthalene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
2-Methylnaphthalene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Acenaphthylene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Acenaphthene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Fluorene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Phenanthrene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Anthracene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Fluoranthene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Pyrene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Benzo(a)anthracene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Chrysene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Benzo(b)fluoranthene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Benzo(k)fluoranthene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Benzo(a)pyrene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Indeno(1,2,3-cd)pyrene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Dibenzo(a,h)anthracene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Benzo(g,h,i)perylene	BRL	(1.0)	0.5							BRL	(5.5)	2.7	BRL	(5.8)	2.9	3	0	2.0	NC	
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene																0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 15

Exposure Point Concentrations
Groundwater

Well Designation Sampling Date	KEI-5			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum	KEI-6			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum
	12/17/2004								12/18/2002							
	MA VPH 97-12								MA VPH 97-12							
	ug/L	MDL	EPC						ug/L	MDL	EPC					
Method(s)																
Units	ug/L	MDL	EPC													
Volatile Petroleum Hydrocarbons																
C5 to C8 Aliphatics	BRL	(40.0)	20.0	1	0	20.0	NC		BRL	(20.0)	10.0	1	0	10.0	NC	
C9 to C12 Aliphatics	25.3	(25.0)	25.3	1	1	25.3	25.3		28	(6.7)	28.0	1	1	28.0	28.0	
C9 to C10 Aromatics	BRL	(55.0)	27.5	1	0	27.5	NC		290	(6.7)	290.0	1	1	290.0	290.0	
Benzene	5	(5.0)	5.0	1	1	5.0	5.0		4	(5.0)	4.0	1	1	4.0	4.0	
Toluene	BRL	(5.0)	2.5	1	0	2.5	NC		BRL	(5.0)	2.5	1	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	1	0	2.5	NC		8	(5.0)	8.0	1	1	8.0	8.0	
Xylenes	BRL	(15.0)	7.5	1	0	7.5	NC		7	(10.0)	7.0	1	1	7.0	7.0	
Naphthalene	BRL	(5.0)	2.5	1	0	2.5	NC		24	(5.0)	24.0	1	1	24.0	24.0	
MTBE	162	(5.0)	162.0	1	1	162.0	162.0		230	(5.0)	230.0	1	1	230.0	230.0	
Extractable Petroleum Hydrocarbons																
C9 to C18 Aliphatics				0	0	NC	NC					0	0	NC	NC	
C19 to C36 Aliphatics				0	0	NC	NC					0	0	NC	NC	
C11 to C22 Aromatics				0	0	NC	NC					0	0	NC	NC	
Naphthalene				0	0	NC	NC					0	0	NC	NC	
2-Methylnaphthalene				0	0	NC	NC					0	0	NC	NC	
Acenaphthylene				0	0	NC	NC					0	0	NC	NC	
Acenaphthene				0	0	NC	NC					0	0	NC	NC	
Fluorene				0	0	NC	NC					0	0	NC	NC	
Phenanthrene				0	0	NC	NC					0	0	NC	NC	
Anthracene				0	0	NC	NC					0	0	NC	NC	
Fluoranthene				0	0	NC	NC					0	0	NC	NC	
Pyrene				0	0	NC	NC					0	0	NC	NC	
Benzo(a)anthracene				0	0	NC	NC					0	0	NC	NC	
Chrysene				0	0	NC	NC					0	0	NC	NC	
Benzo(b)fluoranthene				0	0	NC	NC					0	0	NC	NC	
Benzo(k)fluoranthene				0	0	NC	NC					0	0	NC	NC	
Benzo(a)pyrene				0	0	NC	NC					0	0	NC	NC	
Indeno(1,2,3-cd)pyrene				0	0	NC	NC					0	0	NC	NC	
Dibenzo(a,h)anthracene				0	0	NC	NC					0	0	NC	NC	
Benzo(g,h,i)perylene				0	0	NC	NC					0	0	NC	NC	
Volatile Chlorinated Hydrocarbons																
Tetrachloroethylene				0	0	NC	NC					0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BDL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Table 16

Well Designation	MH-1			MH-1			MH-1			MH-1			MH-1		
Sampling Date	10/28/2005			1/18/2006			3/1/2006			4/17/2006			5/31/2006		
Method(s)	MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons															
C5 to C8 Aliphatics	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5
C9 to C12 Aliphatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5
C9 to C10 Aromatics	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Xylenes	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5
Naphthalene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
MTBE	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Extractable Petroleum Hydrocarbons															
C9 to C18 Aliphatics				BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0
C19 to C36 Aliphatics				BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0
C11 to C22 Aromatics				BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0
Naphthalene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
2-Methylnaphthalene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Acenaphthylene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Acenaphthene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Fluorene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Phenanthrene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Anthracene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Fluoranthene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Pyrene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Benzo(a)anthracene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Chrysene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Benzo(b)fluoranthene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Benzo(k)fluoranthene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Benzo(a)pyrene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Indeno(1,2,3-cd)pyrene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Dibenzo(a,h)anthracene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Benzo(g,h,i)perylene				BRL	(5.4)	2.7	BRL	(5.3)	2.7	BRL	(5.3)	2.6	BRL	(5.7)	2.8
Volatile Chlorinated Hydrocarbons															
Tetrachloroethylene															

Table 16

Well Designation	MH-1			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	7/21/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(75.0)	37.5	6	0	37.5	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	6	0	12.5	NC	
C9 to C10 Aromatics	BRL	(25.0)	12.5	6	0	12.5	NC	
Benzene	BRL	(5.0)	2.5	6	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	6	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	6	0	2.5	NC	
Xylenes	BRL	(15.0)	7.5	6	0	7.5	NC	
Naphthalene	BRL	(5.0)	2.5	6	0	2.5	NC	
MTBE	BRL	(5.0)	2.5	6	0	2.5	NC	
Extractable Petroleum Hydrocarbo								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	5	0	100.0	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	5	0	100.0	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	5	0	100.0	NC	
Naphthalene	BRL	(5.6)	2.8	5	0	2.7	NC	
2-Methylnaphthalene	BRL	(5.6)	2.8	5	0	2.7	NC	
Acenaphthylene	BRL	(5.6)	2.8	5	0	2.7	NC	
Acenaphthene	BRL	(5.6)	2.8	5	0	2.7	NC	
Fluorene	BRL	(5.6)	2.8	5	0	2.7	NC	
Phenanthrene	BRL	(5.6)	2.8	5	0	2.7	NC	
Anthracene	BRL	(5.6)	2.8	5	0	2.7	NC	
Fluoranthene	BRL	(5.6)	2.8	5	0	2.7	NC	
Pyrene	BRL	(5.6)	2.8	5	0	2.7	NC	
Benzo(a)anthracene	BRL	(5.6)	2.8	5	0	2.7	NC	
Chrysene	BRL	(5.6)	2.8	5	0	2.7	NC	
Benzo(b)fluoranthene	BRL	(5.6)	2.8	5	0	2.7	NC	
Benzo(k)fluoranthene	BRL	(5.6)	2.8	5	0	2.7	NC	
Benzo(a)pyrene	BRL	(5.6)	2.8	5	0	2.7	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.6)	2.8	5	0	2.7	NC	
Dibenzo(a,h)anthracene	BRL	(5.6)	2.8	5	0	2.7	NC	
Benzo(g,h,i)perylene	BRL	(5.6)	2.8	5	0	2.7	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Table 16

Exposure Point Concentrations
Surface Water

Well Designation	MH-2			MH-2			MH-2			MH-2			MH-2			MH-2			MH-2		
Sampling Date	10/28/2005			12/30/2005			1/18/2006			3/1/2006			4/17/2006			5/31/2006			7/21/2006		
Method(s)	MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons																					
C5 to C8 Aliphatics				BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5
C9 to C12 Aliphatics				BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5
C9 to C10 Aromatics				BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5
Benzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Toluene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Ethylbenzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Xylenes				BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5
Naphthalene				5.5	(5.0)	5.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
MTBE				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Extractable Petroleum Hydrocarbons																					
C9 to C18 Aliphatics	6100	(200.0)	6,100.0	900	(200.0)	900.0	900	(200.0)	900.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0
C19 to C36 Aliphatics	2400	(200.0)	2,400.0	400	(200.0)	400.0	400	(200.0)	400.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0
C11 to C22 Aromatics	4000	(200.0)	4,000.0	500	(200.0)	500.0	800	(200.0)	800.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0
Naphthalene	19.9	(5.3)	19.9	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
2-Methylnaphthalene	52	(5.3)	52.0	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Acenaphthylene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Acenaphthene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Fluorene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Phenanthrene	9.6	(5.3)	9.6	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Anthracene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Fluoranthene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Pyrene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Benzo(a)anthracene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Chrysene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Benzo(b)fluoranthene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Benzo(k)fluoranthene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Benzo(a)pyrene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Indeno(1,2,3-cd)pyrene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Dibenzo(a,h)anthracene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Benzo(g,h,i)perylene	BRL	(5.3)	2.7	BRL	(6.4)	3.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.3)	2.6	BRL	(6.6)	3.3	BRL	(6.0)	3.0
Volatile Chlorinated Hydrocarbons																					
Tetrachloroethylene																					

Table 16

Well Designation	MH-2			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	9/29/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(75.0)	37.5	7	0	37.5	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	7	0	12.5	NC	
C9 to C10 Aromatics	BRL	(25.0)	12.5	7	0	12.5	NC	
Benzene	BRL	(5.0)	2.5	7	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	7	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	7	0	2.5	NC	
Xylenes	BRL	(15.0)	7.5	7	0	7.5	NC	
Naphthalene	BRL	(5.0)	2.5	7	1	2.9	5.5	
MTBE	BRL	(5.0)	2.5	7	0	2.5	NC	
Extractable Petroleum Hydrocarbo								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	8	3	1,050.0	6,100.0	October-05
C19 to C36 Aliphatics	BRL	(200.0)	100.0	8	3	462.5	2,400.0	October-05
C11 to C22 Aromatics	BRL	(200.0)	100.0	8	3	725.0	4,000.0	October-05
Naphthalene	BRL	(5.2)	2.6	8	1	5.0	19.9	October-05
2-Methylnaphthalene	BRL	(5.2)	2.6	8	1	9.0	52.0	October-05
Acenaphthylene	BRL	(5.2)	2.6	8	0	2.9	NC	
Acenaphthene	BRL	(5.2)	2.6	8	0	2.9	NC	
Fluorene	BRL	(5.2)	2.6	8	0	2.9	NC	
Phenanthrene	BRL	(5.2)	2.6	8	1	3.7	9.6	
Anthracene	BRL	(5.2)	2.6	8	0	2.9	NC	
Fluoranthene	BRL	(5.2)	2.6	8	0	2.9	NC	
Pyrene	BRL	(5.2)	2.6	8	0	2.9	NC	
Benzo(a)anthracene	BRL	(5.2)	2.6	8	0	2.9	NC	
Chrysene	BRL	(5.2)	2.6	8	0	2.9	NC	
Benzo(b)fluoranthene	BRL	(5.2)	2.6	8	0	2.9	NC	
Benzo(k)fluoranthene	BRL	(5.2)	2.6	8	0	2.9	NC	
Benzo(a)pyrene	BRL	(5.2)	2.6	8	0	2.9	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.2)	2.6	8	0	2.9	NC	
Dibenzo(a,h)anthracene	BRL	(5.2)	2.6	8	0	2.9	NC	
Benzo(g,h,i)perylene	BRL	(5.2)	2.6	8	0	2.9	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Reporting Limit (RL) or Method Detection Limit (MDL).
NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 16

Exposure Point Concentrations
Surface Water

Well Designation	MH-3			MH-3			MH-3			MH-3			MH-3			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum
Sampling Date	1/18/2006			4/17/2006			5/31/2006			7/21/2006			9/29/2006							
Method(s)	MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics	75	(75.0)	75.0	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	5	1	45.0	75.0	January-06
C9 to C12 Aliphatics	27.1	(25.0)	27.1	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	5	1	15.4	27.1	January-06
C9 to C10 Aromatics	40.7	(25.0)	40.7	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	BRL	(25.0)	12.5	5	1	18.1	40.7	January-06
Benzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Xylenes	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	5	0	7.5	NC	
Naphthalene	10	(5.0)	10.0	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	1	4.0	10.0	January-06
MTBE	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	5	0	2.5	NC	
Extractable Petroleum Hydrocarbo																				
C9 to C18 Aliphatics	3600	(200.0)	3,600.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	1	800.0	3,600.0	January-06
C19 to C36 Aliphatics	1700	(200.0)	1,700.0	300	(200.0)	300.0	BRL	(200.0)	100.0	300	(200.0)	300.0	BRL	(200.0)	100.0	5	3	500.0	1,700.0	January-06
C11 to C22 Aromatics	2200	(200.0)	2,200.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	BRL	(200.0)	100.0	5	1	520.0	2,200.0	January-06
Naphthalene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
2-Methylnaphthalene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Acenaphthylene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Acenaphthene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Fluorene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Phenanthrene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Anthracene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Fluoranthene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Pyrene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Benzo(a)anthracene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Chrysene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Benzo(b)fluoranthene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Benzo(k)fluoranthene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Benzo(a)pyrene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Dibenzo(a,h)anthracene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Benzo(g,h,i)perylene	BRL	(5.4)	2.7	BRL	(5.4)	2.7	BRL	(5.7)	2.8	BRL	(6.0)	3.0	BRL	(6.1)	3.1	5	0	2.9	NC	
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene																0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Reporting Limit (RL) or Method Detection Limit (MDL).
NC = Not Calculated.

Table 16

Exposure Point Concentrations
Surface Water

Well Designation	SW OUTFALL			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	5/21/2003							
Method(s)	MA EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics				0	0	NC	NC	
C9 to C12 Aliphatics				0	0	NC	NC	
C9 to C10 Aromatics				0	0	NC	NC	
Benzene				0	0	NC	NC	
Toluene				0	0	NC	NC	
Ethylbenzene				0	0	NC	NC	
Xylenes				0	0	NC	NC	
Naphthalene				0	0	NC	NC	
MTBE				0	0	NC	NC	
Extractable Petroleum Hydrocarbo								
C9 to C18 Aliphatics	2080	(200.0)	2,080.0	1	1	2,080.0	2,080.0	
C19 to C36 Aliphatics	720	(200.0)	720.0	1	1	720.0	720.0	
C11 to C22 Aromatics	700	(200.0)	700.0	1	1	700.0	700.0	
Naphthalene	113	(5.0)	113.0	1	1	113.0	113.0	
2-Methylnaphthalene	4658	(5.0)	4,658.0	1	1	4,658.0	4,658.0	
Acenaphthylene	BRL	(5.0)	2.5	1	0	2.5	NC	
Acenaphthene	41.4	(5.0)	41.4	1	1	41.4	41.4	
Fluorene	BRL	(5.0)	2.5	1	0	2.5	NC	
Phenanthrene	73.9	(5.0)	73.9	1	1	73.9	73.9	
Anthracene	BRL	(5.0)	2.5	1	0	2.5	NC	
Fluoranthene	BRL	(5.0)	2.5	1	0	2.5	NC	
Pyrene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(a)anthracene	BRL	(5.0)	2.5	1	0	2.5	NC	
Chrysene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(b)fluoranthene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(k)fluoranthene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(a)pyrene	BRL	(5.0)	2.5	1	0	2.5	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.0)	2.5	1	0	2.5	NC	
Dibenzo(a,h)anthracene	BRL	(5.0)	2.5	1	0	2.5	NC	
Benzo(g,h,i)perylene	BRL	(5.0)	2.5	1	0	2.5	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Reporting Limit (RL) or Method Detection Limit (MDL).
NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 16

Exposure Point Concentrations
Surface Water

Well Designation	SW-1			SW-1			SW-1			SW-1			SW-1			SW-1		
Sampling Date	10/27/2005			11/30/2005			12/30/2005			1/18/2006			4/17/2006			5/31/2006		
Method(s)	MA EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1			MA VPH 97-12, EPH 98-1		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics				BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5	BRL	(75.0)	37.5
C9 to C12 Aliphatics				BRL	(25.0)	12.5	319	(25.0)	319.0	29.6	(25.0)	29.6	BRL	(25.0)	12.5	BRL	(25.0)	12.5
C9 to C10 Aromatics				BRL	(25.0)	12.5	258	(25.0)	258.0	51.8	(25.0)	51.8	BRL	(25.0)	12.5	BRL	(25.0)	12.5
Benzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Toluene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Ethylbenzene				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Xylenes				BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5	BRL	(15.0)	7.5
Naphthalene				BRL	(5.0)	2.5	27.4	(5.0)	27.4	8.5	(5.0)	8.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
MTBE				BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5	BRL	(5.0)	2.5
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics	11400	(200.0)	11,400.0	700	(200.0)	700.0	800	(200.0)	800.0	3000	(200.0)	3,000.0	BRL	(200.0)	100.0	1400	(200.0)	1,400.0
C19 to C36 Aliphatics	7300	(200.0)	7,300.0	900	(200.0)	900.0	700	(200.0)	700.0	1700	(200.0)	1,700.0	BRL	(200.0)	100.0	1100	(200.0)	1,100.0
C11 to C22 Aromatics	8200	(200.0)	8,200.0	900	(200.0)	900.0	600	(200.0)	600.0	1700	(200.0)	1,700.0	BRL	(200.0)	100.0	800	(200.0)	800.0
Naphthalene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
2-Methylnaphthalene	10.6	(5.3)	10.6	BRL	(5.7)	2.8	BRL	(5.3)	2.6	9.45	(5.5)	9.5	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Acenaphthylene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Acenaphthene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Fluorene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Phenanthrene	19.2	(5.3)	19.2	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Anthracene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Fluoranthene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Pyrene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Benzo(a)anthracene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Chrysene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Benzo(b)fluoranthene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Benzo(k)fluoranthene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Benzo(a)pyrene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Indeno(1,2,3-cd)pyrene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Dibenzo(a,h)anthracene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Benzo(g,h,i)perylene	BRL	(5.3)	2.7	BRL	(5.7)	2.8	BRL	(5.3)	2.6	BRL	(5.5)	2.7	BRL	(5.3)	2.6	BRL	(6.5)	3.2
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene																		

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Reporting Limit (RL) or Method Detection Limit (MDL).
NC = Not Calculated.

Table 16

Well Designation	SW-1			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	7/21/2006							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(75.0)	37.5	6	0	NC	NC	
C9 to C12 Aliphatics	BRL	(25.0)	12.5	6	2	66.4	319.0	December-05
C9 to C10 Aromatics	BRL	(25.0)	12.5	6	2	60.0	258.0	December-05
Benzene	BRL	(5.0)	2.5	6	0	NC	NC	
Toluene	BRL	(5.0)	2.5	6	0	NC	NC	
Ethylbenzene	BRL	(5.0)	2.5	6	0	NC	NC	
Xylenes	BRL	(15.0)	7.5	6	0	NC	NC	
Naphthalene	BRL	(5.0)	2.5	6	2	7.7	27.4	December-05
MTBE	BRL	(5.0)	2.5	6	0	NC	NC	
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	1600	(200.0)	1,600.0	7	6	2,714.3	11,400.0	October-05
C19 to C36 Aliphatics	500	(200.0)	500.0	7	6	1,757.1	7,300.0	October-05
C11 to C22 Aromatics	700	(200.0)	700.0	7	6	1,857.1	8,200.0	October-05
Naphthalene	BRL	(5.7)	2.8	7	0	NC	NC	
2-Methylnaphthalene	BRL	(5.7)	2.8	7	2	4.9	10.6	October-05
Acenaphthylene	BRL	(5.7)	2.8	7	0	NC	NC	
Acenaphthene	BRL	(5.7)	2.8	7	0	NC	NC	
Fluorene	BRL	(5.7)	2.8	7	0	NC	NC	
Phenanthrene	BRL	(5.7)	2.8	7	1	5.2	19.2	October-05
Anthracene	BRL	(5.7)	2.8	7	0	NC	NC	
Fluoranthene	BRL	(5.7)	2.8	7	0	NC	NC	
Pyrene	BRL	(5.7)	2.8	7	0	NC	NC	
Benzo(a)anthracene	BRL	(5.7)	2.8	7	0	NC	NC	
Chrysene	BRL	(5.7)	2.8	7	0	NC	NC	
Benzo(b)fluoranthene	BRL	(5.7)	2.8	7	0	NC	NC	
Benzo(k)fluoranthene	BRL	(5.7)	2.8	7	0	NC	NC	
Benzo(a)pyrene	BRL	(5.7)	2.8	7	0	NC	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.7)	2.8	7	0	NC	NC	
Dibenzo(a,h)anthracene	BRL	(5.7)	2.8	7	0	NC	NC	
Benzo(g,h,i)perylene	BRL	(5.7)	2.8	7	0	NC	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 16

Exposure Point Concentrations
Surface Water

Well Designation	SW-2			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	12/30/2005							
Method(s)	MA VPH 97-12, EPH 98-1							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	BRL	(75.0)	37.5	1	0	37.5	NC	
C9 to C12 Aliphatics	43.8	(25.0)	43.8	1	1	43.8	43.8	
C9 to C10 Aromatics	25.8	(25.0)	25.8	1	1	25.8	25.8	
Benzene	BRL	(5.0)	2.5	1	0	2.5	NC	
Toluene	BRL	(5.0)	2.5	1	0	2.5	NC	
Ethylbenzene	BRL	(5.0)	2.5	1	0	2.5	NC	
Xylenes	BRL	(15.0)	7.5	1	0	7.5	NC	
Naphthalene	BRL	(5.0)	2.5	1	0	2.5	NC	
MTBE	BRL	(5.0)	2.5	1	0	2.5	NC	
Extractable Petroleum Hydrocarbo								
C9 to C18 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0	1	0	100.0	NC	
Naphthalene	BRL	(5.8)	2.9	1	0	2.9	NC	
2-Methylnaphthalene	BRL	(5.8)	2.9	1	0	2.9	NC	
Acenaphthylene	BRL	(5.8)	2.9	1	0	2.9	NC	
Acenaphthene	BRL	(5.8)	2.9	1	0	2.9	NC	
Fluorene	BRL	(5.8)	2.9	1	0	2.9	NC	
Phenanthrene	BRL	(5.8)	2.9	1	0	2.9	NC	
Anthracene	BRL	(5.8)	2.9	1	0	2.9	NC	
Fluoranthene	BRL	(5.8)	2.9	1	0	2.9	NC	
Pyrene	BRL	(5.8)	2.9	1	0	2.9	NC	
Benzo(a)anthracene	BRL	(5.8)	2.9	1	0	2.9	NC	
Chrysene	BRL	(5.8)	2.9	1	0	2.9	NC	
Benzo(b)fluoranthene	BRL	(5.8)	2.9	1	0	2.9	NC	
Benzo(k)fluoranthene	BRL	(5.8)	2.9	1	0	2.9	NC	
Benzo(a)pyrene	BRL	(5.8)	2.9	1	0	2.9	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.8)	2.9	1	0	2.9	NC	
Dibenzo(a,h)anthracene	BRL	(5.8)	2.9	1	0	2.9	NC	
Benzo(g,h,i)perylene	BRL	(5.8)	2.9	1	0	2.9	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene				0	0	NC	NC	

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Reporting Limit (RL) or Method Detection Limit (MDL).
NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 16

Exposure Point Concentrations
Surface Water

Well Designation	SW-2 (Upstream)			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum	SW-3			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum		
Sampling Date	10/27/2005																	
Method(s)	MA EPH 98-1																	
Units	ug/L	MDL	EPC						ug/L	MDL	EPC							
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics				0	0	NC	NC				0	0	NC	NC				
C9 to C12 Aliphatics				0	0	NC	NC				0	0	NC	NC				
C9 to C10 Aromatics				0	0	NC	NC				0	0	NC	NC				
Benzene				0	0	NC	NC				0	0	NC	NC				
Toluene				0	0	NC	NC				0	0	NC	NC				
Ethylbenzene				0	0	NC	NC				0	0	NC	NC				
Xylenes				0	0	NC	NC				0	0	NC	NC				
Naphthalene				0	0	NC	NC				0	0	NC	NC				
MTBE				0	0	NC	NC				0	0	NC	NC				
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC		BRL	(200.0)	100.0	1	0	100.0	NC			
C19 to C36 Aliphatics	BRL	(200.0)	100.0	1	0	100.0	NC		BRL	(200.0)	100.0	1	0	100.0	NC			
C11 to C22 Aromatics	BRL	(200.0)	100.0	1	0	100.0	NC		BRL	(200.0)	100.0	1	0	100.0	NC			
Naphthalene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
2-Methylnaphthalene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Acenaphthylene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Acenaphthene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Fluorene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Phenanthrene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Anthracene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Fluoranthene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Pyrene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Benzo(a)anthracene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Chrysene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Benzo(b)fluoranthene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Benzo(k)fluoranthene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Benzo(a)pyrene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Indeno(1,2,3-cd)pyrene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Dibenzo(a,h)anthracene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Benzo(g,h,i)perylene	BRL	(5.8)	2.9	1	0	2.9	NC		BRL	(5.5)	2.7	1	0	2.7	NC			
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene				0	0	NC	NC					0	0	NC	NC			

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Reporting Limit (RL) or Method Detection Limit (MDL).
NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 16

Exposure Point Concentrations
Surface Water

Well Designation Sampling Date Method(s) Units	ESW-1 6/3/2004 USEPA 8270 ug/L MDL EPC			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum	ESW-2 6/3/2004 USEPA 8270 ug/L MDL EPC			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum	
Volatile Petroleum Hydrocarbons																	
C5 to C8 Aliphatics				0	0	NC	NC					0	0	NC	NC		
C9 to C12 Aliphatics				0	0	NC	NC					0	0	NC	NC		
C9 to C10 Aromatics				0	0	NC	NC					0	0	NC	NC		
Benzene				0	0	NC	NC					0	0	NC	NC		
Toluene				0	0	NC	NC					0	0	NC	NC		
Ethylbenzene				0	0	NC	NC					0	0	NC	NC		
Xylenes				0	0	NC	NC					0	0	NC	NC		
Naphthalene				0	0	NC	NC					0	0	NC	NC		
MTBE				0	0	NC	NC					0	0	NC	NC		
Extractable Petroleum Hydrocarbons																	
C9 to C18 Aliphatics				0	0	NC	NC					0	0	NC	NC		
C19 to C36 Aliphatics				0	0	NC	NC					0	0	NC	NC		
C11 to C22 Aromatics				0	0	NC	NC					0	0	NC	NC		
Naphthalene	BRL	(0.8)	0.4	1	0	0.4	NC		BRL	(0.8)	0.4	1	0	0.4	NC		
2-Methylnaphthalene	BRL	(0.8)	0.4	1	0	0.4	NC		BRL	(0.8)	0.4	1	0	0.4	NC		
Acenaphthylene				0	0	NC	NC					0	0	NC	NC		
Acenaphthene	BRL	(0.5)	0.3	1	0	0.3	NC		BRL	(5.0)	2.5	1	0	2.5	NC		
Fluorene				0	0	NC	NC					0	0	NC	NC		
Phenanthrene	BRL	(0.5)	0.3	1	0	0.3	NC		BRL	(5.0)	2.5	1	0	2.5	NC		
Anthracene				0	0	NC	NC					0	0	NC	NC		
Fluoranthene				0	0	NC	NC					0	0	NC	NC		
Pyrene				0	0	NC	NC					0	0	NC	NC		
Benzo(a)anthracene				0	0	NC	NC					0	0	NC	NC		
Chrysene				0	0	NC	NC					0	0	NC	NC		
Benzo(b)fluoranthene				0	0	NC	NC					0	0	NC	NC		
Benzo(k)fluoranthene				0	0	NC	NC					0	0	NC	NC		
Benzo(a)pyrene				0	0	NC	NC					0	0	NC	NC		
Indeno(1,2,3-cd)pyrene				0	0	NC	NC					0	0	NC	NC		
Dibenzo(a,h)anthracene				0	0	NC	NC					0	0	NC	NC		
Benzo(g,h,i)perylene				0	0	NC	NC					0	0	NC	NC		
Volatile Chlorinated Hydrocarbons																	
Tetrachloroethylene				0	0	NC	NC					0	0	NC	NC		

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Reporting Limit (RL) or Method Detection Limit (MDL).
NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 16

Exposure Point Concentrations
Surface Water

Well Designation	ESW-3			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum	ESW-4			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum		
Sampling Date	6/3/2004																	
Method(s)	USEPA 8270																	
Units	ug/L	MDL	EPC						ug/L	MDL	EPC							
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics				0	0	NC	NC				0	0	NC	NC				
C9 to C12 Aliphatics				0	0	NC	NC				0	0	NC	NC				
C9 to C10 Aromatics				0	0	NC	NC				0	0	NC	NC				
Benzene				0	0	NC	NC				0	0	NC	NC				
Toluene				0	0	NC	NC				0	0	NC	NC				
Ethylbenzene				0	0	NC	NC				0	0	NC	NC				
Xylenes				0	0	NC	NC				0	0	NC	NC				
Naphthalene				0	0	NC	NC				0	0	NC	NC				
MTBE				0	0	NC	NC				0	0	NC	NC				
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics				0	0	NC	NC				0	0	NC	NC				
C19 to C36 Aliphatics				0	0	NC	NC				0	0	NC	NC				
C11 to C22 Aromatics				0	0	NC	NC				0	0	NC	NC				
Naphthalene	BRL	(0.8)	0.4	1	0	0.4	NC		BRL	(0.8)	0.4	1	0	0.4	NC			
2-Methylnaphthalene	BRL	(0.8)	0.4	1	0	0.4	NC		BRL	(0.8)	0.4	1	0	0.4	NC			
Acenaphthylene				0	0	NC	NC					0	0	NC	NC			
Acenaphthene	BRL	(5.0)	2.5	1	0	2.5	NC		BRL	(5.0)	2.5	1	0	2.5	NC			
Fluorene				0	0	NC	NC					0	0	NC	NC			
Phenanthrene	BRL	(5.0)	2.5	1	0	2.5	NC		BRL	(5.0)	2.5	1	0	2.5	NC			
Anthracene				0	0	NC	NC					0	0	NC	NC			
Fluoranthene				0	0	NC	NC					0	0	NC	NC			
Pyrene				0	0	NC	NC					0	0	NC	NC			
Benzo(a)anthracene				0	0	NC	NC					0	0	NC	NC			
Chrysene				0	0	NC	NC					0	0	NC	NC			
Benzo(b)fluoranthene				0	0	NC	NC					0	0	NC	NC			
Benzo(k)fluoranthene				0	0	NC	NC					0	0	NC	NC			
Benzo(a)pyrene				0	0	NC	NC					0	0	NC	NC			
Indeno(1,2,3-cd)pyrene				0	0	NC	NC					0	0	NC	NC			
Dibenzo(a,h)anthracene				0	0	NC	NC					0	0	NC	NC			
Benzo(g,h,i)perylene				0	0	NC	NC					0	0	NC	NC			
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene				0	0	NC	NC					0	0	NC	NC			

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Reporting Limit (RL) or Method Detection Limit (MDL).
NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 17

Exposure Point Concentrations
Drinking Water

Well Designation	131 MAIN St			131 MAIN St			131 MAIN St			131 MAIN St			131 MAIN St			131 MAIN St			131 MAIN St		
Sampling Date	12/16/2004			3/3/2005			6/8/2005			8/25/2005			10/28/2005			3/1/2006			3/29/2006		
Method(s)	USEPA 524.2			USEPA 524.2			USEPA 524.2			USEPA 524.2			MA EPH88-1, USEPA 524.2			USEPA 524.2			USEPA 524.2		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons																					
C5 to C8 Aliphatics																					
C9 to C12 Aliphatics																					
C9 to C10 Aromatics																					
Benzene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
Toluene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
Ethylbenzene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
Xylenes	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Naphthalene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
MTBE	5	(0.5)	5.0	5	(0.5)	5.0	5	(0.5)	5.0	3.4	(0.5)	3.4	2.7	(0.5)	2.7	2.6	(0.5)	2.6	3	(0.5)	3.0
Extractable Petroleum Hydrocarbons																					
C9 to C18 Aliphatics													BRL	(200.0)	100.0						
C19 to C36 Aliphatics													BRL	(200.0)	100.0						
C11 to C22 Aromatics													BRL	(200.0)	100.0						
Naphthalene													BRL	(5.0)	2.5						
2-Methylnaphthalene													BRL	(5.0)	2.5						
Acenaphthylene													BRL	(5.0)	2.5						
Acenaphthene													BRL	(5.0)	2.5						
Fluorene													BRL	(5.0)	2.5						
Phenanthrene													BRL	(5.0)	2.5						
Anthracene													BRL	(5.0)	2.5						
Fluoranthene													BRL	(5.0)	2.5						
Pyrene													BRL	(5.0)	2.5						
Benzo(a)anthracene													BRL	(5.0)	2.5						
Chrysene													BRL	(5.0)	2.5						
Benzo(b)fluoranthene													BRL	(5.0)	2.5						
Benzo(k)fluoranthene													BRL	(5.0)	2.5						
Benzo(a)pyrene													BRL	(5.0)	2.5						
Indeno(1,2,3-cd)pyrene													BRL	(5.0)	2.5						
Dibenzo(a,h)anthracene													BRL	(5.0)	2.5						
Benzo(g,h,i)perylene													BRL	(5.0)	2.5						
Volatile Chlorinated Hydrocarbons																					
Tetrachloroethylene	1	(0.5)	1.0	0.8	(0.5)	0.8	BRL	(0.5)	0.3	2	(0.5)	2.0	2.2	(0.5)	2.2	0.9	(0.5)	0.9	2	(0.5)	2.0

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 17

Exposure Point Concentrations
Drinking Water

Well Designation	131 MAIN St			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	9/29/2006							
Method(s)	USEPA 524.2							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics				0	0	NC	NC	
C9 to C12 Aliphatics				0	0	NC	NC	
C9 to C10 Aromatics				0	0	NC	NC	
Benzene	BRL	(0.5)	0.3	8	0	NC	NC	
Toluene	BRL	(0.5)	0.3	8	0	NC	NC	
Ethylbenzene	BRL	(0.5)	0.3	8	0	NC	NC	
Xylenes	BRL	(1.0)	0.5	8	0	NC	NC	
Naphthalene	BRL	(0.5)	0.3	8	0	NC	NC	
MTBE	1.4	(0.5)	1.4	8	8	3.5	5.0	June-05
Extractable Petroleum Hydrocarbo								
C9 to C18 Aliphatics				1	0	NC	NC	
C19 to C36 Aliphatics				1	0	NC	NC	
C11 to C22 Aromatics				1	0	NC	NC	
Naphthalene				1	0	NC	NC	
2-Methylnaphthalene				1	0	NC	NC	
Acenaphthylene				1	0	NC	NC	
Acenaphthene				1	0	NC	NC	
Fluorene				1	0	NC	NC	
Phenanthrene				1	0	NC	NC	
Anthracene				1	0	NC	NC	
Fluoranthene				1	0	NC	NC	
Pyrene				1	0	NC	NC	
Benzo(a)anthracene				1	0	NC	NC	
Chrysene				1	0	NC	NC	
Benzo(b)fluoranthene				1	0	NC	NC	
Benzo(k)fluoranthene				1	0	NC	NC	
Benzo(a)pyrene				1	0	NC	NC	
Indeno(1,2,3-cd)pyrene				1	0	NC	NC	
Dibenzo(a,h)anthracene				1	0	NC	NC	
Benzo(g,h,i)perylene				1	0	NC	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	1.4	(0.5)	1.4	8	7	1.3	2.2	October-05

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Table 17

Exposure Point Concentrations
Drinking Water

Well Designation	132 Main St.			132 Main St.			132 Main St.			132 Main St.			132 Main St.			132 Main St.		
Sampling Date	12/16/2004			1/7/2005			3/3/2005			6/8/2005			8/25/2005			3/29/2006		
Method(s)	USEPA 524.2			USEPA 524.2			USEPA 524.2			USEPA 524.2			USEPA 524.2			USEPA 524.2		
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC
Volatile Petroleum Hydrocarbons																		
C5 to C8 Aliphatics																		
C9 to C12 Aliphatics																		
C9 to C10 Aromatics																		
Benzene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
Toluene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
Ethylbenzene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
Xylenes	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5
Naphthalene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
MTBE	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3
Extractable Petroleum Hydrocarbons																		
C9 to C18 Aliphatics																		
C19 to C36 Aliphatics																		
C11 to C22 Aromatics																		
Naphthalene																		
2-Methylnaphthalene																		
Acenaphthylene																		
Acenaphthene																		
Fluorene																		
Phenanthrene																		
Anthracene																		
Fluoranthene																		
Pyrene																		
Benzo(a)anthracene																		
Chrysene																		
Benzo(b)fluoranthene																		
Benzo(k)fluoranthene																		
Benzo(a)pyrene																		
Indeno(1,2,3-cd)pyrene																		
Dibenzo(a,h)anthracene																		
Benzo(g,h,i)perylene																		
Volatile Chlorinated Hydrocarbons																		
Tetrachloroethylene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 17

Exposure Point Concentrations
Drinking Water

Well Designation	132 Main St.			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	9/29/2006							
Method(s)	USEPA 524.2							
Units	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics				0	0	NC	NC	
C9 to C12 Aliphatics				0	0	NC	NC	
C9 to C10 Aromatics				0	0	NC	NC	
Benzene	BRL	(0.5)	0.3	7	0	0.3	NC	
Toluene	BRL	(0.5)	0.3	7	0	0.3	NC	
Ethylbenzene	BRL	(0.5)	0.3	7	0	0.3	NC	
Xylenes	BRL	(1.0)	0.5	7	0	0.5	NC	
Naphthalene	BRL	(0.5)	0.3	7	0	0.3	NC	
MTBE	BRL	(0.5)	0.3	7	0	0.3	NC	
Extractable Petroleum Hydrocarbo								
C9 to C18 Aliphatics				0	0	NC	NC	
C19 to C36 Aliphatics				0	0	NC	NC	
C11 to C22 Aromatics				0	0	NC	NC	
Naphthalene				0	0	NC	NC	
2-Methylnaphthalene				0	0	NC	NC	
Acenaphthylene				0	0	NC	NC	
Acenaphthene				0	0	NC	NC	
Fluorene				0	0	NC	NC	
Phenanthrene				0	0	NC	NC	
Anthracene				0	0	NC	NC	
Fluoranthene				0	0	NC	NC	
Pyrene				0	0	NC	NC	
Benzo(a)anthracene				0	0	NC	NC	
Chrysene				0	0	NC	NC	
Benzo(b)fluoranthene				0	0	NC	NC	
Benzo(k)fluoranthene				0	0	NC	NC	
Benzo(a)pyrene				0	0	NC	NC	
Indeno(1,2,3-cd)pyrene				0	0	NC	NC	
Dibenzo(a,h)anthracene				0	0	NC	NC	
Benzo(g,h,i)perylene				0	0	NC	NC	
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	BRL	(0.5)	0.3	7	0	0.3	NC	

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 17

Exposure Point Concentrations
Drinking Water

Well Designation	133 Main St.			133 Main St.			133 Main St.			133 Main St.			133 Main St.			No. of Analyses	No. of Defects	Average	Maximum	Date of Maximum
Sampling Date	12/16/2004			6/8/2005			10/27/2005			3/29/2006			9/29/2006							
Method(s)	USEPA 524.2			USEPA 524.2			MA EPH 98-1, USEPA 524.2			USEPA 524.2			USEPA 524.2							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics																0	0	NC	NC	
C9 to C12 Aliphatics																0	0	NC	NC	
C9 to C10 Aromatics																0	0	NC	NC	
Benzene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	5	0	0.3	NC	
Toluene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	5	0	0.3	NC	
Ethylbenzene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	5	0	0.3	NC	
Xylenes	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	BRL	(1.0)	0.5	5	0	0.5	NC	
Naphthalene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	5	0	0.3	NC	
MTBE	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	5	0	0.3	NC	
Extractable Petroleum Hydrocarbons																				
C9 to C18 Aliphatics							BRL	(200.0)	100.0							1	0	100.0	NC	
C19 to C36 Aliphatics							BRL	(200.0)	100.0							1	0	100.0	NC	
C11 to C22 Aromatics							BRL	(200.0)	100.0							1	0	100.0	NC	
Naphthalene							BRL	(5.0)	2.5							1	0	2.5	NC	
2-Methylnaphthalene							BRL	(5.0)	2.5							1	0	2.5	NC	
Acenaphthylene							BRL	(5.0)	2.5							1	0	2.5	NC	
Acenaphthene							BRL	(5.0)	2.5							1	0	2.5	NC	
Fluorene							BRL	(5.0)	2.5							1	0	2.5	NC	
Phenanthrene							BRL	(5.0)	2.5							1	0	2.5	NC	
Anthracene							BRL	(5.0)	2.5							1	0	2.5	NC	
Fluoranthene							BRL	(5.0)	2.5							1	0	2.5	NC	
Pyrene							BRL	(5.0)	2.5							1	0	2.5	NC	
Benzo(a)anthracene							BRL	(5.0)	2.5							1	0	2.5	NC	
Chrysene							BRL	(5.0)	2.5							1	0	2.5	NC	
Benzo(b)fluoranthene							BRL	(5.0)	2.5							1	0	2.5	NC	
Benzo(k)fluoranthene							BRL	(5.0)	2.5							1	0	2.5	NC	
Benzo(a)pyrene							BRL	(5.0)	2.5							1	0	2.5	NC	
Indeno(1,2,3-cd)pyrene							BRL	(5.0)	2.5							1	0	2.5	NC	
Dibenzo(a,h)anthracene							BRL	(5.0)	2.5							1	0	2.5	NC	
Benzo(g,h,i)perylene							BRL	(5.0)	2.5							1	0	2.5	NC	
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	BRL	(0.5)	0.3	5	0	0.3	NC	

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 17

Exposure Point Concentrations
Drinking Water

Well Designation	134 Main St.			134 Main St.			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum
Sampling Date	10/28/2005			3/29/2006							
Method(s)	MA EPH 98-1, USEPA 524.2			USEPA 524.2							
Units	ug/L	MDL	EPC	ug/L	MDL	EPC					
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics							0	0	NC	NC	
C9 to C12 Aliphatics							0	0	NC	NC	
C9 to C10 Aromatics							0	0	NC	NC	
Benzene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	2	0	0.3	NC	
Toluene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	2	0	0.3	NC	
Ethylbenzene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	2	0	0.3	NC	
Xylenes	BRL	(1.0)	0.5	BRL	(1.0)	0.5	2	0	0.5	NC	
Naphthalene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	2	0	0.3	NC	
MTBE	BRL	(0.5)	0.3	BRL	(0.5)	0.3	2	0	0.3	NC	
Extractable Petroleum Hydrocarbo											
C9 to C18 Aliphatics	BRL	(200.0)	100.0				1	0	100.0	NC	
C19 to C36 Aliphatics	BRL	(200.0)	100.0				1	0	100.0	NC	
C11 to C22 Aromatics	BRL	(200.0)	100.0				1	0	100.0	NC	
Naphthalene	BRL	(5.0)	2.5				1	0	2.5	NC	
2-Methylnaphthalene	BRL	(5.0)	2.5				1	0	2.5	NC	
Acenaphthylene	BRL	(5.0)	2.5				1	0	2.5	NC	
Acenaphthene	BRL	(5.0)	2.5				1	0	2.5	NC	
Fluorene	BRL	(5.0)	2.5				1	0	2.5	NC	
Phenanthrene	BRL	(5.0)	2.5				1	0	2.5	NC	
Anthracene	BRL	(5.0)	2.5				1	0	2.5	NC	
Fluoranthene	BRL	(5.0)	2.5				1	0	2.5	NC	
Pyrene	BRL	(5.0)	2.5				1	0	2.5	NC	
Benzo(a)anthracene	BRL	(5.0)	2.5				1	0	2.5	NC	
Chrysene	BRL	(5.0)	2.5				1	0	2.5	NC	
Benzo(b)fluoranthene	BRL	(5.0)	2.5				1	0	2.5	NC	
Benzo(k)fluoranthene	BRL	(5.0)	2.5				1	0	2.5	NC	
Benzo(a)pyrene	BRL	(5.0)	2.5				1	0	2.5	NC	
Indeno(1,2,3-cd)pyrene	BRL	(5.0)	2.5				1	0	2.5	NC	
Dibenzo(a,h)anthracene	BRL	(5.0)	2.5				1	0	2.5	NC	
Benzo(g,h,i)perylene	BRL	(5.0)	2.5				1	0	2.5	NC	
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	BRL	(0.5)	0.3	BRL	(0.5)	0.3	2	0	0.3	NC	

Notes: Concentrations in micrograms per liter (ug/L). BRL = Below Detection Limit (Method Detection Limit (MDL) or Reporting Limit (RL)).
EPC = Exposure Point Concentration. NC = Not Calculated.

Table 18

Quantitative Analysis of Interior Air

Sample Designation	AS-1			AS-1			Sampling Statistics					MADEP Indoor Air Background (MADEP/ORS, 2003. Development of MCP Risk-Based Levels for Soil and Groundwater)	Stolwijk, 1990. Assessment of Population Exposure and Carcinogenic Risk Posed by Volatile Organic Compounds in Indoor Air.				Massachusetts Threshold Effects Limit (TEL) (24 hour average exposure limit) (MADEP/ORS, 1995)	Massachusetts Allowable Ambient Limit (AAL) (annual average concentration) (MADEP/ORS, 1995)
Sampling Location	Ambient Air (Outside Station Building)			Ambient Air (Outside Station Building)			No. of Analyses	No. of Detects	Average	Maximum	Date of Maximum Detect							
Sampling Date	10/27/05			1/2/06														
Analytical Procedure	MA APH			MA APH														
Compound Name	Result µg/m³	Reporting Limit µg/m³	EPC µg/m³	Result µg/m³	Reporting Limit µg/m³	EPC µg/m³												
												µg/m³	10 th % µg/m³	50 th % µg/m³	90 th % µg/m³	98 th % µg/m³	µg/m³	µg/m³
Air Petroleum Hydrocarbons (MADEP)																		
Benzene	4.30	(1.60)	NC	BRL	(1.60)	NC	2	1	NC	NC	Oct-05	21	2	10	20	30	1.74	0.12
Toluene	13.40	(1.68)	13.40	2.50	(1.88)	2.50	2	2	8.0	13.4	Oct-05	28.65	30	65	150	250	80	20
Ethylbenzene	BRL	(4.34)	2.17	BRL	(4.34)	2.17	2	0	2.2	2.17	Oct-05	9.62	4	10	20	--	300	300
Total Xylenes	5.60	(2.17)	NC	BRL	(2.17)	NC	2	1	NC	NC		72.41	13	25	50	--	11.8	11.8
Naphthalene	BRL	(12.56)	NC	BRL	(12.56)	NC	2	0	NC	NC		5	--	2	5	--	14.25	14.25
2-Methylnaphthalene	BRL	(18.58)	NC	BRL	(18.58)	NC	2	0	NC	NC		1.74	--	--	--	--		
Methyl-tert-butyl ether	46.20	(1.80)	46.20	6.10	(1.80)	6.10	2	2	26.2	46.2	Oct-05	NA	--	--	--	--	NA	NA
1,3-Butadiene	BRL	(2.21)	NC	BRL	(2.21)	NC	2	0	NC	NC		NA	--	--	--	--	1.2	0.003
C5 - C8 Aliphatics	245.00	(50.00)	245.00	BRL	(50.00)	25.00	2	1	135.0	245.0	Oct-05	85	--	--	--	--	--	--
C9 - C12 Aliphatics	BRL	(90.00)	45.00	BRL	(90.00)	45.00	2	0	45.0	45.0		90	--	--	--	--	--	--
C9 - C10 Aromatics	BRL	(50.00)	25.00	BRL	(50.00)	25.00	2	0	25.0	25.0		80	--	--	--	--	--	--

Table 18

Sample Designation	AS-2			AS-2			Sampling Statistics					MADEP Indoor Air Background (MADEP/ORS, 2003, Development of MCP Risk-Based Levels for Soil and Groundwater)	Stolwijk, 1990. Assessment of Population Exposure and Carcinogenic Risk Posed by Volatile Organic Compounds in Indoor Air.				Massachusetts Threshold Effects Limit (TEL) (24 hour average exposure limit) (MADEP/ORS, 1995)	Massachusetts Allowable Ambient Limit (AAL) (annual average concentration) (MADEP/ORS, 1995)
Sampling Location	First Floor Office			First Floor Office			No. of Analytes	No. of Objects	Average	Maximum	Date of Maximum Detect							
Sampling Date	10/27/05			1/2/06														
Analytical Procedure	MA APH			MA APH														
Compound Name	Result	Reporting Limit	EPC	Result	Reporting Limit	EPC							10 th %	50 th %	90 th %	98 th %		
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³						µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
Air/Petroleum Hydrocarbons (MADEP)																		
Benzene	20.50	(3.20)	NC	5.30	(1.60)	NC	2	2	NC	NC	Oct-05	21	2	10	20	30	1.74	0.12
Toluene	113.00	(3.76)	113.00	108.00	(1.88)	108.00	2	2	110.5	113.0	Oct-05	28.65	30	65	150	250	80	20
Ethylbenzene	10.60	(4.34)	10.60	14.00	(2.17)	14.00	2	2	12.3	14.0	Jan-06	9.62	4	10	20	--	300	300
Total Xylenes	41.10	(4.34)	NC	55.90	(2.17)	NC	2	2	NC	NC	Jan-06	72.41	13	25	50	--	11.8	11.8
Naphthalene	BRL	(25.12)	NC	BRL	(12.56)	NC	2	0	NC	NC		5	--	2	5	--	14.25	14.25
2-Methylnaphthalene	BRL	(37.16)	NC	BRL	(18.58)	NC	2	0	NC	NC		1.74	--	--	--	--		
Methyl-tert-butyl ether	307.00	(3.60)	307.00	65.70	(1.80)	65.70	2	2	188.4	307.0	Oct-05	NA	--	--	--	--	NA	NA
1,3-Butadiene	BRL	(4.42)	NC	BRL	(2.21)	NC	2	0	NC	NC		NA	--	--	--	--	1.2	0.003
C ₈ - C ₉ Aliphatics	1,690.00	(100.00)	1,690.00	479.00	(50.00)	479.00	2	2	1,084.5	1,690.0	Oct-05	85	--	--	--	--	--	--
C ₉ - C ₁₂ Aliphatics	BRL	(180.00)	90.00	242.00	(90.00)	242.00	2	1	166.0	242.0	Jan-06	90	--	--	--	--	--	--
C ₉ - C ₁₀ Aromatics	BRL	(100.00)	50.00	184.00	(50.00)	184.00	2	1	117.0	184.0	Jan-06	80	--	--	--	--	--	--

Table 18

Sample Designation	AS-3			AS-3			Sampling Statistics					MADEP Indoor Air Background (MADEPORS, 2003. Development of MCP Risk-Based Levels for Soil and Groundwater)	Slolwijk, 1990. Assessment of Population Exposure and Carcinogenic Risk Posed by Volatile Organic Compounds in Indoor Air.				Massachusetts Threshold Effects Limit (TEL) (24 hour average exposure limit) (MADEPORS, 1995)	Massachusetts Allowable Ambient Limit (AAL) (annual average concentration) (MADEPORS, 1995)
Sampling Location	Second Floor Living Area			Second Floor Living Area			No. of Analyses	No. of Districts	Average	Maximum	Date of Maximum Detect							
Sampling Date	10/27/05			1/2/05														
Analytical Procedure	MA APH			MA APH														
Compound Name	Result	Reporting Limit	EPC	Result	Reporting Limit	EPC												
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³						µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	
Air Petroleum Hydrocarbons (MADEP)																		
Benzene	6.50	(1.60)	NC	3.20	(1.60)	NC	2	2	NC	NC	Oct-05	21	2	10	20	30	1.74	0.12
Toluene	49.70	(1.88)	49.70	39.10	(1.88)	39.10	2	2	44.4	49.7	Oct-05	28.65	30	65	150	250	80	20
Ethylbenzene	4.80	(2.17)	4.80	5.20	(2.17)	5.20	2	2	5.0	5.2	Jan-06	9.62	4	10	20	--	300	300
Total Xylenes	19.30	(2.17)	NC	21.40	(2.17)	NC	2	2	NC	NC	Jan-06	72.41	13	25	50	--	11.8	11.8
Naphthalene	BRL	(12.56)	NC	BRL	(12.56)	NC	2	0	NC	NC		5	--	2	5	--	14.25	14.25
2-Methylnaphthalene	BRL	(18.58)	NC	BRL	(18.58)	NC	2	0	NC	NC		1.74	--	--	--	--		
Methyl-tert-butyl ether	93.80	(1.80)	93.80	44.00	(1.80)	44.00	2	2	68.9	93.8	Oct-05	NA	--	--	--	--	NA	NA
1,3-Butadiene	BRL	(2.21)	NC	BRL	(2.21)	NC	2	0	NC	NC		NA	--	--	--	--	1.2	0.003
C ₃ - C ₈ Aliphatics	444.00	(50.00)	444.00	239.00	(50.00)	239.00	2	2	341.5	444.0	Oct-05	85	--	--	--	--	--	--
C ₉ - C ₁₂ Aliphatics	BRL	(90.00)	45.00	97.10	(90.00)	97.10	2	1	71.1	97.1	Jan-06	90	--	--	--	--	--	--
C ₃ - C ₁₀ Aromatics	BRL	(50.00)	25.00	53.50	(50.00)	53.50	2	1	39.3	53.5	Jan-06	80	--	--	--	--	--	--

Table 18

Sample Designation	AS-4			Sampling Statistics					MADEP Indoor Air Background (MADEP/ORS, 2003. Development of MCP Risk-Based Levels for Soil and Groundwater)	Stolwijk, 1990. Assessment of Population Exposure and Carcinogenic Risk Posed by Volatile Organic Compounds in Indoor Air.				Massachusetts Threshold Effects Limit (TEL) (24 hour average exposure limit) (MADEP/ORS, 1995)	Massachusetts Allowable Ambient Limit (AAL) (annual average concentration) (MADEP/ORS, 1995)
Sampling Location	First Floor Reception			No. of Analytes	No. of Detects	Average	Maximum	Date of Maximum Detect							
Sampling Date	1/2/05														
Analytical Procedure	MA APH														
Compound Name	Result	Reporting Limit	EPC							10 th %	50 th %	90 th %	98 th %		
	µg/m ³	µg/m ³	µg/m ³						µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
Air Petroleum Hydrocarbons (MADEP)															
Benzene	4.00	(1.60)	NC	1	1	NC	NC		21	2	10	20	30	1.74	0.12
Toluene	48.90	(1.88)	48.90	1	1	48.9	48.9		28.85	30	65	150	250	80	20
Ethylbenzene	5.60	(2.17)	5.60	1	1	5.6	5.6		9.62	4	10	20	--	300	300
Total Xylenes	24.70	(2.17)	NC	1	1	NC	NC		72.41	13	25	50	--	11.8	11.8
Naphthalene	BRL	(12.56)	NC	1	0	NC	NC		5	--	2	5	--	14.25	14.25
2-Methylnaphthalene	BRL	(18.58)	NC	1	0	NC	NC		1.74	--	--	--	--		
Methyl-tert-butyl ether	42.60	(1.80)	42.60	1	1	42.6	42.6		NA	--	--	--	--	NA	NA
1,3-Butadiene	BRL	(2.21)	NC	1	0	NC	NC		NA	--	--	--	--	1.2	0.003
C ₅ - C ₉ Aliphatics	209.00	(50.00)	209.00	1	1	209.0	209.0		85	--	--	--	--	--	--
C ₉ - C ₁₂ Aliphatics	BRL	(90.00)	45.00	1	0	45.0	45.0		90	--	--	--	--	--	--
C ₉ - C ₁₉ Aromatics	55.60	(50.00)	55.60	1	1	55.6	55.6		80	--	--	--	--	--	--

Table 19

Compound	Soil Exposure Point Concentrations				Groundwater Exposure Point Concentrations					Surface Water
	Soil EPCs (0 - 3 ft) (mg/Kg)	Soil EPCs (0 - 6 ft) (mg/Kg)	Soil EPCs (0 - 15 ft) (mg/Kg)	Sediment EPCsed (mg/Kel)	DCW-1 EPCgw (ug/L)	DCW-2 EPCgw (ug/L)	ECS-1 EPCgw (ug/L)	ECS-4 EPCgw (ug/L)	131 Main St EPCgw (ug/L)	
Volatile Hydrocarbons										
Benzene	0.41	0.35	0.28	NC	78.13	3.12	67.80	352.00	0.25	2.50
Toluene	2.87	2.26	1.43	NC	818.33	3.12	12.10	127.00	0.25	2.50
Ethylbenzene	7.59	5.95	3.64	NC	1,174.67	3.12	99.43	127.00	0.25	2.50
Xylenes	56.29	43.92	26.51	NC	7,356.67	7.49	28.93	280.70	0.50	7.50
Naphthalene	16.63	13.02	8.15	NC	1,850.67	8.12	170.67	153.00	0.25	7.65
MTBE	0.95	1.09	0.70	NC	24,843.33	745.00	7.47	4,760.00	3.51	2.50
Volatile Petroleum Hydrocarbons										
C5 to C8 Aliphatics	138.65	121.41	70.78	NC	3,760.00	610.83	446.33	375.00	NC	37.50
C9 to C12 Aliphatics	338.95	296.61	174.37	NC	27,383.33	53.40	431.67	12,900.00	NC	66.43
C9 to C10 Aromatics	166.59	163.29	97.84	NC	29,116.67	30.82	600.67	15,100.00	NC	59.96
Polycyclic Aromatic Hydrocarbons										
Naphthalene	2.70	2.25	1.36	0.03	329.30	0.83	55.07	63.40	2.50	2.80
2-Methylnaphthalene	15.64	13.04	7.83	0.54	31.63	0.83	42.87	68.00	2.50	4.68
Acenaphthylene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Acenaphthene	0.47	0.40	0.26	0.05	1.65	0.83	2.67	3.05	2.50	2.80
Fluorene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Phenanthrene	3.59	3.00	1.81	1.78	1.65	0.83	2.67	3.05	2.50	5.16
Anthracene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Fluoranthene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Pyrene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Benzo(a)anthracene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Chrysene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Benzo(b)fluoranthene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Benzo(k)fluoranthene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Benzo(a)pyrene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Indeno(1,2,3-cd)pyrene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Dibenzo(a,h)anthracene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Benzo(g,h,i)perylene	NC	NC	NC	0.03	1.65	0.83	2.67	3.05	2.50	2.80
Extractable Petroleum Hydrocarbons										
C9 to C18 Aliphatics	4,181.44	3,485.37	2,097.82	619.29	1,888.00	66.67	166.67	1,700.00	100.00	2,714.29
C19 to C36 Aliphatics	1,542.96	1,286.63	777.57	670.71	775.00	66.67	100.00	600.00	100.00	1,757.14
C11 to C22 Aromatics	1,744.76	1,454.60	876.79	485.29	1,413.50	66.67	566.67	2,100.00	100.00	1,857.14
Volatile Chlorinated Hydrocarbons										
Tetrachloroethylene	NC	NC	NC	NC	NC	NC	NC	0.50	1.32	NC

Table 19

Estimated Exposure Point Concentrations
Dose-Response Information Summary

	Trench Vapor Inhalation Model				Shower Inhalation Model										Trench Model Emission Factors		Shower Model Exposure Factors			Outside Predictive Domain (Y/N)
	Trench Inhalation Exposure Point Concentrations				Shower Inhalation Exposure Point Concentrations					Constants					Trench Vapor Emission Factor (unitless)	Units Conversion L/m³	Exposure Factor Drinking Water Shower Inhalation (µg/m³)(µg/L)	Exposure Factor Drinking Water Dermal Absorption Non-Cancer	Exposure Factor Drinking Water Dermal Absorption Cancer	
Compound	DCW-1 Trench EPCalr,gw (µg/m³)	DCW-2 Trench EPCalr,gw (µg/m³)	ECS-1 Trench EPCalr,gw (µg/m³)	ECS-4 Trench EPCalr,gw (µg/m³)	DCW-1 Shower EPCalr,gw (µg/m³)	DCW-2 Shower EPCalr,gw (µg/m³)	ECS-1 Shower EPCalr,gw (µg/m³)	ECS-4 Shower EPCalr,gw (µg/m³)	131 Main St Shower EPCalr,gw (µg/m³)	X Henry's Law (conc/conc)	X Conv. Factor (l/m³)	Y DEP Dil/Deg. Factor (unitless)								
Volatile Hydrocarbons																				
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	1.10E-04	4.39E-02	9.53E-03	4.95E-04	3.51E-01	2.27E-01	1.00E+03	10	9.52E-07	1000	1.41E+02	1.75E-08	1.75E-08	N		
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	1.15E-05	4.39E-02	1.70E+03	1.79E-04	3.51E-01	2.72E-01	1.00E+03	10	8.73E-07	1000	1.41E+02	1.09E+00	1.09E+00	Y		
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	1.65E-05	4.39E-02	1.40E+04	1.79E-04	3.51E-01	3.22E-01	1.00E+03	10	8.18E-07	1000	1.41E+02	1.09E+00	1.09E+00	Y		
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	1.03E-06	1.05E+03	4.07E+03	3.95E-04	7.03E-01	2.71E-01	1.00E+03	10	8.62E-07	1000	1.41E+02	1.09E+00	1.09E+00	Y		
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	2.60E+05	1.14E+03	2.40E+04	2.15E-04	3.51E-01	1.80E-02	1.00E+03	10	7.96E-07	1000	1.41E+02	1.09E+00	NC	Y		
MTBE	2.13E-01	6.40E-01	6.42E-03	4.09E+00	3.49E-06	1.05E+05	1.05E+03	6.69E-05	4.94E+02	2.40E-02	1.00E+03	10	8.59E-07	1000	1.41E+02	1.09E+00	1.09E+00	Y		
Volatile Petroleum Hydrocarbons																				
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	5.29E-05	8.59E+04	6.27E+04	5.27E-04	NC	5.40E+01	1.00E+03	10	6.08E-07	1000	1.41E+02	NC	NC	N		
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	3.85E-06	7.51E+03	6.07E+04	1.81E+06	NC	6.50E+01	1.00E+03	10	6.08E-07	1000	1.41E+02	NC	NC	N		
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	4.08E+06	4.33E+03	8.44E+04	2.12E+06	NC	3.30E-01	1.00E+03	10	6.08E-07	1000	1.41E+02	3.16E-08	3.16E-08	N		
Polycyclic Aromatic Hydrocarbons																				
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	4.63E+04	1.17E+02	7.74E+03	8.51E-03	3.51E+02	1.80E-02	1.00E+03	10	7.96E-07	1000	1.41E+02	8.25E-09	NC	N		
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	4.45E+03	1.17E+02	6.03E+03	9.56E-03	3.51E-02	2.12E-02	1.00E+03	10	7.75E-07	1000	1.41E+02	4.18E-08	NC	N		
Acenaphthylene	1.27E+03	6.39E-04	2.05E-03	2.33E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	4.67E-03	1.00E+03	10	7.65E-07	1000	1.41E+02	1.05E-08	1.05E-08	N		
Acenaphthene	1.34E+03	6.74E-04	2.16E-03	2.47E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	7.53E-03	1.00E+03	10	8.09E-07	1000	1.41E+02	1.32E-08	NC	N		
Fluorene	1.36E+03	6.85E-04	2.20E-03	2.51E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E-02	3.94E-03	1.00E+03	10	8.22E-07	1000	1.41E+02	NC	NC	N		
Phenanthrene	1.31E+03	6.61E-04	2.12E-03	2.42E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	1.73E-03	1.00E+03	10	7.93E-07	1000	1.41E+02	NC	NC	N		
Anthracene	1.34E+03	6.77E-04	2.17E-03	2.48E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	2.28E-03	1.00E+03	10	8.12E-07	1000	1.41E+02	NC	NC	N		
Fluoranthene	1.18E+03	5.93E-04	1.90E-03	2.17E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	3.63E-04	1.00E+03	10	7.12E-07	1000	1.41E+02	1.09E+00	1.09E+00	Y		
Pyrene	1.28E+03	6.47E-04	2.08E-03	2.37E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	4.87E-04	1.00E+03	10	7.77E-07	1000	1.41E+02	NC	NC	N		
Benzo(a)anthracene	1.49E+03	7.49E-04	2.40E-03	2.74E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	4.91E-04	1.00E+03	10	8.99E-07	1000	1.41E+02	1.09E+00	1.09E+00	Y		
Chrysene	1.16E+03	5.85E-04	1.88E-03	2.14E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	2.14E-04	1.00E+03	10	7.01E-07	1000	1.41E+02	8.23E-09	8.23E-09	N		
Benzo(b)fluoranthene	1.08E+03	5.43E-04	1.74E-03	1.99E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	2.69E-05	1.00E+03	10	6.52E-07	1000	1.41E+02	7.73E-08	NC	N		
Benzo(k)fluoranthene	1.08E+03	5.43E-04	1.74E-03	1.99E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	2.39E-05	1.00E+03	10	6.52E-07	1000	1.41E+02	1.09E-07	NC	N		
Benzo(a)pyrene	1.49E+03	7.49E-04	2.40E-03	2.74E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	1.87E-05	1.00E+03	10	8.99E-07	1000	1.41E+02	7.65E-08	7.65E-08	N		
Indeno(1,2,3-cd)pyrene	1.09E+03	5.49E-04	1.76E-03	2.01E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	1.42E-05	1.00E+03	10	6.59E-07	1000	1.41E+02	5.30E-08	5.30E-08	N		
Dibenzo(a,h)anthracene	1.03E+03	5.18E-04	1.66E-03	1.90E-03	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	5.03E-06	1.00E+03	10	6.22E-07	1000	1.41E+02	2.22E-01	3.33E-01	Y		
Benzo(g,h,i)perylene	5.86E-03	2.96E-03	9.50E-03	1.08E-02	2.32E+02	1.17E+02	3.76E+02	4.29E+02	3.51E+02	1.35E-05	1.00E+03	10	3.56E-06	1000	1.41E+02	2.22E-01	3.33E-01	Y		
Extractable Petroleum Hydrocarbons																				
C9 to C16 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	2.65E+05	9.37E-03	2.34E+04	2.39E+05	1.41E+04	6.90E-01	1.00E+03	10	6.08E-07	1000	1.41E+02	1.17E-08	NC	N		
C19 to C36 Aliphatics	NC	NC	NC	NC	1.09E+05	9.37E-03	1.41E+04	8.43E+04	1.41E+04	NC	1.00E+03	10	NC	1000	1.41E+02	3.45E-09	NC	N		
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	1.99E+05	9.37E-03	9.37E+04	2.95E+05	1.41E+04	3.00E-02	1.00E+03	10	6.08E-07	1000	1.41E+02	1.72E-08	NC	N		
Volatile Chlorinated Hydrocarbons																				
Tetrachloroethylene	NC	NC	NC	4.23E-04	NC	NC	NC	7.03E-01	1.85E+02	7.24E-01	1.00E+03	10	8.45E-07	1000	1.41E+02	NC	NC	N		

Table 19

	Dose-Response Information												Relative Absorption Factors (RAFs, BWSCORS 95-141)													
Compound	Chronic Oral Reference Dose (RfD) (mg/kg/day)	Reference	Subchronic Oral Reference Dose (RfD ₀₁) (mg/kg/day)	Reference	Chronic Inhalation Reference Concentration (RfC) (mg/m ³)	Reference	Subchronic Inhalation Reference Concentration (RfC ₀₁) (mg/m ³)	Reference	Oral Cancer Slope Factor (CSF) (1/mg/kg/day)	Classification	Reference	Inhalation Unit Risk (UR) (1/μg/m ³)	Reference	Chronic Ingestion	Chronic Dermal	Subchronic Ingestion	Subchronic Dermal	Cancer Ingestion	Cancer Dermal	Subchronic Ingestion	Chronic Ingestion	Cancer Ingestion	Non-Cancer Ingestion	Cancer Ingestion	Reference	
Volatile Hydrocarbons																										
Benzene	4.00E-03	1	1.00E-02	1i	3.00E-02	1	9.00E-02	1k	5.50E-02	A	1	7.60E-06	1	1	0.08	1	0.08	1	0.08	1	1	1	1	NC	NC	#
Toluene	2.00E-01	1	2.00E+00	1i	4.00E-01	1	4.00E-01	40	NC	D	1	NC	0	1	0.12	1	0.12	NC	NC	1	1	0	NC	NC	#	
Ethylbenzene	1.00E-01	1	1.00E+00	2d	1.00E+00	1	1.00E+00	1j	NC	D	1	NC	0	1	0.2	1	0.2	NC	NC	1	1	0	NC	NC	#	
Xylenes	2.00E-01	1	2.00E-01	1d	1.00E-01	1	3.00E-01	1k	NC	D	1	NC	0	1	0.12	1	0.12	NC	NC	1	1	0	NC	NC	#	
Naphthalene	2.00E-02	1	2.00E-01	1i	3.00E-03	1	3.00E-03	40	NC	0	0	NC	0	0.36	0.1	0.36	0.1	NC	NC	1	1	0	NC	NC	#	
MTBE	1.00E-01	5	1.00E+00	5	3.00E+00	1	3.00E+00	40	NC	C	0	NC	0	1	0.1	1	0.1	NC	NC	1	1	0	NC	NC	#	
Volatile Petroleum Hydrocarbons																										
C5 to C8 Aliphatics	4.00E-02	31a	4.00E-01	31a	2.00E-01	31a	2.00E-01	40	NC	0	0	NC	0	1	1	1	1	NC	NC	1	1	0	NC	NC	#	
C9 to C12 Aliphatics	1.00E-01	31a	1.00E+00	31a	2.00E-01	31a	2.00E-01	40	NC	0	0	NC	0	1	0.5	1	0.5	NC	NC	1	1	0	NC	NC	#	
C9 to C10 Aromatics	3.00E-02	31a	3.00E-01	31a	5.00E-02	31a	5.00E-02	40	NC	0	0	NC	0	1	0.5	1	0.5	NC	NC	0.91	0.91	0	NC	NC	#	
Polycyclic Aromatic Hydrocarbons																										
Naphthalene	2.00E-02	1	2.00E-01	1i	3.00E-03	1	3.00E-03	40	NC	0	0	NC	0	0.36	0.1	0.36	0.1	NC	NC	1	1	0	NC	NC	#	
2-Methylnaphthalene	4.00E-03	1	4.00E-02	1i	5.00E-02	44	5.00E-01	44	NC	0	0	NC	0	0.36	0.1	0.36	0.1	NC	NC	1	1	0	NC	NC	#	
Acenaphthylene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	NC	D	1	NC	0	0.36	0.1	0.36	0.1	NC	NC	0.91	0.91	NC	NC	NC	#	
Acenaphthene	6.00E-02	1	6.00E-01	2	5.00E-02	44	5.00E-01	44	NC	0	0	NC	0	0.36	0.1	0.36	0.1	NC	NC	1	1	NC	NC	NC	#	
Fluorene	4.00E-02	1	4.00E-01	2	5.00E-02	44	5.00E-01	44	NC	0	0	NC	0	0.36	0.1	0.36	0.1	NC	NC	1	1	0	NC	NC	#	
Phenanthrene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	NC	D	1	NC	0	0.36	0.1	0.36	0.1	NC	NC	0.91	0.91	0	NC	NC	#	
Anthracene	3.00E-01	1	3.00E+00	2	5.00E-02	44	5.00E-01	44	NC	D	1	NC	0	0.36	0.1	0.36	0.1	NC	NC	1	1	NC	NC	NC	#	
Fluoranthene	4.00E-02	1	4.00E-01	2	5.00E-02	44	5.00E-01	44	NC	0	1	NC	0	0.36	0.1	0.36	0.1	NC	NC	1	1	0	NC	NC	#	
Pyrene	3.00E-02	1	3.00E-01	2	5.00E-02	44	5.00E-01	44	NC	D	1	NC	0	0.36	0.1	0.36	0.1	NC	NC	1	1	0	NC	NC	#	
Benzo(a)anthracene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	7.30E-01	B2	1a	2.09E-04	35	0.28	0.02	0.28	0.02	0.28	0.02	0.91	0.91	1	NC	NC	#	
Chrysene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	7.30E-02	B2	1a	2.09E-05	35	0.28	0.02	0.28	0.02	0.28	0.02	0.91	0.91	1	NC	NC	#	
Benzo(b)fluoranthene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	7.30E-01	B2	1a	2.09E-04	35	0.28	0.02	0.28	0.02	0.28	0.02	0.91	0.91	1	NC	NC	#	
Benzo(k)fluoranthene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	7.30E-02	B2	1a	2.09E-05	35	0.28	0.02	0.28	0.02	0.28	0.02	0.91	0.91	1	NC	NC	#	
Benzo(a)pyrene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	7.30E+00	B2	1	2.09E-03	35	0.28	0.02	0.28	0.02	0.28	0.02	0.91	0.91	1	NC	NC	#	
Indeno(1,2,3-cd)pyrene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	7.30E-01	B2	1a	2.09E-04	35	0.28	0.02	0.28	0.02	0.28	0.02	0.91	0.91	1	NC	NC	#	
Dibenzo(a,h)anthracene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	7.30E+00	B2	1a	2.09E-03	35	0.28	0.02	0.28	0.02	0.28	0.02	0.91	0.91	1	NC	NC	#	
Benzo(g,h,i)perylene	3.00E-02	44	3.00E-01	44	5.00E-02	44	5.00E-01	44	NC	0	0	NC	0	0.36	0.1	0.36	0.1	NC	NC	0.91	0.91	NC	NC	NC	#	
Extractable Petroleum Hydrocarbons																										
C9 to C18 Aliphatics	1.00E-01	31a	1.00E+00	31a	2.00E-01	31a	2.00E-01	40	NC	0	0	NC	0	1	0.5	1	0.5	NC	NC	1	1	0	NC	NC	#	
C19 to C36 Aliphatics	2.00E+00	31a	6.00E+00	31a	NC	31a	NC	0	NC	0	0	NC	0	1	0.1	1	0.1	NC	NC	1	1	0	NC	NC	#	
C11 to C22 Aromatics	3.00E-02	31a	3.00E-01	31a	5.00E-02	31a	5.00E-02	40	NC	0	0	NC	0	0.36	0.1	0.36	0.1	NC	NC	0.91	0.91	0	NC	NC	#	
Volatile Chlorinated Hydrocarbons																										
Tetrachloroethylene	1.00E-02	1	1.00E-01	2	4.60E+00	3	4.60E+00	40	5.10E-02	C-B2	2c	5.50E-05	3	1	0.1	1	0.1	1	0.1	1	1	1	1	NC	NC	#

Table 19

Compound	Selected Physical Parameters									
	Molecular Weight	Solubility	Reference	Henry's Law Constant (atm-m ³ /mol)	Reference	Vapor Pressure (Torr @ 20 - 30 C)	Log K _{ow}	K _{oc}	Reference	Plant Uptake Factor K _{sp} (kg _{sp} /kg _{pm})
Volatile Hydrocarbons										
Benzene	78	1780000	43	5.55E-03	43	9.50E+01	2.13E+00	5.17E+01	5a	1.55E-02
Toluene	92	525000	43	6.64E-03	43	2.80E+01	2.73E+00	1.40E+02	5a	3.27E-02
Ethylbenzene	106	169000	43	7.88E-03	43	1.00E+01	3.15E+00	2.04E+02	5a	5.21E-02
Xylenes	106	106000	43	6.63E-03	43	6.00E+00	3.20E+00	2.49E+02	5a	5.63E-02
Naphthalene	128	31000	43	4.40E-04	43	8.20E-02	3.30E+00	1.19E+03	5a	4.95E-02
MTBE	88	51000000	43	5.87E-04	43	2.45E+02	1.05E+00	6.92E+00	calc	2.57E-03
Volatile Petroleum Hydrocarbons										
C5 to C8 Aliphatics	93	11000	44	1.30E+00	44	7.50E+01	NC	2.27E+03	0	NC
C9 to C12 Aliphatics	149	70	44	1.56E+00	44	6.61E-01	0.00E+00	1.50E+05	0	NC
C9 to C10 Aromatics	120	51000	44	7.92E-03	44	2.20E+00	0.00E+00	1.78E+03	0	NC
Polycyclic Aromatic Hydrocarbons										
Naphthalene	128	31000	43	4.40E-04	43	8.20E-02	3.30E+00	1.19E+03	5a	4.95E-02
2-Methylnaphthalene	142	24500	43	5.18E-04	43	6.80E-02	3.86E+00	2.50E+03	13	9.79E-02
Acenaphthylene	154	16100	43	1.14E-04	43	2.90E-02	4.07E+00	2.50E+03	13	1.16E-01
Acenaphthene	154	3900	43	1.84E-04	43	0.00E+00	3.92E+00	4.90E+03	6a	9.20E-02
Fluorene	166	1650	43	9.62E-05	43	0.00E+00	4.21E+00	7.71E+03	6a	1.23E-01
Phenanthrene	178	1150	43	4.23E-05	43	9.60E-04	4.46E+00	1.40E+04	13	1.55E-01
Anthracene	178	43.4	43	5.56E-05	43	1.70E-05	4.55E+00	2.35E+04	6a	1.79E-01
Fluoranthene	202	250	43	8.66E-06	43	5.00E-06	4.95E+00	4.91E+04	6a	2.43E-01
Pyrene	202	135	43	1.19E-05	43	2.50E-06	5.11E+00	6.80E+04	6a	3.11E-01
Benzo(a)anthracene	228	9.4	43	1.20E-05	43	5.00E-09	5.66E+00	3.58E+05	6a	5.19E-01
Chrysene	228	2	43	5.23E-06	43	6.30E-09	5.66E+00	3.98E+05	6b	5.19E-01
Benzo(b)fluoranthene	252	1.5	43	6.57E-07	43	0.00E+00	6.12E+00	1.23E+06	6b	7.75E-01
Benzo(k)fluoranthene	252	0.8	43	5.84E-07	43	9.59E-11	6.06E+00	1.23E+06	6b	7.06E-01
Benzo(e)pyrene	252	1.62	43	4.57E-07	43	5.00E-09	6.10E+00	9.69E+05	6a	7.51E-01
Indeno(1,2,3-cd)pyrene	276	0.19	43	3.48E-07	43	1.00E-09	6.58E+00	3.47E+06	6b	1.16E+00
Dibenzo(a,h)anthracene	278	2.49	43	1.23E-07	43	1.00E-10	6.84E+00	1.79E+06	6a	1.68E+00
Benzo(g,h,i)perylene	276	0.26	43	3.31E-07	43	1.00E-10	6.51E+00	1.60E+06	13	1.04E+00
Extractable Petroleum Hydrocarbons										
C9 to C18 Aliphatics	170	10	44	1.66E+00	44	1.06E-01	0.00E+00	6.80E+05	0	NC
C19 to C36 Aliphatics	0	0	0	NC	0	0.00E+00	0.00E+00	0.00E+00	0	NC
C11 to C22 Aromatics	150	5800	44	7.20E-04	44	2.40E-02	0.00E+00	5.01E+03	0	NC
Volatile Chlorinated Hydrocarbons										
Tetrachloroethylene	166	206000	43	1.77E-02	43	1.90E+01	3.40E+00	2.65E+02	5a	3.54E-02

Notes:

- 1 MADEP, 1992. Developed by MADEP for the Risk Assessment Shortform, Residential Scenario (BWSC/ORS 92-142).
- 2 Massachusetts Allowable Ambient Limits. MADEP, 2002.
- 3 USEPA: Integrated Risk Information System (IRIS) (August, 2004)
- 4 USEPA Health Effects Assessment Summary Tables (HEAST), FY 1997 Update.
- 5 Value withdrawn from HEAST.
- 6 Value developed by MADEP ORS Air/Water Toxics Staff.
- 7 Chronic oral RfD used as a subchronic oral RfD equivalent (Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001).
- 8 Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach. Final Draft. June, 2001.
- 9 The values for naphthalene from IRIS used for 2-methylnaphthalene (Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001).
- 10 Chronic RfD set equal to acenaphthene based on structure (Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001).
- 11 Subchronic RfD set equal to acenaphthene based on structure (Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001).
- 12 Conversion of the oral Reference Dose to a Reference Concentration using the equation: $RfD \times BW / \text{Ventilation Rate}$ (Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001), where $BW = 70 \text{ kg}$, $VR = 20 \text{ m}^3/\text{day}$.
- 13 Chronic RfD set equal to fluoranthene based on structure (Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001).
- 14 Subchronic RfD set equal to fluoranthene based on structure (Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001).
- 15 Cancer Slope Factor or Unit Risk for benzo(a)pyrene (from IRIS) applied to the seven PAH compounds designated as category A, B1, B2, or C carcinogens (Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001).
- 16 Conversion of the oral Cancer Slope Factor to the inhalation Unit Risk using the equation: $\text{Slope Factor} \times \text{Ventilation Rate} \times \text{Constant} / \text{Body Weight}$. Derivation of MCP Risk-Based Levels for Soil and Groundwater. ORS, 2001)
- 17 The chronic oral RfD for naphthalene (HEAST) used for the chronic RfD equivalent for all PAH compounds for which chronic oral RfDs are unavailable.
- 18 Chemical Health Effects Assessment Methodology and the Method to Derive Allowable Ambient Limits (CHEM/AAL). ORS Report 90-1.
- 19 Development of MCP Risk-Based Levels for Soil and Groundwater. MADEP Office of Research and Standards.
- 20 Chronic RfC for CrVI used in accordance with Note #19, above.
- 21 Cited in USEPA Region III Risk Based Concentration Tables (April, 2002) from HEAST FY97. Subchronic set equal to chronic.
- 22 The chronic oral RfD for 1,2-Dichlorobenzene has been used as the chronic oral RfD equivalent for 1,3-Dichlorobenzene and 1,4-Dichlorobenzene (ORS, 2002).
- 23 USEPA Superfund Health Risk Technical Support (9-2-92)
- 24 USEPA Soil Screening Guidance: Technical Background Document, EPA/540/R95/128, May, 1996.
- 25 Derivation of MCP Risk-Based Levels for Soil and Groundwater, May, 2001.
- 26 WSC/ORS -95-141 Appendix B, Table B-11.
- 27 Oral RfD from IRIS (August, 2003) for Endosulfan (CASRN 115-29-7) used for Endosulfan I, Endosulfan II, and Endosulfan Sulfate.
- 28 MADEP 2004. Revisions to Dose-Response Values used in Human Health Risk Assessment. August 18, 2004.
- 29 MADEP 2003. Updated Petroleum Hydrocarbon Fraction Toxicity Values for the VPH/EPH/APH Methodology. Section 2.2.3. Value assigned to chemicals that fall into the C9 - C32 aromatic fraction and do not have assigned IRIS values.

Table 19a

Estimation of Mass Transfer Coefficient
Trench Exposure

				Site-Specific Variables							
Width of Contaminated Area (m):		4.7		Wind Speed 10 m above Water Surface (m/s):		3.25		Wind Speed Factor (U*, m/s):		0.0928	
Air Mixing Zone Height (m):		2.0		Excavation Area (A, m²):		22.4		Excavation Effective Diameter (2(A/m)¹/², m):		5.34	
				Depth of Water in Excavation (m):		0.5		Fetch/Depth Ratio (unitless):		10.68	
				Temperature of Interest (°K):		298					
References:	1	1	2	3	1	4	5	6	7	8	
	Diffusivity in Air Da	Diffusivity in Water Dw	Schmidt Number in Liquid Phase	Schmidt Number in Air Phase	Henry's Law Constant at reference temperature (298K)	Dimensionless H at T of Interest	Liquid Phase Mass Transfer Coefficient	Gas Phase Mass Transfer Coefficient	Overall Mass Transfer Coefficient	Emission Factor	
			ScL = mL/(D _L *D _L)	ScG = mG/(D _G *D _G)		K _{eq} =H/RT	k _L	k _G	K	EF	
Compound Name	(cm²/s)	(cm²/s)	(dimensionless)	(dimensionless)	(atm·m³/mol)	(dimensionless)	m/s	m/s	m/s	(dimensionless)	
Volatile Hydrocarbons											
Benzene	8.80E-02	9.80E-06	911.2	1.7	5.55E-03	2.27E-01	3.06E-06	7.01E-03	3.05E-06	9.52E-07	
Toluene	8.70E-02	8.60E-06	1,038.4	1.7	5.55E-03	2.27E-01	2.80E-06	6.95E-03	2.80E-06	8.73E-07	
Ethylbenzene	7.50E-02	7.80E-06	1,144.9	2.0	5.55E-03	2.27E-01	2.63E-06	6.29E-03	2.62E-06	8.18E-07	
Total Xylenes	7.69E-02	8.44E-06	1,058.1	2.0	5.55E-03	2.27E-01	2.77E-06	6.40E-03	2.76E-06	8.62E-07	
Naphthalene	5.90E-02	7.50E-06	1,190.7	2.6	5.55E-03	2.27E-01	2.56E-06	5.36E-03	2.55E-06	7.96E-07	
MTBE	2.37E-03	8.63E-06	1,034.6	63.6	5.55E-03	2.27E-01	2.81E-06	6.22E-04	2.75E-06	8.59E-07	
Volatile Petroleum Hydrocarbons											
C5 - C8 Aliphatics	8.00E-02	5.00E-06	1,786.0	1.9	5.55E-03	2.27E-01	1.95E-06	6.57E-03	1.95E-06	6.08E-07	
C9 - C12 Aliphatics	7.00E-02	5.00E-06	1,786.0	2.2	5.55E-03	2.27E-01	1.95E-06	6.01E-03	1.95E-06	6.08E-07	
C9 - C10 Aromatics	7.00E-02	5.00E-06	1,786.0	2.2	5.55E-03	2.27E-01	1.95E-06	6.01E-03	1.95E-06	6.08E-07	
Polycyclic Aromatic Hydrocarbons											
Naphthalene	5.90E-02	7.50E-06	1,190.7	2.6	5.55E-03	2.27E-01	2.56E-06	5.36E-03	2.55E-06	7.96E-07	
2-Methylnaphthalene	6.29E-02	7.20E-06	1,240.3	2.4	5.55E-03	2.27E-01	2.49E-06	5.59E-03	2.48E-06	7.75E-07	
Acenaphthylene	4.39E-02	7.07E-06	1,263.1	3.4	5.55E-03	2.27E-01	2.46E-06	4.40E-03	2.45E-06	7.65E-07	
Acenaphthene	4.21E-02	7.69E-06	1,161.2	3.6	5.55E-03	2.27E-01	2.60E-06	4.28E-03	2.59E-06	8.09E-07	
Fluorene	3.63E-02	7.88E-06	1,133.2	4.2	5.55E-03	2.27E-01	2.64E-06	3.87E-03	2.64E-06	8.22E-07	
Phenanthrene	3.33E-02	7.47E-06	1,195.4	4.5	5.55E-03	2.27E-01	2.55E-06	3.65E-03	2.54E-06	7.93E-07	
Anthracene	3.24E-02	7.74E-06	1,153.7	4.7	5.55E-03	2.27E-01	2.61E-06	3.59E-03	2.60E-06	8.12E-07	
Fluoranthene	3.02E-02	6.35E-06	1,406.3	5.0	5.55E-03	2.27E-01	2.29E-06	3.42E-03	2.28E-06	7.12E-07	
Pyrene	2.72E-02	7.24E-06	1,233.4	5.5	5.55E-03	2.27E-01	2.50E-06	3.19E-03	2.49E-06	7.77E-07	
Benzo(a)anthracene	5.10E-02	9.00E-06	992.2	3.0	5.55E-03	2.27E-01	2.89E-06	4.86E-03	2.88E-06	8.99E-07	
Chrysene	2.48E-02	6.21E-06	1,438.0	6.1	5.55E-03	2.27E-01	2.26E-06	3.00E-03	2.25E-06	7.01E-07	
Benzo(b)fluoranthrene	2.26E-02	5.56E-06	1,606.1	6.7	5.55E-03	2.27E-01	2.10E-06	2.82E-03	2.09E-06	6.52E-07	
Benzo(k)fluoranthrene	2.26E-02	5.56E-06	1,606.1	6.7	5.55E-03	2.27E-01	2.10E-06	2.82E-03	2.09E-06	6.52E-07	
Benzo(a)pyrene	4.30E-02	9.00E-06	992.2	3.5	5.55E-03	2.27E-01	2.89E-06	4.34E-03	2.88E-06	8.98E-07	
Indeno(1,2,3-cd)-pyrene	1.90E-02	5.66E-06	1,577.7	7.9	5.55E-03	2.27E-01	2.12E-06	2.51E-03	2.11E-06	6.59E-07	
Dibenzo(a,h)anthracene	2.02E-02	5.18E-06	1,723.9	7.5	5.55E-03	2.27E-01	2.00E-06	2.61E-03	1.99E-06	6.22E-07	
Benzo(g,h,i)perylene	5.65E-05	4.90E-02	0.2	2,669.6	5.55E-03	2.27E-01	8.89E-04	5.09E-05	1.14E-05	3.56E-06	
Extractable Petroleum Hydrocarbons											
C9 - C18 Aliphatics	7.00E-02	5.00E-06	1,786.0	2.2	5.55E-03	2.27E-01	1.95E-06	6.01E-03	1.95E-06	6.08E-07	
C19 - C36 Aliphatics	NC	NC	NC	NC	5.55E-03	2.27E-01	NC	NC	NC	NC	
C10 - C22 Aromatics	6.00E-02	5.00E-06	1,786.0	2.5	5.55E-03	2.27E-01	1.95E-06	5.42E-03	1.95E-06	6.08E-07	
Chlorinated Hydrocarbons											
Tetrachloroethylene	7.20E-02	8.20E-06	1,089.0	2.1	5.55E-03	2.27E-01	2.71E-06	6.12E-03	2.71E-06	8.45E-07	

References:

- 1 Diffusivities taken from MADEP/ORS, 2001: Development of MCP Risk-Based Levels for Soil and Groundwater. "MCP GW2 alpha, Chemconst.
- 2 Schmidt Number on Liquid Side: $Sc_L = \mu_L / (\rho_L D_W)$, where μ_L = viscosity of water = 8.93×10^{-3} gm/cm-sec, ρ_L = density of water = 1.0 gm/cm³, and D_W = diffusivity of compound in water, in m/s.
- 3 Schmidt Number on Gas Side: $Sc_G = \mu_G / (\rho_G D_A)$, where μ_G = viscosity of air = 1.81×10^{-4} gm/cm-sec, ρ_G = density of air = 1.20×10^{-3} gm/cm³, and D_A = diffusivity of compound in air, in m/s.
- 4 Dimensionless Henry's Law Constant calculated at temperature of interest: $K_{eq} = H/RT_{int}$. Universal Gas Constant $R = 8.21 \times 10^{-5}$ atm m³/gmol-K.
- 5 USEPA, 1994. Air Emissions Models for Waste and Wastewater. EPA-453/R-94-080A. Chapter 5. Individual mass transfer coefficients for volatilization of organic solutes from quiescent surface impoundments are estimated following Table 5-1.

For all cases except $U_{10} > 3.25$ m/s and F/D (the ratio between the fetch and the effective diameter of the excavation $((4 \times \text{Area})/\pi)^{0.5}$), the empirical relationships of Springer (1984) are used (Springer, C., P. D. Lunney, and K. T. Valsaraj. Emission of Hazardous Chemicals from Surface and Near Surface Impoundments to Air. U.S. Environmental Protection Agency, Solid and Hazardous Waste Research Division. Cincinnati, OH. Project Number 808161-02. December 1984.)

$$\text{For } 0 < U_{10} < 3.25 \text{ and all } F/D \text{ ratios: } k_L = 2.78 \times 10^{-6} (D_{W(\text{compound})}/D_{\text{ether}})^{2/3}.$$

$$\text{For } U_{10} > 3.25 \text{ and } 14 < F/D < 51.2, k_L = 2.605 \times 10^{-8} + 1.277 \times 10^{-7} U_{10}^2 (D_{W(\text{compound})}/D_{\text{ether}})^{2/3}.$$

$$\text{For } U_{10} > 3.25 \text{ m/s and } F/D > 51.2, k_L = 2.611 \times 10^{-7} U_{10}^2 (D_{W(\text{compound})}/D_{\text{ether}})^{2/3}.$$

Following USEPA, 1994, for $U_{10} > 3.25$ m/s and $F/D < 14$, the empirical relationship of Mackay and Yeun (1983) is used (Mackay, D., and A. Yeun. Mass Transfer Coefficient Correlations for Volatilization of Organic Solutes from Water. Environmental Science and Technology. 17:211-217. 1983.)

$$\text{For } U^* > 0.3 \text{ m/s: } k_L = 1.0 \times 10^{-6} + 34.1 \times 10^{-4} U^* Sc_L^{-1/2} \quad (\text{Frictional velocity } U^* = 0.01 U_{10} (6.1 + 0.63 U_{10})^{0.5})$$

$$\text{For } U^* < 0.3 \text{ m/s: } k_L = 1.0 \times 10^{-6} + 144 \times 10^{-4} U^{2.2} Sc_L^{-0.5}$$

- 6 k_G is determined by the empirical correlation of Mackay and Matasugu (in Hwang, S. T. Toxic Emissions from Land Disposal Facilities. Environmental Progress. 1:46-52. February 1982.) as follows: $k_G = 4.82 \times 10^{-3} U_{10}^{-0.78} Sc_G^{-0.67} d_e^{-0.11}$, where d_e = excavation (impoundment) effective diameter (m) = $(4 \times \text{Area})/\pi)^{0.5}$.
- 7 Overall mass transferr coefficient K is determined from the liquid and gas phase mass transfer coefficients as follows: $1/K = 1/k_L + 1/(K_{eq} k_G)$
- 8 Emission Factor accumulates chemical and site-specific parameters as follows: $EF = KA/(W \mu_{air} \delta_{air})$, where K = overall mass transfer coefficient, A = area of excavation, W = width of contaminated area, μ_{air} = wind velocity in excavation, and δ_{air} = mixing zone height (Texas Natural Resource Conservation Commission, March 6, 1997. Clarifications and Amendments for Implementation of RG-36).

Table 19b

Ingestion of Home-Grown Produce
Estimate of Exposure Multipliers

Produce	Proportion of Homegrown Produce Consumed ¹				Homegrown Intake ²			ARSENIC					CADMIUM				
	Amount Eaten (E) (lbs/wk)	Amount Bought (lbs/wk)	Difference (D) (lbs/wk)	Proportion Homegrown (D/E)				Plant Uptake Factor (Ksp) (mg/Kg) _{plant} / (mg/Kg) _{soil}	Residential Receptor Intake (g/day) ⁶				Plant Uptake Factor (Ksp) (mg/Kg) _{plant} / (mg/Kg) _{soil}	Residential Receptor Intake (g/day)			
					1 < 2 yrs ³	1 < 8 yrs ⁴	0 < 30 yrs ⁵		1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)		1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)
					(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)
	Body Weight (Kg)								10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3
Duration of Exposure Period (years)								1	7	30	30		1	7	30	30	
Averaging Period (years)								1	7	30	75		1	7	30	75	
Conversion Factor (Kg/g)								1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03	
White Potato	2.94	2.77	0.17	0.0578	0.139	0.175	0.215	6.00E-04	7.94E-09	6.25E-09	3.05E-09	1.22E-09	3.00E-02	3.97E-07	3.13E-07	1.52E-07	6.10E-08
Lettuce	1.27	1.22	0.05	0.0394	0.004	0.012	0.025	4.00E-02	1.52E-08	2.86E-08	2.36E-08	9.46E-09	4.30E-01	1.64E-07	3.07E-07	2.54E-07	1.02E-07
Spinach	0.08	0.07	0.01	0.125	0.006	0.006	0.013	4.00E-02	2.29E-08	1.43E-08	1.23E-08	4.92E-09	4.30E-01	2.46E-07	1.54E-07	1.32E-07	5.29E-08
Cabbage	0.54	0.48	0.06	0.1111	0.006	0.012	0.022	4.00E-02	2.29E-08	2.86E-08	2.08E-08	8.32E-09	4.30E-01	2.46E-07	3.07E-07	2.24E-07	8.95E-08
Broccoli	0.23	0.22	0.01	0.0435	0.005	0.005	0.01	4.00E-02	1.90E-08	1.19E-08	9.46E-09	3.78E-09	4.30E-01	2.05E-07	1.28E-07	1.02E-07	4.07E-08
Cauliflower	0.09	0.08	0.01	0.1111	0.003	0.003	0.004	4.00E-02	1.14E-08	7.14E-09	3.78E-09	1.51E-09	4.30E-01	1.23E-07	7.68E-08	4.07E-08	1.63E-08
Peppers	0.26	0.22	0.04	0.1538	0.001	0.002	0.006	2.00E-03	1.90E-10	2.38E-10	2.84E-10	1.13E-10	5.00E-02	4.76E-09	5.95E-09	7.09E-09	2.84E-09
Beans (wax)	0.28	0.16	0.12	0.4286	0.031	0.035	0.055	2.00E-04	5.90E-10	4.17E-10	2.60E-10	1.04E-10	1.00E-02	2.95E-08	2.08E-08	1.30E-08	5.20E-09
Peas	0.04	0.02	0.02	0.5	0.06	0.069	0.106	2.00E-04	1.14E-09	8.21E-10	5.01E-10	2.00E-10	1.00E-02	5.71E-08	4.11E-08	2.51E-08	1.00E-08
Beets	0.06	0.01	0.05	0.8333	0.031	0.046	0.066	2.00E-02	5.90E-08	5.48E-08	3.12E-08	1.25E-08	2.20E-01	6.50E-07	6.02E-07	3.43E-07	1.37E-07
Carrots	0.46	0.41	0.05	0.1087	0.043	0.04	0.049	2.00E-02	8.19E-08	4.76E-08	2.32E-08	9.27E-09	2.20E-01	9.01E-07	5.24E-07	2.55E-07	1.02E-07
Onions	0.6	0.55	0.05	0.0833	0.005	0.015	0.023	2.00E-02	9.52E-09	1.79E-08	1.09E-08	4.35E-09	2.20E-01	1.05E-07	1.96E-07	1.20E-07	4.78E-08
Corn	0.56	0.4	0.16	0.2857	0.297	0.426	0.474	1.00E-04	2.83E-09	2.54E-09	1.12E-09	4.48E-10	3.00E-02	8.49E-07	7.61E-07	3.36E-07	1.34E-07
Cucumbers	0.5	0.38	0.12	0.24	0.009	0.014	0.027	2.00E-03	1.71E-09	1.67E-09	1.28E-09	5.11E-10	5.00E-02	4.29E-08	4.17E-08	3.19E-08	1.28E-08
Pumpkin, Squash	0.21	0.1	0.11	0.5238	0.031	0.044	0.091	2.00E-03	5.90E-09	5.24E-09	4.30E-09	1.72E-09	5.00E-02	1.48E-07	1.31E-07	1.08E-07	4.30E-08
Strawberries	0.11	0.09	0.02	0.1818	0.022	0.025	0.03	2.00E-03	4.19E-09	2.98E-09	1.42E-09	5.67E-10	5.00E-02	1.05E-07	7.44E-08	3.55E-08	1.42E-08
Tomatoes	1.14	0.66	0.48	0.4211	0.146	0.208	0.336	2.00E-03	2.78E-08	2.48E-08	1.59E-08	6.35E-09	5.00E-02	6.95E-07	6.19E-07	3.97E-07	1.59E-07
Cantaloupe	0.59	0.54	0.05	0.0847	0.005	0.014	0.021	2.00E-03	9.52E-10	1.67E-09	9.93E-10	3.97E-10	5.00E-02	2.38E-08	4.17E-08	2.48E-08	9.93E-09
Other Berries	0.06	0.03	0.03	0.5	0.004	0.005	0.005	2.00E-03	7.62E-10	5.95E-10	2.36E-10	9.46E-11	5.00E-02	1.90E-08	1.49E-08	5.91E-09	2.36E-09
Hazard Index Multiplier:									2.96E-07	2.58E-07	1.65E-07	6.58E-08		5.01E-06	4.36E-06	2.61E-06	1.04E-06

Table 19b

Produce	CHROMIUM					LEAD					MERCURY				
	Plant Uptake Factor (Ksp) (mg/Kg) _{plant} / (mg/Kg) _{soil}	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp) (mg/Kg) _{plant} / (mg/Kg) _{soil}	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp) (mg/Kg) _{plant} / (mg/Kg) _{soil}	Residential Receptor Intake (g/day)			
		1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)		1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)		1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)
		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)
Body Weight (Kg)		10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3
Duration of Exposure Period (years)		1	7	30	30		1	7	30	30		1	7	30	30
Averaging Period (years)		1	7	30	75		1	7	30	75		1	7	30	75
Conversion Factor (Kg/g)		1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03
White Potato	1.10E-01	1.46E-06	1.15E-06	5.59E-07	2.24E-07	8.00E-04	1.06E-08	8.33E-09	4.07E-09	1.63E-09	3.30E-03	4.37E-08	3.44E-08	1.68E-08	6.71E-09
Lettuce	7.50E-03	2.86E-09	5.36E-09	4.43E-09	1.77E-09	8.00E-03	3.05E-09	5.71E-09	4.73E-09	1.89E-09	7.00E-03	2.67E-09	5.00E-09	4.14E-09	1.65E-09
Spinach	7.50E-03	4.29E-09	2.68E-09	2.30E-09	9.22E-10	8.00E-03	4.57E-09	2.86E-09	2.46E-09	9.83E-10	7.00E-03	4.00E-09	2.50E-09	2.15E-09	8.61E-10
Cabbage	7.50E-03	4.29E-09	5.36E-09	3.90E-09	1.56E-09	8.00E-03	4.57E-09	5.71E-09	4.16E-09	1.66E-09	7.00E-03	4.00E-09	5.00E-09	3.64E-09	1.46E-09
Broccoli	7.50E-03	3.57E-09	2.23E-09	1.77E-09	7.09E-10	8.00E-03	3.81E-09	2.38E-09	1.89E-09	7.57E-10	7.00E-03	3.33E-09	2.08E-09	1.65E-09	6.62E-10
Cauliflower	7.50E-03	2.14E-09	1.34E-09	7.09E-10	2.84E-10	8.00E-03	2.29E-09	1.43E-09	7.57E-10	3.03E-10	7.00E-03	2.00E-09	1.25E-09	6.62E-10	2.65E-10
Peppers	1.00E-02	9.52E-10	1.19E-09	1.42E-09	5.67E-10	2.00E-03	1.90E-10	2.38E-10	2.84E-10	1.13E-10	3.30E-03	3.14E-10	3.93E-10	4.68E-10	1.87E-10
Beans (wax)	8.10E-01	2.39E-06	1.68E-06	1.05E-06	4.21E-07	1.00E-03	2.95E-09	2.08E-09	1.30E-09	5.20E-10	1.00E-03	2.95E-09	2.08E-09	1.30E-09	5.20E-10
Peas	8.10E-01	4.63E-06	3.33E-06	2.03E-06	8.12E-07	1.00E-03	5.71E-09	4.11E-09	2.51E-09	1.00E-09	1.00E-03	5.71E-09	4.11E-09	2.51E-09	1.00E-09
Beets	1.25E-02	3.69E-08	3.42E-08	1.95E-08	7.80E-09	3.00E-03	8.86E-09	8.21E-09	4.68E-09	1.87E-09	1.70E-02	5.02E-08	4.65E-08	2.65E-08	1.06E-08
Carrots	1.25E-02	5.12E-08	2.98E-08	1.45E-08	5.79E-09	3.00E-03	1.23E-08	7.14E-09	3.48E-09	1.39E-09	1.70E-02	6.96E-08	4.05E-08	1.97E-08	7.88E-09
Onions	1.25E-02	5.95E-09	1.12E-08	6.80E-09	2.72E-09	3.00E-03	1.43E-09	2.68E-09	1.63E-09	6.52E-10	1.70E-02	8.10E-09	1.52E-08	9.24E-09	3.70E-09
Corn	1.25E-02	3.54E-07	3.17E-07	1.40E-07	5.60E-08	1.00E-02	2.83E-07	2.54E-07	1.12E-07	4.48E-08	3.30E-03	9.33E-08	8.37E-08	3.70E-08	1.48E-08
Cucumbers	1.25E-02	1.07E-08	1.04E-08	7.98E-09	3.19E-09	2.00E-03	1.71E-09	1.67E-09	1.28E-09	5.11E-10	3.30E-03	2.83E-09	2.75E-09	2.11E-09	8.43E-10
Pumpkin, Squash	1.25E-02	3.69E-08	3.27E-08	2.69E-08	1.08E-08	2.00E-03	5.90E-09	5.24E-09	4.30E-09	1.72E-09	3.30E-03	9.74E-09	8.64E-09	7.10E-09	2.84E-09
Strawberries	1.25E-02	2.62E-08	1.86E-08	8.87E-09	3.56E-09	2.00E-03	4.19E-09	2.98E-09	1.42E-09	5.67E-10	3.30E-03	6.91E-09	4.91E-09	2.34E-09	9.36E-10
Tomatoes	1.25E-02	1.74E-07	1.55E-07	9.93E-08	3.97E-08	2.00E-03	2.78E-08	2.48E-08	1.59E-08	6.35E-09	3.30E-03	4.59E-08	4.09E-08	2.62E-08	1.05E-08
Cantaloupe	1.25E-02	5.95E-09	1.04E-08	6.21E-09	2.48E-09	2.00E-03	9.52E-10	1.67E-09	9.93E-10	3.97E-10	3.30E-03	1.57E-09	2.75E-09	1.64E-09	6.55E-10
Other Berries	1.25E-02	4.76E-09	3.72E-09	1.48E-09	5.91E-10	2.00E-03	7.62E-10	5.95E-10	2.36E-10	9.46E-11	3.30E-03	1.26E-09	9.82E-10	3.90E-10	1.56E-10
Hazard Index Multiplier:		9.20E-06	6.80E-06	3.99E-06	1.60E-06		3.84E-07	3.41E-07	1.68E-07	6.72E-08		3.58E-07	3.04E-07	1.66E-07	6.62E-08

Table 19b

Produce	NICKEL					SELENIUM					SILVER							
	Plant Uptake Factor (Ksp)	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp)	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp)	Residential Receptor Intake (g/day)						
		(mg/Kg) _{plant} (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)		0 < 30 yrs (Cancer)	(mg/Kg) _{plant} (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs		0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)	(mg/Kg) _{plant} (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)
			(g/day)	(g/day)	(g/day)		(g/day)		(g/day)	(g/day)		(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)
			(g/day)	(g/day)	(g/day)		(g/day)		(g/day)	(g/day)		(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)
Body Weight (Kg)		10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3			
Duration of Exposure Period (years)		1	7	30	30		1	7	30	30		1	7	30	30			
Averaging Period (years)		1	7	30	75		1	7	30	75		1	7	30	75			
Conversion Factor (Kg/g)		1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03			
White Potato	1.25E-01	1.65E-06	1.30E-06	6.35E-07	2.54E-07	2.00E-02	2.65E-07	2.08E-07	1.02E-07	4.07E-08	8.00E-01	1.05E-05	8.33E-06	4.07E-06	1.63E-06			
Lettuce	9.00E-02	3.43E-08	6.43E-08	5.32E-08	2.13E-08	7.00E-02	2.67E-08	5.00E-08	4.14E-08	1.65E-08	8.00E-01	3.05E-07	5.71E-07	4.73E-07	1.89E-07			
Spinach	9.00E-02	5.14E-08	3.21E-08	2.77E-08	1.11E-08	7.00E-02	4.00E-08	2.50E-08	2.15E-08	8.61E-09	8.00E-01	4.57E-07	2.86E-07	2.46E-07	9.83E-08			
Cabbage	9.00E-02	5.14E-08	6.43E-08	4.68E-08	1.87E-08	7.00E-02	4.00E-08	5.00E-08	3.64E-08	1.46E-08	8.00E-01	4.57E-07	5.71E-07	4.16E-07	1.66E-07			
Broccoli	9.00E-02	4.29E-08	2.68E-08	2.13E-08	8.51E-09	7.00E-02	3.33E-08	2.08E-08	1.65E-08	6.62E-09	8.00E-01	3.81E-07	2.38E-07	1.89E-07	7.57E-08			
Cauliflower	9.00E-02	2.57E-08	1.61E-08	8.51E-09	3.40E-09	7.00E-02	2.00E-08	1.25E-08	6.62E-09	2.65E-09	8.00E-01	2.29E-07	1.43E-07	7.57E-08	3.03E-08			
Peppers	4.00E-02	3.81E-09	4.76E-09	5.67E-09	2.27E-09	4.00E-02	3.81E-09	4.76E-09	5.67E-09	2.27E-09	8.00E-01	7.62E-08	9.52E-08	1.13E-07	4.54E-08			
Beans (wax)	1.30E-01	3.84E-07	2.71E-07	1.69E-07	6.76E-08	2.00E-02	5.90E-08	4.17E-08	2.60E-08	1.04E-08	8.00E-01	2.36E-06	1.67E-06	1.04E-06	4.16E-07			
Peas	1.30E-01	7.43E-07	5.34E-07	3.26E-07	1.30E-07	2.00E-02	1.14E-07	8.21E-08	5.01E-08	2.00E-08	8.00E-01	4.57E-06	3.29E-06	2.00E-06	8.02E-07			
Beets	5.20E-01	1.54E-06	1.42E-06	8.11E-07	3.25E-07	4.00E-02	1.18E-07	1.10E-07	6.24E-08	2.50E-08	8.00E-01	2.36E-06	2.19E-06	1.25E-06	4.99E-07			
Carrots	5.20E-01	2.13E-06	1.24E-06	6.02E-07	2.41E-07	4.00E-02	1.64E-07	9.52E-08	4.63E-08	1.85E-08	8.00E-01	3.28E-06	1.90E-06	9.27E-07	3.71E-07			
Onions	5.20E-01	2.48E-07	4.64E-07	2.83E-07	1.13E-07	4.00E-02	1.90E-08	3.57E-08	2.17E-08	8.70E-09	8.00E-01	3.81E-07	7.14E-07	4.35E-07	1.74E-07			
Corn	1.30E-01	3.68E-06	3.30E-06	1.46E-06	5.83E-07	3.00E-02	8.49E-07	7.61E-07	3.36E-07	1.34E-07	8.00E-01	2.26E-05	2.03E-05	8.96E-06	3.59E-06			
Cucumbers	4.00E-02	3.43E-08	3.33E-08	2.55E-08	1.02E-08	4.00E-02	3.43E-08	3.33E-08	2.55E-08	1.02E-08	8.00E-01	6.86E-07	6.67E-07	5.11E-07	2.04E-07			
Pumpkin, Squash	4.00E-02	1.18E-07	1.05E-07	8.61E-08	3.44E-08	4.00E-02	1.18E-07	1.05E-07	8.61E-08	3.44E-08	8.00E-01	2.36E-06	2.10E-06	1.72E-06	6.88E-07			
Strawberries	4.00E-02	8.38E-08	5.95E-08	2.84E-08	1.13E-08	4.00E-02	8.38E-08	5.95E-08	2.84E-08	1.13E-08	8.00E-01	1.68E-06	1.19E-06	5.67E-07	2.27E-07			
Tomatoes	4.00E-02	5.56E-07	4.95E-07	3.18E-07	1.27E-07	4.00E-02	5.56E-07	4.95E-07	3.18E-07	1.27E-07	8.00E-01	1.11E-05	9.90E-06	6.35E-06	2.54E-06			
Cantaloupe	4.00E-02	1.90E-08	3.33E-08	1.99E-08	7.94E-09	4.00E-02	1.90E-08	3.33E-08	1.99E-08	7.94E-09	8.00E-01	3.81E-07	6.67E-07	3.97E-07	1.59E-07			
Other Berries	4.00E-02	1.52E-08	1.19E-08	4.73E-09	1.89E-09	4.00E-02	1.52E-08	1.19E-08	4.73E-09	1.89E-09	8.00E-01	3.05E-07	2.38E-07	9.46E-08	3.78E-08			
Hazard Index Multiplier:		1.14E-05	9.48E-06	4.93E-06	1.97E-06		2.58E-06	2.23E-06	1.25E-06	5.02E-07		6.46E-05	5.50E-05	2.98E-05	1.19E-05			

Table 19b

Ingestion of Home-Grown Produce
Estimate of Exposure Multipliers

Produce	THALLIUM					ZINC					PAHs							
	Plant Uptake Factor (Ksp)	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp)	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp)	Residential Receptor Intake (g/day)						
		(mg/Kg) _{plant} / (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)		0 < 30 yrs (Cancer)	(mg/Kg) _{plant} / (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs		0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)	(mg/Kg) _{plant} / (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)
			(g/day)	(g/day)	(g/day)		(g/day)		(g/day)	(g/day)		(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)
			(g/day)	(g/day)	(g/day)		(g/day)		(g/day)	(g/day)		(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)
Body Weight (Kg)		10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3			
Duration of Exposure Period (years)		1	7	30	30		1	7	30	30		1	7	30	30			
Averaging Period (years)		1	7	30	75		1	7	30	75		1	7	30	75			
Conversion Factor (Kg/g)		1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03			
White Potato	4.00E-04	5.30E-09	4.17E-09	2.03E-09	8.13E-10	2.00E-02	2.65E-07	2.08E-07	1.02E-07	4.07E-08	4.20E-01	5.66E-06	4.38E-06	2.13E-06	8.54E-07			
Lettuce	4.00E-04	1.52E-10	2.86E-10	2.36E-10	9.46E-11	8.00E-01	3.05E-07	5.71E-07	4.73E-07	1.89E-07	2.90E-01	1.10E-07	2.07E-07	1.71E-07	6.86E-08			
Spinach	4.00E-04	2.29E-10	1.43E-10	1.23E-10	4.92E-11	8.00E-01	4.57E-07	2.86E-07	2.46E-07	9.83E-08	2.90E-01	1.66E-07	1.04E-07	8.91E-08	3.57E-08			
Cabbage	4.00E-04	2.29E-10	2.86E-10	2.08E-10	8.32E-11	8.00E-01	4.57E-07	5.71E-07	4.16E-07	1.66E-07	2.90E-01	1.66E-07	2.07E-07	1.51E-07	6.03E-08			
Broccoli	4.00E-04	1.90E-10	1.19E-10	9.46E-11	3.78E-11	8.00E-01	3.81E-07	2.38E-07	1.89E-07	7.57E-08	2.90E-01	1.38E-07	8.63E-08	6.86E-08	2.74E-08			
Cauliflower	4.00E-04	1.14E-10	7.14E-11	3.78E-11	1.51E-11	8.00E-01	2.29E-07	1.43E-07	7.57E-08	3.03E-08	2.90E-01	8.29E-08	5.18E-08	2.74E-08	1.10E-08			
Peppers	4.00E-04	3.81E-11	4.76E-11	5.67E-11	2.27E-11	4.00E-02	3.81E-09	4.76E-09	5.67E-09	2.27E-09	4.20E-01	4.00E-08	5.00E-08	5.96E-08	2.38E-08			
Beans (wax)	4.00E-04	1.18E-09	8.33E-10	5.20E-10	2.08E-10	4.00E-02	1.18E-07	8.33E-08	5.20E-08	2.08E-08	4.20E-01	1.24E-06	8.75E-07	5.46E-07	2.18E-07			
Peas	4.00E-04	2.29E-09	1.64E-09	1.00E-09	4.01E-10	4.00E-02	2.29E-07	1.64E-07	1.00E-07	4.01E-08	4.20E-01	2.40E-06	1.73E-06	1.05E-06	4.21E-07			
Beets	4.00E-04	1.18E-09	1.10E-09	6.24E-10	2.50E-10	5.00E-02	1.48E-07	1.37E-07	7.80E-08	3.12E-08	6.10E-01	1.80E-06	1.67E-06	9.52E-07	3.81E-07			
Carrots	4.00E-04	1.64E-09	9.52E-10	4.63E-10	1.85E-10	5.00E-02	2.05E-07	1.19E-07	5.79E-08	2.32E-08	6.10E-01	2.50E-06	1.45E-06	7.07E-07	2.83E-07			
Onions	4.00E-04	1.90E-10	3.57E-10	2.17E-10	8.70E-11	5.00E-02	2.38E-08	4.46E-08	2.72E-08	1.09E-08	6.10E-01	2.90E-07	5.45E-07	3.32E-07	1.33E-07			
Corn	4.00E-04	1.13E-08	1.01E-08	4.48E-09	1.79E-09	4.00E-02	1.13E-06	1.01E-06	4.48E-07	1.78E-07	4.20E-01	1.19E-05	1.07E-05	4.71E-06	1.88E-06			
Cucumbers	4.00E-04	3.43E-10	3.33E-10	2.55E-10	1.02E-10	4.00E-02	3.43E-08	3.33E-08	2.55E-08	1.02E-08	4.20E-01	3.60E-07	3.50E-07	2.68E-07	1.07E-07			
Pumpkin, Squash	4.00E-04	1.18E-09	1.05E-09	8.61E-10	3.44E-10	4.00E-02	1.18E-07	1.05E-07	8.61E-08	3.44E-08	4.20E-01	1.24E-06	1.10E-06	9.04E-07	3.61E-07			
Strawberries	4.00E-04	8.38E-10	5.95E-10	2.84E-10	1.13E-10	4.00E-02	8.38E-08	5.95E-08	2.84E-08	1.13E-08	4.20E-01	8.80E-07	6.25E-07	2.98E-07	1.19E-07			
Tomatoes	4.00E-04	5.56E-09	4.95E-09	3.18E-09	1.27E-09	4.00E-02	5.56E-07	4.95E-07	3.18E-07	1.27E-07	4.20E-01	5.84E-06	5.20E-06	3.34E-06	1.33E-06			
Cantaloupe	4.00E-04	1.90E-10	3.33E-10	1.99E-10	7.94E-11	4.00E-02	1.90E-08	3.33E-08	1.99E-08	7.94E-09	4.20E-01	2.00E-07	3.50E-07	2.09E-07	8.34E-08			
Other Berries	4.00E-04	1.52E-10	1.19E-10	4.73E-11	1.89E-11	4.00E-02	1.52E-08	1.19E-08	4.73E-09	1.89E-09	4.20E-01	1.60E-07	1.25E-07	4.96E-08	1.99E-08			
Hazard Index Multiplier:		3.23E-08	2.75E-08	1.49E-08	5.97E-09		4.78E-06	4.32E-06	2.75E-06	1.10E-06		3.51E-05	2.97E-05	1.61E-05	6.42E-06			

Table 19b

Ingestion of Home-Grown Produce
Estimate of Exposure Multipliers

Produce	PCBs					ALDRIN/DIELDRIN					DDT/DDE/DDD							
	Plant Uptake Factor (Ksp)	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp) ²	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp) ²	Residential Receptor Intake (g/day)						
		(mg/Kg) _{plant} ¹ (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)		0 < 30 yrs (Cancer)	(mg/Kg) _{plant} ¹ (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs		0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)	(mg/Kg) _{plant} ¹ (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)
		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)	(g/day)	(g/day)	(g/day)
		Body Weight (Kg)	10.5	16.8	42.3		42.3	10.5	16.8	42.3		42.3	10.5	16.8	42.3	42.3		
Duration of Exposure Period (years)	1	7	30	30	1	7	30	30	1	7	30	30						
Averaging Period (years)	1	7	30	75	1	7	30	75	1	7	30	75						
Conversion Factor (Kg/g)	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03		
White Potato	2.00E-02	2.65E-07	2.08E-07	1.02E-07	4.07E-08	1.30E-01	1.72E-06	1.35E-06	2.07E-13	2.64E-07	7.00E-02	9.27E-07	7.29E-07	1.34E-12	1.42E-07			
Lettuce	3.80E-01	1.45E-07	2.71E-07	2.25E-07	8.98E-08	2.00E-01	7.62E-08	1.43E-07	1.18E-07	4.73E-08	1.10E-01	4.19E-08	7.86E-08	6.50E-08	2.60E-08			
Spinach	3.80E-01	2.17E-07	1.36E-07	1.17E-07	4.67E-08	2.00E-01	1.14E-07	7.14E-08	6.15E-08	2.46E-08	1.10E-01	6.29E-08	3.93E-08	3.38E-08	1.35E-08			
Cabbage	3.80E-01	2.17E-07	2.71E-07	1.98E-07	7.91E-08	2.00E-01	1.14E-07	1.43E-07	1.04E-07	4.16E-08	1.10E-01	6.29E-08	7.86E-08	5.72E-08	2.29E-08			
Broccoli	3.80E-01	1.81E-07	1.13E-07	8.98E-08	3.59E-08	2.00E-01	9.52E-08	5.95E-08	4.73E-08	1.89E-08	1.10E-01	5.24E-08	3.27E-08	2.60E-08	1.04E-08			
Cauliflower	3.80E-01	1.09E-07	6.79E-08	3.59E-08	1.44E-08	2.00E-01	5.71E-08	3.57E-08	1.89E-08	7.57E-09	1.10E-01	3.14E-08	1.96E-08	1.04E-08	4.16E-09			
Peppers	2.00E-02	1.90E-09	2.38E-09	2.84E-09	1.13E-09	2.20E-01	2.10E-08	2.62E-08	3.12E-08	1.25E-08	1.10E-01	1.05E-08	1.31E-08	1.58E-08	6.24E-09			
Beans (wax)	2.00E-03	5.90E-09	4.17E-09	2.60E-09	1.04E-09	8.10E-01	2.39E-06	1.69E-06	1.05E-06	4.21E-07	4.00E-02	1.18E-07	8.33E-08	5.20E-08	2.08E-08			
Peas	2.00E-03	1.14E-08	8.21E-09	5.01E-09	2.00E-09	8.10E-01	4.63E-06	3.33E-06	2.03E-06	8.12E-07	4.00E-02	2.29E-07	1.64E-07	1.00E-07	4.01E-08			
Beets	3.60E-01	1.06E-06	9.86E-07	5.62E-07	2.25E-07	4.30E-01	1.27E-05	1.18E-06	6.71E-07	2.68E-07	1.10E-01	3.25E-07	3.01E-07	1.72E-07	6.87E-08			
Carrots	3.60E-01	1.47E-06	8.57E-07	4.17E-07	1.67E-07	4.30E-01	1.76E-05	1.02E-06	4.98E-07	1.99E-07	1.10E-01	4.50E-07	2.62E-07	1.27E-07	5.10E-08			
Onions	3.60E-01	1.71E-07	3.21E-07	1.96E-07	7.83E-08	4.30E-01	2.05E-07	3.84E-07	2.34E-07	9.35E-08	1.10E-01	5.24E-08	9.82E-08	5.98E-08	2.39E-08			
Corn	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-02	5.66E-07	5.07E-07	2.24E-07	8.96E-08	5.10E-01	1.44E-05	1.29E-05	5.71E-06	2.29E-06			
Cucumbers	2.00E-02	1.71E-08	1.67E-08	1.28E-08	5.11E-09	2.20E-01	1.89E-07	1.83E-07	1.40E-07	5.62E-08	1.10E-01	9.43E-08	9.17E-08	7.02E-08	2.81E-08			
Pumpkin, Squash	2.00E-02	5.90E-08	5.24E-08	4.30E-08	1.72E-08	2.20E-01	6.50E-07	5.76E-07	4.73E-07	1.89E-07	1.10E-01	3.25E-07	2.88E-07	2.37E-07	9.47E-08			
Strawberries	2.00E-02	4.19E-08	2.98E-08	1.42E-08	5.67E-09	2.20E-01	4.61E-07	3.27E-07	1.58E-07	6.24E-08	1.10E-01	2.30E-07	1.64E-07	7.80E-08	3.12E-08			
Tomatoes	2.00E-02	2.78E-07	2.48E-07	1.59E-07	6.35E-08	2.20E-01	3.06E-06	2.72E-06	1.75E-06	6.99E-07	1.10E-01	1.53E-06	1.36E-06	8.74E-07	3.50E-07			
Cantaloupe	2.00E-02	9.52E-09	1.67E-08	8.93E-09	3.97E-09	2.20E-01	1.05E-07	1.83E-07	1.09E-07	4.37E-08	1.10E-01	5.24E-08	9.17E-08	5.46E-08	2.18E-08			
Other Berries	2.00E-02	7.62E-09	5.95E-09	2.36E-09	9.46E-10	2.20E-01	8.38E-08	6.55E-08	2.60E-08	1.04E-08	1.10E-01	4.19E-08	3.27E-08	1.30E-08	5.20E-09			
Hazard Index Multiplier:		4.27E-06	3.62E-06	2.19E-06	8.77E-07		1.76E-05	1.40E-05	7.74E-06	3.36E-06		1.91E-05	1.69E-05	7.76E-06	3.25E-06			

Table 19b

Produce	HEPTACHLOR					HEXACHLOROBENZENE					TOXAPHENE							
	Plant Uptake Factor (Ksp) ²	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp) ²	Residential Receptor Intake (g/day)				Plant Uptake Factor (Ksp) ²	Residential Receptor Intake (g/day)						
		(mg/Kg) _{plant} (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)		0 < 30 yrs (Cancer)	(mg/Kg) _{plant} (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs		0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)	(mg/Kg) _{plant} (mg/Kg) _{soil}	1 < 2 yrs	1 < 8 yrs	0 < 30 yrs (Non-Cancer)	0 < 30 yrs (Cancer)
		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)	(g/day)	(g/day)	(g/day)
		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)		(g/day)	(g/day)	(g/day)	(g/day)	(g/day)	(g/day)	(g/day)
Body Weight (Kg)		10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3		10.5	16.8	42.3	42.3			
Duration of Exposure Period (years)		1	7	30	30		1	7	30	30		1	7	30	30			
Averaging Period (years)		1	7	30	75		1	7	30	75		1	7	30	75			
Conversion Factor (Kg/g)		1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03		1.00E-03	1.00E-03	1.00E-03	1.00E-03			
White Potato	3.00E-01	3.97E-06	3.13E-06	1.52E-06	6.10E-07	7.50E-01	9.93E-06	7.81E-06	3.81E-06	1.52E-06	2.70E-01	3.57E-06	2.81E-06	1.37E-06	5.49E-07			
Lettuce	2.00E-02	7.62E-09	1.43E-08	1.18E-08	4.73E-09	5.60E-01	2.13E-07	4.00E-07	3.31E-07	1.32E-07	7.00E-02	2.67E-08	5.00E-08	4.14E-08	1.65E-08			
Spinach	2.00E-02	1.14E-08	7.14E-09	6.15E-09	2.46E-09	5.60E-01	3.20E-07	2.00E-07	1.72E-07	6.88E-08	7.00E-02	4.00E-08	2.50E-08	2.15E-08	8.61E-09			
Cabbage	2.00E-02	1.14E-08	1.43E-08	1.04E-08	4.16E-09	5.60E-01	3.20E-07	4.00E-07	2.91E-07	1.17E-07	7.00E-02	4.00E-08	5.00E-08	3.64E-08	1.46E-08			
Broccoli	2.00E-02	9.52E-09	5.95E-09	4.73E-09	1.89E-09	5.60E-01	2.67E-07	1.67E-07	1.32E-07	5.30E-08	7.00E-02	3.33E-08	2.08E-08	1.65E-08	6.62E-09			
Cauliflower	2.00E-02	5.71E-09	3.57E-09	1.89E-09	7.57E-10	5.60E-01	1.60E-07	1.00E-07	5.30E-08	2.12E-08	7.00E-02	2.00E-08	1.25E-08	6.62E-09	2.65E-09			
Peppers	2.10E-01	2.00E-08	2.50E-08	2.98E-08	1.19E-08	7.80E-01	7.43E-08	9.29E-08	1.11E-07	4.43E-08	7.00E-02	6.67E-09	8.33E-09	9.93E-09	3.97E-09			
Beans (wax)	4.00E-02	1.18E-07	8.33E-08	5.20E-08	2.08E-08	7.80E-01	2.30E-06	1.63E-06	1.01E-06	4.06E-07	7.00E-02	2.07E-07	1.46E-07	9.10E-08	3.64E-08			
Peas	4.00E-02	2.29E-07	1.64E-07	1.00E-07	4.01E-08	7.80E-01	4.46E-06	3.20E-06	1.95E-06	7.82E-07	7.00E-02	4.00E-07	2.88E-07	1.75E-07	7.02E-08			
Beets	2.71E+00	8.00E-06	7.42E-06	4.23E-06	1.69E-06	1.11E+00	3.28E-06	3.04E-06	1.73E-06	6.93E-07	1.73E+00	5.11E-06	4.74E-06	2.70E-06	1.08E-06			
Carrots	2.71E+00	1.11E-05	6.45E-06	3.14E-06	1.26E-06	1.11E+00	4.55E-06	2.64E-06	1.29E-06	5.14E-07	1.73E+00	7.08E-06	4.12E-06	2.00E-06	8.02E-07			
Onions	2.71E+00	1.29E-06	2.42E-06	1.47E-06	5.89E-07	1.11E+00	5.29E-07	9.91E-07	6.04E-07	2.41E-07	1.73E+00	8.24E-07	1.54E-06	9.41E-07	3.76E-07			
Corn	1.40E-01	3.96E-06	3.56E-06	1.57E-06	6.28E-07	7.80E-01	2.21E-05	1.98E-05	8.74E-06	3.50E-06	7.00E-02	1.98E-06	1.78E-06	7.84E-07	3.14E-07			
Cucumbers	2.10E-01	1.80E-07	1.75E-07	1.34E-07	5.36E-08	7.80E-01	6.69E-07	6.50E-07	4.98E-07	1.89E-07	7.00E-02	6.00E-08	5.83E-08	4.47E-08	1.79E-08			
Pumpkin, Squash	2.10E-01	6.20E-07	5.50E-07	4.52E-07	1.81E-07	7.80E-01	2.30E-06	2.04E-06	1.68E-06	6.71E-07	7.00E-02	2.07E-07	1.83E-07	1.51E-07	6.02E-08			
Strawberries	2.10E-01	4.40E-07	3.13E-07	1.49E-07	5.96E-08	7.80E-01	1.63E-06	1.16E-06	5.53E-07	2.21E-07	7.00E-02	1.47E-07	1.04E-07	4.96E-08	1.99E-08			
Tomatoes	2.10E-01	2.92E-06	2.60E-06	1.67E-06	6.67E-07	7.80E-01	1.08E-05	9.66E-06	6.20E-06	2.48E-06	7.00E-02	9.73E-07	8.67E-07	5.56E-07	2.22E-07			
Cantaloupe	2.10E-01	1.00E-07	1.75E-07	1.04E-07	4.17E-08	7.80E-01	3.71E-07	6.50E-07	3.87E-07	1.55E-07	7.00E-02	3.33E-08	5.83E-08	3.48E-08	1.39E-08			
Other Berries	2.10E-01	8.00E-08	6.25E-08	2.48E-08	9.93E-09	7.80E-01	2.97E-07	2.32E-07	9.22E-08	3.69E-08	7.00E-02	2.67E-08	2.08E-08	8.27E-09	3.31E-09			
Hazard Index Multiplier:		3.31E-05	2.72E-05	1.47E-05	5.87E-06		6.46E-05	5.48E-05	2.96E-05	1.19E-05		2.08E-05	1.69E-05	9.04E-06	3.62E-06			

Notes:

- 1 WSC/ORS-95-141, 1995. Guidance for Disposal Site Risk Characterization: In Support of the Massachusetts Contingency Plan. Appendix B. Table B-5. Taken from US DA (1983), Tables 12, 13, and 14. The amount eaten (E) is based on the average family size of 3.06 members/household in this survey. Dry weight of food taken from U.S. EPA (1989d), Table A1-3. The numbers in parentheses by the food name refers to the lines in that Table which were used. Dry weight of homegrown produce is the product of the proportion of produce eaten which is homegrown (D/E) and the Total Intake (TI) of produce for each age group. These factors are shown in Tables 8-18 and 8-19, respectively in WSC/ORS-142-92. Documentation for the Risk Assessment Shortform: Residential Scenario.
- 2 $D/E * TI = \text{Homegrown Intake}$ (Table 8-21 in WSC/ORS-142-92).
- 3 The 1 < 2 year old is assumed to have the same intake of homegrown fruits and vegetables as the 2 year old in Table 8-20 (WSC/ORS-142-92). The average daily 1 < 8 year old intake rate is a weighted combination of the intake rates of the 2 year old (weight = 4) and the 14<16 year old (weight = 3) in Table 8-20:
- 4 The average daily 1 < 8 year old intake rate is a weighted combination of the intake rates of the 2 year old (weight = 4) and the 14<16 year old (weight = 3) in Table 8-20 (WSC/ORS-142-92):

$$\text{Intake}_{1-8} = [(4 * \text{Intake}_2) + (3 * \text{Intake}_{14<16})] / 7$$
- 5 The average daily 0 < 30 year old intake is a weighted combination of the four age groups for which intakes are presented in Table 8-20 (WSC/ORS-142-92): $\text{Intake}_{0-30} = [(\text{Intake}_{<1}) + (4 * \text{Intake}_2) + (13 * \text{Intake}_{14<16}) + (12 * \text{Intake}_{26<30})] / 30$
- 6 Hazard Index Multiplier derived following Documentation for the Risk Assessment Shortform: Residential Scenario. WSC/ORS-142-92. The Hazard Index Multiplier (HIM) is a factor, expressed in $\text{kgsoil}/(\text{kgbw} * \text{day})$, which represents the daily average amount of a chemical ingested via consumption of home-grown produce over the period of exposure: $M_i = \sum_j [(HGFI_j * Ksp_j * D2 * C) / (BW_{\text{receptor}} * AP_{\text{receptor}})]$ after McKone (1989) cited in WSC/ORS 142-92 (McKone, T.E. and Ryan, P.B. (1989) Human Exposures to Chemicals through Food Chains: An Uncertainty Analysis, Environmental Science and Technology 23(9):1154-1163.)
 Where:
 M_i = Multiplier for chemical i (Cancer Risk Multiplier (CRM), Chronic Hazard Index Multiplier (CHIM), or Subchronic Hazard Index Multiplier (SHIM)) (in units of $\text{kgsoil}/\text{kgbody weight} * \text{day}$).
 $HGFI_j$ = Home Grown Food Intake, in dry weight, of specific produce (j) consumed (in units of gm/day).
 Ksp_j = Steady-state partition coefficient for chemical (i) between the dry mass of the produce (j) and the soil in which it is grown (in units of $\text{mg}/\text{kg}/\text{mg}/\text{kgsoil}$).
 $D2$ = Duration of the exposure period (in units of years).
 AP = Averaging Period (in units of years)
 Note: For consistency with MADEP practice, and to permit evaluation of potentially significant infant (between the ages of 1 and 2 years) exposures -- who realistically might not be Subchronic (Ages 1 to 2 years): $D2 = 1 \text{ year}$ $AP = 1 \text{ year}$
 Chronic (Ages 1 to 8 years): $D2 = 7 \text{ years}$ $AP = 7 \text{ years}$, and;
 Lifetime (Ages 0 to 30 years): $D2 = 30 \text{ years}$ $AP = 75 \text{ years}$.
 BW = Receptor body weight (in units of kilograms (kg))
 C = Conversion Factor (10^{-3} kg/gm).

Table 20

Average Daily Dose and Risk Estimate
Soil Ingestion (0 to 3 feet)
Entire Site

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Site Worker (chronic)	3.09E-07	Passerby/Trespasser (child) (6 - 13) (chronic)	2.69E-07	Passerby/Trespasser (child) (13 - 18) (subchronic)	1.58E-07	Passerby/Trespasser (adult) (18 - 31) (chronic)	1.45E-07
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfD _c) (mg/Kg-day)	Subchronic Oral Reference Dose (RfD _{sc}) (mg/Kg-day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.41	1	1	4.00E-03	1.00E-02	1.28E-07	3.20E-05	1.11E-07	2.78E-05	6.52E-08	6.52E-06	6.01E-08	1.50E-05
Toluene	2.87	1	1	2.00E-01	2.00E+00	8.88E-07	4.44E-06	7.71E-07	3.86E-06	4.53E-07	2.26E-07	4.17E-07	2.09E-06
Ethylbenzene	7.59	1	1	1.00E-01	1.00E+00	2.35E-06	2.35E-05	2.04E-06	2.04E-05	1.20E-06	1.20E-06	1.10E-06	1.10E-05
Xylenes	56.29	1	1	2.00E-01	2.00E-01	1.74E-05	8.71E-05	1.51E-05	7.56E-05	8.89E-06	4.44E-05	8.19E-06	4.09E-05
Naphthalene	16.63	0.36	0.36	2.00E-02	2.00E-01	1.85E-06	9.26E-05	1.61E-06	8.04E-05	9.45E-07	4.73E-06	8.71E-07	4.35E-05
MTBE	0.95	1	1	1.00E-01	1.00E+00	2.95E-07	2.95E-06	2.56E-07	2.56E-06	1.51E-07	1.51E-07	1.39E-07	1.39E-06
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	138.65	1	1	4.00E-02	4.00E-01	4.29E-05	1.07E-03	3.73E-05	9.32E-04	2.19E-05	5.47E-05	2.02E-05	5.04E-04
C9 to C12 Aliphatics	338.95	1	1	1.00E-01	1.00E+00	1.05E-04	1.05E-03	9.11E-05	9.11E-04	5.35E-05	5.35E-05	4.93E-05	4.93E-04
C9 to C10 Aromatics	185.59	1	1	3.00E-02	3.00E-01	5.77E-05	1.92E-03	5.01E-05	1.67E-03	2.95E-05	9.82E-05	2.71E-05	9.05E-04
Polycyclic Aromatic Hydrocarbons													
Naphthalene	2.70	0.36	0.36	2.00E-02	2.00E-01	3.01E-07	1.50E-05	2.61E-07	1.31E-05	1.53E-07	7.67E-07	1.41E-07	7.07E-06
2-Methylnaphthalene	15.64	0.36	0.36	4.00E-03	4.00E-02	1.74E-06	4.36E-04	1.51E-06	3.78E-04	8.89E-07	2.22E-05	8.19E-07	2.05E-04
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	0.36	0.36	6.00E-02	6.00E-01	5.28E-08	8.81E-07	4.59E-08	7.65E-07	2.69E-08	4.49E-08	2.48E-08	4.14E-07
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	0.36	0.36	3.00E-02	3.00E-01	4.00E-07	1.33E-05	3.48E-07	1.16E-05	2.04E-07	6.81E-07	1.88E-07	6.27E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	4,181.44	1	1	1.00E-01	1.00E+00	1.29E-03	1.29E-02	1.12E-03	1.12E-02	6.60E-04	6.60E-04	6.08E-04	6.08E-03
C19 to C36 Aliphatics	1,542.96	1	1	2.00E+00	6.00E+00	4.78E-04	2.39E-04	4.15E-04	2.07E-04	2.44E-04	4.06E-05	2.24E-04	1.12E-04
C11 to C22 Aromatics	1,744.76	0.36	0.36	3.00E-02	3.00E-01	1.94E-04	6.48E-03	1.69E-04	5.63E-03	9.92E-05	3.31E-04	9.13E-05	3.04E-03
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							2.44E-02		2.12E-02		1.32E-03		1.15E-02

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 20

Average Daily Dose and Risk Estimate
Soil Ingestion (0 to 3 feet)
Entire Site

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
				Site Worker (chronic)	1.24E-07	Passive Responder (child) (6 - 13) (chronic)	2.51E-08	Passive Responder (child) (13 - 18) (chronic)	1.05E-08	Passive Responder (adult) (18 - 31) (chronic)	2.52E-08
Carcinogenic Effects											
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF _o) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.41	1	5.50E-02	5.11E-08	2.81E-09	1.04E-08	5.70E-10	4.35E-09	2.39E-10	1.04E-08	5.73E-10
Toluene	2.87	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	7.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	56.29	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	16.63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	138.65	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	338.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	186.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	2.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	15.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	4,181.44	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	1,542.96	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	1,744.76	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					2.81E-09		5.70E-10		2.39E-10		5.73E-10

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 21

Average Daily Dose and Risk Estimate
Soil Ingestion (0 to 6 feet)
Entire Site

						Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Utility Worker (subchronic)	1.75E-06
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons							
	0						
Benzene	0.35	1	1	4.00E-03	1.00E-02	6.21E-07	6.21E-05
Toluene	2.26	1	1	2.00E-01	2.00E+00	3.97E-06	1.98E-06
Ethylbenzene	5.95	1	1	1.00E-01	1.00E+00	1.04E-05	1.04E-05
Xylenes	43.92	1	1	2.00E-01	2.00E-01	7.69E-05	3.85E-04
Naphthalene	13.02	0.36	0.36	2.00E-02	2.00E-01	8.21E-06	4.10E-05
MTBE	1.09	1	1	1.00E-01	1.00E+00	1.91E-06	1.91E-06
Volatile Petroleum Hydrocarbons							
	0						
C5 to C8 Aliphatics	121.41	1	1	4.00E-02	4.00E-01	2.13E-04	5.32E-04
C9 to C12 Aliphatics	296.61	1	1	1.00E-01	1.00E+00	5.19E-04	5.19E-04
C9 to C10 Aromatics	163.29	1	1	3.00E-02	3.00E-01	2.85E-04	9.53E-04
Polycyclic Aromatic Hydrocarbons							
	0						
Naphthalene	2.25	0.36	0.36	2.00E-02	2.00E-01	1.42E-06	7.11E-06
2-Methylnaphthalene	13.04	0.36	0.36	4.00E-03	4.00E-02	8.22E-06	2.06E-04
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Acenaphthene	0.40	0.36	0.36	6.00E-02	6.00E-01	2.54E-07	4.24E-07
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC
Phenanthrene	3.00	0.36	0.36	3.00E-02	3.00E-01	1.89E-06	6.30E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Extractable Petroleum Hydrocarbon:							
	0						
C9 to C18 Aliphatics	3,485.37	1	1	1.00E-01	1.00E+00	6.10E-03	6.10E-03
C19 to C36 Aliphatics	1,286.63	1	1	2.00E+00	6.00E+00	2.25E-03	3.76E-04
C11 to C22 Aromatics	1,454.80	0.36	0.36	3.00E-02	3.00E-01	9.17E-04	3.06E-03
Volatile Chlorinated Hydrocarbons							
	0						
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC
Subtotal:							1.23E-02

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 21

Average Daily Dose and Risk Estimate
Soil Ingestion (0 to 6 feet)
Entire Site

Carcinogenic Effects					Receptor	Cis Factor (1/day)
					Utility Worker (subchronic)	6.40E-11
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF ₀) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	
Volatile Hydrocarbons						
Benzene	0.35	1	5.50E-02	2.27E-11	1.25E-12	
Toluene	2.26	NC	NC	NC	NC	
Ethylbenzene	5.95	NC	NC	NC	NC	
Xylenes	43.92	NC	NC	NC	NC	
Naphthalene	13.02	NC	NC	NC	NC	
MTBE	1.09	NC	NC	NC	NC	
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC	
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC	
C9 to C10 Aromatics	163.29	NC	NC	NC	NC	
Polycyclic Aromatic Hydrocarbons						
Naphthalene	2.25	NC	NC	NC	NC	
2-Methylnaphthalene	13.04	NC	NC	NC	NC	
Acenaphthylene	NC	NC	NC	NC	NC	
Acenaphthene	0.40	NC	NC	NC	NC	
Fluorene	NC	NC	NC	NC	NC	
Phenanthrene	3.00	NC	NC	NC	NC	
Anthracene	NC	NC	NC	NC	NC	
Fluoranthene	NC	NC	NC	NC	NC	
Pyrene	NC	NC	NC	NC	NC	
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	
Chrysene	NC	0.28	7.30E-02	NC	NC	
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	3,485.37	NC	NC	NC	NC	
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC	
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC	
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	
Subtotal:					1.25E-12	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Table 22

Noncarcinogenic Effects						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
						Construction Worker (subchronic)	1.25E-06	Resident (Young Child) (subchronic)	4.14E-06	Resident (Child) (chronic)	5.00E-07	Resident (Adult) (chronic)	3.68E-07
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.28	1	1	4.00E-03	1.00E-02	3.54E-07	3.54E-05	1.18E-06	1.18E-04	1.42E-07	3.55E-05	1.04E-07	2.61E-05
Toluene	1.43	1	1	2.00E-01	2.00E+00	1.78E-06	8.92E-07	5.92E-06	2.96E-06	7.15E-07	3.58E-06	5.26E-07	2.63E-06
Ethylbenzene	3.64	1	1	1.00E-01	1.00E+00	4.54E-06	4.54E-06	1.51E-05	1.51E-05	1.82E-06	1.82E-05	1.34E-06	1.34E-05
Xylenes	26.51	1	1	2.00E-01	2.00E-01	3.31E-05	1.65E-04	1.10E-04	5.49E-04	1.33E-05	6.63E-05	9.75E-06	4.87E-05
Naphthalene	8.15	0.36	0.36	2.00E-02	2.00E-01	3.66E-06	1.83E-05	1.22E-05	6.08E-05	1.47E-06	7.33E-05	1.08E-06	5.39E-05
MTBE	0.70	1	1	1.00E-01	1.00E+00	8.73E-07	8.73E-07	2.90E-06	2.90E-06	3.50E-07	3.50E-06	2.57E-07	2.57E-06
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	70.78	1	1	4.00E-02	4.00E-01	8.83E-05	2.21E-04	2.93E-04	7.33E-04	3.54E-05	8.85E-04	2.60E-05	6.51E-04
C9 to C12 Aliphatics	174.37	1	1	1.00E-01	1.00E+00	2.18E-04	2.18E-04	7.22E-04	7.22E-04	8.72E-05	8.72E-04	6.41E-05	6.41E-04
C9 to C10 Aromatics	97.84	1	1	3.00E-02	3.00E-01	1.22E-04	4.07E-04	4.05E-04	1.35E-03	4.89E-05	1.63E-03	3.60E-05	1.20E-03
Polycyclic Aromatic Hydrocarbons													
Naphthalene	1.36	0.36	0.36	2.00E-02	2.00E-01	6.12E-07	3.06E-06	2.03E-06	1.02E-05	2.45E-07	1.23E-05	1.80E-07	9.02E-06
2-Methylnaphthalene	7.83	0.36	0.36	4.00E-03	4.00E-02	3.52E-06	8.80E-05	1.17E-05	2.92E-04	1.41E-06	3.53E-04	1.04E-06	2.59E-04
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.26	0.36	0.36	6.00E-02	6.00E-01	1.18E-07	1.96E-07	3.91E-07	6.52E-07	4.72E-08	7.86E-07	3.47E-08	5.78E-07
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.81	0.36	0.36	3.00E-02	3.00E-01	8.13E-07	2.71E-06	2.70E-06	9.00E-06	3.26E-07	1.09E-05	2.40E-07	7.99E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	2,097.82	1	1	1.00E-01	1.00E+00	2.62E-03	2.62E-03	8.69E-03	8.69E-03	1.05E-03	1.05E-02	7.72E-04	7.72E-03
C19 to C35 Aliphatics	777.57	1	1	2.00E+00	6.00E+00	9.70E-04	1.62E-04	3.22E-03	5.37E-04	3.89E-04	1.94E-04	2.86E-04	1.43E-04
C11 to C22 Aromatics	876.79	0.36	0.36	3.00E-02	3.00E-01	3.94E-04	1.31E-03	1.31E-03	4.36E-03	1.58E-04	5.26E-03	1.16E-04	3.87E-03
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							5.26E-03		1.75E-02		1.99E-02		1.46E-02

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Table 22

Carcinogenic Effects				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
				Construction Worker (subchronic)	8.32E-09	Resident (Young Child) (subchronic)	2.76E-07	Resident (Child) (chronic)	8.00E-08	Resident (Adult) (chronic)	1.47E-07
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF-o) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.28	1	5.50E-02	2.36E-09	1.30E-10	7.85E-08	4.32E-09	2.27E-08	1.25E-09	4.18E-08	2.30E-09
Toluene	1.43	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	3.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	26.51	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	8.15	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	70.78	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	174.37	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	97.84	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	1.36	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	7.83	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.26	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.81	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	2,097.82	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	777.57	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	876.79	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					1.30E-10		4.32E-09		1.25E-09		2.30E-09

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 23

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 3 feet)
Entire Site

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
						Site Worker (chronic)	2.67E-08	Passerby/Trespasser (child) (chronic) (6 - 13)	3.87E-09	Passerby/Trespasser (child) (subchronic) (13 - 18)	2.27E-09	Passerby/Trespasser (adult) (chronic) (18 - 31)	3.35E-09
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.41	1	1	4.00E-03	1.00E-02	1.18E-08	2.96E-06	1.60E-09	4.00E-07	9.39E-10	9.39E-08	1.38E-09	3.46E-07
Toluene	2.87	1	1	2.00E-01	2.00E+00	8.23E-08	4.11E-07	1.11E-08	5.55E-08	6.52E-09	3.26E-09	9.61E-09	4.81E-08
Ethylbenzene	7.59	1	1	1.00E-01	1.00E+00	2.18E-07	2.18E-06	2.94E-08	2.94E-07	1.73E-08	1.73E-08	2.54E-08	2.54E-07
Xylenes	56.29	1	1	2.00E-01	2.00E-01	1.61E-06	8.07E-06	2.18E-07	1.09E-06	1.28E-07	6.40E-07	1.89E-07	9.43E-07
Naphthalene	16.63	0.36	0.36	2.00E-02	2.00E-01	1.72E-07	8.59E-06	2.32E-08	1.16E-06	1.36E-08	6.80E-08	2.01E-08	1.00E-06
MTBE	0.95	1	1	1.00E-01	1.00E+00	2.74E-08	2.74E-07	3.69E-09	3.69E-08	2.17E-09	2.17E-09	3.20E-09	3.20E-08
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	138.65	1	1	4.00E-02	4.00E-01	3.98E-06	9.94E-05	5.37E-07	1.34E-05	3.15E-07	7.88E-07	4.65E-07	1.16E-05
C9 to C12 Aliphatics	338.95	1	1	1.00E-01	1.00E+00	9.72E-06	9.72E-05	1.31E-06	1.31E-05	7.71E-07	7.71E-07	1.14E-06	1.14E-05
C9 to C10 Aromatics	186.59	1	1	3.00E-02	3.00E-01	5.35E-06	1.78E-04	7.22E-07	2.41E-05	4.24E-07	1.41E-06	6.25E-07	2.08E-05
Polycyclic Aromatic Hydrocarbons													
Naphthalene	2.70	0.36	0.36	2.00E-02	2.00E-01	2.79E-08	1.39E-06	3.76E-09	1.88E-07	2.21E-09	1.10E-08	3.26E-09	1.63E-07
2-Methylnaphthalene	15.64	0.36	0.36	4.00E-03	4.00E-02	1.62E-07	4.04E-05	2.18E-08	5.45E-06	1.28E-08	3.20E-07	1.89E-08	4.72E-06
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	0.36	0.36	6.00E-02	6.00E-01	4.90E-09	8.16E-08	6.61E-10	1.10E-08	3.88E-10	6.47E-10	5.72E-10	9.53E-09
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	0.36	0.36	3.00E-02	3.00E-01	3.71E-08	1.24E-06	5.01E-09	1.67E-07	2.94E-09	9.80E-09	4.34E-09	1.45E-07
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	4,181.44	1	1	1.00E-01	1.00E+00	1.20E-04	1.20E-03	1.62E-05	1.62E-04	9.51E-06	9.51E-06	1.40E-05	1.40E-04
C19 to C36 Aliphatics	1,542.96	1	1	2.00E+00	6.00E+00	4.43E-05	2.21E-05	5.97E-06	2.99E-06	3.51E-06	5.85E-07	5.17E-06	2.59E-06
C11 to C22 Aromatics	1,744.76	0.36	0.36	3.00E-02	3.00E-01	1.80E-05	6.01E-04	2.43E-06	8.10E-05	1.43E-06	4.76E-06	2.10E-06	7.02E-05
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							2.26E-03	3.05E-04		1.90E-05		2.64E-04	

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 23

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 3 feet)
Entire Site

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects				Site Worker (chronic)	1.15E-08	Passerby/Trespasser (child) (6 - 13)	3.81E-10	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.52E-10	Passerby/Trespasser (adult) (chronic) (18 - 31)	5.81E-10
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF _o) (1/mg/Kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.41	1	5.50E-02	4.74E-09	2.61E-10	1.49E-10	8.21E-12	6.26E-11	3.44E-12	2.40E-10	1.32E-11
Toluene	2.87	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	7.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	56.29	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	16.63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	138.65	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	338.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	186.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	2.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	15.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	4,181.44	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	1,542.96	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	1,744.76	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					2.61E-10		8.21E-12		3.44E-12		1.32E-11

Notes: NC = Not Calculated.

Table 24

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 6 feet)
Entire Site

						Receptor	NCIS Factor (1/day)
Noncarcinogenic Effects						Utility Worker (subchronic exp.)	6.05E-08
Compound	Soil EPCs (0 - 6 ft) (mg/kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfD) (mg/kg/day)	Subchronic Oral Reference Dose (RfD) (mg/kg/day)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons							
Benzene	0.35	1	1	4.00E-03	1.00E-02	2.15E-08	2.15E-06
Toluene	2.26	1	1	2.00E-01	2.00E+00	1.37E-07	6.85E-08
Ethylbenzene	5.95	1	1	1.00E-01	1.00E+00	3.60E-07	3.60E-07
Xylenes	43.92	1	1	2.00E-01	2.00E-01	2.66E-06	1.33E-05
Naphthalene	13.02	0.36	0.36	2.00E-02	2.00E-01	2.84E-07	1.42E-06
MTBE	1.09	1	1	1.00E-01	1.00E+00	6.59E-08	6.59E-08
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	121.41	1	1	4.00E-02	4.00E-01	7.35E-06	1.84E-05
C9 to C12 Aliphatics	296.61	1	1	1.00E-01	1.00E+00	1.80E-05	1.80E-05
C9 to C10 Aromatics	163.29	1	1	3.00E-02	3.00E-01	9.88E-06	3.29E-05
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.25	0.36	0.36	2.00E-02	2.00E-01	4.91E-08	2.46E-07
2-Methylnaphthalene	13.04	0.36	0.36	4.00E-03	4.00E-02	2.84E-07	7.10E-06
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Acenaphthene	0.40	0.36	0.36	6.00E-02	6.00E-01	8.79E-09	1.47E-08
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC
Phenanthrene	3.00	0.36	0.36	3.00E-02	3.00E-01	6.53E-08	2.18E-07
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	3,485.37	1	1	1.00E-01	1.00E+00	2.11E-04	2.11E-04
C19 to C36 Aliphatics	1,286.63	1	1	2.00E+00	6.00E+00	7.79E-05	1.30E-05
C11 to C22 Aromatics	1,454.80	0.36	0.36	3.00E-02	3.00E-01	3.17E-05	1.06E-04
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC
Subtotal:							4.24E-04

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 24

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 6 feet)
Entire Site

				Receptor	Cis Factor (1/day)
Carcinogenic Effects				Utility Worker (subchronic exp.)	2.21E-12
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF _o) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons					
Benzene	0.35	1	5.50E-02	7.84E-13	4.31E-14
Toluene	2.28	NC	NC	NC	NC
Ethylbenzene	5.95	NC	NC	NC	NC
Xylenes	43.92	NC	NC	NC	NC
Naphthalene	13.02	NC	NC	NC	NC
MTBE	1.09	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons					
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC
C9 to C10 Aromatics	163.29	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons					
Naphthalene	2.25	NC	NC	NC	NC
2-Methylnaphthalene	13.04	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC
Acenaphthene	0.40	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC
Phenanthrene	3.00	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons					
C9 to C18 Aliphatics	3,485.37	NC	NC	NC	NC
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons					
Tetrachloroethylene	NC	1	5.10E-02	NC	NC
				Subtotal:	4.31E-14

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 25

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 15 feet)
Entire Site

						Receptor	NCld Factor (1/day)	Receptor	NCld Factor (1/day)	Receptor	NCld Factor (1/day)	Receptor	NCld Factor (1/day)
Noncarcinogenic Effects						Construction Worker (subchronic exp.)	4.31E-08	Resident (Young Child) (subchronic exp.)	1.21E-08	Resident (Child)	1.51E-08	Resident (Adult)	1.77E-08
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.28	1	1	4.00E-03	1.00E-02	1.22E-08	1.22E-06	3.43E-09	3.43E-07	4.28E-09	1.07E-06	5.04E-09	1.26E-06
Toluene	1.43	1	1	2.00E-01	2.00E+00	6.17E-08	3.08E-08	1.72E-08	8.62E-09	2.16E-08	1.08E-07	2.54E-08	1.27E-07
Ethylbenzene	3.64	1	1	1.00E-01	1.00E+00	1.57E-07	1.57E-07	4.39E-08	4.39E-08	5.49E-08	5.49E-07	6.46E-08	6.46E-07
Xylenes	26.51	1	1	2.00E-01	2.00E-01	1.14E-06	5.71E-06	3.20E-07	1.60E-06	4.00E-07	2.00E-06	4.70E-07	2.35E-06
Naphthalene	8.15	0.36	0.36	2.00E-02	2.00E-01	1.26E-07	6.32E-07	3.54E-08	1.77E-07	4.42E-08	2.21E-06	5.21E-08	2.60E-06
MTBE	0.70	1	1	1.00E-01	1.00E+00	3.02E-08	3.02E-08	8.44E-09	8.44E-09	1.05E-08	1.05E-07	1.24E-08	1.24E-07
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	70.78	1	1	4.00E-02	4.00E-01	3.05E-06	7.63E-06	8.54E-07	2.13E-06	1.07E-06	2.67E-05	1.26E-06	3.14E-05
C9 to C12 Aliphatics	174.37	1	1	1.00E-01	1.00E+00	7.52E-06	7.52E-06	2.10E-06	2.10E-06	2.63E-06	2.63E-05	3.09E-06	3.09E-05
C9 to C10 Aromatics	97.84	1	1	3.00E-02	3.00E-01	4.22E-06	1.41E-05	1.18E-06	3.93E-06	1.48E-06	4.92E-05	1.74E-06	5.79E-05
Polycyclic Aromatic Hydrocarbons													
Naphthalene	1.36	0.36	0.36	2.00E-02	2.00E-01	2.11E-08	1.06E-07	5.92E-09	2.96E-08	7.39E-09	3.70E-07	8.70E-09	4.35E-07
2-Methylnaphthalene	7.83	0.36	0.36	4.00E-03	4.00E-02	1.22E-07	3.04E-06	3.40E-08	8.50E-07	4.25E-08	1.06E-05	5.00E-08	1.25E-05
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.26	0.36	0.36	6.00E-02	6.00E-01	4.07E-09	6.78E-09	1.14E-09	1.90E-09	1.42E-09	2.37E-08	1.67E-09	2.79E-08
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.81	0.36	0.36	3.00E-02	3.00E-01	2.81E-08	9.36E-08	7.86E-09	2.62E-08	9.82E-09	3.27E-07	1.16E-08	3.85E-07
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	2,097.82	1	1	1.00E-01	1.00E+00	9.04E-05	9.04E-05	2.53E-05	2.53E-05	3.16E-05	3.16E-04	3.72E-05	3.72E-04
C19 to C36 Aliphatics	777.57	1	1	2.00E+00	6.00E+00	3.35E-05	5.59E-06	9.38E-06	1.56E-06	1.17E-05	5.86E-06	1.38E-05	6.90E-06
C11 to C22 Aromatics	876.79	0.36	0.36	3.00E-02	3.00E-01	1.36E-05	4.54E-05	3.81E-06	1.27E-05	4.76E-06	1.59E-04	5.60E-06	1.87E-04
Volatile Chlorinated Hyd													
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							1.82E-04	5.08E-05		6.00E-04		7.06E-04	

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 25

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 15 feet)
Entire Site

				Receptor	Cld Factor (1/day)	Receptor	Cld Factor (1/day)	Receptor	Cld Factor (1/day)	Receptor	Cld Factor (1/day)
Carcinogenic Effects				Construction Worker (subchronic exp.)	2.87E-10	Resident (Young Child) (subchronic exp.)	8.04E-10	Resident (Child)	2.41E-09	Resident (Adult)	7.10E-09
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF ₀) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.28	1	5.50E-02	8.17E-11	4.49E-12	2.28E-10	1.26E-11	6.85E-10	3.77E-11	2.02E-09	1.11E-10
Toluene	1.43	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	3.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	26.51	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	8.15	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	70.78	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	174.37	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	97.84	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	1.36	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	7.83	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.26	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.81	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	2,097.82	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	777.57	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	876.79	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					4.49E-12	1.26E-11		3.77E-11		1.11E-10	

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 26

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 3 feet) Entire Site

						Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Site Worker (chronic)	1.00E-06	Passerby/Trespasser (child) (chronic) (6 - 13)	2.47E-06	Passerby/Trespasser (child) (subchronic) (13 - 18)	2.22E-06	Passerby/Trespasser (adult) (chronic) (18 - 31)	2.14E-06
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/Kg-day)	Subchronic Oral Reference Dose (RfDsc) (mg/Kg-day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.41	0.08	0.08	4.00E-03	1.00E-02	3.32E-08	8.30E-06	8.16E-08	2.04E-05	7.32E-08	7.32E-06	7.08E-08	1.77E-05
Toluene	2.87	0.12	0.12	2.00E-01	2.00E+00	3.46E-07	1.73E-06	8.50E-07	4.25E-06	7.63E-07	3.81E-07	7.38E-07	3.69E-06
Ethylbenzene	7.59	0.2	0.2	1.00E-01	1.00E+00	1.53E-06	1.53E-05	3.75E-06	3.75E-05	3.37E-06	3.37E-06	3.26E-06	3.26E-05
Xylenes	56.29	0.12	0.12	2.00E-01	2.00E-01	6.78E-06	3.39E-05	1.67E-05	8.34E-05	1.50E-05	7.48E-05	1.45E-05	7.24E-05
Naphthalene	16.63	0.1	0.1	2.00E-02	2.00E-01	1.67E-06	8.35E-05	4.11E-06	2.05E-04	3.68E-06	1.84E-05	3.56E-06	1.78E-04
MTBE	0.95	0.1	0.1	1.00E-01	1.00E+00	9.58E-08	9.58E-07	2.35E-07	2.35E-06	2.11E-07	2.11E-07	2.04E-07	2.04E-06
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	138.65	1	1	4.00E-02	4.00E-01	1.39E-04	3.48E-03	3.42E-04	8.56E-03	3.07E-04	7.68E-04	2.97E-04	7.43E-03
C9 to C12 Aliphatics	338.95	0.5	0.5	1.00E-01	1.00E+00	1.70E-04	1.70E-03	4.18E-04	4.18E-03	3.76E-04	3.76E-04	3.63E-04	3.63E-03
C9 to C10 Aromatics	186.59	0.5	0.5	3.00E-02	3.00E-01	9.37E-05	3.12E-03	2.30E-04	7.68E-03	2.07E-04	6.89E-04	2.00E-04	6.67E-03
Polycyclic Aromatic Hydrocarbons													
Naphthalene	2.70	0.1	0.1	2.00E-02	2.00E-01	2.71E-07	1.35E-05	6.67E-07	3.33E-05	5.98E-07	2.99E-06	5.79E-07	2.89E-05
2-Methylnaphthalene	15.64	0.1	0.1	4.00E-03	4.00E-02	1.57E-06	3.93E-04	3.66E-06	9.66E-04	3.47E-06	8.66E-05	3.35E-06	8.38E-04
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	0.1	0.1	6.00E-02	6.00E-01	4.76E-08	7.94E-07	1.17E-07	1.95E-06	1.05E-07	1.75E-07	1.02E-07	1.69E-06
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	0.1	0.1	3.00E-02	3.00E-01	3.61E-07	1.20E-05	8.87E-07	2.96E-05	7.96E-07	2.65E-06	7.70E-07	2.57E-05
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	4,181.44	0.5	0.5	1.00E-01	1.00E+00	2.10E-03	2.10E-02	5.16E-03	5.16E-02	4.63E-03	4.63E-03	4.48E-03	4.48E-02
C19 to C36 Aliphatics	1,542.96	0.1	0.1	2.00E+00	6.00E+00	1.55E-04	7.75E-05	3.81E-04	1.90E-04	3.42E-04	5.70E-05	3.31E-04	1.65E-04
C11 to C22 Aromatics	1,744.76	0.1	0.1	3.00E-02	3.00E-01	1.75E-04	5.84E-03	4.31E-04	1.44E-02	3.87E-04	1.29E-03	3.74E-04	1.25E-02
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							3.58E-02	8.80E-02		8.01E-03		7.64E-02	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 26

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 3 feet) Entire Site

				Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)
Carcinogenic Effects				Site Worker (chronic)	4.02E-07	Passerby/Trespasser (child) (chronic) (6 - 13)	2.30E-07	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.48E-07	Passerby/Trespasser (adult) (chronic) (18 - 31)	3.72E-07
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSFs) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.41	0.08	5.50E-02	1.33E-08	7.30E-10	7.62E-09	4.19E-10	4.88E-09	2.68E-10	1.23E-08	6.75E-10
Toluene	2.87	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	7.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	56.29	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	16.63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	138.65	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	338.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	186.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	2.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	15.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	4,181.44	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	1,542.96	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	1,744.76	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					7.30E-10		4.19E-10		2.68E-10		6.75E-10

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 27

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 6 feet)
Entire Site

						Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Utility Worker (subchronic exp.)	2.57E-05
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons							
Benzene	0.35	0.08	0.08	4.00E-03	1.00E-02	7.30E-07	7.30E-05
Toluene	2.26	0.12	0.12	2.00E-01	2.00E+00	7.00E-06	3.50E-06
Ethylbenzene	5.95	0.2	0.2	1.00E-01	1.00E+00	3.06E-05	3.06E-05
Xylenes	43.92	0.12	0.12	2.00E-01	2.00E-01	1.36E-04	6.79E-04
Naphthalene	13.02	0.1	0.1	2.00E-02	2.00E-01	3.35E-05	1.68E-04
MTBE	1.09	0.1	0.1	1.00E-01	1.00E+00	2.80E-06	2.80E-06
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	121.41	1	1	4.00E-02	4.00E-01	3.13E-03	7.82E-03
C9 to C12 Aliphatics	296.61	0.5	0.5	1.00E-01	1.00E+00	3.82E-03	3.82E-03
C9 to C10 Aromatics	163.29	0.5	0.5	3.00E-02	3.00E-01	2.10E-03	7.01E-03
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.25	0.1	0.1	2.00E-02	2.00E-01	5.80E-06	2.90E-05
2-Methylnaphthalene	13.04	0.1	0.1	4.00E-03	4.00E-02	3.36E-05	8.39E-04
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC
Acenaphthene	0.40	0.1	0.1	6.00E-02	6.00E-01	1.04E-06	1.73E-06
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC
Phenanthrene	3.00	0.1	0.1	3.00E-02	3.00E-01	7.72E-06	2.57E-05
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	3,485.37	0.5	0.5	1.00E-01	1.00E+00	4.49E-02	4.49E-02
C19 to C36 Aliphatics	1,286.63	0.1	0.1	2.00E+00	6.00E+00	3.31E-03	5.52E-04
C11 to C22 Aromatics	1,454.80	0.1	0.1	3.00E-02	3.00E-01	3.75E-03	1.25E-02
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC
Subtotal:						7.84E-02	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 27

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 6 feet)
Entire Site

				Receptor	CDs Factor (1/day)
Carcinogenic Effects				Utility Worker (subchronic exp.)	9.41E-10
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSF _o) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons					
Benzene	0.35	0.08	5.50E-02	2.67E-11	1.47E-12
Toluene	2.26	NC	NC	NC	NC
Ethylbenzene	5.95	NC	NC	NC	NC
Xylenes	43.92	NC	NC	NC	NC
Naphthalene	13.02	NC	NC	NC	NC
MTBE	1.09	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons					
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC
C9 to C10 Aromatics	163.29	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons					
Naphthalene	2.25	NC	NC	NC	NC
2-Methylnaphthalene	13.04	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC
Acenaphthene	0.40	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC
Phenanthrene	3.00	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons					
C9 to C18 Aliphatics	3,485.37	NC	NC	NC	NC
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons					
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC
				Subtotal:	1.47E-12

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 28

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 15 Feet) Entire Site

						Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Construction Worker (subchronic exp.)	1.83E-05	Resident (Young Child) (subchronic exp.)	3.09E-05	Resident (Child)	2.15E-05	Resident (Adult)	1.08E-05
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (mg/Kg/day)	Subchronic Oral Reference Dose (mg/Kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.28	0.08	0.08	4.00E-03	1.00E-02	4.17E-07	4.17E-05	7.01E-07	7.01E-05	4.88E-07	1.22E-04	2.46E-07	6.15E-05
Toluene	1.43	0.12	0.12	2.00E-01	2.00E+00	3.15E-06	1.57E-06	5.30E-06	2.65E-06	3.68E-06	1.84E-05	1.86E-06	9.29E-06
Ethylbenzene	3.64	0.2	0.2	1.00E-01	1.00E+00	1.34E-05	1.34E-05	2.25E-05	2.25E-05	1.56E-05	1.56E-04	7.88E-06	7.88E-05
Xylenes	26.51	0.12	0.12	2.00E-01	2.00E-01	5.83E-05	2.92E-04	9.82E-05	4.91E-04	6.82E-05	3.41E-04	3.44E-05	1.72E-04
Naphthalene	8.15	0.1	0.1	2.00E-02	2.00E-01	1.49E-05	7.47E-05	2.51E-05	1.26E-04	1.75E-05	8.74E-04	8.82E-06	4.41E-04
MTBE	0.70	0.1	0.1	1.00E-01	1.00E+00	1.28E-06	1.28E-06	2.16E-06	2.16E-06	1.50E-06	1.50E-05	7.57E-07	7.57E-06
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	70.78	1	1	4.00E-02	4.00E-01	1.30E-03	3.25E-03	2.18E-03	5.46E-03	1.52E-03	3.80E-02	7.66E-04	1.92E-02
C9 to C12 Aliphatics	174.37	0.5	0.5	1.00E-01	1.00E+00	1.60E-03	1.60E-03	2.69E-03	2.69E-03	1.87E-03	1.87E-02	9.44E-04	9.44E-03
C9 to C10 Aromatics	97.84	0.5	0.5	3.00E-02	3.00E-01	8.97E-04	2.99E-03	1.51E-03	5.03E-03	1.05E-03	3.50E-02	5.29E-04	1.76E-02
Polycyclic Aromatic Hydrocarbons													
Naphthalene	1.36	0.1	0.1	2.00E-02	2.00E-01	2.50E-06	1.25E-05	4.20E-06	2.10E-05	2.92E-06	1.46E-04	1.47E-06	7.37E-05
2-Methylnaphthalene	7.83	0.1	0.1	4.00E-03	4.00E-02	1.44E-05	3.59E-04	2.42E-05	6.04E-04	1.68E-05	4.20E-03	8.48E-06	2.12E-03
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.26	0.1	0.1	6.00E-02	6.00E-01	4.81E-07	8.01E-07	8.09E-07	1.35E-06	5.62E-07	9.37E-06	2.84E-07	4.73E-06
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.81	0.1	0.1	3.00E-02	3.00E-01	3.32E-06	1.11E-05	5.58E-06	1.86E-05	3.88E-06	1.29E-04	1.96E-06	6.53E-05
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	2,097.82	0.5	0.5	1.00E-01	1.00E+00	1.92E-02	1.92E-02	3.24E-02	3.24E-02	2.25E-02	2.25E-01	1.14E-02	1.14E-01
C19 to C36 Aliphatics	777.57	0.1	0.1	2.00E+00	6.00E+00	1.43E-03	2.38E-04	2.40E-03	4.00E-04	1.67E-03	8.34E-04	8.42E-04	4.21E-04
C11 to C22 Aromatics	876.79	0.1	0.1	3.00E-02	3.00E-01	1.61E-03	5.36E-03	2.71E-03	9.02E-03	1.88E-03	6.27E-02	9.49E-04	3.16E-02
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							3.35E-02	5.63E-02		3.86E-01		1.95E-01	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 28

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 15 Feet) Entire Site

				Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)
Carcinogenic Effects				Construction Worker	1.22E-07	Resident (Young Child)	2.06E-06	Resident (Child)	3.43E-06	Resident (Adult)	4.33E-06
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSF _o) (1/mg/Kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.28	0.08	5.50E-02	2.78E-09	1.53E-10	4.68E-08	2.57E-09	7.80E-08	4.29E-09	9.84E-08	5.41E-09
Toluene	1.43	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	3.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	26.51	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	8.15	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	70.78	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	174.37	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	97.84	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	1.36	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	7.83	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.26	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.81	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	2,097.82	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	777.57	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	876.79	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					1.53E-10		2.57E-09		4.29E-09		5.41E-09

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 29

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 3 feet)
Entire Site

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Site Worker (chronic)	7.17E-09	Passerby/Trespasser (child) (chronic) (6 - 13)	9.68E-10	Passerby/Trespasser (child) (subchronic) (13 - 18)	5.68E-10	Passerby/Trespasser (adult) (chronic) (18 - 31)	8.38E-10
Compound	Soil EPCs (0 - 6 ft) (mg/kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Inhalation Reference Concentration (RfCs) (mg/m ³)	Subchronic Inhalation Reference Concentration (RfCs) (mg/m ³)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.35	1	1	3.00E-02	9.00E-02	2.54E-09	8.48E-08	3.43E-10	1.14E-08	2.02E-10	2.24E-09	2.97E-10	9.90E-09
Toluene	2.26	1	1	4.00E-01	4.00E-01	1.62E-08	4.06E-08	2.19E-09	5.48E-09	1.29E-09	3.22E-09	1.90E-09	4.74E-09
Ethylbenzene	5.95	1	1	1.00E+00	1.00E+00	4.27E-08	4.27E-08	5.76E-09	5.76E-09	3.38E-09	3.38E-09	4.98E-09	4.98E-09
Xylenes	43.92	1	1	1.00E-01	3.00E-01	3.15E-07	3.15E-06	4.25E-08	4.25E-07	2.50E-08	8.32E-08	3.68E-08	3.68E-07
Naphthalene	13.02	0.36	0.36	3.00E-03	3.00E-03	3.36E-08	1.12E-05	4.53E-09	1.51E-06	2.66E-09	8.88E-07	3.93E-09	1.31E-06
MTBE	1.09	1	1	3.00E+00	3.00E+00	7.81E-09	2.60E-09	1.05E-09	3.51E-10	6.19E-10	2.06E-10	9.12E-10	3.04E-10
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	121.41	1	1	2.00E-01	2.00E-01	8.71E-07	4.35E-06	1.17E-07	5.87E-07	6.90E-08	3.45E-07	1.02E-07	5.09E-07
C9 to C12 Aliphatics	296.61	1	1	2.00E-01	2.00E-01	2.13E-06	1.06E-05	2.87E-07	1.43E-06	1.69E-07	8.43E-07	2.48E-07	1.24E-06
C9 to C10 Aromatics	163.29	1	1	5.00E-02	5.00E-02	1.17E-06	2.34E-05	1.58E-07	3.16E-06	9.28E-08	1.86E-06	1.37E-07	2.74E-06
Polycyclic Aromatic Hydrocarbons													
Naphthalene	2.25	0.36	0.36	3.00E-03	3.00E-03	5.82E-09	1.94E-06	7.85E-10	2.62E-07	4.61E-10	1.54E-07	6.80E-10	2.27E-07
2-Methylnaphthalene	13.04	0.36	0.36	5.00E-02	5.00E-01	3.37E-08	6.73E-07	4.54E-09	9.08E-08	2.67E-09	5.34E-09	3.93E-09	7.86E-08
Acenaphthylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.40	0.36	0.36	5.00E-02	5.00E-01	1.04E-09	2.08E-08	1.41E-10	2.81E-09	8.26E-11	1.65E-10	1.22E-10	2.43E-09
Fluorene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.00	0.36	0.36	5.00E-02	5.00E-01	7.74E-09	1.55E-07	1.04E-09	2.09E-08	6.14E-10	1.23E-09	9.04E-10	1.81E-08
Anthracene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	3,485.37	1	1	2.00E-01	2.00E-01	2.50E-05	1.25E-04	3.37E-06	1.69E-05	1.98E-06	9.90E-06	2.92E-06	1.46E-05
C19 to C36 Aliphatics	1,286.63	1	1	NC	NC	9.23E-06	NC	1.24E-06	NC	7.31E-07	NC	1.08E-06	NC
C11 to C22 Aromatics	1,454.80	0.36	0.36	5.00E-02	5.00E-02	3.76E-06	7.51E-05	5.07E-07	1.01E-05	2.98E-07	5.95E-06	4.39E-07	8.77E-05
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	1	1	4.60E+00	4.60E+00	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							2.56E-04		3.45E-05		2.00E-05		2.99E-05

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 29

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 3 feet)
Entire Site

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects				Site Worker (chronic)	2.87E-09	Passerby/Trespasser (child) (chronic) (6 - 13)	9.03E-11	Passerby/Trespasser (child) (subchronic) (13 - 18)	3.79E-11	Passerby/Trespasser (adult) (chronic) (18 - 31)	1.45E-10
Compound	Soil EPCs (0 - 6 ft) (mg/kg)	Cancer Ingestion	Inhalation Unit Risk (UR) (1/ug/m3)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.35	1	7.80E-06	1.02E-09	7.93E-15	3.20E-11	2.50E-16	1.34E-11	1.05E-16	5.15E-11	4.02E-16
Toluene	2.26	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	5.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	43.92	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	13.02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	1.09	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	163.29	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	2.25	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	13.04	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.40	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.00	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	2.09E-05	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	2.09E-05	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	2.09E-03	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	2.09E-03	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C8 to C18 Aliphatics	3,485.37	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.50E-05	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					7.93E-15		2.50E-16		1.05E-16		4.02E-16

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 30

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 6 feet)
Entire Site

						Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Utility Worker (subchronic exp.)	1.51E-08
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Inhalation Reference Concentration (RfC) (mg/m ³)	Subchronic Inhalation Reference Concentration (RfCsc) (mg/m ³)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
Volatile Hydrocarbons							
Benzene	0.35	1	1	3.00E-02	9.00E-02	5.37E-09	5.96E-08
Toluene	2.26	1	1	4.00E-01	4.00E-01	3.43E-08	8.57E-08
Ethylbenzene	5.95	1	1	1.00E+00	1.00E+00	9.00E-08	9.00E-08
Xylenes	43.92	1	1	1.00E-01	3.00E-01	6.65E-07	2.22E-08
Naphthalene	13.02	0.36	0.36	3.00E-03	3.00E-03	7.09E-08	2.36E-05
MTBE	1.09	1	1	3.00E+00	3.00E+00	1.65E-08	5.49E-09
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	121.41	1	1	2.00E-01	2.00E-01	1.84E-06	9.19E-06
C9 to C12 Aliphatics	296.61	1	1	2.00E-01	2.00E-01	4.49E-06	2.24E-05
C9 to C10 Aromatics	163.29	1	1	5.00E-02	5.00E-02	2.47E-06	4.94E-05
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.25	0.36	0.36	3.00E-03	3.00E-03	1.23E-08	4.09E-06
2-Methylnaphthalene	13.04	0.36	0.36	5.00E-02	5.00E-01	7.10E-08	1.42E-07
Acenaphthylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Acenaphthene	0.40	0.36	0.36	5.00E-02	5.00E-01	2.20E-09	4.40E-09
Fluorene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Phenanthrene	3.00	0.36	0.36	5.00E-02	5.00E-01	1.63E-08	3.27E-08
Anthracene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Fluoranthene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Pyrene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Chrysene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	3,485.37	1	1	2.00E-01	2.00E-01	5.27E-05	2.64E-04
C19 to C36 Aliphatics	1,286.63	1	1	NC	NC	1.95E-05	NC
C11 to C22 Aromatics	1,454.80	0.36	0.36	5.00E-02	5.00E-02	7.92E-06	1.58E-04
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	1	1	4.60E+00	4.60E+00	NC	NC
Subtotal:						5.34E-04	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Table 31

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 15 Feet) Entire Site

						Receptor	NCId Factor (1/day)	Receptor	NCId Factor (1/day)	Receptor	NCId Factor (1/day)	Receptor	NCId Factor (1/day)
Noncarcinogenic Effects						Construction Worker (subchronic exp.)	1.08E-08	Resident (Young Child) (subchronic exp.)	3.02E-09	Resident (Child)	3.77E-09	Resident (Adult)	4.44E-09
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Inhalation Reference Concentration (RfC _c) (mg/m ³)	Subchronic Inhalation Reference Concentration (RfC _s) (mg/m ³)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.28	1	1	3.00E-02	9.00E-02	3.08E-09	3.40E-08	8.57E-10	9.52E-09	1.07E-09	3.57E-08	1.26E-09	4.20E-08
Toluene	1.43	1	1	4.00E-01	4.00E-01	1.54E-08	3.85E-08	4.31E-09	1.08E-08	5.39E-09	1.35E-08	6.34E-09	1.59E-08
Ethylbenzene	3.64	1	1	1.00E+00	1.00E+00	3.93E-08	3.93E-08	1.10E-08	1.10E-08	1.37E-08	1.37E-08	1.62E-08	1.62E-08
Xylenes	26.51	1	1	1.00E-01	3.00E-01	2.86E-07	9.52E-07	7.99E-08	2.66E-07	9.99E-08	9.99E-07	1.18E-07	1.18E-06
Naphthalene	8.15	0.36	0.36	3.00E-03	3.00E-03	3.16E-08	1.05E-05	8.85E-09	2.95E-06	1.11E-08	3.69E-06	1.30E-08	4.34E-06
MTBE	0.70	1	1	3.00E+00	3.00E+00	7.54E-09	2.51E-09	2.11E-09	7.03E-10	2.64E-09	8.79E-10	3.10E-09	1.03E-09
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	70.78	1	1	2.00E-01	2.00E-01	7.63E-07	3.81E-06	2.13E-07	1.07E-06	2.67E-07	1.33E-06	3.14E-07	1.57E-06
C9 to C12 Aliphatics	174.37	1	1	2.00E-01	2.00E-01	1.88E-06	9.40E-06	5.26E-07	2.63E-06	6.57E-07	3.29E-06	7.73E-07	3.87E-06
C9 to C10 Aromatics	97.84	1	1	5.00E-02	5.00E-02	1.05E-06	2.11E-05	2.95E-07	5.90E-06	3.69E-07	7.38E-06	4.34E-07	8.68E-06
Polycyclic Aromatic Hydrocarbons													
Naphthalene	1.36	0.36	0.36	3.00E-03	3.00E-03	5.29E-09	1.76E-06	1.48E-09	4.93E-07	1.85E-09	6.16E-07	2.18E-09	7.25E-07
2-Methylnaphthalene	7.83	0.36	0.36	5.00E-02	5.00E-01	3.04E-08	6.08E-08	8.50E-09	1.70E-08	1.06E-08	2.13E-07	1.25E-08	2.50E-07
Acenaphthylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.26	0.36	0.36	5.00E-02	5.00E-01	1.02E-09	2.03E-09	2.85E-10	5.69E-10	3.56E-10	7.11E-09	4.19E-10	8.37E-09
Fluorene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.81	0.36	0.36	5.00E-02	5.00E-01	7.02E-09	1.40E-08	1.96E-09	3.93E-09	2.46E-09	4.91E-08	2.89E-09	5.78E-08
Anthracene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	2,097.82	1	1	2.00E-01	2.00E-01	2.26E-05	1.13E-04	6.33E-06	3.16E-05	7.91E-06	3.95E-05	9.31E-06	4.65E-05
C19 to C36 Aliphatics	777.57	1	1	NC	NC	8.38E-06	NC	2.34E-06	NC	2.93E-06	NC	3.45E-06	NC
C11 to C22 Aromatics	876.79	0.36	0.36	5.00E-02	5.00E-02	3.40E-06	6.80E-05	9.52E-07	1.90E-05	1.19E-06	2.38E-05	1.40E-06	2.80E-05
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	1	1	4.60E+00	4.60E+00	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							2.29E-04		6.40E-05		8.10E-05		9.53E-05

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Table 31

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 15 Feet) Entire Site

				Receptor	Cld Factor (1/day)	Receptor	Cld Factor (1/day)	Receptor	Cld Factor (1/day)	Receptor	Cld Factor (1/day)
Carcinogenic Effects				Construction Worker (subchronic exp.)	7.19E-11	Resident (Young Child) (subchronic exp.)	2.01E-10	Resident (Child)	6.03E-10	Resident (Adult)	1.77E-09
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Cancer Ingestion	Inhalation Unit Risk (UR) (1/ug/m ³)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.28	1	7.80E-06	2.04E-11	1.59E-16	5.71E-11	4.45E-16	1.71E-10	1.34E-15	5.04E-10	3.93E-15
Toluene	1.43	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	3.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	26.51	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	8.15	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	70.78	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	174.37	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	97.84	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	1.36	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	7.83	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.26	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.81	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	2.09E-05	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	2.09E-05	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	2.09E-03	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	2.09E-03	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	2,097.82	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	777.57	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	876.79	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.50E-05	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					1.59E-16		4.45E-16		1.34E-15		3.93E-15

Notes:
BDL = Below Detection Limit
NC = Not Calculated

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Passerby/Trespasser (child) (chronic) (6 - 13)	2.69E-07	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.58E-07	Passerby/Trespasser (adult) (chronic) (18 - 31)	1.45E-07
Compound	Sediment EPCsed (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/Kg-day)	Subchronic Oral Reference Dose (RfDsc) (mg/Kg-day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	NC	1	1	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	1	1	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	NC	1	1	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	NC	0.36	0.36	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
MTBE	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	1	1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	NC	0.36	0.36	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	0.36	0.36	4.00E-03	4.00E-02	5.26E-08	1.32E-05	3.09E-08	7.73E-07	2.85E-08	7.12E-06
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	0.36	0.36	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	0.36	0.36	3.00E-02	3.00E-01	1.72E-07	5.75E-06	1.01E-07	3.38E-07	9.33E-08	3.11E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	619.29	1	1	1.00E-01	1.00E+00	1.66E-04	1.66E-03	9.78E-05	9.78E-05	9.01E-05	9.01E-04
C19 to C36 Aliphatics	670.71	1	1	2.00E+00	6.00E+00	1.80E-04	9.01E-05	1.06E-04	1.76E-05	9.75E-05	4.88E-05
C11 to C22 Aromatics	485.29	0.36	0.36	3.00E-02	3.00E-01	4.70E-05	1.57E-03	2.76E-05	9.19E-05	2.54E-05	8.47E-04
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:							3.34E-03		2.08E-04		1.81E-03

Notes:
BDL = Below Detection Limit
NC = Not Calculated

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Resident (Young Child) (subchronic)	1.38E-06	Resident (Child)	1.67E-07	Resident (Adult)	1.23E-07
Compound	Sediment EPCsed (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	NC	1	1	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	1	1	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	NC	1	1	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	NC	0.36	0.36	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
MTBE	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	1	1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	NC	0.36	0.36	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	0.36	0.36	4.00E-03	4.00E-02	2.71E-07	6.78E-06	3.27E-08	8.18E-06	2.41E-08	6.02E-06
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	0.36	0.36	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	0.36	0.36	3.00E-02	3.00E-01	8.88E-07	2.96E-06	1.07E-07	3.57E-06	7.89E-08	2.63E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	619.29	1	1	1.00E-01	1.00E+00	8.58E-04	8.58E-04	1.03E-04	1.03E-03	7.61E-05	7.61E-04
C19 to C36 Aliphatics	670.71	1	1	2.00E+00	6.00E+00	9.29E-04	1.55E-04	1.12E-04	5.60E-05	8.24E-05	4.12E-05
C11 to C22 Aromatics	485.29	0.36	0.36	3.00E-02	3.00E-01	2.42E-04	8.06E-04	2.92E-05	9.73E-04	2.15E-05	7.16E-04
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:							1.83E-03		2.08E-03		1.53E-03

Notes:
BDL = Below Detection Limit
NC = Not Calculated

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects				Passive Ingestion r (child) (chronic) (16-43)	2.51E-08	Passive Ingestion r (child) (subchronic) (12-16)	1.05E-08	Passive Ingestion r (adult) (chronic) (46-74)	2.52E-08
Compound	Sediment EPCsed (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF0) (1/mg/kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons									
Benzene	NC	1	5.50E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons									
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	619.29	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	670.71	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	485.29	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC
Subtotal:					NC	NC			

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects				Resident (Young Child) (subchronic)	9.23E-08	Resident (Child)	2.67E-08	Resident (Adult)	4.92E-08
Compound	Sediment EPCsed (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF ₀) (1/mg/kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons									
Benzene	NC	1	5.50E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons									
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	619.29	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	670.71	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	485.29	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC
Subtotal:					NC	NC		NC	

Table 33

						Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Passerby/Trespasser (child) (chronic) (6 - 13)	2.69E-07	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.58E-07	Passerby/Trespasser (adult) (chronic) (18 - 31)	1.45E-07
Compound	Sediment EPCsed (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	NC	0.08	0.08	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	0.12	0.12	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	0.2	0.2	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	NC	0.12	0.12	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	NC	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
MTBE	NC	0.1	0.1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	0.5	0.5	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	0.5	0.5	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	NC	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	0.1	0.1	4.00E-03	4.00E-02	1.46E-08	3.65E-06	8.58E-09	2.15E-07	7.91E-09	1.98E-06
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	0.1	0.1	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	0.1	0.1	3.00E-02	3.00E-01	4.79E-08	1.60E-06	2.81E-08	9.38E-08	2.59E-08	8.64E-07
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	619.29	0.5	0.5	1.00E-01	1.00E+00	8.32E-05	8.32E-04	4.89E-05	4.89E-05	4.50E-05	4.50E-04
C19 to C35 Aliphatics	670.71	0.1	0.1	2.00E+00	6.00E+00	1.80E-05	9.01E-06	1.06E-05	1.76E-06	9.75E-06	4.88E-06
C11 to C22 Aromatics	485.29	0.1	0.1	3.00E-02	3.00E-01	1.30E-05	4.35E-04	7.66E-06	2.55E-05	7.06E-06	2.35E-04
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:							1.28E-03		7.65E-05		6.93E-04

Table 33

						Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Resident (Young Child) (subchronic)	1.38E-06	Resident (Child)	1.67E-07	Resident (Adult)	1.23E-07
Compound	Sediment EPCsed (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	NC	0.08	0.08	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	0.12	0.12	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	0.2	0.2	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	NC	0.12	0.12	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	NC	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
MTBE	NC	0.1	0.1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	0.5	0.5	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	0.5	0.5	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	NC	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	0.1	0.1	4.00E-03	4.00E-02	7.53E-08	1.88E-06	9.09E-09	2.27E-06	6.68E-09	1.67E-06
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	0.1	0.1	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	0.1	0.1	3.00E-02	3.00E-01	2.47E-07	8.22E-07	2.98E-08	9.93E-07	2.19E-08	7.30E-07
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	619.29	0.5	0.5	1.00E-01	1.00E+00	4.29E-04	4.29E-04	5.17E-05	5.17E-04	3.81E-05	3.81E-04
C19 to C36 Aliphatics	670.71	0.1	0.1	2.00E+00	6.00E+00	9.29E-05	1.55E-05	1.12E-05	5.60E-06	8.24E-06	4.12E-06
C11 to C22 Aromatics	485.29	0.1	0.1	3.00E-02	3.00E-01	6.72E-05	2.24E-04	8.11E-06	2.70E-04	5.97E-06	1.99E-04
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:							6.71E-04		7.97E-04		5.86E-04

Table 33

				Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)
Carcinogenic Effects				Passerby/Trespasser (child) (chronic) (6 - 13)	1.65E-06	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.05E-06	Passerby/Trespasser (adult) (chronic) (18 - 31)	2.65E-06
Compound	Sediment EPCsed (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSFo) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons									
Benzene	NC	0.08	5.50E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons									
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	619.29	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	670.71	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	485.29	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC	NC	NC	NC	NC
Subtotal:					NC	NC		NC	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

				Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)
Carcinogenic Effects				Resident (Young Child)	5.73E-06	Resident (Child)	9.34E-06	Resident (Adult)	1.27E-05
Compound	Sediment EPCsd (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSF _o) (1/mg/kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons									
Benzene	NC	0.08	5.50E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons									
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	619.29	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	670.71	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	485.29	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC	NC	NC	NC	NC
Subtotal:					NC			NC	NC

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 34

Average Daily Dose
Dermal Absorption of Surface Water

Noncarcinogenic Effects		BW-1				
Compound	SW-1 EP _{05w} [μg/L]	Permeability Coefficient K _p [cm/hour]	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfD) [mg/kg/day]	Subchronic Oral Reference Dose (RfD) [mg/kg/day]
Volatile Hydrocarbons						
Benzene	NC	1.55E-02	0.08	0.08	4.00E-03	1.00E-02
Toluene	NC	3.27E-02	0.12	0.12	2.00E-01	2.00E-00
Ethylbenzene	NC	5.21E-02	0.2	0.2	1.00E-01	1.00E+00
Xylenes	NC	5.63E-02	0.12	0.12	2.00E-01	2.00E-01
Naphthalene	7.65	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
MTBE	NC	2.57E-03	0.1	0.1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	NC	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	66.43	NC	0.5	0.5	1.00E-01	1.00E+00
C9 to C10 Aromatics	59.96	NC	0.5	0.5	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons						
Naphthalene	NC	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
2-Methylnaphthalene	4.89	9.79E-02	0.1	0.1	4.00E-03	4.00E-02
Acenaphthylene	NC	1.16E-01	0.1	0.1	3.00E-02	3.00E-01
Acenaphthene	NC	9.20E-02	0.1	0.1	6.00E-02	6.00E-01
Fluorene	NC	1.23E-01	0.1	0.1	4.00E-02	4.00E-01
Phenanthrene	5.16	1.55E-01	0.1	0.1	3.00E-02	3.00E-01
Fluoranthene	NC	2.43E-01	0.1	0.1	4.00E-02	4.00E-01
Pyrene	NC	3.11E-01	0.1	0.1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Chrysene	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	7.75E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	7.06E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	7.51E-01	0.02	0.02	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	1.16E+00	0.02	0.02	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	1.68E+00	0.02	0.02	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	1.04E+00	0.1	0.1	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons						
C9 to C16 Aliphatics	2,714.29	NC	0.5	0.5	1.00E-01	1.00E+00
C19 to C36 Aliphatics	1,757.14	NC	0.1	0.1	2.00E+00	5.00E+00
C11 to C22 Aromatics	1,857.14	NC	0.1	0.1	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	3.54E-02	0.1	0.1	1.00E-02	1.00E-01

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 34

Average Daily Dose
Dermal Absorption of Surface Water

Carcinogenic Effects				
SW-1				
Compound	SW-1 EPCSW (µg/L)	Permeability Coefficient Kp (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSFs) (1/mg/kg/day)
Volatile Hydrocarbons				
Benzene	NC	1.55E-02	0.08	5.50E-02
Toluene	NC	3.27E-02	NC	NC
Ethylbenzene	NC	5.21E-02	NC	NC
Xylenes	NC	5.63E-02	NC	NC
Naphthalene	7.65	4.95E-02	NC	NC
MTBE	NC	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons				
C5 to C8 Aliphatics	NC	NC	NC	NC
C9 to C12 Aliphatics	66.43	NC	NC	NC
C9 to C10 Aromatics	59.96	NC	NC	NC
Polycyclic Aromatic Hydrocarbons				
Naphthalene	NC	4.95E-02	NC	NC
2-Methylnaphthalene	4.89	9.79E-02	NC	NC
Acenaphthylene	NC	1.16E-01	NC	NC
Acenaphthene	NC	9.20E-02	NC	NC
Fluorene	NC	1.23E-01	NC	NC
Phenanthrene	5.16	1.55E-01	NC	NC
Anthracene	NC	1.79E-01	NC	NC
Fluoranthene	NC	2.43E-01	NC	NC
Pyrene	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons				
C9 to C18 Aliphatics	2,714.29	NC	NC	NC
C19 to C36 Aliphatics	1,757.14	NC	NC	NC
C11 to C22 Aromatics	1,857.14	NC	NC	NC
Volatile Chlorinated Hydrocarbons				
Tetrachloroethylene	NC	3.54E-02	0.1	5.10E-02
Subtotal:				

Receptor	CDgw Factor (hrs*L/mg)/(kg*da yr*ug)	Receptor	CDgw Factor (hrs*L/mg)/(kg*da yr*ug)	Receptor	CDgw Factor (hrs*L/mg)/(kg*da yr*ug)	Receptor	CDgw Factor (hrs*L/mg)/(kg*da yr*ug)	Receptor	CDgw Factor (hrs*L/mg)/(kg*da yr*ug)	Receptor	CDgw Factor (hrs*L/mg)/(kg*da yr*ug)	Receptor	CDgw Factor (hrs*L/mg)/(kg*da yr*ug)	Receptor	CDgw Factor (hrs*L/mg)/(kg*da yr*ug)
Site Worker 18-45	6.49E-07	Passerby/Respass er (child) (chronic) 18-45	1.10E-06	Passerby/Respass er (child) (subchronic) 18-45	6.81E-07	Passerby/Respass er (adult) (chronic) 18-45	1.81E-06	Resident (Young Child)	2.29E-06	Resident (Child)	3.34E-06	Resident (Adult)	7.91E-06		
Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes: NC = Not Calculated.



Noncarcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 Trench EPCalr,gw (µg/m3)	DCW-2 Trench EPCalr,gw (µg/m3)	ECS-1 Trench EPCalr,gw (µg/m3)	ECS-4 Trench EPCalr,gw (µg/m3)	Unit Conversion	Chronic Inhalation Reference Concentration (RfC) (mg/m3)	Subchronic Inhalation Reference Concentration (RfCsc) (mg/m3)
Volatile Hydrocarbons							
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	0.001	3.00E-02	9.00E-02
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	0.001	4.00E-01	4.00E-01
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	0.001	1.00E+00	1.00E+00
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	0.001	1.00E-01	3.00E-01
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	0.001	3.00E-03	3.00E-03
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	0.001	2.00E-01	2.00E-01
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	0.001	5.00E-02	5.00E-02
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	0.001	5.00E-02	5.00E-01
Acenaphthylene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	0.001	2.00E-01	2.00E-01
C19 to C36 Aliphatics	NC	NC	NC	NC	0.001	NC	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	4.23E-04	0.001	4.60E+00	4.60E+00
					Subtotal:		

DCW-2			
Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)
Construction Worker	1.83E-02	Utility Worker	3.33E-01
Average Daily Exposure (mg/m3)	Hazard Index (unitless)	Average Daily Exposure (mg/m3)	Hazard Index (unitless)
5.43E-08	6.03E-07	9.90E-07	1.10E-05
4.97E-08	1.24E-07	9.08E-07	2.27E-06
4.66E-08	4.66E-08	8.51E-07	8.51E-07
1.18E-07	3.93E-07	2.15E-06	7.17E-06
1.18E-07	3.94E-05	2.16E-06	7.19E-04
1.17E-05	3.90E-06	2.13E-04	7.11E-05
6.79E-06	3.39E-05	1.24E-04	6.19E-04
5.93E-07	2.97E-06	1.08E-05	5.41E-05
3.42E-07	6.85E-06	6.25E-05	1.25E-04
1.21E-08	4.04E-06	2.21E-07	7.37E-05
1.18E-08	2.36E-08	2.15E-07	4.31E-07
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
7.41E-07	3.70E-06	1.35E-05	6.76E-05
NC	NC	NC	NC
7.41E-07	1.48E-05	1.35E-05	2.70E-04
NC	NC	NC	NC
1.11E-04			2.02E-03

Notes: NC = Not Calculated.

Table 35

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench

Noncarcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 Trench EPCalr,gw (µg/m3)	DCW-2 Trench EPCalr,gw (µg/m3)	ECS-1 Trench EPCalr,gw (µg/m3)	ECS-4 Trench EPCalr,gw (µg/m3)	Units Conversion	Chronic Inhalation Reference Concentration (RfC) (mg/m3)	Subchronic Inhalation Reference Concentration (RfCsc) (mg/m3)
Volatile Hydrocarbons							
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	0.001	3.00E-02	9.00E-02
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	0.001	4.00E-01	4.00E-01
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	0.001	1.00E+00	1.00E+00
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	0.001	1.00E-01	3.00E-01
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	0.001	3.00E-03	3.00E-03
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	0.001	2.00E-01	2.00E-01
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	0.001	5.00E-02	5.00E-02
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	0.001	5.00E-02	5.00E-01
Acenaphthylene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	0.001	2.00E-01	2.00E-01
C19 to C36 Aliphatics	NC	NC	NC	NC	0.001	NC	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	4.23E-04	0.001	4.60E+00	4.60E+00
Subtotal:							

ECS-1			
Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)
Construction Worker	1.83E-02	Utility Worker	3.33E-01
Average Daily Exposure (mg/m3)	Hazard Index (unitless)	Average Daily Exposure (mg/m3)	Hazard Index (unitless)
1.18E-05	1.31E-05	2.15E-05	2.39E-04
1.93E-07	4.82E-07	3.52E-06	8.80E-06
1.48E-06	1.48E-06	2.71E-05	2.71E-05
4.55E-07	1.52E-06	8.31E-06	2.77E-05
2.48E-06	8.27E-04	4.53E-05	1.51E-02
1.17E-07	3.91E-08	2.14E-06	7.13E-07
4.95E-06	2.48E-05	9.05E-05	4.53E-04
4.80E-06	2.40E-05	8.75E-05	4.38E-04
6.67E-06	1.33E-04	1.22E-04	2.44E-03
8.01E-07	2.67E-04	1.46E-05	4.87E-03
6.07E-07	1.21E-06	1.11E-05	2.22E-05
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
1.85E-06	9.26E-06	3.38E-05	1.69E-04
NC	NC	NC	NC
7.41E-06	1.48E-04	1.35E-04	2.70E-03
NC	NC	NC	NC
1.45E-03		2.65E-02	

Table 35

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench

Noncarcinogenic Effects							
DCW-1 DCW-2 ECS-1 ECS-4							
Compound	DCW-1 Trench EPCair,gw (µg/m3)	DCW-2 Trench EPCair,gw (µg/m3)	ECS-1 Trench EPCair,gw (µg/m3)	ECS-4 Trench EPCair,gw (µg/m3)	Units Conversion	Chronic Inhalation Reference Concentration (RfC) (mg/m3)	Subchronic Inhalation Reference Concentration (RfC) (mg/m3)
Volatile Hydrocarbons							
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	0.001	3.00E-02	9.00E-02
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	0.001	4.00E-01	4.00E-01
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	0.001	1.00E+00	1.00E+00
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	0.001	1.00E-01	3.00E-01
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	0.001	3.00E-03	3.00E-03
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	0.001	2.00E-01	2.00E-01
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	0.001	5.00E-02	5.00E-02
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	0.001	5.00E-02	5.00E-01
Acenaphthylene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	0.001	2.00E-01	2.00E-01
C19 to C36 Aliphatics	NC	NC	NC	NC	0.001	NC	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	4.23E-04	0.001	4.60E+00	4.60E+00
Subtotal:							

ECS-4			
Receptor	NCInhgw Factor (unitless)	Receptor	NCInhgw Factor (unitless)
Construction Worker	1.83E-02	Utility Worker	3.33E-01
Average Daily Exposure (mg/m3)	Hazard Index (unitless)	Average Daily Exposure (mg/m3)	Hazard Index (unitless)
6.12E-06	6.80E-05	1.12E-04	1.24E-03
2.02E-06	5.06E-06	3.69E-05	9.24E-05
1.90E-06	1.90E-06	3.46E-05	3.46E-05
4.42E-06	1.47E-05	8.06E-05	2.69E-04
2.23E-06	7.42E-04	4.06E-05	1.35E-02
7.47E-05	2.49E-05	1.36E-03	4.54E-04
4.17E-06	2.08E-05	7.60E-05	3.80E-04
1.43E-04	7.17E-04	2.62E-03	1.31E-02
1.68E-04	3.36E-03	3.06E-03	6.12E-02
9.22E-07	3.07E-04	1.68E-05	5.61E-03
9.63E-07	1.93E-06	1.76E-05	3.51E-05
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
1.89E-05	9.44E-05	3.45E-04	1.72E-03
NC	NC	NC	NC
2.33E-05	4.67E-04	4.26E-04	8.51E-03
7.72E-09	1.68E-09	1.41E-07	3.06E-08
Subtotal:			
6.29E-03 1.15E-01			

Table 35

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench

							DCW-1			
Carcinogenic Effects							Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)
							Construction Worker	1.22E-04	Utility Worker	1.22E-05
Compound	DCW-1 Trench EPCair,gw (ug/m ³)	DCW-2 Trench EPCair,gw (ug/m ³)	ECS-1 Trench EPCair,gw (ug/m ³)	ECS-4 Trench EPCair,gw (ug/m ³)	Units Conversion	Inhalation Unit Risk (UR) (1/ug/m ³)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons										
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	1.000	7.80E-06	9.06E-06	7.06E-11	9.06E-07	7.06E-12
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	1.000	NC	8.70E-05	NC	8.70E-06	NC
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	1.000	NC	1.17E-04	NC	1.17E-05	NC
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	1.000	NC	7.72E-04	NC	7.72E-05	NC
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	1.000	NC	1.79E-04	NC	1.79E-05	NC
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	1.000	NC	2.60E-03	NC	2.60E-04	NC
Volatile Petroleum Hydrocarbons										
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	1.000	NC	2.79E-04	NC	2.79E-05	NC
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	1.000	NC	2.03E-03	NC	2.03E-04	NC
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	1.000	NC	2.16E-03	NC	2.16E-04	NC
Polycyclic Aromatic Hydrocarbons										
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	1.000	NC	3.19E-05	NC	3.19E-06	NC
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	1.000	NC	2.98E-06	NC	2.99E-07	NC
Acenaphthylene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Chrysene	NC	NC	NC	NC	1.000	2.09E-05	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	1.000	2.09E-05	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	1.000	2.09E-03	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.000	2.09E-03	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons										
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	1.000	NC	1.40E-04	NC	1.40E-05	NC
C19 to C36 Aliphatics	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	1.000	NC	1.05E-04	NC	1.05E-05	NC
Volatile Chlorinated Hydrocarbons										
Tetrachloroethylene	NC	NC	NC	4.23E-04	1.000	5.50E-05	NC	NC	NC	NC
Subtotal:							7.06E-11		7.06E-12	

Table 35

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench

Carcinogenic Effects							DCW-2			
							Receptor	Cinhg Factor (unitless)	Receptor	Cinhg Factor (unitless)
							Construction Worker	1.22E-04	Utility Worker	1.22E-05
Compound	DCW-1 Trench EPCair,gw (µg/m³)	DCW-2 Trench EPCair,gw (µg/m³)	ECS-1 Trench EPCair,gw (µg/m³)	ECS-4 Trench EPCair,gw (µg/m³)	Units Conversion	Inhalation Unit Risk (UR) (1/µg/m³)	Lifetime Average Daily Exposure (µg/m³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m³)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons										
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	1.000	7.80E-06	3.62E-07	2.82E-12	3.62E-08	2.82E-13
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	1.000	NC	3.32E-07	NC	3.32E-08	NC
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	1.000	NC	3.11E-07	NC	3.11E-08	NC
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	1.000	NC	7.86E-07	NC	7.86E-08	NC
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	1.000	NC	7.87E-07	NC	7.88E-08	NC
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	1.000	NC	7.79E-05	NC	7.80E-06	NC
Volatile Petroleum Hydrocarbons										
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	1.000	NC	4.52E-05	NC	4.53E-06	NC
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	1.000	NC	3.96E-06	NC	3.96E-07	NC
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	1.000	NC	2.28E-06	NC	2.28E-07	NC
Polycyclic Aromatic Hydrocarbons										
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	1.000	NC	8.08E-08	NC	8.08E-09	NC
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	1.000	NC	7.86E-08	NC	7.87E-09	NC
Acenaphthylene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Chrysene	NC	NC	NC	NC	1.000	2.09E-05	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	1.000	2.09E-05	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	1.000	2.09E-03	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.000	2.09E-03	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons										
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	1.000	NC	4.94E-06	NC	4.94E-07	NC
C19 to C36 Aliphatics	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	1.000	NC	4.94E-06	NC	4.94E-07	NC
Volatile Chlorinated Hydrocarbons										
Tetrachloroethylene	NC	NC	NC	4.23E-04	1.000	5.50E-05	NC	NC	NC	NC
Subtotal:								2.82E-12		2.82E-13

Table 35

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench

Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4		
Compound	DCW-1 Trench EPCair,gw (µg/m ³)	DCW-2 Trench EPCair,gw (µg/m ³)	ECS-1 Trench EPCair,gw (µg/m ³)	ECS-4 Trench EPCair,gw (µg/m ³)	Units Conversion	Inhalation Unit Risk (UR) (1/µg/m ³)
Volatile Hydrocarbons						
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	1.000	7.80E-06
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	1.000	NC
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	1.000	NC
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	1.000	NC
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	1.000	NC
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	1.000	NC
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	1.000	NC
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	1.000	NC
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	1.000	NC
Polycyclic Aromatic Hydrocarbons						
Naphthalene	2.62E-01	6.84E-04	4.39E-02	5.05E-02	1.000	NC
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	1.000	NC
Acenaphthylene	NC	NC	NC	NC	1.000	NC
Acenaphthene	NC	NC	NC	NC	1.000	NC
Fluorene	NC	NC	NC	NC	1.000	NC
Phenanthrene	NC	NC	NC	NC	1.000	NC
Anthracene	NC	NC	NC	NC	1.000	NC
Fluoranthene	NC	NC	NC	NC	1.000	NC
Pyrene	NC	NC	NC	NC	1.000	NC
Benzo(a)anthracene	NC	NC	NC	NC	1.000	2.09E-04
Chrysene	NC	NC	NC	NC	1.000	2.09E-05
Benzo(b)fluoranthene	NC	NC	NC	NC	1.000	2.09E-04
Benzo(k)fluoranthene	NC	NC	NC	NC	1.000	2.09E-05
Benzo(a)pyrene	NC	NC	NC	NC	1.000	2.09E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.000	2.09E-04
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.000	2.09E-03
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.000	NC
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	1.000	NC
C19 to C36 Aliphatics	NC	NC	NC	NC	1.000	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	1.000	NC
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	NC	NC	4.23E-04	1.000	5.50E-05

Subtotal:

ECS-1			
Receptor	Clnhgw Factor (unit/less)	Receptor	Clnhgw Factor (unit/less)
Construction Worker	1.22E-04	Utility Worker	1.22E-05
Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)
7.86E-06	6.13E-11	7.86E-07	6.13E-12
1.29E-06	NC	1.29E-07	NC
9.90E-06	NC	9.90E-07	NC
3.04E-06	NC	3.04E-07	NC
1.65E-05	NC	1.66E-06	NC
7.81E-07	NC	7.81E-08	NC
3.31E-05	NC	3.31E-06	NC
3.20E-05	NC	3.20E-06	NC
4.45E-05	NC	4.45E-06	NC
5.34E-06	NC	5.34E-07	NC
4.05E-06	NC	4.05E-07	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
1.23E-05	NC	1.23E-06	NC
NC	NC	NC	NC
4.94E-05	NC	4.94E-06	NC
NC	NC	NC	NC
NC	NC	NC	NC
6.13E-11		6.13E-12	

Table 35

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench

Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4		
Compound	DCW-1 Trench EPCair,gw (µg/m ³)	DCW-2 Trench EPCair,gw (µg/m ³)	ECS-1 Trench EPCair,gw (µg/m ³)	ECS-4 Trench EPCair,gw (µg/m ³)	Unit Conversion	Inhalation Unit Risk (UR) (1/µg/m ³)
Volatile Hydrocarbons						
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	1.000	7.80E-06
Toluene	7.14E-01	2.72E-03	1.08E-02	1.11E-01	1.000	NC
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	1.000	NC
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	1.000	NC
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	1.000	NC
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	1.000	NC
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	1.000	NC
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	1.000	NC
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	1.000	NC
Polycyclic Aromatic Hydrocarbons						
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	1.000	NC
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	1.000	NC
Acenaphthylene	NC	NC	NC	NC	1.000	NC
Acenaphthene	NC	NC	NC	NC	1.000	NC
Fluorene	NC	NC	NC	NC	1.000	NC
Phenanthrene	NC	NC	NC	NC	1.000	NC
Anthracene	NC	NC	NC	NC	1.000	NC
Fluoranthene	NC	NC	NC	NC	1.000	NC
Pyrene	NC	NC	NC	NC	1.000	NC
Benzo(a)anthracene	NC	NC	NC	NC	1.000	2.09E-04
Chrysene	NC	NC	NC	NC	1.000	2.09E-05
Benzo(b)fluoranthene	NC	NC	NC	NC	1.000	2.09E-04
Benzo(k)fluoranthene	NC	NC	NC	NC	1.000	2.09E-05
Benzo(a)pyrene	NC	NC	NC	NC	1.000	2.09E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.000	2.09E-04
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.000	2.09E-03
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.000	NC
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	1.000	NC
C19 to C36 Aliphatics	NC	NC	NC	NC	1.000	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	1.000	NC
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	NC	NC	4.23E-04	1.000	5.50E-05

Subtotal:

ECS-4			
Receptor	Clnhw Factor (unitless)	Receptor	Clnhw Factor (unitless)
Construction Worker	1.22E-04	Utility Worker	1.22E-05
Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)
4.08E-05	3.18E-10	4.08E-06	3.18E-11
1.35E-05	NC	1.35E-06	NC
1.26E-05	NC	1.26E-06	NC
2.95E-05	NC	2.95E-06	NC
1.48E-05	NC	1.48E-06	NC
4.98E-04	NC	4.98E-05	NC
2.78E-05	NC	2.78E-06	NC
9.55E-04	NC	9.55E-05	NC
1.12E-03	NC	1.12E-04	NC
6.15E-06	NC	6.15E-07	NC
6.42E-06	NC	6.42E-07	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
1.26E-04	NC	1.26E-05	NC
NC	NC	NC	NC
1.56E-04	NC	1.56E-05	NC
5.15E-08	2.83E-12	5.15E-09	2.83E-13
8.65E-10		8.65E-11	

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 36

Average Daily Dose
Dermal Absorption of Groundwater

Noncarcinogenic Effects									
	DCW-1	DCW-2	ECS-1	ECS-4					
Compound	DCW-1 EPC _{gw} (µg/L)	DCW-2 EPC _{gw} (µg/L)	ECS-1 EPC _{gw} (µg/L)	ECS-4 EPC _{gw} (µg/L)	Permeability Coefficient K _p (cm/hour)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	0.08	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	0.12	0.12	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	0.2	0.2	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	0.12	0.12	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	0.1	0.1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0.5	0.5	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.5	0.5	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	0.1	0.1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	1.16E-01	0.1	0.1	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	9.20E-02	0.1	0.1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	1.23E-01	0.1	0.1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	1.55E-01	0.1	0.1	3.00E-02	3.00E-01
Fluoranthene	NC	NC	NC	NC	2.43E-01	0.1	0.1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	3.11E-01	0.1	0.1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	0.02	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	0.02	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	0.02	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	0.1	0.1	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	0.5	0.5	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	0.1	0.1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.1	0.1	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	0.1	1.00E-02	1.00E-01

Subtotal:

[illegible]

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 36

Average Daily Dose
Dermal Absorption of Groundwater

Noncarcinogenic Effects		DCW-1	DCW-2	ECS-1	ECS-4				
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	0.08	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	0.12	0.12	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	0.2	0.2	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	0.12	0.12	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	0.1	0.1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0.5	0.5	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.5	0.5	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	0.1	0.1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	1.16E-01	0.1	0.1	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	9.20E-02	0.1	0.1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	1.23E-01	0.1	0.1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	1.55E-01	0.1	0.1	3.00E-02	3.00E-01
Fluoranthene	NC	NC	NC	NC	2.43E-01	0.1	0.1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	3.11E-01	0.1	0.1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	0.02	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	0.02	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	0.02	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	0.1	0.1	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	0.5	0.5	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	0.1	0.1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.1	0.1	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	0.1	1.00E-02	1.00E-01

Subtotal:

[illegible]

Table 36

Average Daily Dose
Dermal Absorption of Groundwater

Noncarcinogenic Effects		DCW-1	DCW-2	ECS-1	ECS-4				
Compound	DCW-1 EPC _{gw} (µg/L)	DCW-2 EPC _{gw} (µg/L)	ECS-1 EPC _{gw} (µg/L)	ECS-4 EPC _{gw} (µg/L)	Permeability Coefficient Xp (cm/hour)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	0.08	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	0.12	0.12	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	0.2	0.2	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	0.12	0.12	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	0.1	0.1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0.5	0.5	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.5	0.5	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	0.1	0.1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	1.16E-01	0.1	0.1	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	9.20E-02	0.1	0.1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	1.23E-01	0.1	0.1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	1.55E-01	0.1	0.1	3.00E-02	3.00E-01
Fluoranthene	NC	NC	NC	NC	2.43E-01	0.1	0.1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	3.11E-01	0.1	0.1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	0.02	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	0.02	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	0.02	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	0.1	0.1	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	0.5	0.5	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	0.1	0.1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.1	0.1	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	0.1	1.00E-02	1.00E-01

Subtotal:

ECS-1			
Receptor	NCDgw Factor ((hrs*L*mg)/(kg*days*u g))	Receptor	NCDgw Factor ((hrs*L*mg)/(kg*days* g))
Construction Worker	6.48E-06	Utility Worker	1.62E-07
Average Daily Exposure (ug/m3)	Hazard Index (unitless)	Average Daily Exposure (ug/m3)	Hazard Index (unitless)
5.45E-07	1.36E-04	1.36E-08	3.41E-06
3.08E-07	1.54E-06	7.69E-09	3.84E-08
6.72E-06	6.72E-05	1.68E-07	1.68E-06
1.27E-06	6.34E-06	3.17E-08	1.58E-07
5.48E-06	2.74E-04	1.37E-07	6.84E-06
1.25E-08	1.25E-07	3.12E-10	3.12E-09
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
1.77E-06	8.83E-05	4.42E-08	2.21E-06
2.72E-06	6.81E-04	6.81E-08	1.70E-05
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
1.25E-03			3.14E-05

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 36

Average Daily Dose
Dermal Absorption of Groundwater

Noncarcinogenic Effects									
DCW-1		DCW-2		ECS-1		ECS-4			
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	0.08	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	0.12	0.12	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	0.2	0.2	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	0.12	0.12	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	0.1	0.1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0.5	0.5	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.5	0.5	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	0.1	0.1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	1.16E-01	0.1	0.1	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	9.20E-02	0.1	0.1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	1.23E-01	0.1	0.1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	1.55E-01	0.1	0.1	3.00E-02	3.00E-01
Fluoranthene	NC	NC	NC	NC	2.43E-01	0.1	0.1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	3.11E-01	0.1	0.1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	0.02	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	0.02	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	0.02	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	0.1	0.1	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	1,868.00	66.67	166.67	1,700.00	NC	0.5	0.5	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	800.00	NC	0.1	0.1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.1	0.1	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	0.1	1.00E-02	1.00E-01

Subtotal:

ECS-4			
Receptor	NCDgw Factor ((hrs*L*mg)/(kg*days*ug))	Receptor	NCDgw Factor ((hrs*L*mg)/(kg*days*ug))
Construction Worker	6.49E-06	Utility Worker	1.62E-07
Average Daily Exposure (ug/m3)	Hazard Index (unitless)	Average Daily Exposure (ug/m3)	Hazard Index (unitless)
2.83E-06	7.08E-04	7.08E-08	1.77E-05
3.23E-06	1.61E-05	8.07E-08	4.03E-07
8.59E-06	8.59E-05	2.15E-07	2.15E-06
1.23E-05	6.15E-05	3.07E-07	1.54E-06
4.91E-06	2.45E-04	1.23E-07	6.14E-06
7.95E-06	7.95E-05	1.99E-07	1.99E-06
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
2.03E-06	1.02E-04	5.08E-08	2.54E-06
4.32E-06	1.08E-03	1.08E-07	2.70E-05
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
1.15E-08	1.15E-06	2.87E-10	2.87E-08
2.38E-02		5.96E-04	

Notes: NC = Not Calculated.



Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 36

Average Daily Dose
Dermal Absorption of Groundwater

Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSFo) (1/mg/kg/day)
Volatile Hydrocarbons							
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	NC	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	NC	NC
Xylenes	7,356.67	7.49	26.93	280.70	5.63E-02	NC	NC
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	NC	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	NC	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	NC	NC
Polycyclic Aromatic Hydrocarbons							
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	NC	NC
Acenaphthylene	NC	NC	NC	NC	1.16E-01	NC	NC
Acenaphthene	NC	NC	NC	NC	9.20E-02	NC	NC
Fluorene	NC	NC	NC	NC	1.23E-01	NC	NC
Phenanthrene	NC	NC	NC	NC	1.55E-01	NC	NC
Anthracene	NC	NC	NC	NC	1.79E-01	NC	NC
Fluoranthene	NC	NC	NC	NC	2.43E-01	NC	NC
Pyrene	NC	NC	NC	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	NC	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	NC	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	NC	NC
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	5.10E-02

Subtotal

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 36

Average Daily Dose
Dermal Absorption of Groundwater

Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSFo) (1mg/kg/day)
Volatile Hydrocarbons							
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	NC	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	NC	NC
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	NC	NC
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	NC	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	NC	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	NC	NC
Polycyclic Aromatic Hydrocarbons							
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	NC	NC
Acenaphthylene	NC	NC	NC	NC	1.16E-01	NC	NC
Acenaphthene	NC	NC	NC	NC	9.20E-02	NC	NC
Fluorene	NC	NC	NC	NC	1.23E-01	NC	NC
Phenanthrene	NC	NC	NC	NC	1.55E-01	NC	NC
Anthracene	NC	NC	NC	NC	1.79E-01	NC	NC
Fluoranthene	NC	NC	NC	NC	2.43E-01	NC	NC
Pyrene	NC	NC	NC	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	NC	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	NC	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	NC	NC
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	5.10E-02

Subtotal

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 36

Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSFo) (1/mg/kg/day)
Volatile Hydrocarbons							
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	NC	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	NC	NC
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	NC	NC
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	NC	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	NC	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	NC	NC
Polycyclic Aromatic Hydrocarbons							
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	NC	NC
Acenaphthylene	NC	NC	NC	NC	1.16E-01	NC	NC
Acenaphthene	NC	NC	NC	NC	9.20E-02	NC	NC
Fluorene	NC	NC	NC	NC	1.23E-01	NC	NC
Phenanthrene	NC	NC	NC	NC	1.55E-01	NC	NC
Anthracene	NC	NC	NC	NC	1.79E-01	NC	NC
Fluoranthene	NC	NC	NC	NC	2.43E-01	NC	NC
Pyrene	NC	NC	NC	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.18E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	NC	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	NC	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	NC	NC
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	5.10E-02

Notes: NC = Not Calculated.

Average Daily Dose
Dermal Absorption of Groundwater

[illegible]

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 36

Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSFo) (1/mg/kg/day)
Volatile Hydrocarbons							
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	NC	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	NC	NC
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	NC	NC
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	NC	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	NC	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	NC	NC
Polycyclic Aromatic Hydrocarbons							
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	NC	NC
Acenaphthylene	NC	NC	NC	NC	1.16E-01	NC	NC
Acenaphthene	NC	NC	NC	NC	9.20E-02	NC	NC
Fluorene	NC	NC	NC	NC	1.23E-01	NC	NC
Phenanthrene	NC	NC	NC	NC	1.55E-01	NC	NC
Anthracene	NC	NC	NC	NC	1.79E-01	NC	NC
Fluoranthene	NC	NC	NC	NC	2.43E-01	NC	NC
Pyrene	NC	NC	NC	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	NC	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	NC	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	NC	NC
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	5.10E-02

Notes: NC = Not Calculated.

Average Daily Dose
Dermal Absorption of Groundwater

[illegible]

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 37

Average Daily Exposure and Risk Estimate
Interior Air Exposures

Noncarcinogenic Effects

Compound Name	Interior Air First Floor Office (µg/m ³)	Interior Air Second Floor Living (µg/m ³)	Units Conversion	Inhalation Reference Concentration (chronic) RfC (mg/m ³)	Inhalation Reference Concentration (subchronic) RfC (mg/m ³)
Air Petroleum Hydrocarbons (MADEP)				0.00E+00	
Benzene	NC	NC	0.001	3.00E-02	9.00E-02
Toluene	1.08E+02	3.91E+01	0.001	4.00E-01	4.00E-01
Ethylbenzene	1.40E+01	5.20E+00	0.001	1.00E+00	1.00E+00
Total Xylenes	NC	NC	0.001	6.00E-02	6.00E-02
Naphthalene	NC	NC	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	NC	NC	0.001	5.00E-02	5.00E-01
MTBE	6.57E+01	4.40E+01	0.001	3.00E+00	3.00E+00
1,3-Butadiene	NC	NC	0.001	2.00E-03	2.00E-03
C5 - C8 Aliphatics	4.79E+02	2.39E+02	0.001	2.00E-01	2.00E-01
C9 - C12 Aliphatics	2.42E+02	9.71E+01	0.001	2.00E-01	2.00E-01
C9 - C10 Aromatics	1.84E+02	5.35E+01	0.001	5.00E-02	5.00E-02
Subtotal:					

First Floor Office							
Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)
Site Worker 18-45	2.19E-01	Resident (Young Child)	1.00E+00	Resident (Child)	1.00E+00	Resident (Adult)	1.00E+00
Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
NC	NC	NC	NC	NC	NC	NC	NC
2.37E-02	5.92E-02	1.08E-01	2.70E-01	1.08E-01	2.70E-01	1.08E-01	2.70E-01
3.07E-03	3.07E-03	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.44E-02	4.80E-03	6.57E-02	2.19E-02	6.57E-02	2.19E-02	6.57E-02	2.19E-02
NC	NC	NC	NC	NC	NC	NC	NC
1.05E-01	5.25E-01	4.79E-01	2.40E+00	4.79E-01	2.40E+00	4.79E-01	2.40E+00
5.30E-02	2.65E-01	2.42E-01	1.21E+00	2.42E-01	1.21E+00	2.42E-01	1.21E+00
4.03E-02	8.07E-01	1.84E-01	3.68E+00	1.84E-01	3.68E+00	1.84E-01	3.68E+00
1.66E+00		7.59E+00		7.59E+00		7.59E+00	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 37

Average Daily Exposure and Risk Estimate
Interior Air Exposures

Noncarcinogenic Effects

Compound Name	Interior Air First Floor Office (µg/m ³)	Interior Air Second Floor Living (µg/m ³)	Unit Conversion	Inhalation Reference Concentration (chronic) RfC (mg/m ³)	Inhalation Reference Concentration (subchronic) RfC (mg/m ³)
Air Petroleum Hydrocarbons (MADEP)				0.00E+00	
Benzene	NC	NC	0.001	3.00E-02	9.00E-02
Toluene	1.08E+02	3.91E+01	0.001	4.00E-01	4.00E-01
Ethylbenzene	1.40E+01	5.20E+00	0.001	1.00E+00	1.00E+00
Total Xylenes	NC	NC	0.001	6.00E-02	6.00E-02
Naphthalene	NC	NC	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	NC	NC	0.001	5.00E-02	5.00E-01
MTBE	6.57E+01	4.40E+01	0.001	3.00E+00	3.00E+00
1,3-Butadiene	NC	NC	0.001	2.00E-03	2.00E-03
C5 - C8 Aliphatics	4.79E+02	2.39E+02	0.001	2.00E-01	2.00E-01
C9 - C12 Aliphatics	2.42E+02	9.71E+01	0.001	2.00E-01	2.00E-01
C9 - C10 Aromatics	1.84E+02	5.35E+01	0.001	5.00E-02	5.00E-02

Subtotal:

Second Floor Living							
Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)
Site Worker 18-45	2.19E-01	Resident (Young Child)	1.00E+00	Resident (Child)	1.00E+00	Resident (Adult)	1.00E+00
Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
NC	NC	NC	NC	NC	NC	NC	NC
8.57E-03	2.14E-02	3.91E-02	9.78E-02	3.91E-02	9.78E-02	3.91E-02	9.78E-02
1.14E-03	1.14E-03	5.20E-03	5.20E-03	5.20E-03	5.20E-03	5.20E-03	5.20E-03
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
9.64E-03	3.21E-03	4.40E-02	1.47E-02	4.40E-02	1.47E-02	4.40E-02	1.47E-02
NC	NC	NC	NC	NC	NC	NC	NC
5.24E-02	2.62E-01	2.39E-01	1.20E+00	2.39E-01	1.20E+00	2.39E-01	1.20E+00
2.13E-02	1.06E-01	9.71E-02	4.86E-01	9.71E-02	4.86E-01	9.71E-02	4.86E-01
1.17E-02	2.35E-01	5.35E-02	1.07E+00	5.35E-02	1.07E+00	5.35E-02	1.07E+00
	6.29E-01		2.87E+00		2.87E+00		2.87E+00

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 37

Average Daily Exposure and Risk Estimate
Interior Air Exposures

Carcinogenic Effects

Compound Name	Interior Air First Floor Office (µg/m ³)	Interior Air Second Floor Living (µg/m ³)	Units Conversion	Inhalation Unit Risk (UR) (1/(µg/m ³))
Air Petroleum Hydrocarbons (MADEP)	0.00E+00	0.00E+00		
Benzene	NC	NC	1	7.80E-06
Toluene	1.08E+02	3.91E+01	1	NC
Ethylbenzene	1.40E+01	5.20E+00	1	NC
Total Xylenes	NC	NC	1	NC
Naphthalene	NC	NC	1	NC
2-Methylnaphthalene	NC	NC	1	NC
MTBE	6.57E+01	4.40E+01	1	NC
1,3-Butadiene	NC	NC	1	3.00E-05
C5 - C8 Aliphatics	4.79E+02	2.39E+02	1	NC
C9 - C12 Aliphatics	2.42E+02	9.71E+01	1	NC
C9 - C10 Aromatics	1.84E+02	5.35E+01	1	NC
Subtotal:				

First Floor Office							
Receptor	Clnhgw Factor (unitless)	Receptor	Clnhgw Factor (unitless)	Receptor	Clnhgw Factor (unitless)	Receptor	Clnhgw Factor (unitless)
Site Worker 18-25	8.77E-02	Resident (Young Child)	6.67E-02	Resident (Child)	1.60E-01	Resident (Adult)	4.00E-01
Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)
NC	NC	NC	NC	NC	NC	NC	NC
9.47E+00	NC	7.20E+00	NC	1.73E+01	NC	4.32E+01	NC
1.23E+00	NC	9.33E-01	NC	2.24E+00	NC	5.60E+00	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
5.76E+00	NC	4.36E+00	NC	1.05E+01	NC	2.63E+01	NC
NC	NC	NC	NC	NC	NC	NC	NC
4.20E+01	NC	3.19E+01	NC	7.66E+01	NC	1.92E+02	NC
2.12E+01	NC	1.61E+01	NC	3.87E+01	NC	9.68E+01	NC
1.61E+01	NC	1.23E+01	NC	2.94E+01	NC	7.36E+01	NC
	NC		NC		NC		NC

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 37

Average Daily Exposure and Risk Estimate
Interior Air Exposures

Carcinogenic Effects

Compound Name	Interior Air First Floor Office (ug/m3)	Interior Air Second Floor Living (ug/m3)	Unit Conversion	Inhalation Unit Risk (UR) (1/(ug/m3))
Air Petroleum Hydrocarbons (MADEP)	0.00E+00	0.00E+00		
Benzene	NC	NC	1	7.80E-06
Toluene	1.08E+02	3.91E+01	1	NC
Ethylbenzene	1.40E+01	5.20E+00	1	NC
Total Xylenes	NC	NC	1	NC
Naphthalene	NC	NC	1	NC
2-Methylnaphthalene	NC	NC	1	NC
MTBE	6.57E+01	4.40E+01	1	NC
1,3-Butadiene	NC	NC	1	3.00E-05
C5 - C8 Aliphatics	4.79E+02	2.39E+02	1	NC
C9 - C12 Aliphatics	2.42E+02	9.71E+01	1	NC
C9 - C10 Aromatics	1.84E+02	5.35E+01	1	NC
Subtotal:				

Second Floor Living							
Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)
Site Worker 18-25	8.77E-02	Resident (Young Child)	6.67E-02	Resident (Child)	1.60E-01	Resident (Adult)	4.00E-01
Lifetime Average Daily Exposure (ug/m3)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m3)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m3)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m3)	Excess Lifetime Cancer Risk (ELCR)
NC	NC	NC	NC	NC	NC	NC	NC
3.43E+00	NC	2.61E+00	NC	6.26E+00	NC	1.56E+01	NC
4.56E-01	NC	3.47E-01	NC	8.32E-01	NC	2.08E+00	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
3.86E+00	NC	2.93E+00	NC	7.04E+00	NC	1.76E+01	NC
NC	NC	NC	NC	NC	NC	NC	NC
2.10E+01	NC	1.59E+01	NC	3.82E+01	NC	9.58E+01	NC
8.51E+00	NC	6.47E+00	NC	1.55E+01	NC	3.88E+01	NC
4.69E+00	NC	3.57E+00	NC	8.56E+00	NC	2.14E+01	NC
Subtotal:		NC		NC		NC	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 38

Average Daily Dose and Risk Estimate Ingestion of Drinking Water

Noncarcinogenic Effects									
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St				
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	131 Main St EPCgw (µg/L)	C. Water Oral BDF	SC Water Oral BDF	Chronic Oral Reference Dose (RfD) (mg/kg/day)	Subchronic Oral Reference Dose (RfD) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	NC	1	1	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	NC	1	1	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	1	1	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	NC	1	1	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	NC	1	1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	1	1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	1	1	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons						0	0		
Naphthalene	329.30	0.83	55.07	63.40	NC	1	1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	1	1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	NC	1	1	8.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Anthracene	NC	NC	NC	NC	NC	1	1	3.00E-01	3.00E+00
Fluoranthene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	NC	1	1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons						0	0		
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	1	1	1.00E-01	1.00E+00
C19 to C26 Aliphatics	775.00	66.67	100.00	600.00	NC	1	1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons						0	0		
Tetrachloroethylene	NC	NC	NC	0.50	1.32	1	1	1.00E-02	1.00E-01

[illegible]

Notes: NC = Not Calculated.

Table 38

Average Daily Dose and Risk Estimate
Ingestion of Drinking Water

Noncarcinogenic Effects									
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St				
Compound	DCW-1 EPC _{gw} (µg/L)	DCW-2 EPC _{gw} (µg/L)	ECS-1 EPC _{gw} (µg/L)	ECS-4 EPC _{gw} (µg/L)	131 Main St EPC _{gw} (µg/L)	C Water Out R/F	SC Water Out R/F	Chronic Oral Reference Dose (RfD) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	NC	1	1	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	NC	1	1	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	1	1	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	NC	1	1	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	NC	1	1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	1	1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	1	1	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	NC	1	1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	1	1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	NC	1	1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Anthracene	NC	NC	NC	NC	NC	1	1	3.00E-01	3.00E+00
Fluoranthene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	NC	1	1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	1	1	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	1	1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	1.32	1	1	1.00E-02	1.00E-01
Subtotal:									

ECS-4							
Receptor	NCingdw Factor (1/day)	Receptor	NCingdw Factor (1/day)	Receptor	NCingdw Factor (1/day)	Receptor	NCingdw Factor (1/day)
Site Worker (chronic)	2.36E-05	Resident (Young Child) (subchronic)	5.55E-05	Resident (Child)	5.04E-05	Resident (Adult)	3.69E-05
Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
7.19E-05	1.80E-02	1.86E-04	1.86E-02	1.57E-04	3.93E-02	1.15E-04	2.88E-02
7.19E-05	3.59E-04	1.86E-04	9.29E-05	1.57E-04	7.66E-04	1.15E-04	5.76E-04
7.19E-05	7.19E-04	1.86E-04	1.86E-04	1.57E-04	1.57E-03	1.15E-04	1.15E-03
1.73E-04	8.63E-04	4.46E-04	2.23E-03	3.77E-04	1.89E-03	2.76E-04	1.38E-03
1.87E-04	9.35E-03	4.83E-04	2.42E-03	4.09E-04	2.05E-02	3.00E-04	1.50E-02
1.72E-02	1.72E-01	4.43E-02	4.43E-02	3.75E-02	3.75E-01	2.75E-02	2.75E-01
1.41E-02	3.52E-01	3.64E-02	9.09E-02	3.08E-02	7.69E-01	2.25E-02	5.63E-01
1.23E-03	1.23E-02	3.18E-03	3.18E-03	2.69E-03	2.69E-02	1.97E-03	1.97E-02
6.46E-04	2.15E-02	1.67E-03	5.56E-03	1.41E-03	4.71E-02	1.03E-03	3.45E-02
1.92E-05	9.60E-04	4.96E-05	2.48E-04	4.20E-05	2.10E-03	3.08E-05	1.54E-03
1.92E-05	4.80E-03	4.96E-05	1.24E-03	4.20E-05	1.05E-02	3.08E-05	7.69E-03
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.54E-03	1.54E-02	3.97E-03	3.97E-03	3.36E-03	3.36E-02	2.46E-03	2.46E-02
1.54E-03	7.68E-04	3.97E-03	6.61E-04	3.36E-03	1.68E-03	2.46E-03	1.23E-03
1.40E-03	4.66E-02	3.81E-03	1.20E-02	3.06E-03	1.02E-01	2.24E-03	7.46E-02
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
6.55E-01		1.86E-01		1.43E+00		1.05E+00	

Noncarcinogenic Effects									
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St				
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	131 Main St EPCgw (µg/L)	C. Mean Oral DOQ	SC. Water Oral DOQ	Chronic Oral Reference Dose [RfDc] (mg/kg/day)	Subchronic Oral Reference Dose [RfDsc] (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	NC	1	1	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	NC	1	1	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	1	1	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	NC	1	1	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	NC	1	1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	1	1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	63.40	431.67	12,900.00	NC	1	1	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	NC	1	1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	1	1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	NC	1	1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Anthracene	NC	NC	NC	NC	NC	1	1	3.00E-01	3.00E+00
Fluoranthene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	NC	1	1	3.00E-02	3.00E-01
Benzo[a]anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo[b]fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo[k]fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo[a]pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Indeno[1,2,3-cd]pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Dibenzo[a,h]anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo[g,h,i]perylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	1	1	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	1	1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Trichloroethylene	NC	NC	NC	0.50	1.32	1	1	1.00E-02	1.00E-01
									Subtotal

Notes: NC = Not Calculated.

[illegible]

Table 38

Average Daily Dose and Risk Estimate
Ingestion of Drinking Water

Noncarcinogenic Effects									
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St				
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	131 Main St EPCgw (µg/L)	C. Water Oral RfD	SC. Water Oral RfD	Chronic Oral Reference Dose [RfD] (mg/kg/day)	Subchronic Oral Reference Dose [RfD] (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	NC	1	1	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	NC	1	1	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	1	1	1.00E-01	1.00E+00
Xylenes	7,358.67	7.49	28.93	280.70	NC	1	1	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	NC	1	1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	1	1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	445.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	1	1	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,115.67	30.82	600.67	15,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	NC	1	1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.83	0.83	42.87	68.00	NC	1	1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	NC	1	1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Anthracene	NC	NC	NC	NC	NC	1	1	3.00E-01	3.00E+00
Fluoranthene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	NC	1	1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C8 to C18 Aliphatics	1,888.00	68.87	166.67	1,700.00	NC	1	1	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	65.67	100.00	800.00	NC	1	1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	65.67	666.67	2,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	1.32	1	1	1.00E-02	1.00E-01
Subtotal									

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 38

Average Daily Dose and Risk Estimate

Ingestion of Drinking Water

Noncarcinogenic Effects									
	DCW-1	DCW-2	EC5-1	EC5-4	131 Main St				
Compound	DCW-1 EPC ₅₀ (µg/L)	DCW-2 EPC ₅₀ (µg/L)	EC5-1 EPC ₅₀ (µg/L)	EC5-4 EPC ₅₀ (µg/L)	131 Main St EPC ₅₀ (µg/L)	C. Water Oral R ₅₀	S.C. Water Oral R ₅₀	Chronic Oral Reference Dose (RfD) (mg/kg/day)	Subchronic Oral Reference Dose (RfD) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	NC	1	1	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	NC	1	1	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	1	1	1.00E-01	1.00E+00
Xylenes	7,358.67	7.49	28.93	280.70	NC	1	1	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	NC	1	1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	1	1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,780.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	1	1	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.87	15,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons						0	0		
Naphthalene	329.30	0.83	55.07	63.40	NC	1	1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	1	1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	NC	1	1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Anthracene	NC	NC	NC	NC	NC	1	1	3.00E-01	3.00E+00
Fluoranthene	NC	NC	NC	NC	NC	1	1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	NC	1	1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.91	0.91	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons						0	0		
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	1	1	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	1	1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.91	0.91	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons						0	0		
Tetrachloroethylene	NC	NC	NC	0.50	1.32	1	1	1.00E-02	1.00E-01

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 38

Average Daily Dose and Risk Estimate
Ingestion of Drinking Water

Carcinogenic Effects							
	DOW-1	DOW-2	EC5-1	EC5-4	131 Main St		
Compound	DOW-1 EPCgw (µg/L)	DOW-2 EPCgw (µg/L)	EC5-1 EPCgw (µg/L)	EC5-4 EPCgw (µg/L)	131 Main St EPCgw (µg/L)	C. Water Del RAF	Oral Cancer Slope Factor [CSF ₀] (1/mg/kg/day)
Volatile Hydrocarbons						0	
Benzene	78.13	3.12	67.80	352.00	NC	1	5.50E-02
Toluene	816.33	3.12	12.10	127.00	NC	0	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	0	NC
Xylenes	7,356.67	7.49	28.93	280.70	NC	0	NC
Naphthalene	1,850.67	8.12	170.67	163.00	NC	0	NC
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	0	NC
Volatile Petroleum Hydrocarbons						0	
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	0	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0	NC
Polycyclic Aromatic Hydrocarbons						0	
Naphthalene	329.30	0.83	55.07	63.40	NC	0	NC
2-Methylnaphthalene	31.83	0.83	42.87	68.00	NC	0	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	0	NC
Phenanthrene	NC	NC	NC	NC	NC	0	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	0	NC
Pyrene	NC	NC	NC	NC	NC	0	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	1	7.30E-01
Chrysene	NC	NC	NC	NC	NC	1	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	1	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	1	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	NC	1	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	1	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	1	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons						0	
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	0	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	0	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0	NC
Volatile Chlorinated Hydrocarbons						0	
Tetrachloroethylene	NC	NC	NC	0.50	1.32	1	5.10E-02

Subtotal:

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 38

Average Daily Dose and Risk Estimate

Ingestion of Drinking Water

Carcinogenic Effects							
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St		
Compound	DCW-1 EPC _{gw} (µg/L)	DCW-2 EPC _{gw} (µg/L)	ECS-1 EPC _{gw} (µg/L)	ECS-4 EPC _{gw} (µg/L)	131 Main St EPC _{gw} (µg/L)	C. Water Oral DAF	Oral Cancer Slope Factor (CSF) (1/mg/kg/day)
Volatile Hydrocarbons						0	
Benzene	78.13	3.12	67.80	352.00	NC	1	5.50E-02
Toluene	818.33	3.12	12.10	127.00	NC	0	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	0	NC
Xylenes	7,356.67	7.49	28.93	280.70	NC	0	NC
Naphthalene	1,850.67	8.12	170.67	153.00	NC	0	NC
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	0	NC
Volatile Petroleum Hydrocarbons						0	
C5 to C8 Aliphatics	3,780.00	610.83	446.33	375.00	NC	0	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0	NC
Polycyclic Aromatic Hydrocarbons						0	
Naphthalene	329.30	0.83	55.07	63.40	NC	0	NC
2-Methylnaphthalene	31.63	0.83	42.87	66.00	NC	0	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	0	NC
Phenanthrene	NC	NC	NC	NC	NC	0	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	0	NC
Pyrene	NC	NC	NC	NC	NC	0	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	1	7.30E-01
Chrysene	NC	NC	NC	NC	NC	1	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	1	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	1	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	NC	1	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	1	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	1	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons						0	
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	0	NC
C19 to C38 Aliphatics	775.00	66.67	100.00	600.00	NC	0	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0	NC
Volatile Chlorinated Hydrocarbons						0	
Tetrachloroethylene	NC	NC	NC	0.50	1.32	1	5.10E-02

[illegible]

Notes: NC = Not Calculated.

Average Daily Dose and Risk Estimate Ingestion of Drinking Water

[illegible]

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 38

Average Daily Dose and Risk Estimate Ingestion of Drinking Water

Carcinogenic Effects							
	DCW-1	DCW-2	EC5-1	EC5-4	131 Main St		
Compound	DCW-1 EPC _{gw} (µg/L)	DCW-2 EPC _{gw} (µg/L)	EC5-1 EPC _{gw} (µg/L)	EC5-4 EPC _{gw} (µg/L)	131 Main St EPC _{gw} (µg/L)	C. Water Oral RfC	Oral Cancer Slope Factor [CSFs] (1/mg/kg/day)
Volatile Hydrocarbons						0	
Benzene	78.13	3.12	67.80	352.00	NC	1	5.50E-02
Toluene	818.33	3.12	12.10	127.00	NC	0	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	0	NC
Xylenes	7,356.67	7.49	28.93	280.70	NC	0	NC
Naphthalene	1,850.87	8.12	170.67	153.00	NC	0	NC
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	0	NC
Volatile Petroleum Hydrocarbons						0	
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	0	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0	NC
Polycyclic Aromatic Hydrocarbons						0	
Naphthalene	329.30	0.83	55.07	63.40	NC	0	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	0	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	0	NC
Phenanthrene	NC	NC	NC	NC	NC	0	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	0	NC
Pyrene	NC	NC	NC	NC	NC	0	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	1	7.30E-01
Chrysene	NC	NC	NC	NC	NC	1	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	1	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	1	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	NC	1	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	1	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	1	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons						0	
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	0	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	0	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0	NC
Volatile Chlorinated Hydrocarbons						0	
Tetrachloroethylene	NC	NC	NC	0.50	1.32	1	5.10E-02

Subtotal:

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 39

Average Daily Dose and Risk Estimate
Dermal Absorption
Drinking Water

Noncarcinogenic Effects						Drinking Water Dermal Factor/Non-Cancer (for compounds within predictive domain)			
						Drinking Water Exposure Factor/Non-Cancer (for compounds outside predictive domain)			
Compound Name	DCW-1 EPCgw (ppb)	DCW-2 EPCgw (ppb)	ECS-1 EPCgw (ppb)	ECS-4 EPCgw (ppb)	131 Main St EPCgw (ppb)	Outside Predictive Domain Y/N	Exposure Factor Drinking Water Dermal Absorption Non-Cancer	Chronic Oral Reference Dose (RfD) (mg/kg/day)	Oral Reference Dose (subchronic) RfD (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	NC	N	1.75E-08	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	NC	Y	1.09E+00	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	Y	1.09E+00	1.00E-01	1.00E+00
Total Xylenes	7,358.67	7.49	28.93	280.70	NC	Y	1.09E+00	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	NC	Y	1.09E+00	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	Y	1.09E+00	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 - C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	N	NC	4.00E-02	4.00E-01
C9 - C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	N	NC	1.00E-01	1.00E+00
C9 - C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	N	3.16E-08	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	NC	N	8.25E-09	2.00E-02	2.00E-01
2-Methylnaphthalene	31.53	0.83	42.87	68.00	NC	N	4.18E-08	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	NC	N	1.05E-08	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	NC	N	1.32E-08	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	NC	N	NC	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	NC	N	NC	3.00E-02	3.00E-01
Anthracene	NC	NC	NC	NC	NC	N	NC	3.00E-01	3.00E+00
Fluoranthene	NC	NC	NC	NC	NC	Y	1.08E+00	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	NC	N	NC	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	Y	1.09E+00	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	NC	N	8.23E-09	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	N	7.73E-08	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	N	1.09E-07	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	N	7.85E-08	3.00E-02	3.00E-01
Indeno(1,2,3-cd)-pyrene	NC	NC	NC	NC	NC	N	5.30E-08	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	Y	2.22E-01	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	Y	2.22E-01	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 - C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	N	1.17E-08	1.00E-01	1.00E+00
C19 - C36 Aliphatics	775.00	66.67	100.00	600.00	NC	N	3.45E-09	2.00E+00	6.00E+00
C11 - C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	N	1.72E-08	3.00E-02	3.00E-01
Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	1.32	N	NC	1.00E-02	1.00E-01
Subtotal:									

DCW-1							
Site Worker (chronic)	NCingdw Factor (1/day)	Resident (Young Child) (subchronic)	NCingdw Factor (1/day)	Resident (Child)	NCingdw Factor (1/day)	Resident (Adult)	NCingdw Factor (1/day)
	1.99E+02		4.24E+02		3.22E+02		3.09E+02
	2.30E-05		5.99E-05		5.04E-05		3.69E-05
Average Daily Dose (mg/kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)
2.67E-04	6.67E-02	5.82E-04	5.82E-02	4.42E-04	1.10E-01	4.23E-04	1.06E-01
2.05E-02	1.02E-01	5.29E-02	2.65E-02	4.48E-02	2.24E-01	3.28E-02	1.64E-01
2.94E-02	2.94E-01	7.60E-02	7.60E-02	6.43E-02	6.43E-01	4.71E-02	4.71E-01
1.84E-01	9.21E-01	4.76E-01	2.38E+00	4.03E-01	2.01E+00	2.95E-01	1.48E+00
4.63E-02	2.32E+00	1.20E-01	5.99E-01	1.01E-01	5.07E+00	7.42E-02	3.71E+00
6.22E-01	6.22E+00	1.61E+00	1.61E+00	1.36E+00	1.36E+01	9.86E-01	9.86E+00
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.79E-01	5.98E+00	3.91E-01	1.30E+00	2.97E-01	9.90E+00	2.84E-01	9.48E+00
5.28E-04	2.64E-02	1.15E-03	5.78E-03	8.76E-04	4.38E-02	8.39E-04	4.19E-02
2.58E-04	6.44E-02	5.62E-04	1.40E-02	4.27E-04	1.07E-01	4.09E-04	1.02E-01
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
4.30E-03	4.30E-02	9.38E-03	9.38E-03	7.13E-03	7.13E-02	8.83E-03	6.83E-02
5.20E-04	2.60E-04	1.13E-03	1.89E-04	8.61E-04	4.31E-04	8.24E-04	4.12E-04
4.72E-03	1.57E-01	1.03E-02	3.43E-02	7.82E-03	2.61E-01	7.49E-03	2.50E-01
NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							
1.62E+01							
6.11E+00							
3.20E+01							
2.58E+01							

Notes: NC = Not Calculated.

Table 39

Average Daily Dose and Risk Estimate
Dermal Absorption
Drinking Water

Noncarcinogenic Effects						Drinking Water Dermal Factor(Non-Cancer (for compounds within predictive domain)			Drinking Water Exposure Factor(Non-Cancer (for compounds outside predictive domain)		

Table 39

						Drinking Water Dermal Factor/Non-Cancer (for compounds within predictive domain)		
Noncarcinogenic Effects						Drinking Water Exposure Factor/Non-Cancer (for compounds outside predictive domain)		

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 39

Average Daily Dose and Risk Estimate

Dermal Absorption	_____ mg/kg/day
Drinking Water	_____ mg/kg/day

						Drinking Water Dermal Factor/Non-Cancer (for compounds within predictive domain)			
Noncarcinogenic Effects						Drinking Water Exposure Factor/Non-Cancer (for compounds outside predictive domain)			
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St	Outside Predictive Domain (Y/N)	Exposure Factor: Drinking Water Dermal Absorption Non-Cancer	Chronic Oral Reference Dose (RfD) (mg/kg/day)	Oral Reference Dose (subchronic) RfD (mg/kg/day)
Compound Name	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	131 Main St EPCgw (µg/L)				
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	NC	N	1.75E-08	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	NC	Y	1.09E+00	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	Y	1.09E+00	1.00E-01	1.00E+00
Total Xylenes	7,356.67	7.49	28.93	280.70	NC	Y	1.09E+00	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	NC	Y	1.09E+00	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	Y	1.09E+00	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 - C8 Aliphatics	3,760.00	610.83	448.33	375.00	NC	N	NC	4.00E-02	4.00E-01
C9 - C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	N	NC	1.00E-01	1.00E+00
C9 - C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	N	3.16E-08	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	NC	N	8.25E-09	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	N	4.18E-08	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	NC	N	1.05E-08	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	NC	N	1.32E-08	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	NC	N	NC	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	NC	N	NC	3.00E-02	3.00E-01
Anthracene	NC	NC	NC	NC	NC	N	NC	3.00E-01	3.00E+00
Fluoranthene	NC	NC	NC	NC	NC	Y	1.09E+00	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	NC	N	NC	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	Y	1.09E+00	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	NC	N	8.23E-09	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	N	7.73E-08	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	N	1.09E-07	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	N	7.85E-08	3.00E-02	3.00E-01
Indeno(1,2,3-cd)-pyrene	NC	NC	NC	NC	NC	N	5.30E-08	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	Y	2.22E-01	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	Y	2.22E-01	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 - C18 Aliphatics	1,888.00	86.67	166.67	1,700.00	NC	N	1.17E-08	1.00E-01	1.00E+00
C19 - C36 Aliphatics	775.00	56.67	100.00	600.00	NC	N	3.45E-09	2.00E+00	6.00E+00
C11 - C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	N	1.72E-08	3.00E-02	3.00E-01
Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	1.32	N	NC	1.00E-02	1.00E-01
Subtotal:									

[illegible]

Notes: NC = Not Calculated.

Table 39

Average Daily Dose and Risk Estimate
Dermal Absorption
Drinking Water

						Drinking Water Dermal Factor/Non-Cancer (for compounds within predictive domain)					
Noncarcinogenic Effects						Drinking Water Exposure Factor/Non-Cancer (for compounds outside predictive domain)					
						Outside Predictive Domain (Y/N)					
						Exposure Factor Drinking Water Dermal Absorption Non-Cancer		Chronic Oral Reference Dose (RfDc) (mg/kg/day)		Oral Reference Dose (subchronic) RfD (mg/kg/day)	
Compound Name	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	EC5-1 EPCgw (µg/L)	EC5-4 EPCgw (µg/L)	131 Main St EPCgw (µg/L)						
Volatile Hydrocarbons											
Benzene	78.13	3.12	67.80	352.00	NC	N	1.75E-08	4.00E-03	1.00E-02		
Toluene	818.33	3.12	12.10	127.00	NC	Y	1.09E+00	2.00E-01	2.00E+00		
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	Y	1.09E+00	1.00E-01	1.00E+00		
Total Xylenes	7,356.67	7.49	28.93	280.70	NC	Y	1.09E+00	2.00E-01	2.00E-01		
Naphthalene	1,850.67	8.12	170.67	153.00	NC	Y	1.09E+00	2.00E-02	2.00E-01		
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	Y	1.09E+00	1.00E-01	1.00E+00		
Volatile Petroleum Hydrocarbons											
C5 - C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	N	NC	4.00E-02	4.00E-01		
C9 - C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	N	NC	1.00E-01	1.00E+00		
C9 - C10 Aromatics	29,116.67	30.62	600.67	15,100.00	NC	N	3.16E-08	3.00E-02	3.00E-01		
Polycyclic Aromatic Hydrocarbons											
Naphthalene	329.30	0.83	55.07	63.40	NC	N	8.25E-09	2.00E-02	2.00E-01		
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	N	4.18E-08	4.00E-03	4.00E-02		
Acenaphthylene	NC	NC	NC	NC	NC	N	1.05E-08	3.00E-02	3.00E-01		
Acenaphthene	NC	NC	NC	NC	NC	N	1.32E-08	6.00E-02	6.00E-01		
Fluorene	NC	NC	NC	NC	NC	N	NC	4.00E-02	4.00E-01		
Phenanthrene	NC	NC	NC	NC	NC	N	NC	3.00E-02	3.00E-01		
Anthracene	NC	NC	NC	NC	NC	N	NC	3.00E-01	3.00E+00		
Fluoranthene	NC	NC	NC	NC	NC	Y	1.09E+00	4.00E-02	4.00E-01		
Pyrene	NC	NC	NC	NC	NC	N	NC	3.00E-02	3.00E-01		
Benzo(a)anthracene	NC	NC	NC	NC	NC	Y	1.09E+00	3.00E-02	3.00E-01		
Chrysene	NC	NC	NC	NC	NC	N	8.23E-09	3.00E-02	3.00E-01		
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	N	7.73E-08	3.00E-02	3.00E-01		
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	N	1.09E-07	3.00E-02	3.00E-01		
Benzo(a)pyrene	NC	NC	NC	NC	NC	N	7.85E-08	3.00E-02	3.00E-01		
Indeno(1,2,3-cd)-pyrene	NC	NC	NC	NC	NC	N	5.30E-08	3.00E-02	3.00E-01		
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	Y	2.22E-01	3.00E-02	3.00E-01		
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	Y	2.22E-01	3.00E-02	3.00E-01		
Extractable Petroleum Hydrocarbons											
C9 - C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	N	1.17E-08	1.00E-01	1.00E+00		
C19 - C38 Aliphatics	775.00	66.67	100.00	600.00	NC	N	3.45E-09	2.00E+00	6.00E+00		
C11 - C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	N	1.72E-08	3.00E-02	3.00E-01		
Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	NC	NC	0.50	1.32	N	NC	1.00E-02	1.00E-01		
										Subtotal:	

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 39

Average Daily Dose and Risk Estimate

Dermal Absorption	Drinking Water
0.00008 mg/kg/day	0.000007 mg/kg/day
6.9E-06	5.8E-07

						Drinking Water Dermal Factor/Cancer for compounds within predictive domain		
Carcinogenic Effects						Drinking Water Exposure Factor/Cancer for compounds outside predictive domain		
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St	Outside Predictive Domain (Y/N)	Exposure Factor Drinking Water Dermal Absorption Cancer	Oral Cancer Slope Factor (CSF) (1/(mg/kg/day))
Compound Name	DCW-1 EPC _{gw} (µg/L)	DCW-2 EPC _{gw} (µg/L)	ECS-1 EPC _{gw} (µg/L)	ECS-4 EPC _{gw} (µg/L)	131 Main St EPC _{gw} (µg/L)			
Volatile Hydrocarbons								
Benzene	78.13	3.12	67.80	352.00	NC	N	1.75E-08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	NC	Y	1.09E+00	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	Y	1.09E+00	NC
Total Xylenes	7,356.67	7.49	28.93	280.70	NC	Y	1.09E+00	NC
Naphthalene	1,850.87	8.12	170.67	153.00	NC	Y	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	Y	1.09E+00	NC
Volatile Petroleum Hydrocarbons								
C5 - C8 Aliphatics	3,760.00	610.83	448.33	375.00	NC	N	NC	NC
C9 - C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	N	NC	NC
C9 - C10 Aromatics	29,116.67	30.82	600.87	15,100.00	NC	N	3.16E-08	NC
Polycyclic Aromatic Hydrocarbons								
Naphthalene	329.30	0.83	55.07	63.40	NC	N	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	N	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	N	1.05E-08	NC
Acenaphthene	NC	NC	NC	NC	NC	N	NC	NC
Fluorene	NC	NC	NC	NC	NC	N	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	N	NC	NC
Anthracene	NC	NC	NC	NC	NC	N	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	Y	1.09E+00	NC
Pyrene	NC	NC	NC	NC	NC	N	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	Y	1.09E+00	7.30E-01
Chrysene	NC	NC	NC	NC	NC	N	8.23E-09	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	NC	N	7.85E-08	7.30E+00
Indeno(1,2,3-cd)-pyrene	NC	NC	NC	NC	NC	N	5.30E-08	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	Y	3.33E-01	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	Y	3.33E-01	NC
Extractable Petroleum Hydrocarbons								
C9 - C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	N	NC	NC
C19 - C36 Aliphatics	775.00	66.67	100.00	600.00	NC	N	NC	NC
C11 - C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	N	NC	NC
Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	0.50	1.32	N	NC	5.10E-02 Subtotal:
								Subtotal:

[illegible]

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 39

Average Daily Dose and Risk Estimate

Dermal Absorption	Drinking Water
[Blank]	[Blank]

						Drinking Water Thermal Factor/Cancer (for compounds within predictive domain)		
Carcinogenic Effects						Drinking Water Exposure Factor/Cancer (for compounds outside predictive domain)		
	DCW-1	DCW-2	EC5-1	EC5-4	131 Main St	Outside Predictive Domain (Y/N)	Exposure Factor Drinking Water Thermal Absorption Cancer	Oral Cancer Slope Factor (CSF) (1/(mg/kg/day))
Compound Name	DCW-1 EPC _{gw} (µg/L)	DCW-2 EPC _{gw} (µg/L)	EC5-1 EPC _{gw} (µg/L)	EC5-4 EPC _{gw} (µg/L)	131 Main St EPC _{gw} (µg/L)			
Volatile Hydrocarbons								
Benzene	78.13	3.12	67.80	352.00	NC	N	1.75E-08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	NC	Y	1.08E+00	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	Y	1.09E+00	NC
Total Xylenes	7,356.67	7.48	28.93	280.70	NC	Y	1.09E+00	NC
Naphthalene	1,850.67	8.12	170.67	153.00	NC	Y	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	Y	1.09E+00	NC
Volatile Petroleum Hydrocarbons								
C5 - C8 Aliphatics	3,760.00	610.83	448.33	375.00	NC	N	NC	NC
C9 - C12 Aliphatics	27,363.33	53.40	431.67	12,900.00	NC	N	NC	NC
C9 - C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	N	3.16E-08	NC
Polycyclic Aromatic Hydrocarbons								
Naphthalene	329.30	0.83	55.07	63.40	NC	N	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	N	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	N	1.05E-08	NC
Acenaphthene	NC	NC	NC	NC	NC	N	NC	NC
Fluorene	NC	NC	NC	NC	NC	N	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	N	NC	NC
Anthracene	NC	NC	NC	NC	NC	N	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	Y	1.09E+00	NC
Pyrene	NC	NC	NC	NC	NC	N	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	Y	1.09E+00	7.30E-01
Chrysene	NC	NC	NC	NC	NC	N	8.23E-09	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	NC	N	7.85E-06	7.30E+00
Indeno(1,2,3-cd)-pyrene	NC	NC	NC	NC	NC	N	5.30E-08	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	Y	3.33E-01	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	Y	3.33E-01	NC
Extractable Petroleum Hydrocarbons								
C9 - C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	N	NC	NC
C19 - C36 Aliphatics	775.00	66.67	100.00	600.00	NC	N	NC	NC
C11 - C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	N	NC	NC
Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	0.50	1.32	N	NC	5.10E-02
Subtotal:								Subtotal:

[illegible]

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 39

Average Daily Dose and Risk Estimate
Dermal Absorption
Drinking Water

						Drinking Water Dermal Factor/Cancer (for compounds within predictive domain)		
Carcinogenic Effects						Drinking Water Exposure Factor/Cancer (for compounds outside predictive domain)		
	DGW-1	DGW-2	ECS-1	ECS-4	131 Main St	Outside Predictive Domain (Y/N)	Exposure Factor Drinking Water Dermal Absorption Cancer	Oral Cancer Slope Factor (C57) (1/(mg/kg/day))
Compound Name	DGW-1 EPCgw (µg/L)	DGW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	131 Main St EPCgw (µg/L)			
Volatile Hydrocarbons								
Benzene	78.13	3.12	67.60	352.00	NC	N	1.75E-08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	NC	Y	1.08E+00	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	Y	1.09E+00	NC
Total Xylenes	7,356.67	7.49	28.93	280.70	NC	Y	1.08E+00	NC
Naphthalene	1,850.67	8.12	170.67	153.00	NC	Y	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	Y	1.09E+00	NC
Volatile Petroleum Hydrocarbons								
C5 - C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	N	NC	NC
C9 - C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	N	NC	NC
C9 - C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	N	3.16E-08	NC
Polycyclic Aromatic Hydrocarbons								
Naphthalene	329.30	0.83	55.07	63.40	NC	N	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	N	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	N	1.05E-08	NC
Acenaphthene	NC	NC	NC	NC	NC	N	NC	NC
Fluorene	NC	NC	NC	NC	NC	N	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	N	NC	NC
Anthracene	NC	NC	NC	NC	NC	N	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	Y	1.09E+00	NC
Pyrene	NC	NC	NC	NC	NC	N	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	Y	1.09E+00	7.30E-01
Chrysene	NC	NC	NC	NC	NC	N	8.23E-09	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	NC	N	7.85E-08	7.30E+00
Indeno(1,2,3-cd)-pyrene	NC	NC	NC	NC	NC	N	5.30E-08	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	Y	3.33E-01	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	Y	3.33E-01	NC
Extractable Petroleum Hydrocarbons								
C9 - C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	N	NC	NC
C19 - C36 Aliphatics	775.00	66.67	100.00	600.00	NC	N	NC	NC
C11 - C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	N	NC	NC
Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	0.50	1.32	N	NC	5.10E-02
								Subtotal:

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 39

Average Daily Dose and Risk Estimate

Dermal Absorption	Drinking Water
[Empty Cell]	[Empty Cell]

						Drinking Water Dermal Factor/Cancer (for compounds within predictive domain)		
Carcinogenic Effects						Drinking Water Exposure Factor/Cancer (for compounds outside predictive domain)		
	DCW-1	DCW-2	EC5-1	EC5-4	131 Main St	Outside Predictive Domain (Y/N)	Exposure Factor Drinking Water Dermal Absorption Cancer	Oral Cancer Slope Factor (CSF) (1/(mg/kg/day))
Compound Name	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	EC5-1 EPCgw (µg/L)	EC5-4 EPCgw (µg/L)	131 Main St EPCgw (µg/L)			
Volatile Hydrocarbons								
Benzene	78.13	3.12	67.80	352.00	NC	N	1.75E-08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	NC	Y	1.09E+00	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	Y	1.09E+00	NC
Total Xylenes	7,356.67	7.49	28.93	280.70	NC	Y	1.09E+00	NC
Naphthalene	1,850.67	8.12	170.67	153.00	NC	Y	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	Y	1.09E+00	NC
Volatile Petroleum Hydrocarbons								
C5 - C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	N	NC	NC
C9 - C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	N	NC	NC
C9 - C10 Aromatics	29,116.67	30.62	600.67	15,100.00	NC	N	3.16E-08	NC
Polycyclic Aromatic Hydrocarbons								
Naphthalene	329.30	0.83	55.07	63.40	NC	N	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	N	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	N	1.05E-08	NC
Acenaphthene	NC	NC	NC	NC	NC	N	NC	NC
Fluorene	NC	NC	NC	NC	NC	N	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	N	NC	NC
Anthracene	NC	NC	NC	NC	NC	N	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	Y	1.09E+00	NC
Pyrene	NC	NC	NC	NC	NC	N	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	Y	1.09E+00	7.30E-01
Chrysene	NC	NC	NC	NC	NC	N	8.23E-09	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	NC	N	7.85E-08	7.30E+00
Indeno(1,2,3-cd)-pyrene	NC	NC	NC	NC	NC	N	5.30E-08	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	Y	3.33E-01	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	Y	3.33E-01	NC
Extractable Petroleum Hydrocarbons								
C9 - C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	N	NC	NC
C19 - C36 Aliphatics	775.00	66.67	100.00	600.00	NC	N	NC	NC
C11 - C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	N	NC	NC
Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	0.50	1.32	N	NC	5.10E-02
								Subtotal:
Subtotal:								

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 39

Average Daily Dose and Risk Estimate

Dermal Absorption	mg/kg/day
Drinking Water	mg/kg/day

						Drinking Water Dermal Factor/Cancer (for compounds within predictive domain)		
Carcinogenic Effects						Drinking Water Exposure Factor/Cancer (for compounds outside predictive domain)		
	DCW-1	DCW-2	EC5-1	EC5-4	131 Main St	Outside Predictive Domain (Y/N)	Exposure Factor Drinking Water Dermal Absorption Cancer	Oral Cancer Slope Factor (CSF) (1/(mg/kg/day))
Compound Name	DCW-1 EPCGw (µg/L)	DCW-2 EPCGw (µg/L)	EC5-1 EPCGw (µg/L)	EC5-4 EPCGw (µg/L)	131 Main St EPCGw (µg/L)			
Volatile Hydrocarbons								
Benzene	78.13	3.12	67.80	352.00	NC	N	1.75E-08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	NC	Y	1.09E+00	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	NC	Y	1.09E+00	NC
Total Xylenes	7,358.67	7.49	28.93	280.70	NC	Y	1.09E+00	NC
Naphthalene	1,850.67	8.12	170.87	153.00	NC	Y	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	3.51	Y	1.09E+00	NC
Volatile Petroleum Hydrocarbons								
C5 - C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	N	NC	NC
C9 - C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	N	NC	NC
C9 - C10 Aromatics	29,118.67	30.82	600.67	15,100.00	NC	N	3.18E-08	NC
Polycyclic Aromatic Hydrocarbons								
Naphthalene	329.30	0.83	55.07	63.40	NC	N	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	NC	N	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	N	1.05E-08	NC
Acenaphthene	NC	NC	NC	NC	NC	N	NC	NC
Fluorene	NC	NC	NC	NC	NC	N	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	N	NC	NC
Anthracene	NC	NC	NC	NC	NC	N	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	Y	1.09E+00	NC
Pyrene	NC	NC	NC	NC	NC	N	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	Y	1.09E+00	7.30E-01
Chrysene	NC	NC	NC	NC	NC	N	8.23E-09	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	N	NC	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	NC	N	7.85E-08	7.30E+00
Indeno(1,2,3-cd)-pyrene	NC	NC	NC	NC	NC	N	5.30E-08	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	Y	3.33E-01	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	Y	3.33E-01	NC
Extractable Petroleum Hydrocarbons								
C9 - C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	N	NC	NC
C19 - C35 Aliphatics	775.00	66.67	100.00	600.00	NC	N	NC	NC
C11 - C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	N	NC	NC
Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	0.50	1.32	N	NC	5.10E-02
Subtotal:								Subtotal:

[illegible]

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 40

Average Daily Exposure and Risk Estimate
Inhalation of Drinking Water

Noncarcinogenic Effects								
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St			
Compound	DCW-1 Shower EPCalr,gw (µg/m ³)	DCW-2 Shower EPCalr,gw (µg/m ³)	ECS-1 Shower EPCalr,gw (µg/m ³)	ECS-4 Shower EPCalr,gw (µg/m ³)	131 Main St Shower EPCalr,gw (µg/m ³)	Unit Conversion Factor (µg/m ³ to mg/m ³)	Chronic Inhalation Reference Concentration (RfC _c) (mg/m ³)	Subchronic Inhalation Reference Concentration (RfC _{sc}) (mg/m ³)
Volatile Hydrocarbons								
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	0.001	3.00E-02	9.00E-02
Toluene	115,027.59	438.67	1,700.82	17,851.53	NC	0.001	4.00E-01	4.00E-01
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	0.001	1.00E+00	1.00E+00
Xylenes	1,034,076.83	1,053.05	4,065.96	39,456.10	NC	0.001	1.00E-01	3.00E-01
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	0.001	3.00E-03	3.00E-03
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.56	NC	0.001	2.00E-01	2.00E-01
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	0.001	5.00E-02	5.00E-02
Polycyclic Aromatic Hydrocarbons								
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	0.001	5.00E-02	5.00E-01
Acenaphthylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	265,383.38	9,370.88	23,427.20	238,957.49	NC	0.001	2.00E-01	2.00E-01
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	0.001	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	70.28	185.37	0.001	4.60E+00	4.60E+00
Subtotal:								

DCW-1							
Receptor	NCInghw Factor (1/day)	Receptor	NCInghw Factor (1/day)	Receptor	NCInghw Factor (1/day)	Receptor	NCInghw Factor (1/day)
Site Worker (chronic)	4.58E-07	Resident (Young Child) (subchronic)	6.97E-07	Resident (Child)	6.97E-07	Resident (Adult)	6.97E-07
Average Daily Dose (mg/kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)
5.03E-06	1.68E-04	7.66E-06	8.51E-05	7.66E-06	2.55E-04	7.66E-06	2.55E-04
5.27E-05	1.32E-04	8.02E-05	2.00E-04	8.02E-05	2.00E-04	8.02E-05	2.00E-04
7.57E-05	7.57E-05	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04
4.74E-04	4.74E-03	7.21E-04	2.40E-03	7.21E-04	7.21E-03	7.21E-04	7.21E-03
1.19E-04	3.97E-02	1.81E-04	6.05E-02	1.81E-04	6.05E-02	1.81E-04	6.05E-02
1.60E-03	5.34E-04	2.43E-03	8.11E-04	2.43E-03	8.11E-04	2.43E-03	8.11E-04
2.42E-04	1.21E-03	3.68E-04	1.84E-03	3.68E-04	1.84E-03	3.68E-04	1.84E-03
1.76E-03	8.82E-03	2.68E-03	1.34E-02	2.68E-03	1.34E-02	2.68E-03	1.34E-02
1.88E-03	3.75E-02	2.85E-03	5.71E-02	2.85E-03	5.71E-02	2.85E-03	5.71E-02
2.12E-05	7.07E-03	3.23E-05	1.08E-02	3.23E-05	1.08E-02	3.23E-05	1.08E-02
2.04E-06	4.08E-05	3.10E-06	6.20E-06	3.10E-06	6.20E-05	3.10E-06	6.20E-05
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.22E-04	6.08E-04	1.85E-04	9.25E-04	1.85E-04	9.25E-04	1.85E-04	9.25E-04
4.99E-05	NC	7.59E-05	NC	7.59E-05	NC	7.59E-05	NC
9.11E-05	1.82E-03	1.39E-04	2.77E-03	1.39E-04	2.77E-03	1.39E-04	2.77E-03
NC	NC	NC	NC	NC	NC	NC	NC
1.02E-01		1.51E-01		1.55E-01		1.56E-01	

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 40

Average Daily Exposure and Risk Estimate Inhalation of Drinking Water

Noncarcinogenic Effects								
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St			
Compound	DCW-1 Shower EPCair,gw (µg/m3)	DCW-2 Shower EPCair,gw (µg/m3)	ECS-1 Shower EPCair,gw (µg/m3)	ECS-4 Shower EPCair,gw (µg/m3)	131 Main St Shower EPCair,gw (µg/m3)	Unit Conversion Factor (µg/m3/mg)	Chronic Inhalation Reference Concentration (RfC) (mg/m3)	Subchronic Inhalation Reference Concentration (RfCsc) (mg/m3)
Volatile Hydrocarbons								
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	0.001	3.00E-02	9.00E-02
Toluene	115,027.58	438.67	1,700.82	17,851.53	NC	0.001	4.00E-01	4.00E-01
Ethylbenzene	165,114.94	438.67	13,976.57	17,851.53	NC	0.001	1.00E+00	1.00E+00
Xylenes	1,034,076.83	1,053.05	4,066.96	39,458.10	NC	0.001	1.00E-01	3.00E-01
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	0.001	3.00E-03	3.00E-03
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.66	NC	0.001	2.00E-01	2.00E-01
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	0.001	5.00E-02	5.00E-02
Polycyclic Aromatic Hydrocarbons								
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	0.001	5.00E-02	5.00E-01
Acenaphthylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	265,383.38	9,370.88	23,427.20	238,957.49	NC	0.001	2.00E-01	2.00E-01
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	0.001	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	70.28	185.37	0.001	4.60E+00	4.60E+00
								Subtotal:

ECS-4							
Receptor	NCingdw Factor (1/day)	Receptor	NCingdw Factor (1/day)	Receptor	NCingdw Factor (1/day)	Receptor	NCingdw Factor (1/day)
Site Worker (chronic)	4.58E-07	Resident (Young Child) (subchronic)	6.97E-07	Resident (Child)	6.97E-07	Resident (Adult)	6.97E-07
Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
2.01E-07	6.70E-06	3.06E-07	3.40E-06	3.06E-07	1.02E-05	3.06E-07	1.02E-05
2.01E-07	5.03E-07	3.06E-07	7.65E-07	3.06E-07	7.65E-07	3.06E-07	7.65E-07
2.01E-07	2.01E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07	3.06E-07
4.83E-07	4.83E-06	7.34E-07	2.45E-06	7.34E-07	7.34E-06	7.34E-07	7.34E-06
5.23E-07	1.74E-04	7.96E-07	2.65E-04	7.96E-07	2.65E-04	7.96E-07	2.65E-04
4.80E-05	1.60E-05	7.30E-05	2.43E-05	7.30E-05	2.43E-05	7.30E-05	2.43E-05
3.94E-05	1.97E-04	5.99E-05	2.99E-04	5.99E-05	2.99E-04	5.99E-05	2.99E-04
3.44E-06	1.72E-05	5.23E-06	2.62E-05	5.23E-06	2.62E-05	5.23E-06	2.62E-05
1.99E-06	3.97E-05	3.02E-06	6.04E-05	3.02E-06	6.04E-05	3.02E-06	6.04E-05
5.37E-08	1.79E-05	8.17E-08	2.72E-05	8.17E-08	2.72E-05	8.17E-08	2.72E-05
5.37E-08	1.07E-06	8.17E-08	1.63E-07	8.17E-08	1.63E-06	8.17E-08	1.63E-06
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
4.30E-06	2.15E-05	6.53E-06	3.27E-05	6.53E-06	3.27E-05	6.53E-06	3.27E-05
4.30E-06	NC	6.53E-06	NC	6.53E-06	NC	6.53E-06	NC
4.30E-06	8.59E-05	6.53E-06	1.31E-04	6.53E-06	1.31E-04	6.53E-06	1.31E-04
NC	NC	NC	NC	NC	NC	NC	NC
	5.83E-04		8.73E-04		8.86E-04		8.86E-04

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 40

Average Daily Exposure and Risk Estimate Inhalation of Drinking Water

Noncarcinogenic Effects								
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St			
Compound	DCW-1 Shower EPCair,gw (µg/m ³)	DCW-2 Shower EPCair,gw (µg/m ³)	ECS-1 Shower EPCair,gw (µg/m ³)	ECS-4 Shower EPCair,gw (µg/m ³)	131 Main St Shower EPCair,gw (µg/m ³)	Unit Conversion Factor (µg/m ³ /mg/m ³)	Chronic Inhalation Reference Concentration (RfC _c) (mg/m ³)	Subchronic Inhalation Reference Concentration (RfC _s) (mg/m ³)
Volatile Hydrocarbons								
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	0.001	3.00E-02	9.00E-02
Toluene	115,027.59	438.67	1,700.82	17,851.53	NC	0.001	4.00E-01	4.00E-01
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	0.001	1.00E+00	1.00E+00
Xylenes	1,034,076.83	1,053.05	4,066.96	39,456.10	NC	0.001	1.00E-01	3.00E-01
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	0.001	3.00E-03	3.00E-03
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,576.46	1,813,265.66	NC	0.001	2.00E-01	2.00E-01
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	0.001	5.00E-02	5.00E-02
Polycyclic Aromatic Hydrocarbons								
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	0.001	5.00E-02	5.00E-01
Acenaphthylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	265,383.38	9,370.88	23,427.20	238,957.49	NC	0.001	2.00E-01	2.00E-01
C19 to C35 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	0.001	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	70.28	185.37	0.001	4.60E+00	4.60E+00
								Subtotal:

ECS-1							
Receptor	NCIngdw Factor (1/day)	Receptor	NCIngdw Factor (1/day)	Receptor	NCIngdw Factor (1/day)	Receptor	NCIngdw Factor (1/day)
Site Worker (chronic)	4.58E-07	Resident (Young Child) (subchronic)	6.97E-07	Resident (Child)	6.97E-07	Resident (Adult)	6.97E-07
Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
4.37E-06	1.46E-04	6.64E-06	7.38E-05	6.64E-06	2.21E-04	6.64E-06	2.21E-04
7.80E-07	1.95E-06	1.19E-06	2.96E-06	1.19E-06	2.96E-06	1.19E-06	2.96E-06
6.41E-06	6.41E-06	9.74E-06	9.74E-06	9.74E-06	9.74E-06	9.74E-06	9.74E-06
1.86E-06	1.86E-05	2.84E-06	9.45E-06	2.84E-06	2.84E-05	2.84E-06	2.84E-05
1.10E-05	3.67E-03	1.67E-05	5.57E-03	1.67E-05	5.57E-03	1.67E-05	5.57E-03
4.81E-07	1.60E-07	7.32E-07	2.44E-07	7.32E-07	2.44E-07	7.32E-07	2.44E-07
2.88E-05	1.44E-04	4.37E-05	2.19E-04	4.37E-05	2.19E-04	4.37E-05	2.19E-04
2.78E-05	1.39E-04	4.23E-05	2.12E-04	4.23E-05	2.12E-04	4.23E-05	2.12E-04
3.87E-05	7.74E-04	5.89E-05	1.18E-03	5.89E-05	1.18E-03	5.89E-05	1.18E-03
3.55E-06	1.18E-03	5.40E-06	1.80E-03	5.40E-06	1.80E-03	5.40E-06	1.80E-03
2.78E-06	5.52E-05	4.20E-06	8.40E-06	4.20E-06	8.40E-05	4.20E-06	8.40E-05
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.07E-05	5.37E-05	1.63E-05	8.17E-05	1.63E-05	8.17E-05	1.63E-05	8.17E-05
6.44E-06	NC	9.80E-06	NC	9.80E-06	NC	9.80E-06	NC
4.30E-05	8.59E-04	6.53E-05	1.31E-03	6.53E-05	1.31E-03	6.53E-05	1.31E-03
NC	NC	NC	NC	NC	NC	NC	NC
	7.05E-03		1.05E-02		1.07E-02		1.07E-02

Table 40

Average Daily Exposure and Risk Estimate
Inhalation of Drinking Water

Noncarcinogenic Effects								
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St			
Compound	DCW-1 Shower EPCair.gw (µg/m ³)	DCW-2 Shower EPCair.gw (µg/m ³)	ECS-1 Shower EPCair.gw (µg/m ³)	ECS-4 Shower EPCair.gw (µg/m ³)	131 Main St Shower EPCair.gw (µg/m ³)	Unit Conversion Factor (µg/m ³)	Chronic Inhalation Reference Concentration (RfCd) (mg/m ³)	Subchronic Inhalation Reference Concentration (RfCsc) (mg/m ³)
Volatile Hydrocarbons								
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	0.001	3.00E-02	9.00E-02
Toluene	115,027.58	438.67	1,700.82	17,851.53	NC	0.001	4.00E-01	4.00E-01
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	0.001	1.00E+00	1.00E+00
Xylenes	1,034,076.83	1,053.05	4,066.96	39,456.10	NC	0.001	1.00E-01	3.00E-01
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	0.001	3.00E-03	3.00E-03
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.66	NC	0.001	2.00E-01	2.00E-01
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	0.001	5.00E-02	5.00E-02
Polycyclic Aromatic Hydrocarbons								
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	0.001	5.00E-02	5.00E-01
Acenaphthylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Extractable Petroleum Hydrocarbons								
C9 to C18 Aliphatics	265,383.38	9,370.88	23,427.20	238,957.49	NC	0.001	2.00E-01	2.00E-01
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	0.001	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	70.28	185.37	0.001	4.60E+00	4.60E+00
						Subtotal:		

ECS-4							
Receptor	NCIngdw Factor (1/day)	Receptor	NCIngdw Factor (1/day)	Receptor	NCIngdw Factor (1/day)	Receptor	NCIngdw Factor (1/day)
Site Worker (chronic)	4.58E-07	Resident (Young Child) (subchronic)	6.97E-07	Resident (Child)	6.97E-07	Resident (Adult)	6.97E-07
Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
2.27E-05	7.56E-04	3.45E-05	3.83E-04	3.45E-05	1.15E-03	3.45E-05	1.15E-03
8.18E-06	2.05E-05	1.24E-05	3.11E-05	1.24E-05	3.11E-05	1.24E-05	3.11E-05
8.18E-06	8.18E-06	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05	1.24E-05
1.81E-05	1.81E-04	2.75E-05	9.17E-05	2.75E-05	2.75E-04	2.75E-05	2.75E-04
9.86E-06	3.29E-03	1.50E-05	5.00E-03	1.50E-05	5.00E-03	1.50E-05	5.00E-03
3.07E-04	1.02E-04	4.66E-04	1.55E-04	4.66E-04	1.55E-04	4.66E-04	1.55E-04
2.42E-05	1.21E-04	3.67E-05	1.84E-04	3.67E-05	1.84E-04	3.67E-05	1.84E-04
8.31E-04	4.16E-03	1.26E-03	6.32E-03	1.26E-03	6.32E-03	1.26E-03	6.32E-03
9.73E-04	1.95E-02	1.48E-03	2.96E-02	1.48E-03	2.96E-02	1.48E-03	2.96E-02
4.09E-05	1.36E-03	6.21E-06	2.07E-03	6.21E-06	2.07E-03	6.21E-06	2.07E-03
4.38E-06	8.76E-05	6.66E-06	1.33E-05	6.66E-06	1.33E-04	6.66E-06	1.33E-04
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.10E-04	5.48E-04	1.67E-04	8.33E-04	1.67E-04	8.33E-04	1.67E-04	8.33E-04
3.87E-05	NC	5.88E-05	NC	5.88E-05	NC	5.88E-05	NC
1.35E-04	2.71E-03	2.06E-04	4.12E-03	2.06E-04	4.12E-03	2.06E-04	4.12E-03
3.22E-08	7.00E-09	4.90E-08	1.07E-08	4.90E-08	1.07E-08	4.90E-08	1.07E-08
		3.58E-02		5.33E-02		5.44E-02	



Noncarcinogenic Effects								
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St			
Compound	DCW-1 Shower EPCalr,gw (µg/m3)	DCW-2 Shower EPCalr,gw (µg/m3)	ECS-1 Shower EPCalr,gw (µg/m3)	ECS-4 Shower EPCalr,gw (µg/m3)	131 Main St Shower EPCalr,gw (µg/m3)	Unit Conversion Factor (µg/m3/mg/m3)	Chronic Inhalation Reference Concentration (RfC) (mg/m3)	Subchronic Inhalation Reference Concentration (RfCsc) (mg/m3)
Volatile Hydrocarbons								
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	0.001	3.00E-02	9.00E-02
Toluene	115,027.58	438.67	1,700.82	17,851.53	NC	0.001	4.00E-01	4.00E-01
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	0.001	1.00E+00	1.00E+00
Xylenes	1,034,076.83	1,053.05	4,066.96	39,456.10	NC	0.001	1.00E-01	3.00E-01
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	0.001	3.00E-03	3.00E-03
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons								
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.66	NC	0.001	2.00E-01	2.00E-01
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Acenaphthylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
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C9 to C18 Aliphatics	265,393.38	9,370.88	23,427.20	238,957.49	NC	0.001	2.00E-01	2.00E-01
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	0.001	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons								
Tetrachloroethylene	NC	NC	NC	70.28	185.37	0.001	4.60E+00	4.60E+00
								Subtotal:

[illegible]

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 40

Average Daily Exposure and Risk Estimate
Inhalation of Drinking Water

Carcinogenic Effects						
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St	
Compound	DCW-1 Shower EPCair,gw (µg/m ³)	DCW-2 Shower EPCair,gw (µg/m ³)	ECS-1 Shower EPCair,gw (µg/m ³)	ECS-4 Shower EPCair,gw (µg/m ³)	131 Main St Shower EPCair,gw (µg/m ³)	Inhalation Unit Risk (UR) (1/ugm ³)
Volatile Hydrocarbons						
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	7.80E-06
Toluene	115,027.58	438.67	1,700.82	17,851.53	NC	NC
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	NC
Xylenes	1,034,076.83	1,053.05	4,066.96	39,456.10	NC	NC
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	NC
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	NC
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	NC
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.66	NC	NC
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	NC
Polycyclic Aromatic Hydrocarbons						
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	NC
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	2.09E-04
Chrysene	NC	NC	NC	NC	NC	2.09E-05
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	2.09E-04
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	2.09E-05
Benzo(a)pyrene	NC	NC	NC	NC	NC	2.09E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	2.09E-04
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	2.09E-03
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	255,383.38	9,370.88	23,427.20	238,957.49	NC	NC
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	NC
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	NC	NC	70.28	185.37	5.50E-05
Subtotal:						

DCW-1							
Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)
Site Worker (chronic)	1.83E-07	Resident (Young Child) (subchronic)	NC	Resident (Child)	NC	Resident (Adult)	2.99E-07
Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
2.01E-03	1.57E-08	NC	NC	NC	NC	3.28E-03	2.56E-08
2.11E-02	NC	NC	NC	NC	NC	3.44E-02	NC
3.03E-02	NC	NC	NC	NC	NC	4.93E-02	NC
1.90E-01	NC	NC	NC	NC	NC	3.09E-01	NC
4.77E-02	NC	NC	NC	NC	NC	7.77E-02	NC
6.40E-01	NC	NC	NC	NC	NC	1.04E+00	NC
9.69E-02	NC	NC	NC	NC	NC	1.58E-01	NC
7.06E-01	NC	NC	NC	NC	NC	1.15E+00	NC
7.50E-01	NC	NC	NC	NC	NC	1.22E+00	NC
8.49E-03	NC	NC	NC	NC	NC	1.38E-02	NC
8.15E-04	NC	NC	NC	NC	NC	1.33E-03	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
4.87E-02	NC	NC	NC	NC	NC	7.93E-02	NC
2.00E-02	NC	NC	NC	NC	NC	3.25E-02	NC
3.64E-02	NC	NC	NC	NC	NC	5.94E-02	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.57E-08			NC		NC		2.56E-08

Notes: NC = Not Calculated.

Table 40

Average Daily Exposure and Risk Estimate
Inhalation of Drinking Water

Carcinogenic Effects						
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St	
Compound	DCW-1 Shower EPCair,gw (µg/m ³)	DCW-2 Shower EPCair,gw (µg/m ³)	ECS-1 Shower EPCair,gw (µg/m ³)	ECS-4 Shower EPCair,gw (µg/m ³)	131 Main St Shower EPCair,gw (µg/m ³)	Inhalation Unit Risk (IUR) (1/ug/m ³)
Volatile Hydrocarbons						
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	7.80E-06
Toluene	115,027.58	438.67	1,700.82	17,851.53	NC	NC
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	NC
Xylenes	1,034,076.83	1,053.05	4,066.96	39,456.10	NC	NC
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	NC
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	NC
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	NC
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.66	NC	NC
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	NC
Polycyclic Aromatic Hydrocarbons						
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	NC
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	2.09E-04
Chrysene	NC	NC	NC	NC	NC	2.09E-05
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	2.09E-04
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	2.09E-05
Benzo(a)pyrene	NC	NC	NC	NC	NC	2.09E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	2.09E-04
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	2.09E-03
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	265,383.38	9,370.88	23,427.20	238,957.49	NC	NC
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	NC
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	NC	NC	70.28	185.37	5.50E-05
Subtotal:						

ECS-4							
Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)
Site Worker (chronic)	1.83E-07	Resident (Young Child) (subchronic)	NC	Resident (Child)	NC	Resident (Adult)	2.99E-07
Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
8.04E-05	6.27E-10	NC	NC	NC	NC	1.31E-04	1.02E-09
8.04E-05	NC	NC	NC	NC	NC	1.31E-04	NC
8.04E-05	NC	NC	NC	NC	NC	1.31E-04	NC
1.93E-04	NC	NC	NC	NC	NC	3.15E-04	NC
2.09E-04	NC	NC	NC	NC	NC	3.41E-04	NC
1.92E-02	NC	NC	NC	NC	NC	3.13E-02	NC
1.57E-02	NC	NC	NC	NC	NC	2.57E-02	NC
1.38E-03	NC	NC	NC	NC	NC	2.24E-03	NC
7.94E-04	NC	NC	NC	NC	NC	1.29E-03	NC
2.15E-05	NC	NC	NC	NC	NC	3.50E-05	NC
2.15E-05	NC	NC	NC	NC	NC	3.50E-05	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.72E-03	NC	NC	NC	NC	NC	2.80E-03	NC
1.72E-03	NC	NC	NC	NC	NC	2.80E-03	NC
1.72E-03	NC	NC	NC	NC	NC	2.80E-03	NC
NC	NC	NC	NC	NC	NC	NC	NC
6.27E-10			NC		NC		1.02E-09

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 40

Average Daily Exposure and Risk Estimate Inhalation of Drinking Water

Carcinogenic Effects						
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St	
Compound	DCW-1 Shower EPCair,gw (µg/m3)	DCW-2 Shower EPCair,gw (µg/m3)	ECS-1 Shower EPCair,gw (µg/m3)	ECS-4 Shower EPCair,gw (µg/m3)	131 Main St Shower EPCair,gw (µg/m3)	Inhalation Unit Risk (UR) (1/µg/m3)
Volatile Hydrocarbons						
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	7.80E-06
Toluene	115,027.58	438.67	1,700.82	17,851.53	NC	NC
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	NC
Xylenes	1,034,076.83	1,053.05	4,066.96	39,456.10	NC	NC
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	NC
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	NC
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	NC
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.66	NC	NC
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	NC
Polycyclic Aromatic Hydrocarbons						
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	NC
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	2.09E-04
Chrysene	NC	NC	NC	NC	NC	2.09E-05
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	2.09E-04
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	2.09E-05
Benzo(a)pyrene	NC	NC	NC	NC	NC	2.09E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	2.09E-04
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	2.09E-03
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	265,383.38	9,370.88	23,427.20	238,957.49	NC	NC
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	NC
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	NC	NC	70.28	185.37	5.50E-05
Subtotal:						

Notes: NC = Not Calculated.

ECS-1							
Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)
Site Worker (chronic)	1.83E-07	Resident (Young Child) (subchronic)	NC	Resident (Child)	NC	Resident (Adult)	2.99E-07
Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
1.75E-03	1.36E-08	NC	NC	NC	NC	2.85E-03	2.22E-08
3.12E-04	NC	NC	NC	NC	NC	5.08E-04	NC
2.56E-03	NC	NC	NC	NC	NC	4.18E-03	NC
7.46E-04	NC	NC	NC	NC	NC	1.22E-03	NC
4.40E-03	NC	NC	NC	NC	NC	7.17E-03	NC
1.92E-04	NC	NC	NC	NC	NC	3.14E-04	NC
1.15E-02	NC	NC	NC	NC	NC	1.87E-02	NC
1.11E-02	NC	NC	NC	NC	NC	1.81E-02	NC
1.55E-02	NC	NC	NC	NC	NC	2.52E-02	NC
1.42E-03	NC	NC	NC	NC	NC	2.31E-03	NC
1.10E-03	NC	NC	NC	NC	NC	1.80E-03	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
4.30E-03	NC	NC	NC	NC	NC	7.00E-03	NC
2.58E-03	NC	NC	NC	NC	NC	4.20E-03	NC
1.72E-02	NC	NC	NC	NC	NC	2.80E-02	NC
NC	NC	NC	NC	NC	NC	NC	NC
	1.36E-08		NC		NC		2.22E-08

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 40

Average Daily Exposure and Risk Estimate
Inhalation of Drinking Water

Carcinogenic Effects						
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St	
Compound	DCW-1 Shower EPCair,gw (µg/m ³)	DCW-2 Shower EPCair,gw (µg/m ³)	ECS-1 Shower EPCair,gw (µg/m ³)	ECS-4 Shower EPCair,gw (µg/m ³)	131 Main St Shower EPCair,gw (µg/m ³)	Inhalation Unit Risk (UR) (1/µg/m ³)
Volatile Hydrocarbons						
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	7.80E-06
Toluene	115,027.58	438.67	1,700.82	17,851.53	NC	NC
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	NC
Xylenes	1,034,076.83	1,053.05	4,066.96	39,456.10	NC	NC
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	NC
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	NC
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	NC
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.66	NC	NC
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	NC
Polycyclic Aromatic Hydrocarbons						
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	NC
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	2.09E-04
Chrysene	NC	NC	NC	NC	NC	2.09E-05
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	2.09E-04
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	2.09E-05
Benzo(a)pyrene	NC	NC	NC	NC	NC	2.09E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	2.09E-04
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	2.09E-03
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	265,383.38	9,370.88	23,427.20	238,957.49	NC	NC
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	NC
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	NC	NC	70.28	185.37	5.50E-05
Subtotal:						

ECS-4							
Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)	Receptor	Cingdw Factor (1/day)
Site Worker (chronic)	1.83E-07	Resident (Young Child) (subchronic)	NC	Resident (Child)	NC	Resident (Adult)	2.99E-07
Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
9.07E-03	7.08E-08	NC	NC	NC	NC	1.48E-02	1.15E-07
3.27E-03	NC	NC	NC	NC	NC	5.33E-03	NC
3.27E-03	NC	NC	NC	NC	NC	5.33E-03	NC
7.23E-03	NC	NC	NC	NC	NC	1.18E-02	NC
3.94E-03	NC	NC	NC	NC	NC	6.43E-03	NC
1.23E-01	NC	NC	NC	NC	NC	2.00E-01	NC
9.67E-03	NC	NC	NC	NC	NC	1.57E-02	NC
3.32E-01	NC	NC	NC	NC	NC	5.42E-01	NC
3.89E-01	NC	NC	NC	NC	NC	6.34E-01	NC
1.63E-03	NC	NC	NC	NC	NC	2.66E-03	NC
1.75E-03	NC	NC	NC	NC	NC	2.86E-03	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
4.38E-02	NC	NC	NC	NC	NC	7.14E-02	NC
1.55E-02	NC	NC	NC	NC	NC	2.52E-02	NC
5.41E-02	NC	NC	NC	NC	NC	8.82E-02	NC
1.29E-05	7.09E-10	NC	NC	NC	NC	2.10E-05	1.15E-09
2.60E-07		NC		NC		4.24E-07	

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 40

Average Daily Exposure and Risk Estimate Inhalation of Drinking Water

Carcinogenic Effects						
	DCW-1	DCW-2	ECS-1	ECS-4	131 Main St	
Compound	DCW-1 Shower EPCair,gw (µg/m3)	DCW-2 Shower EPCair,gw (µg/m3)	ECS-1 Shower EPCair,gw (µg/m3)	ECS-4 Shower EPCair,gw (µg/m3)	131 Main St Shower EPCair,gw (µg/m3)	Inhalation Unit Risk (UR) (1/ug/m3)
Volatile Hydrocarbons						
Benzene	10,982.67	438.67	9,530.19	49,478.26	NC	7.80E-06
Toluene	115,027.58	438.67	1,700.82	17,851.53	NC	NC
Ethylbenzene	165,114.94	438.67	13,976.67	17,851.53	NC	NC
Xylenes	1,034,076.83	1,053.05	4,066.96	39,456.10	NC	NC
Naphthalene	260,135.68	1,141.49	23,989.46	21,506.17	NC	NC
MTBE	3,492,059.17	104,719.61	1,049.54	669,080.97	493.73	NC
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	528,517.74	85,860.71	62,738.05	52,711.21	NC	NC
C9 to C12 Aliphatics	3,849,089.78	7,506.66	60,676.46	1,813,265.66	NC	NC
C9 to C10 Aromatics	4,092,732.71	4,332.28	84,431.65	2,122,504.77	NC	NC
Polycyclic Aromatic Hydrocarbons						
Naphthalene	46,287.47	117.14	7,740.35	8,911.71	NC	NC
2-Methylnaphthalene	4,445.31	117.14	6,025.48	9,558.30	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	NC	2.09E-04
Chrysene	NC	NC	NC	NC	NC	2.09E-05
Benzo(b)fluoranthene	NC	NC	NC	NC	NC	2.09E-04
Benzo(k)fluoranthene	NC	NC	NC	NC	NC	2.09E-05
Benzo(a)pyrene	NC	NC	NC	NC	NC	2.09E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	NC	2.09E-04
Dibenzo(a,h)anthracene	NC	NC	NC	NC	NC	2.09E-03
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	265,383.38	9,370.88	23,427.20	238,957.49	NC	NC
C19 to C36 Aliphatics	108,936.50	9,370.88	14,056.32	84,337.94	NC	NC
C11 to C22 Aromatics	198,686.13	9,370.88	93,708.82	295,182.78	NC	NC
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	NC	NC	70.28	185.37	5.50E-05
						Subtotal

[illegible]

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 41

Risk Estimate:
Ingestion of Home-Grown Produce
Entire Site

Massachusetts

						Receptor		Receptor		Receptor	
						Resident (young child 1 - 2)		Resident (child 1 - 8)		Resident (adult 0 - 30)	
Noncarcinogenic Effects											
Compound	Soil EPCs (0 - 15 ft) (mg/Kg)	Non- Cancer Ingestion	Area Adjustmen t Factor	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Hazard Index Multiplier (subchronic, SHIM)	Hazard Index (Subchronic, unitless)	Hazard Index Multiplier (chronic, HIMc)	Hazard Index (Chronic, unitless)	Hazard Index Multiplier (chronic, HIMc)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	0.28	NC	1	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	1.43	NC	1	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	3.64	NC	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	26.51	NC	1	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	8.15	NC	1	2.00E-02	2.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
MTBE	0.70	NC	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	70.78	NC	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	174.37	NC	1	1.00E-01	1.00E+00	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
C9 to C10 Aromatics	97.84	NC	1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	1.36	NC	1	2.00E-02	2.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
2-Methylnaphthalene	7.83	NC	1	4.00E-03	4.00E-02	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Acenaphthylene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Acenaphthene	0.26	NC	1	6.00E-02	6.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Fluorene	NC	NC	1	4.00E-02	4.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Phenanthrene	1.81	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Anthracene	NC	NC	1	3.00E-01	3.00E+00	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Fluoranthene	NC	NC	1	4.00E-02	4.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Pyrene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Benzo(a)anthracene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Chrysene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Benzo(b)fluoranthene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Benzo(k)fluoranthene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Benzo(a)pyrene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Indeno(1,2,3-cd)pyrene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Dibenzo(a,h)anthracene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Benzo(g,h,i)perylene	NC	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	2,097.82	NC	1	1.00E-01	1.00E+00	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
C19 to C36 Aliphatics	777.57	NC	1	2.00E+00	6.00E+00	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
C11 to C22 Aromatics	876.79	NC	1	3.00E-02	3.00E-01	3.51E-05	NC	2.97E-05	NC	1.61E-05	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	NC	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:						NC	NC	NC	NC	NC	NC

Notes: ND = Not Detected. NC = Not Calculated. NCB = Not Calculated Below Background.

Table 42

Exposure Route/Receptor												Residential Use		
Table Reference												Resident (young child 1 - 2)	Resident (child 1 - 8)	Resident (adult 0 - 30)
Site Worker 18 - 45														
Construction Worker														
Utility Worker														
Passerby/ Trespasser (child 6 - 13)														
Passerby/ Trespasser (child 13 - 18)														
Passerby/ Trespasser (adult 18 - 31)														
Noncarcinogenic Effects														
Media	Exposure Pathway	Exposure Point												
Soil	Incidental Ingestion	Disposal Site Area (0 to 3 feet)	20	2.44E-02	NC	NC	2.12E-02	1.32E-03	1.15E-02	NC	NC	NC		
	Incidental Ingestion	Disposal Site Area (0 to 6 feet)	21	NC	NC	1.23E-02	NC	NC	NC	NC	NC	NC		
	Incidental Ingestion	Disposal Site Area (0 to 15 feet)	22	NC	5.26E-03	NC	NC	NC	NC	1.75E-02	1.99E-02	1.46E-02		
	Ingestion: Fugitive Dust	Disposal Site Area (0 to 3 feet)	23	2.26E-03	NC	NC	3.05E-04	1.90E-05	2.84E-04	NC	NC	NC		
	Ingestion: Fugitive Dust	Disposal Site Area (0 to 6 feet)	24	NC	NC	4.24E-04	NC	NC	NC	NC	NC	NC		
	Ingestion: Fugitive Dust	Disposal Site Area (0 to 15 feet)	25	NC	1.82E-04	NC	NC	NC	NC	5.08E-05	6.00E-04	7.06E-04		
	Dermal Contact	Disposal Site Area (0 to 3 feet)	26	3.58E-02	NC	NC	8.80E-02	8.01E-03	7.64E-02	NC	NC	NC		
	Dermal Contact	Disposal Site Area (0 to 6 feet)	27	NC	NC	7.84E-02	NC	NC	NC	NC	NC	NC		
	Dermal Contact	Disposal Site Area (0 to 15 feet)	28	NC	3.35E-02	NC	NC	NC	NC	5.63E-02	3.86E-01	1.95E-01		
	Inhalation: Fugitive Dust	Disposal Site Area (0 to 3 feet)	29	2.56E-04	NC	NC	3.45E-05	2.00E-05	2.99E-05	NC	NC	NC		
	Inhalation: Fugitive Dust	Disposal Site Area (0 to 6 feet)	30	NC	NC	5.34E-04	NC	NC	NC	NC	NC	NC		
	Inhalation: Fugitive Dust	Disposal Site Area (0 to 15 feet)	31	NC	2.29E-04	NC	NC	NC	NC	8.40E-05	8.10E-05	9.53E-05		
	Sed. Incidental Ingestion	Surface	Surface	33	NC	NC	2.31E-03	3.34E-03	2.08E-04	1.81E-03	1.83E-03	2.08E-03	1.53E-03	
Sed. Dermal Contact	Surface	Surface	0	NC	NC	8.48E-04	1.28E-03	7.65E-05	6.93E-04	8.71E-04	7.97E-04	5.86E-04		
S. Water	Dermal Contact	Outlet at S. Meadow Brook	34	2.68E-05	NC	NC	1.94E-04	1.69E-05	1.75E-04	5.69E-05	3.45E-04	3.27E-04		
	Water Inh. Vapors Trench	DCW-1	35	NC	1.98E-02	3.61E-01	NC	NC	NC	NC	NC	NC		
	Water Inh. Vapors Trench	DCW-2	35	NC	1.11E-04	2.02E-03	NC	NC	NC	NC	NC	NC		
	Water Inh. Vapors Trench	ECS-1	35	NC	1.45E-03	2.65E-02	NC	NC	NC	NC	NC	NC		
Water	Water Inh. Vapors Trench	ECS-4	35	NC	6.29E-03	1.15E-01	NC	NC	NC	NC	NC	NC		
	Water Dermal Contact	DCW-1	36	NC	2.21E-03	5.51E-05	NC	NC	NC	NC	NC	NC		
	Water Dermal Contact	DCW-2	36	NC	5.05E-06	1.28E-06	NC	NC	NC	NC	NC	NC		
	Water Dermal Contact	ECS-1	36	NC	1.25E-03	3.14E-05	NC	NC	NC	NC	NC	NC		
Water	Water Dermal Contact	ECS-4	36	NC	2.38E-02	5.98E-04	NC	NC	NC	NC	NC	NC		
	Air Inhalation	Interior Building	Ambient	34	NC	NC	NC	NC	NC	NC	NC	NC		
	Air Inhalation	Interior Building	First Floor Office	37	1.68E+00	NC	NC	NC	NC	7.59E+00	7.59E+00	7.59E+00		
	Air Inhalation	Interior Building	Second Floor Living	37	6.29E-01	NC	NC	NC	NC	2.87E+00	2.87E+00	2.87E+00		
D. Water	Air Inhalation	Interior Building	First Floor Reception	34	NC	NC	NC	NC	NC	NC	NC	NC		
	D. Water Ingestion	DCW-1	38	4.03E+01	NC	NC	NC	NC	NC	1.27E+01	8.82E+01	6.46E+01		
	D. Water Ingestion	DCW-2	38	8.55E-01	NC	NC	NC	NC	NC	1.86E-01	1.43E+00	1.05E+00		
	D. Water Ingestion	ECS-1	38	2.21E+00	NC	NC	NC	NC	NC	8.82E-01	4.83E+00	3.54E+00		
	D. Water Ingestion	ECS-4	38	2.18E+01	NC	NC	NC	NC	NC	1.16E+01	4.76E+01	3.49E+01		
	D. Water Ingestion	131 Main St	38	4.49E-03	NC	NC	NC	NC	NC	2.65E-03	9.81E-03	7.19E-03		
	D. Water Inhalation	DCW-1	39	1.02E-01	NC	NC	NC	NC	NC	1.51E-01	1.58E-01	1.56E-01		
	D. Water Inhalation	DCW-2	39	5.83E-04	NC	NC	NC	NC	NC	8.73E-04	8.86E-04	8.86E-04		
	D. Water Inhalation	ECS-1	39	7.05E-03	NC	NC	NC	NC	NC	1.05E-02	1.07E-02	1.07E-02		
	D. Water Inhalation	ECS-4	39	3.58E-02	NC	NC	NC	NC	NC	5.33E-02	5.44E-02	5.44E-02		
	D. Water Inhalation	131 Main St	39	1.88E-06	NC	NC	NC	NC	NC	2.86E-06	2.86E-06	2.86E-06		
	D. Water Dermal Contact	DCW-1	40	1.62E+01	NC	NC	NC	NC	NC	6.11E+00	3.20E+01	2.58E+01		
	D. Water Dermal Contact	DCW-2	40	2.18E-01	NC	NC	NC	NC	NC	5.96E-02	4.87E-01	3.50E-01		
	D. Water Dermal Contact	ECS-1	40	5.96E-01	NC	NC	NC	NC	NC	1.86E-01	1.12E+00	9.50E-01		
	D. Water Dermal Contact	ECS-4	40	6.04E+02	NC	NC	NC	NC	NC	1.32E+02	1.00E+03	9.58E+02		
D. Water Dermal Contact	131 Main St	40	1.37E-03	NC	NC	NC	NC	NC	1.29E-03	2.73E-03	2.18E-03			
Sum	Soil Ingestion of Produce:	Disposal Site Area (0 to 15 feet)	41	NC	NC	NC	NC	NC	NC	NC	NC	NC		
				6.E+02	8.E-02	5.E-01	1.E-01	1.E-02	9.E-02	2.E+02	1.E+03	1.E+03		
Cumulative Hazard Index (Passerby/Trespasser)										2.E-01				

Table 42

Exposure Route/Receptor				Table Reference	Site Worker 18 - 45	Construction Worker	Utility Worker	Passerby/Trespasser (child 6 - 13)	Passerby/Trespasser (child 13 - 18)	Passerby/Trespasser (adult 18 - 31)	Residential Use		
											Resident (young child 1 - 2)	Resident (child 1 - 8)	Resident (adult 18 - 30)
Carcinogenic Effects													
Media	Exposure Pathway	Exposure Point											
Soil	Incidental Ingestion	Disposal Site Area	(0 to 3 feet)	20	2.81E-09	NC	NC	5.70E-10	2.39E-10	5.73E-10	NC	NC	NC
	Incidental Ingestion	Disposal Site Area	(0 to 6 feet)	21	NC	NC	1.25E-12	NC	NC	NC	NC	NC	NC
	Incidental Ingestion	Disposal Site Area	(0 to 15 feet)	22	NC	1.30E-10	NC	NC	NC	NC	4.32E-09	1.25E-09	2.30E-09
	Ingestion: Fugitive Dust	Disposal Site Area	(0 to 3 feet)	23	2.61E-10	NC	NC	8.21E-12	3.44E-12	1.32E-11	NC	NC	NC
	Ingestion: Fugitive Dust	Disposal Site Area	(0 to 6 feet)	24	NC	NC	4.31E-14	NC	NC	NC	NC	NC	NC
	Ingestion: Fugitive Dust	Disposal Site Area	(0 to 15 feet)	25	NC	4.49E-12	NC	NC	NC	NC	1.26E-11	3.77E-11	1.11E-10
	Dermal Contact	Disposal Site Area	(0 to 3 feet)	26	7.30E-10	NC	NC	4.19E-10	2.88E-10	6.75E-10	NC	NC	NC
	Dermal Contact	Disposal Site Area	(0 to 6 feet)	27	NC	NC	1.47E-12	NC	NC	NC	NC	NC	NC
	Dermal Contact	Disposal Site Area	(0 to 15 feet)	28	NC	1.53E-10	NC	NC	NC	NC	2.57E-09	4.28E-09	5.41E-09
	Inhalation: Fugitive Dust	Disposal Site Area	(0 to 3 feet)	29	7.93E-15	NC	NC	2.50E-16	1.05E-16	4.02E-16	NC	NC	NC
	Inhalation: Fugitive Dust	Disposal Site Area	(0 to 6 feet)	30	NC	NC	1.53E-18	NC	NC	NC	NC	NC	NC
	Inhalation: Fugitive Dust	Disposal Site Area	(0 to 15 feet)	31	NC	1.58E-16	NC	NC	NC	NC	4.45E-16	1.34E-16	3.93E-15
	Sed. Incidental Ingestion	Surface	Surface	33	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Sed. Dermal Contact	Surface	Surface	0	NC	NC	NC	NC	NC	NC	NC	NC	NC
S. Water	Dermal Contact	Outlet at S. Meadow Brook	SW-1	34	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Dermal Contact	Location	Sample Location	34	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Dermal Contact	Location	Sample Location	34	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Dermal Contact	Location	Sample Location	34	NC	NC	NC	NC	NC	NC	NC	NC	NC
Water	Inh. Vapors Trench	DCW-1		35	NC	7.06E-11	7.06E-12	NC	NC	NC	NC	NC	NC
	Inh. Vapors Trench	DCW-2		35	NC	2.82E-12	2.82E-13	NC	NC	NC	NC	NC	NC
	Inh. Vapors Trench	ECS-1		35	NC	6.13E-11	6.13E-12	NC	NC	NC	NC	NC	NC
	Inh. Vapors Trench	ECS-4		35	NC	8.65E-10	8.65E-11	NC	NC	NC	NC	NC	NC
Water	Dermal Contact	DCW-1		36	NC	3.46E-08	8.64E-10	NC	NC	NC	NC	NC	NC
	Dermal Contact	DCW-2		36	NC	1.38E-09	3.45E-11	NC	NC	NC	NC	NC	NC
	Dermal Contact	ECS-1		36	NC	3.00E-08	7.50E-10	NC	NC	NC	NC	NC	NC
	Dermal Contact	ECS-4		36	NC	1.52E-06	3.80E-08	NC	NC	NC	NC	NC	NC
Air	Inhalation	Interior Building	Ambient	34	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Inhalation	Interior Building	First Floor Office	37	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Inhalation	Interior Building	Second Floor Living	37	NC	NC	NC	NC	NC	NC	NC	NC	NC
	Inhalation	Interior Building	First Floor Reception	34	NC	NC	NC	NC	NC	NC	NC	NC	NC
D. Water	Ingestion	DCW-1		38	3.96E-05	NC	NC	NC	NC	NC	NC	NC	8.35E-05
	Ingestion	DCW-2		38	1.58E-08	NC	NC	NC	NC	NC	NC	NC	3.33E-08
	Ingestion	ECS-1		38	3.44E-05	NC	NC	NC	NC	NC	NC	NC	7.24E-05
	Ingestion	ECS-4		38	8.19E-04	NC	NC	NC	NC	NC	NC	NC	1.73E-03
	Ingestion	131 Main St		38	1.96E-04	NC	NC	NC	NC	NC	NC	NC	4.14E-04
	Inhalation	DCW-1		39	1.57E-08	NC	NC	NC	NC	NC	NC	NC	2.56E-08
	Inhalation	DCW-2		39	6.27E-10	NC	NC	NC	NC	NC	NC	NC	1.02E-09
	Inhalation	ECS-1		39	1.36E-08	NC	NC	NC	NC	NC	NC	NC	2.22E-08
	Inhalation	ECS-4		39	2.60E-07	NC	NC	NC	NC	NC	NC	NC	4.24E-07
	Inhalation	131 Main St		39	3.29E-09	NC	NC	NC	NC	NC	NC	NC	5.36E-09
	Dermal Contact	DCW-1		40	5.87E-06	NC	NC	NC	NC	NC	NC	NC	1.09E-05
	Dermal Contact	DCW-2		40	2.34E-07	NC	NC	NC	NC	NC	NC	NC	4.37E-07
	Dermal Contact	ECS-1		40	5.08E-06	NC	NC	NC	NC	NC	NC	NC	9.50E-06
	Dermal Contact	ECS-4		40	3.26E-04	NC	NC	NC	NC	NC	NC	NC	6.09E-04
	Dermal Contact	131 Main St		40	1.49E-04	NC	NC	NC	NC	NC	NC	NC	2.79E-04
Sum	Soil Ingestion of Produce:	Disposal Site Area	(0 to 15 feet)	41	NC	NC	NC	NC	NC	NC	NC	NC	NC
					1.E-03	2.E-06	4.E-08	1.E-09	5.E-10	1.E-09	7.E-09	6.E-09	2.E-03
Cumulative Hazard Index (Passerby/Trespasser)										3.E-09			

Notes: NC = Not Calculated.

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table 43

Contaminants of Concern
Groundwater
Comparison with Upper Concentration Limits
Comparison with MMCLs

Units	No. of Analyses	No. of Detects	Average EPC (Whole Site) ug/L	Maximum EPC ug/L	Maximum Detect ug/L	Upper Concentration Limit (310 CMR 40.0996(7)) ug/L	Massachusetts Maximum Contaminant Levels (MMCLs (310 CMR 22.000)) (Spring, 2004) ug/L	Secondary Maximum Contaminant Levels (SMCLs (310 CMR 22.000)) (Spring, 2004)	MADEP Office of Research and Standards Guidelines (MA ORSGLs) (Spring, 2004) ug/L
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	77	11	293.93	3,760.00	7,130.00	100,000.0			300.0
C9 to C12 Aliphatics	77	18	1,292.74	27,383.33	63,200.00	100,000.0			700.0
C9 to C10 Aromatics	77	17	1,437.37	29,116.67	64,700.00	100,000.0			200.0
Benzene	77	12	14.53	352.00	352.00	100,000.0	5.0		
Toluene	77	10	37.50	818.33	1,220.00	80,000.0	1,000.0		
Ethylbenzene	77	16	60.77	1,174.67	1,610.00	100,000.0	700.0		
Xylenes	77	16	327.26	7,356.67	11,140.00	100,000.0	10,000.0		
Naphthalene	77	19	88.68	1,850.67	3,920.00	100,000.0			
MTBE	77	32	1,236.58	24,843.33	37,400.00	100,000.0		20 - 40	70.0
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	80	5	193.15	1,888.00	3,900.00	100,000.0			700.0
C19 to C36 Aliphatics	80	4	122.50	775.00	1,900.00	100,000.0			14,000.0
C11 to C22 Aromatics	80	11	211.93	2,100.00	3,500.00	100,000.0			200.0
Naphthalene	74	16	23.21	329.30	1,147.00	100,000.0			140.0
2-Methylnaphthalene	74	13	6.25	68.00	68.00	100,000.0			
Acenaphthylene	74	0	NC	NC	NC	30,000.0			
Acenaphthene	74	0	NC	NC	NC	50,000.0			
Fluorene	74	0	NC	NC	NC	30,000.0			
Phenanthrene	74	0	NC	NC	NC	3,000.0			
Anthracene	74	0	NC	NC	NC	30,000.0			
Fluoranthene	74	0	NC	NC	NC	2,000.0			
Pyrene	74	0	NC	NC	NC	800.0			
Benzo(a)anthracene	74	0	NC	NC	NC	10,000.0			
Chrysene	74	0	NC	NC	NC	30,000.0			
Benzo(b)fluoranthene	74	0	NC	NC	NC	4,000.0			
Benzo(k)fluoranthene	74	0	NC	NC	NC	1,000.0			
Benzo(a)pyrene	74	0	NC	NC	NC	5,000.0	0.2		
Indeno(1,2,3-cd)pyrene	74	0	NC	NC	NC	1,000.0			
Dibenzo(a,h)anthracene	74	0	NC	NC	NC	400.0			
Benzo(a,h,i)perylene	74	0	NC	NC	NC	30,000.0			
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	1	0	0.50	NC	NC	100,000.0	5.0		

Note: Concentrations in micrograms per liter (ug/L). EPC = Exposure Point Concentration. NC = Not Calculated.

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Carver, Massachusetts

Table 44

Contaminants of
Concern (Soil)
Comparison with Upper Concentration Limits

Units	No. Analyses	No. Detections	Maximum EPC mg/Kg	Maximum Detect mg/Kg	Location of Maximum	Upper Concentration Limit (310 CMR 40.0996(7)) mg/Kg
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	254	9	138.65	537.0	Left UST	5,000.0
C9 to C12 Aliphatics	254	8	338.95	1,830.0	Left UST	20,000.0
C9 to C10 Aromatics	254	5	186.59	1,010.0	Left UST	5,000.0
Benzene	255	1	0.41	1.42	DCE	9,000.0
Toluene	255	2	2.87	15.0	DCE	10,000.0
Ethylbenzene	255	5	7.59	29.7	DCE	10,000.0
Xylenes	255	7	56.29	121.0	DCE	10,000.0
Naphthalene	255	7	16.63	62.8	DCE	10,000.0
MTBE	255	3	1.09	4.93	DCE	5,000.0
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	250	5	4,181.44	10,200.0	DCE	20,000.0
C19 to C36 Aliphatics	250	6	1,542.96	3,740.0	DCE	10,000.0
C11 to C22 Aromatics	250	5	1,744.76	3,560.0	DCE	10,000.0
Naphthalene	250	3	2.70	6.6	DCE	10,000.0
2-Methylnaphthalene	250	3	15.64	43.2	DCE	10,000.0
Acenaphthylene	245	0	0.08	0.0		10,000.0
Acenaphthene	250	3	0.47	1.27	DCE	10,000.0
Fluorene	245	0	0.08	0.0		10,000.0
Phenanthrene	250	3	3.59	9.51	DCE	10,000.0
Anthracene	245	0	0.08	0.0		10,000.0
Fluoranthene	245	0	0.08	0.0		10,000.0
Pyrene	245	0	0.08	0.0		10,000.0
Benzo(a)anthracene	245	0	0.08	0.0		3,000.0
Chrysene	245	0	0.08	0.0		400.0
Benzo(b)fluoranthene	245	0	0.08	0.0		3,000.0
Benzo(k)fluoranthene	245	0	0.08	0.0		10,000.0
Benzo(a)pyrene	245	0	0.08	0.0		300.0
Indeno(1,2,3-cd)pyrene	245	0	0.08	0.0		3,000.0
Dibenzo(a,h)anthracene	245	0	0.08	0.0		300.0
Benzo(g,h,i)perylene	245	0	0.08	0.0		10,000.0
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	240	0	0.00	0.0		10,000.0

Notes: Concentrations in milligrams per kilogram (mg/Kg).
NC = Not Calculated.

ATTACHMENT I



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Benzene (CASRN 71-43-2)

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MAIN CONTENTS

Reference Dose for Chronic Oral Exposure (RfD)

Note:

For non-cancer effect information: A **TOXICOLOGICAL REVIEW** is available for this chemical in Adobe® PDF format (180 Pages, 776 Kbytes). A **peer review document** in Adobe PDF format (12 pages, 135 Kbytes) is also available. Similar documents can be found in the **List of Available IRIS Toxicological Reviews**.

For carcinogenicity information: **Support Document** and **response to the peer review** for the benzene inhalation carcinogenicity assessment in Adobe® PDF format (57 Pages, 285 Kbytes).

Support Document and **response to the peer review** for the benzene oral carcinogenicity assessment in Adobe® PDF format (27 Pages, 74 Kbytes). Similar documents can be found in the **List of Available IRIS Toxicological Reviews and Other Support Documents**.

Links to specific pages in the toxicological review are available throughout this summary. To utilize this feature, your Web browser and Adobe program must be configured properly so the PDF displays within the browser window. If your browser and Adobe program need configuration, [please go to the IRIS Help page for instructions](#).

0276

Benzene; CASRN 71-43-2; 04/17/2003

Health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several Program Offices and the Office of Research and Development. The summaries presented in Sections I and II represent a consensus reached in the review process. Background information and explanations of the methods used to derive the values given in IRIS are provided in the Background Documents.

STATUS OF DATA FOR Benzene

File First On-Line 03/01/1988

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	on-line	04/17/2003
Inhalation RfC Assessment (I.B.)	on-line	04/17/2003
Carcinogenicity Assessment (II.)	on-line	01/19/2000

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

Chronic Health
Hazards for Non-
Carcinogenic Effects
Reference Dose for
Chronic Oral Exposure
(RfD)

- Oral RfD Summary
- Principal and Supporting Studies
- Uncertainty and Modifying Factors
- Additional Studies/Comments
- Confidence in the Oral RfD
- EPA Documentation and Review

Reference
Concentration for
Chronic Inhalation
Exposure (RfC)

- Inhalation RfC Summary
- Principal and Supporting Studies
- Uncertainty and Modifying Factors
- Additional Studies/Comments
- Confidence in the Inhalation RfC
- EPA Documentation and Review

Carcinogenicity
Assessment for
Lifetime Exposure

Evidence for Human
Carcinogenicity

- Weight of Evidence Characterization
- Human Carcinogenicity Data
- Animal Carcinogenicity Data
- Supporting Data for Carcinogenicity

Quantitative Estimate
of Carcinogenic Risk
from Oral Exposure

- Summary of Risk

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name -- Benzene
CASRN -- 71-43-2
Last Revised -- 04/17/2003

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg/day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Please refer to the IRIS Background Document for an elaboration of these concepts. The U.S. EPA has evaluated this substance for potential human carcinogenicity. A summary of that evaluation is found in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Decreased lymphocyte count (Human occupational inhalation study; Rothman et al., 1996)	BMDL = 1.2 mg/kg/day	300	1	4.0 x 10 ⁻³ mg/kg/day

*Conversion factors: MW = 78.11. Assuming 25°C and 760 mm Hg, BMCL (mg/m³) = 7.2 ppm x MW/24.45 = 23 mg/m³. BMCL_{ADJ} = 23 mg/m³ x 10 m³/20 m³ x 5 days/7 days = 8.2 mg/m³. The BMDL was derived by route-to-route extrapolation with the assumptions that inhalation absorption was 50% and oral absorption was 100% in the dose range near the BMC. BMDL_{ADJ} = 8.2 mg/m³ x 20 m³/day x 0.5 ÷ 70 kg = 1.2 mg/kg/day. (The original BMC was based on a benchmark response of one standard deviation change from the control mean.)

I.A.2. Principal and Supporting Studies (Oral RfD)

The RfD is based on route-to-route extrapolation of the results of benchmark dose (BMD) modeling of the absolute lymphocyte count (ALC) data from the occupational epidemiologic study by Rothman et al. (1996), in which workers were exposed to benzene by inhalation. A comparison analysis based on BMD modeling of data from the National Toxicology Program's (NTP's) experimental animal gavage study (NTP, 1986) was also conducted. In addition, comparison analyses using the lowest-observed-adverse-effect levels (LOAELs) from the Rothman et al. (1996) and NTP (1986) studies were performed.

Rothman et al. (1996) conducted a cross-sectional study of 44 workers exposed to benzene and 44 age- and gender-matched unexposed controls. Twenty-one of the 44 subjects in the exposed and control groups were female. Mean (standard deviation) years of occupational exposure to benzene were 6.3 (4.4), with a range of 0.7–16 years. Benzene exposure was monitored by organic vapor passive dosimetry badges worn by each worker for a full workshift on 5 days within a 1–2 week period prior to collection of blood samples. The median 8-hour time-weighted average (TWA) benzene exposure concentration for all exposed workers was 31 ppm (89 mg/m³). The exposed group was subdivided into two equal groups of 22 subjects: those exposed to greater than the median concentration and those exposed to less than the median concentration. The median 8-hour TWA exposure concentration was 13.6 ppm (43.4 mg/m³) for the low-exposure group and 91.9 ppm (294 mg/m³) for the high-exposure group.

Six hematological measurements were evaluated: total white blood cell (WBC) count, ALC, hematocrit, red blood cell (RBC) count, platelet count, and mean corpuscular volume (MCV). All six parameters were significantly different in the high-benzene exposure group (>31 ppm) when compared to controls. ALC, WBC count, RBC count, hematocrit, and platelets were all significantly decreased, and MCV was significantly increased. ALC was the most sensitive endpoint; it was reduced from 1.9 x 10³/µL blood in controls to 1.6 x 10³/µL (p<0.01) in the <31 ppm group and to 1.3 x 10³/µL (p<0.001) in the group exposed to >31 ppm benzene. The ALC was also significantly reduced (1.6 x 10³/µL; p=0.03) in a subgroup of 11 workers exposed to a median 8-hour TWA of 7.6 ppm (24 mg/m³) benzene. For additional details about this study see Section I.B.2.

Estimates
- Dose-Response Data
- Additional Comments
- Discussion of Confidence

Quantitative Estimate
of Carcinogenic Risk
from Inhalation
Exposure

- Summary of Risk Estimates
- Dose-Response Data
- Additional Comments
- Discussion of Confidence

EPA Documentation,
Review and, Contacts

- Bibliography
- Revision History
- Synonyms

BMD modeling of the ALC data of Rothman et al. (1996) yielded a benchmark concentration (BMC) of 13.7 ppm (8-hr TWA) and a BMCL (the 95% lower bound on the BMC) of 7.2 ppm (8-hr TWA) for the default benchmark response of one standard deviation change from the control mean (see Section I.B.2 for details of the analysis). Converting the units and adjusting for continuous exposure results in a BMCL_{ADJ} of 8.2 mg/m³. (According to the Ideal Gas Law, concentration in mg/m³ = concentration in ppm $\times$ MW/24.45 at 25°C and 760 mm Hg. Thus, $\text{BMCL (mg/m}^3) = 7.2 \times 78.11/24.45 = 23.0 \text{ mg/m}^3$. $\text{BMCL}_{\text{ADJ}} = 23.0 \text{ mg/m}^3 \times 10 \text{ m}^3/20 \text{ m}^3 \times 5 \text{ days/7 days} = 8.2 \text{ mg/m}^3$, where 10 m³ is the default human occupational volume of air inhaled in an 8-hour workshift, and 20 m³ is the default human ambient volume of air inhaled in a 24-hour day (U.S. EPA, 1994).]

In the support document for the benzene cancer assessment on IRIS (U.S. EPA, 1999), EPA provided a simple method for extrapolation of benzene-induced cancer risk from the inhalation to the oral route. The same method is applied here for noncancer (hematopoietic) effects. The method is based on the relative efficiency of benzene absorption across routes of exposure, especially pulmonary and gastrointestinal barriers. An inhalation absorption rate of 50% and an oral absorption rate of 100% were used to calculate the absorbed benzene dose. These values are based on human inhalation absorption studies and the study by Sabourin et al. (1987) that compared inhalation and oral absorption in rats and mice. The authors found that during a 6-hour inhalation exposure, the retention of [¹⁴C]benzene decreased from 33 $\pm$ 6% to 15 $\pm$ 9% for rats and from 50 $\pm$ 1% to 10 $\pm$ 2% for mice as exposure concentration increased from 26 to 2,600 mg/m³ (10 to 1,000 ppm). In the same study, gastrointestinal absorption of benzene administered by gavage was >97% for doses between 0.5 and 150 mg/kg body weight. At oral doses below 15 mg/kg, >90% of the ¹⁴C excreted was in the urine as non-ethyl acetate-extractable material. At higher doses, an increasing percentage of the orally administered benzene was exhaled unmetabolized. Thus, in the dose range represented by the BMCL from the study by Rothman et al. (1996), absorption of a comparable oral dose was assumed to be 100%. See also U.S. EPA (1999) for more details about the route-to-route extrapolation of benzene inhalation results to oral exposures.

To calculate an equivalent oral dose rate, the BMCL_{ADJ} is multiplied by the default inhalation rate, multiplied by 0.5 to correct for the higher oral absorption, and divided by the standard default human body weight of 70 kg: $8.2 \text{ mg/m}^3 \times 20 \text{ m}^3/\text{day} \times 0.5 + 70 \text{ kg} = 1.2 \text{ mg/kg/day}$. The RfD is then derived by dividing the equivalent oral dose by the overall uncertainty factor (UF) of 300: $\text{RfD} = \text{equivalent oral dose}/\text{UF} = 1.2 \text{ mg/kg/day} + 300 = 4 \times 10^{-3} \text{ mg/kg/day}$. The overall UF of 300 comprises a UF of 3 for effect-level extrapolation, 10 for intraspecies differences (human variability), 3 for subchronic-to-chronic extrapolation, and 3 for database deficiencies (see Section I.A.3).

For comparison, an RfD was also calculated based on the LOAEL of 7.6 ppm (8 hr TWA) from the Rothman et al. (1996) study (see Section I.B.2). Converting the units and adjusting for continuous exposure results in a $\text{LOAEL}_{\text{ADJ}}$ of 8.7 mg/m³. Then the equivalent oral exposure is calculated as above: $8.7 \text{ mg/m}^3 \times 20 \text{ m}^3/\text{day} \times 0.5 + 70 \text{ kg} = 1.2 \text{ mg/kg/day}$. The equivalent oral exposure is then divided by an overall UF of 1000 to obtain the RfD: $1.2 \text{ mg/kg/day} + 1000 = 1 \times 10^{-3} \text{ mg/kg/day}$. The combined UF of 1000 represents UFs of 10 to account for the use of a LOAEL because of the lack of an appropriate no-observed-adverse-effect level (NOAEL), 10 for intraspecies differences in response (human variability), 3 for subchronic-to-chronic extrapolation, and 3 for database deficiencies. The value of $1 \times 10^{-3} \text{ mg/kg/day}$ is in good agreement with the value of $4 \times 10^{-3} \text{ mg/kg/day}$ calculated from the BMDL (the 95% lower bound on the BMD).

A comparison RfD derivation was also performed using the results of the NTP (1986) experimental animal gavage study. In that study, F344 rats and B6C3F1 mice of both sexes were administered benzene by gavage, 5 days/week for 103 weeks. Male rats (50/group) were administered doses of 0, 50, 100, or 200 mg/kg, and females (50/group) were administered doses of 0, 25, 50, or 100 mg/kg. B6C3F1 mice (50/sex/group) were administered doses of 0, 25, 50, or 100 mg/kg. Blood was drawn from 10 randomly preselected animals per species/sex/dose group at 12, 15, 18, and 21 months, as well as from all animals at the terminal kill at 24 months. Additional groups of 10 animals of each sex and species were administered benzene for 51 weeks at the same doses of the 103-week (2-year) study, and blood was drawn at 0, 3, 6, 9, and 12 months. This study identified a LOAEL of 25 mg/kg for leukopenia and lymphocytopenia in female F344 rats and male and female B6C3F1 mice and 50 mg/kg in male F344 rats. These were the lowest doses tested, and thus no NOAEL was identified.

Reductions in lymphocyte count was the critical effect, and attempts were made to model the dose-response relationships using a BMD modeling approach. Modeling was performed for each dataset in two data groupings within which the datasets are comparable (6- and 9-month; and 12-, 15-, 18-, and 21-month), and ranges of results are presented. Each of these datasets had at most 10

animals/dose, so the dose-response results are not very robust. The males of each species exhibited more dramatic and consistent reductions in lymphocyte count, but it was not clear a priori which species was more sensitive; therefore, dose-response analyses were performed for both the male mouse and the male rat.

The continuous linear, polynomial, and power models in EPA's Benchmark Dose Modeling Software (version 1.20) were used for the modeling. The software estimates the parameters using the method of maximum likelihood. Most of the data were supralinear (i.e., the magnitude of the reductions in lymphocyte count decreased with increasing unit dose), and it was necessary to transform the dose data according to the formula $d' = \ln(d+1)$ in order to fit the available models. The results are summarized in Table 1. For each dataset, the selected model was chosen based on the lowest Akaike's Information Criterion (AIC) value, with consideration of the graphical display, as suggested in EPA's draft *Benchmark Dose Technical Guidance Document* (U.S. EPA, 2000). For selecting between models within a family of models, for example, between a linear and a two-degree polynomial model, consideration was given to the log-likelihood values to evaluate the statistical significance of adding an extra parameter. There was substantial variability in these data, but it appeared to be random and not amenable to modeling. Therefore, constant variance was assumed for all the models, although in some cases the variances failed the test for homogeneity.

In the absence of a clear definition for an adverse effect for this endpoint, a default benchmark response of one standard deviation change from the control mean response was selected, as suggested in the draft technical guidance document. This definition of the benchmark response is highly sensitive to the substantial variability in data such as these, and thus the benchmark response itself is not very robust. The usefulness of this default definition would be strengthened by the use of a larger dataset of historical control data, but such data were not located. The software uses the estimated "constant" standard deviation as the standard deviation for all the group means. The 95% lower confidence limits (BMDLs) on the BMDs are calculated using the likelihood profile method.

The results shown in Table 1 suggest that the male rat is more sensitive than the male mouse to lymphocyte count reductions from exposure to benzene in this NTP gavage bioassay because the ranges of BMDs/BMDLs are substantially lower for the male rat, especially for year 2. The ranges for the male rat are fairly tight, and the models selected provide good fits to all the male rat datasets. However, all but one of the calculated BMDs for the male rat are over an order of magnitude below the lowest exposure dose of 50 mg/kg. Ideally, BMDs should be closer to the low end of the range of observation, that is, the range of the actual exposure doses, to reduce the impacts of model selection and the uncertainties inherent in extrapolating to lower doses.

Nevertheless, data from two drinking water studies provide support for selecting a BMD in this range. These two studies were of shorter duration and used fewer experimental animals than the NTP (1986) study; however, they do provide dose-response data for BMD modeling, and they also have the advantage of being drinking water studies; thus the benzene exposure scenario is more relevant to human oral benzene exposures. In one study, Hsieh et al. (1988) exposed male CD-1 mice (five/group) to 0, 8, 40, or 180 mg/kg/day benzene in drinking water for 28 days. Hematological effects were observed at all exposure levels. BMD modeling of the ALC yielded a BMD of 2.2 mg/kg/day and a BMDL of 1.4 mg/kg/day, based on a linear model with transformed doses and a benchmark response of one standard deviation change from the control mean, as above. In the second study, White et al. (1984) exposed female B6C3F1 mice to 0, 12, 195, or 350 mg/kg/day benzene in drinking water for 30 days. BMD modeling of the ALC (five to six mice/group) resulted in a BMD of 11.6 mg/kg/day and a BMDL of 5.3 mg/kg/day (also based on a linear model with transformed doses and a benchmark response of one standard deviation change from the control mean, as above).

The results in Table 1 from BMD modeling of the male rat ALC data from the NTP (1986) study show the lowest BMDL of about 1 mg/kg at three time points in the second year;

Table 1. BMD modeling results for NTP (1986) male mouse and male rat lymphocyte counts, with transformed dose data

Dataset	Model	Variance Homogeneity	Fit	BMD ^a (mg/kg)	BMDL ^a (mg/kg)
Male Mouse					
6-month	two-degree polynomial	ok	borderline $p=0.047$	19.68	6.57

9-month	linear	no	yes, $p=0.35$	9.07	4.05
year 1 range				9.07–19.68	4.05–6.57
12-month	linear	ok	yes, $p=0.30$	3.74	2.32
15-month	power	no	yes, $p=0.31$	47.46	18.55
18-month	power	no	borderline $p=0.09$	28.93	13.99
21-month	power	no	yes, $p=0.15$	23.34	5.80
year 2 range				3.74–47.46	2.32–18.55
Male Rat					
6-month	power	ok	yes, $p=0.30$	9.92	4.52
9-month	linear	no	yes, $p=0.11$	3.71	2.30
year 1 range				3.71–9.92	2.30–4.52
12-month	linear	no	yes, $p=0.22$	1.34	0.95
15-month	linear	ok	yes, $p=0.93$	1.34	0.95
18-month	linear	no	yes, $p=0.22$	2.73	1.74
21-month	linear	ok	yes, $p=0.54$	1.69	1.10
year 2 range				1.34–2.73	0.95–1.74

^aUnadjusted animal dose in mg/kg, after transforming the results back according to the formula dose = exp(transformed dose) – 1. (The BMD was based on a benchmark response of one standard deviation change from the control mean.)

thus this was selected as the point of departure for an RfD calculation. Adjusting for exposure 7 days/week yields a BMDL_{ADJ} of 0.7 mg/kg/day. This value is divided by an overall UF of 1000 to obtain the RfD: RfD = 0.7 mg/kg/day ÷ 1000 = 7×10^{-4} mg/kg/day. The overall UF of 1000 comprises UFs of 3 for effect-level extrapolation, 10 for interspecies extrapolation for oral studies, 10 for intraspecies variability, and 3 for database deficiencies. This RfD value is in reasonably good agreement (within an order of magnitude) with the RfD of 4×10^{-3} mg/kg/day derived from the Rothman et al. (1996) human inhalation study.

For comparison purposes, an RfD can also be derived from the LOAEL of 25 mg/kg identified for hematological effects in the NTP (1986) study (there was no NOAEL). Adjusting from 5-day to 7-day exposure yields a LOAEL_{ADJ} of 18 mg/kg/day, which can be used to calculate an RfD for benzene as follows: RfD = LOAEL_{ADJ} ÷ UF = 18 mg/kg/day ÷ 3000 = 6×10^{-3} mg/kg/day, where the combined UF of 3000 is made up of component factors of 10 for LOAEL-to-NOAEL extrapolation, 10 for interspecies extrapolation, 10 for intraspecies variability, and 3 for database deficiencies. This value is in good agreement with the RfD of 4×10^{-3} mg/kg/day calculated from the BMD analysis of the Rothman et al. (1996) human data.

1.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF = 300 for the BMCL-oral-equivalent from the Rothman et al. (1996) study.

First, because the BMC is considered to be an adverse effect level, an effect level extrapolation factor analogous to the LOAEL-to-NOAEL UF is used. EPA is planning to develop guidance for applying an effect level extrapolation factor to a BMD. A factor of 3 will be used in this analysis, based on the professional judgement that, although the BMD corresponds to an adverse effect level at the low end of the observable range, the endpoint is not very serious in and of itself. Decreased ALC is a very sensitive sentinel effect that can be measured in the blood, but it is not a frank effect, and there is no evidence that it is related to any functional impairment at levels of decrement near the benchmark response. For a more serious effect, a larger factor, such as 10, might be selected. Second, a factor of 10 was used for intraspecies differences in response (human variability) as a means of protecting potentially sensitive human subpopulations. Third, a subchronic-to-chronic extrapolation factor was applied because the mean exposure duration for the subjects in the principal study was 6.3 years, which is less than the exposure duration of 7 years (one-tenth of the

assumed human life span of 70 years) that has been used by the Superfund program as a cut-off for deriving a subchronic human reference dose (U.S. EPA, 1989). Furthermore, the exposure duration varied from 0.7 years to 16 years. However, because the mean exposure duration was near the borderline of what would be considered chronic (i.e., 6.3 years vs. 7 years), a value of 3 (vs. 10) was felt to be appropriate for the UF. Finally, a UF of 3 was chosen to account for database deficiencies because no two-generation reproductive and developmental toxicity studies for benzene are available. Therefore, an overall UF of $3 \times 10 \times 3 \times 3 = 300$ is used to calculate the chronic oral RfD.

For the comparison analysis based on the Rothman et al. (1996) LOAEL_{ADJ}-equivalent oral dose rate value of 1.2 mg/kg/day, the following UFs were selected: a factor of 10 for use of a LOAEL due to lack of an appropriate NOAEL, a factor of 10 for intraspecies variability, a factor of 3 for subchronic-to-chronic extrapolation, and a factor of 3 for database deficiencies, as above. Hence, an overall UF of $10 \times 10 \times 3 \times 3 = 1000$ was used in the comparison analysis.

For the comparison analysis based on the BMOL_{ADJ} calculated from BMD modeling of the male rat data from the NTP (1986) gavage study, the following UFs were used: a UF of 3 for effect-level extrapolation, which is analogous to the LOAEL-to-NOAEL extrapolation factor, because the BMC is considered an adverse effect level; a UF of 10 for interspecies extrapolation for oral studies; a UF of 10 for intraspecies variability; and a UF of 3 for database deficiencies. Thus, an overall UF of $3 \times 10 \times 10 \times 3 = 1000$ was used in this comparison analysis.

Finally, for the comparison analysis based on the LOAEL from the NTP (1986) gavage study, the following UFs were used: 10 for LOAEL-to-NOAEL extrapolation, 10 for interspecies extrapolation, 10 for intraspecies variability, and 3 for database deficiencies. Therefore, an overall UF of 3000 was used in this comparison analysis.

1.A.4. Additional Studies/Comments (Oral RfD)

Benzene is toxic by all routes of administration. Hematotoxicity and immunotoxicity have been consistently reported to be the most sensitive indicators of noncancer toxicity in both humans and experimental animals, and these effects have been the subject of several reviews (Aksoy, 1989; Goldstein, 1988; Snyder et al., 1993; Ross, 1996; U.S. EPA, 2002). The bone marrow is the target organ for the expression of benzene hematotoxicity and immunotoxicity. Leukocytopenia has been consistently shown to be a more sensitive indicator of benzene toxicity in experimental animal systems than anemia, and lymphocytopenia has been shown to be an even more sensitive indicator of benzene toxicity than overall leukocytopenia. Neither gastrointestinal effects from oral exposure nor pulmonary effects due to inhalation exposure have been reported. (see Section 1.B.4 for a more detailed summary of benzene toxicity).

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.4 \(PDF\)](#).

1.A.5. Confidence in the Oral RfD

Study -- Medium
Database -- Medium
RfD -- Medium

The overall confidence in this RfD assessment is medium. The principal study of Rothman et al. (1996) was well conducted, and the availability of good-quality human data for a sensitive endpoint eliminates the uncertainty associated with basing the RfD on experimental animal data. A dose-response relationship was established between ALC and benzene air concentration and benzene urine metabolites. Six blood parameters measured (ALC, WBC count, RBC count, hematocrit, platelets, and MCV) were significantly different in the high-benzene-exposure group when compared with controls. However, only the ALC was reduced in a subgroup of 11 subjects exposed to a median 8-hour TWA of 7.6 ppm benzene, suggesting that this exposure level may be at the low end of the range of benzene exposures eliciting hematotoxic effects in humans.

In addition, the RfD of 4×10^{-3} mg/kg/day obtained from route-to-route extrapolation of the BMD modeling results from the Rothman et al. (1996) study is in good agreement with the value of 1×10^{-3} mg/kg/day based on the oral equivalent LOAEL. The RfD is also in good agreement with the value of 7×10^{-4} mg/kg/day, based on BMD modeling of the male rat ALC data from the NTP (1986) chronic rodent gavage study and the value of 6×10^{-3} mg/kg/day based on the LOAEL from the NTP

(1986) study.

With continuous endpoints such as hematological parameters, there is uncertainty about when a change in a parameter that has inherent variability becomes an adverse effect. Other uncertainties explicitly recognized in the quantitative derivation of the chronic oral RfD include intraspecies variability (to accommodate sensitive human subgroups), the applicability of the subchronic inhalation data to chronic oral exposures, and database deficiencies due to the lack of a two-generation reproductive/developmental toxicity study for benzene.

Route-to-route extrapolation was used to estimate oral equivalent doses from inhalation exposures resulting from analysis of the Rothman et al. (1996) occupational data. In experiments conducted to compare the metabolite doses to the target organ following oral or inhalation exposure, Sabourin et al. (1987, 1989) found that there was no simple relationship between the two routes of exposure. All published experimental animal models of the in vivo metabolism and disposition of benzene have used the physiologically based approach to pharmacokinetics, and they conclude that formation of metabolites follow Michaelis-Menten kinetics. Although these models predict the urinary metabolites formed from benzene exposures, they offer no information regarding the dosimetry of oxidative metabolites in the bone marrow, a site of action. However, the target specificity of benzene toxicity for the bone marrow progenitor cells irrespective of route of administration is well documented in both humans and experimental animal models. Thus, route-to-route extrapolation is justified and introduces a lower degree of uncertainty than extrapolating from test animals to humans (U.S. EPA, 1999). Use of a modifying factor of 3 was considered to recognize uncertainties in the route-to-route extrapolation; however, it was deemed unnecessary. The RfD is based on human data for a sensitive endpoint; thus, it was felt that the composite UF of 300 provides sufficient protection.

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#).

I.A.6. EPA Documentation and Review of the Oral RfD

Source Document -- U.S. EPA, 2002

This assessment was peer reviewed by external scientists as well as in response to public comments. Their comments have been evaluated carefully and incorporated in the finalization of this IRIS summary. The [peer review document](#) (12 pages, 135 Kbytes) is available in Adobe PDF format.

Other EPA Documentation -- U.S. EPA, 1985, 1999

Date of Agency Consensus -- January 23, 2002

I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

[Back to top](#)

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name -- Benzene
CASRN -- 71-43-2
Last Revised -- 04/17/2003

The Inhalation Reference Concentration (RfC) is analogous to the oral RfD and is likewise based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. The inhalation RfC considers toxic effects for both the respiratory system (portal-of-entry) and for effects peripheral to the respiratory system (extrarrespiratory effects). It is generally expressed in units of mg/cu.m. In general, the RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhalation exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Inhalation RfCs were derived

according to Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry (U.S. EPA, 1994). RfCs can also be derived for the noncarcinogenic health effects of substances that are carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in section II of this file.

I.B.1. Inhalation RfC Summary

Critical Effect	Exposures*	UF	MF	RfC
Decreased lymphocyte count (Human occupational inhalation study of Rothman et al., 1996)	BMCL = 8.2 mg/m ³	300	1	3 x 10 ⁻² mg/m ³

*Conversion factors: MW = 78.11. BMCL = 7.2 ppm, 8-hour TWA. Assuming 25°C and 760 mm Hg, BMCL (mg/m³) = 7.2 ppm x MW/24.45 = 23.0 mg/m³. BMCL_{ADJ} = 23.0 mg/m³ x 10 m³/20 m³ x 5 days/7 days = 8.2 mg/m³. (The BMC was based on a benchmark response of one standard deviation change from the control mean.)

I.B.2. Principal and Supporting Studies (Inhalation RfC)

The RfC is based on BMD modeling of the ALC data from the occupational epidemiologic study of Rothman et al. (1996), in which workers were exposed to benzene by inhalation. A comparison analysis based on BMD modeling of hematological data from the Ward et al. (1985) subchronic experimental animal inhalation study was also conducted. In addition, comparison analyses using the LOAEL from the Rothman et al. (1996) study and the NOAEL from the Ward et al. (1985) study were performed.

Rothman et al. (1996) conducted a cross-sectional study of 44 workers exposed to a range of benzene concentrations and 44 age- and gender-matched unexposed controls, all from Shanghai, China. Twenty-one of the 44 subjects in the exposed and control groups were female. The exposed workers were from three workplaces where benzene was used—a factory that manufactured rubber padding for printing presses, a factory that manufactured adhesive tape, and a factory that used benzene-based paint. The unexposed workers were from two workplaces: a factory that manufactured sewing machines and an administrative facility. Workers who had a prior history of cancer, therapeutic radiation, chemotherapy, or current pregnancy were excluded. Requirements for inclusion in the study were current employment for at least 6 months in a factory that used benzene, minimal exposure to other aromatic solvents, and no exposure to other chemicals known to be toxic to bone marrow or to ionizing radiation. Controls who had no history of occupational exposure to benzene or other bone marrow-toxic agents were frequency-matched to the exposed subjects on age (5-year intervals) and gender.

Benzene exposure was monitored by organic vapor passive dosimetry badges worn by each worker for a full workshift on 5 days within a 1–2 week period prior to collection of blood samples. Benzene exposure of controls in the sewing machine factory was monitored for 1 day, but no exposure monitoring was performed in the administrative facility. Benzene exposure was also evaluated by analyzing for benzene metabolites in urine samples collected at the end of the benzene exposure period for the exposed subjects. Historical benzene exposure of the subjects was evaluated by examining employment history. Data on age, gender, current and lifelong tobacco use, alcohol consumption, medical history, and occupational history were collected by interview. Six hematological measurements were evaluated: total WBC count, ALC, hematocrit, RBC count, platelet count, and MCV. Total WBC counts and ALC were performed using a Coulter T540 blood counter. Abnormal counts were confirmed. Benzene metabolites in urine were measured by an isotope dilution gas chromatography/mass spectrometry assay. Correlation analyses were performed with Spearman rank order correlation. The Wilcoxon rank sum test was used to test for hematological differences.

Mean (standard deviation) years of occupational exposure to benzene were 6.3 (4.4) with a range of 0.7–16 years. The median 8-hour TWA benzene exposure concentration for all exposed workers was 31 ppm (99 mg/m³). Exposure to toluene and xylene was ≤ 0.2 ppm (0.6 mg/m³) in all groups. The exposed group was subdivided into two equal groups of 22—one group comprising workers who were exposed to greater than the median concentration and the other containing those exposed to

less than the median concentration. The median (range) 8-hour TWA exposure concentration was 13.6 (1.6–30.6) ppm (43.4 [5.1–97.8] mg/m³) for the low-exposure group and 91.9 (31.5–328.5) ppm (294 [101–1049] mg/m³) for the high-exposure group. A subgroup of the low-exposure group composed of 11 individuals who were not exposed to >31 ppm (100 mg/m³) at any time during the monitoring period was also examined in some comparisons. The median (range) 8-hour TWA exposure of these individuals was 7.6 (1–20) ppm (24 [3.2–64] mg/m³). The urinary concentrations of the metabolites phenol, muconic acid, hydroquinone, and catechol were all significantly correlated with measured benzene exposure.

All six blood parameters measured were significantly different in the high-benzene exposure group as compared to controls. ALC, WBC count, RBC count, hematocrit, and platelets were all significantly decreased, and MCV was significantly increased. The ALC was reduced from $1.9 \times 10^3/\mu\text{L}$ blood in controls to $1.6 \times 10^3/\mu\text{L}$ ($p < 0.01$) in the <31 ppm (99 mg/m³) group and to $1.3 \times 10^3/\mu\text{L}$ ($p < 0.001$) in the group exposed to >31 ppm benzene. In the subgroup of 11 workers exposed to a median 8-hour TWA of 7.6 ppm (24 mg/m³) benzene, the ALC ($1.6 \times 10^3/\mu\text{L}$) was also significantly reduced ($p = 0.03$). The RBC and platelet counts were also significantly reduced in the <31 ppm exposure group, but only ALC was significantly different in the low-exposure subgroup. The fact that no other measured blood cell parameters were significantly different in this subgroup suggests that ALC was the most sensitive measure of benzene hematotoxicity and that this exposure level (median 8-hour TWA of 7.6 ppm) may be at the low end of the range of benzene exposures eliciting hematotoxic effects in humans.

ALC is also thought to have a potential role as a "sentinel" effect for a cascade of early hematological and related biological changes that might be expected to result in the more profound examples of benzene poisoning observed in other cohorts of the National Cancer Institute/Chinese Academy of Preventive Medicine study, as described by Dosemeci et al. (1996). That ALC depletion is accompanied by gene-duplicating mutations in somatic cells under the same range of exposure conditions suggests that benzene can cause repeated damage to longer-lived stem cells in human bone marrow, further implicating the compound as etiologically important in the onset of benzene-associated leukemia. This finding underlines the importance of basing public health concern for benzene on a toxicological effect that is representative of the earliest biological changes induced by the compound.

BMD modeling of the ALC exposure-response data from Rothman et al. (1996) was done using U.S. EPA's Benchmark Dose Modeling Software (version 1.20). The data are rather supralinear, that is, the change in ALC per unit change in exposure decreases with increasing exposure; therefore, in order to fit the data with one of the available continuous models, the exposure levels were first transformed according to the equation $d' = \ln(d+1)$. Then the exposure-response data were fitted using the continuous linear model, which provided a good fit ($p = 0.54$). A two-degree polynomial and a power model also fit the data, but the linear model was selected because it is the most parsimonious. The parameters were estimated using the method of maximum likelihood. A constant variance model was used.

In the absence of a clear definition for an adverse effect for this continuous endpoint, a default benchmark response of one standard deviation change from the control mean was selected, as suggested in EPA's draft *Benchmark Dose Technical Guidance Document* (U.S. EPA, 2000). This default definition of a benchmark response for continuous endpoints corresponds to an excess risk of approximately 10% for the proportion of individuals below the 2nd percentile (or above the 98th percentile) of the control distribution for normally distributed effects (see U.S. EPA, 2000). A 95% lower confidence limit (BMCL) on the resulting BMC was calculated using the likelihood profile method. Transforming the results back to the original exposure scale yields a BMC of 13.7 ppm (8-hr TWA) and a BMCL of 7.2 ppm (8-hr TWA).

As suggested in the draft technical guidance document (U.S. EPA, 2000), the BMCL is chosen as the point of departure for the RfC derivation. An adjusted BMCL is calculated by converting ppm to mg/m³ and adjusting the 8-hour TWA occupational exposure to an equivalent continuous environmental exposure. The BMCL is first converted to mg/m³ using the molecular weight of 78.11 for benzene and assuming 25°C and 760 mm Hg: $7.2 \text{ ppm} \times 78.11/24.45 = 23.0 \text{ mg/m}^3$. The converted value is then adjusted from the 8-hour occupational TWA to a continuous exposure concentration using the default respiration rates (U.S. EPA, 1994): $\text{BMCL}_{\text{ADJ}} = 23.0 \text{ mg/m}^3 \times (10 \text{ m}^3/20 \text{ m}^3) \times 5 \text{ days}/7 \text{ days} = 8.2 \text{ mg/m}^3$.

The RfC is then derived by dividing the adjusted BMCL by the overall UF of 300: $\text{RfC} = \text{BMCL}_{\text{ADJ}}/\text{UF}$

$= 8.2 \text{ mg/m}^3 / 300 = 3 \times 10^{-2} \text{ mg/m}^3$. The overall UF of 300 comprises a UF of 3 for effect-level extrapolation, 10 for intraspecies differences (human variability), 3 for subchronic-to-chronic extrapolation, and 3 for database deficiencies (see Section I.B.3).

For comparison, an RfC was also calculated based on the LOAEL of 7.6 ppm (8-hr TWA) from the Rothman et al. (1996) study. Converting the units and adjusting for continuous exposure as above results in a $\text{LOAEL}_{\text{ADJ}}$ of 8.7 mg/m³. The $\text{LOAEL}_{\text{ADJ}}$ is then divided by an overall UF of 1000 to obtain the RfC: $8.7 \text{ mg/m}^3 / 1000 = 9 \times 10^{-3} \text{ mg/m}^3$. The combined UF of 1000 represents UFs of 10 to account for the use of a LOAEL because of the lack of an appropriate NOAEL, 10 for intraspecies differences in response (human variability), 3 for subchronic-to-chronic extrapolation, and 3 for database deficiencies. The value of $9 \times 10^{-3} \text{ mg/m}^3$ is in good agreement with the RfC of $3 \times 10^{-2} \text{ mg/m}^3$ calculated from the BMC.

A comparison RfC derivation based on BMD modeling of hematological data from the Ward et al. (1985) subchronic experimental animal inhalation study was also conducted. The Ward study was selected because it used a relatively long inhalation exposure duration and an adequate number of animals, and it provided dose-response data. Ward et al. exposed male and female CO-1 mice and Sprague-Dawley rats to 0, 1, 10, 30 or 300 ppm (0, 3.2, 32, 96 or 960 mg/m³) benzene, 6 hours/day, 5 days/week for 91 days and measured various hematological endpoints. The study identified both a LOAEL of 300 ppm and a NOAEL of 30 ppm. The male mouse appeared to be the most sensitive sex/species in this study. The exposure-response relationships for the different hematological endpoints for the male mouse were modeled using a BMD modeling approach and decreased hematocrit (i.e., volume percentage of erythrocytes in whole blood) was chosen as the critical effect.

U.S. EPA's Benchmark Dose Modeling Software (version 1.20) was used for the modeling. An assumption of constant variance was used, although the test for homogeneity of the variances failed. The continuous linear, polynomial, and power models all resulted in the same BMC and BMCL estimates; however, the linear model had better results for the fit statistics. The linear model had a p-value of 0.09, which is of borderline adequacy (the draft technical guidance document [U.S. EPA, 2000] recommends a p-value of ≥ 0.1), and the other models had p-values of 0.04. Thus the continuous linear model was selected. The parameters were estimated using the method of maximum likelihood.

In the absence of a clear definition for an adverse effect for this continuous endpoint, a default benchmark response of one standard deviation from the control mean was selected, as suggested in the draft technical guidance document (U.S. EPA, 2000). The software uses the estimated standard deviation. A 95% lower confidence limit (BMCL) on the resulting BMC was calculated using the likelihood profile method. A BMC of 100.7 ppm and a BMCL of 85.0 ppm were obtained.

It should be noted that the dose spacing in this study was less than ideal. Responses in the three lower exposure groups for all the hematological endpoints tended to clump near control group levels, and significant deviations in response were generally seen only in the 300 ppm group, with a large exposure range in between, including where the BMC is located, for which there are no response data. Therefore, there is some uncertainty about the actual shape of the exposure-response curve in the region of the benchmark response and, thus, some corresponding uncertainty about the values of the BMC and BMCL estimates.

ALCs were not reported in Ward et al. (1985), so this endpoint could not be compared to the human ALC results. Total WBC counts were reported and exhibited the largest percent change in response between the control and the 300 ppm group; however, the data for this endpoint also had substantial variance, and because the benchmark response used for this analysis is a function of the standard deviation, WBC count did not yield the lowest BMC estimate. The actual lowest BMC estimates were obtained for increased mean cell hemoglobin (MCH) (78 ppm; BMCL = 67 ppm) and increased mean cell volume (79 ppm; BMCL = 68 ppm); however, these endpoints are probably not adverse per se. On the other hand, they are likely to be compensatory effects and, thus, markers of toxicity, and one could probably justify using them as the critical effects. In any event, the BMC estimates are not much different from the BMC of 100 ppm obtained for decreased hematocrit. The results are also similar for total blood hemoglobin (BMC = 104 ppm, BMCL = 88 ppm). RBC count results were in between those for MCV and MCH and those for hematocrit and total hemoglobin; however, the model fits were not adequate for the RBC data and, thus, the RBC results have more uncertainty.

To derive the RfC, the BMCL is used as the point of departure, as suggested in the draft *Benchmark Dose Technical Guidance Document* (U.S. EPA, 2000). For conversion of the inhalation exposures across species, ppm equivalency was assumed; this is identical to using EPA's inhalation dosimetry

methodology with Regional Gas Dose Ratio for the respiratory tract region (RGDR)_r = 1 (U.S. EPA, 1994). The BMCL is first converted to mg/m³ using the molecular weight of 78.11 for benzene and assuming 25°C and 760 mm Hg: BMCL (mg/m³) = 85.0 ppm × 78.11/24.45 = 272 mg/m³. The converted value is then adjusted to an equivalent continuous exposure: BMCL_{ADJ} = 272 mg/m³ × (6 hrs/24 hrs) × 5 days/7 days = 48.5 mg/m³.

The RfC is then obtained by dividing the adjusted BMCL by the overall UF of 1000: RfC = 48.5 mg/m³ ÷ 1000 = 5 × 10⁻² mg/m³. The overall UF of 1000 comprises a UF of 3 for effect-level extrapolation, 3 for interspecies extrapolation (inhalation), 10 for intraspecies differences, 3 for subchronic-to-chronic extrapolation, and 3 for database deficiencies (see Section I.B.3). This value is in good agreement with the RfC of 3 × 10⁻² mg/m³ calculated from the BMC from the Rothman et al. (1996) human study.

For further comparison, an RfC was also calculated, based on the NOAEL of 30 ppm from the Ward et al. (1985) study. Converting the units and adjusting for continuous exposure as above results in a NOAEL_{ADJ} of 17.1 mg/m³. The NOAEL_{ADJ} is then divided by an overall UF of 300 to obtain the RfC: 17.1 mg/m³ ÷ 300 = 6 × 10⁻² mg/m³. The combined UF of 300 represents a UF of 3 for interspecies extrapolation (inhalation), 10 for intraspecies differences, 3 for subchronic-to-chronic extrapolation, and 3 for database deficiencies. The value of 6 × 10⁻² mg/m³ is also in good agreement with the RfC of 3 × 10⁻² mg/m³ calculated from the BMC from the Rothman et al. (1996) human study.

It should be noted, however, that other experimental animal studies have reported significant hematological effects at benzene exposures of 10–25 ppm, which are lower than the NOAEL of 30 ppm from the Ward et al. (1985) study. These studies have insufficient data for dose-response modeling, and they used shorter exposure durations and/or fewer experimental animals than did the Ward et al. (1985) study; nonetheless, they observed statistically significant hematological effects at 10–25 ppm. Baarson et al. (1984), for example, exposed male C57BL/6J mice (five/group) to 10 ppm benzene, 6 hours/day, 5 days/week, for 178 days and observed statistically significant reductions in blood lymphocytes at each of the three monitoring time points (32, 66, and 178 days) when compared to controls. The magnitude of the reduction in lymphocytes ranged from about 53% at 32 days to about 68% at 178 days. Cronkite et al. (1985) exposed male and female C57BL/6 BNL mice to various concentrations of benzene 6 hours/day, 5 days/week for 2 weeks and observed no decrease in blood lymphocytes at 10 ppm, but they did observe a statistically significant reduction of about 21% at 25 ppm as compared to controls (5–10 mice/group). Thus, lower RfCs than those calculated above for the Ward et al. (1985) study are possible, based on other experimental animal results. In the most extreme case, using a LOAEL of 10 ppm and an overall UF of 3000 yields a LOAEL_{ADJ} of 5.7 mg/m³ and an RfC of 2 × 10⁻³ mg/m³.

I.B.3. Uncertainty and Modifying Factors (Inhalation RfC)

UF = 300 for the BMCL from the Rothman et al. (1996) study.

First, because the BMC is considered to be an adverse effect level, an effect level extrapolation factor analogous to the LOAEL-to-NOAEL UF is used. U.S. EPA is planning to develop guidance for applying an effect level extrapolation factor to a BMD. In the interim, a factor of 3 will be used in this analysis (see Section I.A.3). For a more serious effect, a larger factor, such as 10, might be selected. Second, a factor of 10 was used for intraspecies differences in response (human variability) as a means of protecting potentially sensitive human subpopulations. Third, a UF of 3 for subchronic-to-chronic extrapolation was applied (see Section I.A.3). Finally, a UF of 3 was chosen to account for database deficiencies, because no two-generation reproductive and developmental toxicity studies for benzene are available. Therefore, an overall UF of 3 × 10 × 3 × 3 = 300 is used to calculate the RfC.

For the comparison analysis based on the Rothman et al. (1996) LOAEL, the following UFs were selected: a factor of 10 for use of a LOAEL due to lack of an appropriate NOAEL, a factor of 10 for intraspecies variability, a factor of 3 for subchronic-to-chronic extrapolation, and a factor of 3 for database deficiencies. Hence, an overall UF of 10 × 10 × 3 × 3 = 1000 was used in the comparison analysis.

For the comparison analysis based on the BMCL calculated from BMD modeling of the male mouse data from the Ward et al. (1985) subchronic inhalation study, the following UFs were used: a UF of 3 for effect-level extrapolation, which is analogous to the LOAEL-to-NOAEL extrapolation factor, because the BMC is considered an adverse effect level; a UF of 3 for interspecies extrapolation for

inhalation studies; a UF of 10 for intraspecies variability; and a UF of 3 for database deficiencies. In addition, a partial UF of 3 was used to extrapolate from subchronic to chronic exposure. This partial value was selected based on the observation that hematological fluctuations such as reductions in RBCs and WBCs in the high-dose mice were noted at interim sacrifice (14 days) as well as at termination (91 days), suggesting that the responses occurred early in the exposure cycle and then remained comparatively unchanged. Thus, an overall UF of 3 × 3 × 10 × 3 × 3 = 1000 was used in this comparison analysis.

Finally, for the comparison analysis based on the NOAEL from the Ward et al. (1985) subchronic inhalation study, the following UFs were used: 3 for interspecies extrapolation for inhalation studies, 10 for intraspecies variability, 3 for database deficiencies, and 3 for subchronic-to-chronic extrapolation, as above. Therefore, an overall UF of 300 was used in this comparison analysis.

MF = None. No modifying factor was considered necessary.

I.B.4. Additional Studies/Comments (Inhalation RfC)

Benzene is toxic by all routes of administration. Hematotoxicity and immunotoxicity have been consistently reported to be the most sensitive indicators of noncancer toxicity in both humans and experimental animals, and these effects have been the subject of several reviews (Aksoy, 1989; Goldstein, 1988; Snyder et al., 1993; Ross, 1996; U.S. EPA, 2002). The bone marrow is the target organ for the expression of benzene hematotoxicity and immunotoxicity. Neither gastrointestinal effects from oral exposure nor pulmonary effects due to inhalation exposure have been reported.

Chronic exposure to benzene results in progressive deterioration in hematopoietic function. Anemia, leukopenia, lymphocytopenia, thrombocytopenia, pancytopenia, and aplastic anemia have been reported after chronic benzene exposure (Aksoy, 1989; Goldstein, 1988). In an earlier follow-up study of benzene-exposed workers, Aksoy et al. (1972) reported that 8 of 32 workers who had been diagnosed with pancytopenia died, mainly from infection and bleeding. In contrast to these blood cellularity depression effects, benzene is also known to induce bone marrow hyperplasia. Acute myelogenous leukemia has been frequently observed in studies of human cohorts exposed to benzene, and there is evidence linking benzene exposure to several other forms of leukemia. Whether the hematotoxic/immunotoxic effects of benzene exposure and its carcinogenic effects are due to a common mechanism is not yet known. This is in part due to the fact that although the bone marrow depressive effects of exposure to benzene in humans can be readily duplicated in several experimental animal model systems, a suitable experimental animal system for the induction of leukemia has not been found. The hematotoxicity/immunotoxicity effects of benzene exposure lead to significant health effects apart from potential induction of leukemia, as several deaths due to aplastic anemia have been reported (ATSDR, 1997).

Leukocytopenia has been consistently shown to be a more sensitive indicator of benzene toxicity in experimental animal systems than anemia, and lymphocytopenia has been shown to be an even more sensitive indicator of benzene toxicity than overall leukocytopenia (Snyder et al., 1980; Ward et al., 1985; Baarson et al., 1984). Rothman et al. (1996) also found that a decrease in ALC was the most sensitive indicator of benzene exposure in a group of workers. Ward et al. (1996) observed a strong relationship between benzene exposure and decreased WBC counts in a rubber worker cohort, but no significant relationship with RBC counts was found.

Bogardi-Sare et al. (2000) found that exposure to benzene concentrations of less than 15 ppm can induce depression of circulating B-lymphocytes. Dosemeci et al. (1996) were able to demonstrate the presence of benzene poisoning (WBC <4000 cells/mm³ and platelet count <80,000/mm³) at levels of exposure in the 5–19 ppm range.

As is the case with many other organic solvents, benzene has been shown to produce neurotoxic effects in test animals and humans after short-term exposures to relatively high concentrations (U.S. EPA, 2002). The neurotoxicity of benzene, however, has not been extensively studied, and no systematic studies of the neurotoxic effects of long-term exposure have been conducted. Additionally, there is some evidence from human epidemiologic studies of reproductive and developmental toxicity of benzene, but the data did not provide conclusive evidence of a link between exposure and effects (U.S. EPA, 2002). Some test animal studies provide limited evidence that exposure to benzene affects reproductive organs; however, these effects were limited to high exposure concentrations that exceeded the maximum tolerated dose (U.S. EPA, 2002). Results of inhalation studies conducted in test animals are fairly consistent across species and have demonstrated that at concentrations of greater than 150 mg/m³ (47 ppm) benzene is fetotoxic and causes decreased fetal weight and/or minor skeletal variants (U.S. EPA, 2002). Exposure of mice to

benzene in utero has also been shown to cause changes in the hematogenic progenitor cells in fetuses, 2-day neonates, and 6 week-old adults (Keller and Snyder, 1986, 1988).

For more detail on Susceptible Populations, exit to the toxicological review, Section 4.4 (PDF).

I.B.5. Confidence in the Inhalation RfC

Study --Medium
Database --Medium
RfC -- Medium

The overall confidence in this RfC assessment is medium. The principal study of Rothman et al. (1996) was well conducted, and the availability of good-quality human data for a sensitive endpoint eliminates the uncertainty associated with basing the RfC on experimental animal data. In addition, the RfC of 3×10^{-2} mg/m³ obtained from the BMD modeling results from the Rothman et al. (1996) study is in good agreement with the value of 9×10^{-3} mg/m³ based on the LOAEL. The RfC is also in good agreement with the values of 5×10^{-2} mg/m³ and 6×10^{-2} mg/m³ based on the BMC and the NOAEL, respectively, from the Ward et al. (1985) subchronic rodent inhalation study. This consistency in results provides increased confidence in the RfC.

With continuous endpoints such as hematological parameters, there is uncertainty about when a change in a parameter that has inherent variability becomes an adverse effect. Other uncertainties explicitly recognized in the quantitative derivation include intraspecies variability (to accommodate sensitive human subgroups), subchronic-to-chronic extrapolation, and database deficiencies due to the lack of two-generation reproductive and well-conducted developmental toxicity studies for benzene.

For more detail on Characterization of Hazard and Dose Response, exit to the toxicological review, Section 6 (PDF).

I.B.6. EPA Documentation and Review of the Inhalation RfC

Source Document -- U.S. EPA, 2002.

This assessment was peer reviewed by external scientists as well as in response to public comments. Their comments have been evaluated carefully and incorporated in the finalization of this IRIS summary. The peer review document (12 pages, 135 Kbytes) is available in Adobe PDF format.

Other EPA Documentation -- None

Date of Agency Consensus -- January 23, 2002

I.B.7. EPA Contacts (Inhalation RfC)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

[Back to top](#)

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name -- Benzene
CASRN -- 71-43-2
Last Revised -- 01/19/2000

Section II provides information on three aspects of the carcinogenic assessment for the substance in question; the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral exposure and from inhalation exposure. The

quantitative risk estimates are presented in three ways. The slope factor is the result of application of a low-dose extrapolation procedure and is presented as the risk per (mg/kg)/day. The unit risk is the quantitative estimate in terms of either risk per ug/L drinking water or risk per ug/cu.m air breathed. The third form in which risk is presented is a drinking water or air concentration providing cancer risks of 1 in 10,000, 1 in 100,000 or 1 in 1,000,000. The rationale and methods used to develop the carcinogenicity information in IRIS are described in The Risk Assessment Guidelines of 1986 (EPA/600/8-87/045) and in the IRIS Background Document. IRIS summaries developed since the publication of EPA's more recent Proposed Guidelines for Carcinogen Risk Assessment also utilize those Guidelines where indicated (Federal Register 61(79):17960-18011, April 23, 1996). Users are referred to Section I of this IRIS file for information on long-term toxic effects other than carcinogenicity.

II.A. Evidence for Human Carcinogenicity

II.A.1. Weight-of-Evidence Characterization

Benzene is classified as a "known" human carcinogen (Category A) under the Risk Assessment Guidelines of 1986. Under the proposed revised Carcinogen Risk Assessment Guidelines (U.S. EPA, 1996), benzene is characterized as a known human carcinogen for all routes of exposure based upon convincing human evidence as well as supporting evidence from animal studies. (U.S. EPA, 1979, 1985, 1998; ATSDR, 1997).

Epidemiologic studies and case studies provide clear evidence of a causal association between exposure to benzene and acute nonlymphocytic leukemia (ANLL) and also suggest evidence for chronic nonlymphocytic leukemia (CNLL) and chronic lymphocytic leukemia (CLL). Other neoplastic conditions that are associated with an increased risk in humans are hematologic neoplasms, blood disorders such as preleukemia and aplastic anemia, Hodgkin's lymphoma, and myelodysplastic syndrome (MDS). These human data are supported by animal studies. The experimental animal data add to the argument that exposure to benzene increases the risk of cancer in multiple species at multiple organ sites (hematopoietic, oral and nasal, liver, forestomach, preputial gland, lung, ovary, and mammary gland). It is likely that these responses are due to interactions of the metabolites of benzene with DNA (Ross, 1996; Latriano et al., 1986). Recent evidence supports the viewpoint that there are likely multiple mechanistic pathways leading to cancer and, in particular, to leukemogenesis from exposure to benzene (Smith, 1996).

II.A.2. Human Carcinogenicity Data

Benzene is a known human carcinogen based upon evidence presented in numerous occupational epidemiological studies. Significantly increased risks of leukemia, chiefly acute myelogenous leukemia (AML), have been reported in benzene-exposed workers in the chemical industry, shoemaking, and oil refineries.

The following epidemiologic studies briefly described are the key studies that support the weight-of-evidence classification that exposure to benzene is causally related to an increase in the risk of cancer, specifically leukemia.

Aksoy et al. (1974) reported effects of benzene exposure among 28,500 Turkish workers employed in the shoe industry. The mean duration of employment was 9.7 years (range 1 to 15 years) and the mean age was 34.2 years. Peak exposure to benzene was reported to be 210 to 650 ppm. Twenty-six cases of leukemia and a total of 34 leukemias or preleukemias were observed, corresponding to an incidence of 13/100,000 (by comparison to 6/100,000 for the general population). A follow-up analysis of the study (Aksoy, 1980) reported eight additional cases of leukemia as well as evidence suggestive of increases in other malignancies. This case study lacks detailed information on personal exposure to benzene and potential exposure to other chemicals, a well-defined comparison population, and control of confounding variables.

Infante et al. (1977b), in a retrospective cohort mortality study, examined the leukemogenic effects of benzene exposure in 748 white male workers exposed at least 1 day while employed in the manufacture of rubber products. Exposure occurred from 1940 to 1949 and vital status was obtained through 1975. A statistically significant increased risk of leukemia (7 observed, 1.48 expected; $p < .002$) was found by comparison of observed leukemia deaths in this cohort with those expected based upon general U.S. population death rates. The risk of leukemia was said by the authors to be potentially understated since follow-up was only 75% complete. According to the authors, there was no evidence of solvent exposure other than benzene. No effort was made to evaluate individual exposures to benzene for the purpose of doing a dose-response analysis. The main criticism of this

study, as well as its later updates, is the small size of the cohort.

In an extension and elaboration of the analysis done by Infante et al. (1977b), Rinsky et al. (1981) reported seven deaths from leukemia in this same cohort after achieving a 98% vital status ascertainment through June 1975. Forty additional deaths from all causes were reported, but no new leukemia deaths. Again, the risk of death from leukemia was statistically significant (standardized mortality ratio [SMR] was 560 based upon 7 leukemia deaths, $p < .001$). Some 437 members of the cohort were exposed for less than 1 year. Those who received 5 or more years of exposure exhibited an SMR of 2100, based upon 5 leukemia deaths versus 0.25 expected ($p < .01$). All seven leukemia cases were of the myelogenous or monocytic cell type. Four additional deaths from leukemia were also noted but could not be added to the total because they did not fit the criteria for inclusion. The authors tried to reconstruct past exposure to benzene at the two locations of this company and found that in some areas of the plants airborne benzene concentrations occasionally rose to several hundred parts per million, but most often employee 8-hour time-weighted averages (TWA) fell within the limits considered permissible at the time of exposure. No dose-response analysis was attempted.

In an updated version of the Rinsky et al. (1981) study, the same authors examined a somewhat expanded cohort of 1165 nonsalaried white men employed in the rubber hydrochloride department for at least 1 day through December 1965 and followed to December 31, 1981 (Rinsky et al., 1987). Followup was 98.6% complete. Again, a statistically significant excess risk of leukemia was found for the total cohort (9 observed, 2.7 expected; $p < 0.05$). For the first time, individual measurements of cumulative exposure in terms of ppm-years were generated for all members of the cohort utilizing the historical air-sampling data discussed above or interpolating estimates based on the existing data. SMRs for leukemia ranged from a nonsignificant 109 (2 observed, 1.83 expected) at cumulative exposures under 40 ppm-years to a statistically significant SMR of 2339 (5 observed, 0.21 expected; $p < .05$) at 200 ppm-years or more of exposure. The authors found significantly elevated risks of leukemia at cumulative exposures less than the then equivalent current standard for occupational exposure, which was 10 ppm over a 40-year working lifetime.

The Rinsky et al. (1981, 1987) study analyses, based upon the original cohort of Pliofilm rubber workers studied by Infante et al. (1977b), were selected by the Agency as the critical study for dose-response analysis and for the quantitative estimation of cancer risk to humans. The Rinsky et al. (1981, 1987) analyses show ample power, latency, reasonably good estimates of exposure to benzene except prior to 1946, few confounders, and a wide range of exposure to benzene from low levels to high levels. Limitations include the small cohort size, reporting only nine leukemia deaths with no estimates of risk according to cell type. There remain questions about the estimation of personal exposure to benzene, especially prior to 1946 when no measurements of airborne benzene were made. And finally, at levels less than 200 ppm-years it is not possible to determine leukemia risk in this cohort because of lack of sensitivity of the data at low levels.

Ott et al. (1978) observed a nonsignificantly increased risk of leukemia (3 deaths) among 594 chemical workers exposed to benzene followed for at least 23 years in a retrospective cohort mortality study. Benzene exposures ranged from under 2 ppm to over 25 ppm 8-hour TWA. Bond et al. (1986) updated this report by following this cohort an additional 9 years to the end of 1982 and adding an additional 362 exposed workers not studied previously. The authors reported finding a nonsignificant excess risk (SMR = 194) of deaths from leukemia based upon 4 cases. All were diagnosed as myelogenous leukemias. The authors reported that this represented a significant excess (4 observed versus 0.9 expected, $p < .011$) for myelogenous leukemia based upon the International Classification of Diseases and Causes of Death. It is not stated whether these four deaths were acute or chronic. One additional death was classified as a "pneumonia" death, but on the death certificate "acute myelogenous leukemia" was noted as a significant contributing condition. Cumulative exposure estimates ranged from 18 ppm-months to a high of 4211 ppm-months. The Bond et al. (1986) study has little power to detect significant risk of leukemia at low doses. The authors also state that their data should not be used for determining unit risk estimates because of the small number of events, competing exposures to other potentially hazardous materials, and the contribution of unquantified brief exposures to benzene.

Wong (1983, 1987) reported on the mortality of male chemical workers who had been exposed to benzene for at least 6 months during the years 1946 to 1975. The study population of 4602 persons was drawn from seven chemical plants and cumulative exposures to benzene were determined for all subjects. The control subjects (3074 persons) held jobs at the same plants for at least 6 months but were never subjected to benzene exposure. Dose-dependent increases were seen in the risk of leukemia and the risk of lymphatic and hematopoietic cancer. Chemical workers with a cumulative exposure to benzene of 720 ppm-months were subject to a borderline significant relative risk of 3.93 ($p = .05$) for lymphatic and hematopoietic cancer. None of the leukemia deaths were of the acute

myeloid cell type, the type that was known to be associated with exposure to benzene in other studies. The author further observed that cumulative exposure, not peak exposure, was the major variable in quantifying mortality risk from lymphopoietic cancer. The Mantel-Haenszel chi-square for upward trend in risk of leukemia with increasing cumulative exposure was significantly elevated at the 99% level of confidence. Some of the limitations of this study include imprecise historical industrial hygiene data, unusual distribution of leukemia cell types, i.e., there were no acute cases of myelogenous leukemia out of seven leukemia cases, and possible exposure of comparison subjects to potentially carcinogenic solvents other than benzene.

The National Cancer Institute of the U.S. National Institutes of Health and the Chinese Academy of Preventative Medicine have been conducting a comprehensive epidemiological study of 74,828 benzene-exposed workers employed from 1972 to 1987 in 672 factories in 12 cities of China (Dosemeci et al., 1994; Hayes et al., 1996, 1997; Yin et al., 1987, 1989, 1994, 1996). A comparison group of workers consisting of 35,805 employees was assembled from non-benzene-exposed units of 69 of the same factories and 40 factories elsewhere. Workers in a variety of jobs in painting, printing, footwear, rubber, chemical, and other industries were followed for vital status for an average period of time of less than 12 years. Less than 0.3% were lost to follow-up. Employee work histories were linked to benzene exposure data in order to derive individual time-specific estimates for each worker (Dosemeci et al., 1994). This large cohort mortality study produced a significantly elevated risk of hematologic neoplasms (RR = 2.2, 95% C.I. = 1.1-4.2) in workers exposed to benzene at an average level of less than 10 ppm. A combination of ANLL and MDS produced a risk of 3.2 (95% C.I. = 1.0-10.1). For exposure to a sustained concentration of 25 ppm benzene, the risk of ANLL and MDS increased to 7.1 (95% C.I. = 2.1-23.7). The risk of other leukemias (other than ANLL), including chronic myeloid and monocytic leukemia, was not significantly elevated (RR = 2.0). Additionally, the risk of non-Hodgkin's lymphoma was significantly elevated (RR = 4.2 with 95% C.I. = 1.1-15.9) for those with a sustained exposure to benzene that occurred at least 10 years prior to diagnosis. The authors concluded that benzene exposure "is associated with a spectrum of hematologic neoplasms and related disorders in humans and that risks for these conditions are elevated at average benzene-exposure levels of less than 10 ppm." Limitations of this study include possible concurrent exposures to many different chemicals found in the factories where the benzene exposure occurred. There is a lack of reliable exposure information in the early days of the observation period, when only 3% of the exposure estimates were based on actual measurements.

All of the epidemiological studies referred to above have some methodological problems, i.e., confounding exposures, lack of sufficient power, and other limitations, but the consistent excess risk of leukemia across all of these studies argues that such problems could not be entirely responsible for the elevated risks of cancer. Most of these epidemiologic and case studies have been reviewed in peer-reviewed publications (IARC, 1982; ATSDR, 1997; U.S. EPA, 1998). They provide clear evidence of a causal association between exposure to benzene and ANLL. The evidence is suggestive with respect to CNLL and CLL.

The limitations of these studies, except for Rinsky et al. (1981, 1987), preclude their use in quantitative risk estimation. This is further discussed in the quantitative risk estimation sections (II.C.3 and II.C.4).

II.A.3. Animal Carcinogenicity Data

Although human epidemiological studies provide the bulk of the evidence reaffirming the classification of benzene as a category A, "known" human carcinogen (U.S. EPA, 1979, 1985, 1998), many experimental animal studies, both inhalation and oral, also support the evidence that exposure to benzene increases the risk of cancer in multiple organ systems including the hematopoietic system, oral and nasal cavities, liver, forestomach, preputial gland, lung, ovary, and mammary gland. The key animal studies that support the finding of an excess risk of leukemia in humans from exposure to benzene by the inhalation route are Maltoni et al. (1982, 1983, 1985, 1989), Cronkite et al. (1984, 1985, 1989), Snyder et al. (1988), and Farris et al. (1993); and by the oral route, Huff et al. (1989), NTP (1986), and Maltoni et al. (1983, 1985, 1989). The details of these studies have been reviewed (ATSDR, 1997). Studies on the carcinogenicity of benzene in rodents include inhalation exposures to Sprague-Dawley rats, C57BL/6 mice, AKR mice, CD-1 mice, and CBA mice; and gavage treatment of Sprague-Dawley rats, Wistar rats, F344 rats, RF/J mice, Swiss mice, and B6C3F1 mice (Cronkite et al., 1989; Goldstein et al., 1982; Huff et al., 1989; Maltoni et al., 1983, 1988; NTP, 1986; Snyder et al., 1980, 1982, 1984; Farris et al., 1993). Inhalation concentrations ranged from 0 to 1000 ppm and gavage doses ranged from 0 to 200 mg/kg.

It is noted that in humans the cancer induced by benzene exposure is predominantly acute nonlymphocytic leukemia, while in rodents lymphocytic leukemia was observed in two series of experiments in C57BL/6 mice (Snyder et al., 1980) and CBA/Ca mice (Cronkite et al., 1989). The

difference in induction of hematopoietic cancers in mice and humans is not fully understood, but it may be related to species-specific differences in hematopoiesis. Lymphocytes make up a larger portion of the nucleated cells in mouse bone marrow than in human bone marrow (Parnley, 1988) and could simply represent a larger target cell population for benzene metabolites. The bone marrow, Zymbal gland, and Harderian gland all contain peroxidases, which can activate phenols to toxic quinones and free radicals. Sulfatases, which remove conjugated sulfate and thus reform free phenols, are also present at high levels in these target organs. The selective distribution of these two types of enzymes in the body may explain the accumulation of free phenol, hydroquinone, and catechol in the bone marrow and the resulting differences in target organ toxicity of benzene metabolites in humans and animals. The animal bioassay results may have some relevance to human leukemia, but it should be emphasized that there is no well-demonstrated and reproducible animal model for leukemia resulting from benzene exposure. The mechanism of leukemia development following exposure to benzene is not well understood (Low et al., 1989, 1995).

II.A.4. Supporting Data for Carcinogenicity

The supporting evidence for the carcinogenic effects of exposure to benzene comes from our current understanding of the metabolism and mode of action (Stephens et al., 1994; Medinsky et al., 1996; Lee et al., 1996; Valentine et al., 1996; Rothman, 1997). This is briefly summarized below and reviewed in U.S. EPA (1998).

It is generally agreed that the toxicity of inhaled benzene results from its biotransformation to reactive species. Benzene is metabolized in the liver by cytochrome P4502E1 (CYP2E1) to its major metabolites: phenol, hydroquinone, and catechol. The intermediate benzene oxide can also undergo ring opening to trans-trans muconic acid. Although there is a scientific consensus that metabolism of benzene is required for resultant toxicity and carcinogenic response, the role of a metabolite or metabolites of benzene in producing these adverse effects is controversial and more research data are needed to better define sequelae of pathogenesis following exposure to benzene and its metabolites. Current evidence indicates that benzene-induced myelotoxicity and genotoxicity result from a synergistic combination of phenol with hydroquinone, muconaldehyde, or catechol.

Molecular targets for the action of these metabolites, whether acting alone or in concert, include tubulin, histone proteins, topoisomerase II, and other DNA-associated proteins. Damage to these proteins would potentially cause DNA strand breakage, mitotic recombination, chromosomal translocations, and malsegregation of chromosomes to produce aneuploidy. If these effects took place in stem or early progenitor cells, a leukemic clone with selective advantage to grow could arise as a result of protooncogene activation, gene fusion, and suppressor-gene inactivation. Epigenetic effects of benzene metabolites on the bone marrow stroma, and perhaps the stem cells themselves, could then foster development and survival of a leukemic clone. Since these plausible events have not been conclusively demonstrated, this remains a hypothesis (Smith, 1996).

[Back to top](#)

II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure

II.B.1. Summary of Risk Estimates

II.B.1.1. Oral Slope Factor -- 1.5×10^{-2} to 5.5×10^{-2} per (mg/kg)/day

II.B.1.2. Drinking Water Unit Risk -- 4.4×10^{-7} to 1.6×10^{-6} per (ug/L)

II.B.1.3. Extrapolation Method -- Linear extrapolation of human occupational data

Drinking Water Concentrations at Specified Risk Levels:

Risk Level	Concentration
E-4 (1 in 10^4)	10^2 ug/L to 10^3 ug/L
E-5 (1 in 10^5)	10^1 ug/L to 10^2 ug/L

E-6 (1 in 10^6)

10^0 ug/L to 10^1 ug/L

II.B.2. Dose-Response Data (Carcinogenicity, Oral Exposure)

Tumor Type -- leukemia

Test Species -- human

Route -- inhalation, occupational exposure

Reference -- Rinsky et al., 1981, 1987; Paustenbach et al., 1993; Crump 1994; U.S. EPA, 1998; U.S. EPA, 1999.

The quantitative oral unit risk estimate is an extrapolation from the known inhalation dose-response to the potential oral route of exposure documented in Section II.C. The inhalation risk estimate is reported as a range, from 2.2×10^{-6} to 7.8×10^{-6} per ug/m³. No relevant data exist in the published literature for oral absorption of benzene in humans. Inhalation absorption is assumed to be about 50% while that of oral is selected as 100% based upon a review of the relevant human and animal literature (U.S. EPA, 1999). Absorption of benzene via the dermal route of exposure is usually less than 1% of the applied dose and therefore it is not considered to contribute significantly to the oral risk estimation. In the previous oral unit risk estimate it was assumed that absorption was equal for both the inhalation and oral routes of exposure (U.S. EPA, 1992). The inhalation unit risk range (per ug/m³) is first converted to the oral slope factor, which is in units of risk per ug/kg/day, by assuming a standard air intake of 20 m³/day, a standard body weight of 70 kg for an adult human, and 50% absorption via inhalation. The drinking water unit risk was then calculated from the oral slope factor assuming a drinking water intake of 2 L/day. In calculating the drinking water concentrations for specific risk levels, the upper and lower end of the range round off to a single value.

This assessment of the oral unit risk range replaces the previous oral carcinogenicity assessment on IRIS dated April 1, 1992.

II.B.3. Additional Comments (Carcinogenicity, Oral Exposure)

EPA's quantitative estimate for the cancer risk associated with inhalation exposure to benzene was recently updated (U.S. EPA, 1998). The new inhalation unit risk estimate is reported as a range, from 2.2×10^{-6} to 7.8×10^{-6} per ug/m³ (U.S. EPA, 1999b). To extrapolate to oral risk, the inhalation unit risk range is first converted to units of dose (ug/kg/day). Using the standard air intake factor of 20 m³/day, the standard weight estimate of 70 kg, and the 50% absorption factor for inhalation exposure given above, the dose from 1 ug/m³ continuous daily exposure is:

$$1 \text{ ug/m}^3 \times 20 \text{ m}^3/\text{day} \times 0.5 \times (1/70) \text{ kg} = 0.143 \text{ ug/kg/day}$$

The risk estimate range is then divided by this dose, to generate an oral slope factor in units of inverse dose:

$$\begin{aligned} \text{risk}/(\text{ug/kg/day}) &= 2.2 \times 10^{-6} / 0.143 \text{ ug/kg/day} \text{ to } 7.8 \times 10^{-6} / 0.143 \text{ ug/kg/day} \\ &= 1.54 \times 10^{-5} \text{ to } 5.45 \times 10^{-5} \text{ per ug/kg/day} \end{aligned}$$

Assuming 100% oral absorption and a standard intake of 2 L/day, the concentration in drinking water that would produce a dose of 1 ug/kg/day is:

$$1 \text{ ug/kg/day} \times 70 \text{ kg} \times (2 \text{ L/day})^{-1} = 35 \text{ ug/L}$$

Thus, the oral unit risk, in units of risk/(ug/L) would be:

$$(1.54 \times 10^{-5} \text{ to } 5.45 \times 10^{-5}) / 35 \text{ ug/L} = 4.4 \times 10^{-7} \text{ to } 1.6 \times 10^{-6} / \text{ug/L}$$

Note: This estimate is a risk factor for ingested benzene, and is not sufficient to account for total exposure to drinking water. For development of a drinking water safe concentration, the risk due to inhalation of volatilized benzene from drinking water and to dermal uptake must be added to the ingestion risk (Beavers et al., 1996; Lindstrom et al., 1994).

If one assumes a 20% respiratory absorption rate, the lowest value in a group of subjects (range

20% to 50%) that was found in one study (Srbova et al., 1950), then the oral unit risk range becomes 1.10×10^{-6} to 3.89×10^{-6} . This may represent an upper bound on the risk range. The standard values (20 m³/day, 70 kg, 2 L/day) used for the risk estimation do not necessarily account for the population variability.

The range of risk estimates of 4.4×10^{-7} to 1.6×10^{-6} / μ g/L is recommended, within which any value will have equal scientific plausibility. The assumption is made that the leukemia effect is dependent on the absorbed dose. For inhalation, the metabolized dose is assumed to be 50% of the inhaled dose. This conclusion is supported by studies in humans (Pekari et al., 1992; Hunter, 1966; Hunter, 1968; Hunter and Blair, 1972; Nomiyama and Nomiyama, 1974; Srbova et al., 1950; Teisinger et al., 1952, as cited in Fiserova-Bergerova et al., 1974; Yu and Weisel, 1988) and by a pharmacokinetic model developed by Bois et al. (1996). In the absence of data in humans regarding the fraction of orally-ingested benzene that is metabolized, data from mice and rats (Sabourin et al., 1987) suggests that there is a complete absorption of the dose received by corn oil gavage and intraperitoneally.

II.B.4. Discussion of Confidence (Carcinogenicity, Oral Exposure)

The most useful available human epidemiological data for evaluation of the risk of cancer from exposure to benzene comes from occupational inhalation exposure studies (Rinsky et al., 1981, 1987). There are few human data regarding oral exposure to benzene. Route-to-route extrapolation is justified because similar toxic effects are observed in animals through either the oral or inhalation route of exposure to benzene (ATSDR, 1997) and toxicokinetic data available from animal studies (Gerrity et al., 1990). Experimental animal data also demonstrate that benzene is metabolized to the same products whether it is inhaled or ingested. Therefore, it is reasonable to extrapolate from inhalation dose-response to estimate an equivalent oral dose-response.

A rigorous method for route-to-route extrapolation that involves the development of a pharmacokinetic model to predict the concentration of the ultimate carcinogen in bone marrow has been proposed but has not been validated (Smith and Fanning, 1997). Furthermore, the nature of the distribution of benzene metabolites to the bone marrow is not well understood. The chemical species responsible for the induction of leukemia in animals and humans may involve more than one metabolite (Smith, 1996).

The absorption efficiencies across pulmonary and gastrointestinal barriers provide an informed basis to adopt reasonable values for benzene absorption. The oral slope factor is derived from the inhalation slope factor currently documented in the IRIS database (Section II.C). No relevant oral benzene exposure data on humans are available, but it is known that complete gastrointestinal absorption occurs in the rat and mouse study as reported by Sabourin et al. (1987); it is reasonable to assume complete absorption in humans. However, it is clear from numerous studies of pulmonary absorption in humans that absorption of benzene via the inhalation route is incomplete. There is a general consensus in the literature supporting the use of a 50% absorption via inhalation and not using default assumptions that assume both exposure routes have equivalent absorption efficiencies. Based upon several inhalation studies, EPA has judged an absorption factor of 50% to be the most scientifically sound.

In the absence of evidence to the contrary, key studies support the reasonableness of extrapolating from inhalation to oral cancer risk. The calculations use standard EPA conversion factors for air and water intake and informed assumptions about the amount of absorption of benzene from oral and inhalation exposure.

A substantial literature provides information on pulmonary absorption in humans. The animal study selected for this assessment provides excellent information in two species for both inhalation and oral absorption. However, data on oral absorption from drinking water exposure would be a useful addition.

While the human data demonstrate good agreement indicating that approximately one-half of inhaled benzene is absorbed into the bloodstream at exposure concentrations between 1 and 100 ppm, considerable interindividual variability was observed in all studies that reported on multiple subjects. Many factors, including activity level, pulmonary health, and metabolic clearance, are likely to influence the amount of benzene actually taken up in a diverse population exposed by the inhalation route. To date, characterization of the extent of variability is limited.

The simple absorption ratio approach taken to route-to-route extrapolation here cannot account for

differences in disposition of benzene after it crosses the pulmonary or gastrointestinal barrier. First-pass metabolism of ingested benzene may have significant effects on the dose of benzene metabolites that reaches the target bone marrow cells (Sabourin et al., 1989). Leukemogenic metabolites may be produced more efficiently after ingestion, but on the other hand, rapid clearance of benzene and metabolites after ingestion may be a mitigating factor. The data are inadequate to address these questions for humans at this time, but a variety of biomarkers of benzene exposure can help to address questions of internal dose of benzene metabolites. Biomarker data, together with further development of PBPK models, using human data to define parameters wherever possible, may provide improved dose metrics for benzene risk assessment in the near future.

[Back to top](#)

II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure

II.C.1. Summary of Risk Estimates

II.C.1.1. Air Unit Risk

A range of 2.2×10^{-6} to 7.8×10^{-6} is the increase in the lifetime risk of an individual who is exposed for a lifetime to 1 μ g/m³ benzene in air.

II.C.1.2. Extrapolation Method:

Low-dose linearity utilizing maximum likelihood estimates (Crump, 1992, 1994).

Air Concentrations at Specified Risk Levels:

Risk Level	Concentration
E-4 (1 in 10,000)	13.0 to 45.0 μ g/m ³
E-5 (1 in 100,000)	1.3 to 4.5 μ g/m ³
E-6 (1 in 1,000,000)	0.13 to 0.45 μ g/m ³

II.C.2. Dose-Response Data for Carcinogenicity, Inhalation Exposure

Tumor Type -- Leukemia

Test Species -- Humans

Route -- Inhalation

References -- Rinsky et al., 1981, 1987; Paustenbach et al., 1993; Crump and Allen, 1984; Crump, 1992, 1994; U.S. EPA, 1998.

II.C.3. Additional Comments (Carcinogenicity, Inhalation Exposure)

The Pliofilm workers of Rinsky et al. (1981, 1987) provide the best published set of data to date for evaluating human cancer risks from exposure to benzene. Compared to the published studies of Ott et al. (1978), Bond et al. (1986), and Wong (1987), this cohort has fewer reported co-exposures to other potentially carcinogenic substances in the workplace that might confound risk analysis for benzene. This cohort also provides a greater range of exposures than those of Ott et al. (1978), Bond et al. (1986), and Wong (1987). The Rinsky et al. data were used for developing the unit cancer risk by Crump (1992, 1994). Differences in the unit risk estimates, in addition to the choice of model used, stem largely from differences in the exposure estimates and the dose-response model used.

Although the ongoing Chinese cohort studies (Dosemeci et al., 1994; Hayes et al., 1996, 1997; Yin et al., 1987, 1989, 1994, 1996) provide a large data set and perhaps may provide information in the future to better characterize risk of cancer at low dose exposure, their use in the derivation of risk estimates remains problematic at present for the reasons cited in Section II.A.2.

The two most important determinants of the magnitude of the unit risk number are the choice of extrapolation model to be used to estimate risk at environmental levels of exposure and the choice of

the exposure estimates to which the Pliofilm workers (Rinsky et al., 1981, 1987) were subjected. Crump (1992, 1994) presented 96 unit risk calculation analyses by considering different combinations of the following factors: (1) different disease endpoints, (2) additive or multiplicative models, (3) linear/nonlinear exposure-response relationships, (4) two different sets of exposure measurements (Crump and Allen [1984] vs. exposure estimates by Paustenbach et al. [1993]) and (5) cumulative or weighted exposure measurements. The unit risk estimates range from 8.6×10^{-5} to 2.5×10^{-2} at 1 ppm (3200 $\mu\text{g}/\text{m}^3$) of benzene air concentration (Crump, 1992, 1994).

The risk estimates would fall into the lower range if a sublinear exposure response model were found to be more plausible. However, the shape of the exposure dose-response curve cannot be considered without a better understanding of the biological mechanism(s) of benzene-induced leukemia. Understanding of the mechanisms by which exposure to benzene and its metabolites exert their toxic and carcinogenic effects remains uncertain (U.S. EPA, 1998). It is likely that more than one mechanistic pathway may be responsible for the toxicity of benzene contributing to the leukemogenic process. Not enough is known to determine the shape of the dose-response curve at environmental levels of exposure and to provide a sound scientific basis to choose any particular extrapolation model to estimate human cancer risk at low doses. In fact, recent data (Hayes et al., 1997) suggest that because genetic abnormalities appear at low exposures in humans, and the formation of toxic metabolites plateaus above 25 ppm, the dose-response curve could be supralinear below 25 ppm. Given this, EPA believes that use of a linear extrapolation model as a default approach is appropriate.

When a linear model was employed, the choice of cancer unit risk estimates narrows to a range between 7.1×10^{-3} and 2.5×10^{-2} at 1 ppm (2.2×10^{-6} to 7.8×10^{-6} at 1 $\mu\text{g}/\text{m}^3$ of benzene in air), depending on which exposure measurements were used, i.e., Crump and Allen (1984) or Paustenbach et al. (1993). The choice of these limits was dictated by the following considerations: (1) use of the (1981, 1987) Rinsky cohort, (2) use of Crump's (1992, 1994) analysis of the Crump and Allen (1984) and the Paustenbach (1992, 1993) exposure measurements. The range of risks nearly includes the 1985 EPA risk estimate of 2.6×10^{-2} at 1 ppm (8.1×10^{-6} at 1 $\mu\text{g}/\text{m}^3$). The set of risk estimates falling within this interval reflects both the inherent uncertainties in the risk assessment of benzene and the limitations of the epidemiologic studies in determining dose-response and exposure data.

II.C.4. Discussion of Confidence (Carcinogenicity, Inhalation Exposure)

The major conclusion of this update (U.S. EPA, 1998) is a reaffirmation within an order of magnitude of the benzene interim unit risk estimates derived in EPA's 1985 interim risk assessment (U.S. EPA, 1985), which established the probability of humans developing cancer from exposure to 1 ppm of benzene. Review of the 1985 interim risk assessment required addressing two main concerns.

The first concern was the use of the updated epidemiologic data from Rinsky et al.'s (1987) cohort of Pliofilm workers and selection of appropriate estimates of their exposure to benzene for the derivation of the unit risk estimate. Although numerous epidemiological studies demonstrate an association of exposure to benzene and increased risk of human cancer, these studies are not without methodological limitations. The Rinsky et al. (1981, 1987) study continues to provide the best available data for derivation of unit cancer risk estimates. This study had the least number of confounders and a wide range of exposure to benzene.

The second major concern was continued application of the low-dose linearity concept to the model used to generate estimates of unit risk. It was concluded that at present there is insufficient evidence to reject this concept, and a linear extrapolation was used (U.S. EPA, 1998). If one assumes that the linear extrapolation model is the appropriate model to be used, given the uncertainties outlined, then the range of suitable estimates is defined by the choice of exposure estimates selected. The lowest unit risk among linear choices is determined by the exposure estimates of Paustenbach et al. (1993) according to the calculations of Crump (1992, 1994), simply because Paustenbach's exposure estimates for the Rinsky cohort are highest. That estimate is 7.1×10^{-3} at 1 ppm (2.2×10^{-6} at 1 $\mu\text{g}/\text{m}^3$). The highest risk number is determined by Crump (1992, 1994) using the lower exposure estimates from Crump and Allen (1984), and that is 2.5×10^{-2} at 1 ppm (7.8×10^{-6} at 1 $\mu\text{g}/\text{m}^3$).

At present, the true cancer risk from exposure to benzene cannot be ascertained, even though dose-response data are used in the quantitative cancer risk analysis, because of uncertainties in the low-dose exposure scenarios and lack of clear understanding of the mode of action. A range of estimates of risk is recommended, each having equal scientific plausibility. The range estimates are maximum likelihood values (i.e., best statistical estimates) and were derived from observable dose

responses using a linear extrapolation model to estimate low environmental exposure risks. The extrapolation range is on the order of 20-80 depending on what environmental level is of interest. This range is fairly low and thus does not suggest any unusual lack of plausibility about the estimates. The use of a linear model is a default public health protective approach and an argument both for and against recognizing supra- and sublinear relationships at low doses and nonthreshold or threshold modes of action on exposure to benzene. Therefore, the true risk could be either higher or lower. The numerical difference between the 1985 risk estimate (2.6×10^{-2} at 1 ppm or 8.1×10^{-6} at 1 $\mu\text{g}/\text{m}^3$) compared to the new high-end risk (2.5×10^{-2} at 1 ppm or 7.8×10^{-6} at 1 $\mu\text{g}/\text{m}^3$) is insignificant and no scientific inferences about the merit of one value versus the other should be made.

[Back to top](#)

II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)

II.D.1. EPA Documentation

Source Documents -- U.S. EPA, 1999; U.S. EPA, 1998; U.S. EPA, 1995; U.S. EPA, 1979.

The U.S. EPA. (1998) inhalation assessment and the U.S. EPA (1999) extrapolation of the inhalation unit risk estimate to the oral route of exposure were externally peer reviewed. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A summary record of the comments and EPA responses is included as an appendix to the benzene support document file.

The EPA 1979 and 1985 documents provide the basis for the classification of benzene as a Group A carcinogen.

II.D.2. EPA Review (Carcinogenicity Assessment)

Agency Consensus Date:
inhalation carcinogenicity: 9/30/1998
oral carcinogenicity: 1/3/2000

II.D.3. EPA Contacts (Carcinogenicity Assessment)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (fax), or hotline.iris@epa.gov (Internet address).

III. [reserved]

IV. [reserved]

V. [reserved]

[Back to top](#)

VI. Bibliography

Benzene
CASRN -- 71-43-2
Last Revised -- 04/17/2003

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[Back to top](#)

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[Back to top](#)

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[Back to top](#)

_VII. Revision History

Benzene
CASRN - 71-43-2

Date	Section	Description
12/01/1988	II.A.4.	Anderson and Richardson citation year corrected
12/01/1988	II.A.4.	Kissling and Speck citation year corrected
07/01/1989	I.B.	Inhalation RfD now under review
02/01/1990	II.	Clarified citations
02/01/1990	II.A.3.	Corrected Maltoni, 1979 to Maltoni and Scarnato, 1979
02/01/1990	II.A.3.	Corrected Maltoni, 1983 to Maltoni et al., 1983
02/01/1990	II.A.3.	Corrected Synder et al., 1980 to 1981
02/01/1990	VI.	Bibliography on-line
03/01/1990	VI.C.	Clarify Maltoni et al., 1983 and NTP, 1986 references
08/01/1990	III.A.10	Primary contact changed
08/01/1990	IV.F.1.	EPA contact changed
01/01/1991	II.	Text edited
01/01/1991	II.C.1.	Inhalation slope factor removed (global change)
01/01/1992	IV.	Regulatory actions updated
04/01/1992	II.B.2.	Text revised
02/01/1994	II.D.3.	Secondary contact's phone number changed
08/01/1995	I.B.	EPA's RfD/RfC and CRAVE workgroups were discontinued in May, 1995. Chemical substance reviews that were not completed by September 1995 were taken out of IRIS review. The IRIS Pilot Program replaced the workgroup functions beginning in September, 1995.
04/01/1997	III., IV., V.	Drinking Water Health Advisories, EPA Regulatory Actions, and Supplementary Data were removed from IRIS on or before April 1997. IRIS users were directed to the appropriate EPA Program Offices for this information.
10/16/1998	II., VI.	Revised inhalation carcinogenicity section and references
01/19/2000	II., VI.	Revised oral carcinogenicity section and references

02/22/2001 I. This chemical is being reassessed under the IRIS Program.
04/17/2003 IA., IB., VI. New RfD and RfC sections; references.

[Back to top](#)

VIII. Synonyms

Benzene
CASRN -- 71-43-2
Last Revised -- 01/19/2000

71-43-2
Benzene
benzol
coal naphtha
cyclohexatriene
phene
phenyl hydride
polystream
pyrobenzol

Note: [Support Document](#) and [response to the peer review](#) for the benzene inhalation carcinogenicity assessment in Adobe® PDF format (57 Pages, 285 Kbytes).
[Support Document](#) and [response to the peer review](#) for the benzene oral carcinogenicity assessment in Adobe® PDF format (27 Pages, 74 Kbytes). Similar documents can be found in the [List of Available IRIS Toxicological Reviews and Other Support Documents](#).

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[Back to top](#)

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Ethylbenzene (CASRN 100-41-4)

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Entire IRIS Website

MAIN CONTENTS

Reference Dose for Chronic Oral Exposure (RfD)

0051

Ethylbenzene; CASRN 100-41-4

Health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several Program Offices and the Office of Research and Development. The summaries presented in Sections I and II represent a consensus reached in the review process. Background information and explanations of the methods used to derive the values given in IRIS are provided in the Background Documents.

STATUS OF DATA FOR Ethylbenzene

File First On-Line 01/31/1987

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	on-line	06/01/1991
Inhalation RfC Assessment (I.B.)	on-line	03/01/1991
Carcinogenicity Assessment (II.)	on-line	08/01/1991

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name -- Ethylbenzene
CASRN -- 100-41-4
Last Revised -- 06/01/1991

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of substances that are also carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD

Chronic Health
Hazards for Non-
Carcinogenic Effects
Reference Dose for
Chronic Oral Exposure
(RfD)

- Oral RfD Summary
- Principal and
Supporting Studies
- Uncertainty and
Modifying Factors
- Additional Studies/
Comments
- Confidence in the
Oral RfD
- EPA Documentation
and Review

Reference
Concentration for
Chronic Inhalation
Exposure (RfC)

- Inhalation RfC
Summary
- Principal and
Supporting Studies
- Uncertainty and
Modifying Factors
- Additional Studies/
Comments
- Confidence in the
Inhalation RfC
- EPA Documentation
and Review

Carcinogenicity
Assessment for
Lifetime Exposure

Evidence for Human
Carcinogenicity

- Weight-of-Evidence
Characterization
- Human
Carcinogenicity Data
- Animal
Carcinogenicity Data
- Supporting Data for
Carcinogenicity

Quantitative Estimate
of Carcinogenic Risk
from Oral Exposure

- Summary of Risk

Liver and kidney toxicity	NOEL: 136 mg/kg/day (converted to 97.1 mg/kg/day)	1000 1	1E-1 mg/kg/day
Rat Subchronic to Chronic Oral Bioassay	LOAEL: 408 mg/kg/day (converted to 291 mg/kg/day)		
Wolf et al., 1956			

*Conversion Factors: 5 days/7 days; thus, 136 mg/kg/day x 5 days/7 days = 97.1 mg/kg/day

I.A.2. Principal and Supporting Studies (Oral RfD)

Wolf, M.A., V.K. Rowe, D.D. McCollister, R.L. Hollingsworth and F. Oyen. 1956. Toxicological studies of certain alkylated benzenes and benzene. Arch. Ind. Health. 14: 387-398.

The chosen study is a rat 182-day oral bioassay in which ethylbenzene was given 5 days/week at doses of 13.6, 136, 408, or 680 mg/kg/day in olive oil gavage. There were 10 albino female rats/dose group and 20 controls.

The criteria considered in judging the toxic effects on the test animals were growth, mortality, appearance and behavior, hematologic findings, terminal concentration of urea nitrogen in the blood, final average organ and body weights, histopathologic findings, and bone marrow counts. The LOAEL of 408 mg/kg/day is associated with histopathologic changes in liver and kidney.

I.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF -- The uncertainty factor of 1000 reflects 10 for both intraspecies and interspecies variability to the toxicity of this chemical in lieu of specific data, and 10 for extrapolation of a subchronic effect level to its chronic equivalent.

MF -- None

I.A.4. Additional Studies/Comments (Oral RfD)

None.

I.A.5. Confidence in the Oral RfD

Study -- Low
Database -- Low
RfD -- Low

Confidence in the chosen study is low because rats of only one sex were tested and the experiment was not of chronic duration. Confidence in the supporting database is low because other oral toxicity data were not found. Low confidence in the RfD follows.

I.A.6. EPA Documentation and Review of the Oral RfD

U.S. EPA. 1980. Ambient Water Quality Criteria for Ethylbenzene. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Water Regulations and Standards, Washington, DC. EPA 440/5-80-048. NTIS PB 81-117590.

U.S. EPA. 1985. Drinking Water Criteria Document for Ethylbenzene. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Drinking Water, Washington, DC. (Public review draft)

U.S. EPA. 1985. Health Effects Assessment for Ethylbenzene. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Emergency and Remedial Response, Washington, DC. ECAO-CIN-H008.

Estimates
- Dose-Response Data
- Additional Comments
- Discussion of
Confidence

Quantitative Estimate
of Carcinogenic Risk
from Inhalation
Exposure

- Summary of Risk
Estimates
- Dose-Response Data
- Additional Comments
- Discussion of
Confidence

EPA Documentation,
Review and, Contacts

• Bibliography
• Revision History
• Synonyms

The 1980 Ambient Water Quality Criteria Document for Ethylbenzene received extensive Agency and public review.

The 1985 Drinking Water Criteria Document for Ethylbenzene and the 1985 Health Effects Assessment for Ethylbenzene received extensive Agency review with the help of selected outside scientists.

Agency Work Group Review -- 05/20/1985

Verification Date -- 05/20/1985

I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

[Back to top](#)

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name -- Ethylbenzene
CASRN -- 100-41-4
Last Revised -- 03/01/1991

The inhalation Reference Concentration (RfC) is analogous to the oral RfD and is likewise based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. The inhalation RfC considers toxic effects for both the respiratory system (portal-of-entry) and for effects peripheral to the respiratory system (extrapulmonary effects). It is expressed in units of mg/cu.m. In general, the RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhalation exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Inhalation RfCs were derived according to the Interim Methods for Development of Inhalation Reference Doses (EPA/600/8-88/066F August 1989) and subsequently, according to Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry (EPA/600/8-90/068F October 1994). RfCs can also be derived for the noncarcinogenic health effects of substances that are carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.B.1. Inhalation RfC Summary

Critical Effect	Exposures*	UF	MF	RfC
Developmental toxicity	NOAEL: 434 mg/cu.m (100 ppm) NOAEL(ADJ): 434 mg/cu.m NOAEL(HEC): 434 mg/cu.m	300	1	1E+0 mg/cu.m
Rat and Rabbit Developmental Inhalation Studies	LOAEL: 4340 mg/cu.m (1000 ppm) LOAEL(ADJ): 4340 mg/cu.m LOAEL(HEC): 4340 mg/cu.m			
Andrew et al., 1981; Hardin et al., 1981				

*Conversion Factors: MW = 106.18. Assuming 25C and 760 mmHg, NOAEL(mg/cu.m) = 100 ppm x MW/24.45 = 434 mg/cu.m. For developmental effects, this concentration is not adjusted; therefore, NOAEL(ADJ) = NOAEL. The NOAEL(HEC) was calculated for a gas:extrapulmonary effect, assuming periodicity was attained. Since b:a lambda values are unknown for the experimental animal species (a) and humans (h), a default value of 1.0 was used for this ratio. NOAEL(HEC) = NOAEL(ADJ) x (b:a lambda(a)/lambda(h)) = 434 mg/cu.m.

I.B.2. Principal and Supporting Studies (Inhalation RfC)

Andrew, F.D., R.L. Buschbom, W.C. Cannon, R.A. Miller, L.F. Montgomery, D.W. Phelps, et al. 1981. Teratologic assessment of ethylbenzene and 2-ethoxyethanol. Battelle Pacific Northwest Laboratory, Richland, WA. PB 83-208074., 108.

Hardin, B.D., G.P. Bond, M.R. Sikov, F.D. Andrew, R.P. Selites and R.W. Niermeier. 1981. Testing of selected workplace chemicals for teratogenic potential. Scand. J. Work Environ. Health, 7(suppl 4): 66-75.

Inhalation experiments were conducted with Wistar rats (n=78-107/concentration) and New Zealand white rabbits (n=29-30/concentration) exposed 6 to 7 hours/day, 7 days/week during days 1-19 and 1-24 of gestation, respectively, to nominal concentrations of 0, 100, or 1000 ppm (434 or 4342 mg/cu.m) (Andrew et al., 1981). A separate group of rats was exposed pregestationally for 3 weeks prior to mating and exposure was continued into the gestational period. Actual concentrations were within 10% of target concentrations. All pregnant animals were sacrificed 1 day prior to term (21 days for rats; 30 days for rabbits). Maternal organs (liver, lungs, kidney, heart, spleen, adrenals, ovaries, and brain) were examined histopathologically. Uteri were examined and fetuses were weighed, sexed, and measured for crown-to-rump length, and examined for external, internal and skeletal abnormalities. For statistical analyses, the litter was chosen as the experimental unit.

Ethylbenzene did not elicit embryotoxicity, fetotoxicity, or teratogenicity in rabbits at either exposure level. There were no significant incidences of major malformations, minor anomalies, or common variants in fetal rabbits from exposed groups. Maternal toxicity in the rabbits was not evident. There was no evidence of histologic damage in any of the dams' organs. The principal observation noted by the investigators was a reduced number of live rabbit kits per litter (p<0.05) at both exposure levels when evaluated by ANOVA and Duncan's Multiple Range Test. The number of live kits per litter in the air-exposed controls was reported as 8 (3+/-s.d.), compared with 7 (3+/-s.d.) for each exposure group. However, if one recalculates the data presented in Table 9 of Andrew et al. (1981), the number of live kits per litter for the low concentration (100 ppm) was 8 rather than 7 as presented in the paper. Since the number of live kits per litter at the high concentration was 7, this may suggest an effect at 1000 ppm, but not at 100 ppm. However, the number of implantations per litter and the number of dead or resorbed per litter were not different from controls. Prenatal mortality ranged from 5 to 8% and preimplantation loss ranged from 18 to 27%. Neither indicated a concentration-related intrauterine mortality. The results of the rabbit study are indicative of a NOAEL of 100 ppm based on a lack of developmental effects in rabbits. The NOAEL(HEC) is 434 mg/cu.m.

In rats exposed only during gestation, there were no histopathological effects in any of the maternal organs examined. There was no effect on fertility or on any of the other measures of reproductive status. The principal observation in fetuses was an increased incidence (p<0.05) of supernumerary and rudimentary ribs in the high exposure group and an elevated incidence of extra ribs in both the high and 100 ppm groups. Both absolute and relative liver, kidney, and spleen weights were significantly increased in pregnant rats from the 1000 ppm group.

Groups of female rats were also exposed for 3 weeks prior to mating and exposure was continued during gestation. Like the 1000-ppm group exposed only during gestation, there was also an increased incidence of extra ribs (p<0.05) in the pre-gestationally exposed high exposure group. However, an increased incidence was not seen at 100 ppm in those exposed pre-gestationally, in contrast to the comparable group exposed only during gestation. There was no increase in rudimentary ribs in either of exposed groups. When extra and rudimentary ribs were grouped together, there was no significant increase in supernumerary ribs in either of the exposed groups. The apparent discrepancy in the incidence of supernumerary ribs between the pregestationally-exposed group and those exposed only during gestation may be based, in part, on the fewer numbers of litters examined in the pregestationally-exposed group. There were no effects on fertility or on any of the other measures of reproductive status. No fetal toxicity was noted at either exposure level. Body weights, placental weights, and sex ratios were within normal limits. Absolute and relative liver and spleen weights were significantly increased in pregnant rats from the 1000 ppm group; only relative kidney weight was increased significantly. There were no histopathological effects in any of the organs examined.

Skeletal variants were seen at both 434 and 4342 mg/cu.m in the rats with the effects at 432 mg/cu.m being reduced compared with those occurring at 4342 mg/cu.m. By themselves, the effects are marginally adverse, even at 4342 mg/cu.m. However, a weight-of-evidence approach, noting a cluster of other mild effects at 4342 mg/cu.m, is used to determine that 1000 ppm is a LOAEL. The skeletal variations are considered along with evidence of slightly reduced litter size in rabbits at 4342 mg/cu.m and an increase in "% skeletal retarded fetuses" at 600 mg/cu.m (Ungvary and Tatrai, 1985). Additional support for this position is derived from the observations of somewhat elevated maternal liver, kidney, and spleen weights (Andrew et al., 1981).

__I.B.3. Uncertainty and Modifying Factors (Inhalation RfC)

UF -- The uncertainty factor of 300 reflects a factor of 10 to protect unusually sensitive individuals, 3 to adjust for interspecies conversion and 10 to adjust for the absence of multigenerational reproductive and chronic studies.

MF -- None

__I.B.4. Additional Studies/Comments (Inhalation RfC)

Ungvary and Tatrai (1985) exposed CFY rats (n=17-20) to levels of 600, 1200, or 2400 mg/cu.m for 24 hours/day during days 7 to 15 of gestation. CFLP mice (n=20) were exposed to 500 mg/cu.m for 24 hours/day from gestational days 6 to 15 or for 3 days intermittently for 4 hours/day for days 6-15. It is not clear from the description if the results pertain to the continuous exposure or the intermittent exposure. New Zealand rabbits (n=3-9) were exposed for 24 hours/day to concentrations of 500 or 1000 mg/cu.m from gestational days 7 to 20. Untreated animals and those exposed to air only served as controls.

It was stated that maternal toxicity (unspecified species) was moderate and concentration-dependent; however, no data were presented to support this statement. Maternal weight gain was reported to have decreased for rabbits exposed to 1000 mg/cu.m. It was reported that rabbits exposed to 1000 mg/cu.m exhibited mild maternal toxicity manifested by reduced weight gain. However, the percent weight gain was not reported. There were no data for developmental endpoints in the 1000-ppm group because there were no live fetuses. One dam had died and three others aborted in this exposure group. Four dams had total resorptions. However, four other compounds in addition to ethyl benzene were tested at 1000 mg/cu.m and all caused spontaneous abortions at this level. Thus, the results are not clearly indicative of a treatment-related effect. This observation, coupled with the lack of any indication of abortions in rabbits in the Hardin et al. (1981) study, suggests that this effect in rabbits is not treatment-related.

Ungvary and Tatrai (1985) did observe a significant reduction in the mean female fetal weight in rabbit dams exposed 24 hours/day to 500 mg/cu.m. Andrew et al. (1981) did not observe such an effect in rabbits exposed up to 4348 mg/cu.m. These conflicting results in rabbits might be attributable to differences in study design.

Postimplantation loss (% dead or resorbed fetuses), and exposure-related skeletal retardation were significantly elevated ($p < 0.05$) in rats at all exposure levels with one exception. Exposure to 600 mg/cu.m for 6 hours/day (it was not stated if this was a single exposure or the exposure duration on each day of gestation) did not result in any statistically significant fetal effects although there was increased incidence of dead/resorbed fetuses, lower weight of fetuses, and skeletal retarded fetuses. In the 24-hour/day exposure groups, malformations characterized as "anomalies of the uropoietic apparatus" and an increased incidence of extra ribs were significantly increased only at the highest exposure level. No data were presented on the anomalies of the uropoietic apparatus. There was a significant ($p < 0.05$) increase in skeletal retardation and fetal resorption in all continuous exposure groups although the concentration-response was shallow. The percent skeletal retarded fetuses, for example, at exposure concentrations of 600, 1200, and 2400 mg/cu.m was 26, 30, and 35%, respectively; the incidence in controls was 13%. These results in rats suggest a LOAEL(HEC) of 2400 mg/cu.m for extra ribs in the absence of demonstrable maternal toxicity.

In mice, an increased incidence of "anomalies of the uropoietic apparatus" was the only observation, but no data were presented. There was no discussion concerning maternal toxicity.

A 90-day subchronic inhalation study was conducted in F344/N rats (n=10/sex/group) and B6C3F1 mice (n=10/sex/group) that were exposed to 0, 100, 250, 500, 750, and 1000 ppm (0, 434, 1086, 2171, 3257, and 4343 mg/cu.m) 6 hours/day, 5 days/week (NTP, 1988; 1989; 1990). The duration-adjusted values were 0, 77.5, 194, 388, 582, and 776 mg/cu.m, respectively. The test atmosphere concentrations monitored by gas chromatography were within a 10% range of the target concentrations. At study termination, necropsies were conducted on the lung, liver, kidney, heart, testes, and thymus with organ weight measurements. Clinical chemistry data were obtained for rats. Histopathological examinations were conducted on all animals in the high concentration groups and in controls; animals in the lower concentration groups were evaluated when lesions were observed until no observed effects were seen. Sperm morphology and vaginal cytology tests were performed. There were no mortalities, exposure-related clinical signs of toxicity, or significant adverse effects on body weight in any of the exposed rats or mice.

In rats, hematology parameters were unaffected. Of the liver enzymes evaluated, only serum alkaline phosphatase (SAP) activity was significantly reduced in a concentration-related manner (at 500 ppm and above) for both sexes with a greater sensitivity in females. The significance of this decrease is not clear since in liver damage, SAP levels usually increase. The investigators suggested the decrease may be due to reduced water and food intake. No liver histopathology was noted for any exposure group. Significant concentration-related increases in absolute liver weights occurred in males at 250 ppm and higher (12.5, 17.3, 22.0, and 23.6% at 250, 500, 750, and 1000 ppm, respectively); in females the lowest concentration at which an increase in absolute liver weight was seen was in the 500-ppm group (11.8%). The increase in the 750- and 1000-ppm groups was 11.5 and 15.8%, respectively. Relative liver weights were significantly increased in all male exposure groups except the 100-ppm group while all female exposure groups except the two lowest groups showed significant increases. Absolute kidney weight in males significantly increased only in the 500- and 750-ppm groups; relative weight was increased in the three highest exposure groups. In females, both absolute and relative kidney weights increased significantly in the three highest exposure groups. Regeneration of renal tubules in the kidneys of male rats only was seen in all groups including controls. The severity of the lesions was greatest in the rats at in the high-exposure group.

The most significant gross observation in rats was the presence of enlarged bronchial and/or mediastinal lymph nodes, but these observations were not dose-related. The incidence for minimal lung inflammation in male rats was 0/10, 3/10, 9/10, 9/10, 8/10, and 10/10 for the 0-, 100-, 250-, 500-, 750-, and 1000-ppm exposure groups, respectively. Microscopically, this enlargement was attributable to an increase in normal constituents of the lymph nodes characterized by accumulations of macrophages, lymphocytes, neutrophils, and plasma cells. It was the opinion of the NTP Pathology Working Group (PWG) that hyperplasia of the lymph nodes and lower respiratory tract was typical of an infectious agent with an associated active immune response rather than ethylbenzene exposure (NTP, 1989). This diagnosis was supported by the following observations: an uneven distribution of lesions among and within groups; foci of airway inflammation were randomly distributed throughout the lungs; considerable variability in severity within groups; and there was no consistent concentration-response relationship. No lesions were seen in the nasal cavity. The PWG described these lesions as not typical of the type of lesions which occurs with known pulmonary irritants. These lesions were not found in control animals, which were housed in separate rooms. No infectious agent was identified upon serologic examination. In the draft NTP technical report (NTP, 1990), the inflammatory lung lesions were described as probably unrelated to exposure. Antibodies to common rodent respiratory tract viruses were not detected. However, only sera from control rats were sampled. Lesions morphologically indistinguishable from those in this study have been seen in control and treatment groups of rats from other inhalation and dosed feed studies (NTP, 1990). The PWG recommended that this effect be reevaluated in another study.

In mice, no significant exposure-related gross or histopathological observations were noted at terminal necropsy of any organs, including the lung. The only exposure-related effects were significantly elevated absolute and relative liver weight in both sexes of mice at 750 and 1000 ppm and significantly elevated relative kidney weight of the females exposed to 1000 ppm. There were no significant histopathological changes or function test alterations in either liver or kidney of either sex.

The NTP peer review of the subchronic study took place on November 20, 1990 at Research Triangle Park. The NTP Board of Scientific Counselors' panel of experts agreed with the conclusions of the NTP report that there were no indications of toxicity due to ethyl benzene. A 2-year lifetime study in both rats and mice has been initiated and exposures have been conducted through 7 months. No serial sacrifices are planned and results are not expected prior to 1992.

Clark (1983) exposed Wistar rats (n=18/sex/group) (12-13 weeks old) to 0 and 100 ppm (0 and 434 mg/cu.m) reagent grade ethylbenzene 6 hours/day, 5 days/week for 12 weeks. The duration-adjusted values were 0 and 77.5 mg/cu.m. Clinical observations, body weight, food intake, hematology, urinalysis, organ weights, and histopathology of all major organs (including the lung and nasal cavity) were used as parameters to assess toxicity. No statistically significant effects were observed at 100 ppm. There were no differences from controls in the liver enzymes, including SAP. While slight bile duct hyperplasia was seen in 15/18 exposed males and 14/18 exposed females, hyperplasia was also common in controls (10/18 females and 8/18 males), and these observations were not statistically significant. The results of this study suggest a NOAEL of 100 ppm. The NOAEL (HEC) is 77.5 mg/cu.m. The results are in general agreement with the findings of the NTP study in F344 rats.

Wolf et al. (1956) exposed rats (n=10-25/sex/group) to 400, 600 or 1250 ppm (1737, 2606, or 5428 mg/cu.m) ethylbenzene 7 hours/day, 5 days/week for about 6 months. The duration-adjusted values were 0, 362, 542, and 1131 mg/cu.m, respectively, using the 7-hour duration. Exposure ranged from

186 to 214 days. Male rats only were also exposed to 2200 ppm (9554 mg/cu.m) for 7 hours/day, 5 days/week for about 5 months. The duration-adjusted value was 1990 mg/cu.m. Histopathology was performed on a variety of organs including the lung. Data on liver and kidney weights and histopathology were not presented; these parameters were discussed only in descriptive terms. Repeated exposure of rats, guinea pigs, and rhesus monkeys was examined.

Growth was depressed moderately in male rats at 2200 ppm. Liver and kidney weights in rats were increased slightly in all exposed groups compared with matched controls, and rats exposed to 1250 and 2200 ppm developed histopathological changes manifested as cloudy swelling of the liver and renal tubules and testicular degeneration. The data indicate a NOAEL for liver histopathology at 600 ppm (542 mg/cu.m). However, no incidence data was reported. Since it is not clear that these effects are adverse when taken in context with the results of the NTP study, a NOAEL or LOAEL is not identified.

Guinea pigs (5-10/sex/group) and rabbits (1-2/sex/group) were exposed to 0, 400, or 600 ppm (duration-adjusted concentrations of 0, 362, or 542 mg/cu.m, respectively) ethylbenzene 7 hours/day, 5 days/week for about 6 months. Only females were exposed to 1250 ppm (duration-adjusted value of 1131 mg/cu.m). Growth was depressed in female guinea pigs exposed to 1250 ppm. Liver weight was described as slightly increased only in the 600-ppm exposure group. The study does not clearly indicate 600 ppm as a LOAEL so the NOAEL for guinea pigs is designated at 600 ppm. The NOAEL(HEC) is 542 mg/cu.m. Other than an observation of slight degeneration of the testicular germinal epithelium in the male rabbit at 600 ppm, there were no adverse effects reported for rabbits of either sex.

One male Rhesus monkey was exposed to 600 ppm (duration-adjusted value of 542 mg/cu.m) and two females were exposed to 400 ppm (duration-adjusted value of 362 mg/cu.m). A slight degeneration of the testicular germinal epithelium and increased liver weight was observed in the male monkey. No effects were reported for the female rhesus monkeys.

The small number of rabbits and monkeys preclude identification of NOAEL and LOAEL values for these species.

Cragg et al. (1989) exposed B6C3F1 mice (n=5/sex/group) and F344 rats (n=5/sex/group) to actual concentrations of 0, 99, 382, and 782 ppm (0, 430, 1659, and 3396 mg/cu.m) 6 hours/day, 5 days/week for 4 weeks. The duration-adjusted values were 0, 77, 296, 606 mg/cu.m, respectively. In the same study, New Zealand White rabbits (n=5/sex/group) were exposed to actual concentrations of 0, 382, 782, or 1610 ppm (0, 1659, 3396, or 6992 mg/cu.m). The duration-adjusted values were 0, 296, 606 and 1249 mg/cu.m, respectively. No changes were evident in mortality, clinical chemistry parameters, urinalysis, nor were there treatment-related gross or histopathological findings. Urinalysis was not performed on rabbits and clinical chemistry parameters were not performed on mice. Liver enzymes measured included AP. Hematology was performed on all species. Histopathology was only conducted on the high concentration animals except all rabbits' testes were examined. There was no liver histopathology in any of the species.

In the 382-ppm exposure group, rats exhibited sporadic incidences of salivation and lacrimation. (These observations were not noted in the NTP subchronic study). Absolute liver weights were significantly increased in male rats; relative weight was increased at 782 ppm. In females, absolute liver weight was significantly increased at 782 ppm and relative weight at both concentrations. Male rats of the 782 ppm group had a significant ($p < 0.05$) increase in platelets while females only had a significant ($p < 0.05$) increase in total leukocytes.

In mice, females showed a statistically significant increase in absolute, but not relative liver weight, at 782 ppm. There were no significant liver weight changes in male mice. Both males and females exhibited an increased liver weight relative to brain weight at 782 ppm only. Rabbits showed no changes in liver weight ratios at any exposure level.

Since there were no adverse histopathological findings for the liver, a NOAEL of 782 ppm is identified for rats and mice. The NOAEL(HEC) is 606 mg/cu.m. The NOAEL for rabbits is 1610 ppm; the NOAEL(HEC) is 1249 mg/cu.m.

Elovaara et al. (1985) found concentration-related increases in drug-metabolizing enzymes of liver and kidney, with corresponding ultrastructural alterations in a subchronic inhalation study with rats. Male Wistar rats (n=5/group) were exposed to 0, 50, 300, or 600 ppm (0, 217, 1302, or 2604 mg/cu.m) ethylbenzene 6 hours/day, 5 days/week for 2, 5, 9, or 16 weeks. The duration-adjusted values were 0, 38.7, 233, and 465 mg/cu.m, respectively. The liver was the only organ examined

histologically (light and electron microscopy). There were no changes in liver weight at any concentration. After 16 weeks exposure, NADPH-cytochrome reductase and UDPG-transferase were significantly elevated at 300 and 600 ppm. Aminopyrine N-demethylase and 7-ethoxycoumarin-O-deethylase (7-ECDE) were elevated at all exposure levels. The elevation in UDPG-transferase was exposure-related and may signify glucuronidation of ethylbenzene metabolites during detoxication. Electron microscopy also showed changes in hepatocyte ultrastructure [e.g., smooth endoplasmic reticulum (SER) proliferation, slight degranulation of rough endoplasmic reticulum] at all exposure levels beginning 2 to 9 weeks after exposure. Necrosis was not observed nor were there any increases in serum alanine aminotransferase. SAP was not measured. The proliferation of SER is consistent with enzyme induction. At 16 weeks, changes in ultrastructure were mainly confined to the high-exposure group. There was no effect of exposure on hepatic glutathione (GSH) content. Significant increases in relative kidney weight only were reported following 2 and 9, but not at 16 weeks of exposure to 600 ppm. Kidney 7-ECDE, and UDPG transferase activities showed statistically significant and exposure-related increases at all exposure levels.

In the absence of histologic evidence of damage, changes in absolute or relative liver weight, and no effect on serum ALT, the microsomal enzyme induction and ultrastructural changes are considered to be adaptation phenomena. The results of this study suggest a NOAEL of 600 ppm. The NOAEL (HEC) is 465 mg/cu.m for liver and kidney. The absence of liver weight changes is not consistent with the findings of the NTP (1988) subchronic study.

Angerer and Wulf (1985) evaluated 35 workers who chronically (2-24 years, average 8.2 years) sprayed varnishes containing alkyd-phenol and polyester resins dissolved in solvent mixtures consisting principally of xylene isomers and ethylbenzene. Some of the varnishes contained lead-based pigments. The air samples from personal monitors indicated average levels of 4.0 ppm for ethylbenzene. Although workers had significantly elevated lymphocytes in addition to significantly decreased erythrocyte counts and hemoglobin levels compared with controls, these effects cannot be attributed to ethylbenzene since other compounds (e.g., xylene, methylchloroform, n-butanol, toluene, C9 hydrocarbons) were detected in some of the six workplaces evaluated.

Bardodej and Cirek (1988) carried out biomonitoring of 200 ethylbenzene production workers occupationally exposed for a mean duration of 12.2 years to unspecified concentrations of ethylbenzene and benzene over a 20-year period. The workers were evaluated twice a year and ethylbenzene metabolites measured. No statistically significant differences in hematological effects (e.g., RBC, WBC, leukocyte and platelet counts) or liver function tests (e.g., aminotransferase and/or SAP and LDH activities and bilirubin tests) were observed between exposed and nonexposed workers.

__I.B.5. Confidence In the Inhalation RfC

Study -- Low
Database -- Low
RfC -- Low

The developmental study by Hardin et al. (1981) was well-conducted and indicated no clearly adverse effects in any species. The study is given a low confidence rating because higher exposure levels may have provided more information on the potential for maternal toxicity and developmental effects. The database is given a low rating since although other studies have examined a variety of other endpoints (e.g., liver and lung), by histopathology in rats and mice, there are no chronic studies and no multi-generation developmental studies. These latter studies would be useful to determine more conclusively the potential of ethylbenzene to affect development.

NTP does not consider observations of lung lesions in rats exposed in the NTP subchronic study to be treatment-related. However, no infectious agent has been detected. Therefore, there remains a possibility that ethylbenzene may play a role in producing lung lesions. It is anticipated that this issue will be clarified upon completion of the chronic study in progress.

In view of the previous considerations, the RfC is given a low confidence rating.

__I.B.5. EPA Documentation and Review of the Inhalation RfC

Source Document -- This assessment is not presented in any existing U.S. EPA document.

Other EPA Documentation -- U.S. EPA, 1984; 1985; 1987

Agency Work Group Review -- 09/19/1990, 12/20/1990

Verification Date -- 12/20/1990

I.B.7. EPA Contacts (Inhalation RFC)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or holiine.iris@epa.gov (internet address).

[Back to top](#)

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name -- Ethylbenzene
CASRN -- 100-41-4
Last Revised -- 08/01/1991

Section II provides information on three aspects of the carcinogenic assessment for the substance in question; the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral exposure and from inhalation exposure. The quantitative risk estimates are presented in three ways. The slope factor is the result of application of a low-dose extrapolation procedure and is presented as the risk per (mg/kg)/day. The unit risk is the quantitative estimate in terms of either risk per ug/L drinking water or risk per ug/cu.m air breathed. The third form in which risk is presented is a drinking water or air concentration providing cancer risks of 1 in 10,000, 1 in 100,000 or 1 in 1,000,000. The rationale and methods used to develop the carcinogenicity information in IRIS are described in The Risk Assessment Guidelines of 1986 (EPA/600/8-87/045) and in the IRIS Background Document. IRIS summaries developed since the publication of EPA's more recent Proposed Guidelines for Carcinogen Risk Assessment also utilize those Guidelines where indicated (Federal Register 61(79):17966-18011, April 23, 1996). Users are referred to Section I of this IRIS file for information on long-term toxic effects other than carcinogenicity.

II.A. Evidence for Human Carcinogenicity

II.A.1. Weight-of-Evidence Characterization

Classification -- D; not classifiable as to human carcinogenicity.

Basis -- nonclassifiable due to lack of animal bioassays and human studies.

II.A.2. Human Carcinogenicity Data

None.

II.A.3. Animal Carcinogenicity Data

None. NTP has plans to initiate bioassay. Metabolism and excretion studies at 3.5, 35 and 350 mg/kg are to be conducted as well.

II.A.4. Supporting Data for Carcinogenicity

The metabolic pathways for humans and rodents are different (Engstrom et al., 1984). Major metabolites in humans, mandelic acid and phenylglyoxylic acid, are minor metabolites in rats and rabbits (Kiese and Lenk, 1974). The major animal metabolites were not detected in the urine of exposed workers (Engstrom et al., 1984).

Ethylbenzene at 0.4 mg/plate was not mutagenic for Salmonella strains TA98, TA1535, TA1537 and TA1538 with or without Aroclor 1254 induced rat liver homogenates (S9) (Nestmann et al., 1980).

Ethylbenzene was shown to increase the mean number of sister chromatid exchanges in human whole blood lymphocyte culture at the highest dose examined without any metabolic activation system (Norppa and Vainio, 1983).

Dean et al. (1985) used a battery of short-term tests including bacterial mutation assays, mitotic gene conversion in *Saccharomyces cerevisiae* JD1 in the presence and absence of S9 and chromosomal damage in a cultured rat liver cell line. Ethylbenzene was not mutagenic in the range of concentrations tested (0.2, 2, 20, 50 and 200 ug/plate) for *S. typhimurium* TA98, TA100, TA1535, TA1537 and TA1538 or for *Escherichia coli* WP2 and WP2uvrA. Ethylbenzene also showed no response in the *S. cerevisiae* JD1 gene conversion assay. In contrast, ethylbenzene hydroperoxide showed positive responses with *E. coli* WP2 at 200 ug/plate in the presence of S9 and an equally significant response with the gene conversion system of yeast.

[Back to top](#)

II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure

Not available.

[Back to top](#)

II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure

Not available.

[Back to top](#)

II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)

II.D.1. EPA Documentation

Source Document -- U.S. EPA, 1980, 1984, 1987

The Ambient Water Quality Criteria Document and the Health Assessment Document have received Agency and external review. The Drinking Water Criteria Document has been extensively reviewed.

II.D.2. EPA Review (Carcinogenicity Assessment)

Agency Work Group Review -- 10/07/1987

Verification Date -- 10/07/1987

II.D.3. EPA Contacts (Carcinogenicity Assessment)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or holiine.iris@epa.gov (internet address).

[Back to top](#)

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name -- Ethylbenzene
CASRN -- 100-41-4
Last Revised -- 03/01/1991

VI.A. Oral RfD References

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[Back to top](#)

VI.B. Inhalation RfC References

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[Back to top](#)

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[Back to top](#)

VII. Revision History

Substance Name -- Ethylbenzene
CASRN -- 100-41-4

Last updated on Wednesday, March 8th, 2006
URL: <http://www.epa.gov/iris/subst/0051.htm#23reforal>

Date	Section	Description
03/01/1988	I.A.1.	Dose conversion clarified
03/01/1988	I.A.6.	Documentation revised
03/01/1988	III.A.	Health Advisory added
09/07/1988	II.	Carcinogen summary on-line
08/01/1989	VI.	Bibliography on-line
08/01/1990	IV.F.1.	EPA contact changed
10/01/1990	I.B.	Inhalation RfC now under review
03/01/1991	I.B.	Inhalation RfC summary on-line
03/01/1991	VI.B.	Inhalation RfC references added
06/01/1991	I.A.7.	Primary contact changed
08/01/1991	II.D.3.	Secondary contact changed
01/01/1992	I.A.7.	Secondary contact changed
01/01/1992	IV.	Regulatory actions updated
04/01/1997	III., IV., V.	Drinking Water Health Advisories, EPA Regulatory Actions, and Supplementary Data were removed from IRIS on or before April 1997. IRIS users were directed to the appropriate EPA Program Offices for this information.
12/10/1998	I., II.	This chemical is being reassessed under the IRIS Program.

[Back to top](#)

VIII. Synonyms

Substance Name -- Ethylbenzene
CASRN -- 100-41-4
Last Revised -- 01/31/1987

100-41-4
AETHYLBENZOL
BENZENE, ETHYL
EB
ETHYLBENZEEN
Ethylbenzene
ETHYLBENZOL
ETILBENZENE
ETYLOBENZEN
NCI-C56393
PHENYLETHANE
UN 1175

[Back to top](#)

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2-Methylnaphthalene (CASRN 91-57-6)

[view QuickView](#)



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List of IRIS Substances

Full IRIS Summaries/Toxicological Reviews

Entire IRIS Website

MAIN CONTENTS

Reference Dose for Chronic Oral Exposure (RfD)

Note: A TOXICOLOGICAL REVIEW is available for this chemical in Adobe® PDF format (97 Pages, 242 Kbytes). Similar documents can be found in the [List of Available IRIS Toxicological Reviews](#).

Links to specific pages in the toxicological review are available throughout this summary. To utilize this feature, your Web browser and Adobe program must be configured properly so the PDF displays within the browser window. If your browser and Adobe program need configuration, please go to the [IRIS Help page](#) for instructions.

1006

2-Methylnaphthalene; CASRN 91-57-6; (12/22/2003)

Health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several Program Offices and the Office of Research and Development. The summaries presented in Sections I and II represent a consensus reached in the review process. Background information and explanations of the methods used to derive the values given in IRIS are provided in the Background Documents.

STATUS OF DATA FOR 2-METHYLNAPHTHALENE

File First On-Line 12/22/2003

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	on-line	12/22/2003
Inhalation RfC Assessment (I.B.)	discussion	12/22/2003
Carcinogenicity Assessment (II.)	on-line	12/22/2003

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name -- 2-Methylnaphthalene
CASRN -- 91-57-6
Last Revised -- 12/22/2003

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of substances that

Chronic Health
Hazards for Non-
Carcinogenic Effects
Reference Dose for
Chronic Oral Exposure
(RfD)

- Oral RfD Summary
- Principal and Supporting Studies
- Uncertainty and Modifying Factors
- Additional Studies/Comments
- Confidence in the Oral RfD
- EPA Documentation and Review

Reference
Concentration for
Chronic Inhalation
Exposure (RfC)

- Inhalation RfC Summary
- Principal and Supporting Studies
- Uncertainty and Modifying Factors
- Additional Studies/Comments
- Confidence in the Inhalation RfC
- EPA Documentation and Review

Carcinogenicity
Assessment for
Lifetime Exposure

Evidence for Human
Carcinogenicity

- Weight of Evidence Characterization
- Human Carcinogenicity Data
- Animal Carcinogenicity Data
- Supporting Data for Carcinogenicity

Quantitative Estimate
of Carcinogenic Risk
from Oral Exposure

- Summary of Risk

are also carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Pulmonary alveolar proteinosis	BMD ₀₅ : 4.7 mg/kg-day	1000	1	4E-3 mg/kg-day
B6C3F1 male and female mice 81-week dietary study Murata et al. (1997)	BMDL ₀₅ : 3.5 mg/kg-day			

* Conversion Factors and Assumptions: Incidence data for pulmonary alveolar proteinosis in control and exposed male and female mice were analyzed by benchmark dose modeling. The lower 95% confidence interval on the benchmark dose associated with a 5% extra risk (BMD₀₅) for pulmonary alveolar proteinosis in male and female mice was the point of departure for the RfD.

I.A.2. Principal and Supporting Studies (Oral RfD)

Murata, Y; Denda, A; Maruyama, H; Nakae, D; Tsutsumi, M; Tsujuchi, T; Konishi, Y (1997) Short communication. Chronic toxicity and carcinogenicity studies of 2-methylnaphthalene in B6C3F1 mice. *Fundam Appl Toxicol.* 36:90-93.

Murata et al. (1997) fed B6C3F1 mice (50/sex/group) diets containing 0, 0.075, or 0.15% 2-methylnaphthalene for 81 weeks. The average intakes were reported as 0, 54.3 or 113.8 mg/kg-day for males and 0, 50.3, or 107.6 mg/kg-day for females. Mice were monitored daily for clinical signs of toxicity. For the first 16 weeks, food consumption and body weight were measured weekly and every other week thereafter. Blood was collected at sacrifice for leukocyte classification and comprehensive biochemical analyses. Organ weights were measured for the brain, heart, kidney, liver, individual lobes of the lung, pancreas, salivary glands, spleen, and testis. Histopathology was performed for these tissues and the adrenals, bone (sternal, vertebral, and rib), eye, hardenian glands, mammary gland, ovary, seminal vesicle, skeletal muscle, skin, small and large intestine, spinal cord, stomach, trachea, uterus, and vagina. Pulmonary function was not measured. Quantitative differences between groups were statistically analyzed using Fisher's exact test and analysis of variance (ANOVA) with a multiple comparison post-test by Dunnett ($p \leq 0.05$) was used as the threshold for statistical significance).

The toxicities of 2-methylnaphthalene and 1-methylnaphthalene (CASRN 90-12-0) were evaluated simultaneously under the same experimental conditions and protocols, including the use of a shared control group (Murata et al., 1993, 1997). The 1- and 2-methylnaphthalene dose groups, as well as the controls, were housed in the same room. Results of these studies were reported separately (Murata et al., 1993, 1997). Some quantitative details regarding the control animals and descriptions of methodology and histology were provided in the earlier paper (Murata et al., 1993) evaluating 1-methylnaphthalene toxicity, but were omitted from the later paper (Murata et al., 1997) evaluating the toxicity of 2-methylnaphthalene.

Survival and food consumption were not affected by exposure to 2-methylnaphthalene at 0.075 or 0.15% for 81 weeks (Murata et al., 1997). Body weight data were presented graphically as mean growth curves for males and females in the control and exposed groups. Group means and standard deviations were not presented. The study specified that the reduction in final mean body weight was statistically significant for the high-dose male group. The mean final body weights for the male and female high-dose groups were reported to be reduced by 7.5 and 4.5%, respectively, when compared with controls. The decrease was not considered to be biologically significant for this assessment.

As shown in Table I.A.2.1, dietary exposure to 2-methylnaphthalene was associated with an increased incidence of pulmonary alveolar proteinosis that was statistically significant in both sexes at both exposure levels when compared with controls (Murata et al., 1997). Both male and female exposed groups showed statistically significant ($p < 0.05$) trends for an increased incidence of pulmonary alveolar proteinosis with increasing dose using Cochran-Armitage trend tests (U.S. EPA, 2003). Pulmonary alveolar proteinosis was characterized by the authors as being similar to the lesions described previously in their laboratory (Murata et al., 1993, 1997). According to the Murata

Estimates

- Dose-Response Data
- Additional Comments
- Discussion of Confidence

Quantitative Estimate
of Carcinogenic Risk
from Inhalation
Exposure

- Summary of Risk Estimates
- Dose-Response Data
- Additional Comments
- Discussion of Confidence

EPA Documentation,
Review and Contacts

- Bibliography
- Revision History
- Synonyms

et al. (1993) report, pulmonary alveolar proteinosis was characterized by an accumulation of phospholipids in the alveolar lumens and, upon gross inspection, white protuberant nodules approximately 1-5 mm in diameter. Histologically, there was visible filling of alveolar lumens with cholesterol crystals, foamy cells, and an amorphous acidophilic material. No prominent fibrosis, edema, alveolitis, or lipoidosis were seen in alveolar walls or in epithelial cells. No evidence of bronchiolar Clara cell necrosis or sloughing was reported in the Murata et al., (1997) study nor was there histopathological evidence of non-neoplastic effects in any other tissue.

Table I.A.2.1. Incidence of pulmonary alveolar proteinosis in B6C3F1 mice fed 2-methylnaphthalene for 81 weeks

	Female			Male		
Dose (% diet)	0	0.075	0.15	0	0.075	0.15
Dose (mg/kg-day)	0	50.3	107.6	0	54.3	113.8
Pulmonary alveolar proteinosis	5/50	27/49*	22/48*	4/49	21/49*	23/49*

* Statistically significant by Fisher's exact test as reported by Murata et al (1997).
Source: Adapted from Murata et al., 1997.

The authors also reported other statistically significant differences between control and exposure groups, but no data were provided regarding their magnitude or the exposure levels at which they occurred. Serum neutral fat levels were elevated in exposed males and females, and relative and absolute brain and kidney weights were increased among exposed males. In exposed females, differential counts of stab (young) and segmented (adult) neutrophils were significantly decreased while lymphocyte counts were increased when compared to controls (Murata et al., 1997). The biological significance of these differences is unclear, due to the lack of reported data (response magnitude and exposure level). Evidence of exposure-related neoplastic lesions was restricted to statistically significant increases in lung adenomas or total lung tumors (adenomas or carcinomas) in male mice in the 0.075% group, but not in the 0.15% male group or in either exposed group of female mice (see IRIS Summary Section II).

The RfD was derived by benchmark dose analysis of the incidence data for pulmonary alveolar proteinosis in B6C3F1 male and female mice exposed to 2-methylnaphthalene in the diet for 81 weeks (Murata et al., 1997). The incidences for pulmonary alveolar proteinosis for males and females at each exposure level were not statistically significantly different from each other, according to Fisher's exact test ($p \leq 0.05$). Because neither sex was clearly more sensitive, the incidence data for males, females, and both males and females combined were fit to all dichotomous variable models available in the BMDS Version 1.3.2 software. The best fit was obtained using data for the combined male and female control and low dose groups. The practice of excluding the high dose group from modeling is justified by several considerations (U.S. EPA, 2000d). First, without a mechanistic understanding of how pulmonary alveolar proteinosis results from exposure to 2-methylnaphthalene, data from exposures much higher than that associated with the benchmark response do not provide very much information about the shape of the response in the region of the benchmark response. Also, the lack of fit for the full data set appears to be due to the characteristics of the high dose groups, where the response plateaus (U.S. EPA, 2003). Although dropping the high dose groups ignores some of the data and decreases the degrees of freedom for modeling, it is a reasonable approach because the focus of BMD analysis is on the low dose and response region (U.S. EPA, 2000). The BMDS quantal-linear model provides a model closest to a straight line, which is all that can be justified for modeling essentially two data points, the combined control groups and the similar male and female low dose groups.

A benchmark response level of 5% extra risk of the critical effect, pulmonary alveolar proteinosis, was selected for this assessment. This effect is similar to a disorder of unknown etiology that has been identified in humans. If this disorder were to occur in humans following exposure to 2-methylnaphthalene, it is anticipated that children may be more susceptible especially since children affected with the disorder often experience more severe symptoms than adults. Thus, a 5% extra risk of pulmonary alveolar proteinosis was judged to be an appropriate level of extra risk for this critical effect. The BMD₀₅ from the quantal-linear model was 4.7 mg/kg-day for pulmonary alveolar proteinosis in male and female mice exposed to 2-methylnaphthalene in the diet for 81 weeks (Murata et al., 1997). The lower 95% confidence limit on the BMD₀₅ (i.e., BMD_{LC05}) was 3.5 mg/kg-day.

A limitation of the principal study (Murata et al., 1997) was the occurrence of pulmonary alveolar

proteinosis in control mice (9/99; see Table I.A.2.1.). The authors noted that pulmonary alveolar proteinosis had never been observed previously by them in more than 5,000 B6C3F1 control mice, and speculated that the background incidence may have been elevated by inhalation exposure to volatilized test chemicals. The principal study (Murata et al., 1997) described here was conducted simultaneously with a study evaluating 0.075 and 0.15% 1-methylnaphthalene in the diet (Murata et al., 1993). Potential confounding from possible inhalation exposure of controls to volatilized 2-methylnaphthalene and 1-methylnaphthalene adds some uncertainty to the dose-response relationship between oral exposure to 2-methylnaphthalene and pulmonary alveolar proteinosis described by the results from this study.

I.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF = 1000. A total uncertainty factor of 1000 was applied to the BMD₀₅ of 4.7 mg/kg-day: 10 for extrapolation for interspecies differences (UF_A: animal to human); 10 for consideration of intraspecies variation (UF_H: human variability); and 10 for deficiencies in the database (UF_D).

A 10-fold UF was used to account for uncertainty in extrapolating from laboratory animals to humans (i.e., interspecies variability). No information was available regarding the toxicity of 2-methylnaphthalene in humans exposed orally. No information was available to assess toxicokinetic differences between animals and humans.

A 10-fold UF was used to account for variation in sensitivity among members of the human population (i.e., interindividual variability).

A 10-fold UF was used to account for uncertainty associated with deficiencies in the database. One chronic duration oral toxicity study in one animal species (mice) is available (Murata et al., 1997). The database lacks adequate studies of oral developmental toxicity, reproductive toxicity, and neurotoxicity. The database also lacks a 2-generation reproductive toxicity study.

An UF was not needed to account for subchronic to chronic extrapolation because a chronic study (81 weeks) was used to derive the RfD.

An UF for LOAEL-to-NOAEL extrapolation was not considered as such, since benchmark dose modeling was used to determine the point of departure. While the 5% extra response level used to derive the RfD is not a no-response level, some consideration of what level of extra risk of pulmonary alveolar proteinosis constitutes a minimal health risk is appropriate.

MF = 1.

I.A.4. Additional Studies/Comments (Oral RfD)

The database for the oral toxicity of 2-methylnaphthalene is restricted to the principal study (Murata et al., 1997) and two prechronic toxicity studies (Fitzhugh and Buschke, 1949; Murata et al., 1997). Fitzhugh and Buschke (1949) did not observe cataract formation in rats fed 2-methylnaphthalene (approximately 40 mg/kg-day) for at least 2 months, and did not investigate any other endpoints. Murata et al. (1997) conducted a range-finding study in which groups of B6C3F1 mice (10/sex/group) were fed diets containing 2-methylnaphthalene for 13 weeks delivering approximate average daily doses of 0, 31, 92, 276, 827, or 2,500 mg/kg-day. No histopathological effects were observed in tissues and organs of male or female mice exposed to 827 or 2,500 mg/kg-day (tissues from mice in lower dose groups were not examined histologically). Decreased body weights, compared with control values, were observed at the three highest dose levels in both males and females, and were attributed to food refusal (Murata et al., 1997). The absence of pulmonary alveolar proteinosis in the prechronically exposed mice, which were exposed to much higher doses than those experienced by mice with pulmonary alveolar proteinosis in the principal study, suggests that the development of pulmonary alveolar proteinosis from oral exposure to 2-methylnaphthalene may require exposures at chronic durations.

Additional supporting data have been derived from dermal studies using a methylnaphthalene mixture (CASRN 1321 84 4) of 2-methylnaphthalene and 1-methylnaphthalene in an approximate 2:1 ratio in mice. Murata et al. (1992) exposed female B6C3F1 mice (15/group) to 0 or 119 mg/kg of a methylnaphthalene mixture by applying an acetone solution containing 1.2% methylnaphthalene to their backs twice weekly for 30 weeks. Lung surfaces grossly contained multiple grayish white nodules. Histologically, the alveoli appeared to be filled with cholesterol crystals, an amorphous

eosinophilic material, and many mononucleated giant cells with foamy cytoplasm. The alveolar spaces in areas where proteinosis was present were also filled with free myelinoid structures. The authors stated that most myelinoid structures appeared to originate from hyperplastic and hypertrophic type II pneumocyte meocrine secretion. The enlarged mononucleated giant cells contained similar myelinoid structures to those seen in the alveolar space, along with lipid droplets. The myelinoid structures consisted of concentrically arranged and multilayered membranes interspersed with amorphous materials. Various numbers and sizes of needle-like crystals were also seen in the mononucleated giant cells' cytoplasm. Alveolar walls were thickened but there was no prominent fibrosis. Partial thickening was due to hyperplasia and hypertrophy of type II pneumocytes or focal hyperplasia of cells resembling type I pneumocytes in appearance. Ultrastructural analyses verified these observations, and detected numerous necrotic cells in areas of proteinosis. Murata et al. (1992) concluded that the mononucleated giant cells were type II pneumocytes overfilled with myelinoid structures, rather than macrophages that might have engulfed lamellar bodies, and that some of these cells ruptured into the alveolar lumens. The authors reported that a higher dermal dose (238 mg/kg, twice weekly) than that used in the present study induced a 100% incidence of pulmonary alveolar proteinosis in a shorter period of time (20 weeks), but noted that this was unpublished data (Murata et al., 1992). Murata et al. (1992) stated that the pulmonary alveolar proteinosis observed in mice exposed to a methylnaphthalene mixture via the dermal route in the current study had been demonstrated previously by their laboratory (Emi and Konishi, 1985).

Emi and Konishi (1985) painted the shaved backs of female B6C3F1 mice with 0, 29.7, or 118.8 mg/kg of a methylnaphthalene mixture in acetone twice weekly for 61 weeks. The control through high-dose groups contained 4, 11, and 32 mice, respectively. At sacrifice, animals were necropsied, and histology was performed on the skin and principal organs. Although survival information was not provided, a reported peak in mortality at 38 weeks was attributed to lipid pneumonia. Lipid pneumonia was observed in animals that died as early as 10 weeks. The final incidence of this effect were 0/4, 3/11, and 31/32 for the control, low-, and high-dose groups, respectively. Lipid pneumonia was characterized grossly by multiple delocalized white spots and soft clearly demarcated nodules. The predominant histological feature was hypertrophy and hyperplasia of type II pneumocytes in the lung. Additional observations included slight alveolar wall thickening, multinucleated giant cell reaction, and the presence in the alveolar lumens of foamy cells and cholesterol crystals. Evidence of focal alveolar dilation and emphysema were also observed, but were considered compensatory reactions.

The mechanisms by which 2-methylnaphthalene may cause pulmonary alveolar proteinosis are poorly understood (U.S. EPA, 2003), but light and electron microscopic observations of lung tissues from mice repeatedly exposed to dermal doses of methylnaphthalene mixtures (containing 1- and 2-methylnaphthalene in a 2:1 ratio) indicate that type II pneumocytes may be the specific cellular target of mixtures containing 2-methylnaphthalene (Murata et al., 1992). From these observations, Murata et al. (1992) hypothesized that, in response to a mixture containing 2-methylnaphthalene, type II pneumocytes produce increased amounts of lamellar bodies due to hyperplasia and hypertrophy, and eventually transform into mononucleated giant cells. The rupture of mononucleated giant cells is hypothesized to lead to the accumulation of the myelinoid structures in the alveolar lumen.

It is unknown whether 2-methylnaphthalene or its metabolites are responsible for the development of pulmonary alveolar proteinosis. Given the enrichment of type II pneumocytes in cytochrome P450 (CYP) enzymes (Castranova et al., 1988) and the involvement of these enzymes in metabolizing 2-methylnaphthalene (U.S. EPA, 2003), it is plausible that metabolites may play a role in the pathogenesis of pulmonary alveolar proteinosis.

Acute intraperitoneal injection studies in mice support the conclusion that the lung is a sensitive target organ for 2-methylnaphthalene (Buckpitt et al., 1986; Griffin et al., 1981, 1982, 1983; Honda et al., 1990; Rasmussen et al., 1986), but the site of adverse effects in the lungs associated with acute exposure (Clara cells in the bronchiolar lining) is different from the site (type II pneumocytes in alveoli) associated with chronic oral exposure. The absence of bronchiolar lesions in mice exposed chronically to 2-methylnaphthalene (Murata et al., 1993, 1997) may be related to changes in the resistance of Clara cells to 2-methylnaphthalene induced toxicity (Lakritz et al., 1996).

In humans, pulmonary alveolar proteinosis is a rare condition that has been associated with decreased pulmonary function. It is characterized by decreased functional lung volume, reduced diffusing capacity, and symptoms such as dyspnea and cough. It has not been associated with airflow obstruction (Lee et al., 1997; Mazzone et al., 2001; Wang et al., 1997). Although cases of pulmonary alveolar proteinosis in humans have not been directly associated with exposure to 2-methylnaphthalene, the observations of 2-methylnaphthalene-induced pulmonary alveolar proteinosis in mice are assumed to be relevant to humans.

For more detail on Susceptible Populations, exit to the toxicological review, Section 4.7 (PDF).

__I.A.5. Confidence in the Oral RfD

Study -- Medium
Database -- Low
RfD -- Low

The principal study for the RfD (Murata et al., 1997) examined a comprehensive number of endpoints, including extensive histopathology, and tested two dietary dose levels using sufficient numbers (50/sex/group) of B6C3F1 mice. Confidence in the study is medium because there was potential confounding from possible inhalation exposure of controls to volatilized 2-methylnaphthalene and 1-methylnaphthalene. This adds some uncertainty to the dose-response relationship between oral exposure to 2-methylnaphthalene and pulmonary alveolar proteinosis described by the results. Confidence in the oral toxicity database is low. No epidemiology studies or case reports were located which examined the potential effects of human exposure to 2-methylnaphthalene. Only mice have been examined in adequate animal studies on toxicity from repeated exposure to 2-methylnaphthalene. No assays of developmental toxicity, reproductive toxicity, or neurotoxicity following oral exposure to 2-methylnaphthalene are available. Confidence in the oral RfD is low, principally due to the low confidence in the database.

For more detail on Characterization of Hazard and Dose Response, exit to the toxicological review, Section 6 (PDF).

__I.A.6. EPA Documentation and Review of the Oral RfD

Source Document -- U.S. EPA (2003).

This assessment was peer reviewed by external scientists. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A record of these comments is included as an appendix to the Toxicological Review of 2-Methylnaphthalene (U.S. EPA, 2003). *To review this appendix, exit to the toxicological review, Appendix A, Summary of External Peer Review and Public Comments and Disposition (PDF)*

Agency Consensus Date -- 12/11/2003

__I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (fax), or hotline.iris@epa.gov (email address).

[Back to top](#)

__I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name -- 2-Methylnaphthalene
CASRN -- 91-57-6
Last Revised -- 12/22/2003

An RfC cannot be calculated for 2-methylnaphthalene due to inadequate data. No epidemiology studies or case reports were located which examined the potential effects of human inhalation exposure to 2-methylnaphthalene. No chronic or prechronic toxicity studies were identified in which animals were exposed to 2-methylnaphthalene by inhalation.

__I.B.1. Inhalation RfC Summary

Not applicable.

__I.B.2. Principal and Supporting Studies (Inhalation RfC)

Not applicable.

I.B.3. Uncertainty and Modifying Factors (Inhalation RfC)

Not applicable.

I.B.4. Additional Studies/Comments (Inhalation RfC)

Not applicable.

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.7 \(PDF\)](#).

I.B.5. Confidence in the Inhalation RfC

Not applicable.

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#).

I.B.6. EPA Documentation and Review of the Inhalation RfC

Source Document -- U.S. EPA, 2003

This assessment was peer reviewed by external scientists. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A record of these comments is included as an appendix to the Toxicological Review of 2-Methylnaphthalene (U.S. EPA, 2003). To review this appendix, exit to [the toxicological review, Appendix A, Summary of External Peer Review and Public Comments and Disposition \(PDF\)](#).

Agency Consensus Date -- 12/11/2003

I.B.7. EPA Contacts (Inhalation RfC)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (fax), or hotline.iris@epa.gov (email address).

[Back to top](#)

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name -- 2-Methylnaphthalene

CASRN -- 91-57-6

Last Revised -- 12/22/2003

Section II provides information on three aspects of the carcinogenic assessment for the substance in question: the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral exposure and inhalation exposure. Users are referred to Section I of this IRIS file for information on long-term toxic effects other than carcinogenicity.

The rationale and methods used to develop the carcinogenicity information in IRIS is described in the Draft Revised Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1999 Guidelines for carcinogen risk assessment. Review Draft, NCEA-F-0544, July. Risk Assessment Forum. <http://www.epa.gov/ncea/rat/cancer.htm>). The quantitative risk estimates result from application of a low-dose extrapolation procedure, and both the central estimate and upper bound estimate of risk per unit of exposure are presented. The quantitative risk estimates are presented in three ways to facilitate their use. The oral slope factor is the 95% upper bound on the estimate of risk per (mg/kg)/day of oral exposure. The unit risk is the 95% upper bound on the estimate of risk, either per µg/L drinking water or per µg/cu.m air breathed. The third form in which risk is presented is the 95%

lower bound on the estimated concentration of the chemical in drinking water or air associated with cancer risks of 1 in 10,000, 1 in 100,000, or 1 in 1,000,000.

II.A. Evidence for Human Carcinogenicity

II.A.1. Weight-of-Evidence Characterization

Under EPA's Draft Revised Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1999), the data regarding the carcinogenicity of 2-methylnaphthalene in mice and the lack of human carcinogenicity data are *inadequate to assess human carcinogenic potential*. Animal cancer data are limited to one 81-week dietary study in mice exposed to 2-methylnaphthalene in the diet. Statistically significant increases in the incidence of lung adenomas and total lung tumors (adenomas and carcinomas combined) for the low-dose male group (54.3 mg/kg-day) were observed when compared to controls. However, no evidence of carcinogenicity was observed in male mice exposed to the high dose (113.8 mg/kg-day), or in female mice exposed to 50.3 or 107.6 mg/kg-day 2-methylnaphthalene. Lack of an apparent dose-response relationship makes the data unsuitable for a quantitative assessment of carcinogenic potential. Mice dermally exposed biweekly to 2-methylnaphthalene (equivalent to 32 µg/kg-day) plus benzo[a]pyrene (BaP) for 78 weeks had no increased incidence of skin tumors, compared to mice receiving BaP alone (Schmeltz et al., 1978). The incidence of non-skin tumors were not reported. The study is of limited toxicological value since 2-methylnaphthalene was not tested alone. In addition, short-term genotoxicity tests with 2-methylnaphthalene provide no consistent evidence of mutagenic activity in bacteria or clastogenic activity in human lymphocytes *in vitro* (Florin et al., 1980; Hermann, 1981; Kulka et al., 1988).

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#).

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.7 \(PDF\)](#).

II.A.2. Human Carcinogenicity Data

None.

II.A.3. Animal Carcinogenicity Data

Limited evidence.

The Murata et al. (1997) study that was used to derive the RfD for 2-methylnaphthalene (see Section I.A.2) evaluated the chemical's carcinogenicity. Statistically significant increased incidences of lung adenomas or total lung tumors (adenomas or adenocarcinomas) were found in the 0.075% male mouse group, but not in the 0.15% male mouse group or in either of the female exposed groups (Table II.A.3.1.). No evidence of a trend of increasing tumor incidence with increasing dose was observed in males or females (U.S. EPA, 2003). No statistically significant elevations in incidences of tumors in other tissues or organs were seen in any exposure group, when compared with controls.

Table II.A.3.1. Lung tumor incidence in B6C3F1 mice fed 2-methylnaphthalene for 81 weeks

	Female			Male		
Dose (% diet)	0	0.075	0.15	0	0.075	0.15
Dose (mg/kg-day)	0	50.3	107.6	0	54.3	113.8
Lung adenoma	4/50	4/49	5/48	2/49	9/49*	5/49
Lung adenocarcinoma	1/50	0/49	1/48	0/49	1/49	1/49
Total lung tumors	5/50	4/49	6/48	2/49	10/49*	6/49

* Statistically significant by Fisher's exact test (p<0.05).

Source: Adapted from Murata et al., 1997.

II.A.4. Supporting Data for Carcinogenicity

Supporting evidence for the carcinogenicity of 2-methylnaphthalene is restricted to evidence from a cancer study that did not find an increased incidence of skin tumors in ICR/Ha Sprague-Dawley mice

(30/group) dermally exposed three times weekly to 0 or 25 µg 2-methylnaphthalene (equivalent to 32 µg/kg-day) plus 300 ng benzo[a]pyrene for 78 weeks, compared to mice receiving BaP alone (Schmeltz et al., 1978). The incidences of non-skin tumors were not reported. The study is of limited toxicological value since 2-methylnaphthalene was not tested alone.

No evidence of lung tumors was reported in studies involving exposure of B6C3F1 mice to a methylnaphthalene mixture (a 2:1 mixture of 2-methylnaphthalene and 1-methylnaphthalene) at doses of 0 or 119 mg/kg twice weekly for 30 weeks (Murata et al., 1992), or 0, 29.7, or 118.8 mg/kg twice weekly for 61 weeks (Emi and Konishi, 1985); however, the less-than-lifetime duration of these studies limits their usefulness as cancer bioassays.

No mutagenicity was observed in *Salmonella typhimurium* strains TA98, TA100, TA1535, or TA1537 treated with 2-methylnaphthalene (Florin et al., 1980; Hermann, 1981) or a methylnaphthalene mixture (Kopper Co. Inc., 1982), with or without metabolic activation by S9 hepatic microsomal fractions. *In vitro* exposure of human lymphocytes to 2-methylnaphthalene with metabolic activation by S9 produced statistically significant increases in the incidence of sister chromatid exchanges (up to 22%) at all concentrations tested (0.25 to 4 mM) and of chromatid breaks (6.5-fold) only at the highest concentration tested (4 mM) (Kulka et al., 1988). No differences were observed following exposure without metabolic activation. The authors considered the sister chromatid response to be negative because the magnitude of the response was less than a 2-fold increase. They also considered the chromatid breaks to be minor because no damage was observed at lower concentrations (up to 2 mM). In these studies, S9 hepatic microsomal fractions were prepared from male Sprague-Dawley, Fischer 344, or Wistar rats induced with either Aroclor 1254 or 3-methylcholanthrene.

In vitro assays in WB F344 rat liver epithelial cells found that 2-methylnaphthalene, as well as naphthalene and 1-methylnaphthalene, inhibited gap junctional intercellular communication (Weis et al., 1996). The authors suggested that the inhibition could be an epigenetic mechanism of tumor promotion by preventing intercellular transport of regulatory molecules.

Differences in metabolism between 2-methylnaphthalene and naphthalene or other methylnaphthalene isomers preclude the use of evidence for carcinogenicity of these structurally similar chemicals as supporting evidence for 2-methylnaphthalene carcinogenicity. Naphthalene toxicity and carcinogenicity have been hypothesized to be due to, at least in part, metabolism via CYP-mediated ring epoxidation to reactive metabolites such as the 1,2-epoxide or 1,2-quinone derivatives (Cho et al., 1995; Greene et al., 2000; Lakritz et al., 1996; NTP, 1992, 2000; Van Winkle et al., 1999). The metabolic formation of ring epoxides is a relatively minor pathway for 2-methylnaphthalene (NTP 2000; U.S. EPA, 2003). No studies evaluating the metabolism of 1-methylnaphthalene in humans or animals are available. Metabolism of this chemical may follow a similar pathway as that described here for 2-methylnaphthalene (i.e., side chain oxidation) since these chemicals are structurally related to each other.

[Back to top](#)

II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure

Not applicable.

II.B.1. Summary of Risk Estimates

Not applicable.

II.B.2. Dose-Response Data (Carcinogenicity, Oral Exposure)

Not applicable.

II.B.3. Additional Comments (Carcinogenicity, Oral Exposure)

Not applicable.

II.B.4. Discussion of Confidence (Carcinogenicity, Oral Exposure)

Not applicable.

[Back to top](#)

II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure

Not applicable.

II.C.1. Summary of Risk Estimates

Not applicable.

II.C.2. Dose-Response Data for Carcinogenicity, Inhalation Exposure

Not applicable.

II.C.3. Additional Comments (Carcinogenicity, Inhalation Exposure)

Not applicable.

II.C.4. Discussion of Confidence (Carcinogenicity, Inhalation Exposure)

Not applicable.

[Back to top](#)

II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)

II.D.1. EPA Documentation

Source Documents – U.S. EPA (2003).

This assessment was peer reviewed by external scientists. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A record of these comments is included as an appendix to the Toxicological Review of 2-Methylnaphthalene (U.S. EPA, 2003). [To review this appendix, exit to the toxicological review, Appendix A, Summary of External Peer Review and Public Comments and Disposition \(PDF\)](#)

II.D.2. EPA Review (Carcinogenicity Assessment)

Agency Consensus Date – 12/11/2003

II.D.3. EPA Contacts (Carcinogenicity Assessment)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (fax), or hotline.iris@epa.gov (email address).

[Back to top](#)

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name -- 2-Methylnaphthalene
CASRN -- 91-57-6

Last Revised -- 12/22/2003

VI.A. Oral RfD References

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[Back to top](#)

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[Back to top](#)

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[Back to top](#)

VII. Revision History

Substance Name -- 2-Methylnaphthalene
CASRN -- 91-57-6

Date	Section	Description
12/22/2003	All	First IRIS RfD, cancer assessment

[Back to top](#)

VIII. Synonyms

Substance Name -- 2-Methylnaphthalene
CASRN -- 91-57-6
Last Revised -- 12/22/2003

β -methylnaphthalene
methyl naphthalene
methylnaftalen

Note: A TOXICOLOGICAL REVIEW is available for this chemical in Adobe® PDF format (97 Pages, 272 Kbytes). Similar documents can be found in the [List of Available IRIS Toxicological Reviews](#).

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[Back to top](#)

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Naphthalene (CASRN 91-20-3)

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MAIN CONTENTS

Reference Dose for Chronic Oral Exposure (RfD)

Note: A TOXICOLOGICAL REVIEW is available for this chemical in Adobe® PDF format (116 Pages, 786 Kbytes). Similar documents can be found in the [List of Available IRIS Toxicological Reviews](#).

Links to specific pages in the toxicological review are available throughout this summary. To utilize this feature, your Web browser and Adobe program must be configured properly so the PDF displays within the browser window. If your browser and Adobe program need configuration, please go to the [IRIS Help page](#) for instructions.

0436

Naphthalene; CASRN 91-20-3 (09/17/1998)

Health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several Program Offices and the Office of Research and Development. The summaries presented in Sections I and II represent a consensus reached in the review process. Background information and explanations of the methods used to derive the values given in IRIS are provided in the Background Documents.

STATUS OF DATA FOR Naphthalene

File First On-Line 12/01/1990

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	On-line	09/17/1998
Inhalation RfC Assessment (I.B.)	On-line	09/17/1998
Carcinogenicity Assessment (II.)	On-line	09/17/1998

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name -- Naphthalene
CASRN -- 91-20-3
Last Revised -- 09/17/1998

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of

Chronic Health
Hazards for Non-
Carcinogenic Effects

Reference Dose for
Chronic Oral Exposure
(RfD)

- Oral RfD Summary
- Principal and Supporting Studies
- Uncertainty and Modifying Factors
- Additional Studies/Comments
- Confidence in the Oral RfD
- EPA Documentation and Review

Reference
Concentration for
Chronic Inhalation
Exposure (RfC)

- Inhalation RfC Summary
- Principal and Supporting Studies
- Uncertainty and Modifying Factors
- Additional Studies/Comments
- Confidence in the Inhalation RfC
- EPA Documentation and Review

Carcinogenicity
Assessment for
Lifetime Exposure

Evidence for Human
Carcinogenicity

- Weight-of-Evidence Characterization
- Human Carcinogenicity Data
- Animal Carcinogenicity Data
- Supporting Data for Carcinogenicity

Quantitative Estimate
of Carcinogenic Risk
from Oral Exposure

- Summary of Risk

deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of substances that are also carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Decreased mean terminal body weight in males	NOAEL: 100 mg/kg-day; 71 mg/kg-day (adjusted)	3000	1	2E-2 mg/kg-day

Subchronic oral rat study
LOAEL: 200 mg/kg-day;
142 mg/kg-day (adjusted)

BCL, 1980a

*Conversion Factors and Assumptions -- MW = 128.19. Duration adjustment (5/7) of the doses (100, 200 mg/kg-day) arrived at a critical NOAEL/LOAEL pair of 71 and 143 mg/kg-day for decreased mean terminal body weight in male rats.

I.A.2. Principal and Supporting Studies (Oral RfD)

Battelle's Columbus Laboratories (BCL). (1980a) Unpublished subchronic toxicity study: Naphthalene (C52904), Fischer 344 rats. Prepared by Battelle Laboratories under NTP Subcontract No. 76-34-108002.

Naphthalene (> 99% pure) in corn oil was administered by gavage to groups of 10 male and 10 female Fischer 344 rats at dose levels of 0, 25, 50, 100, 200, or 400 mg/kg (duration-adjusted 0, 17.9, 35.7, 71.4, 142.9, and 285.7 mg/kg-day), 5 days/week for 13 weeks (BCL, 1980a). Measured parameters included food consumption and body weight weekly, twice-daily observation for clinical signs of toxicity, hematological parameters for blood collected at termination (hemoglobin, hematocrit, total and differential white blood cell count, red blood cell count, mean cell volume, mean cell hemoglobin concentration), necropsy of all rats in the study, and complete histopathological examination of 27 organs and tissues (including the eyes, lungs, stomach, liver, kidney, reproductive organs, thymus, and kidney) from all control and 400-mg/kg rats. Male kidneys and female thymuses from the 200-mg/kg group were also examined histopathologically (according to the histopathology tables; however, the report text states that the 100-mg/kg group was examined). Organ weight data were not reported.

At the highest dose level, two males died during the last week of treatment, and rats of both sexes displayed diarrhea, lethargy, hunched posture, and rough coats at intermittent intervals throughout the study (BCL, 1980a). Food consumption was not affected by exposure, but mean decreases in terminal body weight greater than 10% compared with control values were found in several groups of exposed rats (over the 13-week period); namely, 23% depression in females at 400 mg/kg and a 29% and 12% depression in males at 400 and 200 mg/kg-day, respectively. Differences between mean values of hematological parameters in exposed groups and control groups were < 10% of control values, except for a 94% increase in numbers of mature neutrophils and a 25.1% decrease in numbers of lymphocytes in male 400-mg/kg rats and a 37.2% increase in mature neutrophils in 400-mg/kg females. Histological examinations revealed low incidences of lesions in exposed male kidneys and exposed female thymuses; no lesions were observed in respective control kidneys or thymuses. Lesions such as focal cortical lymphocytic infiltration or focal tubular regeneration were observed in kidneys of 2/10 male rats exposed to 200 mg/kg naphthalene, and diffuse renal tubular degeneration occurred in 1/10 male rats exposed to 400 mg/kg naphthalene. Other lesions include lymphoid depletion of the thymus, which occurred in 2/10 females exposed to 400 mg/kg naphthalene, but not in any other females. No other tissue lesions were detected. Decreased body weight was the most sensitive effect noted in this study and was identified as the most appropriate critical effect for the purposes of RfD derivation. Mean terminal body weight decreases greater than 10% compared with control values were found in male rats following a 90-day gavage exposure to 200 mg/kg-day (LOAEL). The NOAEL for a > 10% decrease in body weight in this study was 100 mg/kg-day (71 mg/kg-day duration-adjusted).

Shopp, GM; White, KL, Jr.; Holsapple, MP; et al. (1984) Naphthalene toxicity in CD-1 mice: general toxicology and immunotoxicology. *Fundam Appl Toxicol* 4(3 pt 1):406-419.

Estimates
- Dose-Response Data
- Additional Comments
- Discussion of Confidence

Quantitative Estimate
of Carcinogenic Risk
from Inhalation
Exposure

- Summary of Risk Estimates
- Dose-Response Data
- Additional Comments
- Discussion of Confidence

EPA Documentation,
Review and Contacts

- Bibliography
- Revision History
- Synonyms

Groups of male and female albino CD-1 mice (approximately 6 weeks old at the start) were administered gavage doses of 0, 5.3, 53, or 133 mg/kg naphthalene (99.3% pure) in corn oil for 90 consecutive days (Shopp et al., 1984). A naive control group and the 5.3- and 53-mg/kg dose groups each contained 76 male mice and 40 female mice. The vehicle control group contained 112 male mice and 76 female mice. The high-dose group contained 96 male mice and 60 female mice. Significant chemical-related decreases in terminal body weights or survival were not observed in either sex. No significant alterations in absolute or relative organ weights occurred in exposed male mice. Significant decreases in absolute weights of brain, liver, and spleen and relative weight of spleen occurred in high-dose females; however, organ-to-body weight ratios were significantly different only for the spleen. Histopathological examination of organs was not conducted, but the authors noted that cataracts were not formed in exposed mice (methods used to assess the presence of cataracts were not specified). Examination of hematological parameters (including numbers of leukocytes, erythrocytes, and platelets and determination of hematocrit and hemoglobin) at termination revealed only slight, but statistically significant, increases in hemoglobin in high-dose females only; however, the hematological data were not shown in the report. Chemical analysis of serum showed statistically significant decreased blood urea nitrogen in all exposed female groups, and increased serum globulin and protein in the two highest female dose groups. In the same study, no exposure-related responses were found in a battery of immunological assays (humoral immune response, lymphocyte responsiveness, delayed-type hypersensitivity response, popliteal lymph node response, and bone marrow function); immunotoxic responses were observed in positive controls given intraperitoneal injections of 50 mg/kg cyclophosphamide on days 87, 88, 89, and 90. The study identified a LOAEL of 133 mg/kg-day and a NOAEL of 53 mg/kg-day with significant decreases in absolute weight of brain, liver, and spleen and relative weight of spleen in high-dose females. Therefore, the LOAEL of 133 mg/kg-day is based on the observed organ effects, especially the decrease in the relative weight of the spleen along with the suggestive evidence for effects on hepatic enzyme function. The toxicological significance of the statistically significant alterations in hematological and serum chemical parameters is not clear.

The use of the BCL (1980a) study in deriving the RfD was based on the following reasons:

The verification of the chemical dose, animal maintenance, and study design (10 rats/sex/dose group for 5 dose groups and 1 control group) are consistent with GLP guidelines submitted for 90-day studies, unlike the Shopp et al. (1984) study, in which the numbers of animals actually evaluated compared to those exposed for most endpoints (organ weights, clinical chemistry, and immunological testing) were small.

The decrease in mean terminal body weight in the BCL (1980a) study was not a result of decreased food consumption and was accompanied by clinical signs (diarrhea, lethargy, and rough coats) consistent with sick animals.

Decreases in mean terminal body weight of at least 10% were observed in females and males in the case of the BCL (1980a) study, unlike the Shopp et al. (1984) study, in which no significant changes in body weight were reported at any dose level.

The statistically significant alterations ($p < 0.05$) observed in the absolute (brain, liver, and spleen) and relative weight (spleen) of some organs in the absence of any decrease in body weight (Shopp et al., 1984) is not consistent with the absence of lesions and the lack of significant alterations in the clinical chemistry data, hematology, mixed-function oxidase activity, or the immunotoxicity assays for either sex.

Although the gross and histopathological examination was limited to the control and high-dose group in the BCL (1980a) study, renal lesions of low incidence were observed in the kidneys (focal cortical lymphocytic infiltration, focal and diffuse tubular regeneration) and thymus (lymphoid depletion) in males and females, respectively, at 100 mg/kg (71 mg/kg-day), unlike the Shopp et al. (1984) study, in which gross necropsy (no histopathological examination of tissues) on a randomly selected number of animals revealed no lesions.

1.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF = 3000.

The duration-adjusted NOAEL for terminal body weight decrease ($> 10\%$ of control) in male rats from the BCL (1980a) 90-day gavage study, 71 mg/kg-day, was divided by an uncertainty factor of 3000 (10 to extrapolate from rats to humans, 10 to protect sensitive humans, 10 to extrapolate from subchronic to chronic exposure, and 3 for database deficiencies including the lack of chronic oral

exposure studies and 2-generation reproductive toxicity studies) to arrive at a chronic RfD for naphthalene of 2E-2 mg/kg-day.

MF = 1.

1.A.4. Additional Studies/Comments (Oral RfD)

In deriving the RfD additional studies were evaluated for a variety of critical effects. Nervous system depression in pregnant rats (NTP, 1991) occurring at a lower dose (50 mg/kg-day), was judged to be nonadverse, because the effect was considered to be transient in nature. Data from studies of mice exposed acutely to injections of naphthalene, or 1- or 2-methylnaphthalene (Buckpitt and Franklin, 1989), or chronically to 1- or 2-methylnaphthalene in the diet (Murata et al., 1993, 1997) provide suggestive evidence that chronic oral exposure to naphthalene at low doses may produce lung injury. However, deriving an RfD for naphthalene based on the methylnaphthalene data was judged to be too uncertain, because of metabolic differences between naphthalene and methylnaphthalenes and the absence of lung injury in subchronic oral studies in rats (BCL, 1980a) and mice with naphthalene (BCL, 1980b; Shopp et al., 1984).

A benchmark dose (BMD) approach to modeling the male rat body weight data fits mathematical models for a continuous variable to the data using maximum likelihood methods (see Appendix B to the Toxicological Review of Naphthalene, "Benchmark Dose Calculations"). In this approach, maximum likelihood estimates (MLEs) of dose (with no duration adjustment) associated with a 10% decrease in mean body weight compared with nonexposure conditions were 171 and 172 mg/kg-day using a polynomial and power model, respectively; respective 95% confidence lower limits on these doses, taken as BMDs, were 130 and 135 mg/kg-day. Assuming that either of these BMDs are surrogates for NOAELs, as suggested by the analysis of developmental toxicity data by Allen et al. (1994a,b) and Kavlock et al. (1995), making duration adjustments ($\text{BMD} \times 5/7$) and applying the same 3000 uncertainty factor used for the NOAEL/LOAEL approach arrives at a prospective RfD for naphthalene, 3E-2 mg/kg-day, that is comparable to the RfD derived with the NOAEL/LOAEL approach.

Benchmark dose approaches to deriving a chronic RfD for naphthalene were also examined using data for maternal body weight decreases in the NTP (1991) rat developmental toxicity study and data for lung proteinosis in mice exposed for 81 weeks to 1-methylnaphthalene in the diet (Murata et al., 1993). Decreased maternal body weight was not selected as the basis of chronic RfD derivation because the pregnant rats were exposed for only a small percentage of their lives. As discussed earlier, deriving the naphthalene RfD based on 1-methylnaphthalene data was judged to be too uncertain because of metabolic differences between naphthalene and methylnaphthalenes and the absence of lung injury in rats and mice orally exposed to naphthalene for subchronic periods.

The benchmark methodology for naphthalene is contained within an appendix of the Toxicological Review for the readers' information, however it was decided to use the LOAEL/NOAEL approach rather than the benchmark approach in the derivation of the RfD/RfC.

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.7 \(PDF\)](#).

1.A.5. Confidence in the Oral RfD

Study -- High
Database -- Low
RfD -- Low

The principal study was given a high confidence rating because adequate numbers of animals were included and experimental protocols were adequately designed, conducted, and reported. Confidence in the database was rated low because of the lack of adequate chronic oral data for naphthalene; the lack of any dose-response data for naphthalene-induced hemolytic anemia, probably one of the most well-known health hazards to humans exposed to naphthalene; and the lack of two-generation reproductive toxicity studies. Humans exposed via inhalation, combined inhalation and dermal exposure, and combined inhalation and oral exposure have developed hemolytic anemia. Hemolytic anemia is characterized by findings of lowered hemoglobin, hematocrit, and erythrocyte values, elevated reticulocyte counts, Heinz bodies, elevated serum bilirubin, and fragmentation of erythrocytes. In severe cases, the hemolytic anemia was accompanied by jaundice, high serum levels of bilirubin, cyanosis, and kernicterus with pronounced neurological signs. Neither

oral nor inhalation exposure levels were available in human studies reporting anemia (Melzer-Lange and Walsh-Kelly, 1989; Owa, 1989; Owa et al., 1993). Infants deficient in G6PDH are thought to be especially sensitive to naphthalene-induced hemolytic anemia. Resulting confidence in the RfD is low. A quantitative comparison of the acute dog study (7 days at 262 mg/kg-day; free-standing LOAEL of 262 mg/kg-day based hemolytic anemia) with the RfD (chronic oral rat study based on decrease in mean terminal body weight) to determine whether the RfD is protective of hemolytic anemia in humans is not possible since adequate dose-response data in a subchronic or chronic dog study are lacking. Therefore, because of the absence of an appropriate animal model one cannot extrapolate either qualitatively or quantitatively to humans with respects to hemolytic anemia.

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#).

__I.A.6. EPA Documentation and Review of the Oral RfD

Source Document -- U.S. EPA, 1998

This assessment was peer reviewed by external scientists. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A record of these comments is included in an appendix to the Toxicological Review of Naphthalene in support of Summary Information on the Integrated Risk Information System (IRIS) (U.S. EPA, 1998). [To review this appendix, exit to the toxicological review, Appendix A, Summary of and Response to External Peer Review Comments \(PDF\)](#).

Other EPA Documentation -- U.S. EPA, 1980, 1986, 1987a, 1988

Agency Consensus Date - 07/01/98

__I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (fax), or hotline.iris@epa.gov (Internet address).

[Back to top](#)

__I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Naphthalene
CASRN -- 91-20-3
Last Revised -- 09/17/1998

The inhalation Reference Concentration (RfC) is analogous to the oral RfD and is likewise based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. The inhalation RfC considers toxic effects for both the respiratory system (portal-of-entry) and for effects peripheral to the respiratory system (extrarrespiratory effects). It is generally expressed in units of mg/m³. In general, the RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhalation exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Inhalation RfCs were derived according to the Interim Methods for Development of Inhalation Reference Doses (EPA/600/8-88/066F, August 1989), and subsequently according to Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry (EPA/600/8-90/066F, October 1994). RfCs can also be derived for the noncarcinogenic health effects of substances that are carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

__I.B.1. Inhalation RfC Summary

Critical Effect	Experimental Doses*	UF	MF	RfC
Nasal effects: hyperplasia	NOAEL: None	3000	1	3E-3

and metaplasia in
respiratory
and olfactory epithelium,
respectively

LOAEL(HEC): 9.3 mg/m³

mg/m³

Chronic mouse inhalation
study

NTP, 1992a

*Conversion Factors and Assumptions -- Following the Category 3 guidance (U.S. EPA, 1994), experimental exposure concentrations of 0, 10, and 30 ppm were converted to 0, 52, and 157 mg/m³, respectively; adjusted to a continuous exposure basis in mg/m³ (6/24 hr x 5/7 days) equals mg/m³ x 0.1786; 0, 9.3, and 28 mg/m³. Because the blood:gas (air) coefficients for naphthalene were not available, the default ratio of 1 was used and the values for the LOAEL(HEC) were 0, 9.3, and 28 mg/m³. Scenario -- The LOAEL human equivalent concentration (HEC) was calculated for an extrarrespiratory effect for a category 3 gas. Since the b:a lambda for humans (h) is unknown, a default value of 1.0 is used for this ratio. LOAEL(HEC) x [b:a lambda(animal)/b:a lambda(human)] = 9.3 mg/m³.

__I.B.2. Principal and Supporting Studies (Inhalation RfC)

National Toxicology Program (NTP). (1992a) Toxicology and carcinogenesis studies of naphthalene in B6C3F1 mice (inhalation studies). Technical Report Series No. 410. NIH Publication No. 92-3141.

B6C3F1 mice (75/sex/group) were exposed to naphthalene (scintillation grade, > 99% pure) at target concentrations of 0, 10, and 30 ppm (0, 52, 157 mg/m³) for 6 hr/day, 5 days/week, for 103 weeks (NTP, 1992a). The duration-adjusted levels were 0, 9.3, and 28 mg/m³, respectively. Additional groups of 75 male and 75 female replacement animals were exposed to 30 ppm to ensure that a sufficient number of mice lived to study termination. Naphthalene vapor was generated by direct sublimation and monitored by a software feedback arrangement. Average weekly concentrations were within 20% of target concentrations, except one week when the mean concentration in the low-concentration chamber was 5.5 ppm. Supplemental hematology studies were scheduled with 25 animals/sex/group, but only the first sacrifice (at 14 days) was conducted because of high mortality in the male control group from fighting. Serial slit-lamp biomicroscopy and indirect ophthalmoscopic examinations were conducted on 5 animals/sex/group at 6-mo intervals. Gross necropsies were conducted on all animals. Complete histopathologic examinations of major tissues were conducted on all animals, except that the only tissues examined from low-concentration animals dying or killed after 21 mo of exposure were the lungs and nasal cavities.

Survival of the male controls was significantly lower than in the exposed males. Reduced survival was related to wound trauma and lesions from increased fighting in this group. Similar effects were not seen in the exposed males, because they tended to huddle in cage corners during exposure periods and so fought less. There was no significant difference in survival between the treatment and control females. There were no treatment-related ocular lesions in the selected mice that underwent ophthalmologic examinations at 6-mo intervals. There were no biologically significant changes in hematologic parameters at day 14 of the study. Final mean body weights of the treated animals were within 10% of the corresponding controls.

Inflammation, metaplasia of the olfactory epithelium, and hyperplasia of the respiratory epithelium were noted in the noses of virtually all exposed mice of both sexes, but in only one control female mouse. These effects were slightly more severe in the high-concentration group. See Table 1 for incidence data. The lesions were focal or multifocal, occurred mainly in the posterior nasal cavity, and were minimal to mild in severity. Inflammatory lesions included substantia propria edema, congestion, mixed inflammatory cell infiltrates, necrotic debris, and intraluminal serous to fibrinopurulent exudate. Respiratory epithelial hyperplasia resulted in a thickened, folded, irregular mucosal surface. Olfactory epithelial metaplasia often involved ciliated columnar or pseudocolumnar respiratory-like epithelial cells replacing the usual olfactory cell layer. The lesions were collectively considered features of a generalized inflammatory and regenerative process.

Table 1. Incidence of nonneoplastic respiratory lesions in B6C3F1 mice exposed by inhalation to naphthalene, 6 hr/day, 5 days/week for 2 years

Exposure level/sex (ppm)	Respiratory lesion		
	Inflammation, lung	Hyperplasia, nasal respiratory epithelium	Metaplasia, nasal olfactory epithelium
0/male	0/70	0/70	0/70
0/female	3/69	0/69	0/69
10/male	21/69	66/69	66/69
10/female	13/65	65/65	65/65
30/male	56/135	134/135	134/135
30/female	52/135	135/135	135/135

Source: NTP, 1992a.

Minimal to mild lung lesions, including infiltration of histiocytes or lymphocytes, inflammation, hyperplasia of the alveolar epithelium, and bronchial submucosal gland distension, were observed in both controls and treated mice. The incidence and severity were generally higher in the treated groups of both sexes, but there was no clear concentration-response relationship.

Females in the high-exposure group had elevated incidences of alveolar/bronchiolar adenomas and carcinomas (combined incidence 22%, compared with 7% in the control group and 3% in the low-exposure group). The incidence was also above that of historical controls and was considered compound-related. The incidences of alveolar/bronchiolar adenomas and carcinomas in treated males were marginally increased (10%, 25%, and 23%, in the control, low-concentration, and high-concentration groups, respectively). However, because the increase was not statistically significant and was within the range of historical controls, it was not considered exposure related. Instead, it was attributed to the longer life span of the treated animals. Nasal adenomas occurred in the anterior nasal cavities of two females in the low-concentration group. They were not considered compound related because the increase was not concentration related or statistically significant. Therefore, the nasal lesions discussed above should not be considered preneoplastic.

Calculation of the Human Equivalent Concentration (HEC)

Dose conversion: Because of its low water solubility and low reactivity, naphthalene-related effects on the nasal epithelium are expected to result following absorption of naphthalene and metabolism to reactive oxygenated metabolites, rather than being a result of direct contact. This hypothesis is supported by data on naphthalene metabolism indicating that toxic effects on the respiratory tract are due to a naphthalene metabolite that may be formed either in the liver or in the respiratory tract. For example, necrosis of bronchial epithelial (Clara) cells in mice (O'Brien et al., 1985, 1989; Tong et al., 1981) and necrosis of olfactory epithelium in mice, rats, and hamsters (Plopper et al., 1992) occur following intraperitoneal injection of naphthalene. The nasal effects from inhalation exposure to naphthalene were considered to be extra-respiratory effects of a category 3 gas, as defined in the U.S. EPA guidance for deriving RfCs (U.S. EPA, 1994). Following this guidance, experimental exposure concentrations were adjusted to a mg/m³ basis (0, 52, and 157 mg/m³), adjusted to a continuous exposure basis (mg/m³ × 6h/24h × 5d/7d = mg/m³ × 0.1786: 0, 9.3, and 28 mg/m³), and converted to human equivalent concentrations (HECs) by multiplying the adjusted concentrations by the ratio of mouse:human blood/gas partition coefficients. Because the blood/gas coefficients for naphthalene were not available, the default ratio of 1 was used.

Dose-response modeling: Whereas the data from the NTP (1992a) study show nasal effects to be the most sensitive effects from chronic inhalation exposure to naphthalene, they provide no indication of the shape of the dose-response curve because the incidence of nasal lesions at the lowest exposure level was 100% in females and nearly 100% in males (see Table 1). In this case, application of a BMD approach, in which quantal mathematical models are fit to the incidence data for nasal effects, does not sensibly assist in extrapolating to a NOAEL, and a NOAEL/LOAEL approach was taken for deriving an RfC for naphthalene.

1.B.3. Uncertainty and Modifying Factors (Inhalation RfC)

UF = 3000.

The adjusted LOAEL(HEC) of 9.3 mg/m³ for nasal effects (hyperplasia in respiratory epithelium and metaplasia in olfactory epithelium) was divided by an uncertainty factor of 3000 (10 to extrapolate

from mice to humans, 10 to protect sensitive humans, 10 to extrapolate from a LOAEL to a NOAEL, and 3 for database deficiencies including the lack of a 2-generation reproductive toxicity study and chronic inhalation data for other animal species) to arrive at a chronic RfC for naphthalene of 3E-3 mg/m³.

MF = 1.

1.B.4. Additional Studies/Comments (Inhalation RfC)

SUPPORTING STUDIES

Human experience with acute accidental exposures to naphthalene identifies the development of hemolytic anemia and cataracts as health hazards of concern. However, information is not available regarding dose-response relationships for these effects in humans with acute, subchronic, or chronic exposure by any route. Animal inhalation studies are restricted to three studies of mice: a 2-year study (NTP, 1992), a 6-mo study (Adkins et al., 1986), and a 4-hr study (Buckpitt, 1982). Results from the chronic study, supported by the subchronic and acute studies, identify nasal and pulmonary injuries as critical effects from chronic inhalation exposure to naphthalene; effects in other organs or tissues were not found. Incidence data for male and female mice with hyperplasia of the nasal respiratory epithelium, metaplasia of the nasal olfactory epithelium, and chronic pulmonary inflammation clearly show that the nose is more sensitive than the lung to chronic inhalation exposure to naphthalene. At both exposure levels (10 and 30 ppm, 6 hr/day, 5 days/week), > 95% of mice of either sex showed nasal lesions, whereas pulmonary lesions were found in < 1/3 and < 1/2 of mice exposed at 10 and 30 ppm, respectively (Table 1). Nasal lesions in the respiratory and olfactory epithelium in mice found in the NTP (1992a) study were therefore selected as the critical effects for the purpose of RfC derivation.

Adkins et al. (1986) exposed female A/J mice (30/group) to 0, 10, or 30 ppm (0, 52, or 157 mg/m³) naphthalene for 6 hr/day, 5 days/week for 6 mo, and counted the number of adenomas in each lung. The duration-adjusted concentrations were 0, 9.2, and 28 mg/m³, respectively. Exposure to naphthalene caused increases in the total number of adenomas and the percentage of animals with adenomas, but the differences were not significant. The number of tumors per tumor-bearing mouse lung was significantly increased at both exposure levels.

Buckpitt (1982) subjected groups of five male mice (Swiss Webster) plus control group to 1-hr exposures to naphthalene concentrations of 0, 52.4, 95.8, 204, or 380 mg/m³. Adverse effects were seen only at the highest concentration, and included swelling of cells and sloughing into the airway lumen of cells from either the major and/or terminal airways. The effects were milder in the presence of cytochrome P450 inhibitor and stronger in the presence of a glutathione depletor, suggesting that cytotoxicity is due to a naphthalene metabolite produced by P450 and that glutathione plays a protective role. Naphthalene reduced glutathione levels in the lung, liver, and kidney, but the concentration-response curve was flat.

Following a single 4-hr exposure of five male and five female Wistar Albino rats to 77.7 ppm (407 mg/m³), closed eyes, lacrimation, and mouth breathing were observed (Bushy Run Research Center, 1986). No signs of toxicity were observed postexposure or during the 14-day observation period, and gross necropsy revealed no exposure-related lesions.

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.7 \(PDF\)](#).

1.B.5. Confidence in the Inhalation RfC

Study -- Medium
Database -- Low to Medium
RfC -- Low to Medium

The principal study was given medium confidence because adequate numbers of animals were used, and the severity of nasal effects increased at the higher exposure concentration. However, the study produced high mortality (< 40% survival in the male control group due to wound trauma and secondary lesions resulting from increased fighting). Also, hematological evaluation was not conducted beyond 14 days. The database was given a low-to-medium confidence rating because there are no chronic or subchronic inhalation studies in other animal species, and there are no reproductive or developmental studies for inhalation exposure. In the absence of human or primate

toxicity data, the assumption is made that nasal responses in mice to inhaled naphthalene are relevant to humans; however, it cannot be said with certainty that this RfC for naphthalene based on nasal effects will be protective for hemolytic anemia and cataracts, the more well-known human effects from naphthalene exposure. Medium confidence in the RfC follows.

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#).

II.B.6. EPA Documentation and Review of the Inhalation RfC

Source Document -- U.S. EPA, 1998

This assessment was peer reviewed by external scientists. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A record of these comments is included in an appendix to the Toxicological Review of Naphthalene in support of Summary Information on the Integrated Risk Information System (IRIS) (U.S. EPA, 1998). [To review this appendix, exit to the toxicological review, Appendix A, Summary of and Response to External Peer Review Comments \(PDF\)](#).

Other EPA Documentation -- U.S. EPA, 1980, 1986, 1987a, 1988

Agency Consensus Date - 7/1/98

II.B.7. EPA Contacts (Inhalation RfC)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (fax), or hotline.iris@epa.gov (Internet address).

[Back to top](#)

II. Carcinogenicity Assessment for Lifetime Exposure

Naphthalene
CASRN -- 91-20-3
Last Revised -- 09/17/1998

Section II provides information on three aspects of the carcinogenic assessment for the substance in question, the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral exposure and from inhalation exposure. The quantitative risk estimates are presented in three ways. The slope factor is the result of application of a low-dose extrapolation procedure and is presented as the risk per (mg/kg)/day. The unit risk is the quantitative estimate in terms of either risk per µg/L drinking water or risk per µg/m³ air breathed. The third form in which risk is presented is a concentration of the chemical in drinking water or air associated with cancer risks of 1 in 10,000, 1 in 100,000, or 1 in 1,000,000. The rationale and methods used to develop the carcinogenicity information in IRIS are described in the Risk Assessment Guidelines of 1986 (EPA/600/8-87/045) and in the IRIS Background Document. IRIS summaries developed since the publication of EPA's more recent Proposed Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1996) also utilize those Guidelines where indicated. Users are referred to Section I of this IRIS file for information on long-term effects other than carcinogenicity.

II.A. Evidence for Human Carcinogenicity

II.A.1. Weight-of-Evidence Characterization

Using criteria of the 1986 Guidelines for Carcinogen Risk Assessment, naphthalene is classified in Group C, a possible human carcinogen. This is based on the inadequate data of carcinogenicity in humans exposed to naphthalene via the oral and inhalation routes, and the limited evidence of carcinogenicity in animals via the inhalation route.

Using the 1996 Proposed Guidelines for Carcinogen Risk Assessment, the human carcinogenic potential of naphthalene via the oral or inhalation routes "cannot be determined" at this time based on human and animal data; however, there is suggestive evidence (observations of benign respiratory tumors and one carcinoma in female mice only exposed to naphthalene by inhalation [NTP, 1992a]). Additional support includes increase in respiratory tumors associated with exposure to 1-methylnaphthalene.

At the present time the mechanism whereby naphthalene produces benign respiratory tract tumors are not fully understood, but are hypothesized to involve oxygenated reactive metabolites produced via the cytochrome P-450 monooxygenase system. However, based on the many negative results obtained in genotoxicity tests, a genotoxic mechanism appears unlikely.

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#).

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.7 \(PDF\)](#).

II.A.2. Human Carcinogenicity Data

Available data are inadequate to establish a causal association between exposure to naphthalene and cancer in humans. Adequately scaled epidemiological studies designed to examine a possible association between naphthalene exposure and cancer were not located. Overall, no data are available to evaluate the carcinogenic potential in exposed human populations.

II.A.3. Animal Carcinogenicity Data

Inhalation: In an NTP (1992a) cancer bioassay, groups of male and female B6C3F1 mice were exposed (whole-body) to naphthalene (> 99% pure) vapors at concentrations of 0 (75 mice/sex), 10 (75 mice/sex), or 30 ppm (150 mice/sex) 6 hr/day, 5 days/week for 2 years. Mice were housed five to a cage. There were 150 mice housed in each of 4 inhalation chambers; 2 chambers were used for the high-exposure level. A comprehensive histological examination was performed on all control and high-dose mice and on low-dose mice that died or were sacrificed before 21 months of exposure. After 21 months of exposure, only the nasal cavity and lung were examined in the low-dose group. In each chamber, 50 animals per sex were designated for the 2-year studies; 5 animals per sex were designated for hematological evaluations at 14 days and 3, 6, 12, and 18 mo. However, because of high mortality in the male control group (see next paragraph), only the 14-day hematological evaluation was conducted. The other surviving interim mice were incorporated into the 2-year study.

Statistically significant decreases in survival were observed in the control male mice compared with the exposed groups. Exposed male mice were observed to huddle in corners of the cages during exposure and were less inclined to fight. Survival percentages at the end of the study were 37% (26/70), 75% (52/69), and 89% (118/133) for the 0, 10, and 30 ppm male groups, respectively. Survival percentages did not include mice sacrificed at 14 days, mice that died before the study began, mice that were accidentally killed, or mice that were lost during the study. Survival at 2 years in the control female mice (86%; 59/69) was comparable to survival in the exposed groups; survival percentages were 88% (57/65) and 76% (102/135) for low- and high-dose females. Body weights were not affected by exposure in either sex.

Statistically significant increases in incidences of nonneoplastic lesions were found in the lung and nose of males and females at both exposure levels. Observed nonneoplastic effects included the following (with respective incidences listed in the order of control, low-, and high-exposure groups): chronic inflammation of the lung (0/70, 21/69, and 56/135 for males; 3/69, 13/65, and 52/135 for females); chronic inflammation (0/70, 67/69, and 133/135 for males and 1/69, 65/65, and 135/135 for females); metaplasia of the olfactory epithelium (0/70, 66/69, and 134/135 for males; 0/69, 65/65, and 135/135 for females); and hyperplasia of the respiratory epithelium in the nose (0/70, 66/69, and 134/135 for males; 0/69, 65/65, and 135/135 for females).

The lung inflammation in the exposed mice was described as consisting of "focal intra-alveolar mixed inflammatory cell exudates and interstitial fibrosis" that in more advanced lesions consisted "primarily of large foamy macrophages, sometimes accompanied by multinucleated giant cells." Foci of alveolar epithelial hyperplasia were noted to occur generally in regions distant to inflammation.

A statistically significant increase in the incidence of alveolar/bronchiolar adenomas was observed in

the 30 ppm group of females (28/135), but not in the 10 ppm group (2/65), relative to the control female group (5/69). Among females, an additional mouse in the 30-ppm group displayed an alveolar/bronchiolar carcinoma. The historical combined incidence of alveolar/bronchiolar adenomas and carcinomas in control B6C3F1 female mice from NTP inhalation studies was cited as 39/466 (8.4%, range 0-12%). The authors commented that alveolar/bronchiolar adenomas and carcinomas constitute a morphologic continuum. The incidences of male mice with alveolar/bronchiolar adenomas were 7/70, 15/69, and 27/135 for the control, 10 ppm, and 30 ppm groups, respectively; for combined adenomas and carcinomas of the alveolar/bronchiolar region, the respective incidences were 7/70, 17/69, and 31/135. A statistical analysis that adjusted for intercurrent mortality (logistics regression analysis) determined that the tumor incidences for control and exposed groups of male mice were not significantly different (NTP, 1992a). Historical incidence for combined alveolar/bronchiolar adenomas and carcinomas in control male B6C3F1 mice from NTP inhalation studies was cited as 94/478 (19.7%, range 10%-30%). The adenomas were described as "locally compressive nodular masses consisting of cords of well-differentiated epithelial cells," whereas the carcinoma was "composed of ribbons and/or coalescing sheets of smaller, more anaplastic, cells which sometimes extended into adjacent parenchyma."

Hemangiosarcomas occurred at various sites within the vascular endothelium in five high-dose female mice (5/135), but not within the other groups of female mice (0/69 and 0/65 for control and 10 ppm females, respectively). The high-dose female incidence (3.7%) was not significantly different from the concurrent control incidence and was within the range of historical control incidences from NTP inhalation studies (range: 0-8%; overall incidence: 17/467 or 3.6%). No significantly elevated incidences of tumors were found at other tissue sites in exposed male or female mice (NTP, 1992a).

Adkins et al. (1986) exposed groups of 30 female A/J strain mice (6 to 8 weeks old) to 0, 10, or 30 ppm naphthalene (98%-99% pure) vapors, 6 hr/day, 5 days/week for 6 mo. After the 6-mo exposure period, excised lungs were examined for tumors. Tumors were examined histologically. The authors did not describe any noncancer histopathological effects that their examinations may have revealed. Survival was not different between the exposed and control groups. Lung tumors were found in all 20 positive control mice given single intraperitoneal injections of 1 g urethane/kg; the mean number of tumors per mouse in the positive control was 28.9. Increased numbers of lung tumors were found in the naphthalene-exposed groups compared with the control group, but the differences were not statistically significant (6, 10, and 11 for the 0, 10, and 30 ppm groups). Tumors were described as alveolar adenomas consisting of "large cuboidal or columnar epithelial cells supported by a sparse fibroblastic stroma and arranged in poorly defined acinar structures with papillary formations." No carcinomas were found. Naphthalene exposure did not significantly increase the percentage of animals with tumors (21%, 29%, and 30% for 0, 10, and 30 ppm mice, respectively). Statistically significant increases in the number of adenomas per tumor-bearing lung were observed in the exposed mice, but there was no increase in response with increasing dose. Mean numbers of tumors per tumor-bearing lung (sd noted in parentheses) were: 1.00 (0.00), 1.25 (0.07), and 1.25 (0.07) for 0, 10, and 30 ppm mice, respectively. Applicability of this study to the assessment of risk for lifetime exposure is limited due to the less-than-lifetime exposure and observation periods, and the limited tissue evaluation examining only the lung. Nevertheless, the finding that only 6 months of exposure caused statistically significant increased numbers of lung tumors per tumor-bearing lung in the exposed groups, coupled with the results of the NTP (1992a) mouse bioassay, provides further suggestive evidence that naphthalene produces a tumorigenic response in the mouse lung.

Oral: Schmahl (1955) reported that naphthalene administered in food did not cause cancer in a group of 28 rats (in-house strains BDI and BDII). Naphthalene (purchased from Merck Co. and described as "Naphthalene puriss. cryst. alcoh. depur. [54935]") was dissolved in oil and given 6 times/week in food. The absorption spectrum of the test material displayed no atypical peaks compared with published data for naphthalene, suggesting high purity. The daily dose was reported to vary between 10 and 20 mg, but further details regarding dose variation were not provided. After reaching a total dose of 10 g/rat (food intake and body weights were not reported), treatment was stopped on the 700th experimental day, and animals were observed until spontaneous death, between 700 and 800 days of age. Assuming an average daily dose of 15 mg/rat and a body weight of 0.36 kg (U.S. EPA, 1987b, reference body weight for male Fischer 344 rats), an estimated average daily dose of 42 mg/kg is calculated. Autopsies were performed on dead animals, and organs that appeared unusual were examined histologically (the report did not specify which organs were histologically examined). The number of rats in the control group was not reported; survival for control and exposed rats was reported to be similar. Reported results from the autopsy and histological examinations were restricted to the statement that no toxic effects were seen, including eye damage and tumors. Inadequacies in experimental design (e.g., only one dose level) was administered, the histopathological examination was not complete, hematological endpoints were not evaluated, and some rats lived as long as 300 days beyond exposure before being examined) and inadequacies in reporting of experimental details and results limit the conclusions that can be drawn

from this study regarding either the carcinogenicity or noncarcinogenic toxicity of naphthalene. This study is considered inadequate as a cancer bioassay because of reporting and design inadequacies and the likelihood that the maximum tolerated dose may not have been approached.

Other Routes of Administration: Schmahl (1955) reported that naphthalene repeatedly administered by subcutaneous or intraperitoneal injection did not produce tumors in rats (in-house strains BDI and BDII). Groups of 10 rats were given either subcutaneous or intraperitoneal weekly injections of naphthalene in oil (20 mg/rat per injection) starting at 100 days of age and continuing for 40 weeks (the total doses were 820 mg/rat). Rats were maintained until spontaneous death occurred. Life spans were reported to be 700 or 900 days for rats with subcutaneous or intraperitoneal doses, respectively. Autopsies were performed on dead animals, and organs which appeared unusual were examined histologically (the report did not specify which organs were examined, if any). The author reported that no toxic effects were found with parenteral administration of naphthalene. No tumors developed in either group. Reported information on control rats was restricted to the statement that lifespan for exposed rats was similar to lifespan for control rats (700 days with subcutaneous doses and 900 days with intraperitoneal doses).

Boyland et al. (1964) implanted naphthalene into the bladder of stock Chester Beatty mice and examined them after 30 weeks in an effort to determine the suitability of naphthalene as a potential vehicle for carcinogenicity testing. The original number of mice implanted with naphthalene was not reported, but 23 mice were reported to have survived 30 weeks. One mouse developed a bladder carcinoma (1/23; 4%); no adenomas or papillomas were found. Tumor incidence was as low as when paraffin wax was used (2-4%), and lower than with the implantation of cholesterol (12%). There are limitations of this study that make it an inadequate lifetime cancer bioassay including the short exposure and observation periods, and the lack of untreated controls.

Coal tar-derived naphthalene that contained approximately 10% unidentified impurities was tested for carcinogenicity by Knake (1956). While rats (40, sex unspecified) were given seven subcutaneous injections of 0 or 500 mg/kg naphthalene in sesame oil at 2-week intervals over an approximate 3.5-month period. Thirty-four of 38 naphthalene rats and 32/38 control rats survived the injection period. Survival was somewhat reduced in the naphthalene-exposed rats compared with the vehicle-control rats during the following 18-month period. Survival incidences at 6, 11, and 17 months after the injection period were 21/34, 6/34, and 0/34 for the naphthalene-exposed rats and 17/32, 12/32, and 4/32 for the control rats. Lymphosarcomas were found in 5/34 (14.7%) exposed rats during the 18-month observation period; one exposed rat showed a mammary fibrosarcoma. Vehicle controls showed a 6% (2/32) incidence of tumors (one with lymphosarcoma and one with mammary fibrosarcoma). Mice (25, inbred black) were painted with 0.5% naphthalene in benzene 5 days/week for life; 21 control mice were painted with benzene alone. Four treated mice developed lymphomatous leukemia, three had lung adenomas, one had lymphosarcoma, and one had a non-specified tumor (9/25 with tumors). In the benzene controls, one had lymphosarcoma, one had lung adenoma, and one had a non-specified tumor (3/21 with tumors). These studies are limited for the assessment of carcinogenicity due to the presence of unknown impurities that may have carcinogenic properties. Moreover, the vehicle (benzene) in the mouse study has been shown to cause leukemia in humans and rodents, and the site of injection in the rat study was painted, prior to injection, with carbolfuchsin, a known carcinogen.

La Voie et al. (1988) gave intraperitoneal naphthalene doses (in dimethylsulfoxide) of 0.25, 0.50, and 1.0 μ mole to male and female newborn CD-1 mice on days 1, 8, and 15 of life (total dose = 1.75 μ mole naphthalene). The report did not specify the purity of the naphthalene tested. Forty-nine pups were treated with naphthalene and 46 control pups were treated with dimethylsulfoxide alone. Mice were maintained (10 mice/cage) until moribund or until 52 weeks when survivors were killed. All gross lesions as well as liver sections from all mice were examined histologically. No statistically significant increased incidence of liver tumors (adenomas or hepatomas) was found in the exposed mice. Reported incidences for the number of mice with liver tumors were (denominators are for the number of mice that lived at least 6 months): 0/16 and 2/31 for exposed females and males, and 0/21 and 4/21 for vehicle-control females and males. This assay is inadequate to assess the carcinogenicity of lifetime exposure to naphthalene because the exposure period (2 weeks) and observation period (52 weeks) were significantly less than the lifetime for mice (approximately 2 years), and complete histological examinations were not conducted.

II.A.4. Supporting Data for Carcinogenicity

The genotoxic potential of naphthalene has been evaluated in many test systems. Most studies provided negative results. Naphthalene was not mutagenic in *Salmonella typhimurium* assays in the presence or absence of liver metabolic preparations (Bos et al., 1988; Connor et al., 1985; Florin et al., 1980; Godek et al., 1985; McCann et al., 1975; Nakamura et al., 1987; Narbonne et al., 1987;

NTP, 1992a; Sakai et al., 1985). Naphthalene did not damage DNA (as assayed by the induction of the SOS-repair system) in *E. coli* PQ37 (Mersch-Sundermann et al., 1993).

NTP (1992a) found that naphthalene induced, in cultured Chinese hamster ovary cells, sister chromatid exchanges within a concentration range of 27 to 90 µg/mL in the presence or absence of metabolic activation, and chromosomal aberrations within a range of 30 to 67.5 µg/mL only in the presence of metabolic activation.

Naphthalene was mutagenic in the marine bacterium *Vibrio fischeri* (Arsten et al., 1994) and in the *Drosophila melanogaster* wing somatic mutation and recombination test (Delgado-Rodriguez et al., 1995). Culture of mouse embryos in medium containing 0.16 mM naphthalene produced a 10-fold increase in chromosomal damage compared to untreated controls; the genotoxic response to naphthalene was amplified by the inclusion of a hepatic metabolic activation system in the medium (Gollahon et al., 1990).

Incubation of human peripheral lymphocytes in medium containing naphthalene and a human liver metabolic activation system did not produce increased frequency of sister chromatid exchanges compared with controls (Tingle et al., 1993; Wilson et al., 1995). Naphthalene did not induce unscheduled DNA synthesis in cultured rat hepatocytes (Barknecht et al., 1985) or increased numbers of micronuclei in bone marrow cells of mice following intraperitoneal injection of single 250-mg/kg doses (Sorg et al., 1985). Single oral doses of naphthalene as high as 500 mg/kg did not increase the frequency of micronucleated erythrocytes in exposed mice compared with untreated control mice (Harper et al., 1984). Naphthalene did not induce in vitro transformations of Fischer rat embryo cells (Freeman et al., 1973) or Swiss mouse embryo cells (Rhim et al., 1974). Sina et al. (1983) reported that naphthalene did not induce single-strand DNA breaks in cultured rat hepatocytes as detected by alkaline dilution.

Naphthalene metabolites 1-naphthol and 2-naphthol were not mutagenic in *S. typhimurium*, with or without metabolic activation (Florin et al., 1980; McCann et al., 1975; Narbonne et al., 1987). Another proposed naphthalene metabolite, naphthoquinone, was not mutagenic in several strains of *S. typhimurium* with or without metabolic activation (Sakai et al., 1985), but Flowers-Geary et al. (1994) reported that naphthalene-1,2-dione was mutagenic in strains of *S. typhimurium* without metabolic activation. The naphthalene metabolite, 1-naphthol, failed to produce positive results in several other genotoxicity assays including tests for sex-linked recessive lethal mutations in *Drosophila melanogaster* (Gocke et al., 1981), mutations in mouse L5178Y cells (Amacher and Turner, 1982), unscheduled DNA synthesis in cultured rat hepatocytes (Probst and Hill, 1980), and induction of micronuclei in bone marrow cells of mice (Gocke et al., 1981) and rats (Hossack and Richardson, 1977) after acute in vivo exposure.

Tsuda et al. (1980) found no evidence for neoplastic transformation of liver cells in a group of 10 young adult F344 rats (sex not specified) treated with single gavage doses of 100 mg/kg naphthalene in corn oil compared with a group of 10 vehicle control rats. Rats were given gavage doses of naphthalene or vehicle following partial hepatectomy, but before dietary treatment with an anti-cell proliferation agent (2-acetylaminofluorene) and a necrotizing agent (carbon tetrachloride). Gamma-glutamyl transpeptidase foci (observed following the dietary treatments of exposed and control rats) were used as an indicator of neoplastic transformation. In contrast to naphthalene, a single gavage dose of 200 mg/kg benzo[a]pyrene induced significant increases in the number, area, and size of gamma-glutamyl transpeptidase foci.

[Back to top](#)

II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure

An oral slope factor for naphthalene was not derived because of a lack of chronic oral naphthalene studies.

[Back to top](#)

II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure

An inhalation unit risk estimate for naphthalene was not derived because of the weakness of the evidence (observations of predominant benign respiratory tumors in mice at high dose only) that naphthalene may be carcinogenic in humans.

[Back to top](#)

II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)

II.D.1. EPA Documentation

Source Document – U.S. EPA, 1998

This assessment was peer reviewed by external scientists. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A record of these comments is included in an appendix to the Toxicological Review of Naphthalene in support of Summary Information on the Integrated Risk Information System (IRIS) (U.S. EPA, 1998). [To review this appendix, exit to the toxicological review, Appendix A, Summary of and Response to External Peer Review Comments \(PDF\).](#)

II.D.2. EPA Review (Carcinogenicity Assessment)

Agency Consensus Date - 07/01/1998

II.D.3. EPA Contacts (Carcinogenicity Assessment)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (fax), or hotline.iris@epa.gov (Internet address).

[Back to top](#)

III. [reserved]

IV. [reserved]

V. [reserved]

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Naphthalene
CASRN – 91-20-3
Last Revised – 09/17/1998

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[Back to top](#)

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[Back to top](#)

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Wilson, AS; Tingle, MD; Kelly, MD; et al. (1995) Evaluation of the generation of genotoxic and cytotoxic metabolites of benzo[a]pyrene, aflatoxin B, naphthalene and tamoxifen using human liver microsomes and human lymphocytes. Human Exp Toxicol 14:507-515.

[Back to top](#)

VII. Revision History

Naphthalene
CASRN -- 91-20-3
Last Revised -- 09/17/1998

Date	Section	Description
12/01/1990	II.	Carcinogen assessment on-line
12/01/1990	VI.	Bibliography on-line
01/01/1992	IV.	Regulatory Action section on-line
09/01/1992	II.	Classification noted as pending change
09/01/1992	II.D.2.	Work group review date added
11/01/1993	I.A.	Work group review date added
09/01/1994	I.A.	Work group review date added
05/01/1995	II.	Pending change note replaced
05/01/1995	II.D.2.	Work group review date added
07/01/1995	II.	Pending change note replaced; see new note
08/01/1995	I.A., II., II.D.2	EPA's RfD/RfC and CRAVE workgroups were discontinued in May, 1995. Chemical substance reviews that were not completed by September 1995 were taken out of IRIS review. The IRIS Pilot Program replaced the workgroup functions beginning in September, 1995.
08/01/1995	II.	Note revised
08/01/1995	II.A.3.	Paragraph 1 revised
04/01/1997	III., IV., V.	Drinking Water Health Advisories, EPA Regulatory Actions, and Supplementary Data were removed from IRIS on or before April 1997. IRIS users were directed to the appropriate EPA Program Offices for this information.
09/17/1998	I., II., VI.	Revised RfD, RfC, carcinogenicity assessments
01/09/2002	II.	This chemical is being reassessed under the IRIS Program.

[Back to top](#)

VIII. Synonyms

Naphthalene
CASRN -- 91-20-3
Last Revised -- 12/01/1990

91-20-3
Naphthalene
Albocarbon
Caswell No. 587

Dezodorator
EPA Pesticide Chemical Code 055801
HSDB 184
MOTH BALLS
MOTH FLAKES
Naftalen [Polish]
Naftaleno [Spanish]
Naphtalene [French]
Naphthalene
Naphthalin
Naphthaline
Naphthene
NAPHTHALENE, molten
NCI-C52904
NSC 37565
RCRA WASTE NUMBER U165
TAR CAMPHOR
UN 1334
UN 2304
WHITE TAR

Note: ATOXICOLOGICAL REVIEW is available for this chemical in Adobe* PDF format (116 Pages, 786 Kbytes). Similar documents can be found in the [List of Available IRIS Toxicological Reviews](#).

* You will need Adobe Acrobat Reader, available as a free download, to view some of the files on this page. See [EPA's PDF page](#) to learn more about PDF, and for a link to the free Acrobat Reader.

[Back to top](#)

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EPA Home > Browse EPA Topics > Human Health > Health Effects > IRIS Home > IRIS Summaries

Phenanthrene (CASRN 85-01-8)

[view QuickView](#)



MAIN CONTENTS

Reference Dose for Chronic Oral Exposure (RfD)

0459

Phenanthrene; CASRN 85-01-8

Health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several Program Offices and the Office of Research and Development. The summaries presented in Sections I and II represent a consensus reached in the review process. Background information and explanations of the methods used to derive the values given in IRIS are provided in the Background Documents.

STATUS OF DATA FOR Phenanthrene

File First On-Line 12/01/1990

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	no data	
Inhalation RfC Assessment (I.B.)	no data	09/01/1994
Carcinogenicity Assessment (II.)	on-line	12/01/1990

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name -- Phenanthrene
CASRN -- 85-01-8

Not available at this time.

[Back to top](#)

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name -- Phenanthrene
CASRN -- 85-01-8

Not available at this time.

Chronic Health
Hazards for Non-
Carcinogenic Effects
Reference Dose for
Chronic Oral Exposure
(RfD)

- Oral RfD Summary
- Principal and
Supporting Studies
- Uncertainty and
Modifying Factors
- Additional Studies/
Comments
- Confidence in the
Oral RfD
- EPA Documentation
and Review

Reference
Concentration for
Chronic Inhalation
Exposure (RfC)

- Inhalation RfC
Summary
- Principal and
Supporting Studies
- Uncertainty and
Modifying Factors
- Additional Studies/
Comments
- Confidence in the
Inhalation RfC
- EPA Documentation
and Review

Carcinogenicity
Assessment for
Lifetime Exposure

Evidence for Human
Carcinogenicity

- Weight-of-Evidence
Characterization
- Human
Carcinogenicity Data
- Animal
Carcinogenicity Data
- Supporting Data for
Carcinogenicity

Quantitative Estimate
of Carcinogenic Risk
from Oral Exposure

- Summary of Risk

[Back to top](#)

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name -- Phenanthrene
CASRN -- 85-01-8
Last Revised -- 12/01/1990

Section II provides information on three aspects of the carcinogenic assessment for the substance in question; the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral exposure and from inhalation exposure. The quantitative risk estimates are presented in three ways. The slope factor is the result of application of a low-dose extrapolation procedure and is presented as the risk per (mg/kg)/day. The unit risk is the quantitative estimate in terms of either risk per ug/L drinking water or risk per ug/cu.m air breathed. The third form in which risk is presented is a drinking water or air concentration providing cancer risks of 1 in 10,000, 1 in 100,000 or 1 in 1,000,000. The rationale and methods used to develop the carcinogenicity information in IRIS are described in The Risk Assessment Guidelines of 1986 (EPA/600/8-87/045) and in the IRIS Background Document. IRIS summaries developed since the publication of EPA's more recent Proposed Guidelines for Carcinogen Risk Assessment also utilize those Guidelines where indicated (Federal Register 61(79):17960-18011, April 23, 1996). Users are referred to Section I of this IRIS file for information on long-term toxic effects other than carcinogenicity.

II.A. Evidence for Human Carcinogenicity

II.A.1. Weight-of-Evidence Characterization

Classification -- D, not classifiable as to human carcinogenicity

Basis -- Based on no human data and inadequate data from a single gavage study in rats and skin painting and injection studies in mice.

II.A.2. Human Carcinogenicity Data

None.

II.A.3. Animal Carcinogenicity Data

Inadequate. Data from a rat gavage study and mouse skin application and injection studies are not adequate to assess the carcinogenicity of phenanthrene. Ten female Sprague-Dawley rats received a single oral dose of 200 mg phenanthrene in sesame oil (Huggins and Yang, 1962). No mammary tumors occurred. The observation period was not specified; however, based on the discussion of other experiments in the report it was probably at least 60 days. Controls were not reported.

Complete carcinogenic activity was not shown in two skin painting assays. Kennaway (1924) reported no tumors in 100 mice (strain and sex not specified) treated with phenanthrene (purity not specified) in 90% benzene (dose not reported) for 9 months. Roe and Grant (1964) reported in an abstract that mice (number, sex and strain not specified) did not develop tumors after dermal exposure to 5% phenanthrene (purity not specified, vehicle not specified) 3 times/week for 1 year.

Five studies of cancer-initiating activity in skin painting assays in mice have yielded one positive result. Groups of 30 female CD-1 mice received a single dermal application of 1.8 mg phenanthrene in benzene, followed by twice-weekly applications of tetradecanoylphorbol acetate (TPA, 3 mg), a promoter, for 35 weeks (Scribner, 1973). Phenanthrene used in the study was purified by preparative thin-layer chromatography (TLC) and determined to be homogeneous on TLC. It is stated in the report that the dose of TPA was 3 mg (5 umol); however, it is not clear whether this refers to the twice weekly or total dose. Controls were treated with TPA (6 mg); it is not clear whether controls received benzene (vehicle). The tumor incidence (skin papilloma) at 35 weeks was 12/30 (40%) in treated mice and 0/30 in TPA controls.

Tumor-initiating activity was not shown in the four other mouse skin painting studies. In the first

Estimates
- Dose-Response Data
- Additional Comments
- Discussion of
Confidence

Quantitative Estimate
of Carcinogenic Risk
from Inhalation
Exposure

- Summary of Risk
Estimates
- Dose-Response Data
- Additional Comments
- Discussion of
Confidence

EPA Documentation,
Review and Contacts

• Bibliography
• Revision History
• Synonyms

study, male Swiss albino (Ha/ICR) mice (15 to 20/group) received 10 applications of a 0.1% solution of phenanthrene in acetone (total dose 1 mg) or acetone alone, followed by repeated applications of TPA (2.5 ug in acetone) 3 times/week for 20 weeks (LaVoie et al., 1981). Phenanthrene was >99.5% pure as determined by high pressure liquid chromatography (HPLC). No tumors occurred in treated or control mice. Wood et al. (1979) exposed female CD-1 mice (30/group) to a single application of 1.8 mg phenanthrene in acetone:ammonium hydroxide (1000:1) or vehicle alone, followed by TPA (10 ug) twice weekly for 35 weeks. Phenanthrene used in this study was >98% pure and homogeneous on HPLC. Tumor incidence (skin papillomas) out of 27-29 survivors in each group was 17% in treated mice and 7% in vehicle controls (not statistically different). In another study, albino mice (10/sex/dose, strain not specified) received four dermal applications of phenanthrene (total dose 1.2 mg, purity not specified) in acetone or to acetone alone, followed by croton oil once each week for 20 weeks (Roe, 1962). Tumor incidence (skin papillomas) was 4/19 (21%) in treated mice and 2/20 (10%) in vehicle controls. In the last study (Salaman and Roe, 1956), groups of 20 "S" strain mice (sex unspecified) received 10 dermal applications (3 times/week) of 18% phenanthrene (total dose 0.54 g, purity not specified) in acetone, followed by 18 weekly applications of croton oil. Controls were treated with 18 applications of croton oil; 10 controls survived until termination. The tumor incidence (skin papillomas) was 5/20 (25%) in treated mice and 4/10 (40%) in croton oil controls.

Parenterally administered phenanthrene was not shown to have tumorigenic activity in three studies. In the first (Buening et al., 1979), groups of Swiss Webster B1.U:Ha ICR mice (100/group, approximately 50% of each sex) received intraperitoneal injections of phenanthrene (total dose 0.25 mg) in dimethyl sulfoxide (DMSO) or DMSO alone on days 1, 8, and 15 after birth. Phenanthrene was >98% pure and homogeneous on HPLC. Incidence of pulmonary tumors (adenomas) at 38 to 42 weeks was 1/18 (6%) and 5/17 (30%) in female and male treated mice and 7/38 (18%) and 2/10 (19%) in female and male controls; the apparent differences were not statistically significant. No hepatic tumors occurred in treated or control mice. One treated female mouse developed malignant lymphoma. In the second study (Grant and Roe, 1963), albino mice (sex, strain and group size not specified) received single subcutaneous injections of phenanthrene (40 ug, purity not specified) in an acetone/gelatin vehicle or only the vehicle. Incidence of pulmonary adenomas after 52-62 weeks was 3/39 (6%) in treated mice and 8/34 (24%) in vehicle controls. Other tumors reported were 4 hepatomas and 2 skin papillomas in treated mice, and 1 mammary adenocarcinoma, 1 hepatoma and 1 hemangioma in control mice. Finally in the Steiner (1955) study, groups of 40 to 50 male and female C57BL mice (numbers per sex not specified) received single subcutaneous injections of 5 mg phenanthrene (purity not specified) in tricapylin. No tumors were reported in 27 surviving mice after 4 months. Vehicle controls were not reported.

II.A.4. Supporting Data for Carcinogenicity

Phenanthrene has not yielded positive results in assays for DNA damage in *Bacillus subtilis* and *Escherichia coli* (Rosenkrantz and Poirier, 1979; McCarroll et al., 1981). Tests for mutagenicity in *Salmonella typhimurium* have yielded positive (Oesch et al., 1981; Sakai et al., 1985; Bos et al., 1988) and negative results (Wood et al., 1979; McCann et al., 1975; LaVoie et al., 1981; Kaden et al., 1979; Bos et al., 1988). The results of phenanthrene in a fungi recombination assay (Simmon, 1979) and in tests for DNA damage in several mammalian cell cultures were not positive (Lake et al., 1978; Probst et al., 1981; Rice et al., 1984). A test for forward mutation in Chinese hamster ovary cells exposed to 1 ug/mL was not positive (Huberman and Sachs, 1976), whereas a test in human lymphoblast TK6 cells incubated with rat liver S9 (Arochlor) and 9 ug/mL phenanthrene yielded positive results (Barfknecht et al., 1981). Phenanthrene did not yield positive results in sister chromatid exchange and chromosome aberration assays in mammalian cell cultures (Popescu et al., 1977) or in cell transformation assays in several types of mammalian cells (5-40 ug/mL) (Marquardt and Heidelberger, 1972; Kakunaga, 1973; Evans and DiPaolo, 1975; Pienta et al., 1977).

Current theories regarding the mechanisms of metabolic activation of polycyclic aromatic hydrocarbons lead to predictions of a carcinogenic potential for phenanthrene. Jerina et al. (1978) considered phenanthrene to have a "bay-region" structure. It is metabolized by mixed function oxidases to reactive diol epoxides (Nordqvist et al., 1981; Vyas et al., 1982) that have been shown to be weakly mutagenic in some bacterial and mammalian cell assays (Wood et al., 1979). Evidence from in vivo assays indicates, however, that phenanthrene metabolites have a relatively low tumorigenic potential. The 1,2-, 3,4- and 9,10-dihydrodiol metabolites of phenanthrene did not show tumor initiating activity in mouse skin painting assays (Wood et al., 1979). The 1,2-diol-3,4-epoxides of phenanthrene did not produce lung tumors when injected into newborn mice (Buening et al., 1979). The relatively weak mutagenic and tumorigenic activity of phenanthrene diol epoxides is inconsistent with the "bay region theory" of PAH carcinogenesis. The reason for the inconsistency has not been elucidated. Phenanthrene epoxides have a relatively small molecular size (relative to other more active PAH epoxides such as chrysene diol epoxides) and as a result may have a lower

affinity for DNA or may be transported less efficiently into the mammalian nucleus (Wood et al., 1979). While some studies have considered phenanthrene to have a "bay-region" structure, it may not clearly fall into this category.

[Back to top](#)

II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure

None.

[Back to top](#)

II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure

None.

[Back to top](#)

II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)

The 1990 Drinking Water Criteria Document for Polycyclic Aromatic Hydrocarbons (PAHs) has received Agency and external review.

II.D.1. EPA Documentation

Source Document -- U.S. EPA, 1990

The 1990 Drinking Water Criteria Document for Polycyclic Aromatic Hydrocarbons has received Agency and external review.

II.D.2. EPA Review (Carcinogenicity Assessment)

Agency Work Group Review -- 02/07/1990, 05/03/1990

Verification Date -- 05/03/1990

II.D.3. EPA Contacts (Carcinogenicity Assessment)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

[Back to top](#)

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name -- Phenanthrene
CASRN -- 85-01-8
Last Revised -- 07/01/1993

VI.A. Oral RfD References

None

[Back to top](#)

VI.B. Inhalation RfC References

None

[Back to top](#)

VI.C. Carcinogenicity Assessment References

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[Back to top](#)

VII. Revision History

Substance Name -- Phenanthrene
CASRN -- 85-01-8

Date	Section	Description
12/01/1990	II.	Carcinogen assessment on-line
12/01/1990	VI.	Bibliography on-line
01/01/1992	IV.	Regulatory Action section on-line
07/01/1993	VI.C.	References clarified
09/01/1994	I.B.	Inhalation RfC now under review
08/01/1995	I.B.	EPA's RID/RIC and CRAVE workgroups were discontinued in May, 1995. Chemical substance reviews that were not completed by September 1995 were taken out of IRIS review. The IRIS Pilot Program replaced the workgroup functions beginning in September, 1995.
04/01/1997	III., IV., V.	Drinking Water Health Advisories, EPA Regulatory Actions, and Supplementary Data were removed from IRIS on or before April 1997. IRIS users were directed to the appropriate EPA Program Offices for this information.

[Back to top](#)

VIII. Synonyms

Substance Name -- Phenanthrene
CASRN -- 85-01-8
Last Revised -- 12/01/1990

85-01-8
Phenanthrene
HSDB 2166
NSC 26256
Phenanthren [German]
Phenanthrene

[Back to top](#)

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Last updated on Wednesday, March 8th, 2006
URL: <http://www.epa.gov/iris/subst/0459.htm#23reforal>



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Tetrachloroethylene (CASRN 127-18-4)

[view QuickView](#)



Search IRIS by Keyword

List of IRIS Substances

Full IRIS Summaries/Toxicological Reviews

Entire IRIS Website

MAIN CONTENTS

Reference Dose for Chronic Oral Exposure (RfD)

0105

Tetrachloroethylene; CASRN 127-18-4

Health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several Program Offices and the Office of Research and Development. The summaries presented in Sections I and II represent a consensus reached in the review process. Background information and explanations of the methods used to derive the values given in IRIS are provided in the Background Documents.

STATUS OF DATA FOR Tetrachloroethylene

File First On-Line 01/31/1987

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	on-line	03/01/1988
Inhalation RfC Assessment (I.B.)	no data	
Carcinogenicity Assessment (II.)	no data	

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name -- Tetrachloroethylene
CASRN -- 127-18-4
Last Revised -- 03/01/1988

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of substances that are also carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD

Chronic Health
Hazards for Non-
Carcinogenic Effects
Reference Dose for
Chronic Oral Exposure
(RfD)

- Oral RfD Summary
- Principal and
Supporting Studies
- Uncertainty and
Modifying Factors
- Additional Studies/
Comments
- Confidence in the
Oral RfD
- EPA Documentation
and Review

Reference
Concentration for
Chronic Inhalation
Exposure (RfC)

- Inhalation RfC
Summary
- Principal and
Supporting Studies
- Uncertainty and
Modifying Factors
- Additional Studies/
Comments
- Confidence in the
Inhalation RfC
- EPA Documentation
and Review

Carcinogenicity
Assessment for
Lifetime Exposure

Evidence for Human
Carcinogenicity

- Weight-of-Evidence
Characterization
- Human
Carcinogenicity Data
- Animal
Carcinogenicity Data
- Supporting Data for
Carcinogenicity

Quantitative Estimate
of Carcinogenic Risk
from Oral Exposure

- Summary of Risk

Hepatotoxicity in
mice, weight gain
in rats

NOAEL: 20 mg/kg/day
(converted to
14 mg/kg/day)

1000 1 1E-2
mg/kg/day

6-Week Mouse Gavage
Study

LOAEL: 100 mg/kg/day
(converted to
71 mg/kg/day)

Buben and O'Flaherty,
1985

Estimates
- Dose-Response Data
- Additional Comments
- Discussion of
Confidence

Quantitative Estimate
of Carcinogenic Risk
from Inhalation
Exposure

- Summary of Risk
Estimates
- Dose-Response Data
- Additional Comments
- Discussion of
Confidence

EPA Documentation,
Review and Contacts

• Bibliography
• Revision History
• Synonyms

*Conversion Factors: Doses have been adjusted for treatment schedule (5 days/week)

I.A.2. Principal and Supporting Studies (Oral RfD)

Buben, J.A. and E.J. O'Flaherty. 1985. Delineation of the role of metabolism in the hepatotoxicity of trichloroethylene and perchloroethylene: a dose-effect study. *Toxicol. Appl. Pharmacol.* 78: 105-122.

Buben and O'Flaherty (1985) exposed Swiss-Cox mice to tetrachloroethylene in corn oil by gavage at doses of 0, 20, 100, 200, 500, 1500, and 2000 mg/kg, 5 days/week for 6 weeks. Liver toxicity was evaluated by several parameters including liver weight/body weight ratio, hepatic triglyceride concentration, DNA content, histopathological evaluation, and serum enzyme levels. Increased liver triglycerides were first observed in mice treated with 100 mg/kg. Liver weight/body weight ratios were significantly higher than controls for animals treated with 100 mg/kg. At higher doses, hepatotoxic effects included decreased DNA content, increased SGPT, decreased levels of G6P and hepatocellular necrosis, degeneration and polyploidy.

A NOEL of 14 mg/kg/day was established in a second study, as well (Hayes et al., 1986). Groups of 20 Sprague-Dawley rats of both sexes were administered doses of 14, 400, or 1400 mg/kg/day in drinking water. Males in the high-dose group and females in the two highest groups exhibited depressed body weights. Equivocal evidence of hepatotoxicity (increased liver and kidney weight/body weight ratios) were also observed at the higher doses.

I.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF -- The uncertainty factor of 1000 results from multiplying factors of 10 to account for intraspecies variability, interspecies variability and extrapolation of a subchronic effect level to its chronic equivalent.

MF -- None

I.A.4. Additional Studies/Comments (Oral RfD)

Other data support the findings of the principal studies. Exposure of mice and rats to tetrachloroethylene by gavage for 11 days caused hepatotoxicity (centrilobular swelling) at doses as low as 100 mg/kg/day in mice (Schumann et al., 1980). Mice were more sensitive to the effects of tetrachloroethylene exposure than rats. Increased liver weight was observed in mice at 250 mg/kg, while rats did not exhibit these effects until doses of 1000 mg/kg/day were reached. Relative sensitivity to man cannot be readily established but the RfD of 1E-2 mg/kg/day is protective of the most mild effects observed in humans [diminished odor perception/modified Romberg test scores in volunteers exposed to 100 ppm for 7 hours; roughly equivalent to 20 mg/kg/day (Stewart et al., 1961)].

The principal studies are of short duration. Inhalation studies have been performed which indicate that the uncertainty factor of 10 is sufficient for extrapolation of the subchronic effect to its chronic equivalent. Liver enlargement and vacuolation of hepatocytes were found to be reversible lesions for mice exposed to low concentrations of tetrachloroethylene (Kjellstrand et al., 1984). In addition, elevated liver weight/body weight ratios observed in animals exposed to tetrachloroethylene for 30 days were similar to those in animals exposed for 120 days. Several chronic inhalation studies have also been performed (Carpenter, 1937; NTP, 1985; Rowe et al., 1952). None are inconsistent with a NOAEL of 14 mg/kg/day for tetrachloroethylene observed by Buben and O'Flaherty (1985) and Hayes et al. (1986).

I.A.5. Confidence in the Oral RfD

Study -- Low
Database -- Medium
RfD -- Medium

No one study combines the features desired for deriving an RfD: oral exposure, large number of animals, multiple dose groups, testing in both sexes and chronic exposure. Confidence in the principal studies is low mainly because of the lack of complete histopathological examination at the NOAEL in the mouse study. The database is relatively complete but lacks studies of reproductive and teratology endpoints subsequent to oral exposure; thus, it receives a medium confidence rating. Medium confidence in the RfD follows.

I.A.6. EPA Documentation and Review of the Oral RfD

U.S. EPA. 1985. Health Assessment Document for Tetrachloroethylene (Perchloroethylene). Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Research Triangle Park, NC for the Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA 600/8-82/005F.

U.S. EPA. 1987. Quantification of Toxicological Effects for Tetrachloroethylene. Prepared from the Health Assessment Document for Tetrachloroethylene (Perchloroethylene). Office of Drinking Water, Washington, DC.

Agency Work Group Review -- 05/20/1985, 08/05/1986, 09/17/1987

Verification Date -- 09/17/1987

I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (Internet address).

[Back to top](#)

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name -- Tetrachloroethylene
CASRN -- 127-18-4

Not available at this time.

[Back to top](#)

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name -- Tetrachloroethylene
CASRN -- 127-18-4

Not available at this time.

VI. Bibliography

Substance Name -- Tetrachloroethylene
CASRN -- 127-18-4
Last Revised -- 07/01/1989

VI.A. Oral RfD References

Buben, J.A. and E.J. O'Flaherty. 1985. Delineation of the role of metabolism in the hepatotoxicity of trichloroethylene and perchloroethylene: A dose-effect study. *Toxicol. Appl. Pharmacol.* 78: 105-122.

Carpenter, C.P. 1937. The chronic toxicity of tetrachloroethylene. *J. Ind. Hyg. Toxicol.* 19(7): 323-336.

Hayes, J.R., L.W. Condie, Jr. and J.F. Borzelleca. 1986. The subchronic toxicity of tetrachloroethylene (perchloroethylene) administered in the drinking water of rats. *Fund. Appl. Toxicol.* 7: 119-125.

Kjellstrand, P., B. Holmquist, M. Kanje, et al. 1984. Perchloroethylene: Effects on body and organ weights and plasma butyrylcholinesterase activity in mice. *Acta Pharmacol. Toxicol.* 54(5): 414-424.

NTP (National Toxicology Program). 1985. NTP Technical Report on the Toxicology and Carcinogenesis Studies of Tetrachloroethylene (perchloroethylene). U.S. Dept. Health and Human Services, NIH Publ. No. 85-2567.

Rowe, V.K., D.D. McCollister, H.C. Spencer, E.M. Adams and D.D. Irish. 1952. Vapor toxicity of tetrachloroethylene for laboratory animals and human subjects. *Arch. Ind. Hyg. Occup. Med.* 5: 566-579.

Schumann, A.M., J.F. Quast and P.G. Watanabe. 1980. The pharmacokinetics and macromolecular interaction of perchloroethylene in mice and rats as related to oncogenicity. *Toxicol. Appl. Pharmacol.* 55: 207-219.

Stewart, R.D., H.H. Gay, D.S. Erley, C.L. Hake and A.W. Schaffer. 1961. Human exposure to tetrachloroethylene vapor. *Arch. Environ. Health.* 2: 40-46.

U.S. EPA. 1985. Health Assessment Document for Tetrachloroethylene (perchloroethylene). Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Research Triangle Park, NC for the Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA 600/8-82-005F. Office of Drinking Water, Washington, DC.

U.S. EPA. 1987. Quantification of Toxicological Effects for Tetrachloroethylene. Prepared from the Health Assessment Document for Tetrachloroethylene (perchloroethylene). Office of Drinking Water, Washington, DC.

[Back to top](#)

VI.B. Inhalation RfC References

None

[Back to top](#)

VI.C. Carcinogenicity Assessment References

None

[Back to top](#)

VII. Revision History

Substance Name -- Tetrachloroethylene
CASRN -- 127-18-4

Date	Section	Description
12/23/1987	I.A.	RfD withdrawn pending further review
03/01/1988	I.A.	Revised Oral RfD summary added - RfD changed
03/01/1988	III.A.	Health Advisory added
07/01/1989	VI.	Bibliography on-line
05/01/1990	II.	Carcinogen assessment now under review
06/01/1990	IV.A.1.	Area code for EPA contact corrected
06/01/1990	IV.F.1.	EPA contact changed
01/01/1992	IV.	Regulatory actions updated
04/01/1992	IV.	Regulatory action section withdrawn
08/01/1995	II.	EPA's RfD/RfC and CRAVE workgroups were discontinued in May, 1995. Chemical substance reviews that were not completed by September 1995 were taken out of IRIS review. The IRIS Pilot Program replaced the workgroup functions beginning in September, 1995.
04/01/1997	III., IV., V.	Drinking Water Health Advisories, EPA Regulatory Actions, and Supplementary Data were removed from IRIS on or before April 1997. IRIS users were directed to the appropriate EPA Program Offices for this information.
01/02/1998	I., II.	This chemical is being reassessed under the IRIS Program.

[Back to top](#)

VIII. Synonyms

Substance Name -- Tetrachloroethylene
CASRN -- 127-18-4
Last Revised -- 01/31/1987

127-18-4
Ankilostin
Antisal 1
Antisol 1
Carbon bichloride
Carbon dichloride
Czterochloroetylen
Dec-Solv
Didakene
Didokene
Dowclene EC
Dow-Per
ENT 1,860
Ethene, tetrachloro-
Ethylene tetrachloride
Ethylene, tetrachloro-
Fedal-Un
NCI-C04580
Nema
PCE
PER
Perawin

PERC
Perchloorethyleen, per
Perchlor
Perchloraethylen, per
Perchlorethylene
Perchlorethylene, per
Perchloroethylene
Perclene
Percloroetiene
Percosolv
Percosolve
PERK
Perklone
Persec
Tetlen
Tetracap
Tetrachlooretheen
Tetrachloraethen
Tetrachlorethylene
Tetrachloroethene
Tetrachloroethylene
1,1,2,2-Tetrachloroethylene.
Tetracloroetene
Tetraquer
Tetraleno
Tetralex
Tetravec
Tetroguer
Tetropil
WLN: GYGUYG

[Back to top](#)

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Last updated on Wednesday, March 8th, 2006
URL: <http://www.epa.gov/iris/subst/0106.htm#23reforal>



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Toluene (CASRN 108-88-3)

[view QuickView](#)



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List of IRIS Substances

Full IRIS Summaries/Toxicological Reviews

Entire IRIS Website

MAIN CONTENTS

Reference Dose for Chronic Oral Exposure (RfD)

Note: A TOXICOLOGICAL REVIEW is available for this chemical in Adobe® PDF format (179 Pages, 1.8M). Similar documents can be found in the [List of Available IRIS Toxicological Reviews](#).

Links to specific pages in the toxicological review are available throughout this summary. To utilize this feature, your Web browser and Adobe program must be configured properly so the PDF displays within the browser window. If your browser and Adobe program need configuration, please go to the [IRIS Help page](#) for instructions.

0118

Toluene; CASRN 108-88-3; 09/23/2005

Human health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several program offices, regional offices, and the Office of Research and Development. Sections I (Chronic Health Hazard Assessments for Noncarcinogenic Effects) and II (Carcinogenicity Assessment for Lifetime Exposure) present the positions that were reached during the review process. Supporting information and explanations of the methods used to derive the values given in IRIS are provided in the guidance documents located on the IRIS website at <http://www.epa.gov/iriswebp/iris/backgr-d.htm>.

STATUS OF DATA FOR Toluene

File First On-Line 01/31/1987

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	on-line	09/23/2005
Inhalation RfC Assessment (I.B.)	on-line	09/23/2005
Carcinogenicity Assessment (II.)	on-line	09/23/2005

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name -- Toluene
CASRN -- 108-88-3
Section I.A. Last Revised -- 09/23/2005

The RfD is an estimate of an oral exposure, for a given duration, to the human population (including susceptible subgroups) that is likely to be without an appreciable risk of adverse health effects over a lifetime. It is derived from a statistical lower confidence limit on the benchmark dose (BMDL), a no-

Chronic Health
Hazard for Non-
Carcinogenic Effects
Reference Dose for
Chronic Oral Exposure
(RfD)

- Oral RfD Summary
- Principal and
Supporting Studies
- Uncertainty and
Modifying Factors
- Additional Studies/
Comments
- Confidence in the
Oral RfD
- EPA Documentation
and Review

Reference
Concentration for
Chronic Inhalation
Exposure (RfC)

- Inhalation RfC
Summary
- Principal and
Supporting Studies
- Uncertainty and
Modifying Factors
- Additional Studies/
Comments
- Confidence in the
Inhalation RfC
- EPA Documentation
and Review

Carcinogenicity
Assessment for
Lifetime Exposure

Evidence for Human
Carcinogenicity
- Weight of Evidence
Characterization
- Human
Carcinogenicity Data
- Animal
Carcinogenicity Data
- Supporting Data for
Carcinogenicity

Quantitative Estimate
of Carcinogenic Risk
from Oral Exposure

- Summary of Risk

observed-adverse-effect level (NOAEL), a lowest-observed-adverse-effect level (LOAEL), or another suitable point of departure, with uncertainty/variability factors applied to reflect limitations of the data used. The RfD is intended for use in risk assessments for health effects known or assumed to be produced through a nonlinear (possibly threshold) mode of action. It is expressed in units of mg/kg-day. Please refer to the guidance documents at <http://www.epa.gov/iriswebp/iris/backgr-d.htm> for an elaboration of these concepts. Since RfDs can be derived for the noncarcinogenic health effects of substances that are also carcinogens, it is essential to refer to other sources of information concerning the carcinogenicity of this chemical substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

The previous IRIS assessment utilized the NTP (1990) 13-week rat gavage study as the principal study and changes in liver and kidney weights as the critical effect for derivation of the RfD (0.2 mg/kg-day). The NOAEL was identified as 223 mg/kg-day. A composite UF of 1000 was applied to account for interspecies and intraspecies extrapolations, subchronic-to-chronic extrapolation, and limited reproductive and developmental toxicity data. The current assessment differs due to newer methodologies and consideration of additional data.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	RfD
Increased kidney weight	BMDL: 238 mg/kg-day BMD: 431 mg/kg-day	3000	0.08 mg/kg-day
13-week gavage study in rats (NTP, 1990)			

* Conversion Factors and Assumptions -- BMDL -- 95% lower confidence limit on the maximum likelihood estimate of the dose corresponding to a one standard deviation change in the mean. BMD -- Maximum likelihood estimate of the dose corresponding to a one standard deviation change in the mean.

I.A.2. Principal and Supporting Studies (Oral RfD)

No studies examining the chronic or subchronic effects of oral exposure to toluene in humans are available. A lifetime gavage study in rats (Maltoni et al., 1997) reported only carcinogenic endpoints and is, therefore, not suitable for use as the principal study for derivation of an RfD. One subchronic study (NTP, 1990) examining oral exposure to toluene in rodents (rats and mice) is available and was chosen as the principal study. The critical effect chosen is increased kidney weight. NTP (1990) exposed both sexes of F-344 rats and both sexes of B6C3F1 mice to toluene by gavage for 13 weeks. In male rats, absolute and relative weights of both the liver and kidney were significantly increased ($p < 0.05$) at doses greater than or equal to 446 mg/kg-day. Absolute kidney weights were 100, 107, 112, 119, and 113% of controls; relative kidney weights were 100, 100, 106, 114, and 146% of controls for 0, 223, 446, 900, or 1800 mg/kg-day dose levels. The study in rats established a NOAEL of 223 mg/kg-day for increases in liver and kidney weights of male rats, with a LOAEL of 446 mg/kg-day. Histopathologic lesions in the liver consisted of hepatocellular hypertrophy, occurring at doses greater than 2500 mg/kg-day. Nephrosis was observed in rats that died, and damage to the tubular epithelia of the kidney occurred in terminally sacrificed rats. Kidney sections were examined in particular for the occurrence of hyaline droplets in the proximal tubules with negative findings. Additional study information can be found in Section 4 of the Toxicological Review (U.S. EPA, 2005). A concentration-dependent nephropathy was also seen in chronic inhalation cancer bioassays (NTP, 1990; Huff, 2003). It should be noted that no increase in kidney weight was seen in the parallel study in B6C3F1 mice, indicating a species difference in the response.

The choice of increased kidney weight as the critical effect is supported by several acute oral and inhalation human toxicity studies, indicating renal tubule toxicity. One case report following lethal oral exposure to 625 mg/kg toluene (Armeno et al., 1989) and a nonlethal case report of thinner ingestion (Caravali and Bjerk, 1997) noted acute tubular necrosis and acidosis. Inhalation of high doses of toluene has caused distal renal tubular acidosis (Taher et al., 1974; Fischman and Oster, 1979) among drug users, sometimes with tubular proteinuria (Kamijima et al., 1994). A case of focal segmental glomerulosclerosis was noted for a leather worker exposed to toluene for 40 years (Bosch et al., 1988). Toluene sniffing has been associated with the formation of renal stones (Kroeger et al., 1980), proteinuria (Streichner et al., 1981), and hepato-renal damage (O'Brien et al., 1971). In addition, a case of anti-glomerular basement membrane antibody-mediated glomerulonephritis has

Estimates
- Dose-Response Data
- Additional Comments
- Discussion of
Confidence

Quantitative Estimate
of Carcinogenic Risk
from Inhalation
Exposure

- Summary of Risk
Estimates
- Dose-Response Data
- Additional Comments
- Discussion of
Confidence

EPA Documentation,
Review and Contacts

• Bibliography
• Revision History
• Synonyms

also been reported in a woman who sniffed glue for several weeks (Bonzel et al., 1987). It should be noted that several studies involving painters (Askergren, 1982; Franchini et al., 1983) or printers (Gericke et al., 2001) with toluene exposure have reported no effect on renal function. Askergren (1982) and Franchini et al. (1983) found no effect on excretion of beta-2-microglobulin, and Gericke et al. (2001) found no effect on serum creatinine levels or glomerular filtration rate. The choice of increased kidney weight as a critical effect is based on the above data and the available animal data indicating an increase in kidney weight in the same studies where overt kidney toxicity was observed at higher doses. The available data on postulated modes of action for toluene-induced kidney toxicity are described in Section 4.5.3 of the Toxicological Review (U.S. EPA, 2005).

The RfD was derived by the benchmark dose approach using EPA's (U.S. EPA, 2001) benchmark dose software (BMDS, Version 1.3). The benchmark response (BMR) was defined as the change of one control standard deviation from the control mean (U.S. EPA, 2000). Benchmark analysis was performed for absolute kidney weight changes in male rats (NTP, 1990). Male rat kidney data were chosen for BMD modeling as these data exhibited a greater response than that seen in female rats (see study description in Section 4.2.1.1 of the Toxicological Review). A BMDL of 238 mg/kg-day was derived and used as the point of departure. The BMDL corresponds to the lower bound on the dose associated with a 10% increase in individuals having a kidney weight greater than the 98th percentile of kidney weights in the control group (and the SD corresponding to 9% increase in kidney weight from control). Details of the model results are presented in Appendix B-1 of the Toxicological Review.

__I.A.3. Uncertainty and Modifying Factors (Oral RfD)

Total UF = 3000

A total uncertainty factor (UF) of 3000 was applied to this effect level: 10 for extrapolation for interspecies differences (UF_A; animal to human), 10 for consideration of intraspecies variation (UF_H; human variability), 10 for use of a subchronic study to estimate chronic effects (UF_S; duration of exposure), and 3 for database insufficiencies and contradictions in the immunotoxicity data (UF_D). The total UF = 10 x 10 x 10 x 3 = 3000.

An uncertainty factor of 10 was used to account for laboratory animal-to-human interspecies differences (UF_A). No information is available on differences or similarities in the toxicity of toluene between animals and humans.

An uncertainty factor of 10 was used to account for intraspecies differences (UF_H) including variability in susceptibility in human populations and life-stages. This UF was not reduced because of the lack of human oral exposure information.

An uncertainty factor of 10 was used to account for extrapolating from a subchronic study to estimate chronic exposure conditions (UF_S).

An uncertainty factor was not needed to account for extrapolating from a LOAEL to a NOAEL because BMD modeling was used to identify the point of departure.

An uncertainty factor of 3 was used to account for deficiencies in the toluene database. An oral subchronic study in two species is available. Neurotoxicity has been identified by inhalation studies in humans and animals as a critical endpoint. However, limited neurotoxicity studies by the oral route are available. Several oral exposure high-dose reproductive and developmental toxicity studies are available which indicate toluene does not generally elicit developmental or reproductive effects except at doses that are significantly higher than those causing other systemic effects (see Section 4.3 of the Toxicological Review for details). A two-generation reproductive toxicity study by the oral route of exposure is not available, however, a two-generation reproductive toxicity study by the inhalation route of exposure is available that possibly lends support to the oral database in that effects are noted at high concentrations. Toxicokinetic information indicates that the absorption kinetics of toluene is similar and extensive following both oral and inhalation exposure. For example, Gospe and Al-Bayali (1994) compared oral and inhalation exposures to toluene in the rat and concluded that oral dosing produces blood toluene levels that are similar to those produced by inhalation (see Section 3.1.2 of the Toxicological Review). It should be noted, however, that differences in metabolism between exposure routes have not been elucidated, nor has a role for metabolites been ascertained in the toxicity of toluene. Immunotoxicity data are available but the results are conflicting. The data to date are inadequate to draw conclusions regarding whether

immunosuppression may be a more sensitive endpoint (i.e., an endpoint that would result in a lower point of departure) than kidney toxicity.

A three-fold uncertainty factor for insufficiencies in the database was used to account for the lack of adequate data on endpoints of potential concern for toluene, including neurotoxicity, two-generation reproductive toxicity, and immunotoxicity.

The RfD for toluene was calculated as follows:

$$\begin{aligned}\text{RfD} &= \text{BMDL} \div \text{UF} \\ &= 238 \text{ mg/kg-day} \div 3000 \\ &= 0.08 \text{ mg/kg-day}\end{aligned}$$

__I.A.4. Additional Studies/Comments (Oral RfD)

A number of immunotoxicity studies are available (Hsieh et al., 1989, 1990b, 1991; Burns et al., 1994) and were considered for use as the principal study. Changes in thymus weights in the Hsieh et al. (1989) study were not considered an adverse effect since no change was observed in later studies by Hsieh et al. (1990b) and Burns et al. (1994). Additional effects on immunological endpoints were considered as a potential critical effect from toluene exposure. For example, statistically significant and dose-related decreases in antibody response were noted by Hsieh et al. (1989, 1990b, 1991). There is evidence that the PFC assay is among the most predictive tests available for immunotoxicity (Luster et al., 1992) and that suppression of the antibody response is predictive of decreased resistance to challenge with infectious agents or tumor cells (Luster et al., 1993). An important objective of the use of the PFC assay and anti-SRBC ELISA in immunotoxicity testing is to determine the ability of the immune system to respond to an antigenic challenge. As such, it tests the ability of three primary immune system cells (i.e., macrophages [phagocytosis and processing of SRBCs], T lymphocytes [which assist B lymphocytes] and B lymphocytes [production and release of anti-SRBC specific antibody]) to respond to this antigen in a coordinated manner leading to the production of antibodies to SRBC.

However, in the same test that Hsieh et al. (1989, 1990b, 1991) showed suppression of the antibody response (the PFC assay), Burns et al. (1994) did not find immunosuppression. The studies were not entirely parallel; Hsieh and Burns used different mouse strains (CD-1 and B6C3F1, respectively), examined different sexes (males and females, respectively), and utilized different exposure durations (28 vs. 14 days, respectively). Furthermore, the host resistance assays by Burns et al. (1994) indicated a lack of immunotoxicity when animals treated with toluene were challenged. Host resistance to challenges with *Listeria monocytogenes*, *Streptococcus pneumoniae*, *Plasmodium yoelii*, or B16F10 melanoma was not affected at a dose of 600 mg/kg-day for 14 days. In addition, a reduced incidence of tumors was observed in mice that were challenged with PYB6 fibrosarcoma. Stefanovic et al. (1987) found no significant changes in immunoglobulin levels after toluene treatment of human sera and also showed no changes in the complement activity parameters studied in the toluene treated sera. The conflicting data between the Hsieh and Burns studies and the lack of suppression of host resistance present an unclear picture of toluene immunotoxicity. For these reasons, immunotoxic endpoints alone are not considered critical effects.

Additional studies by Hsieh et al. (1990a,c) found statistically significant increases in a variety of brain neurotransmitter levels at exposure levels as low as 5 mg/kg-day. The study authors measured levels at one time point immediately at the termination of toluene treatment; it cannot be determined if the effects observed were persistent. Neurotoxicity studies from oral exposure to toluene have not been performed; therefore, the changes in neurotransmitter levels have not been correlated with behavioral, neuropsychological, or neuroanatomical changes and were not considered further. Available reproductive studies (Gospe et al., 1994, 1996; Gospe and Zhou, 1998, 2000) were conducted at higher doses than those used in the studies described above with minimal effects on dams and offspring and, as such, were not considered for the choice of principal study.

For more detail on Susceptible Populations, exit to the toxicological review, Section 4.7 (PDF).

__I.A.5. Confidence in the Oral RfD

Study – Medium
Database – Medium
RfD – Medium

The overall confidence in the RfD assessment is medium. Confidence in the principal study is medium. It is an adequate gavage study of subchronic duration. Confidence in the database is rated medium due to the lack of chronic data, neurotoxicity studies, and a two-generation reproductive toxicity study, and uncertainty surrounding the immunotoxicity of toluene. An oral subchronic study in two species and several immunotoxicity studies are available. A number of oral and inhalation studies have demonstrated that toluene does not elicit developmental or reproductive effects except at doses that are significantly higher than those causing other systemic effects. The available toxicokinetic data indicate the absorption of toluene is similar and extensive following both oral and inhalation exposure. A two-generation reproductive inhalation toxicity study is available which lends support to the oral database in that effects are noted only at high concentrations.

For more detail on Characterization of Hazard and Dose Response, exit to the [toxicological review, Section 6 \(PDF\)](#).

I.A.6. EPA Documentation and Review of the Oral RfD

Source Document -- U.S. EPA (2005)

This assessment was peer reviewed by a group of external scientists. Comments from the peer reviewers were evaluated carefully and considered by the Agency during the finalization of this assessment. A record of these comments is included in Appendix A of the Toxicological Review of Toluene (U.S. EPA, 2005). To review this appendix, exit to the [toxicological review, Appendix A, Summary of External Peer Review and Public Comments and Disposition \(PDF\)](#)

Agency Completion Date -- 08/26/2005

I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202) 566-1676 (phone), (202) 566-1749 (fax), or hotline.iris@epa.gov (email address).

[Back to top](#)

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name -- Toluene
CASRN -- 108-88-3
Section I.B Last Revised -- 09/23/2005

The RfC is an estimate of an inhalation exposure, for a given duration, to the human population (including susceptible subgroups) that is likely to be without an appreciable risk of adverse health effects over a lifetime. It is derived from a statistical lower confidence limit on the benchmark concentration (BMCL), a no-observed-adverse-effect level (NOAEL), a lowest-observed-adverse-effect level (LOAEL), or another suitable point of departure, with uncertainty/variability factors applied to reflect limitations of the data used. The RfC considers toxic effects for both the respiratory system (portal-of-entry) and for effects peripheral to the respiratory system (extrarrespiratory effects). The inhalation RfC (generally expressed in units of mg/m³) is analogous to the oral RfD and is similarly intended for use in risk assessments for health effects known or assumed to be produced through a nonlinear (possibly threshold) mode of action.

Inhalation RfCs are derived according to *Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry* (U.S. EPA, 1994). Since RfCs can also be derived for the noncarcinogenic health effects of substances that are carcinogens, it is essential to refer to other sources of information concerning the carcinogenicity of this chemical substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

The previous IRIS assessment utilized the Foo et al. (1990) occupational study as the principal study and neurological effects as the critical effect for the derivation of the RfC (0.4 mg/m³). The LOAEL was identified as 332 mg/m³ (88 ppm), which was converted to a human equivalent concentration of 119 mg/m³. A composite UF of 300 was used that consisted of a 10-fold UF for intraspecies

variability, a 10-fold UF for the use of a LOAEL instead of a NOAEL, and a three-fold UF for database deficiencies, including a lack of animal exposure data evaluating neurotoxicity and respiratory irritation. The current IRIS assessment takes into account a number of newer human studies that are available and incorporates newer methodologies.

I.B.1. Inhalation RfC Summary

Critical Effect	Experimental Doses*	UF	RfC
Neurological effects in occupationally-exposed workers	NOAEL (average): 34 ppm (128 mg/m ³) NOAEL (ADJ): 46 mg/m ³	10	5 mg/m ³

Multiple human studies (see Table 1 and Figure 1).

*Conversion Factors and Assumptions -- See Table 1 for a list of studies used in the derivation of the RfC. Assuming 25 °C and 760 mm Hg, NOAEL (average) (mg/m³) = 34 ppm × 92.15/24.45 = 128 mg/m³. This is an extrarrespiratory effect of a soluble vapor. The NOAEL (HEC) is based on an 8-hour TWA occupational exposure. MVho = 10 m³/day, MVh = 20 m³/day. NOAEL (HEC) = NOAEL (ADJ) = 128 × MVho/MVh × 5 days/7 days = 46 mg/m³.

I.B.2. Principal and Supporting Studies (Inhalation RfC)

A substantial database examining the effects of toluene in subchronic and chronic occupationally exposed humans exists. The weight of evidence from these studies indicates neurologic effects (i.e., impaired color vision, impaired hearing, decreased performance in neurobehavioral analysis, changes in motor and sensory nerve conduction velocity, headache, dizziness) as the most sensitive endpoint. Numerous case studies in humans exposed to high concentrations of toluene for abusive purposes have also indicated neurological effects in adults as critical effects of concern. Human studies indicating the potential for adverse effects from toluene exposure other than neurological effects are also available. None of these studies indicated effects at doses lower than those observed for neurological effects. Animal studies (NTP, 1990) have also suggested respiratory irritation as a sensitive effect, but this effect in humans appears to occur at higher exposure concentrations than those resulting in neurologic effects.

All of the available occupational studies were considered for the principal study upon which to base the derivation of the RfC. A discussion of available animal studies is presented in Section I.B.4. Numerous human studies have identified NOAELs in the range of 25-50 ppm toluene for individual neurological effects (Cavalleri et al., 2000; Eller et al., 1999; Nakatsuka et al., 1992; Neubert et al., 2001; Schaper et al., 2003; Zavalic et al., 1998a; Zupanec et al., 2002). These studies were designed to measure effects on subjective symptoms (e.g., headache, dizziness), color vision, neurological and psychomotor functioning, and hearing. Several studies have shown statistically significant effects in workers in the range of 83-132 ppm on at least one of the following neurological effects: color vision, auditory evoked brain potentials, neurobehavioral parameters, and neurological functioning (Abbate et al., 1993; Boey et al., 1997; Eller et al., 1999; Foo et al., 1990; Neubert et al., 2001; Vrca et al., 1995, 1996, 1997; Zavalic et al., 1998a).

As a whole, the available studies present a substantial body of evidence in humans indicating a relationship between neurological effects and toluene exposure at the lowest occupational exposure levels measured. No single study stands out as the best study on which to characterize neurological effects nor to specify a single critical effect. Thus, in lieu of selecting one study as the principal study, a review of the human database indicated ten studies can be considered adequate. The determination of study adequacy was based on the use of accepted testing procedures for neurological endpoints, chronic exposure duration, inclusion of a measure of exposure, comparison to defined control groups, and no known co-exposure to other solvents in the workplace. Figure 1 and Table 1 summarizes this subset of studies. Response levels of the adequate studies are identified in Table 1 and are calculated as the difference between the reported means from the exposure and reference groups for statistically significant outcomes. This subset of studies presents a cluster of NOAELs for neurological effects which are generally below reported LOAELs for all endpoints. A deficit in neurological function was chosen as the critical effect based on this suite of neurological studies due to the overall preponderance of evidence for this endpoint at low doses.

Potential limitations associated with the studies that were considered adequate are included in Table

1. For additional discussion of the limitations and uncertainties associated with studies that were considered adequate, see Sections 4.1.2.2, 4.5.3 and Appendix A of the Toxicological Review (U.S. EPA, 2005). Not included in the subset are studies with known co-exposure to other solvents (Antti-Poika et al., 1985; Yin et al., 1987; Campagna et al., 2001), studies lacking adequate exposure information (Antti-Poika et al., 1985; Murata et al., 1993), studies without a reference group (Muttray et al., 1995; Morata et al., 1997; Schaper et al., 2003; Tanaka et al., 2003), and studies where questionnaires were the only assessment of toxicity or exposure (Lee et al., 1988; Zupanec et al., 2002; Seeber et al., 2004). These studies contribute qualitatively to the overall weight of evidence of the choice of critical effect but are given lesser weight due to the inadequacies described. Orbaek and Nise (1989) was not included in the subset of studies due to the low number of workers tested and uncertainty in the exposure levels. Chouaniere et al. (2002) observed effects on psychomotor performance at doses of 25 and 40 ppm but the doses were estimated based on test results precluding the use of this study for quantitative purposes.

Figure 1. Summary of NOAELs/LOAELs for neurological endpoints for a subset of occupational studies of chronic inhalation exposure to toluene.

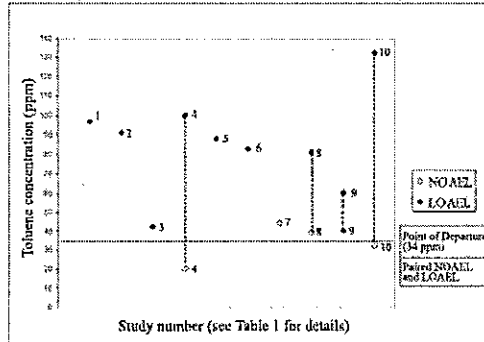


Table 1. Selected subset of occupational studies of neurological effects from toluene inhalation

Study number in Figure 1 and reference	Number of workers and duration of exposure (average years $\pm$ SD)	NOAEL (ppm)	LOAEL (ppm)	Effect/test	Response level at the LOAEL (statistically significant response compared to controls) ^a	Noted potential limitations
1. Abbate et al., 1993	Reference (n=40), exposed (n=40) (12-14 years; no SD reported)	None ^b	97	Brainstem response auditory-evoked potential	28% increase of the latency shift for wave-I during passage from 11 to 90 repetitions.	
2. Boey et al., 1997	Reference (n = 29) exposed (n = 29) (4.9 $\pm$ 3.5 years;	None	91	Neuropsychological examination; digit span, visual reproduction, Benton visual retention test, trail making test, symbol digit modality test,	Increased time to complete the grooved pegboard test 7% and 6% for dominant and non-dominant hands	Control workers were exposed to 12 ppm toluene

	range of 1-13 years)			grooved pegboard test, and finger tapping tests	respectively, increase in time to complete trail-making test parts A&B, 31% & 28%, respectively; 15% decrease in backward digit span test; 12% and 10% decrease in symbol digit modality test for written and oral sections, respectively.	
3. Cavalleri et al., 2000	Reference (n=16), exposed (n=33) (9.75 years; no SD reported)	None	42	Color vision impairment (Lanthony D-15)	29% increase in CCI and 49% increase in total confusion index (TOCI) (reported as mean of both eyes).	Exposure measured from urinary excretion of toluene: on the basis of previous data, air concentrations estimated to be 42 ppm.
4. Eller et al., 1999	Reference (n=19), low exposure (n=30), high exposure (n=49) low exposure (1-12 years; no SD reported) high exposure (>12 years)	20	>100	Neuropsychological examination (Cognitive Function Scanner); verbal and nonverbal learning and memory, visuomotor function, computerized neurological examination (CATSYS, TREMOR, and SWAY), subjective assessment	13% increase in performance time on Bourdon Wiersma Test but no increase in the number of missed or incorrect detections; 33% of exposed population reported concentration difficulties.	The high exposure classification was based on historical exposures which may have exceeded 100 ppm for up to 27 years.
5. Foo et al., 1990	Reference (n=30), exposed (n=30) (5.7 $\pm$ 3.2 years)	None	88	Neurobehavioral tests: Benton visual retention test, visual reproduction, trail making, grooved pegboard, digit span, digit symbol, finger tapping, and simple reaction time	Increased time to complete the trail-making test parts A&B, 51% & 63%, respectively; 25% decrease in digit symbol test performance; 16% decrease in total digit span test scores (both forward and backward).	Control workers were exposed to 13 ppm toluene for 2.5 $\pm$ 3.2 years. The education level was lower in the exposed group. As a result, data from the neurobehavioral tests were adjusted for years of education using a generalized linear model.
6. Murata	Reference	None	83	Electrophysiological	9% reduction	Exposed

et al., 1993	(n=10), exposed (n=10) (11 years; range of 1-36 years; no SD reported)			analysis of maximal motor and sensory nerve conduction velocity (MCV & SCV)	in the MCV in the forearm and 6% reduction in the SCV in the palm.	workers were matched for age but not alcohol consumption.
7. Nakatsuka et al., 1992	Reference (n=120), exposed (n=174)	44-48	None	Color vision impairment (Lanthony's new color test and Ishihara's color vision test)	No measured effect on color vision.	In lieu of determining exposure duration, groups were age-matched to control for effects of aging on color vision.
8. Neubert et al., 2001	Ref-ex (n=109), ref-int (n=48), exp gp I (n=316), exp gp II (n=535), exp gp III (n=308), exp gp IV (n=65)	39 (exp gp I)	81 (ex gp IV)	Psychophysiological and psychomotor testing: verbal memory span, visuomotor performance, immediate visual memory, self-rating of feeling, biosensory vigilance, critical flicker fusion frequency test, personality dispositions	5% reduction in ascending flicker fusion frequency.	Exposure was identified as chronic but the duration was not reported.
9. Vrca et al., 1995	Reference (n=59), exposed (n=49) (21.4 ± 7.4 years)	None	40-60	Visual evoked potentials	The amplitudes of visual evoked brain potentials were 24, 43, and 55% higher for N75, P100, and N145, respectively.	Exposure levels were estimated based on urinary levels of metabolites and toluene levels in blood.
10. Zavalic et al., 1998a	Reference (n=90), low exposure (n=46), high exposure (n=37) low exposure (16.21 ± 6.1 years) high exposure (18.34 ± 6.03 years)	32	132	Color vision impairment (Lanthony D-15)	10-14% increase in CCI (both eyes).	The results from this investigation were reported in several publications (Zavalic et al., 1998a,b,c); some reporting discrepancies exist regarding the number of workers in the exposed and control groups and the statistical analyses.

^a Not all studies examined all neurotoxicity endpoints.

^b No NOAEL identified in this study.

The subset of studies shown in Figure 1 were weighted equally since none was clearly a stronger study. The highest NOAEL was identified as 44 ppm (Nakatsuka et al., 1992). The lowest LOAELs were identified as 40-42 ppm (Vrca et al., 1995, 1997; Cavallieri et al., 2000). An arithmetic mean of the NOAEL values in Table 1 was chosen to represent an average point of departure. Thus, the average exposure level of 34 ppm is used as the point of departure for the derivation of the RfC. This value is lower than the LOAELs identified above. The range of NOAELs for the suite of neurological effects is 20 to 48 ppm. The average NOAEL is used as a surrogate given concerns about the use of a particular individual NOAEL based on the discussion in Section 5.2.1 of the Toxicological Review (U.S. EPA, 2005). There is some uncertainty in using an average value from a suite of studies with varied endpoints and varied levels of response for the point of departure. However, the uncertainty is expected to be less than that associated with choosing any particular one of the available studies for deriving the point of departure since there were potential limitations associated with many of the available studies and no single study stands out as being of the highest quality. Furthermore, this subset of studies presents a cluster of NOAELs for neurological effects which are generally below reported LOAELs for all endpoints.

The NOAEL (average) of 34 ppm (128 mg/m³) was adjusted from an occupational exposure scenario to continuous exposure conditions as follows:

$$\begin{aligned}\text{NOAEL (adj)} &= \text{NOAEL (average)} \times \text{VEho/VEh} \times 5 \text{ days/7 days} \\ &= 128 \text{ mg/m}^3 \times 10 \text{ m}^3/20 \text{ m}^3 \times 5 \text{ days/7 days} \\ &= 46 \text{ mg/m}^3\end{aligned}$$

Where:

VEho = human occupational default minute volume (10 m³ breathed during the 8 hour workday)

VEh = human ambient default minute volume (20 m³ breathed during the entire day)

1.B.3. Uncertainty and Modifying Factors (Inhalation RfC)

UF = 10

A total uncertainty factor of 10 was applied to the adjusted average NOAEL (i.e., 10 for consideration of intraspecies variation). A 10-fold uncertainty factor for intraspecies differences (UF_i) was used to account for potentially susceptible human subpopulations and lifestyles. This 10-fold uncertainty factor includes consideration of the Pelekis et al. (2001) model employing pharmacokinetic information to derive a chemical-specific intraspecies UF for toluene that accounts for childhood exposure only. Their analysis suggests an informed quantitation of adult-to-child variability reported to be in the 3-fold range. The Pelekis model is based on the pharmacokinetic differences between adults and children. However, differences in human susceptibility may also be due to lifestyle (e.g., advanced age) differences among the adult population, genetic polymorphisms, decreased renal clearance in disease states, and unknown pharmacodynamic variations in response to toluene exposure. Since the variability defined in the Pelekis model may not account for these additional differences in pharmacokinetics and pharmacodynamics, a full factor of 10 is used.

An uncertainty factor to account for laboratory animal-to-human interspecies differences (UF_A) was not necessary because the point of departure is based on human exposure data.

An uncertainty factor to account for extrapolating from less than chronic results (UF_S) was not necessary. Most of the studies used in the analysis were of chronic duration.

An uncertainty factor was not needed to account for extrapolating from a LOAEL to a NOAEL because a surrogate NOAEL, i.e., an average NOAEL from a subset of studies, was used to derive the point of departure.

The database for inhalation exposure to toluene is considered adequate. Numerous human and animal chronic and subchronic studies are available. Animal studies have demonstrated reproductive and developmental effects of toluene at exposure levels higher than those used for the determination of the point of departure. In addition, neurotoxicity studies and a two-generation reproductive toxicity study are available. There is some uncertainty regarding potential immunological effects of toluene via the inhalation route of exposure. These uncertainties arise from the conflicting immunotoxicity data on toluene following oral exposure in animal studies (see Sections 4.2.1.1 and 5.1.1 of the Toxicological Review for study descriptions). Two studies on immunologic effects following inhalation

exposure are available. Stengel et al. (1998) assessed several immunological parameters in blood following chronic occupational exposure to 50 ppm toluene but no statistically significant effects were observed. Aranyi et al. (1985) examined the effects of inhalation exposure to toluene on pulmonary host defenses in animals and found transient effects at low doses with a lack of a dose-response relationship. These results indicate additional research may be needed to further evaluate the potential immunological effects of toluene by the inhalation route of exposure but do not warrant an uncertainty factor at this time. A database uncertainty factor is not considered necessary.

I.B.4. Additional Studies/Comments (Inhalation RfC)

A number of animal studies have examined the neurological effects of inhaled toluene. These studies were generally carried out at high doses and reported impaired responses in neurologic examinations. For example, Rebert et al. (1989a,b) reported abnormal flash-evoked potentials in rats exposed to a single inhalation exposure of 500-16,000 ppm toluene. Evoked potentials reflect the function of the nervous system. Increases in latencies in evoked potentials can reflect deficits in nerve conduction and are indicators of a potential neurotoxic effect. Wood et al. (1983) exposed rats to toluene levels up to 3000 ppm for 4 hours prior to behavioral evaluation and reported that toluene reduced performance in behavioral tests, particularly at the 1780 and 3000 ppm exposure levels. Von Euler et al. (2000) exposed 30 rats to 80 ppm toluene for 4 weeks and found a selective decrease of approximately 6% in the area of the parietal cortex by magnetic resonance imaging. Autoradiographic analysis revealed a 7-10% decrease of the cerebrocortical area. Inhalation exposure to toluene has also been shown to result in irreversible high-frequency hearing loss in rats. Pryor et al. (1984) evaluated hearing loss by a behavioral technique (avoidance response elicited to an auditory signal) and brainstem auditory-evoked responses (elicited by tone pips of differing loudness and frequency and detected by subdural scalp electrodes). Hearing loss, as measured by both techniques, was observed after as few as 2 weeks of exposure to 1000 ppm toluene for 14 hours/day. Hearing loss was irreversible, as evidenced by a failure to return to normal response after 3 months of recovery.

In addition to neurologic effects in humans, the previous RfC on the IRIS database was based on irritation of the upper respiratory tract, specifically the nasal epithelium, as reported in the chronic NTP (1990) study in rats. However, these effects occurred in rats exposed to high concentrations (600 ppm or greater) of toluene and did not show an appreciable increase with increasing concentration (i.e., the incidence of the lesions was greater at 600 ppm than at 1200 ppm). Support that the nasal lesions are a high-exposure phenomenon also comes from the results of a chronic inhalation study in rats performed by CIIT (1980), which reported no effects on the nasal epithelium of animals exposed to 300 ppm toluene. A 28-day inhalation study in rats (30 and 300 ppm) likewise failed to demonstrate treatment-related lesions in the nasal epithelium (Poon et al., 1994). Acute studies in humans have demonstrated that subjective reports of irritation of the nose and/or eyes occurs at exposure levels of 100 ppm or greater (Baelum et al., 1985, 1990; Echeverria et al., 1989; Andersen et al., 1983) but not at exposures below 100 ppm (Echeverria et al., 1989; Andersen et al., 1983). Because neurologic effects are a more sensitive endpoint for exposed humans, neurologic deficits were selected as the critical endpoint in this assessment.

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.7 \(PDF\)](#).

I.B.5. Confidence in the Inhalation RfC

Study -- High
Database -- High
RfC -- High

The overall confidence in this RfC assessment is high. Confidence in the database is high. Many chronic studies in humans are available. In addition, numerous animal studies on the reproductive and developmental effects of toluene exist, which identify these effects as occurring at doses higher than that identified as the point of departure. No single study was chosen as the principal study, however, a subset of studies were considered adequate for the determination of the RfC. The overall study confidence is high.

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#).

I.B.5. EPA Documentation and Review of the Inhalation RfC

Source Document -- U.S. EPA (2005)

This assessment was peer reviewed by a group of external scientists. Comments from the peer reviewers were evaluated carefully and considered by the Agency during the finalization of this assessment. A record of these comments is included in Appendix A of the Toxicological Review of Toluene (U.S. EPA, 2005). [To review this appendix, exit to the toxicological review, Appendix A, Summary of External Peer Review and Public Comments and Disposition \(PDF\)](#)

Agency Completion Date -- 08/26/2005

I.B.7. EPA Contacts (Inhalation RfC)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202) 566-1676 (phone), (202) 566-1749 (fax), or hotline.iris@epa.gov (email address).

[Back to top](#)

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name -- Toluene

CASRN -- 108-88-3

Section II. Last Revised -- 09/23/2005

This section provides information on three aspects of the carcinogenic assessment for the substance in question: the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral and inhalation exposure. Users are referred to Section I of this file for information on long-term toxic effects other than carcinogenicity.

The rationale and methods used to develop the carcinogenicity information in IRIS are described in the *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005). The quantitative risk estimates are derived from the application of a low-dose extrapolation procedure, and are presented in two ways to better facilitate their use. First, route-specific risk values are presented. The "oral slope factor" is an upper bound on the estimate of risk per mg/kg-day of oral exposure. Similarly, a "unit risk" is an upper bound on the estimate of risk per unit of concentration, either per µg/L drinking water (see Section II.B.1.) or per µg/m³ air breathed (see Section II.C.1.). Second, the estimated concentration of the chemical substance in drinking water or air when associated with cancer risks of 1 in 10,000, 1 in 100,000, or 1 in 1,000,000 is also provided.

II.A. Evidence for Human Carcinogenicity

II.A.1. Weight-of-Evidence Characterization

Under the *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005), *there is inadequate information to assess the carcinogenic potential of toluene* because studies of humans chronically exposed to toluene are inconclusive, toluene was not carcinogenic in adequate inhalation cancer bioassays of rats and mice exposed for life (CIIT, 1980; NTP, 1990; Huff, 2003), and increased incidences of mammary cancer and leukemia were reported in a lifetime rat oral bioassay at a dose level of 500 mg/kg-day but not at 800 mg/kg-day (Maltoni et al., 1997). In the NTP (1990) and Huff (2003) studies, no neoplasms were noted in male rats, and one nasal, two kidney, and two forestomach neoplasms observed in female rats were considered not to be associated with toluene exposure. No increase in the incidence of neoplasms was observed in mice. Toluene has generally not been genotoxic in short-term testing protocols. The previous IRIS assessment classified toluene as Group D (*not classifiable as to human carcinogenicity*) under the *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 1986) based on inadequate data on the carcinogenicity of toluene in humans and inadequate evidence of carcinogenicity in animals. Toluene is not included in the *10th Report on Carcinogens* (NTP, 2002). IARC has classified toluene as Group 3 (*not classifiable as to its carcinogenicity in humans*) with a supporting statement that there is inadequate evidence in humans and evidence suggesting a lack of carcinogenicity of toluene in experimental animals (IARC, 1999).

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological](#)

[review, Section 6 \(PDF\).](#)

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.7 \(PDF\)](#).

II.A.2. Human Carcinogenicity Data

Available studies in toluene-exposed workers have reported very limited or no evidence suggesting carcinogenic effects of toluene exposure (Anttila et al., 1998; Svensson et al., 1990; Wiebelt and Becker, 1999). A cohort mortality study in toluene-exposed workers (Wiebelt and Becker, 1999) did not report an increase in cancer-specific mortality for the entire cohort. A subcohort of highly-exposed workers demonstrated statistically significant increases in mortality from cancers of the bone and connective tissue, but lack of exposure characterization, co-exposure information, and categorization of and adjustment for other confounding factors (age, smoking, etc.) within the subcohort precludes drawing conclusions from these results as to the possible association between toluene exposure and cancer risk. Svensson et al. (1990) similarly did not report increased cancer-specific mortality among rotogravure printers. While an increase in tumors of the respiratory tract was reported, this increase was not statistically significant when only subjects with exposure periods of five years or more were examined, and no dose-response relationships were present for tumor incidence. Anttila et al. (1998) carried out a retrospective cohort analysis of 5301 workers monitored for biological markers of occupational exposure to styrene, toluene, or xylene; no significantly increased incidence rates of cancer could be associated with toluene exposure. Other studies examining the carcinogenicity of toluene in occupationally exposed humans have failed to adequately account for co-exposure to other compounds.

II.A.3. Animal Carcinogenicity Data

NTP (1990) and Huff (2003) have conducted a 2-year inhalation carcinogenicity study in F-344 rats and B6C3F1 mice and found no evidence for carcinogenicity in either sex of either species at exposure levels up to 1200 ppm. Another inhalation carcinogenicity study in F-344 rats (CIT, 1980; Gibson and Hardisty, 1983) likewise reported no evidence for carcinogenic effects of toluene at exposure levels up to 300 ppm. A lifetime carcinogenicity study in Sprague-Dawley rats by the oral route (Maltoni et al., 1997) was suggestive of potential carcinogenic effects of toluene, but the dose-response relationships were not well defined (i.e., the 500 mg/kg animals had considerably more tumors than those in the 800 mg/kg group) and study details were inadequately reported.

II.A.4. Supporting Data for Carcinogenicity

Available studies examining the genotoxic effects of toluene have generally reported negative results. Toluene was found to be nonmutagenic in reverse mutation assays with *S. typhimurium* (Mortelmans and Riccio, 1980; Nestmann et al., 1980; Bos et al., 1981; Litton Bionetics, Inc., 1981; Snow et al., 1981; Connor et al., 1985; Nakamura et al., 1987; NTP, 1990) and *E. coli* (Fluck et al., 1976; Mortelmans and Riccio, 1980) with and without metabolic activation. Toluene did not induce mitotic gene conversion (Litton Bionetics, Inc., 1981; Mortelmans and Riccio, 1980) or mitotic crossing over (Mortelmans and Riccio, 1980) in *S. cerevisiae*. Although Litton Bionetics, Inc. (1981) reported that toluene did not cause increased chromosomal aberrations in bone marrow cells, several Russian studies (Lyapkalo, 1973; Dobrokhotov and Enikeev, 1977) report toluene as effective in causing chromosomal damage in bone marrow cells of rats. There was no evidence of chromosomal aberrations in blood lymphocytes of workers exposed to toluene only (Forni et al., 1971; Maki-Paakkanen et al., 1980), although a slight increase was noted in workers co-exposed to toluene and benzene (Forni et al., 1971; Funes-Craviola et al., 1977). This finding is supported by studies of cultured human lymphocytes exposed to toluene in vitro; no elevation of chromosomal aberrations or sister chromatid exchanges was observed (Gerner-Smith and Friedrich, 1978).

[Back to top](#)

II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure

Not applicable. Data are inadequate for an assessment of human carcinogenic potential.

[Back to top](#)

II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure

Not applicable. Data are inadequate for an assessment of human carcinogenic potential.

[Back to top](#)

II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)

II.D.1. EPA Documentation

Source Document -- U.S. EPA (2005)

This assessment was peer reviewed by a group of external scientists. Comments from the peer reviewers were evaluated carefully and considered by the Agency during the finalization of this assessment. A record of these comments is included in Appendix A of the Toxicological Review of Toluene (U.S. EPA, 2005). [To review this appendix, exit to the toxicological review, Appendix A, Summary of External Peer Review and Public Comments and Disposition \(PDF\).](#)

II.D.2. EPA Review (Carcinogenicity Assessment)

Agency Completion Date -- 8/26/2005

II.D.3. EPA Contacts (Carcinogenicity Assessment)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202) 566-1676 (phone), (202) 566-1749 (fax), or holiine.iris@epa.gov (email address).

[Back to top](#)

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name -- Toluene
CASRN -- 108-88-3
Section V.I. Last Revised -- 09/23/2005

VI.A. Oral RfD References

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[Back to top](#)

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[Back to top](#)

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[Back to top](#)

VII. Revision History

Substance Name -- Toluene
CASRN -- 108-88-3
File First On-Line 01/31/1987

Date	Section	Description
03/01/1988	I.A.4.	Text revised
09/07/1988	II.	Carcinogen summary on-line
02/01/1989	II.D.3.	Secondary contact's phone number corrected
07/01/1989	I.B.	Inhalation RfD now under review
03/01/1990	VI.	Bibliography on-line
04/01/1990	VI.C.	Combs et al., 1973 citation corrected
06/01/1990	IV.A.1.	Area code for EPA contact corrected
06/01/1990	IV.F.1.	EPA contact changed
07/01/1990	I.A.	Withdrawn; new RfD verified (in preparation)
07/01/1990	VI.A.	Oral RfD references withdrawn
08/01/1990	I.A.	Oral RfD summary replaced; RfD changed
08/01/1990	II.	Text edited
08/01/1990	VI.A.	Oral RfD references revised
09/01/1990	III.A.	Health Advisory on-line
09/01/1990	VI.D.	Health Advisory references added
08/01/1991	VI.C.	Litton Bionetics, Inc., 1981 reference title clarified
01/01/1992	IV.	Regulatory actions updated
04/01/1992	IV.A.1.	CAA regulatory action withdrawn

08/01/1992	I.B.	Inhalation RfC on-line
08/01/1992	VI.B.	Inhalation references on-line
02/01/1994	II.D.3.	Secondary contact's phone number changed
04/01/1994	IA.7.	Primary contact changed
04/01/1997	III., IV., V.	Drinking Water Health Advisories, EPA Regulatory Actions, and Supplementary Data were removed from IRIS on or before April 1997. IRIS users were directed to the appropriate EPA Program Offices for this information.
02/22/2001	I., II.	This chemical is being reassessed under the IRIS Program.
09/23/2005	I., II., VI.	New RID, RfC, and cancer assessment.

[Back to top](#)

VIII. Synonyms

Substance Name -- Toluene
CASRN -- 108-88-3
Section VIII Last Revised -- 09/23/2005

108-88-3
ANTISAL 1a
BENZENE, METHYL
METHACIDE
METHYLBENZENE
METHYLBENZOL
MONOMETHYLBENZENE
NCI-C07272
PHENYLMETHANE
RCRA WASTE NUMBER U220
TOLUEEN
TOLUEN
Toluene
TOLUOL
TOLUOLO
TOLU-SOL
UN 1294

Note: A TOXICOLOGICAL REVIEW is available for this chemical in Adobe® PDF format (179 Pages, 1.8M). Similar documents can be found in the [List of Available IRIS Toxicological Reviews](#).

* You will need Adobe Acrobat Reader, available as a free download, to view some of the files on this page. See [EPA's PDF page](#) to learn more about PDF, and for a link to the free Acrobat Reader.

[Back to top](#)

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URL: <http://www.epa.gov/iris/subst/0118.htm#23reforad>



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Xylenes (CASRN 1330-20-7)

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☐ Entire IRIS Website

MAIN CONTENTS

Reference Dose for Chronic Oral Exposure (RfD)

Note: A TOXICOLOGICAL REVIEW is available for this chemical in Adobe® PDF format (113 Pages, 498 Kbytes). Similar documents can be found in the [List of Available IRIS Toxicological Reviews](#).

Links to specific pages in the toxicological review are available throughout this summary. To utilize this feature, your Web browser and Adobe program must be configured properly so the PDF displays within the browser window. If your browser and Adobe program need configuration, please go to the [IRIS Help](#) page for instructions.

0270

Xylenes; CASRN 1330-20-7

Health assessment information on a chemical substance is included in IRIS only after a comprehensive review of chronic toxicity data by U.S. EPA health scientists from several Program Offices and the Office of Research and Development. The summaries presented in Sections I and II represent a consensus reached in the review process. Background information and explanations of the methods used to derive the values given in IRIS are provided in the Background Documents.

STATUS OF DATA FOR Xylenes

File First On-Line 09/30/1987

Category (section)	Status	Last Revised
Oral RfD Assessment (I.A.)	on-line	02/21/2003
Inhalation RfC Assessment (I.B.)	on-line	02/21/2003
Carcinogenicity Assessment (II.)	on-line	02/21/2003

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name -- Xylenes
CASRN -- 1330-20-7
Last Revised -- 02/21/2003

The oral Reference Dose (RfD) is based on the assumption that thresholds generally exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of

Chronic Health
Hazards for Non-
Carcinogenic Effects

Reference Dose for
Chronic Oral Exposure
(RfD)

- Oral RfD Summary
- Principal and Supporting Studies
- Uncertainty and Modifying Factors
- Additional Studies/Comments
- Confidence in the Oral RfD
- EPA Documentation and Review

Reference
Concentration for
Chronic Inhalation
Exposure (RfC)

- Inhalation RfC Summary
- Principal and Supporting Studies
- Uncertainty and Modifying Factors
- Additional Studies/Comments
- Confidence in the Inhalation RfC
- EPA Documentation and Review

Carcinogenicity
Assessment for
Lifetime Exposure

Evidence for Human
Carcinogenicity

- Weight of Evidence Characterization
- Human Carcinogenicity Data
- Animal Carcinogenicity Data
- Supporting Data for Carcinogenicity

Quantitative Estimate
of Carcinogenic Risk
from Oral Exposure

- Summary of Risk

these concepts. RfDs can also be derived for the noncarcinogenic health effects of substances that are also carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

The RfD in this updated assessment replaces a previous RfD value of 2 mg/kg-day. The previous and new RfD values are based on the same principal study (NTP, 1986). A database uncertainty factor (UF) was not considered in the derivation of the previous RfD.

The term xylenes refers to mixtures of the three xylene isomers (o-, m-, p-) and ethylbenzene. m-Xylene is commonly the predominant component (40–77%) in commercial preparations of xylenes (also referred to as mixed xylenes), with the other components each comprising roughly up to 20% of the mass. The use of xylenes as a solvent, in paints and coatings, and in gasoline is widespread. For the most part, studies cited in this assessment are conducted on mixed xylenes. Results from studies comparing the toxicity of individual xylene isomers indicate that differences, when they occur, are specific to the endpoint under consideration (see Section 4.4.3 of the Toxicological Review for more information).

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Decreased body weight, increased mortality	NOAEL: 250 mg/kg-day (179 mg/kg-day)*	1000	1	0.2 mg/kg-day
Chronic F344/N rat study Oral gavage exposure	LOAEL: 500 mg/kg-day			

(NTP, 1986)

*Conversion Factors and Assumptions -- 250 mg/kg-day x 5 days/7 days = 179 mg/kg-day.

I.A.2. Principal and Supporting Studies (Oral RfD)

The National Toxicology Program's 2-year study in rats was selected as the principal study and the subchronic toxicity studies in rats by Wolfe (1988a, b) as supporting studies. In the NTP (1986) study, groups of 50 male and 50 female Fischer 344 rats and 50 male and 50 female B6C3F1 mice were administered mixed xylenes (60% m-xylene, 13.6% p-xylene, 9.1% o-xylene, 17.0% ethylbenzene) in corn oil by gavage at doses of 0, 250, or 500 mg/kg-day (rats) and 0, 500, or 1000 mg/kg-day (mice) for 5 days per week for 103 weeks. Necropsy and histologic examinations were performed on all animals. Tissues were examined for gross lesions and masses. The tissues examined included mandibular lymph nodes, salivary gland, femur (including marrow), thyroid gland, parathyroids, small intestine, colon, liver, prostate/testis or ovaries/uterus, heart, esophagus, stomach, brain, thymus, trachea, pancreas, spleen, skin, lungs and mainstem bronchi, kidneys, adrenal glands, urinary bladder, pituitary gland, eyes (if grossly abnormal), and mammary gland. Hematology and clinical chemistry analyses were not conducted.

Effects of exposure in rats were limited to decreased body weight and decreased survival in high-dose (500 mg/kg-day) males. Mean body weights were 5–8% lower in high-dose male rats than in controls from week 59 to week 97, with body weights at 103 weeks being 4% less in high-dose males than in controls (statistical significance not reported). Male rat survival rates after 103 weeks showed a dose-related decrease (36/50, 25/50, and 20/50 for the control, low-, and high-dose males, respectively). A life-table trend test for decreased survival incidence with increasing dose was statistically significant ($p=0.033$). Pair-wise comparisons with control survival incidence indicated that only the high-dose male rat incidence was significantly decreased ($p=0.04$). A number of the deaths were attributed to gavage error (3/50, 8/50, and 11/50, respectively, for the control, low-, and high-dose groups). The authors did not record observations of rat behavior during dosing. Based on the available observations, the incidence of treatment-related deaths demonstrated a dose-related increase (11/50, 17/50, and 19/50, respectively [22%, 34%, and 38%]). The LOAEL is 500 mg/kg-day and the NOAEL is 250 mg/kg-day for decreased body weight and decreased survival. There was no evidence of carcinogenicity in male or female rats exposed to doses up to 500 mg/kg-day.

In mice, the only treatment-related effect observed was hyperactivity, which occurred in all high-dose

Estimates
- Dose-Response Data
- Additional Comments
- Discussion of Confidence

Quantitative Estimate
of Carcinogenic Risk
from Inhalation
Exposure

- Summary of Risk Estimates
- Dose-Response Data
- Additional Comments
- Discussion of Confidence

EPA Documentation,
Review and Contacts

- Bibliography
- Revision History
- Synonyms

mice of each sex, 5–30 minutes after dosing. This effect was observed consistently beginning at week 4, and it continued until study termination at 103 weeks. The LOAEL is 1000 mg/kg-day and the NOAEL is 500 mg/kg-day for hyperactivity.

In a study by Wolfe (1988a), groups of 20 male and 20 female Sprague-Dawley rats were administered m-xylene (99% purity) by gavage in corn oil at doses of 0, 100, 200, or 800 mg/kg-day for 90 consecutive days. Survival incidences were 20/20, 17/20, 15/20, and 18/20, respectively, for males, and 20/20, 20/20, 16/20, and 16/20 for females. Mortality in the mid-dose males and mid- and high-dose females attained statistical significance ($p \leq 0.05$), but a significant trend was observed only in females. Mottled lungs and a failure of the lungs to collapse were observed in all mid- and high-dose animals that died early and in 2/3 of the low-dose males that died early but was not evident in any of the animals that survived to study termination. Histopathologic examination of the lungs from animals that died before study termination revealed foreign material in the alveoli in all but one animal. Therefore, these deaths were attributed to vehicle and/or compound aspiration.

Clinical signs present throughout the study were limited to high levels of salivation prior to dosing in high-dose males and females. Body weight gains over the entire study period were decreased ($p \leq 0.05$) in mid- and high-dose males (89% and 75% of controls, respectively) and high-dose females (85% of controls). Food consumption was likewise decreased ($p \leq 0.05$) in high-dose males during weeks 1–5 (90% of control levels) and in mid- and high-dose males during weeks 6–9 (92% of control levels for both groups). A thorough histologic examination revealed no other abnormal findings. Other effects noted were not definitively related to treatment and/or were not biologically significant. The NOAEL and LOAEL are identified as 200 and 800 mg/kg-day, respectively, based on decreased body weight.

In a second study by Wolfe (1988b), groups of 20 male and 20 female Sprague-Dawley rats were administered p-xylene (99% purity) by gavage in corn oil at doses of 0, 100, 200, or 800 mg/kg-day for 90 consecutive days. Survival incidences were 20/20, 19/20, 17/20, and 16/20, respectively, for males, and 20/20, 18/20, 18/20, and 17/20 for females. Mortality in high-dose males attained statistical significance, and a statistically significant trend was present in the male groups. As in the Wolfe (1988a) study, mottled lungs and/or a failure of the lungs to collapse was observed in nearly all treated animals that died early but was not evident in any of the animals that survived to study termination. It was determined that most of the unscheduled deaths were the result of test material aspiration, as indicated by the presence of intra-alveolar foreign material in the lungs that was generally associated with pulmonary congestion.

Treatment-related clinical signs were limited to increased salivation occurring just prior to dosing that was resolved by 1-hour post-dosing in both high-dose males and females. Body weight gains at 13 weeks were slightly reduced (89% of control levels, not statistically significant) in high-dose males and females, and high-dose females had significantly increased food consumption for weeks 10–13 (110%). No treatment-related effects were observed in hematology or clinical chemistry parameters, ophthalmologic examination, or organ weights. Histopathology revealed no abnormal findings in any tissue or organ. The NOAEL and LOAEL are identified as 200 and 800 mg/kg-day, respectively, based on early mortality in male rats that showed signs of test material aspiration into the lungs.

The NTP (1986) 2-year study in rats was selected as the principal study for the derivation of the RfD for xylenes because it is the only oral animal study of chronic duration, and some effects (decreased body weight and possible increased mortality) were evident at doses lower than those for effects seen in other studies. The body weight decrease (5–8% of controls) is considered to be of marginal biological significance, but there was a statistically significant trend for decreased survival in male rats with increasing exposure levels, and survival in the high-dose males was statistically significantly decreased when compared with controls. Given the possibility of treatment-related frank toxicity, it is not considered prudent to discount the only other observed effect, i.e., decreased body weight. Thus, the highest dose in the study, 500 mg/kg-day, is considered a LOAEL for changes in body weight and mortality.

1.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF = 1000

A UF of 10 was applied to account for laboratory animal-to-human interspecies differences. No information is available to support a change from default.

A UF of 10 was applied for intraspecies uncertainty to account for human variability and sensitive populations. This factor accounts for humans who may be more sensitive than the general

population to exposure to xylenes.

A UF of 10 was used to account for database uncertainty. The available oral database for xylenes includes chronic and subchronic gavage toxicity studies in mice and rats and a developmental toxicity study. None of these studies indicate that additional data would result in a lower RfD. However, the database lacks adequate studies of the oral neurotoxicity of xylenes as well as multigenerational reproductive toxicity and developmental neurotoxicity studies. Given the identification of neurological impairment as a critical health hazard from inhalation exposure to xylenes, the lack of comprehensive neurotoxicity testing following chronic oral exposure is of particular concern. It should be noted that transient neurotoxic effects (e.g., lethargy, tremors and unsteadiness) were reported in mice following oral exposure to xylenes for 13 weeks (NTP, 1986). There are no toxicokinetic data identifying oral dose levels at which first-pass hepatic metabolism of xylenes becomes saturated in animals or humans; such data could decrease uncertainty regarding whether neurological impairment may occur at dose levels below those causing body weight decreases and mortality in rats. It is uncertain whether the availability of comprehensive oral neurotoxicity data would result in a lower RfD.

An additional uncertainty associated with the oral database is that the majority of studies examined mixed xylenes, which are known to contain ethylbenzene. The IRIS assessment for ethylbenzene (U.S. EPA, 2002a), which was entered on the database in 1987, cites effects on liver and kidney as the most sensitive endpoints following oral exposure. As discussed below, effects on the liver and kidney have been reported following oral exposure to mixed xylenes, but the most sensitive effect reported in animal bioassays is decreased body weight and increased mortality, as identified by the principal study (NTP, 1986). However, because the mechanism behind the critical effect has not been clearly elucidated, a possible contribution of ethylbenzene to the toxicity of mixed xylenes cannot be entirely eliminated. Additional studies comparing the toxicity of mixed xylenes with that of the individual isomers would better inform the database.

The RfD is based on a NOAEL from a chronic study, which obviates the need for a UF due to LOAEL to NOAEL extrapolation or subchronic extrapolation.

MF = 1

1.A.4. Additional Studies/Comments (Oral RfD)

In a NTP (1986) study, groups of 10 male and 10 female Fischer 344 rats were administered mixed xylenes (60% m-xylene, 13.6% p-xylene, 17.0% ethylbenzene, 9.1% o-xylene) in corn oil by gavage at doses of 0, 62.5, 125, 250, 500, or 1000 mg/kg-day for 5 days per week for 13 weeks. At termination of the study, necropsy was performed on all animals and comprehensive histologic examinations were performed on vehicle and high-dose group animals. High-dose males and females gained 15% and 8% less body weight, respectively, than did controls, with final body weights being 89% and 97%, respectively, of those of controls (statistical significance not reported). No signs of toxicity or treatment-related gross or microscopic pathologic lesions were observed. The LOAEL is 1000 mg/kg-day and the NOAEL is 500 mg/kg-day based on decreased body weight in male rats without tissue lesions.

In the same study, male and female B6C3F₁ mice were treated with mixed xylenes. Groups of 10 mice of each sex were administered 0, 125, 250, 500, 1000, and 2000 mg/kg-day in corn oil by gavage for 5 days per week for 13 weeks. Two female mice in the high-dose group died prematurely, although gavage error could not be ruled out as the cause. At 2000 mg/kg-day, starting 5–10 minutes after dosing and lasting for 15–60 minutes, the animals exhibited lethargy, short and shallow breathing, unsteadiness, tremors, and paresis. In the high-dose group, mean body weight was 7% lower for males and 17% lower for females than in the vehicle control. Although not stated explicitly, the text implies that this was a common finding among the animals dosed at this level. No treatment-related gross or microscopic pathologic lesions were seen in this study. The NOAEL is 1000 mg/kg-day and the LOAEL is 2000 mg/kg-day for transient signs of nervous system depression in mice without tissue lesions.

In a study by Condie et al. (1988) groups of 10 male and 10 female Sprague-Dawley rats were administered mixed xylenes (17.6% o-xylene, 62.3% m-xylene and p-xylene [which coeluted], 20% ethyl benzene) by gavage in corn oil for 90 consecutive days at doses of 0, 150, 750, or 1500 mg/kg-day. Effects of exposure included decreased body weights in high-dose males (94% of controls), dose-related increased liver weights and liver-to-body weight ratios in all exposed groups of males (8, 18, and 29% increase in absolute weight above controls in the low-, mid-, and high-dose animals, respectively) and in mid- and high-dose females (14 and 30%, respectively), and increased

kidney weights and kidney-to-body weight ratios in mid- and high-dose males (16 and 19% increase in absolute weight relative to controls, respectively) and high-dose females (18% increase in absolute weight relative to controls). The authors postulated that the modest increases in aspartate aminotransferase seen in high-dose females and increases in alanine aminotransferase in high-dose males and in mid- and high-dose females, combined with the lack of significant histopathologic findings in the liver, suggest that the enlargement of the liver was an adaptation response to xylenes treatment rather than an adverse toxicological effect.

Hematology analysis revealed a mild polycythemia and leukocytosis in the high-dose males and females in the absence of any observable changes in the health of the rats. Microscopic evaluation of the kidneys revealed a dose-related increase in hyaline droplet formation in male rats (0/9, 3/9, 5/10, 8/10, respectively) and a dose-related increase in the early appearance of minimal chronic nephropathy in female rats (1/10, 3/10, 6/10, 7/10, respectively). Compared with controls, the incidence of minimal nephropathy was statistically significantly elevated ($p < 0.05$) in the 750 and 1500 mg/kg-day female groups but not in the 150 mg/kg-day group (Fishers exact test performed by Syracuse Research Corporation). The hyaline droplet formation in male rats was assumed by the authors to be related to male rat-specific α -2 μ -globulin accumulation and not to be relevant to humans. The LOAEL is 750 mg/kg-day, based on increased kidney weights and early appearance of mild nephropathy in female rats, and the NOAEL is 150 mg/kg-day.

Kidney effects were not found in the NTP (1986) bioassay with Fisher 344/N rats or B6C3F1 mice exposed to xylenes for 13 weeks or 2 years. Likewise, no nephropathy was reported in a nephrotoxicity screening assay in male Fischer 344/N rats exposed to 2000 mg/kg m-xylene for 5 days per week for 4 weeks (Borriston Laboratories, Inc., 1983). In addition, no kidney effects were found in Sprague-Dawley rats exposed for 90 days to m-xylene or p-xylene at doses as high as 800 mg/kg-day (Wolfe et al., 1988a, b). Thus, the available data do not consistently identify the kidney as a sensitive target of xylenes in animals. Likewise, the available data do not consistently identify the liver as a sensitive target of xylenes in animals (NTP, 1986; Wolfe et al., 1988a, b; Condie et al., 1988).

A developmental toxicity study in CD-1 mice (Nawrot and Staples, 1980) indicates that developmental effects may occur following exposure to xylenes. However, the study was reported as an abstract with incomplete documentation of exposure protocols and results; it does not identify reliable NOAELs and LOAELs for maternal and developmental toxicity. Nevertheless, information in the abstract indicates that exposure on gestation days 6–15 to daily doses of o-, m-, or p-xylene at 1935 or 2580 mg/kg-day—but not at 774 mg/kg-day—resulted in overt maternal toxicity and increased incidences of cleft palate in the fetuses.

For more detail on Susceptible Populations, exit to the toxicological review, Section 4.7 (PDF).

__I.A.5. Confidence in the Oral RfD

Study -- Medium
Database -- Medium
RfD -- Medium

Confidence in the principal study is medium. The study was a 2-year toxicology and carcinogenesis assay that evaluated the critical endpoint for RfD derivation (body weight and mortality) and included comprehensive histologic examination of tissues for nonneoplastic and neoplastic lesions. Some gavage errors occurred during the study, limiting the confidence assessment to medium. Confidence in the oral exposure database is medium because the database contains chronic animal studies in two species (rats and mice), numerous subchronic studies, and an evaluation of the developmental effects of oral xylenes, but it is lacking oral neurotoxicity studies as well as multigenerational reproductive toxicity and developmental neurotoxicity studies. Medium confidence in the RfD follows.

For more detail on Characterization of Hazard and Dose Response, exit to the toxicological review, Section 6 (PDF).

__I.A.6. EPA Documentation and Review of the Oral RfD

Source Document -- U.S. EPA, 2002a

This assessment was peer reviewed by external scientists. Their comments have been evaluated

carefully and incorporated in finalization of this IRIS summary. A record of these comments is included as an appendix to U.S. EPA (2002a). *To review this appendix, exit to the toxicological review, Appendix A, Summary of and Response to External Peer Review Comments (PDF)*

Agency Consensus Date -- 01/30/2003

__I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

[Back to top](#)

__I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name -- Xylenes
CASRN -- 1330-20-7
Last Revised -- 02/21/2003

The inhalation Reference Concentration (RfC) is analogous to the oral RfD and is likewise based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. The inhalation RfC considers toxic effects for both the respiratory system (portal-of-entry) and for effects peripheral to the respiratory system (extrapulmonary effects). It is generally expressed in units of mg/cu.m. In general, the RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhalation exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Inhalation RfCs are derived according to *Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry* (EPA/600/8-90/066F October 1994). RfCs can also be derived for the noncarcinogenic health effects of substances that are carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

As noted in Section I.A. of this file, xylenes refers to mixtures of all three xylene isomers and ethylbenzene. The inhalation RfC for xylenes presented herein is based on a principal study (Korsak et al., 1994) in which rats were exposed by inhalation to m-xylene. There is some uncertainty associated with selecting a principal study for xylenes that involved exposure to m-xylene alone, but this isomer is generally predominant in commercial mixtures. In addition, although there are no studies comparing xylene isomers in affecting critical neurological endpoints following subchronic or chronic inhalation exposure, the potencies of individual xylene isomers were similar in affecting neurobehavior, as shown in a study of rats following acute exposures (Moser et al., 1985) (see Section 4.4.3 of the Toxicological Review for more information).

No inhalation RfC for xylenes has previously been on IRIS.

__I.B.1. Inhalation RfC Summary

Critical Effect	Experimental Doses*	UF	MF	RfC
Impaired motor coordination (decreased rotarod performance)	NOAEL: 50 ppm NOAEL _(HEC) : 39 mg/m ³	300	1	0.1 mg/m ³
Subchronic inhalation study in male rats	LOAEL: 100 ppm LOAEL _(HEC) : 78 mg/m ³			

(Korsak et al., 1994)

*Conversion Factors and Assumptions - MW = 106.17. Assuming 25C and 760 mmHg, NOAEL (mg/m³) = 50 ppm x 106.17/24.45 = 217 mg/m³. NOAEL_[ADJ] = 217 mg/m³ x 6 hrs/day x 5 days/7

days = 39 mg/m³. The NOAEL_[HEC] was calculated for extrarespiratory effects of a Category 3 gas (U.S. EPA, 1994). Blood/gas partition coefficients: H(b/g)_{rat} = 46.0; H(b/g)_{human} = 26.4 (Tardif et al., 1995). $(H_{b/g, rat} / H_{b/g, human}) = 1.7$; value of 1 is used when the ratio is > 1 (U.S. EPA, 1994). NOAEL_[HEC] = NOAEL_[ADL] × (H_{b/g, rat} / H_{b/g, human}) = 39 mg/m³.

1.B.2. Principal and Supporting Studies (Inhalation RfC)

Korsak et al. (1992) exposed groups of 12 male Wistar rats to toluene, m-xylene, or a 1:1 mixture for 6 hours per day, 5 days per week at a concentration of 0 or 100 ppm for 6 months or 1000 ppm for 3 months. Rotarod performance and spontaneous motor activity were assayed 24 hours after termination of the exposure periods. The rotarod test was used as a measure of motor coordination disturbances from exposure to m-xylene. The rotarod test involves placing the subject animals on a rotating rod and evaluating their ability to remain on the rod for a period of 2 minutes. The animals were trained to perform the task, exposed to chemical or control gas, and evaluated at defined intervals. By the time interval after exposure, considerable proportions of absorbed xylenes are expected to have been eliminated from the body (see Section 3.4 and Appendix B of the Toxicological Review).

Body weights and weights of seven organs were measured; only data for animals sacrificed after 3 months of exposure was reported (controls and 1000 ppm rats). At 3 and 6 months, blood samples were collected 24 hours after termination of exposure for measurement of serum chemistry variables (e.g., alanine aminotransferase, aspartate aminotransferase, sorbitol dehydrogenase, alkaline phosphatase, and total protein) and hematologic variables (erythrocyte counts, hemoglobin concentration, hematocrit, leukocyte count, and differential leukocyte counts). Serum chemistry and hematologic results were reported only for rats exposed to 1000 ppm for 3 months. Statistical evaluations (using a p=0.05 level of significance) of collected data included analysis of variance, Dunnett's test, and Fishers exact test.

Rats exposed to m-xylene alone exhibited statistically significantly decreased rotarod performance and decreased spontaneous activity, as measured 24 hours after termination of the exposures, when compared with controls. The percentages of failures in the rotarod test were roughly 60% in rats exposed to 1000 ppm for 3 months, 35% in rats exposed to 100 ppm for 6 months, and 0% for controls at either time period. The mean spontaneous motor activity in rats exposed to 100 ppm for 6 months was about 400 movements per hour, compared with about 800 movements per hour for controls. Spontaneous motor activity data for rats exposed to 1000 ppm m-xylene for 3 months were not presented in the report. No statistically significant exposure-related changes in body weight, absolute or relative organ weights, or clinical chemistry or hematology variables were noted in rats exposed to 1000 ppm m-xylene for 3 months, with the exception of decreased differential counts (percentage of white blood cells counted) of lymphocytes (45.5 ± 9.5 vs. 60.8 ± 6.4 for controls; 25% decrease) and increased counts of monocytes (16.3 ± 8.9 vs. 8.3 ± 4.2 for controls; 96% increase). Total counts of white blood cells (in units of cells per mm³ of blood), however, were not statistically significantly changed by exposure. The LOAEL is 100 ppm, based on decreased rotarod performance and decreased spontaneous motor activity. No NOAEL was identified.

In a second study, Korsak et al. (1994) exposed groups of 12 male Wistar rats by inhalation to 0, 50, or 100 ppm m-xylene or n-butyl alcohol or a 1:1 mixture (purity of chemicals not provided) for 6 hours per day, 5 days per week, for 3 months and evaluated similar endpoints as in the earlier study (Korsak et al., 1992). Blood for clinical biochemistry and hematologic analysis was collected 24 hours after termination of exposure. The report does not specify the timing of the neurologic examinations; however, given that the 1994 study was conducted by the same group of investigators as the 1992 study and that one of the tests (rotarod performance) was the same in both studies, it appears reasonable to assume that the tests were administered 24 hours after termination of exposure. Statistical evaluations (using a p=0.05 level of significance) of the collected data included analysis of variance, Dunnett's test, and Fishers exact test.

No statistically significant exposure-related changes were noted in body weight gain, absolute or relative organ weights, hepatic activities of microsomal monooxygenases, lipid peroxidation, or levels of triglycerides in the liver. Statistically significant decreases in erythrocyte number were seen in animals exposed to 50 ppm (93% of controls) or 100 ppm (80.5% of controls) of m-xylene alone. Similarly, decreased levels of hemoglobin were reported in both groups (92% of controls for both groups). At 100 ppm, a statistically significant increase in leukocyte number (35% increase over controls) was reported. Exposure to 50 or 100 ppm m-xylene alone also resulted in decreased rotarod performance starting at 1 month of exposure, which remained at the same level until the end of the 3-month exposure. Decreases were statistically significant in the 100 ppm group when

compared with the controls. The results were presented in graphical form; the actual numerical data are not provided. The decreases in performance were roughly 8% and 33% for the 50 and 100 ppm groups, respectively, versus 0% for the controls.

Sensitivity to pain was assessed using the hot plate behavior test, in which the animals are placed on a hot (54°C) surface and the time interval between being placed on the plate and licking of the paws is measured. Rats exposed to 50 or 100 ppm m-xylene alone had statistically significantly increased sensitivity to pain at the end of the 3-month exposure (latency of the paw-lick response was 8.7 and 8.6 seconds, respectively, vs. 12.2 seconds for the controls). The LOAEL is 100 ppm, based on decreased rotarod performance and decreased latency in the paw-lick response in the hot-plate test, and the NOAEL is 50 ppm.

To evaluate whether xylenes influence aging of the central nervous system or induces persistent changes in radial maze performance, Graliewicz et al. (1995) exposed 8-month-old, male LOD-Wistar rats (20 per dose level) to air containing 0, 100, or 1000 ppm "pure" m-xylene (exact purity not provided) for 6 hours per day, 5 days per week, for 3 months. One-hour electroencephalograph (EEG) recordings were performed on days 28 and 56 of exposure and on days 14, 28, 56, and 84 after exposure. The number and duration of spontaneous neocortical spike and wave discharges (SWD) from the EEG were taken as electrophysiological indices of the biological age of the brain. As rats age, SWDs increase in number and become longer. Because of large interindividual variation in number and duration of SWDs within each group, these variables were normalized to a percentage of the initial values. Exposed rats were not subjected to the daily exposure protocol when EEG recordings were made on days 28 and 56 during the exposure period. Tests of spatial learning in an 8-arm radial maze were also conducted for a 2-week period starting from day 70 after exposure to day 83.

During the first adaptation stage of the test (five consecutive daily training periods), rats were familiarized with the maze. The second stage (five consecutive daily trials) measured effectiveness of finding water in the maze (e.g., duration of trial, number of entries into the arms, number of omission and preservation errors). One-way or two-way parametric analysis of variance was applied to the collected data, and effects were regarded as statistically significant at p<0.05. Body weights were also measured during and after the exposure period at various intervals, but statistically significant differences were not found among the groups.

The analysis of variance indicated no group effect on the normalized number and cumulative-duration SWD variables. However, a statistically significant group x successive recording period effect was indicated. In control rats, these variables were increased to a statistically significant degree, compared with those of the exposed groups, only on day 84 after exposure. The mean cumulative SWD duration (expressed in percentage) on day 84 was about 300 for the control compared with means of about 150 in each of the exposed groups. The authors hypothesized that these exposure-related changes in the spontaneous, age-related changes in cortical SWD activity may be related to cortical excitability or to an increase in catecholaminergic transmissions.

Unlike the controls, rats exposed to 100 or 1000 ppm m-xylene did not exhibit a statistically significant shortening of the time needed to complete a trial in the radial maze with successive daily trials. These results indicate a learning deficit in the exposed rats. For example, on the fifth consecutive trial, the mean trial durations in each of the exposed groups were about 240–250 seconds, compared with a mean of about 150 seconds for the control group. In addition, the exposed groups did not exhibit the statistically significant decrease in omission errors with successive days in the radial arm maze test that was exhibited by the control group (number of arms in the maze omitted during a 5-minute period when the rats explored the maze). The mean number of omission errors in control rats showed a progressive decrease from about 2.75 on the first trial to 0 on the fourth and fifth successive trials. In contrast, the means on the fifth consecutive trial were about 1.5 and 2.5 for the 100 ppm and 1000 ppm groups, respectively. The lowest exposure level in this study, 100 ppm, is designated as a LOAEL for deficits in radial maze performance.

Graliewicz and Wladerna (2001) exposed groups of male Wistar rats (10–11 animals/group) to 0 or 100 ppm of m-xylene for 6 hours per day, 5 days per week for 4 weeks. Behavioral testing was performed at various intervals before (radial maze and open-field evaluations) and after exposure (radial maze [days 14–18], open-field activity [day 25], passive avoidance [days 39–48], hot plate test [days 50–51], and active avoidance [days 54–60]). The radial maze and hot plate test protocols are described in previous studies from this group (Graliewicz and Wladerna, 1995; Korsak et al., 1992).

In the open-field activity test, animals were placed in a 100 cm x 100 cm arena that was surrounded

by 20 cm high walls and divided into 49 equal squares. The number of square borders crossed (locomotor activity), number of rearings (exploratory activity), and number of grooming episodes were recorded. In the passive avoidance test, animals were placed on a platform above the floor of the cage, and the time until the animal stepped off the platform was recorded in a series of six trials. In the first two trials, the animals were allowed to explore the cage for 60 seconds after stepping down; in the third trial, the animals received a series of footshocks after stepping off the platform. In trials 4, 5, and 6 the animals received no shocks and were allowed to stay on the floor for 1 minute after stepping off the platform. In the active avoidance test, animals were trained to avoid an electric footshock by moving from one compartment of the cage to another when a sound is played. After successfully displaying avoidance behavior in four of five trials, the animals were considered to be trained. Post-exposure evaluations determined the frequency of avoidance behavior in response to the same stimulus.

No differences between control and exposed rats were seen in radial maze parameters (number of arm entries, arms omitted, or arms entered multiple times) either before exposure (7 days prior to exposure) or at 14–18 days after the termination of exposure. Similarly, no differences in open-field activity were seen between groups examined on day 8 prior to exposure or day 25 postexposure or in active avoidance (number of trials to avoidance criterion), examined on days 54 and 60 post-exposure. Xylene-exposed rats showed a significantly shorter step-down time (trial 6 only; no difference in trials 1–5) in the passive avoidance test (examined on days 39–48 postexposure) and a significantly greater paw-lick latency in the hot plate behavior test (examined on days 50–51 postexposure), identifying 100 ppm as a LOAEL for neurobehavioral effects.

Because available human data are insufficient for deriving an RFC and chronic animal inhalation data are lacking, the subchronic study of Korsak et al. (1994) was selected as the principal study and Korsak et al. (1992), Gralewicz et al. (1995), and Gralewicz and Wladema (2001) as the supporting studies. Neurological effects (impaired motor coordination) are selected as the critical effect for deriving the RFC. Two neurological endpoints were evaluated in this study. Rotarod performance was statistically significantly decreased (33% from controls) at 100 ppm, and a statistically significant decreased sensitivity to pain was observed at 50 and 100 ppm (8.6 and 8.7 seconds, respectively, vs. 12.2 seconds for controls; measurements made 24 hours postexposure). Gralewicz and Wladema (2001) also measured the effect of m-xylene exposure (6 hrs/day, 5 days/wk for 4 weeks; neurological endpoints measured postexposure day 50) on pain sensitivity. In this study, a statistically significant increase in pain sensitivity (35 seconds vs. 10 seconds in control) was found at the 100 ppm dose, the lowest dose tested. The variation in the response to m-xylene in these two studies decreases the confidence in using the pain sensitivity endpoint as the critical effect.

A number of statistically significant neurological effects have been noted in male rats at a dose of 100 ppm m-xylene in other supporting studies: decreased rotarod performance and spontaneous movement activity following exposure for 6 hours per day, 5 days per week for 6 months (Korsak et al., 1992), decreased radial maze performance following exposure for 6 hours per day, 5 days per week for 3 months (Gralewicz et al., 1995); and shortened step-down time in the passive avoidance test following exposure for 6 hours per day, 5 days per week for 4 weeks. All studies measured neurological endpoints 24 hours postexposure with the exception of Gralewicz and Wladema (2001), which measured effects at postexposure day 50. For these reasons, a NOAEL of 50 ppm and a LOAEL of 100 ppm is identified for neurological effects (impaired motor coordination).

The principal study (Korsak et al., 1994) reported no statistically significant exposure-related changes in body weight gain, absolute or relative organ weights, hepatic activities of monooxygenases or lipid peroxidation, or levels of triglycerides in the liver. Compared with controls, exposed rats showed statistically significant changes in red blood cell counts (7–20% decreased), hemoglobin levels (8% decreased), and white blood cell counts (35% increased). Effects in red blood cell counts and hemoglobin levels were observed at 50 ppm. However, these changes were not observed in another study from the same laboratory (Korsak et al., 1992) in rats exposed to 1000 ppm m-xylene. Furthermore, effects on erythrocytes were not found at concentrations of 78–810 ppm in other studies (Carpenter et al., 1975; Jenkins et al., 1970).

I.B.3. Uncertainty and Modifying Factors (Inhalation RFC)

UF = 300

A UF of 3 was applied to account for laboratory animal-to-human interspecies differences. A factor of 3 was applied because default NOAEL_{HEC} dosimetric adjustments were used to calculate a human equivalent concentration (HEC), reducing the uncertainty involved with the extrapolation from the results of an animal study to a human exposure scenario (i.e., the toxicokinetic portion of the UF is 1;

the toxicodynamic portion of the UF is 3).

A uncertainty factor of 10 was applied for intraspecies uncertainty to account for human variability and sensitive populations. The degree of human variance in abilities to absorb or dispose of xylenes is unknown, as is the degree of human variance in responding to xylenes neurotoxicity. Results from developmental toxicity studies of rats exposed by inhalation during gestation indicate that adverse developmental effects occur only at higher doses than chronic doses producing the critical effects observed in adult male rats in the principal and supporting studies, suggesting that the developing fetus is not at special risk from low-level exposure to xylenes. However, as with oral exposure, the effects of inhaled xylenes in other potentially sensitive populations such as newborns or young children or animals have not been assessed.

A UF of 3 was applied for extrapolation from subchronic to chronic duration. A factor of 10 was not used because the changes in rotarod performance did not increase with time from 1 to 3 months and were similar to those described in a separate study of 6-months duration (Korsak et al., 1992).

A UF of 3 was applied for uncertainties in the database. The inhalation database includes some human studies, subchronic studies in rats and dogs, neurotoxicity studies, a one-generation reproductive toxicity study, developmental toxicity studies, and developmental neurotoxicity studies. Although the available developmental toxicity studies are confounded by a lack of litter incidence reporting, the data reported for fetal incidences do not indicate effects at levels lower than that found to induce neurologic impairment in several endpoints in male rats. The database is lacking a two-generation reproductive toxicity study.

MF = 1

I.B.4. Additional Studies/Comments (Inhalation RFC)

The weight of evidence from limited human data and more extensive animal data identify mild neurological impairment and possible developmental effects as potential health hazards from repeated inhalation exposure to xylenes. The animal inhalation exposure database contains no chronic toxicity studies, but there are a number of subchronic toxicity studies (of which several focused on neurological endpoints), a one-generation reproduction study in rats, and several developmental toxicity studies, some of which evaluated offspring for performance in neurobehavioral tests. Subchronic toxicity assays in animals have not found consistent evidence for other noncancer effects, such as changes in body weight or in hepatic, hematologic, or renal toxicity endpoints, following exposure to concentrations of xylenes as high as 800–1000 ppm for 6 hours per day, 5 days per week (e.g., Carpenter et al., 1975; Jenkins et al., 1970; Korsak et al., 1992, 1994).

Reversible symptoms of neurological impairment and irritation of the eyes and throat are well-known health hazards from acute inhalation exposure to xylenes and other aromatic solvents. In general, these acute effects are expected to involve reversible molecular interactions of the solvent itself (not metabolites) with membranes of the affected tissues, including neuronal membranes, and are most pronounced at high exposure levels in excess of 1000 ppm. At lower concentrations, more subtle effects may occur. Human volunteers exposed under controlled conditions to xylene concentrations in the range of 200–400 ppm for short time periods (15 minutes to 4 hours) have reported symptoms of irritation (e.g., watering eyes and sore throat) or neurological impairment (e.g., mild nausea, headache) (Carpenter et al., 1975; Garaberal et al., 1978).

In other studies involving single or multiple 4-hour exposures of human volunteers to 200 ppm xylenes, reversible effects on balance and reaction times have been reported (Laine et al., 1993; Savolainen and Linnavuo, 1979; Savolainen et al., 1984); however, other studies of 4-hour exposures to 200 ppm have not found impaired performance in tests of simple reaction time, short-term memory, and choice reaction time (Olson et al., 1985) or changes in visually evoked brain potentials (Seppäläinen et al., 1993) or electroencephalographic patterns (Seppäläinen et al., 1991). Impaired performance on tests of memory and reaction times was also reported for subjects exposed to 100 ppm xylenes for 4 hours (Dudek et al., 1990). The available controlled-exposure human studies indicate that concentrations around 100–200 ppm are close to the threshold level for short-term reversible neurological and irritation effects from xylenes.

The available human data alone do not provide adequate evidence for neurological impairment from repeated exposure to xylenes concentrations less than or equal to 200 ppm. Aside from the controlled-exposure studies reviewed above, most of the human data associating xylenes exposure to neurological impairment are case reports involving acute high-level exposures (800–10,000 ppm) (e.g., Goldie, 1960; Hipolito, 1980; Klauke et al., 1982). Epidemiologic studies are restricted to a

cross-sectional health evaluation study (Uchida et al., 1993) that reported increased prevalence of self-reported neurological symptoms and irritation, but no apparent changes in serum enzymes indicative of liver or kidney damage in a group of Chinese workers. The workers were from a boot manufacturing plant that used a xylene-containing glue and two other plants that used mixed xylenes as a solvent in wire production or printing. The measured time-weighted-average mean concentration of airborne xylenes in these workplaces was 21 ($\pm$ 21) ppm. The study has several limitations, including a lack of reporting on the duration of exposure, co-exposure to other chemicals, no clear demonstration of relationships between response and dose or duration, and the inherent bias presented by self-reporting of symptoms.

Although the human evidence for persistent effects on the nervous system or other persistent effects from repeated inhalation exposure to xylenes is inadequate, results from animal studies more clearly identify potential persistent neurological impairment and possible developmental effects as potential health hazards from repeated inhalation exposure.

Overall results from rat studies described in Section I.B.2 provide evidence that repeated exposure to m-xylene at concentrations $\geq$ 100 ppm (6 hrs/day, 5 days/week) may produce persistent changes in several neurologic endpoints in adult rats. Supporting evidence for potential persistent neurologic effects from xylenes includes reports of changes in indices of hearing loss in rats exposed to $\geq$ 800 ppm mixed xylenes for 14 hours per day for 6 weeks (Pryor et al., 1987) and in rats exposed to 1000 ppm mixed xylenes for 18 hours per day, 7 days per week, for 61 days (Nylén and Hagman, 1994).

There are no studies of the possible developmental toxicity of inhaled xylenes in humans, but there are a number of studies examining standard developmental toxicity endpoints and neurobehavioral endpoints in offspring of animals exposed to mixed xylenes or individual xylene isomers. Evidence for impaired neurological development in rat offspring following gestational exposure to inhaled xylenes is not strong or consistent. Changes in neurobehavioral variables reported for offspring of animals exposed during gestation are restricted to impaired cognitive but not motor performance in the Morris water maze test in female but not male offspring of rats exposed to 500 ppm mixed xylenes for 6 hours per day on gestation days 7–20 (Hass et al., 1995, 1997) and decreased rotarod performance in offspring of rats exposed to 200 ppm "technical" xylenes for 6 hours per day on gestation days 6–20 (Hass and Jakobsen, 1993). Deficits in the water maze test were only observed in female rat offspring raised in standard housing and not in female rats raised in "enriched" housing with various toys (Hass et al., 1995).

Although decreased rotarod performance by offspring was observed in the study by Hass and Jakobsen (1993), it was not observed in the later study by the same group of investigators (Hass et al., 1995). The reported effect on rotarod performance in the earlier study was questioned by Hass et al. (1995) because the test was not conducted by experimenters who were blind to the exposure status of the rats. In addition, offspring of rats exposed to 800 or 1600 ppm p-xylene for 6 hours per day on gestation days 7–16 performed similarly to offspring of nonexposed rats in tests of central nervous system development: an acoustic startle response test on postnatal days 13, 17, 21, and 63 and a figure-8 maze activity test on postnatal days 22 and 65 (Rosen et al., 1986).

Several other inhalation developmental toxicity studies have examined standard developmental toxicity endpoints in rats (Litton Bionetics, 1978; Bio/dynamics Inc., 1983; Rosen et al., 1986; Ungváry et al., 1980; Ungváry and Tátrai, 1985), mice (Ungváry and Tátrai, 1985) and rabbits (Ungváry and Tátrai, 1985) following gestational exposure to xylenes. These studies have most clearly identified maternally toxic levels for decreased body weight gain in pregnant rats at concentrations greater than or equal to 700 ppm o-, p-, or m-xylene for 24 hours per day (Ungváry et al., 1980) or 1600 ppm p-xylene for 6 hours per day (Rosen et al., 1986) and for maternal death and abortions in pregnant rabbits exposed to 230 ppm (but not 115 ppm) mixed xylenes or p-xylene for 24 hours per day (Ungváry and Tátrai, 1985). In rats, effects on fetal skeletal and visceral malformations (such as cleft palate) and variations (such as retarded skeletal ossification or extra ribs) were reported at concentrations of up to 700 ppm o-, m-, or p-xylene for 24 hours per day (Ungváry et al., 1980) or 780 ppm mixed xylenes for 24 hours per day (Bio/dynamics Inc., 1983; Litton Bionetics, 1978; Ungváry and Tátrai, 1985). Likewise, effects on skeletal and visceral malformations and variations were reported in mice at concentrations of up to 230 ppm mixed xylenes (12 hrs/day in three 4-hr periods) or 115 ppm o-, p-, or m-xylene by the same protocol (Ungváry and Tátrai, 1985) or in rabbits exposed to 115 ppm mixed xylenes or o-, p-, or m-xylene for 24 hours per day (Ungváry and Tátrai, 1985).

Statistically significant increased incidences of fetuses with retarded skeletal ossification or extra ribs were reported in these studies, but the incidences were reported on an exposure-group basis in all but one of the studies. No litter-specific information was provided except in the Litton Bionetics (1978) study, which reported that, after adjustment for covariance with litter size, incidences of

fetuses with delayed ossification in rats exposed to 400 ppm were no longer statistically significantly different from control values.

The most significant effects on developmental endpoints were decreased fetal body weight or fetal survival in rats at xylene isomer concentrations of 350 or 700 ppm for 24 hours per day (Ungváry et al., 1980) or a mixed xylenes concentration of 780 ppm for 24 hours per day (Ungváry and Tátrai, 1985) and increased abortions in rabbits exposed to 230 ppm for 24 hours per day (Ungváry and Tátrai, 1985). These effects, although of concern, occurred at concentrations above those at which neurobehavioral effects were found in adult male rats following subchronic exposure (see Section I.B.2).

Information regarding the potential reproductive toxicity of xylenes in humans is restricted to case-control studies reporting possible associations between occupational exposure to xylenes and other solvents and spontaneous abortions (e.g., Taskinen et al., 1986, 1994). However, these studies are of limited usefulness in assessing the potential reproductive toxicity of xylenes, because the numbers of cases of spontaneous abortions were small, and the women had been exposed to a number of chemicals.

Two reproductive toxicity studies in rats exposed to xylenes by inhalation are available (Bio/dynamics Inc., 1983; Nylén and Hagman, 1994). In a one-generation reproductive/developmental toxicity study (Bio/dynamics Inc., 1983), male and female CD rats were exposed to 0, 60, 250, or 500 ppm xylenes (technical grade xylene: 2.4% toluene, 12.8% ethylbenzene, 20.3% p-xylene, 44.2% m-xylene, 20.4% o-xylene) by inhalation for 6 hours per day, 5 days per week, for 131 days prior to mating, with exposure continued in the females during gestation days 1–20 and lactation days 5–20. Two additional 500-ppm groups used the same exposure protocol, except that only the F_0 males were exposed in one, and only the F_0 females were exposed in the other. The highest exposure level in this study, 500 ppm, was a NOAEL for reproductive performance in the parental generation. Likewise, a study of male Sprague-Dawley rats exposed to 0 or 1000 ppm xylene solvent for 18 hours per day, 7 days per week, for 61 days reported no differences between control and exposed rats in several testicular endpoints and fertility (Nylén and Hagman, 1994).

In summary, human data are suggestive of neurological effects and irritation of the eyes and respiratory tract following inhalation exposure to xylenes. Animal studies have demonstrated that neurological effects are the most sensitive effect of xylenes inhalation, with measurable effects in several neurobehavioral endpoints beginning at concentrations as low as 100 ppm following subchronic exposure (Gralewicz et al., 1995; Korsak et al., 1992, 1994; Nylén and Hagman, 1994; Pryor et al., 1987). At higher exposure levels, changes in body weight have been reported by some studies (Tátrai and Ungváry, 1980; Tátrai et al., 1981) but not by others (Carpenter et al., 1975; Jenkins et al., 1970; Ungváry, 1990). Similarly, high-level exposure to xylenes has resulted in changes in liver morphology, weight, and enzymatic functions (Tátrai and Ungváry, 1980; Tátrai et al., 1981; Ungváry, 1990). Gestational exposure of animals to xylenes has resulted in neurodevelopmental effects (Hass et al., 1995, 1997; Hass and Jakobsen, 1993) and other possible developmental effects (Ungváry et al., 1980; Ungváry and Tátrai, 1985), but only at levels above those at which neurobehavioral effects in adult male rats were reported. Finally, no reproductive effects were found in a one-generation reproductive/developmental study of male and female rats exposed to 500 ppm xylenes (Bio/dynamics Inc., 1983) or in male rats exposed to 1000 ppm xylenes for 61 days (Nylén and Hagman, 1994).

For more detail on Susceptible Populations, exit to the toxicological review, Section 4.7 (PDF).

I.B.5. Confidence in the Inhalation RfC

Study – Medium
Database – Medium
RfC – Medium

Confidence in the principal study is medium, because the study was an examination of a critical effect of xylene toxicity that also examined organ weights, body weights, and hematological parameters but was of subchronic duration, examined only one sex of a single species, and did not conduct histologic examination of the animals. Confidence in the database is medium; the database contains several subchronic studies as well as several developmental studies, developmental neurotoxicity studies, and a one-generation reproductive toxicity study. However, a two-generation reproduction study and chronic animal data are lacking. Medium confidence in the RfC results.

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#)

I.B.6. EPA Documentation and Review of the Inhalation RfC

Source Document – U.S. EPA, 2002

This assessment was peer reviewed by external scientists. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A record of these comments is included as an appendix to U.S. EPA, 2002. [To review this appendix, exit to the toxicological review, Appendix A, Summary of and Response to External Peer Review Comments \(PDF\)](#)

Agency Consensus Date – 01/30/2003

I.B.7. EPA Contacts (Inhalation RfC)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (fax), or hotline.iris@epa.gov (Internet address).

[Back to top](#)

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name -- Xylenes
CASRN -- 1330-20-7
Last Revised -- 02/21/2003

Section II provides information on three aspects of the carcinogenic assessment for the substance in question: the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen and quantitative estimates of risk from oral exposure and inhalation exposure. The quantitative risk estimates are presented in three ways. The slope factor is the result of application of a low-dose extrapolation procedure and is presented as the risk per (mg/kg)/day. The unit risk is the quantitative estimate in terms of either risk per µg/L drinking water or risk per µg/cu.m air breathed. The third form in which risk is presented is a concentration of the chemical in drinking water or air associated with cancer risks of 1 in 10,000, 1 in 100,000, or 1 in 1,000,000. The rationale and methods used to develop the carcinogenicity information in IRIS are described in the Draft Revised Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1999). Users are referred to Section I of this IRIS file for information on long-term toxic effects other than carcinogenicity.

II.A. Evidence for Human Carcinogenicity

II.A.1. Weight-of-Evidence Characterization

Under the Draft Revised Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1999), *data are inadequate for an assessment of the carcinogenic potential of xylenes*. Adequate human data on the carcinogenicity of xylenes are not available, and the available animal data are inconclusive as to the ability of xylenes to cause a carcinogenic response. Evaluations of the genotoxic effects of xylenes have consistently given negative results.

Data on the carcinogenicity of xylenes following inhalation exposure are limited. A number of human occupational studies have suggested possible carcinogenic effects of chronic inhalation exposure to xylenes. However, in each case co-exposure to other chemicals was a major confounder, leading to an inability to adequately assess the potential effects of chronic exposure to xylenes. Animal data on the carcinogenicity of xylenes following inhalation exposure are not available.

Examinations of the carcinogenicity of xylenes following oral exposure in humans are not available. NTP (1986) conducted a 2-year oral cancer bioassay in male and female Fischer 344 rats and male and female B6C3F1 mice. Rats were exposed to 0, 250, or 500 mg/kg-day of mixed xylenes by gavage for 5 days per week for 103 weeks. No evidence of carcinogenesis was seen in male or female rats. Similarly, mice exposed to 0, 500, or 1000 mg/kg-day for 2 years did not show evidence of carcinogenic effects (NTP, 1986). However, a study by Malloni et al. (1983, 1985) reported an

increase in the overall number of malignant tumors in male and female rats treated by gavage with 0 or 500 mg/kg mixed xylenes for 4 days per week for 104 weeks. However, only total tumor incidence was reported; descriptions of target organs and tumor types were not included in the report. In the absence of additional information and because only one dose was used, the Malloni et al. study does not provide sufficient evidence of the carcinogenicity of xylenes in animals.

For more detail on Characterization of Hazard and Dose Response, exit to [the toxicological review, Section 6 \(PDF\)](#).

For more detail on Susceptible Populations, exit to [the toxicological review, Section 4.7 \(PDF\)](#).

II.A.2. Human Carcinogenicity Data

Inadequate.

Associations between occupational exposure to xylenes and increased risk of leukemia (Arp et al., 1983; Wilcosky et al., 1984), non-Hodgkin's lymphoma (Wilcosky et al., 1984), and cancer of the rectum (Gérin et al., 1998), colon (Gérin et al., 1998), or nervous system (Spiras et al., 1991) have been reported. However, a number of limitations preclude the usefulness of these data, including small sample sizes, no quantified exposure concentrations, and/or concurrent exposures to other solvents.

II.A.3. Animal Carcinogenicity Data

Inadequate.

In National Toxicology Program toxicology and carcinogenesis studies (NTP, 1986), groups of 50 male and 50 female Fischer 344/N rats and 50 male and 50 female B6C3F1 mice were administered mixed xylenes (60% m-xylene, 13.6% p-xylene, 17.0% ethylbenzene, 9.1% o-xylene) in corn oil by gavage at doses of 0, 250, or 500 mg/kg-day (rats) and 0, 500, or 1000 mg/kg-day (mice) for 5 days per week for 103 weeks. Necropsy and histologic examinations were performed on all animals.

In rats, no statistically significantly increased incidences of nonneoplastic or neoplastic lesions were found in exposed groups when compared with controls. A survival-adjusted increased incidence of interstitial cell tumors was found in the high-dose male rat group relative to controls, but this was not considered to be a treatment-related increase. The authors attributed the increase to high-dose male rats dying between weeks 62 and 92, noting that incidences for these tumors were comparable with controls during other time intervals and that the overall incidences were not statistically significantly different between control and exposed groups. In mice, no statistically significantly increased incidences of nonneoplastic or neoplastic lesions were found in male or female exposed groups when compared with controls. NTP (1986) concluded that the study provided no evidence of carcinogenicity of xylenes in male or female F344/N rats or B6C3F1 mice.

Malloni et al. (1983, 1985) exposed groups of 40 male and 40 female Sprague-Dawley rats to 500 mg/kg mixed xylenes (unspecified proportions) in olive oil orally by gavage 4–5 days per week for 104 weeks. The control groups of 50 males and 50 females were treated with olive oil only. Rats were kept under observation until spontaneous death; all rats died by 141 weeks. Percentages of mice that survived treatment were similar in controls and treated groups through 92 weeks (Malloni et al., 1983), but survival data for later periods were not reported (Malloni et al., 1985). For example, 50% and 65% of exposed males and females, respectively, survived at 92 weeks, compared with 58% and 66% of control males and females.

Only limited information regarding tumor incidences at specific tissue sites was provided with no information provided on nonneoplastic lesions or tumor pathology. Final (i.e., 141-week) tumor incidence data were reported only for rats with hemolymphoreticular neoplasias (thymomas, others, and total) and for rats with malignant tumors at any site (Malloni et al., 1985). Incidences for thymomas were 1/34 and 0/36 in exposed males and females, compared with 0/45 and 0/49 in controls. Incidences of rats with other hemolymphoreticular neoplasias (not otherwise specified) were 4/34 and 3/36 in exposed males and females, compared with 3/45 and 1/45 in controls.¹ Fishers exact tests (performed by Syracuse Research Corporation) indicated no significant differences between groups in the incidences for hemolymphoreticular neoplasias (including the combined incidence for thymomas and "others").

The study authors also reported an increase in the total number of exposed rats with malignant tumors (of unspecified type): 14/38 and 22/40 for exposed males and females, compared with 11/45 and 10/49 for controls.² The exposed female total malignant tumor incidence is statistically significantly increased when compared with controls by the Fishers exact test. Because of the incomplete reporting of site-specific tumor incidence data and pathology, the study by Maltoni et al. (1983, 1985) is of limited use in evaluating the carcinogenicity of xylenes.

¹Denominators are the number of rats reported to have been alive at 58 weeks when the first hemolymphoreticular neoplasia was observed.

²The denominators are the reported numbers of rats alive at 33 weeks when the first malignant tumor was observed.

II.A.4. Supporting Data for Carcinogenicity

The genotoxicity of commercial xylenes and all three individual isomers has been studied and the results are, for the most part, negative (IARC, 1989). All studies cited in the GENE-TOX database are negative with the exception of one study for which no conclusion was drawn. Xylenes are not mutagenic in bacterial test systems with *Salmonella typhimurium* (Bos et al., 1981; Florin et al., 1980; NTP, 1986) and *Escherichia coli* (McCarroll et al., 1981) or in cultured mouse lymphoma cells (Litton Bionetics, 1978). Xylenes do not induce chromosomal aberrations or sister chromatid exchanges in Chinese hamster ovary cells (Anderson et al., 1990) or cultured human lymphocytes (Gerner-Smidt and Friedrich, 1978), chromosomal aberrations in rat bone marrow (Litton Bionetics, 1978), micronuclei in mouse bone marrow (Mohlshamipour et al., 1985), or sperm head abnormalities in rats (Washington et al., 1983). Technical grade xylenes, but not o- and m-xylene, are weakly mutagenic in *Drosophila* recessive lethal tests (Donner et al., 1980). No increase in the frequency of sister chromatid exchanges was observed in peripheral lymphocytes in individuals exposed to xylenes in an occupational setting (Haglund et al., 1980; Pap and Varga, 1987) or an experimental setting (Richer et al., 1993).

[Back to top](#)

II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure

Not applicable.

[Back to top](#)

II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure

Not applicable.

[Back to top](#)

II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)

II.D.1. EPA Documentation

Source Document – U.S. EPA, 2002

This assessment was peer reviewed by external scientists. Their comments have been evaluated carefully and incorporated in finalization of this IRIS summary. A record of these comments is included as an appendix to U.S. EPA, 2002. To review this appendix, exit to the toxicological review, Appendix A, Summary of and Response to External Peer Review Comments (PDF).

II.D.2. EPA Review (Carcinogenicity Assessment)

Agency Consensus Date – 01/30/2003

II.D.3. EPA Contacts (Carcinogenicity Assessment)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or holine.iris@epa.gov (internet address).

[Back to top](#)

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name -- Xylenes

CASRN -- 1330-20-7

Last Revised -- 02/21/2003

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[Back to top](#)

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[Back to top](#)

VI.C. Carcinogenicity Assessment References

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[Back to top](#)

VII. Revision History

Substance Name -- Xylenes
CASRN -- 1330-20-7

Date	Section	Description
09/26/1988	II.	Carcinogen summary on-line
07/01/1989	I.B.	Inhalation RfD now under review
07/01/1989	VI.	Bibliography on-line
03/01/1991	II.D.3.	Primary contact changed
03/01/1991	IV.F.1.	EPA contact changed
01/01/1992	I.A.7.	Secondary contact changed
01/01/1992	IV.	Regulatory actions updated
08/01/1995	I.B.	EPA's RfD/RfC and CRAVE workgroups were discontinued in May, 1995. Chemical substance reviews that were not completed by September 1995 were taken out of IRIS review. The IRIS Pilot Program replaced the workgroup functions beginning in September, 1995.
04/01/1997	III., IV., V.	Drinking Water Health Advisories, EPA Regulatory Actions, and Supplementary Data were removed from IRIS on or before April 1997. IRIS users were directed to the appropriate EPA Program Offices for this information.
12/10/1998	I., II.	This chemical is being reassessed under the IRIS Program.
02/21/2003	All	Revised RfD, RfC, Cancer assessment.

[Back to top](#)

VIII. Synonyms

Substance Name -- Xylenes
CASRN -- 1330-20-7
Last Revised -- 02/21/2003

108-38-3
1330-20-7
106-42-3
95-47-6
dimethylbenzene
1,2-dimethylbenzene
1,3-dimethylbenzene
1,4-dimethylbenzene
mixed xylenes
m-xylene
meta-xylene
o-xylene
ortho-xylene
p-xylene
para-xylene
xylenes

Note: A TOXICOLOGICAL REVIEW is available for this chemical in Adobe® PDF format (113 Pages, 498 Kbytes). Similar documents can be found in the [List of Available IRIS Toxicological Reviews](#).

* You will need Adobe Acrobat Reader, available as a free download, to view some of the files on this page. See [EPA's PDF page](#) to learn more about PDF, and for a link to the free Acrobat Reader.

[Back to top](#)

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URL: <http://www.epa.gov/iris/subst/0270.htm%23reforal>

ATTACHMENT II

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-1

Generalized Exposure Assessment
Imminent Hazard Evaluation

Potential Receptor	Age (years)	Current/ Future Exposure	Subchronic/ Chronic	Effects Evaluated	Potential Exposure Point		Potential Exposure Routes
					Media	Location	
Site Worker	18 - 45	Current	Subchronic	Threshold/Nonthreshold	Soil	Disposal Site Area, 0- to 3-ft depth	Ingestion, dermal contact
					Groundwater	No Exposure	
					Dust	Disposal Site Area, 0- to 3-ft depth	Inhalation/ingestion, inhalation
					Sediment	No Exposure	
					Vapors	Interior of Existing Building	Inhalation
					Drinking Water	No Exposure	
Construction Worker (future exposure)	18+	No Exposure	Subchronic	Threshold/Nonthreshold	Soil	No Exposure	
					Groundwater	No Exposure	
					Dust	No Exposure	
					Sediment	No Exposure	
					Vapors	No Exposure	
Utility Worker	22+	Current	Subchronic	Threshold/Nonthreshold	Soil	Disposal Site Area, 0- to 6-ft depth	Ingestion, dermal contact
					Groundwater	Limited, in trenches	Dermal contact
					Dust	Disposal Site Area, 0- to 6-ft depth	Inhalation/ingestion, inhalation
					Sediment	South Meadow Brook Outfall Area	Ingestion, dermal contact
					Surface Water	South Meadow Brook Outfall Area	Dermal contact
					Vapors	Limited, in trenches	Inhalation
Passerby/Trespasser	6 - 13 13 - 18 18 - 31	Current	Subchronic Chronic	Threshold/Nonthreshold Threshold/Nonthreshold	Soil	Disposal Site Area, 0- to 3-ft depth	Ingestion, dermal contact
					Groundwater	No Exposure	
					Dust	Disposal Site Area, 0- to 3-ft depth	Inhalation/ingestion, inhalation
					Sediment	South Meadow Brook Outfall Area	Ingestion, dermal contact
					Surface Water	South Meadow Brook Outfall Area	Dermal contact
					Vapors	No Exposure	
Resident	1 - 6 6 - 18 0 - 30	Current	Subchronic Chronic	Threshold Non-Threshold	Soil	Disposal Site Area, 0- to 3-ft depth	Ingestion, dermal contact
					Groundwater	No Exposure	
					Dust	Disposal Site Area, 0- to 3-ft Depth	Inhalation/ingestion, inhalation
					Sediment	South Meadow Brook Outfall Area	Ingestion, dermal contact
					Surface Water	South Meadow Brook Outfall Area	Dermal contact
					Vapors	Existing Site Building	Inhalation
					Drinking Water	No Exposure	

Notes:

Table B-2

	Receptor	Site Worker		Construction Worker		Utility Worker		Passerby/Trespasser (child)		Passerby/Trespasser (child)		Passerby/Trespasser (adult)		Resident (young child)		Resident (child)		Resident (adult)	
		Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference
General Receptor Characteristics	Age (years)	16 - 45	1	18 +	1	22	1	6 - 13	1	13-18	1	18 - 31	1	1 - 6	4	6 - 18	4	0 - 30	4
	Average Body Weight (BW) (Kg)	57.1	1	57.1	1	57.1	1	31.6	3	53.8	3	58.4	3	14	4	42	4	57.1	4
	Exposure Period (EP) (years)	5	2	0.5	2	0.00274	2	5	3	5	3	5	3	5	4	5	4	5	4
	Averaging Period (AP) (years)																		
	Non-cancer risk	5	2	0.5	2	0.00274	2	5	3	5	3	5	3	5	4	5	4	5	4
	Cancer risk	75	1	75	1	75	1	75	1	75	1	75	1	75	1	75	1	75	1
	Duration of Exposure Event (ED) (days/event)	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	
	Frequency of Exposure (EF) (events/year)	236	3	0	3	0	3	0	3	0	3	0	3	151		151		151	
	Exposure Period (EP, years)	5	3	0.5	3	0.00274	3	5	3	5	3	5	3	5		5		5	
	Total No. of Exposure Events	1,180		0		0		0		0		0		755	4	755	4	755	4
Indoor Exposure (soil/dust)	Duration of Exposure Event (ED) (days/event)	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	
	Frequency of Exposure (EF) (events/year)	129	3	260	3	365	3	62	3	62	3	62	3	214		214		214	
	Exposure Period (EP, years)	5	3	0.5	3	0.00274	3	5	3	5	3	5	3	5		5		5	
	Total No. of Exposure Events	645		130	3	1	3	310		310		310		1,070		1,070		1,070	
Outdoor Exposure (soil/dust)	Duration of Exposure Event (ED) (days/event)	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	
	Frequency of Exposure (EF) (events/year)	129	3	260	3	365	3	62	3	62	3	62	3	214		214		214	
	Exposure Period (EP, years)	5	3	0.5	3	0.00274	3	5	3	5	3	5	3	5		5		5	
	Total No. of Exposure Events	645		130	3	1	3	310		310		310		1,070		1,070		1,070	
Outdoor Exposure (Inhalation)	Duration of Exposure Event (ED) (days/event)	1	1	1	1	1	1	1	1	1	1	1	1	1		1		1	
	Frequency of Exposure (EF) (events/year)	173		260		365		62	3	62	3	62	3	214		214		214	
	Exposure Period (EP, years)	5	2	0.5	3	0.00274	3	5		5		5		5		5		5	
	Total No. of Exposure Events	865	3	130	3	1	3	310		310		310	3	1,070	4	1,070	4	1,070	4
Ingestion (Outdoor Exposure)	Daily Soil Ingestion Rate (IR) (mg/day)	50	5	100	5	100	5	50	6	50	6	50	6	58	4	21	4	21	4
Dermal Absorption (Outdoor Exposure)	Total Skin Surface Area (cm ²)	16900	7	16900	7	16900	7	10937	7	16170	7	18150	7	7200	7	13100	7	16900	7
	Fraction of Skin Exposed (unitless)	0.32	3	0.3	3	0.3	3	0.3	3	0.31	3	0.29	3	0.5	4	0.56	4	0.3	4
	Skin Surface Area in contact with soil (SA) (cm ² /day)	5408		5070		5070		3281.1		5012.7		5263.5		3600		7336		5070	
	Mass of Soil on Skin (AF) (mg/cm ²)	0.03	8	0.29	8	0.29	8	0.14	8	0.14	8	0.14	8						
	Normalized Mass of Soil on Skin (Residential only, mg/day)													432	4	901	4	618	4
Ingestion/Inhalation of Fugitive Dust (>10um, Outdoor Exposure)	Concentration of Respirable Particles (RP) (ug/m ³)	60	10	60	10	60	10	60	10	60	10	60	10	00	10	60	10	60	10
	Proportion of Contaminated Resp. Part. (P) (unitless)	1	9	1	9	1	9	1	10	1	10	1	10	1	10	1	10	1	10
	Ventilation Rate (VR) (m ³ /hour)	3.5	11	3.6	11	3.6	11	1.5	11	1.5	11	2.4	11	0.6	11	1.5	11	2.4	11
	Ventilation Rate (VR _i) (m ³ /day)	20	11	20	11	20	11	8.3	11	8.3	11	13.3	11	3.3	11	8.3	11	13.3	11
	Apportioning Factor (GI-Resp.) (unitless)	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9
	Apportioning Factor (Resp.) (unitless)	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9	0.5	9
	Exposure Frequency (events/day)	1	10	1	10	1	10	1	10	1	10	1	10	1	10	1	10	1	10
	Duration of Exposure Event (ED) (hours/event)	8	10	8	10	8	10	4	12	4	12	4	12	4	12	6	12	6	12
	Duration of Exposure Event (ED) (days/event)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Frequency of Exposure (EF) (events/year)	10	12	10	12	1	12	62	12	62	12	62	12	122	12	122	12	122	12
Ingestion of / Dermal Contact with Sediment	Exposure Period (EP, years)	5	2	0.5	2	1	2	5	2	5	2	5	2	5		5		5	
	Total No. of Exposure Events	50		20	12	1	12	310	12	310	12	310	12	610	12	610	12	610	12
	Daily Sediment Ingestion Rate (IR) (mg/day)	50	5	100	5	100	5	50	6	50	6	50	6	58	4	21	4	21	4
	Total Skin Surface Area (cm ²)	16900	7	19400	7	19400	7	10937	7	16170	7	18150	7	7200	7	13100	7	16150	7
	Fraction of Skin Exposed (unitless)	0.05	12	0.05	12	0.05	12	0.3	3	0.31	3	0.29	3	0.5	4	0.56	4	0.3	4
	Skin Surface Area in contact with soil (SA) (cm ² /day)	845		970		970		3281.1		5012.7		5263.5		3600		7336		5445	
	Mass of Sediment on Skin (AF) (mg/cm ²)	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1	8
	Duration of Exposure Event (ED) (hours/event)	4	12	8	12	4	12	4	12	4	12	4	12	4	12	4	12	4	12
	Frequency of Exposure (EF) (events/year)	10	12	20	12	1	12	62	12	62	12	62	12	122	14	122	14	122	14
	Total Skin Surface Area (cm ²)	16900	7	16900	7	16900	7	10937	7	16170	7	18150	7	7200	7	13100	7	16900	7
Dermal Contact, Groundwater	Fraction of Skin Exposed (unitless)	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12	0.05	12
	Skin Surface Area in contact with groundwater (SA) (cm ²)	845		845		845		548.85		808.5		907.5		360		655		845	

Table B-2

	Receptor	Site Worker	Construction Worker	Utility Worker	Passerby/Trespasser (child)	Passerby/Trespasser (child)	Passerby/Trespasser (adult)	Resident (young child)	Resident (child)	Resident (adult)
		References	References	References	References	References	References	References	References	References
Age Daily Dose/Exposure Factors	Ingestion: Soil									
	Noncancer Ingestion for Soil (NCIs) (1/day)	3.09E-07	1.25E-06	1.75E-06	2.89E-07	1.58E-07	1.45E-07	4.14E-06	5.00E-07	3.68E-07
	Cancer Ingestion for Soil (CIs) Factor (1/day)	2.06E-08	8.32E-09	6.40E-11	1.79E-08	1.05E-08	9.70E-09	2.76E-07	3.33E-08	2.45E-08
	Soil Dermal Absorption									
	Noncancer Dermal for Soil (NCDs) Factor (1/day)	1.00E-06	1.83E-05	2.57E-05	2.47E-06	2.22E-06	2.14E-06	3.09E-05	2.15E-05	1.08E-05
	Cancer Dermal for Soil (CDs) Factor (1/day)	6.69E-08	1.22E-07	9.41E-10	1.65E-07	1.48E-07	1.43E-07	2.08E-06	1.43E-06	7.22E-07
	Inhalation of Dust (GI)									
	Noncancer Ingestion for Dust (NCId) (1/day)	2.87E-08	4.31E-08	6.05E-08	3.87E-09	2.27E-09	3.35E-09	1.21E-08	1.51E-08	1.77E-08
	Cancer Ingestion for Dust (CId) Factor (1/day)	1.91E-09	2.87E-10	2.21E-12	2.58E-10	1.52E-10	2.23E-10	8.04E-10	1.01E-09	1.18E-09
	Noncancer Inhalation for Soil (NCInhs) Factor (1/day)	7.17E-09	1.08E-08	1.51E-08	9.68E-10	5.68E-10	8.38E-10	3.02E-09	3.77E-09	4.44E-09
	Cancer Part. Inh. for Soil (CInhs) Factor (1/day)	4.78E-10	7.19E-11	5.53E-13	6.45E-11	3.79E-11	5.58E-11	2.01E-10	2.51E-10	2.96E-10
	Groundwater Dermal Absorption									
	Noncancer Dermal for GW (NCDgw) Factor ((hrs*L*mg)/(kg*days*ug))	1.62E-06	6.49E-06	1.82E-07	1.18E-05	1.02E-05	1.08E-05	3.44E-05	2.09E-05	1.98E-05
	Cancer Dermal for GW (CDgw) Factor ((hrs*L*mg)/(kg*days*ug))	1.08E-07	4.32E-08	5.92E-12	7.84E-07	6.81E-07	7.04E-07	2.29E-06	1.39E-06	1.32E-06
	Ingestion: Sediment									
	Noncancer Ingestion for Sediment (NCIsed) (1/day)	2.40E-08	1.92E-07	1.75E-06	2.69E-07	1.58E-07	1.45E-07	1.38E-06	1.67E-07	1.23E-07
	Cancer Ingestion for Sediment (CIsed) Factor (1/day)	1.80E-09	1.28E-09	6.40E-11	1.79E-08	1.05E-08	9.70E-09	9.23E-08	1.11E-08	8.20E-09
	Dermal Absorption: Sediment									
	Noncancer Dermal for Sediment (NCDsed) Factor (1/day)	4.05E-07	1.86E-06	1.70E-05	1.76E-05	1.58E-05	1.53E-05	8.59E-05	5.84E-05	3.19E-05
	Cancer Dermal for Sediment (CDsed) Factor (1/day)	2.70E-08	1.24E-08	6.21E-10	1.18E-08	1.06E-08	1.02E-08	5.73E-06	3.89E-06	2.12E-06

Table B-2

Exposure Assumptions
Calculations
Imminent Hazard Evaluation

Exposure Factors			Units
Ingestion: Soil	NCIs CIs	$= \frac{IR(\text{mg/day}) * ED(\text{days}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 (\text{yrs/day})) * (1/1,000,000 (\text{kg/mg}))}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Dermal Absorption: Soil	NCDs CDs	$= \frac{SA (\text{cm}^2/\text{day}) * AF(\text{mg}/\text{cm}^2) * ED(\text{days}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 (\text{yrs/day})) * (1/1,000,000 (\text{kg/mg}))}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Ingestion: (Dust)	NCId CId	$= \frac{VR(\text{m}^3/\text{hr}) * RP(\text{ug}/\text{m}^3) * P * ED(\text{hr}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 (\text{yrs/day})) * (1/1,000,000,000 (\text{kg}/\text{ug}))}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Inhalation (Dust)	NCInhs CInhs	$= \frac{VR(\text{m}^3/\text{hr}) * RP(\text{ug}/\text{m}^3) * P * ED(\text{hr}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 (\text{yrs/day})) * (1/1,000,000,000 (\text{kg}/\text{ug}))}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Dermal Absorption (Groundwater)	NCDgw CDgw	$= \frac{SA(\text{cm}^2) * ED(\text{hrs}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 (\text{yrs/day})) * (1/1000 (\text{I}/\text{cm}^3)) * (1/1000(\text{mg}/\text{ug}))}{BW(\text{kg}) * AP(\text{yrs})}$	$\frac{\text{hrs} * \text{mg} * \text{I}}{\text{kg} * \text{day} * \text{cm} * \text{ug}}$
Inhalation (Vapors, groundwater)	NCInhw CInhw	$= \frac{ED(\text{hrs}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/24(\text{days}/\text{hr})) * (1/365(\text{yrs}/\text{day}))}{AP(\text{yrs})}$	unitless
Ingestion: Sediment	NCIsed CIsed	$= \frac{IR(\text{mg}/\text{day}) * ED(\text{days}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 (\text{yrs}/\text{day})) * (1/1,000,000 (\text{kg}/\text{mg}))}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Dermal Absorption: Sediment	NCDsed Cdsed	$= \frac{SA (\text{cm}^2/\text{day}) * AF(\text{mg}/\text{cm}^2) * ED(\text{days}) * EF(1/\text{yr}) * EP(\text{yrs}) * (1/365 (\text{yrs}/\text{day})) * (1/1,000,000 (\text{kg}/\text{mg}))}{BW(\text{kg}) * AP(\text{yrs})}$	1/day
Drinking Water Ingestion	NCIngw Cingw	$= \frac{VI(\text{I}/\text{day}) * EF(1/\text{day}) * ED(\text{days}) * EP(\text{yrs}) * 1/1,000 (\text{mg}/\text{ug})}{BW(\text{kg}) * AP(\text{yrs})}$	$\frac{\text{I} * \text{mg}}{\text{ug} * \text{kg} * \text{day}}$
Dermal Absorption (showering/bathing)	NCDdw CDdw	Equal to Ingestion times a factor related to the chemical-specific permeability constant (MADEP, 1995)	
Inhalation (showering/bathing)	NCInhdw CInhdw	$= \frac{NCIngw * BW (\text{kg}) * (1\text{d}/24\text{hr})}{VR (\text{m}^3/\text{hr})}$	$\frac{\text{I} * \text{mg}}{\text{ug} * \text{m}^3}$

- 1 WSC/ORS 95-141, 1995. Guidance for Disposal Site Risk Characterization in Support of the Massachusetts Contingency Plan.
- 2 WSC/ORS 95-141, 1995. Appendix B. Table B-1. Average of median body weights for females and males in receptor age group.
- 3 BWSC, 1996. DRAFT Commercial/Industrial Shortform, Exposure Scenarios.
- 4 WSC/ORS, 1992. Documentation for the Risk Assessment Short Form Residential Scenario.
- 5 BWSC/ORS, 2002. Calculation of an Enhanced Soil Ingestion Rate. DRAFT Technical Update.
- 6 WSC/ORS 95-141, 1995. Appendix B. Section C.
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- 8 BWSC/ORS, 2002. Weighted Skin Adherence Factors. DRAFT Technical Update.
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- 11 WSC/ORS 95-141, 1995. Appendix B. Section E. Table B-4.
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- 13 WSC/ORS 95-141, 1995. Appendix B. Section D.
- 14 Residential dermal contact with groundwater, presuming irrigation use of local groundwater. Exposure frequency is estimated as 4 hours per day for 122 days (daily during June, July, August, and September).
- 15 Development of MCP Risk-Based Levels for Soil and Groundwater. Paul Locke, MADEP/ORS, 2001.

Table B-3

Average Daily Dose and Risk Estimate
Soil Ingestion (0 to 3 feet)
Imminent Hazard Evaluation

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Site Worker (chronic)	3.09E-07	Passerby/Trespasser (child) (5 - 13) (chronic)	2.69E-07	Passerby/Trespasser (child) (13 - 18) (subchronic)	1.58E-07	Passerby/Trespasser (adult) (18 - 31) (chronic)	1.45E-07
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.41	1	1	4.00E-03	1.00E-02	1.28E-07	3.20E-05	1.11E-07	2.78E-05	6.52E-08	6.52E-06	6.01E-08	1.50E-05
Toluene	2.87	1	1	2.00E-01	2.00E+00	8.88E-07	4.44E-06	7.71E-07	3.86E-06	4.53E-07	2.26E-07	4.17E-07	2.09E-06
Ethylbenzene	7.59	1	1	1.00E-01	1.00E+00	2.35E-06	2.35E-05	2.04E-06	2.04E-05	1.20E-06	1.20E-06	1.10E-06	1.10E-05
Xylenes	56.29	1	1	2.00E-01	2.00E-01	1.74E-05	8.71E-05	1.51E-05	7.56E-05	8.89E-06	4.44E-05	8.19E-06	4.09E-05
Naphthalene	16.63	0.36	0.36	2.00E-02	2.00E-01	1.85E-06	9.26E-05	1.61E-06	8.04E-05	9.45E-07	4.73E-06	8.71E-07	4.35E-05
MTBE	0.95	1	1	1.00E-01	1.00E+00	2.95E-07	2.95E-06	2.56E-07	2.56E-06	1.51E-07	1.51E-07	1.39E-07	1.39E-06
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	138.65	1	1	4.00E-02	4.00E-01	4.29E-05	1.07E-03	3.73E-05	9.32E-04	2.19E-05	5.47E-05	2.02E-05	5.04E-04
C9 to C12 Aliphatics	338.95	1	1	1.00E-01	1.00E+00	1.05E-04	1.05E-03	9.11E-05	9.11E-04	5.35E-05	5.35E-05	4.93E-05	4.93E-04
C9 to C10 Aromatics	186.59	1	1	3.00E-02	3.00E-01	5.77E-05	1.92E-03	5.01E-05	1.67E-03	2.95E-05	9.82E-05	2.71E-05	9.05E-04
Polycyclic Aromatic Hydrocarbons													
Naphthalene	2.70	0.36	0.36	2.00E-02	2.00E-01	3.01E-07	1.50E-05	2.61E-07	1.31E-05	1.53E-07	7.67E-07	1.41E-07	7.07E-06
2-Methylnaphthalene	15.64	0.36	0.36	4.00E-03	4.00E-02	1.74E-06	4.36E-04	1.51E-06	3.78E-04	8.89E-07	2.22E-05	8.19E-07	2.05E-04
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	0.36	0.36	6.00E-02	6.00E-01	5.28E-08	8.81E-07	4.59E-08	7.65E-07	2.69E-08	4.49E-08	2.48E-08	4.14E-07
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	0.36	0.36	3.00E-02	3.00E-01	4.00E-07	1.33E-05	3.48E-07	1.16E-05	2.04E-07	6.81E-07	1.88E-07	6.27E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	4,181.44	1	1	1.00E-01	1.00E+00	1.29E-03	1.29E-02	1.12E-03	1.12E-02	6.60E-04	6.60E-04	6.08E-04	6.08E-03
C19 to C36 Aliphatics	1,542.96	1	1	2.00E+00	6.00E+00	4.78E-04	2.39E-04	4.15E-04	2.07E-04	2.44E-04	4.06E-05	2.24E-04	1.12E-04
C11 to C22 Aromatics	1,744.76	0.36	0.36	3.00E-02	3.00E-01	1.94E-04	6.48E-03	1.69E-04	5.63E-03	9.92E-05	3.31E-04	9.13E-05	3.04E-03
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							2.44E-02		2.12E-02		1.32E-03		1.15E-02

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-3

Average Daily Dose and Risk Estimate
Soil Ingestion (0 to 3 feet)
Imminent Hazard Evaluation

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects				Site Worker (chronic)	2.06E-08	Passive Ingestion (child) (6 - 13) (kg/day)	1.79E-08	Passive Ingestion (child) (13 - 18) (kg/day)	1.05E-08	Passive Ingestion (adult) (18 - 31) (kg/day)	9.70E-09
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.41	1	5.50E-02	8.52E-09	4.69E-10	7.40E-09	4.07E-10	4.35E-09	2.39E-10	4.00E-09	2.20E-10
Toluene	2.87	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	7.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	56.29	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	16.63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	138.65	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	338.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	186.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	2.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	15.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	4,181.44	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	1,542.96	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	1,744.76	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
				Subtotal:	4.69E-10	4.07E-10		2.39E-10		2.20E-10	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Table B-4

						Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Utility Worker (subchronic)	1.75E-06
Compound	Soil EPCs (0 - 6 ft) (mg/kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons 0							
Benzene	0.35	1	1	4.00E-03	1.00E-02	6.21E-07	6.21E-05
Toluene	2.26	1	1	2.00E-01	2.00E+00	3.97E-06	1.98E-06
Ethylbenzene	5.95	1	1	1.00E-01	1.00E+00	1.04E-05	1.04E-05
Xylenes	43.92	1	1	2.00E-01	2.00E-01	7.69E-05	3.85E-04
Naphthalene	13.02	0.36	0.36	2.00E-02	2.00E-01	8.21E-06	4.10E-05
MTBE	1.09	1	1	1.00E-01	1.00E+00	1.91E-06	1.91E-06
Volatile Petroleum Hydrocarbons 0							
C5 to C8 Aliphatics	121.41	1	1	4.00E-02	4.00E-01	2.13E-04	5.32E-04
C9 to C12 Aliphatics	296.61	1	1	1.00E-01	1.00E+00	5.19E-04	5.19E-04
C9 to C10 Aromatics	163.29	1	1	3.00E-02	3.00E-01	2.86E-04	9.53E-04
Polycyclic Aromatic Hydrocarbons 0							
Naphthalene	2.25	0.36	0.36	2.00E-02	2.00E-01	1.42E-06	7.11E-06
2-Methylnaphthalene	13.04	0.36	0.36	4.00E-03	4.00E-02	8.22E-06	2.06E-04
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Acenaphthene	0.40	0.36	0.36	6.00E-02	6.00E-01	2.54E-07	4.24E-07
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC
Phenanthrene	3.00	0.36	0.36	3.00E-02	3.00E-01	1.89E-06	6.30E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Extractable Petroleum Hydrocarbons 0							
C9 to C18 Aliphatics	3,485.37	1	1	1.00E-01	1.00E+00	6.10E-03	6.10E-03
C19 to C36 Aliphatics	1,286.63	1	1	2.00E+00	6.00E+00	2.25E-03	3.76E-04
C11 to C22 Aromatics	1,454.80	0.36	0.36	3.00E-02	3.00E-01	9.17E-04	3.06E-03
Volatile Chlorinated Hydrocarbons 0							
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC
Subtotal:						1.23E-02	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-4

Average Daily Dose and Risk Estimate
Soil Ingestion (0 to 6 feet)
Imminent Hazard Evaluation

Carcinogenic Effects				Receptor	Cis Factor (1/day)
				Utility Worker (subchronic)	6.40E-11
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF ₀) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons					
Benzene	0.35	1	5.50E-02	2.27E-11	1.25E-12
Toluene	2.26	NC	NC	NC	NC
Ethylbenzene	5.95	NC	NC	NC	NC
Xylenes	43.92	NC	NC	NC	NC
Naphthalene	13.02	NC	NC	NC	NC
MTBE	1.09	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons					
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC
C9 to C10 Aromatics	163.29	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons					
Naphthalene	2.25	NC	NC	NC	NC
2-Methylnaphthalene	13.04	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC
Acenaphthene	0.40	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC
Phenanthrene	3.00	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons					
C9 to C18 Aliphatics	3,485.37	NC	NC	NC	NC
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons					
Tetrachloroethylene	NC	1	5.10E-02	NC	NC
Subtotal:					1.25E-12

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Table B-5

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 3 feet)
Imminent Hazard Evaluation

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Site Worker (chronic)	2.87E-08	Passerby/Trespasser (child) (chronic) (6 - 13)	3.87E-09	Passerby/Trespasser (child) (subchronic) (13 - 18)	2.27E-09	Passerby/Trespasser (adult) (chronic) (18 - 31)	3.35E-09
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfD) (mg/Kg/day)	Subchronic Oral Reference Dose (RfD) (mg/Kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.41	1	1	4.00E-03	1.00E-02	1.18E-08	2.96E-06	1.60E-09	4.00E-07	9.39E-10	9.39E-08	1.38E-09	3.46E-07
Toluene	2.87	1	1	2.00E-01	2.00E+00	8.23E-08	4.11E-07	1.11E-08	5.55E-08	6.52E-09	3.26E-09	9.61E-09	4.81E-08
Ethylbenzene	7.59	1	1	1.00E-01	1.00E+00	2.18E-07	2.18E-06	2.94E-08	2.94E-07	1.73E-08	1.73E-08	2.54E-08	2.54E-07
Xylenes	56.29	1	1	2.00E-01	2.00E-01	1.61E-06	8.07E-06	2.18E-07	1.09E-06	1.28E-07	6.40E-07	1.89E-07	9.43E-07
Naphthalene	16.63	0.36	0.36	2.00E-02	2.00E-01	1.72E-07	8.59E-06	2.32E-08	1.16E-06	1.36E-08	6.80E-08	2.01E-08	1.00E-06
MTBE	0.95	1	1	1.00E-01	1.00E+00	2.74E-08	2.74E-07	3.69E-09	3.69E-08	2.17E-09	2.17E-09	3.20E-09	3.20E-08
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	138.65	1	1	4.00E-02	4.00E-01	3.98E-06	9.94E-05	5.37E-07	1.34E-05	3.15E-07	7.88E-07	4.65E-07	1.16E-05
C9 to C12 Aliphatics	338.95	1	1	1.00E-01	1.00E+00	9.72E-06	9.72E-05	1.31E-06	1.31E-05	7.71E-07	7.71E-07	1.14E-06	1.14E-05
C9 to C10 Aromatics	186.59	1	1	3.00E-02	3.00E-01	5.35E-06	1.78E-04	7.22E-07	2.41E-05	4.24E-07	1.41E-06	6.25E-07	2.08E-05
Polycyclic Aromatic Hydrocarbons													
Naphthalene	2.70	0.36	0.36	2.00E-02	2.00E-01	2.79E-08	1.39E-06	3.76E-09	1.88E-07	2.21E-09	1.10E-08	3.26E-09	1.63E-07
2-Methylnaphthalene	15.64	0.36	0.36	4.00E-03	4.00E-02	1.62E-07	4.04E-05	2.18E-08	5.45E-06	1.28E-08	3.20E-07	1.89E-08	4.72E-06
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	0.36	0.36	6.00E-02	6.00E-01	4.90E-09	8.16E-08	6.61E-10	1.10E-08	3.88E-10	6.47E-10	5.72E-10	9.53E-09
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	0.36	0.36	3.00E-02	3.00E-01	3.71E-08	1.24E-06	5.01E-09	1.67E-07	2.94E-09	9.80E-09	4.34E-09	1.45E-07
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	4,181.44	1	1	1.00E-01	1.00E+00	1.20E-04	1.20E-03	1.62E-05	1.62E-04	9.51E-06	9.51E-06	1.40E-05	1.40E-04
C19 to C36 Aliphatics	1,542.96	1	1	2.00E+00	6.00E+00	4.43E-05	2.21E-05	5.97E-06	2.99E-06	3.51E-06	5.85E-07	5.17E-06	2.59E-06
C11 to C22 Aromatics	1,744.76	0.36	0.36	3.00E-02	3.00E-01	1.80E-05	6.01E-04	2.43E-06	8.10E-05	1.43E-06	4.76E-06	2.10E-06	7.02E-05
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							2.26E-03	3.05E-04		1.90E-05		2.64E-04	

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-5

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 3 feet)
Imminent Hazard Evaluation

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects				Site Worker (chronic)	1.91E-09	Passerby/Trespasser (child) (chronic) (6 - 13)	2.58E-10	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.52E-10	Passerby/Trespasser (adult) (chronic) (18 - 31)	2.23E-10
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSFs) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.41	1	5.50E-02	7.90E-10	4.34E-11	1.07E-10	5.86E-12	6.26E-11	3.44E-12	9.23E-11	5.07E-12
Toluene	2.87	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	7.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	56.29	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	16.63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	138.65	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	338.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	186.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	2.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	15.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	4,181.44	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	1,542.96	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	1,744.76	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					4.34E-11		5.86E-12		3.44E-12		5.07E-12

Notes: NC = Not Calculated.

Table B-6

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 6 feet)
Imminent Hazard Evaluation

						Receptor	NCIS Factor (1/day)
Noncarcinogenic Effects						Utility Worker (subchronic exp.)	6.05E-08
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDs) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons							
Benzene	0.35	1	1	4.00E-03	1.00E-02	2.15E-08	2.15E-06
Toluene	2.26	1	1	2.00E-01	2.00E+00	1.37E-07	6.85E-08
Ethylbenzene	5.95	1	1	1.00E-01	1.00E+00	3.60E-07	3.60E-07
Xylenes	43.92	1	1	2.00E-01	2.00E-01	2.66E-06	1.33E-05
Naphthalene	13.02	0.36	0.36	2.00E-02	2.00E-01	2.84E-07	1.42E-06
MTBE	1.09	1	1	1.00E-01	1.00E+00	6.59E-08	6.59E-08
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	121.41	1	1	4.00E-02	4.00E-01	7.35E-06	1.84E-05
C9 to C12 Aliphatics	296.61	1	1	1.00E-01	1.00E+00	1.80E-05	1.80E-05
C9 to C10 Aromatics	163.29	1	1	3.00E-02	3.00E-01	9.88E-06	3.29E-05
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.25	0.36	0.36	2.00E-02	2.00E-01	4.91E-08	2.46E-07
2-Methylnaphthalene	13.04	0.36	0.36	4.00E-03	4.00E-02	2.84E-07	7.10E-06
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Acenaphthene	0.40	0.36	0.36	6.00E-02	6.00E-01	8.79E-09	1.47E-08
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC
Phenanthrene	3.00	0.36	0.36	3.00E-02	3.00E-01	6.53E-08	2.18E-07
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	3,485.37	1	1	1.00E-01	1.00E+00	2.11E-04	2.11E-04
C19 to C36 Aliphatics	1,286.63	1	1	2.00E+00	6.00E+00	7.79E-05	1.30E-05
C11 to C22 Aromatics	1,454.80	0.36	0.36	3.00E-02	3.00E-01	3.17E-05	1.06E-04
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC
					Subtotal:	4.24E-04	

Table B-6

Average Daily Dose
Inhalation/Ingestion of Fugitive Dust
(0 to 6 feet)
Imminent Hazard Evaluation

				Receptor	Cis Factor (1/day)
Carcinogenic Effects				Utility Worker (subchronic exp.)	2.21E-12
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons					
Benzene	0.35	1	5.50E-02	7.84E-13	4.31E-14
Toluene	2.26	NC	NC	NC	NC
Ethylbenzene	5.95	NC	NC	NC	NC
Xylenes	43.92	NC	NC	NC	NC
Naphthalene	13.02	NC	NC	NC	NC
MTBE	1.09	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons					
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC
C9 to C10 Aromatics	163.29	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons					
Naphthalene	2.25	NC	NC	NC	NC
2-Methylnaphthalene	13.04	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC
Acenaphthene	0.40	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC
Phenanthrene	3.00	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons					
C9 to C18 Aliphatics	3,485.37	NC	NC	NC	NC
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons					
Tetrachloroethylene	NC	1	5.10E-02	NC	NC
Subtotal:					4.31E-14

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-7

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 3 feet)
Imminent Hazard Evaluation

						Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Site Worker (chronic)	1.00E-06	Passerby/Trespasser (child) (chronic) (6 - 13)	2.47E-06	Passerby/Trespasser (child) (subchronic) (13 - 18)	2.22E-06	Passerby/Trespasser (adult) (chronic) (18 - 31)	2.14E-06
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfD) (mg/Kg/day)	Subchronic Oral Reference Dose (RfD) (mg/Kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.41	0.08	0.08	4.00E-03	1.00E-02	3.32E-08	8.30E-06	8.16E-08	2.04E-05	7.32E-08	7.32E-06	7.08E-08	1.77E-05
Toluene	2.87	0.12	0.12	2.00E-01	2.00E+00	3.46E-07	1.73E-05	8.50E-07	4.25E-06	7.63E-07	3.81E-07	7.38E-07	3.69E-06
Ethylbenzene	7.59	0.2	0.2	1.00E-01	1.00E+00	1.53E-06	1.53E-05	3.75E-06	3.75E-05	3.37E-06	3.37E-06	3.26E-06	3.26E-05
Xylenes	56.29	0.12	0.12	2.00E-01	2.00E-01	6.78E-06	3.39E-05	1.67E-05	8.34E-05	1.50E-05	7.48E-05	1.45E-05	7.24E-05
Naphthalene	16.63	0.1	0.1	2.00E-02	2.00E-01	1.67E-06	8.35E-05	4.11E-06	2.05E-04	3.68E-06	1.84E-05	3.56E-06	1.78E-04
MTBE	0.95	0.1	0.1	1.00E-01	1.00E+00	9.58E-08	9.58E-07	2.35E-07	2.35E-06	2.11E-07	2.11E-07	2.04E-07	2.04E-06
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	138.65	1	1	4.00E-02	4.00E-01	1.39E-04	3.48E-03	3.42E-04	8.56E-03	3.07E-04	7.68E-04	2.97E-04	7.43E-03
C9 to C12 Aliphatics	338.95	0.5	0.5	1.00E-01	1.00E+00	1.70E-04	1.70E-03	4.18E-04	4.18E-03	3.76E-04	3.76E-04	3.63E-04	3.63E-03
C9 to C10 Aromatics	186.59	0.5	0.5	3.00E-02	3.00E-01	9.37E-05	3.12E-03	2.30E-04	7.68E-03	2.07E-04	6.89E-04	2.00E-04	6.67E-03
Polycyclic Aromatic Hydrocarbons													
Naphthalene	2.70	0.1	0.1	2.00E-02	2.00E-01	2.71E-07	1.36E-05	6.67E-07	3.33E-05	5.98E-07	2.99E-06	5.79E-07	2.89E-05
2-Methylnaphthalene	15.64	0.1	0.1	4.00E-03	4.00E-02	1.57E-06	3.93E-04	3.86E-06	9.66E-04	3.47E-06	8.66E-05	3.35E-06	8.38E-04
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	0.1	0.1	6.00E-02	6.00E-01	4.76E-08	7.94E-07	1.17E-07	1.95E-06	1.06E-07	1.76E-07	1.02E-07	1.69E-06
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	0.1	0.1	3.00E-02	3.00E-01	3.61E-07	1.20E-05	8.87E-07	2.96E-05	7.96E-07	2.65E-06	7.70E-07	2.57E-05
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	4,181.44	0.5	0.5	1.00E-01	1.00E+00	2.10E-03	2.10E-02	5.16E-03	5.16E-02	4.63E-03	4.63E-03	4.48E-03	4.48E-02
C19 to C36 Aliphatics	1,542.96	0.1	0.1	2.00E+00	6.00E+00	1.55E-04	7.75E-05	3.81E-04	1.90E-04	3.42E-04	5.70E-05	3.31E-04	1.65E-04
C11 to C22 Aromatics	1,744.76	0.1	0.1	3.00E-02	3.00E-01	1.75E-04	5.84E-03	4.31E-04	1.44E-02	3.87E-04	1.29E-03	3.74E-04	1.25E-02
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							3.58E-02		8.80E-02		8.01E-03		7.64E-02

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-7

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 3 feet)
Imminent Hazard Evaluation

				Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)
Carcinogenic Effects				Site Worker (chronic)	6.69E-08	Passerby/Trespasser (child) (chronic) (6 - 13)	1.65E-07	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.48E-07	Passerby/Trespasser (adult) (chronic) (18 - 31)	1.43E-07
Compound	Soil EPCs (0 - 3 ft) (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSF _o) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.41	0.08	5.50E-02	2.21E-09	1.22E-10	5.44E-09	2.99E-10	4.88E-09	2.68E-10	4.72E-09	2.60E-10
Toluene	2.87	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	7.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	56.29	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	16.63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	0.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	138.65	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	338.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	186.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	2.70	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	15.64	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.47	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.59	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	4,181.44	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	1,542.96	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	1,744.76	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					1.22E-10			2.99E-10			2.60E-10

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-8

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 6 feet)
Imminent Hazard Evaluation

						Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Utility Worker (subchronic exp.)	2.57E-05
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons							
Benzene	0.35	0.08	0.08	4.00E-03	1.00E-02	7.30E-07	7.30E-05
Toluene	2.26	0.12	0.12	2.00E-01	2.00E+00	7.00E-06	3.50E-06
Ethylbenzene	5.95	0.2	0.2	1.00E-01	1.00E+00	3.06E-05	3.06E-05
Xylenes	43.92	0.12	0.12	2.00E-01	2.00E-01	1.36E-04	6.79E-04
Naphthalene	13.02	0.1	0.1	2.00E-02	2.00E-01	3.35E-05	1.68E-04
MTBE	1.09	0.1	0.1	1.00E-01	1.00E+00	2.80E-06	2.80E-06
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	121.41	1	1	4.00E-02	4.00E-01	3.13E-03	7.82E-03
C9 to C12 Aliphatics	296.61	0.5	0.5	1.00E-01	1.00E+00	3.82E-03	3.82E-03
C9 to C10 Aromatics	163.29	0.5	0.5	3.00E-02	3.00E-01	2.10E-03	7.01E-03
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.25	0.1	0.1	2.00E-02	2.00E-01	5.80E-06	2.90E-05
2-Methylnaphthalene	13.04	0.1	0.1	4.00E-03	4.00E-02	3.36E-05	8.39E-04
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC
Acenaphthene	0.40	0.1	0.1	6.00E-02	6.00E-01	1.04E-06	1.73E-06
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC
Phenanthrene	3.00	0.1	0.1	3.00E-02	3.00E-01	7.72E-06	2.57E-05
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	3,485.37	0.5	0.5	1.00E-01	1.00E+00	4.49E-02	4.49E-02
C19 to C36 Aliphatics	1,286.63	0.1	0.1	2.00E+00	6.00E+00	3.31E-03	5.52E-04
C11 to C22 Aromatics	1,454.80	0.1	0.1	3.00E-02	3.00E-01	3.75E-03	1.25E-02
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC
Subtotal:						7.84E-02	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-8

Average Daily Dose and Risk Estimate
Dermal Absorption: Soil
(0 to 6 feet)
Imminent Hazard Evaluation

				Receptor	CDs Factor (1/day)
Carcinogenic Effects				Utility Worker (subchronic exp.)	9.41E-10
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSF _o) (1/mg/kg/day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons					
Benzene	0.35	0.08	5.50E-02	2.67E-11	1.47E-12
Toluene	2.26	NC	NC	NC	NC
Ethylbenzene	5.95	NC	NC	NC	NC
Xylenes	43.92	NC	NC	NC	NC
Naphthalene	13.02	NC	NC	NC	NC
MTBE	1.09	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons					
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC
C9 to C10 Aromatics	163.29	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons					
Naphthalene	2.25	NC	NC	NC	NC
2-Methylnaphthalene	13.04	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC
Acenaphthene	0.40	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC
Phenanthrene	3.00	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons					
C9 to C18 Aliphatics	3,485.37	NC	NC	NC	NC
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons					
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC
Subtotal:					1.47E-12

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-9

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 3 feet)
Imminent Hazard Evaluation

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Site Worker (chronic)	7.17E-09	Passerby/Trespasser (child) (chronic) (6 - 13)	9.68E-10	Passerby/Trespasser (child) (subchronic) (13 - 18)	5.68E-10	Passerby/Trespasser (adult) (chronic) (18 - 31)	8.38E-10
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Inhalation Reference Concentration (RfCcs) (mg/m3)	Subchronic Inhalation Reference Concentration (RfCscs) (mg/m3)	Average Daily Exposure (mg/m3)	Hazard Index (unitless)	Average Daily Exposure (mg/m3)	Hazard Index (unitless)	Average Daily Exposure (mg/m3)	Hazard Index (unitless)	Average Daily Exposure (mg/m3)	Hazard Index (unitless)
Volatile Hydrocarbons													
Benzene	0.35	1	1	3.00E-02	9.00E-02	2.54E-09	8.48E-08	3.43E-10	1.14E-08	2.02E-10	2.24E-09	2.97E-10	9.90E-09
Toluene	2.26	1	1	4.00E-01	4.00E-01	1.62E-08	4.06E-08	2.19E-09	5.48E-09	1.29E-09	3.22E-09	1.90E-09	4.74E-09
Ethylbenzene	5.95	1	1	1.00E+00	1.00E+00	4.27E-08	4.27E-08	5.76E-09	5.76E-09	3.38E-09	3.38E-09	4.98E-09	4.98E-09
Xylenes	43.92	1	1	1.00E-01	3.00E-01	3.15E-07	3.15E-06	4.25E-08	4.25E-07	2.50E-08	8.32E-08	3.68E-08	3.68E-07
Naphthalene	13.02	0.36	0.36	3.00E-03	3.00E-03	3.36E-08	1.12E-05	4.53E-09	1.51E-06	2.66E-09	8.88E-07	3.93E-09	1.31E-06
MTBE	1.09	1	1	3.00E+00	3.00E+00	7.81E-09	2.60E-09	1.05E-09	3.51E-10	6.19E-10	2.06E-10	9.12E-10	3.04E-10
Volatile Petroleum Hydrocarbons													
C5 to C8 Aliphatics	121.41	1	1	2.00E-01	2.00E-01	8.71E-07	4.35E-06	1.17E-07	5.87E-07	6.90E-08	3.45E-07	1.02E-07	5.09E-07
C9 to C12 Aliphatics	296.61	1	1	2.00E-01	2.00E-01	2.13E-06	1.08E-05	2.87E-07	1.43E-06	1.69E-07	8.43E-07	2.48E-07	1.24E-06
C9 to C10 Aromatics	163.29	1	1	5.00E-02	5.00E-02	1.17E-06	2.34E-05	1.58E-07	3.16E-06	9.28E-08	1.86E-06	1.37E-07	2.74E-06
Polycyclic Aromatic Hydrocarbons													
Naphthalene	2.25	0.36	0.36	3.00E-03	3.00E-03	5.82E-09	1.94E-06	7.85E-10	2.62E-07	4.61E-10	1.54E-07	6.80E-10	2.27E-07
2-Methylnaphthalene	13.04	0.36	0.36	5.00E-02	5.00E-01	3.37E-08	6.73E-07	4.54E-09	9.08E-08	2.67E-09	5.34E-09	3.93E-09	7.86E-08
Acenaphthylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.40	0.36	0.36	5.00E-02	5.00E-01	1.04E-09	2.08E-08	1.41E-10	2.81E-09	8.26E-11	1.65E-10	1.22E-10	2.43E-09
Fluorene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.00	0.36	0.36	5.00E-02	5.00E-01	7.74E-09	1.55E-07	1.04E-09	2.09E-08	6.14E-10	1.23E-09	9.04E-10	1.81E-08
Anthracene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons													
C9 to C18 Aliphatics	3,485.37	1	1	2.00E-01	2.00E-01	2.50E-05	1.25E-04	3.37E-06	1.69E-05	1.98E-06	9.90E-06	2.92E-06	1.46E-05
C19 to C36 Aliphatics	1,286.63	1	1	NC	NC	9.23E-06	NC	1.24E-06	NC	7.31E-07	NC	1.08E-06	NC
C11 to C22 Aromatics	1,454.80	0.36	0.36	5.00E-02	5.00E-02	3.76E-06	7.51E-05	5.07E-07	1.01E-05	2.98E-07	5.95E-06	4.39E-07	8.77E-06
Volatile Chlorinated Hydrocarbons													
Tetrachloroethylene	NC	1	1	4.60E+00	4.60E+00	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:							2.56E-04	3.45E-05		2.00E-05		2.99E-05	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-9

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 3 feet)
Imminent Hazard Evaluation

		Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects		Site Worker (chronic)	4.78E-10	Passerby/Trespasser (child) (5 - 13)	6.45E-11	Passerby/Trespasser (child) (subchronic) (13 - 18)	3.79E-11	Passerby/Trespasser (adult) (chronic) (18 - 31)	5.58E-11		
Compound	Soil EPCs (0 - 6 ft) (mg/kg)	Cancer Ingestion	Inhalation Unit Risk (UR) (1/ug/m ³)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons											
Benzene	0.35	1	7.80E-06	1.70E-10	1.32E-15	2.29E-11	1.78E-16	1.34E-11	1.05E-16	1.98E-11	1.54E-16
Toluene	2.26	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	5.95	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	43.92	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	13.02	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	1.09	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	163.29	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	2.25	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	13.04	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	0.40	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	3.00	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	2.09E-05	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	2.09E-05	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	2.09E-03	NC	NC	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	2.09E-04	NC	NC	NC	NC	NC	NC	NC	NC
Dibenz(a,h)anthracene	NC	0.28	2.09E-03	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	3,485.37	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	5.50E-05	NC	NC	NC	NC	NC	NC	NC	NC
Subtotal:					1.32E-15		1.78E-16		1.05E-16		1.54E-16

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-10

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 6 feet)
Imminent Hazard Evaluation

						Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Utility Worker (subchronic exp.)	1.51E-08
Compound	Soil EPCs (0-6 ft) (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Inhalation Reference Concentration (RfC _c) (mg/m ³)	Subchronic Inhalation Reference Concentration (RfC _{sc}) (mg/m ³)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
Volatile Hydrocarbons							
Benzene	0.35	1	1	3.00E-02	9.00E-02	5.37E-09	5.96E-08
Toluene	2.26	1	1	4.00E-01	4.00E-01	3.43E-08	8.57E-08
Ethylbenzene	5.95	1	1	1.00E+00	1.00E+00	9.00E-08	9.00E-08
Xylenes	43.92	1	1	1.00E-01	3.00E-01	6.65E-07	2.22E-06
Naphthalene	13.02	0.36	0.36	3.00E-03	3.00E-03	7.09E-08	2.36E-05
MTBE	1.09	1	1	3.00E+00	3.00E+00	1.65E-08	5.49E-09
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	121.41	1	1	2.00E-01	2.00E-01	1.84E-06	9.19E-06
C9 to C12 Aliphatics	296.61	1	1	2.00E-01	2.00E-01	4.49E-06	2.24E-05
C9 to C10 Aromatics	163.29	1	1	5.00E-02	5.00E-02	2.47E-06	4.94E-05
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.25	0.36	0.36	3.00E-03	3.00E-03	1.23E-08	4.09E-06
2-Methylnaphthalene	13.04	0.36	0.36	5.00E-02	5.00E-01	7.10E-08	1.42E-07
Acenaphthylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Acenaphthene	0.40	0.36	0.36	5.00E-02	5.00E-01	2.20E-09	4.40E-09
Fluorene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Phenanthrene	3.00	0.36	0.36	5.00E-02	5.00E-01	1.63E-08	3.27E-08
Anthracene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Fluoranthene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Pyrene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Chrysene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	5.00E-02	5.00E-01	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	5.00E-02	5.00E-01	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	3,485.37	1	1	2.00E-01	2.00E-01	5.27E-05	2.64E-04
C19 to C36 Aliphatics	1,286.63	1	1	NC	NC	1.95E-05	NC
C11 to C22 Aromatics	1,454.80	0.36	0.36	5.00E-02	5.00E-02	7.92E-06	1.58E-04
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	1	1	4.60E+00	4.60E+00	NC	NC
Subtotal:							5.34E-04

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-10

Average Daily Exposure and Risk Estimate
Inhalation of Fugitive Dust
(0 to 6 feet)
Imminent Hazard Evaluation

			Receptor	Cis Factor (1/day)	
Carcinogenic Effects			Utility Worker (subchronic exp.)	5.53E-13	
Compound	Soil EPCs (0 - 6 ft) (mg/Kg)	Cancer Ingestion	Inhalation Unit Risk (UR) (1ug/m3)	Lifetime Average Daily Exposure (ug/m ³)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons					
Benzene	0.35	1	7.80E-06	1.96E-13	1.53E-18
Toluene	2.26	NC	NC	NC	NC
Ethylbenzene	5.95	NC	NC	NC	NC
Xylenes	43.92	NC	NC	NC	NC
Naphthalene	13.02	NC	NC	NC	NC
MTBE	1.09	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons					
C5 to C8 Aliphatics	121.41	NC	NC	NC	NC
C9 to C12 Aliphatics	296.61	NC	NC	NC	NC
C9 to C10 Aromatics	163.29	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons					
Naphthalene	2.25	NC	NC	NC	NC
2-Methylnaphthalene	13.04	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC
Acenaphthene	0.40	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC
Phenanthrene	3.00	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	2.09E-04	NC	NC
Chrysene	NC	0.28	2.09E-05	NC	NC
Benzo(b)fluoranthene	NC	0.28	2.09E-04	NC	NC
Benzo(k)fluoranthene	NC	0.28	2.09E-05	NC	NC
Benzo(a)pyrene	NC	0.28	2.09E-03	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	2.09E-04	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	2.09E-03	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons					
C9 to C18 Aliphatics	3,485.37	NC	NC	NC	NC
C19 to C36 Aliphatics	1,286.63	NC	NC	NC	NC
C11 to C22 Aromatics	1,454.80	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons					
Tetrachloroethylene	NC	1	5.50E-05	NC	NC
Subtotal:				1.53E-18	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Table B-11

Average Daily Exposure and Risk Estimate
Incidental Ingestion of Sediment
Imminent Hazard Evaluation

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Passerby/Trespasser (child) (chronic) (5 - 13)	2.69E-07	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.58E-07	Passerby/Trespasser (adult) (chronic) (18 - 31)	1.45E-07
Compound	Sediment EPConc (mg/kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	NC	1	1	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	1	1	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	NC	1	1	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	NC	0.36	0.36	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
MTBE	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	1	1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	NC	0.36	0.36	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	0.36	0.36	4.00E-03	4.00E-02	5.26E-08	1.32E-05	3.09E-08	7.73E-07	2.85E-08	7.12E-06
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	0.36	0.36	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	0.36	0.36	3.00E-02	3.00E-01	1.72E-07	5.75E-06	1.01E-07	3.38E-07	9.33E-08	3.11E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	619.29	1	1	1.00E-01	1.00E+00	1.66E-04	1.66E-03	9.78E-05	9.78E-05	9.01E-05	9.01E-04
C19 to C36 Aliphatics	670.71	1	1	2.00E+00	6.00E+00	1.80E-04	9.01E-05	1.06E-04	1.76E-05	9.75E-05	4.88E-05
C11 to C22 Aromatics	485.29	0.36	0.36	3.00E-02	3.00E-01	4.70E-05	1.57E-03	2.76E-05	9.19E-05	2.54E-05	8.47E-04
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:							3.34E-03		2.08E-04		1.81E-03

Notes:
BDL = Below Detection Limit
NC = Not Calculated

						Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)	Receptor	NCIs Factor (1/day)
Noncarcinogenic Effects						Resident (Young Child) (subchronic)	1.38E-06	Resident (Child)	1.67E-07	Resident (Adult)	1.23E-07
Compound	Sediment EPCsed (mg/Kg)	Chronic Ingestion	Subchronic Ingestion	Chronic Oral Reference Dose (RfDc) (mg/Kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/Kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	NC	1	1	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	1	1	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	NC	1	1	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	NC	0.36	0.36	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
MTBE	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	1	1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	1	1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	NC	0.36	0.36	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	0.36	0.36	4.00E-03	4.00E-02	2.71E-07	6.78E-06	3.27E-03	8.18E-06	2.41E-08	6.02E-06
Acenaphthylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	0.36	0.36	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC
Fluorene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	0.36	0.36	3.00E-02	3.00E-01	8.88E-07	2.96E-06	1.07E-07	3.57E-06	7.89E-08	2.63E-06
Anthracene	NC	0.36	0.36	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.36	0.36	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	0.28	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.36	0.36	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	619.29	1	1	1.00E-01	1.00E+00	8.58E-04	8.58E-04	1.03E-04	1.03E-03	7.61E-05	7.61E-04
C19 to C36 Aliphatics	670.71	1	1	2.00E+00	6.00E+00	9.29E-04	1.55E-04	1.12E-04	5.60E-05	8.24E-05	4.12E-05
C11 to C22 Aromatics	485.29	0.36	0.36	3.00E-02	3.00E-01	2.42E-04	8.06E-04	2.92E-05	9.73E-04	2.15E-05	7.16E-04
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	1	1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:							1.83E-03		2.08E-03		1.53E-03

Notes:
BDL = Below Detection Limit
NC = Not Calculated

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects				Passive receptor (child) (chronic) (60-120)	1.79E-08	Passive receptor (child) (subchronic) (60-120)	1.05E-08	Passive receptor (adult) (chronic) (60-360)	9.70E-09
Compound	Sediment EPCsed (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF) (1/mg/kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons									
Benzene	NC	1	5.50E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons									
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	619.29	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	670.71	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	485.29	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC
Subtotal:					NC			NC	NC

Table B-11

				Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)	Receptor	Cis Factor (1/day)
Carcinogenic Effects				Resident (Young Child) (subchronic)	9.23E-08	Resident (Child)	1.11E-08	Resident (Adult)	8.20E-09
Compound	Sediment EPCsed (mg/Kg)	Cancer Ingestion	Oral Cancer Slope Factor (CSF) (1/mg/kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons									
Benzene	NC	1	5.50E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons									
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.28	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.28	7.30E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.28	7.30E+00	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	619.29	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	670.71	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	485.29	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	1	5.10E-02	NC	NC	NC	NC	NC	NC
Subtotal:					NC	NC		NC	

Notes:
BDL = Below Detection Limit
NC = Not Calculated

						Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Passerby/Trespasser (child) (chronic) (6 - 13)	2.69E-07	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.58E-07	Passerby/Trespasser (adult) (chronic) (18 - 31)	1.45E-07
Compound	Sediment EPDsed (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	NC	0.08	0.08	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	0.12	0.12	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	0.2	0.2	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	NC	0.12	0.12	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	NC	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
MTBE	NC	0.1	0.1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	0.5	0.5	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	0.5	0.5	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	NC	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	0.1	0.1	4.00E-03	4.00E-02	1.46E-08	3.65E-06	8.58E-09	2.15E-07	7.91E-09	1.98E-06
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	0.1	0.1	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	0.1	0.1	3.00E-02	3.00E-01	4.79E-08	1.60E-06	2.81E-08	9.38E-08	2.59E-08	8.64E-07
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	619.29	0.5	0.5	1.00E-01	1.00E+00	8.32E-05	8.32E-04	4.89E-05	4.89E-05	4.50E-05	4.50E-04
C19 to C36 Aliphatics	670.71	0.1	0.1	2.00E+00	6.00E+00	1.80E-05	9.01E-06	1.06E-05	1.76E-06	9.75E-06	4.88E-06
C11 to C22 Aromatics	485.29	0.1	0.1	3.00E-02	3.00E-01	1.30E-05	4.35E-04	7.66E-06	2.55E-05	7.06E-06	2.35E-04
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:							1.28E-03		7.65E-05		6.93E-04

						Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)	Receptor	NCDs Factor (1/day)
Noncarcinogenic Effects						Resident (Young Child) (subchronic)	1.38E-05	Resident (Child)	1.67E-07	Resident (Adult)	1.23E-07
Compound	Sediment EPCsed (mg/Kg)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)	Average Daily Dose (mg/Kg-day)	Hazard Index (unitless)
Volatile Hydrocarbons											
Benzene	NC	0.08	0.08	4.00E-03	1.00E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	0.12	0.12	2.00E-01	2.00E+00	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	0.2	0.2	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Xylenes	NC	0.12	0.12	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC
Naphthalene	NC	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
MTBE	NC	0.1	0.1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons											
C5 to C8 Aliphatics	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	0.5	0.5	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	0.5	0.5	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons											
Naphthalene	NC	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	0.1	0.1	4.00E-03	4.00E-02	7.53E-08	1.88E-06	9.09E-09	2.27E-06	6.68E-09	1.67E-06
Acenaphthylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	0.1	0.1	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC
Fluorene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	0.1	0.1	3.00E-02	3.00E-01	2.47E-07	8.22E-07	2.98E-08	9.93E-07	2.19E-08	7.30E-07
Anthracene	NC	0.1	0.1	3.00E-01	3.00E+00	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC
Pyrene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons											
C9 to C18 Aliphatics	619.29	0.5	0.5	1.00E-01	1.00E+00	4.29E-04	4.29E-04	5.17E-05	5.17E-04	3.81E-05	3.81E-04
C19 to C36 Aliphatics	670.71	0.1	0.1	2.00E+00	6.00E+00	9.29E-05	1.55E-05	1.12E-05	5.60E-06	8.24E-06	4.12E-06
C11 to C22 Aromatics	485.29	0.1	0.1	3.00E-02	3.00E-01	6.72E-05	2.24E-04	8.11E-06	2.70E-04	5.97E-06	1.99E-04
Volatile Chlorinated Hydrocarbons											
Tetrachloroethylene	NC	0.1	0.1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC
Subtotal:							6.71E-04		7.97E-04		5.86E-04

				Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)
Carcinogenic Effects				Passerby/Trespasser (child) (chronic) (6 - 13)	1.18E-06	Passerby/Trespasser (child) (subchronic) (13 - 18)	1.06E-06	Passerby/Trespasser (adult) (chronic) (18 - 31)	1.02E-06
Compound	Sediment EPCsed (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSF) (1/mg/kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons									
Benzene	NC	0.08	5.50E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons									
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	619.29	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	670.71	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	485.29	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC	NC	NC	NC	NC
Subtotal:					NC		NC		NC

				Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)	Receptor	CDs Factor (1/day)
Carcinogenic Effects				Resident (Young Child)	5.73E-06	Resident (Child)	3.89E-06	Resident (Adult)	2.12E-06
Compound	Sediment EPCsed (mg/Kg)	Cancer Dermal	Oral Cancer Slope Factor (CSF _o) (1/mg/kg-day)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons									
Benzene	NC	0.08	5.50E-02	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Xylenes	NC	NC	NC	NC	NC	NC	NC	NC	NC
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
MTBE	NC	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C12 Aliphatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
C9 to C10 Aromatics	NC	NC	NC	NC	NC	NC	NC	NC	NC
Polycyclic Aromatic Hydrocarbons									
Naphthalene	NC	NC	NC	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene	0.54	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Phenanthrene	1.78	NC	NC	NC	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Chrysene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	0.02	7.30E-02	NC	NC	NC	NC	NC	NC
Benzo(a)pyrene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	0.02	7.30E-01	NC	NC	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	0.02	7.30E+00	NC	NC	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	619.29	NC	NC	NC	NC	NC	NC	NC	NC
C19 to C36 Aliphatics	670.71	NC	NC	NC	NC	NC	NC	NC	NC
C11 to C22 Aromatics	485.29	NC	NC	NC	NC	NC	NC	NC	NC
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	0.1	5.10E-02	NC	NC	NC	NC	NC	NC
Subtotal:					NC		NC		NC

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-13

Average Daily Dose
Dermal Absorption of Surface Water
Imminent Hazard Evaluation

Noncarcinogenic Effects							SW-1													
Compound	SW-1 EPCW (µg/L)	Permeability Coefficient Kp (cm/hour)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDc) (mg/kg/day)	Receptor	NCQgw Factor (hrs ^{1/2} ·mg/kg·day ⁻¹ · µg ⁻¹)	Receptor	NCQgw Factor (hrs ^{1/2} ·mg/kg·day ⁻¹ · µg ⁻¹)	Receptor	NCQgw Factor (hrs ^{1/2} ·mg/kg·day ⁻¹ · µg ⁻¹)	Receptor	NCQgw Factor (hrs ^{1/2} ·mg/kg·day ⁻¹ · µg ⁻¹)	Receptor	NCQgw Factor (hrs ^{1/2} ·mg/kg·day ⁻¹ · µg ⁻¹)				
Volatile Hydrocarbons							SW-1													
Benzene	NC	1.55E-02	0.08	0.08	4.00E-03	1.00E-02	Site Worker 18-45	NC	Passerby/Tresspass or (child)	1.19E-05	Passerby/Tresspass or (child)	1.02E-05	Passerby/Tresspass or (adult)	1.00E-05	Resident (Young Child)	3.44E-05	Resident (Child)	2.09E-05	Resident (Adult)	1.68E-05
Toluene	NC	3.27E-02	0.12	0.12	2.00E-01	2.00E+00	Average Daily Exposure (µg/m3)	Hazard Index (unitless)	Average Daily Exposure (µg/m3)	Hazard Index (unitless)	Average Daily Exposure (µg/m3)	Hazard Index (unitless)	Average Daily Exposure (µg/m3)	Hazard Index (unitless)	Average Daily Exposure (µg/m3)	Hazard Index (unitless)	Average Daily Exposure (µg/m3)	Hazard Index (unitless)	Average Daily Exposure (µg/m3)	Hazard Index (unitless)
Ethylbenzene	NC	5.21E-02	0.2	0.2	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Xylenes	NC	5.63E-02	0.12	0.12	2.00E-01	2.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Naphthalene	7.65	4.95E-02	0.1	0.1	2.00E-02	2.00E-01	NC	NC	4.45E-07	2.22E-05	3.86E-07	1.93E-06	3.99E-07	2.00E-05	1.30E-06	6.50E-06	7.89E-07	3.94E-05	7.49E-07	3.74E-05
MTBE	NC	2.57E-03	0.1	0.1	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Volatile Petroleum Hydrocarbons							SW-1													
C5 to C8 Aliphatics	NC	NC	1	1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
C9 to C12 Aliphatics	66.43	NC	0.5	0.5	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
C9 to C10 Aromatics	59.96	NC	0.5	0.5	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Polycyclic Aromatic Hydrocarbons							SW-1													
Naphthalene	NC	4.95E-02	0.1	0.1	2.00E-02	2.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
2-Methylnaphthalene	4.89	9.79E-02	0.1	0.1	4.00E-03	4.00E-02	NC	NC	5.63E-07	1.41E-04	4.89E-07	1.22E-05	5.06E-07	1.26E-04	1.65E-06	4.12E-05	9.99E-07	2.50E-04	9.48E-07	2.37E-04
Acenaphthylene	NC	1.16E-01	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Acenaphthene	NC	9.20E-02	0.1	0.1	6.00E-02	6.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Fluorene	NC	1.23E-01	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Phenanthrene	5.16	1.55E-01	0.1	0.1	3.00E-02	3.00E-01	NC	NC	9.43E-07	3.14E-05	8.19E-07	2.73E-06	8.47E-07	2.82E-05	2.76E-06	9.19E-06	1.67E-06	5.57E-05	1.59E-06	5.29E-05
Fluoranthene	NC	2.43E-01	0.1	0.1	4.00E-02	4.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Pyrene	NC	3.11E-01	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Benzo(a)anthracene	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Chrysene	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Benzo(b)fluoranthene	NC	7.75E-01	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Benzo(k)fluoranthene	NC	7.06E-01	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Benzo(a)pyrene	NC	7.51E-01	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Indeno(1,2,3-cd)pyrene	NC	1.16E+00	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Dibenzo(a,h)anthracene	NC	1.68E+00	0.02	0.02	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Benzo(g,h,i)perylene	NC	1.04E+00	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Extractable Petroleum Hydrocarbons							SW-1													
C9 to C18 Aliphatics	2,714.29	NC	0.5	0.5	1.00E-01	1.00E+00	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
C19 to C36 Aliphatics	1,757.14	NC	0.1	0.1	2.00E+00	6.00E+00	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
C11 to C22 Aromatics	1,857.14	NC	0.1	0.1	3.00E-02	3.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Volatile Chlorinated Hydrocarbons							SW-1													
Tetrachloroethylene	NC	3.54E-02	0.1	0.1	1.00E-02	1.00E-01	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Subtotal:							SW-1													
							NC	NC	1.94E-04	1.69E-05	1.75E-04	5.69E-05	3.45E-04	3.27E-04						

Notes: NC = Not Calculated.

Table B-13

Carcinogenic Effects				
SW-1				
Compound	SW-1 EPCSW [µg/L]	Permeability Coefficient Kg (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor [CSF] [1/mg/kg-day]
Volatile Hydrocarbons				
Benzene	NC	1.55E-02	0.08	5.50E-02
Toluene	NC	3.27E-02	NC	NC
Ethylbenzene	NC	5.21E-02	NC	NC
Xylenes	NC	5.63E-02	NC	NC
Naphthalene	7.65	4.95E-02	NC	NC
MTBE	NC	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons				
C5 to C8 Aliphatics	NC	NC	NC	NC
C9 to C12 Aliphatics	66.43	NC	NC	NC
C9 to C10 Aromatics	69.96	NC	NC	NC
Polycyclic Aromatic Hydrocarbons				
Naphthalene	NC	4.95E-02	NC	NC
2-Methylnaphthalene	4.89	9.79E-02	NC	NC
Acenaphthylene	NC	1.16E-01	NC	NC
Acenaphthene	NC	9.20E-02	NC	NC
Fluorene	NC	1.23E-01	NC	NC
Phenanthrene	5.16	1.55E-01	NC	NC
Anthracene	NC	1.79E-01	NC	NC
Fluoranthene	NC	2.43E-01	NC	NC
Pyrene	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons				
C9 to C18 Aliphatics	2,714.29	NC	NC	NC
C19 to C36 Aliphatics	1,757.14	NC	NC	NC
C11 to C22 Aromatics	1,857.14	NC	NC	NC
Volatile Chlorinated Hydrocarbons				
Tetrachloroethylene	NC	3.54E-02	0.1	5.10E-02
Subtotal:				

Receptor	CDgw Factor ((hr*L*mg)/(kg*da yr*ug))	Receptor	CDgw Factor ((hr*L*mg)/(kg*da yr*ug))	Receptor	CDgw Factor ((hr*L*mg)/(kg*da yr*ug))	Receptor	CDgw Factor ((hr*L*mg)/(kg*da yr*ug))	Receptor	CDgw Factor ((hr*L*mg)/(kg*da yr*ug))	Receptor	CDgw Factor ((hr*L*mg)/(kg*da yr*ug))	Receptor	CDgw Factor ((hr*L*mg)/(kg*da yr*ug))	Receptor	CDgw Factor ((hr*L*mg)/(kg*da yr*ug))
Site Worker (18-43)	NC	Passerby/Respass- er (child) (chronic) (18-43)	7.84E-07	Passerby/Respass- er (child) (subchronic) (18-43)	8.81E-07	Passerby/Respass- er (adult) (chronic) (18-43)	7.04E-07	Resident (Young Child)	1.29E-06	Resident (Child)	1.39E-06	Resident (Adult)	1.32E-06		
Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/kg-day)	Excess Lifetime Cancer Risk (ELCR)		
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC



Noncarcinogenic Effects		DCW-1	DCW-2	ECS-1	ECS-4		
Compound	DCW-1 Trench EPCalc.gw (µg/m3)	DCW-2 Trench EPCalc.gw (µg/m3)	ECS-1 Trench EPCalc.gw (µg/m3)	ECS-4 Trench EPCalc.gw (µg/m3)	Units Conversion	Chronic Inhalation Reference Concentration (RfC) (mg/m3)	Subchronic Inhalation Reference Concentration (RfCsc) (mg/m3)
Volatile Hydrocarbons							
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	0.001	3.00E-02	9.00E-02
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	0.001	4.00E-01	4.00E-01
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	0.001	1.00E+00	1.00E+00
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	0.001	1.00E-01	3.00E-01
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	0.001	3.00E-03	3.00E-03
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	0.001	3.00E+00	3.00E+00
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	0.001	2.00E-01	2.00E-01
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	0.001	2.00E-01	2.00E-01
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	0.001	5.00E-02	5.00E-02
Polycyclic Aromatic Hydrocarbons							
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	0.001	5.00E-02	5.00E-01
Acenaphthylene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Acenaphthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluorene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Phenanthrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Chrysene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	0.001	5.00E-02	5.00E-01
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	0.001	2.00E-01	2.00E-01
C19 to C36 Aliphatics	NC	NC	NC	NC	0.001	NC	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	0.001	5.00E-02	5.00E-02
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	4.23E-04	0.001	4.60E+00	4.60E+00
					Subtotal		

Page 1 of 8
RA IHE, ADE Inh. Trench

[illegible]Page 2 of 8
RA IHE, ADE Inh. Trench

ECS-1			
Receptor	NClngw Factor (unitless)	Receptor	NClngw Factor (unitless)
Construction Worker	NC	Utility Worker	3.33E-01
Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
NC	NC	2.15E-05	2.39E-04
NC	NC	3.52E-06	8.80E-06
NC	NC	2.71E-05	2.71E-05
NC	NC	8.31E-06	2.77E-05
NC	NC	4.53E-05	1.51E-02
NC	NC	2.14E-06	7.13E-07
NC	NC	9.05E-05	4.53E-04
NC	NC	8.75E-05	4.38E-04
NC	NC	1.22E-04	2.44E-03
NC	NC	1.46E-05	4.87E-03
NC	NC	1.11E-05	2.22E-05
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	3.38E-05	1.69E-04
NC	NC	NC	NC
NC	NC	1.35E-04	2.70E-03
NC	NC	NC	NC
NC	NC	NC	NC

Page 3 of 8
RA IHE, ADE Inh. Trench

Table B-14

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench
Imminent Hazard Evaluation

							DCW-1			
Carcinogenic Effects							Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)
							Construction Worker	NC	Utility Worker	1.22E-05
Compound	DCW-1 Trench EPCalc,gw (µg/m³)	DCW-2 Trench EPCalc,gw (µg/m³)	ECS-1 Trench EPCalc,gw (µg/m³)	ECS-4 Trench EPCalc,gw (µg/m³)	Units Conversion	Inhalation Unit Risk (UR) (1/µg/m³)	Lifetime Average Daily Exposure (ug/m³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m³)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons										
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	1.000	7.80E-06	NC	NC	9.06E-07	7.06E-12
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	1.000	NC	NC	NC	8.70E-06	NC
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	1.000	NC	NC	NC	1.17E-05	NC
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	1.000	NC	NC	NC	7.72E-05	NC
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	1.000	NC	NC	NC	1.79E-05	NC
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	1.000	NC	NC	NC	2.60E-04	NC
Volatile Petroleum Hydrocarbons										
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	1.000	NC	NC	NC	2.79E-05	NC
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	1.000	NC	NC	NC	2.03E-04	NC
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	1.000	NC	NC	NC	2.16E-04	NC
Polycyclic Aromatic Hydrocarbons										
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	1.000	NC	NC	NC	3.19E-06	NC
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	1.000	NC	NC	NC	2.99E-07	NC
Acenaphthylene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Chrysene	NC	NC	NC	NC	1.000	2.09E-05	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	1.000	2.09E-05	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	1.000	2.09E-03	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.000	2.09E-03	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons										
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	1.000	NC	NC	NC	1.40E-05	NC
C19 to C36 Aliphatics	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	1.000	NC	NC	NC	1.05E-05	NC
Volatile Chlorinated Hydrocarbons										
Tetrachloroethylene	NC	NC	NC	4.23E-04	1.000	5.50E-05	NC	NC	NC	NC
Subtotal:								NC		7.05E-12

Table B-14

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench
Imminent Hazard Evaluation

Carcinogenic Effects							DCW-2			
							Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)
							Construction Worker	NC	Utility Worker	1.22E-05
Compound	DCW-1 Trench EPCair,gw (ug/m3)	DCW-2 Trench EPCair,gw (ug/m3)	ECS-1 Trench EPCair,gw (ug/m3)	ECS-4 Trench EPCair,gw (ug/m3)	Units Conversion	Inhalation Unit Risk (UR) (1ug/m3)	Lifetime Average Daily Exposure (ug/m3)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (ug/m3)	Excess Lifetime Cancer Risk (ELCR)
Volatile Hydrocarbons										
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	1.000	7.80E-06	NC	NC	3.62E-08	2.82E-13
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	1.000	NC	NC	NC	3.32E-08	NC
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	1.000	NC	NC	NC	3.11E-08	NC
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	1.000	NC	NC	NC	7.86E-08	NC
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	1.000	NC	NC	NC	7.88E-08	NC
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	1.000	NC	NC	NC	7.80E-08	NC
Volatile Petroleum Hydrocarbons										
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	1.000	NC	NC	NC	4.53E-06	NC
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	1.000	NC	NC	NC	3.96E-07	NC
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	1.000	NC	NC	NC	2.28E-07	NC
Polycyclic Aromatic Hydrocarbons										
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	1.000	NC	NC	NC	8.08E-09	NC
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	1.000	NC	NC	NC	7.87E-09	NC
Acenaphthylene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Acenaphthene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Fluorene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Phenanthrene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Anthracene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Fluoranthene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Pyrene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Chrysene	NC	NC	NC	NC	1.000	2.09E-05	NC	NC	NC	NC
Benzo(b)fluoranthene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Benzo(k)fluoranthene	NC	NC	NC	NC	1.000	2.09E-05	NC	NC	NC	NC
Benzo(a)pyrene	NC	NC	NC	NC	1.000	2.09E-03	NC	NC	NC	NC
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.000	2.09E-04	NC	NC	NC	NC
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.000	2.09E-03	NC	NC	NC	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
Extractable Petroleum Hydrocarbons										
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	1.000	NC	NC	NC	4.94E-07	NC
C19 to C36 Aliphatics	NC	NC	NC	NC	1.000	NC	NC	NC	NC	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	1.000	NC	NC	NC	4.94E-07	NC
Volatile Chlorinated Hydrocarbons										
Tetrachloroethylene	NC	NC	NC	4.23E-04	1.000	5.50E-05	NC	NC	NC	NC
Subtotal:								NC		2.82E-13

Table B-14

Average Daily Exposure and Risk Estimate
Inhalation of Vapors: Trench
Imminent Hazard Evaluation

Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4		
Compound	DCW-1 Trench EPCair,gw (µg/m³)	DCW-2 Trench EPCair,gw (µg/m³)	ECS-1 Trench EPCair,gw (µg/m³)	ECS-4 Trench EPCair,gw (µg/m³)	Units Conversion	Inhalation Unit Risk (UR) (1/µg/m³)
Volatile Hydrocarbons						
Benzene	7.44E-02	2.97E-03	6.45E-02	3.35E-01	1.000	7.80E-06
Toluene	7.14E-01	2.72E-03	1.06E-02	1.11E-01	1.000	NC
Ethylbenzene	9.60E-01	2.55E-03	8.13E-02	1.04E-01	1.000	NC
Xylenes	6.34E+00	6.46E-03	2.49E-02	2.42E-01	1.000	NC
Naphthalene	1.47E+00	6.47E-03	1.36E-01	1.22E-01	1.000	NC
MTBE	2.13E+01	6.40E-01	6.42E-03	4.09E+00	1.000	NC
Volatile Petroleum Hydrocarbons						
C5 to C8 Aliphatics	2.29E+00	3.72E-01	2.72E-01	2.28E-01	1.000	NC
C9 to C12 Aliphatics	1.67E+01	3.25E-02	2.63E-01	7.85E+00	1.000	NC
C9 to C10 Aromatics	1.77E+01	1.87E-02	3.65E-01	9.19E+00	1.000	NC
Polycyclic Aromatic Hydrocarbons						
Naphthalene	2.62E-01	6.64E-04	4.39E-02	5.05E-02	1.000	NC
2-Methylnaphthalene	2.45E-02	6.46E-04	3.32E-02	5.27E-02	1.000	NC
Acenaphthylene	NC	NC	NC	NC	1.000	NC
Acenaphthene	NC	NC	NC	NC	1.000	NC
Fluorene	NC	NC	NC	NC	1.000	NC
Phenanthrene	NC	NC	NC	NC	1.000	NC
Anthracene	NC	NC	NC	NC	1.000	NC
Fluoranthene	NC	NC	NC	NC	1.000	NC
Pyrene	NC	NC	NC	NC	1.000	NC
Benzo(a)anthracene	NC	NC	NC	NC	1.000	2.09E-04
Chrysene	NC	NC	NC	NC	1.000	2.09E-05
Benzo(b)fluoranthene	NC	NC	NC	NC	1.000	2.09E-04
Benzo(k)fluoranthene	NC	NC	NC	NC	1.000	2.09E-05
Benzo(a)pyrene	NC	NC	NC	NC	1.000	2.09E-03
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.000	2.09E-04
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.000	2.09E-03
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.000	NC
Extractable Petroleum Hydrocarbons						
C9 to C18 Aliphatics	1.15E+00	4.06E-02	1.01E-01	1.03E+00	1.000	NC
C19 to C36 Aliphatics	NC	NC	NC	NC	1.000	NC
C11 to C22 Aromatics	8.60E-01	4.05E-02	4.05E-01	1.28E+00	1.000	NC
Volatile Chlorinated Hydrocarbons						
Tetrachloroethylene	NC	NC	NC	4.23E-04	1.000	5.50E-05
Subtotal:						

ECS-1			
Receptor	CinHgW Factor (unitless)	Receptor	CinHgW Factor (unitless)
Construction Worker	NC	Utility Worker	1.22E-05
Lifetime Average Daily Exposure (µg/m³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m³)	Excess Lifetime Cancer Risk (ELCR)
NC	NC	7.86E-07	6.13E-12
NC	NC	1.29E-07	NC
NC	NC	9.90E-07	NC
NC	NC	3.04E-07	NC
NC	NC	1.68E-06	NC
NC	NC	7.81E-08	NC
NC	NC	3.31E-06	NC
NC	NC	3.20E-06	NC
NC	NC	4.45E-06	NC
NC	NC	5.34E-07	NC
NC	NC	4.05E-07	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	1.23E-06	NC
NC	NC	NC	NC
NC	NC	4.94E-06	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	6.13E-12	

Subtotal:[illegible]

Notes: NC = Not Calculated.

Subtotal:Page 1 of 8
RA IHE, ADD Dermal GW

Notes: NC = Not Calculated.



Noncarcinogenic Effects		DCW-1	DCW-2	ECS-1	ECS-4				
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Chronic Dermal	Subchronic Oral	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	0.08	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	0.12	0.12	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	0.2	0.2	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	0.12	0.12	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	0.1	0.1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0.5	0.5	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.5	0.5	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	0.1	0.1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	1.16E-01	0.1	0.1	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	9.20E-02	0.1	0.1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	1.23E-01	0.1	0.1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	1.55E-01	0.1	0.1	3.00E-02	3.00E-01
Fluoranthene	NC	NC	NC	NC	2.43E-01	0.1	0.1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	3.11E-01	0.1	0.1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	0.02	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	0.02	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	0.02	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	0.1	0.1	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	0.5	0.5	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	0.1	0.1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.1	0.1	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	0.1	1.00E-02	1.00E-01

Subtotal:

[illegible]

Notes: NC = Not Calculated.

Subtotal:3.14E-05Page 3 of 8
RA IHE, ADD Dermal GW



Noncarcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4					
Compound	DCW-1 EPC _{gw} (µg/L)	DCW-2 EPC _{gw} (µg/L)	ECS-1 EPC _{gw} (µg/L)	ECS-4 EPC _{gw} (µg/L)	Permeability Coefficient K _p (cm/hour)	Chronic Dermal	Subchronic Dermal	Chronic Oral Reference Dose (RfDc) (mg/kg/day)	Subchronic Oral Reference Dose (RfDsc) (mg/kg/day)
Volatile Hydrocarbons									
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	0.08	4.00E-03	1.00E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	0.12	0.12	2.00E-01	2.00E+00
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	0.2	0.2	1.00E-01	1.00E+00
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	0.12	0.12	2.00E-01	2.00E-01
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	0.1	0.1	1.00E-01	1.00E+00
Volatile Petroleum Hydrocarbons									
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	1	1	4.00E-02	4.00E-01
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	0.5	0.5	1.00E-01	1.00E+00
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	0.5	0.5	3.00E-02	3.00E-01
Polycyclic Aromatic Hydrocarbons									
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	0.1	0.1	2.00E-02	2.00E-01
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	0.1	0.1	4.00E-03	4.00E-02
Acenaphthylene	NC	NC	NC	NC	1.16E-01	0.1	0.1	3.00E-02	3.00E-01
Acenaphthene	NC	NC	NC	NC	9.20E-02	0.1	0.1	6.00E-02	6.00E-01
Fluorene	NC	NC	NC	NC	1.23E-01	0.1	0.1	4.00E-02	4.00E-01
Phenanthrene	NC	NC	NC	NC	1.55E-01	0.1	0.1	3.00E-02	3.00E-01
Fluoranthene	NC	NC	NC	NC	2.43E-01	0.1	0.1	4.00E-02	4.00E-01
Pyrene	NC	NC	NC	NC	3.11E-01	0.1	0.1	3.00E-02	3.00E-01
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	0.02	3.00E-02	3.00E-01
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	0.02	3.00E-02	3.00E-01
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	0.02	3.00E-02	3.00E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	0.02	3.00E-02	3.00E-01
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	0.1	0.1	3.00E-02	3.00E-01
Extractable Petroleum Hydrocarbons									
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	0.5	0.5	1.00E-01	1.00E+00
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	0.1	0.1	2.00E+00	6.00E+00
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	0.1	0.1	3.00E-02	3.00E-01
Volatile Chlorinated Hydrocarbons									
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	0.1	1.00E-02	1.00E-01

Subtotal:

[illegible]

Notes: NC = Not Calculated.



Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSF _o) (1kg/kg/day)
Volatile Hydrocarbons							
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	NC	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	NC	NC
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	NC	NC
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	NC	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	NC	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	NC	NC
Polycyclic Aromatic Hydrocarbons							
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	NC	NC
Acenaphthylene	NC	NC	NC	NC	1.16E-01	NC	NC
Acenaphthene	NC	NC	NC	NC	9.20E-02	NC	NC
Fluorene	NC	NC	NC	NC	1.23E-01	NC	NC
Phenanthrene	NC	NC	NC	NC	1.55E-01	NC	NC
Anthracene	NC	NC	NC	NC	1.79E-01	NC	NC
Fluoranthene	NC	NC	NC	NC	2.43E-01	NC	NC
Pyrene	NC	NC	NC	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	NC	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	800.00	NC	NC	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	NC	NC
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	5.10E-02

[illegible]

Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSFo) (1mg/kg/day)
Volatile Hydrocarbons							
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	NC	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	NC	NC
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	NC	NC
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	NC	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	NC	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	NC	NC
Polycyclic Aromatic Hydrocarbons							
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	NC	NC
Acenaphthylene	NC	NC	NC	NC	1.16E-01	NC	NC
Acenaphthene	NC	NC	NC	NC	9.20E-02	NC	NC
Fluorene	NC	NC	NC	NC	1.23E-01	NC	NC
Phenanthrene	NC	NC	NC	NC	1.55E-01	NC	NC
Anthracene	NC	NC	NC	NC	1.79E-01	NC	NC
Fluoranthene	NC	NC	NC	NC	2.43E-01	NC	NC
Pyrene	NC	NC	NC	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	NC	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	NC	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	NC	NC
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	5.10E-02

Subtotal:

Notes: NC = Not Calculated.

[illegible]



Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 EPCgw (µg/L)	DCW-2 EPCgw (µg/L)	ECS-1 EPCgw (µg/L)	ECS-4 EPCgw (µg/L)	Permeability Coefficient Kp (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSFo) (1/mg/kg/day)
Volatile Hydrocarbons							
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	NC	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	NC	NC
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	NC	NC
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	NC	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	NC	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	NC	NC
Polycyclic Aromatic Hydrocarbons							
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	NC	NC
Acenaphthylene	NC	NC	NC	NC	1.16E-01	NC	NC
Acenaphthene	NC	NC	NC	NC	9.20E-02	NC	NC
Fluorene	NC	NC	NC	NC	1.23E-01	NC	NC
Phenanthrene	NC	NC	NC	NC	1.55E-01	NC	NC
Anthracene	NC	NC	NC	NC	1.79E-01	NC	NC
Fluoranthene	NC	NC	NC	NC	2.43E-01	NC	NC
Pyrene	NC	NC	NC	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	NC	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	NC	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	NC	NC
Volatile Chlorinated Hydrocarbons							
Tetrachloromethylene	NC	NC	NC	0.50	3.54E-02	0.1	5.10E-02

Subtotal:

[illegible]



Carcinogenic Effects	DCW-1	DCW-2	ECS-1	ECS-4			
Compound	DCW-1 EPC _{Gw} (µg/L)	DCW-2 EPC _{Gw} (µg/L)	ECS-1 EPC _{Gw} (µg/L)	ECS-4 EPC _{Gw} (µg/L)	Permeability Coefficient K _p (cm/hour)	Cancer Dermal	Oral Cancer Slope Factor (CSF _o) (1/mg/kg/day)
Volatile Hydrocarbons							
Benzene	78.13	3.12	67.80	352.00	1.55E-02	0.08	5.50E-02
Toluene	818.33	3.12	12.10	127.00	3.27E-02	NC	NC
Ethylbenzene	1,174.67	3.12	99.43	127.00	5.21E-02	NC	NC
Xylenes	7,356.67	7.49	28.93	280.70	5.63E-02	NC	NC
Naphthalene	1,850.67	8.12	170.67	153.00	4.95E-02	NC	NC
MTBE	24,843.33	745.00	7.47	4,760.00	2.57E-03	NC	NC
Volatile Petroleum Hydrocarbons							
C5 to C8 Aliphatics	3,760.00	610.83	446.33	375.00	NC	NC	NC
C9 to C12 Aliphatics	27,383.33	53.40	431.67	12,900.00	NC	NC	NC
C9 to C10 Aromatics	29,116.67	30.82	600.67	15,100.00	NC	NC	NC
Polycyclic Aromatic Hydrocarbons							
Naphthalene	329.30	0.83	55.07	63.40	4.95E-02	NC	NC
2-Methylnaphthalene	31.63	0.83	42.87	68.00	9.79E-02	NC	NC
Acenaphthylene	NC	NC	NC	NC	1.16E-01	NC	NC
Acenaphthene	NC	NC	NC	NC	9.20E-02	NC	NC
Fluorene	NC	NC	NC	NC	1.23E-01	NC	NC
Phenanthrene	NC	NC	NC	NC	1.55E-01	NC	NC
Anthracene	NC	NC	NC	NC	1.79E-01	NC	NC
Fluoranthene	NC	NC	NC	NC	2.43E-01	NC	NC
Pyrene	NC	NC	NC	NC	3.11E-01	NC	NC
Benzo(a)anthracene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-01
Chrysene	NC	NC	NC	NC	5.19E-01	0.02	7.30E-02
Benzo(b)fluoranthene	NC	NC	NC	NC	7.75E-01	0.02	7.30E-01
Benzo(k)fluoranthene	NC	NC	NC	NC	7.06E-01	0.02	7.30E-02
Benzo(a)pyrene	NC	NC	NC	NC	7.51E-01	0.02	7.30E+00
Indeno(1,2,3-cd)pyrene	NC	NC	NC	NC	1.16E+00	0.02	7.30E-01
Dibenzo(a,h)anthracene	NC	NC	NC	NC	1.68E+00	0.02	7.30E+00
Benzo(g,h,i)perylene	NC	NC	NC	NC	1.04E+00	NC	NC
Extractable Petroleum Hydrocarbons							
C9 to C18 Aliphatics	1,888.00	66.67	166.67	1,700.00	NC	NC	NC
C19 to C36 Aliphatics	775.00	66.67	100.00	600.00	NC	NC	NC
C11 to C22 Aromatics	1,413.50	66.67	666.67	2,100.00	NC	NC	NC
Volatile Chlorinated Hydrocarbons							
Tetrachloroethylene	NC	NC	NC	0.50	3.54E-02	0.1	5.10E-02

Subtotal:

ECS-4		Imminent Hazard	
Receptor	CDGw Factor ((hrs*L*mg)/(kg*days*u g))	Receptor	CDGw Factor ((hrs*L*mg)/(kg*days* g))
Construction Worker	NC	Utility Worker	5.92E-12
Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Dose (mg/Kg-day)	Excess Lifetime Cancer Risk (ELCR)
NC	NC	7.08E-08	3.89E-09
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	NC	NC
NC	NC	2.87E-10	1.46E-11
	NC		3.80E-08

Notes: NC = Not Calculated.

Table B-16

Average Daily Exposure and Risk Estimate
Interior Air Exposures
Imminent Hazard Evaluation

Noncarcinogenic Effects

Compound Name	Interior Air First Floor Office (µg/m ³)	Interior Air Second Floor Living (µg/m ³)	Unit Conversion	Inhalation Reference Concentration (chronic) RfC (mg/m ³)	Inhalation Reference Concentration (subchronic) RfC (mg/m ³)
Air Petroleum Hydrocarbons (MADEP)				0.00E+00	
Benzene	NC	NC	0.001	3.00E-02	9.00E-02
Toluene	1.08E+02	3.91E+01	0.001	4.00E-01	4.00E-01
Ethylbenzene	1.40E+01	5.20E+00	0.001	1.00E+00	1.00E+00
Total Xylenes	NC	NC	0.001	6.00E-02	6.00E-02
Naphthalene	NC	NC	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	NC	NC	0.001	5.00E-02	5.00E-01
MTBE	6.57E+01	4.40E+01	0.001	3.00E+00	3.00E+00
1,3-Butadiene	NC	NC	0.001	2.00E-03	2.00E-03
C5 - C8 Aliphatics	4.79E+02	2.39E+02	0.001	2.00E-01	2.00E-01
C9 - C12 Aliphatics	2.42E+02	9.71E+01	0.001	2.00E-01	2.00E-01
C9 - C10 Aromatics	1.84E+02	5.35E+01	0.001	5.00E-02	5.00E-02
Subtotal:					

First Floor Office							
Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)
Site Worker 18-45	2.19E-01	Resident (Young Child)	1.00E+00	Resident (Child)	1.00E+00	Resident (Adult)	1.00E+00
Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
NC	NC	NC	NC	NC	NC	NC	NC
2.37E-02	5.92E-02	1.08E-01	2.70E-01	1.08E-01	2.70E-01	1.08E-01	2.70E-01
3.07E-03	3.07E-03	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
1.44E-02	4.80E-03	6.57E-02	2.19E-02	6.57E-02	2.19E-02	6.57E-02	2.19E-02
NC	NC	NC	NC	NC	NC	NC	NC
1.05E-01	5.25E-01	4.79E-01	2.40E+00	4.79E-01	2.40E+00	4.79E-01	2.40E+00
5.30E-02	2.65E-01	2.42E-01	1.21E+00	2.42E-01	1.21E+00	2.42E-01	1.21E+00
4.03E-02	8.07E-01	1.84E-01	3.68E+00	1.84E-01	3.68E+00	1.84E-01	3.68E+00
1.66E+00		7.59E+00		7.59E+00		7.59E+00	

Table B-16

Average Daily Exposure and Risk Estimate
Interior Air Exposures
Imminent Hazard Evaluation

Noncarcinogenic Effects

Compound Name	Interior Air First Floor Office (µg/m ³)	Interior Air Second Floor Living (µg/m ³)	Units Conversion	Inhalation Reference Concentration (chronic) RfC (mg/m ³)	Inhalation Reference Concentration (subchronic) RfC (mg/m ³)
Air Petroleum Hydrocarbons (MADEP)				0.00E+00	
Benzene	NC	NC	0.001	3.00E-02	9.00E-02
Toluene	1.08E+02	3.91E+01	0.001	4.00E-01	4.00E-01
Ethylbenzene	1.40E+01	5.20E+00	0.001	1.00E+00	1.00E+00
Total Xylenes	NC	NC	0.001	6.00E-02	6.00E-02
Naphthalene	NC	NC	0.001	3.00E-03	3.00E-03
2-Methylnaphthalene	NC	NC	0.001	5.00E-02	5.00E-01
MTBE	6.57E+01	4.40E+01	0.001	3.00E+00	3.00E+00
1,3-Butadiene	NC	NC	0.001	2.00E-03	2.00E-03
C5 - C8 Aliphatics	4.79E+02	2.39E+02	0.001	2.00E-01	2.00E-01
C9 - C12 Aliphatics	2.42E+02	9.71E+01	0.001	2.00E-01	2.00E-01
C9 - C10 Aromatics	1.84E+02	5.35E+01	0.001	5.00E-02	5.00E-02

Subtotal:

Second Floor Living							
Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)	Receptor	NCInhw Factor (unitless)
Site Worker 18-45	2.19E-01	Resident (Young Child)	1.00E+00	Resident (Child)	1.00E+00	Resident (Adult)	1.00E+00
Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)	Average Daily Exposure (mg/m ³)	Hazard Index (unitless)
NC	NC	NC	NC	NC	NC	NC	NC
8.57E-03	2.14E-02	3.91E-02	9.78E-02	3.91E-02	9.78E-02	3.91E-02	9.78E-02
1.14E-03	1.14E-03	5.20E-03	5.20E-03	5.20E-03	5.20E-03	5.20E-03	5.20E-03
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
9.64E-03	3.21E-03	4.40E-02	1.47E-02	4.40E-02	1.47E-02	4.40E-02	1.47E-02
NC	NC	NC	NC	NC	NC	NC	NC
5.24E-02	2.62E-01	2.39E-01	1.20E+00	2.39E-01	1.20E+00	2.39E-01	1.20E+00
2.13E-02	1.06E-01	9.71E-02	4.86E-01	9.71E-02	4.86E-01	9.71E-02	4.86E-01
1.17E-02	2.35E-01	5.35E-02	1.07E+00	5.35E-02	1.07E+00	5.35E-02	1.07E+00
6.29E-01		2.87E+00		2.87E+00		2.87E+00	

Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts

Table B-16

Average Daily Exposure and Risk Estimate
Interior Air Exposures
Imminent Hazard Evaluation

Carcinogenic Effects

Compound Name	Interior Air First Floor Office (µg/m ³)	Interior Air Second Floor Living (µg/m ³)	Units Conversion	Inhalation Unit Risk (UR) (1/(µg/m ³))
Air Petroleum Hydrocarbons (MADEP)	0.00E+00	0.00E+00		
Benzene	NC	NC	1	7.80E-06
Toluene	1.08E+02	3.91E+01	1	NC
Ethylbenzene	1.40E+01	5.20E+00	1	NC
Total Xylenes	NC	NC	1	NC
Naphthalene	NC	NC	1	NC
2-Methylnaphthalene	NC	NC	1	NC
MTBE	6.57E+01	4.40E+01	1	NC
1,3-Butadiene	NC	NC	1	3.00E-05
C5 - C8 Aliphatics	4.79E+02	2.39E+02	1	NC
C9 - C12 Aliphatics	2.42E+02	9.71E+01	1	NC
C9 - C10 Aromatics	1.84E+02	5.35E+01	1	NC
Subtotal:				

First Floor Office							
Receptor	Cinhgw Factor (unitless)	Receptor	Cinhgw Factor (unitless)	Receptor	Cinhgw Factor (unitless)	Receptor	Cinhgw Factor (unitless)
Site Worker 18-25	8.77E-02	Resident (Young Child)	6.67E-02	Resident (Child)	1.60E-01	Resident (Adult)	4.00E-01
Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure (µg/m ³)	Excess Lifetime Cancer Risk (ELCR)
NC	NC	NC	NC	NC	NC	NC	NC
9.47E+00	NC	7.20E+00	NC	1.73E+01	NC	4.32E+01	NC
1.23E+00	NC	9.33E-01	NC	2.24E+00	NC	5.60E+00	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
5.76E+00	NC	4.38E+00	NC	1.05E+01	NC	2.63E+01	NC
NC	NC	NC	NC	NC	NC	NC	NC
4.20E+01	NC	3.19E+01	NC	7.66E+01	NC	1.92E+02	NC
2.12E+01	NC	1.61E+01	NC	3.87E+01	NC	9.68E+01	NC
1.61E+01	NC	1.23E+01	NC	2.94E+01	NC	7.38E+01	NC
NC	NC	NC	NC	NC	NC	NC	NC

Notes:
BDL = Below Detection Limit
NC = Not Calculated

Table B-16

Average Daily Exposure and Risk Estimate
Interior Air Exposures
Imminent Hazard Evaluation

Carcinogenic Effects

Compound Name	Interior Air First Floor Office ($\mu\text{g}/\text{m}^3$)	Interior Air Second Floor Living ($\mu\text{g}/\text{m}^3$)	Unit Conversion	Inhalation Unit Risk (UR) ($1/(\mu\text{g}/\text{m}^3)$)
Air Petroleum Hydrocarbons (MADEP)	0.00E+00	0.00E+00		
Benzene	NC	NC	1	7.80E-06
Toluene	1.08E+02	3.91E+01	1	NC
Ethylbenzene	1.40E+01	5.20E+00	1	NC
Total Xylenes	NC	NC	1	NC
Naphthalene	NC	NC	1	NC
2-Methylnaphthalene	NC	NC	1	NC
MTBE	6.57E+01	4.40E+01	1	NC
1,3-Butadiene	NC	NC	1	3.00E-05
C5 - C8 Aliphatics	4.79E+02	2.39E+02	1	NC
C9 - C12 Aliphatics	2.42E+02	9.71E+01	1	NC
C9 - C10 Aromatics	1.84E+02	5.35E+01	1	NC
Subtotal:				

Second Floor Living							
Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)	Receptor	Cinhw Factor (unitless)
Site Worker 18-25	8.77E-02	Resident (Young Child)	6.67E-02	Resident (Child)	1.60E-01	Resident (Adult)	4.00E-01
Lifetime Average Daily Exposure ($\mu\text{g}/\text{m}^3$)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure ($\mu\text{g}/\text{m}^3$)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure ($\mu\text{g}/\text{m}^3$)	Excess Lifetime Cancer Risk (ELCR)	Lifetime Average Daily Exposure ($\mu\text{g}/\text{m}^3$)	Excess Lifetime Cancer Risk (ELCR)
NC	NC	NC	NC	NC	NC	NC	NC
3.43E+00	NC	2.61E+00	NC	6.26E+00	NC	1.56E+01	NC
4.56E-01	NC	3.47E-01	NC	8.32E-01	NC	2.08E+00	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
NC	NC	NC	NC	NC	NC	NC	NC
3.86E+00	NC	2.93E+00	NC	7.04E+00	NC	1.76E+01	NC
NC	NC	NC	NC	NC	NC	NC	NC
2.10E+01	NC	1.59E+01	NC	3.82E+01	NC	9.56E+01	NC
8.51E+00	NC	6.47E+00	NC	1.55E+01	NC	3.88E+01	NC
4.69E+00	NC	3.57E+00	NC	8.56E+00	NC	2.14E+01	NC
NC	NC	NC	NC	NC	NC	NC	NC

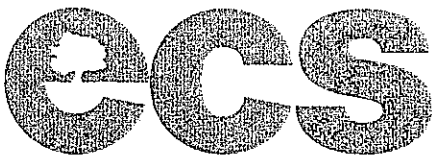
Table B-17

													Residential Use		
Exposure Route/Receptor				Table Reference	Site Worker 18 - 45	Construction Worker	Utility Worker	Passerby/ Trespasser (child 6 - 13)	Passerby/ Trespasser (child 13 - 18)	Passerby/ Trespasser (adult 18 - 31)	Resident (young child 1 - 2)	Resident (child 1 - 8)	Resident (adult 0 - 30)		
Noncarcinogenic Effects															
Media	Exposure Pathway		Exposure Point												
Soil	Incidental Ingestion	Disposal Site Area	(0 to 3 feet)	20	2.44E-02	NC	NC	2.12E-02	1.32E-03	1.15E-02	3.46E-02	3.94E-02	2.80E-02		
	Incidental Ingestion	Disposal Site Area	(0 to 6 feet)	21	NC	NC	1.23E-02	NC	NC	NC	NC	NC	NC		
	Ingestion: Fugitive Dust	Disposal Site Area	(0 to 3 feet)	23	2.26E-03	NC	NC	3.05E-04	1.90E-05	2.64E-04	1.01E-04	1.19E-03	1.40E-03		
	Ingestion: Fugitive Dust	Disposal Site Area	(0 to 6 feet)	24	NC	NC	4.24E-04	NC	NC	NC	NC	NC	NC		
	Dermal Contact	Disposal Site Area	(0 to 3 feet)	26	3.58E-02	NC	NC	8.80E-02	8.01E-03	7.64E-02	1.12E-01	7.64E-01	3.86E-01		
	Dermal Contact	Disposal Site Area	(0 to 6 feet)	27	NC	NC	7.84E-02	NC	NC	NC	NC	NC	NC		
	Inhalation: Fugitive Dust	Disposal Site Area	(0 to 3 feet)	29	2.56E-04	NC	NC	3.45E-05	2.00E-05	2.99E-05	1.06E-04	1.34E-04	1.58E-04		
	Inhalation: Fugitive Dust	Disposal Site Area	(0 to 6 feet)	30	NC	NC	5.34E-04	NC	NC	NC	NC	NC	NC		
	Incidental Ingestion	Surface	Surface	33	NC	NC	2.31E-03	3.34E-03	2.08E-04	1.81E-03	1.83E-03	2.08E-03	1.53E-03		
Sed.	Dermal Contact	Surface	Surface	0	NC	NC	8.48E-04	1.28E-03	7.65E-05	6.93E-04	6.71E-04	7.97E-04	5.86E-04		
S. Water	Dermal Contact	Outlet at S. Meadow Brook	SW-1	34	NC	NC	2.68E-07	1.94E-04	1.69E-05	1.75E-04	5.69E-05	3.45E-04	3.27E-04		
	Water	Inh. Vapors Trench	DCW-1	35	NC	NC	3.61E-01	NC	NC	NC	NC	NC	NC		
	Water	Inh. Vapors Trench	DCW-2	35	NC	NC	2.02E-03	NC	NC	NC	NC	NC	NC		
	Water	Inh. Vapors Trench	ECS-1	35	NC	NC	2.65E-02	NC	NC	NC	NC	NC	NC		
Water	Inh. Vapors Trench	ECS-4	35	NC	NC	NC	1.15E-01	NC	NC	NC	NC	NC	NC		
	Dermal Contact	DCW-1	36	NC	NC	NC	5.51E-05	NC	NC	NC	NC	NC	NC		
	Dermal Contact	DCW-2	36	NC	NC	NC	1.26E-06	NC	NC	NC	NC	NC	NC		
	Dermal Contact	ECS-1	36	NC	NC	NC	3.14E-05	NC	NC	NC	NC	NC	NC		
Water	Dermal Contact	ECS-4	36	NC	NC	NC	5.98E-04	NC	NC	NC	NC	NC	NC		
	Air	Inhalation	Interior Building	First Floor Office	37	1.66E+00	NC	NC	NC	NC	7.59E+00	7.59E+00	7.59E+00		
	Air	Inhalation	Interior Building	Second Floor Living	37	6.29E-01	NC	NC	NC	NC	2.87E+00	2.87E+00	2.87E+00		
						2.E+00	NC	5.E-01	1.E-01	1.E-02	9.E-02	8.E+00	8.E+00	8.E+00	
								Cumulative Hazard Index (Passerby/Trespasser)		2.E-01					

Table B-17

													Residential Use		
Exposure Route/Receptor				Table Reference	Site Worker 18 - 45	Construction Worker	Utility Worker	Passerby/ Trespasser (child 6 - 13)	Passerby/ Trespasser (child 13 - 18)	Passerby/ Trespasser (adult 18 - 31)	Resident (young child 1 - 2)	Resident (child 1 - 8)	Resident (adult 0 - 30)		
Carcinogenic Effects															
Media		Exposure Pathway		Exposure Point											
Sum	Soil	Incidental Ingestion	Disposal Site Area	(0 to 3 feet)	20	4.69E-10	NC	NC	4.07E-10	2.39E-10	2.20E-10	6.27E-09	7.57E-10	5.57E-10	
	Soil	Incidental Ingestion	Disposal Site Area	(0 to 6 feet)	21	NC	NC	1.25E-12	NC	NC	NC	NC	NC	NC	
	Soil	Ingestion: Fugitive Dust:	Disposal Site Area	(0 to 3 feet)	23	4.34E-11	NC	NC	5.86E-12	3.44E-12	5.07E-12	1.83E-11	2.28E-11	2.69E-11	
	Soil	Ingestion: Fugitive Dust:	Disposal Site Area	(0 to 6 feet)	24	NC	NC	4.31E-14	NC	NC	NC	NC	NC	NC	
	Soil	Dermal Contact	Disposal Site Area	(0 to 3 feet)	26	1.22E-10	NC	NC	2.99E-10	2.68E-10	2.60E-10	3.74E-09	2.60E-09	1.31E-09	
	Soil	Dermal Contact	Disposal Site Area	(0 to 6 feet)	27	NC	NC	1.47E-12	NC	NC	NC	NC	NC	NC	
	Soil	Inhalation: Fugitive Dust	Disposal Site Area	(0 to 3 feet)	29	1.32E-15	NC	NC	1.78E-16	1.05E-16	1.54E-16	5.56E-16	6.95E-16	8.18E-16	
	Soil	Inhalation: Fugitive Dust	Disposal Site Area	(0 to 6 feet)	30	NC	NC	1.53E-18	NC	NC	NC	NC	NC	NC	
Maximum	Sed.	Incidental Ingestion	Surface	Surface	33	NC	NC	NC	NC	NC	NC	NC	NC	NC	
	Sed.	Dermal Contact	Surface	Surface	0	NC	NC	NC	NC	NC	NC	NC	NC	NC	
	S. Water	Dermal Contact	Outlet at S. Meadow Brook	SW-1	34	NC	NC	NC	NC	NC	NC	NC	NC	NC	
	Water	Inh. Vapors Trench		DCW-1	35	NC	NC	7.06E-12	NC	NC	NC	NC	NC	NC	
	Water	Inh. Vapors Trench		DCW-2	35	NC	NC	2.82E-13	NC	NC	NC	NC	NC	NC	
	Water	Inh. Vapors Trench		ECS-1	35	NC	NC	6.13E-12	NC	NC	NC	NC	NC	NC	
	Water	Inh. Vapors Trench		ECS-4	35	NC	NC	8.65E-11	NC	NC	NC	NC	NC	NC	
	Maximum	Water	Dermal Contact		DCW-1	36	NC	NC	8.64E-10	NC	NC	NC	NC	NC	NC
Water		Dermal Contact		DCW-2	36	NC	NC	3.45E-11	NC	NC	NC	NC	NC	NC	
Water		Dermal Contact		ECS-1	36	NC	NC	7.50E-10	NC	NC	NC	NC	NC	NC	
Water		Dermal Contact		ECS-4	36	NC	NC	3.80E-08	NC	NC	NC	NC	NC	NC	
Air		Inhalation	Interior Building	First Floor Office	37	NC	NC	NC	NC	NC	NC	NC	NC	NC	
Air		Inhalation	Interior Building	Second Floor Living	37	NC	NC	NC	NC	NC	NC	NC	NC	NC	
					6.E-10	NC	4.E-08	7.E-10	5.E-10	5.E-10	1.E-08	3.E-09	2.E-09		
									Cumulative Hazard Index (Passerby/Trespasser)		2.E-09				

APPENDIX J



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November 7, 2006
File No. 03-204082.02

Carver Selectmans Office
108 Main Street
Carver, MA 02330

Re: Notice of Document Availability
Phase II Comprehensive Site Assessment
Eagle Gas, Inc.
131 Main Street
Carver, Massachusetts
RTN 4-17582 & 4-17825

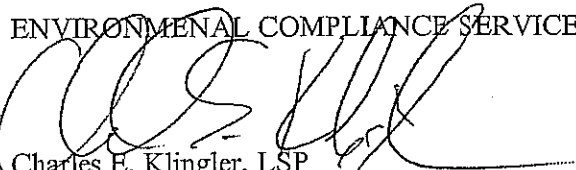
To whom it may concern:

This letter is to inform the Chief Municipal Officer and Board of Health of Carver, in accordance with 310 CMR 40.1403(3)(e), that Eagle Gas, Inc. will be submitting a Phase II Comprehensive Site Assessment to the Massachusetts Department of Environmental Protection (MADEP) for the above-referenced property.

Attached please find copies of the summary/statement of the findings of the Phase II report. If interested, you can arrange to obtain copies of the report by contacting ECS at (508) 832-6022.

Sincerely,

ENVIRONMENTAL COMPLIANCE SERVICES, Inc.


Charles E. Klingler, LSP
Auburn Branch Manager

cc: Carver Board of Health, 108 Main Street, Carver, MA 02330
Massachusetts DEP, Southeast Regional Office (submitted with reports)
Eagle Gas, Inc. (submitted with reports)

9.0 SUMMARY AND FINDINGS

On behalf of Eagle Gas, ECS has completed a Phase II - CSA and Method 3 Risk Characterization for RTN 4-17582 & 4-17825, assigned for a release of diesel fuel at the Eagle Gas property located at 131 Main Street in Carver, Massachusetts. This investigation was conducted to satisfy the requirements of Massachusetts General Laws Chapter 21-E and the Massachusetts Contingency Plan, 310 CMR 40.0000. ECS presents the following summary and findings:

- The subject property is currently used as a retail petroleum fuel dispensing facility. The subject release relates to diesel fuel. In January 2003, LNAPL diesel fuel was detected in a monitoring well located adjacent to Main Street and MADEP assigned RTN 4-17582 for the release condition. In May 2003, it was determined that the remote fill line for the diesel fuel UST was the cause of the release. Deliveries to this line were immediately ceased upon discovery.

In mid May 2003, the storm water drainage line outfall to South Meadow Brook was inspected and a sheen was observed on the surface water discharging from the outfall pipe. MADEP had reason to believe that the release was associated with RTN 4-17582 and issued RTN 4-17825 to Eagle Gas for this release condition.

In April 2004, Eagle Gas submitted a Phase I and an NRS Scoresheet in which the 2 RTN's were linked. The Site was classified as a Tier 1A Site, however, a Tier 1 Permit Application was not submitted at this time. A Tier 1 Permit Application and revised NRS Scoresheet were eventually submitted to MADEP in December 2005. A Phase II SOW was submitted to MADEP in May 2006. Several IRA reports have been submitted to MADEP since Site inception.

Prior to ECS involvement, a groundwater interceptor trench was installed in Main Street. The trench was never "activated" with an automated recovery system. EFR events and manual bailing of LNAPL have been implemented as remedial activities under an IRA.

- Assessments completed to define the extent of impact have included, but are not limited to: soil boring advancement and monitoring well installation; soil screening (PID); soil and groundwater sampling and analyses; storm drain manhole/catch basin screening (PID); sediment and surface water sampling and analyses, and; indoor air screening, sampling and analysis. The results are summarized in Tables attached to this report.
- The extent of the Disposal Site in the area of the Eagle Gas property is approximately 68-feet in length (east-west) and approximately 40-feet wide (north-south), (Figure 3). The estimated extent of LNAPL at the disposal site is approximately 60-feet in length and up to 30-feet in width (Figure 6). Soil and groundwater impact are not expected to exceed a vertical depth of 20 feet in this area.

The diesel fuel released at the Site property exists as LNAPL and dissolved phase hydrocarbon and is limited in extent in groundwater and soil in the vicinity of the Eagle Gas property. Diesel fuel has migrated to the east with groundwater beneath Main Street and has apparently intercepted the subsurface drain line beneath Main Street. Migration with groundwater is limited, impact has not been detected on the east side of Main Street or along the outer annulus of the storm drain pipe to any substantial degree downgradient

of the Site property. At times of high water, when the groundwater table intersects the outer annulus of the storm drain line, LNAPL and diesel fuel impacted groundwater apparently enter the drain line. Thus, the drain line from the source area to the outfall, including the outfall area, i.e. the inlet to South Meadow Brook, are included in the disposal site boundary. Surface water, soil and sediment in the immediate vicinity of the outfall have apparently been impacted by the release (approximate 200 square foot area). It is expected that the vertical impact in this area does not exceed 2-3 feet.

The area of the Disposal Site includes: approximately 3,000 square feet in the area of the Site property and approximately 1,500 square feet within the drain line and at the outfall area. The total area of the disposal site is currently estimated as 4,500 square feet.

- The COC identified relate to diesel fuel and primarily consist of SVOC (EPH and PAH) with a lower percentage of VOC (VPH). The majority of the COC are relatively low in mobility, are relatively non-persistent, and are relatively non-volatile. Their observed distribution supports this. The detected contaminants do not bioaccumulate.
- Stratigraphy at the Site consists of fine sand and silt consistent with glaciofluvial deposits. The hydraulic conductivity was estimated to be 1.0×10^{-5} cm/s. Groundwater was determined to flow under the Site property to the east under an average gradient of 0.043; and under Main Street to the east at an average gradient of 0.012. Linear groundwater velocities for the 2 hydraulic gradients were calculated to be 2.19 and 0.73 feet per year, respectively.
- The primary migration pathway for diesel fuel released to the subsurface was determined to be migration through soil to groundwater and the migration or "spreading" of the LNAPL across the water table. Dissolved constituents have also been observed to migrate to a limited extent with groundwater flow. The approximate extent of the LNAPL contaminant plume is shown on Figure 6. The soil and groundwater impact from the diesel fuel were determined to approximate the extent of the LNAPL plume (Figure 7). The other migration pathway identified at the Site is infiltration to the inner annulus of the subsurface storm water drain-line located beneath Main Street and discharge at the outfall to South Meadow Brook. Vapor migration of diesel fuel constituents along utility conduits or to indoor air has not been observed and is not believed to be a significant pathway.
- The area of the Site near the Site property is covered by bituminous concrete. The area of the Site near the outfall is unpaved. The soil categories applicable to the Site are S-1, S-2 and S-3. The Site and surrounding area are categorized as a Current or Potential Drinking Water Source Area. The MCP groundwater categories applicable to the Site are: GW-1, GW-2 (within 30 feet of an occupied structure) and GW-3.
- South Meadow Brook is located approximately 650 feet south of the source area. South Meadow Brook discharges into the WeWeantic River, which ultimately discharges to Buzzards Bay in the Atlantic Ocean. The WeWeantic River is categorized as a Class B and Class SA surface water down stream of the Site. Water from South Meadow Brook is also apparently used for irrigation downstream of the subject outfall area.
- Conditions within the Disposal Site Area have been evaluated in a MCP Method 3 Risk Characterization. Potential exposure of Site workers, utility workers, construction workers, visitors, trespassers, and passersby, and current and potential future residents to

residual contamination present within the Disposal Site Area has been evaluated. Conditions on the Site have been evaluated in terms of Imminent Hazard and Condition of Substantial Release Migration, and with respect to risk of harm to health, the public welfare, safety and the environment. It is the opinion of ECS that an Imminent Hazard does not exist but that a condition of SRM does exist. This is in agreement with past evaluations. It is also the opinion of ECS that conditions within the Disposal Site Area with respect to the release in question do not present a condition of No Significant Risk of harm to human health, now and for the reasonably foreseeable future. It is further determined that a condition of No Significant Risk of harm to the public welfare or safety does not exist due to the local presence of separate-phase petroleum on the water table. Current conditions within the Disposal Site Area were determined to constitute No Significant Risk of harm to the environment. It is therefore concluded that conditions with respect to the release in question do not present a condition of No Significant Risk of harm and that further remedial response actions are required.



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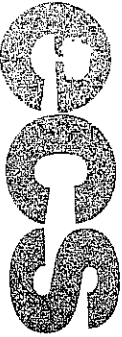
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