



Prepared for:

## 2017 Monitoring Report

**CROWLEY®**

Eureka Lodge  
Mile 128 Glenn Highway, Alaska

FINAL  
May 2018

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**FINAL 2017 MONITORING REPORT**  
**EUREKA LODGE**  
**MILE 128 GLENN HIGHWAY, ALASKA**

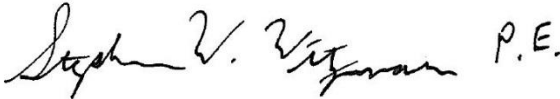
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**Prepared for:**  
**Crowley Fuels LLC**  
201 Arctic Slope Avenue  
Anchorage, Alaska 99518

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**ERM Project # 0424283**

Prepared By:   
Kassi Murray, EI  
Staff Engineer

Reviewed By:  P.E.  
Stephen Witzmann, PE  
Project Manager

ERM Alaska, Inc.  
825 West 8th Avenue  
Anchorage, Alaska 99501  
T: (907) 258-4880  
F: (907) 258-4033

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## ACRONYMS AND ABBREVIATIONS

AAC.....	Alaska Administrative Code
ADEC .....	Alaska Department of Environmental Conservation
amsl .....	above mean sea level
AST .....	aboveground storage tank
bgs.....	below ground surface
btoc .....	below top of casing
BTEX.....	benzene, toluene, ethylbenzene, and xylenes
Crowley.....	Crowley Fuels LLC
DO.....	dissolved oxygen
DRO .....	diesel-range organics
ERM .....	ERM Alaska, Inc.
ft .....	feet
GRO .....	gasoline-range organics
GWUDISW ...	groundwater under the direct influence of surface water
mg/kg .....	milligrams per kilogram
mg/L .....	milligrams per liter
MLFA .....	Michael L. Foster & Associates, Inc.
ml/min.....	milliliters per minute
mV.....	millivolts
ORP .....	oxidation-reduction potential
PID .....	Permanent Identifier
PAH.....	polycyclic aromatic hydrocarbon
QA/QC .....	quality assurance/quality control
RRO .....	residual-range organics
TAH.....	total aromatic hydrocarbons
TAqH.....	total aqueous hydrocarbons
°C .....	degree Celsius
µg/L .....	micrograms per liter

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## 1. INTRODUCTION

This 2017 monitoring report presents the results of water and forensic sampling activities conducted by ERM Alaska, Inc. (ERM) in October 2017 at the Eureka Lodge aboveground storage tank (AST) site located at mile 128 of the Glenn Highway in Alaska. The Alaska Department of Environmental Conservation (ADEC) file number for the Eureka Lodge site is 210.38.006.

Monitoring activities were conducted in accordance with *2012 Groundwater and Surface Water Monitoring Work Plan* dated June 4, 2012 (OASIS 2012), and the *2017 Addendum to the 2012 Groundwater and Surface Water Monitoring Work Plan* dated September 8, 2017 (ERM 2017) as approved by the ADEC. This report was prepared in accordance with Title 18 of the Alaska Administrative Code (AAC), Chapter 75 (18 AAC 75), Oil and Other Hazardous Substances Pollution Control Regulations, as amended through November 7, 2017 (ADEC 2017a), 18 AAC 70 Alaska Water Quality Standards (AWQS) amended as of February 5, 2017 (ADEC 2017b), 18 AAC 80 Drinking Water Regulations amended as of November 7, 2017 (ADEC 2017c), and ADEC *Field Sampling Guidance* revised August 2017 (ADEC 2017d).

The primary objective of the monitoring activities was to evaluate the nature and extent of petroleum hydrocarbon impact to groundwater, surface water, and drinking water resulting from a spill of supreme unleaded gasoline during supply-truck-to-tank filling operations in 2010. The secondary objective was to evaluate petroleum contamination that is still present within the subsurface soil at the site, which included a review of laboratory chromatographs and analysis and interpretation of forensic soil samples collected to assess the age and makeup of the residual contamination in soil. Collection and analysis of groundwater, surface water, and drinking water samples was performed to address a request received from ADEC and to further document potential petroleum hydrocarbon impact at the Eureka Lodge site. Review of laboratory chromatographs and analysis of forensic soil samples was conducted to better understand what additional actions, if any, are required to address the 2010 release.

This document provides additional review of historical data and presents newly collected data. This document is organized as follows; site background information (Section 2), field activities (Section 3), analytical results and discussion (Section 4), estimate of fuel contamination removed (Section 5), review of 2010 chromatographs (Section 6), forensic sample analysis and interpretation (Section 7), conclusions (Section 8), recommendations (Section 9); and finally, references (Section 10).

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## 2. SITE BACKGROUND

### 2.1. Brief Site History

As reported in the 2010 *Spill Response Report* (MFLA 2010a), Crowley Fuels LLC (Crowley) personnel overfilled an AST at the Eureka Lodge on June 11<sup>th</sup>, 2010. Based on the Spill Summary Report (Spill Number 10239916202), Crowley personnel initially estimated that 20 gallons of supreme unleaded gasoline were released to the soil beneath the tank. This estimate was based on the flow rate of the pump and estimated reaction time for the truck driver. The 2010 *Spill Response Report* estimated the release volume as ten gallons. The exact amount of fuel released is unknown. Remedial action was conducted on June 15<sup>th</sup> and 16<sup>th</sup>, 2010. Nine bulk storage bags containing approximately 13 tons of contaminated material were excavated, shipped offsite, and subjected to thermal remediation.

On September 28<sup>th</sup> and 29<sup>th</sup>, 2010, a Crowley contractor returned to the site and conducted additional soil excavation activities (MLFA 2010b). The east tank and an adjacent shed were moved temporarily to gain access to contaminated soil. Approximately 86 tons of additional contaminated soil was removed and thermally remediated offsite (MLFA 2010b).

Data presented in the 2010 *Spill Response Report* suggests that remedial excavation in 2010 proceeded through the contaminated surface soil layer and encountered a deeper layer of soil contamination associated with an earlier and unrelated release.

The Eureka Lodge has been selling fuel since at least 1948 (Anchorage Museum of History & Art. Library & Archives). The 2010 *Spill Response Report* discusses two earlier releases and a third spill was identified in ADEC records:

- 1) A spill response effort in May 2002 to a heating oil release located several hundred feet to the east of the 2010 spill location described excavating soil 3.5 feet below ground surface within 40 feet of the nearby lake without encountering groundwater (MLFA 2010a). The release occurred on approximately April 29<sup>th</sup>, 2002, included 450 gallons of home heating oil (or diesel fuel), and was recorded as case file 02239912002. The location of the 2002 spill is unknown and variously reported as “some distance east of gasoline tank” and “several hundred feet east.” The following data is listed in the ADEC Spill Prevention and Response Spill Database:
  - a. Responsible party for the 2002 spill: unknown
  - b. Response: “Field Visit/s”
  - c. Cause: Corrosion (Mechanical/Structural)
  - d. Status: Case Closed, No Further Action on September 5<sup>th</sup>, 2002.
- 2) In 2008, three gallons of diesel were released (closed spill No 08239905002).

- 3) A report prepared in 2009 described a limited release investigation following a small (3.5-gallon) heating oil spill at the east storage tank, at the same location as the 2010 spill. Contaminated soil was subsequently removed and the excavation backfilled. A sample collected 12 inches below the middle of the west skid (of the east tank) contained diesel range organics (DRO 3,320 milligrams per kilogram [mg/kg]) and gasoline range organics (GRO 55.6 mg/kg) (MLFA 2010a).

ADEC has identified a number of concerns and data gaps associated with the Eureka Lodge site:

- Petroleum contamination remains in the ground above 18 AAC 75 Table B2 Maximum Allowable Concentrations.
- If excavated, benzene-contaminated soil could be a characteristic hazardous waste.
- Soil contamination is not well defined to the south and to the west due to the west tank and asphalt road.
- Groundwater flow direction is not well understood due to lack of recharge and/or frozen monitoring wells.
- A new drinking water well at the site requires evaluation.

On 5 July 2017, ADEC requested samples be collected from monitoring wells, surface water, and the new drinking water well to help determine potential contaminant distribution and concentrations. Additional assessment of the groundwater flow direction was also requested. Lastly, ADEC requested that field work be completed in late summer, such as the end of August, to avoid frozen ground conditions.

## 2.2. Site Location and Description

Eureka Lodge is located at mile 128 of the Glenn Highway, 30 miles west of Glennallen, Alaska (Figure 1). The lodge owns two ASTs that are located at approximately 61°56'17.39" north latitude and -147°10'20.73" west longitude on the north side of the Glenn Highway, east of the Eureka Lodge (Figure 2). The site is located within Bureau of Land Management Public Land Survey Section 1, Township 21 North, Range 12 East, Seward Meridian.

## 2.3. Site Operations and History

The building and fuel ASTs are owned and operated by the Eureka Lodge. The west AST, known as west tank, is an 8,000-gallon capacity tank utilized for regular unleaded gasoline. The east AST, known as east tank, is a 6,000-gallon dual compartment tank. The 2,000-gallon northern compartment is used for supreme unleaded gasoline and the 4,000-gallon southern compartment is used for diesel fuel. Both ASTs are skid mounted. The ASTs are filled on an as-needed basis by Crowley.

## 2.4. Site Investigations and Remediation

### 2.4.1. June 2010 Removal

On June 11<sup>th</sup>, 2010 at approximately 17:45, during normal filling operations, Crowley overfilled the east tank at the Eureka Lodge. A total of ten gallons of supreme unleaded gasoline was reported as spilled. Crowley contacted Michael L. Foster & Associates, Inc. (MLFA) to complete the initial removal of impacted soil.

On June 15<sup>th</sup> and 16<sup>th</sup>, 2010, MLFA and Crowley hand-excavated and removed impacted soil adjacent to and below the east tank to depths ranging from 11 to 18 inches below ground surface (bgs). The depth of the excavation was limited by harder soils located at approximately 18 inches bgs. A total of nine super-sacks containing 13 tons of contaminated soil were shipped to Alaska Soil Recycling in Anchorage, Alaska for thermal remediation.

As detailed in the 2010 *Spill Response Report*, the contractor felt that the excavation proceeded through the newly-contaminated soil and encountered a deeper layer of soil contamination associated with an earlier and unrelated release (MLFA 2010a).

### 2.4.2. September 2010 Removal

Based on concentrations of GRO remaining in the soil after the initial excavation and the close proximity of the release to an intake well house located at the lake just north of the site, ADEC required additional excavation work to be performed (MLFA 2010b). On September 28<sup>th</sup> and 29<sup>th</sup>, 2010, MLFA returned to the site under contract with Crowley and excavated additional soil.

The east tank and an adjacent shed were moved temporarily to gain access to contaminated soil. MLFA excavated approximately 86 tons of contaminated soil. The excavation material consisted primarily of dry, brownish/grey silt and silty gravel fill material from the ground surface to six feet bgs. Dark grey, moist silt was encountered below 6 feet bgs. Groundwater was not encountered during excavation activities. The total excavation depth was approximately four feet bgs on the northern side of the tank area and seven feet bgs for the rest of the excavation. The excavation averaged 12 feet wide by 23 feet long. The approximate extent of excavation is shown on Figure 3. Concerns that further excavation could affect the stability of the adjacent west tank limited the extent of the excavation to the west. Excavation sidewall and floor confirmation samples collected prior to back filling contained up to 21.2 mg/kg benzene, 604 mg/kg GRO, 19.2 mg/kg ethylbenzene, 84.7 mg/kg xylenes, and 10,900 mg/kg DRO.

Prior to backfilling the excavation, polyethylene sheeting was placed along the excavation sidewalls to demarcate residual contaminated soil from clean backfill material. The excavation was backfilled with clean material on September 30<sup>th</sup>, 2010.

The contractor concluded: “Based on removal of contaminated soil beneath and around the tank to 7 feet deep, site observations, field screening results, and laboratory analyses, MLFA believes that the recent gasoline release has been significantly remediated, and that additional remedial action is not required (MLFA 2010b).” ADEC assigned spill number 10239916202 to the site and transferred site administration from the ADEC Spill Prevention and Response Program (SPAR) to the ADEC Contaminated Sites Program.

#### **2.4.3. June 2011 Field Activities**

In 2011, ERM (formerly OASIS Environmental, Inc.) conducted field activities to further characterize potential contaminant impacts to soil, groundwater, and surface water (OASIS 2011). A total of eight borings were advanced to a depth of 20 feet bgs and sampled. Frozen soils were encountered as shallow as 4 feet bgs. Three of the borings were completed as monitoring wells to allow for collection of groundwater samples. Soil from two borings, both located on the south side of the site, contained fuel concentrations above 18 AAC 75 cleanup levels. Analytical results for soil samples from the other six soil borings were below cleanup levels. Soil boring SB-02 contained 4,000 mg/kg DRO and 0.049 mg/kg benzene. Soil boring SB-03 contained 18E mg/kg benzene. The qualifier E indicates that the reported concentration is greater than the upper calibration limit; the actual concentration is known to be greater than the upper calibration range.

Soil boring logs indicated that groundwater was only encountered in two of the eight boreholes. Three monitoring wells were installed. Monitoring well MW-1 was installed in soil boring SB-02. Monitoring well MW-2 was installed to the east of the 2010 release site, and monitoring well MW-3 was installed to the north, upgradient from the release site.

During June 2011 monitoring activities, monitoring wells MW-1 and MW-3 were dry and could not be sampled. Analytical results from the groundwater sample collected from MW-2 and the surface water samples collected from the nearby unnamed lake showed that target analyte concentrations were below ADEC cleanup levels. The report concluded “it remains unknown if there is groundwater flow across the site.” A sheen test conducted on shoreline sediments did not produce sheen.

#### **2.4.4. September 2012 Field Activities**

In 2012, groundwater was present in all three wells. However, monitoring wells MW-1 and MW-2, located south and east of the ASTs respectively, appeared to be frozen at depths of 8.04 feet bgs and 6.86 feet bgs; respectively (OASIS 2012b). ERM conducted groundwater and surface water sampling at monitoring wells MW- 1, MW-2, MW-3; surface water intake location SW-01; and lake surface water location SW-02. Analytical results from groundwater were below 18 AAC 75 Table C cleanup levels. Analytical results for surface water were below their respective Alaska Water Quality Standards (AWQS). A sheen test was also conducted on shoreline sediments and did not produce sheen.

#### **2.4.5. 2013 Field Activities**

In 2013, ERM conducted groundwater monitoring at monitoring wells MW-1, MW-2, and MW-3 (ERM 2013). Analytical results for groundwater samples were all below 18 AAC 75 Table C groundwater cleanup levels. It was concluded that groundwater at the site did not appear to be a productive aquifer because of the lack of measurable recharge in the monitoring wells during the sampling event. The results were consistent with the 2011 and 2012 water quality results, showing no contaminant concentrations above 18 AAC 75 Table C groundwater cleanup levels. It was concluded that no further groundwater monitoring appeared necessary at the site as a result of the release.

### **2.5. Geology and Hydrology**

The Eureka Lodge is situated at approximately 3,290 feet above mean sea level (amsl) and is surrounded by mountains (Figure 1). Located north of the lodge and ASTs is an unnamed lake with mountains beyond the lake rising to over 4,400 feet amsl. South of the site is the Glenn Highway and a steep drop off towards Eureka Creek. Based on the topographic map for the area, the groundwater is expected to flow south. An assessment of groundwater flow is further discussed in Section 3.4.

Soil at the site consists primarily of silt with gravel and organic material from 0 to 8 feet bgs; and silt with 5 to 10 percent gravel from 8 feet bgs to 20 feet bgs. Frozen soil was documented in many of the boreholes when they were installed in 2011. During soil boring work in 2011, groundwater was encountered in two of the eight boreholes at approximately 17 feet bgs. The other boreholes were dry.

### **2.6. Contaminants of Concern and Regulatory Framework**

Groundwater analytical results were compared to 18 AAC 75.345 Table C groundwater cleanup levels. Surface water analytical results were compared to 18 AAC 70.020 AWQS. Drinking water analytical results were compared to 18 AAC 80 Drinking Water Standards. All applicable cleanup levels can be found in the corresponding analytical results tables. Table A below presents the cleanup levels for the contaminants of concern at this project site.

**TABLE A: APPLICABLE WATER CLEANUP LEVELS AND STANDARDS FOR CONTAMINANTS OF CONCERN**

<b>Contaminant of Potential Concern</b>	<b>ADEC Groundwater Cleanup Level (µg/L) 18 AAC 75.345</b>	<b>Alaska Water Quality Standards (µg/L) 18 AAC 70.020</b>	<b>Drinking Water Maximum Contaminant Levels (µg/L) 18 AAC 80</b>
GRO	2,200	--	--
DRO	1,500	--	--
Benzene	4.6	5	5
Toluene	1,100	1,000	1,000
Ethylbenzene	15	700	700
Total xylenes	190	10,000	10,000
Total aromatic hydrocarbons (TAH)	--	10	--
Total aqueous hydrocarbons (TAqH)	--	15	--

## 2.7. Project Objectives and Scope of Work

Water quality monitoring and subsurface forensic soil analyses were performed during October 2017. Two objectives were identified for the 2017 field effort. One was to perform water quality monitoring at the site to further document the potential petroleum hydrocarbon impact at the Eureka Lodge site. The other was to better understand what actions, if any, are required to address the 2010 release.

Prescribed assessment activities were described in the 2012 *Groundwater and Surface Water Monitoring Work Plan* (OASIS 2012) as well as the 2017 *Addendum to the 2012 Work Plan* (ERM 2017). Completed activities are summarized below.

- Mobilized ERM personnel to the site.
- Completed subsurface clearance activities, included marking out all utilities and identifying safe places to collect soil samples.
- Advanced four test pits to identify soil that was still contaminated to collect samples for forensic analysis.
- Located monitoring wells.
- Measured depth-to-water (DTW) and total depth of wells MW-3 and MW-1.



- Groundwater from monitoring well MW-3 was analyzed for the full list of volatile organic compounds (VOCs), diesel range organics (DRO), GRO, and polycyclic aromatic hydrocarbons (PAH).
- Groundwater from monitoring well MW-1 was analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), DRO, GRO, and PAHs.
- Performed surface water monitoring at locations SW-01 and SW-02. Both samples were analyzed for GRO, DRO, BTEX and PAHs. Total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH) concentrations were calculated for comparison against AWQS (ADEC 2017b).
- Collected a drinking water sample at location DW-01 for PAH and full list VOC analysis.
- Collected elevation data at monitoring wells and the surface water body using a laser auto-leveler to gain accurate water elevation data for the site.
- Delivered water samples to TestAmerica Anchorage for shipment to TestAmerica in Tacoma, WA.
- Shipped soil samples to Torkelson Geochemistry, Inc. in Tulsa, Oklahoma for forensic analysis and interpretation.
- Demobilized ERM personnel and equipment from the site.

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### 3. FIELD ACTIVITIES

Field activities conducted in support of the Eureka Lodge site assessment objectives are described below. Deviations from the work plan include the following:

- Monitoring well MW-2 could not be located; therefore the well was not sampled. Significant effort was made to locate the well. The field team used the large scale, detailed figure from 2013, interviewed the site owner concerning the location, and used a metal detector. The lodge owner mentioned that the gravel area where MW-2 was located was refinished a couple of years ago. He has not been able to locate the monitoring well after the area was refinished.
- Monitoring wells MW-1 and MW-3 were sampled before parameters stabilized due to insufficient groundwater recharge. Details are presented in Section 3.1.

The summary of all analytical samples collected at the site can be found in Table 1. Water quality field parameters can be found in Table 2, while analytical results can be found in Tables 3 through 6.

Sample data sheets are provided as Appendix A and field notes are provided as Appendix B. A photographic log is included as Appendix C.

#### 3.1. Groundwater Sample Collection

##### 3.1.1. *Changes to Sampling Protocol for MW-1 and MW-3*

Limited available water impacted the groundwater sample collection protocol. Due to schedule constraints and concern with early freeze up of monitoring wells, the Work Plan Addendum was prepared on an expedited basis. Following mobilization, limited recharge at the monitoring wells became evident and the proposed approach was reviewed in light of previous monitoring events. This necessitated a modification of the technical approach to allow sample collection. This section serves to document sampling protocol and rationale.

Geologically, MW-1 is situated in a strata not generally recognized as productive aquifer material. The well log indicates silt with fines and gravel (0 to 10 feet bgs), dense silt (10 to 15 feet bgs), and dense silt with fines (15 to 20 feet bgs) (OASIS 2011). At time of drilling the various boreholes, frozen soil (which could indicate static water level) was encountered beginning at depths ranging from approximately 4 feet bgs to 10 feet bgs. During drilling of MW-1 groundwater was evident; however, after completion of the well, water did not flow into the casing (OASIS 2011). MW-3 shows a similar stratigraphic profile to MW-1 with the well screen set in a dense silt horizon. In general the area consists of silts with gravel and organics from 0 to 8 feet; and silt with varying amount of gravel (5 to 10%) from 8 to total depth of the wells/borings (20 feet).

### 3.1.1.1. MW-1

Because of limited groundwater recharge, it was determined that it would not be possible to purge enough water to obtain stable parameters and still collect a sample. Details are discussed below.

MW-1 exhibits very low recharge. Initial measurements show drawdown of approximately one foot every five minutes at a pump rate of 240 milliliters per minute (mL/min). ADEC Field Sampling Guidance requires that the: "Flow rate must be between 50 and 500 mL/min" (ADEC 2017d). In order to accommodate for this drawdown, the submersible pump was set approximately one foot off the bottom of the well, at 18 feet below top of casing (btoc). Water volume was calculated to determine a water column adequate to fill the required sample jar volumes. It was determined; a two foot water column above the pump would be required to fill the sample bottles. In situ water quality parameters were measured in the hope that the well would stabilize before the drawdown dictated the necessity to sample.

At this point attempts to sample the well in 2011, 2012, and 2013 were reviewed. In 2011, the well was reported as dry. The *2012 Water Monitoring Report* states: "MW-1 and MW-2, located south and east of the ASTs, appeared to be frozen at depths of 8.04 ft and 6.86 ft, respectively." "After recording the DTW measurements, wells were purged, however, limited recharge preventing purging with minimum drawdown in the three monitoring wells. No significant recharge occurred in the wells after 5 hours. After purging to the extent possible given the limited recharge, samples were collected for laboratory analysis" (ERM 2013). At MW-1, limited volume allowed for collection of samples for GRO, DRO, and BTEX analysis, but there was insufficient volume to collect a sample for PAH analysis. The *2013 Water Monitoring Report* indicated the same approach was used: DTW measurements were collected, wells were purged, limited recharge prevented purging with minimum drawdown, field parameters were recorded, and samples were collected. Field parameters were not taken for MW-1 due to limited groundwater recharge in the monitoring well.

Based on review of in 2011, 2012, and 2013 groundwater monitoring activities and the rate of drawdown observed in 2017, it was determined that it would not be possible to obtain stable parameters and still collect a sample. Although the well parameters did not stabilize during the 2017 sampling event, it was necessary to collect a sample before the well lacked adequate water volume necessary to fill the sample bottles.

The applicability of the water quality parameters and analytical results are suspect, as a stagnant column of water was sampled. Based on the soil properties documented in the boring logs and witnessed during soil sample collection, and based upon the recharge rates experienced, water in the monitoring wells is considered stagnant. An aquifer is not present at this depth.

For comparison purposes, analytical results have been compared to 18 AAC 75 Table C groundwater cleanup levels. The sample may be representative of the stagnant water

filling the pores of the porous, but low permeability substrate. Because of limited water and insufficient soil porosity, human health exposure to this water as drinking water does not appear to be a valid exposure pathway. Results should only be considered indicative of the potential for localized contaminant migration.

During the 2017 sampling event, static water level was encountered at 6.87 feet below top of casing. As the well log indicates the presence of silt with relatively low percentages of fine gravel, it can be assumed this water level is not a function of aquifer flow, as no discernable aquifer is present. Instead, the water appears to be a function of localized precipitation and snow melt accumulating in the well. It can be assumed that the transmissivity of the general area is low, as silt is the predominate media. Therefore, groundwater and contaminate migration is likely minimal in the local area.

#### **3.1.1.2. MW-3**

MW-3 exhibits similar hydrogeological characteristics as MW-1. Recharge was approximately on the order of 0.02 feet recovery after 45 minutes. The pump was set at approximately 18.3 feet from btoc to account for low recharge so that a water sample could be collected.

#### **3.1.2. Sample Collection**

Groundwater samples were collected from monitoring wells MW-1 and MW-3. Monitoring well locations are shown on Figure 3. Prior to sample collection, each well was gauged for DTW and total depth. Free-phase hydrocarbons were not encountered at either well. After recording the DTW measurements, wells were purged; however, as described in Section 3.1.2, the wells had limited recharge. Therefore wells were only purged to a level that would allow sufficient water volume for sample collection. The field team collected water quality parameters for hydrogen potential (pH), temperature, conductivity in microsemens per centimeter ( $\mu\text{S}/\text{cm}$ ), oxidation reduction potential (ORP) in millivolts (mV), and dissolved oxygen (DO) in milligrams per liter (mg/L). A summary of water quality parameters collected is provided as Table 2 attached. Sample data sheets are included as Appendix A.

After purging to the extent possible given the limited recharge, samples were collected for laboratory analysis. Samples were submitted for off-site analyses to TestAmerica for the following:

- GRO by method AK101
- PAH by U.S. Environmental Protection Agency (USEPA) SW8270D SIM
- DRO by AK102
- MW-1 only; BTEX by USEPA SW8260C
- MW-3 only; VOCs by USEPA SW8260C and USEPA SW8260C SIM

Water samples were collected directly into laboratory provided and, as appropriate, pre-preserved sample containers. Sample containers were labeled with field sample identification numbers, the date and times of collection, and analyses requested.

Note there are three VOCs listed in 18 AAC 75 which TestAmerica does not include in their method USEPA SW8260C list (1,1,2-trichloro-1,2,2-trifluoroethane [Freon-113], vinyl acetate, and 1,4-dioxane). The site history does not suggest that these compounds were ever used at the site; therefore, it was not necessary for those three analytes to be reported.

### 3.2. Surface Water Sample Collection

Surface water samples 17-ERK-SW-01 and 17-ERK-SW-02 (and duplicate sample 17-ERK-SWZ ) were collected at the locations shown on Figure 3 and Photograph 12. These samples were collected using an extended pole with a beaker on the end. The beaker was dipped into the surface water to about 0.5 inches deep. The sample containers were filled up one by one starting with the volatile samples: GRO and BTEX. Surface water samples were analyzed for the following:

- GRO by AK101
- BTEX by USEPA 624 for use in calculating TAH and TAqH
- DRO by AK102
- PAH by USEPA 625 for use in calculating TAqH

Calculated values for TAH and TAqH were compared to AWQS.

This surface water body is no longer used as a drinking water source. The Eureka Lodge now uses their drinking water well described in Section 3.3 and shown in Photographs 10 and 11. Based on input from the owners of the lodge, no other community members drink from the surface water body.

### 3.3. Drinking Water Sample Collection

The lodge's current drinking water source is a well that was constructed in 2010. ADEC provided Crowley with a copy of the well drilling log. Although the borehole was advanced to 105 feet bgs, sufficient water was only encountered in a gravel lens from 20 feet bgs to 22 feet bgs (according to the well log). The well was constructed with a 6-inch diameter casing that has perforations between 20 feet bgs and 23 feet bgs and an open end. Per an internal ADEC email dated 21 April 2016 and provided via Crowley, ADEC considers this drinking water source to be ground water under the influence of surface water (GWUDISW). The same email chain was initiated with a message from a nearby resident to ADEC and referred to the drinking water system as a “community well house” and the source of their water.

A drinking water sample was collected from the new Eureka Lodge drinking water well to compare analytical results to 18 AAC 80 Drinking water regulations. Photograph 11 of

Appendix C, was taken inside of the drinking water well house. The picture shows the top of the drinking water well with a PVC pipe connecting into the drinking water well filtration system. Located on the PVC pipe before the filtration system is a red valve with a hose connection. The hose connection leads outside of the well house. In order to bypass the filtration system and the collection storage tanks, once the system was fully purged, the drinking water sample was collected directly from the hose connection on the outside of the well house. Volatile samples were collected first, followed by nonvolatile samples. The drinking water sample was submitted for off-site analyses for the following constituents:

- PAH by USEPA SW8270D SIM
- Drinking water regulated VOCs by USEPA 524.2

Although the analytical method for PAHs is not specifically a drinking water method, it provides results for the PAH compounds of interest, while the analogous drinking water method would not.

### 3.4. Groundwater Flow Assessment

To better determine groundwater flow direction, ERM conducted a topographic survey using a level mounted on a tripod and a stadia rod. The relative elevations of the water surface of the unnamed lake and top of casing of each of the monitoring wells were determined. Depth to groundwater was measured for monitoring wells MW-1 and MW-3. Table B below shows the relative elevation measurements.

**TABLE B: RELATIVE GROUNDWATER ELEVATIONS**

	Height of MW-1 (ft)	Height of MW-3 (ft)	Height of SW-02 (ft)
Stadia rod measurement (from laser to location)	4.52	4.93	6.97
TOC to water level	6.87	7.37	NA
Laser to top of water	11.39	12.30	6.97
Relative elevation difference from elevation reference point shown on Figure 3 to water level (laser to base of tripod is 4.41 feet)	-6.98	-7.89	-2.56

Table B shows that surface water in the unnamed lake is higher than the groundwater elevation in monitoring wells MW-1 and MW-3. However, the available data suggests that the two monitoring wells may not be hydraulically connected with the lake. The

mountainous terrain and steep slopes suggest that the groundwater slope likely parallels the surface slope, running downhill toward Eureka Creek.

The geological stratum below the site (primarily silt that is likely frozen most of the year) is generally not recognized as productive aquifer material. Monitoring wells exhibited negligible recharge. Water accumulating in the monitoring wells appears to be stagnant water accumulating slowly over time from precipitation and snow melt and does not appear to be hydraulically connected with the unnamed lake. At the drinking water well, a gravel lens from 20 feet bgs to 22 feet bgs may be hydraulically connected with the unnamed lake, which is located approximately 140 feet up hill.

It was not possible to tie in to the nearest survey control point: Permanent Identifier (PID): TT1754; therefore, the reported elevations are relative to the elevation reference point. The location of the level mounted tripod was accurately determined using a global positioning system to allow accurate future assessment at the site.

### **3.5. Forensic Sample Collection**

Given the reportedly limited volume of leaded gasoline released (10 gallons), the large volume of contaminated soil removed (99.28 tons), and results for excavation confirmation samples indicating far higher concentrations of DRO than GRO (10,900 mg/kg DRO versus 604 mg/kg GRO), forensic samples of residual contamination in soil were collected to better understand the nature of residual fuel contamination at the site. Forensic samples were subjected to hydrocarbon fingerprinting (capillary gas chromatography), which provides detailed information not available from routine methods approved by ADEC or the USEPA. This includes better understanding of the type of product released and improved understanding of the amount of weathering that has occurred as the result of evaporation, biodegradation, and dissolution in water. These three processes preferentially reduce fuel components that are more volatile, more readily biodegradable, or more easily dissolved. Assessing impacted soils can help understand the amount and type of weathering that has occurred. Comparison of fingerprints of remaining hydrocarbons to the fingerprints of possible sources can help determine if residual contamination is associated with the June 11<sup>th</sup>, 2010 release or if it is associated with an earlier, unrelated release.

Soil sample locations were selected based on the location and results of 2010 excavation confirmation samples (MLFA 2010b). Given limitations imposed by utility locations, sample locations were selected with the intent of capturing contamination remaining across the sidewalls and base of the 2010 excavation and with the intent of representing the most contaminated areas.

Three soils samples were collected and labeled TB-2, TB-3, and TB-4 at depths of 1.5 feet bgs, 3.7 feet bgs, and 2.15 feet bgs; respectively. The locations of the samples are shown on Figure 3. To assess impacted soil, sample locations and depths were determined based on two factors. First, the extent and distribution of residual contamination as documented in the 2010 *Spill Response Remedial Action Report* and the 2011 *Site*



*Characterization Report* was considered. Second, because the September 2010 removal action excavation was lined with polyethylene sheeting prior to backfill, the sheeting was used to distinguish impacted soil from backfill. Samples TB-2 and TB-3 were collected outside of the footprint of the September 2010 excavation; sample TB-4 was collected beneath the 2010 excavation. Samples were collected using a soil auger and clean sample spoon. Unpreserved 4 ounce jars were filled with soil and submitted to Torkelson Geochemistry, Inc., a firm that specializes in forensic evaluation. Samples were characterized using capillary gas chromatography and the laboratory provided written interpretation of the data.

### **3.6. Investigation-Derived Waste Management**

There were two sources of waste for this project: investigation-derived wastes associated with field sampling, and purge water from groundwater sampling. Field sampling wastes generated included used nitrile gloves, paper towels, empty cardboard boxes, sample tubing, and sampling spoons. All solid waste was placed in trash bags on site and disposed of at the Anchorage landfill. Purge water was treated on site using granular activated carbon. There was no sheen present on the treated water so it was discharged on site.

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## 4. RESULTS AND DISCUSSION

This section presents discussion of the analytical results of groundwater, surface water, and drinking water sampling performed during the October 2017 field effort. A quality assurance summary is also provided.

### 4.1. Groundwater Sampling Analytical Results

All groundwater samples were analyzed for GRO, DRO, and PAHs. MW-3 was also sampled for a full list of VOCs; MW-1 was also analyzed for BTEX constituents. The analytical results were reported target analytes as non-detect with exception to DRO and dibenzo(a,h)anthracene, both detected at MW-1. DRO was the only constituent above the 18 AAC 75 Table C groundwater cleanup level of 1,500 micrograms per liters ( $\mu\text{g}/\text{L}$ ) with a result of 3,700  $\mu\text{g}/\text{L}$ . Groundwater analytical results are presented in Table 3 and are summarized on Figure 3.

### 4.2. Surface Water Sampling Analytical Results

Two surface water samples were collected from the unnamed lake located north of the ASTs. The samples were analyzed for GRO, DRO, BTEX, and PAHs. The only compound detected was DRO at concentrations of 220  $\mu\text{g}/\text{L}$  and 100  $\mu\text{g}/\text{L}$  from SW-01 and SW-02, respectively. AWQS does not regulate DRO and GRO in surface water. Surface Water analytical results are presented in Table 4 and are summarized on Figure 3. Although measured concentrations of all BTEX and PAH compounds were below the detection limit, concentrations for TAH and TAqH were calculated in accordance with ADEC guidance and were below AWQSS.

### 4.3. Drinking Water Sampling Analytical Results

One drinking water sample was collected from the new Eureka Lodge water well, DW-01. The sample was analyzed for VOCs and PAHs. Toluene was the only analyte detected at a concentration of 0.16J  $\mu\text{g}/\text{L}$  for the primary sample and 0.17J  $\mu\text{g}/\text{L}$  for the duplicate sample. Both results are significantly lower than the drinking water maximum contaminant level of 1,000  $\mu\text{g}/\text{L}$ , listed in USEPA regulations. Drinking Water analytical results are presented in Table 5 and are shown on Figure 3.

### 4.4. Quality Assurance Summary Report

All samples were submitted to the project laboratory, TestAmerica, located in Anchorage in accordance with standard chain-of-custody procedures outlined in the work plan. Duplicate samples were collected at a frequency of 10% per method and matrix for quality assurance/quality control (QA/QC) purposes. All samples were preserved and stored at a temperature of less than 6°C for laboratory analysis. A quality assurance review of the analytical results was performed by ERM in the form of a Quality Assurance Summary Report. The report discusses the data QA/QC procedures

and presents the results of the QA/QC analysis. Applicable data qualifiers are provided in the tables along with the analytical results. The laboratory analytical reports from TestAmerica are provided as Appendix D. The ADEC analytical data checklist and the ERM Quality Assurance Report are provided as Appendix E.

The Quality Assurance Report indicates the analytical data are acceptable and defensible for project use. A total of 648 results were reported, with no results considered rejected. The data completeness for this project is 100%.

## 5. ESTIMATE OF FUEL CONTAMINATION REMOVED

Calculations presented in Appendix F estimate the volume of fuel present in the soil excavated from the site in 2010. For comparison, Crowley estimated 10 gallons of unleaded gasoline (~38 liters) were released (MLFA 2010a).

The volume estimate of fuel present in excavated soil was estimated based on the following data:

- The mass of contaminated soil removed on June 15<sup>th</sup> and 16<sup>th</sup>, 2010 as reported in the *2010 Spill Response Report* (MLFA 2010a),
- GRO and DRO concentrations measured in the characterization sample (EL-5) (MLFA 2010a),
- The published density of fuel based on Safety Data Sheets for typical gasoline and diesel fuel products,
- The mass of contaminated soil removed on September 28<sup>th</sup> and 29<sup>th</sup>, 2010 as reported in the *2010 Spill Response Remedial Action Report* (MLFA 2010b), and
- An average of the GRO and DRO concentrations measured in the characterization sample (EL-5) and concentrations measured in excavation confirmation samples (MLFA 2010a, 2010b).

The estimated volume of fuel present in excavated soil includes 92 liters of gasoline and 581 liters of diesel fuel or other middle range distillate. This volume far exceeds the volume of fuel reported as being released.

It has been assumed that the volume of fuel released, as reported by the operator, is accurate. The density liquid density used in calculating recovered fuel volumes is estimated based on data for Exxon Mobile unleaded automotive gasoline and diesel fuel and is assumed to be representative of fuel removed from the site.

The largest source of uncertainty in the estimate of the volume of fuel in the excavated soil comes from the values used for fuel concentrations. Fuel concentrations present in excavated soil are estimated based on the available analytical data. It was assumed that the analytical results for soil sample EL-5 are representative of the initial 13 tons of soil removed. It was assumed that an average of the analytical results for soil sample EL-5 and of the excavation confirmation samples (Eureka-East, Eureka-South, Eureka-West, Eureka-North, Eureka-BTM-North, and Eureka-BTM-South) is representative of the 86 tons of soil removed in September 2010. Excavated contaminated soil appears to have been impacted primarily by middle range distillates, as opposed to the unleaded gasoline released in 2010.

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## 6. REVIEW OF 2010 CHROMATOGRAPHS

As documented in the *Spill Response Report*, soil sample EL-5 was collected from the contaminated material excavated on June 15<sup>th</sup>, 2010, and the sample was analyzed in support of waste characterization (MLFA 2010a). At the time of sample collection, this waste characterization sample was intended to be representative of the initial 13 tons of contaminated soil removed in response to the 2010 release. Analytical results for the sample indicate that it contained 1,250 mg/kg GRO, 7,670 mg/kg DRO, 20.7 mg/kg benzene, and elevated levels of other BTEX compounds.

Based on review of the sample's chromatograph by an ERM chemist, the soil that was excavated in 2010 did have gasoline range organics present; however, there was also middle range distillates present. These middle range distillates could be from diesel fuel or arctic grade fuel oil. The results of the chromatograph review confirm reports that there was other fuel spilled at the site in addition to the premium unleaded gasoline spilled by Crowley in 2010. Unfortunately, the chromatograph does not give any insight on the age or weathering of the fuel that was released.

The gas chromatographs are included as Appendix G; the chromatograph for soil sample EL-5 is on the final page of the appendix.

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## 7. FORENSIC SAMPLE ANALYSIS AND INTERPRETATION

Three soil samples were collected at the site for forensic analysis. The hydrocarbon fingerprint analysis and evaluation is presented in Appendix H, while Table C below summarizes the findings.

**TABLE C: SUMMARY OF THE FORENSIC ANALYSIS OF SOIL SAMPLES**

Sample Description	Depth [feet bgs]	Finding	Uncorrected Age Estimate <sup>1</sup> [years]
TB-2	1.5	Mixture of extremely weathered middle distillate, either diesel fuel or fuel oil, and a smaller amount of unidentifiable heavier hydrocarbon	16 +/- 2
TB-3	3.7	Moderately weathered middle distillate, either diesel fuel or fuel oil	3 +/- 2
TB-4	2.15	Mixture of severely weathered middle distillate, either diesel fuel or fuel oil and a much smaller amount of unidentifiable heavier hydrocarbon	12 +/- 2

**Notes:**

The technique used to estimate the date of hydrocarbon release in soil samples does not correct for climatic factors and estimates are based on studies conducted in temperate regions. Given the subarctic climate of Eureka Lodge, weathering processes occur much more slowly and the age listed represents an underestimation of the age of the release. Review of the available data suggests that these soils are likely frozen most of the year. While the soil is frozen, biodegradation of hydrocarbons, the primary agent of weathering, is essentially stopped. While the data are inconclusive as to the date(s) of release(s), they do suggest that biodegradation is negligible for deeper soils (like TB-3) and that soils at this depth are likely frozen for almost the entire year.

The primary conclusion of the forensic analysis is that the residual fuel in the soil samples were comprised primarily of middle distillates. Samples TB-2 and TB-4 also contained smaller amounts of heavier hydrocarbons. These results indicate that residual fuel contamination at the site is not due to the 2010 release of unleaded gasoline.

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## 8. CONCLUSIONS

### 8.1. Groundwater

Monitoring well MW-2 could not be found during the field effort. Monitoring wells MW-1 and MW-3 had almost no recharge resulting in the inability to stabilize parameters before collecting the analytical samples. The only result above the 18 AAC 75 Table C groundwater cleanup levels was DRO at MW-1 with a concentration of 3,700 µg/L.

### 8.2. Surface Water

Analytical results for two surface water samples collected from the unnamed lake north of the ASTs indicate no contaminant impact to the surface water. All analytical results for BTEX, PAHs, and GRO were below the detection limit. Low levels of DRO were detected. Measured DRO concentrations were below the 18 AAC 75 groundwater cleanup level and may be related to naturally occurring organic matter in the water column.

### 8.3. Drinking Water

Analytical results from the Eureka Lodge drinking water well indicated no significant impact from petroleum contamination. Possible sources of the contamination may include the 2010 spill, other spills known to have occurred at the site, other unidentified releases, or components of the drinking water system. Given the extremely low concentration of toluene detected (0.17 µg/L) relative to the drinking water maximum contaminant level (1,000 µg/L), the proposal for periodic monitoring appears to be more than adequate.

### 8.4. Residual Contamination

Based on the analytical results for the final excavation confirmation samples taken in 2010, which exceed current 18 AAC 75 Method Two cleanup levels, and the forensic analysis, residual fuel contamination remains in soil at the site. The primary contaminants of concern are DRO and benzene. The fuel present appears to be primarily a middle range distillate. The high benzene concentrations at much of the site are not associated with other petroleum hydrocarbons and the benzene may have been used and released as a solvent.

The known aerial extent of DRO contamination is very limited. DRO has been detected above the 18 AAC 75 Method Two cleanup level in three soil samples: Eureka-West (10,900 mg/kg), Eureka-South (558 mg/kg), and SB-02-01-SO (4,000 mg/kg) (MLFA 2010b, OASIS 2011). All three of these samples were collected within approximately 8 feet of each other on the south and west side of the east tank. Monitoring well MW-1 was installed in soil boring SB-02; DRO is impacting the water that accumulates in MW-1. The presence of the west tank, the office/storage building, and the paved parking lot

has prevented collection of additional samples to the south and west; the extent of DRO contamination has not been defined in these directions.

BTEX compounds, primarily benzene, are also present. The extent of benzene contamination is far larger than the known extent of DRO. Benzene was detected above the 18 AAC 75 Method Two soil cleanup level in all six of the 2010 excavation confirmation samples and in soil borings SB-02 and SB-03, which were advanced during the 2011 investigation (MLFA 2010b, OASIS 2011). Benzene has been detected at concentrations up to 21.2 mg/kg, far above the current 18 AAC 75 Method Two soil cleanup level 0.022 mg/kg. The highest measured concentrations of benzene occurred in samples Eureka-BTM-North (10.2 mg/kg), Eureka-BTM-South (21.2 mg/kg), and SB-03-02-SO (18E mg/kg); these samples contained concentrations of GRO and DRO below their respective soil cleanup levels (MLFA 2010b, OASIS 2011). These data suggest that a separate hazardous substance release occurred and that the benzene at the site is not associated with the 2010 unleaded gasoline release. Historically, chemicals containing benzene have been used as an industrial solvent; it is especially effective at degreasing metal parts.

All available data suggest that unleaded gasoline released at the site in 2010 was removed by excavation and that any residual fuel from that release has degraded over time.

## 9. RECOMMENDATIONS

Residual contamination is present in soil underneath the Eureka Lodge ASTs. Dense infrastructure in the area prevents additional excavation of contaminated soil at this time.

At least the top 20 feet of site soil is composed almost entirely of dense silt with some gravel (OASIS 2011). This material likely has a hydraulic conductivity ranging between 0.01 feet per day and 0.001 feet per day, with relative permeability ranging from semi-pervious to impervious (Bear 1972). The geological stratum situated below the site is generally not recognized as productive aquifer material. Water accumulating in the monitoring wells appears to be stagnant water accumulating slowly over time from precipitation and snow melt. As the water is not associated with an aquifer, continued groundwater monitoring is providing no useful data, and groundwater monitoring should be terminated. The remaining two monitoring wells should be decommissioned.

Based on the estimated volume of fuel removed in soil excavated after the 2010 spill (MLFA 2010a, 2010b), the results of forensic analysis, and review of a chromatograph from the soil removed in 2010, residual fuel contamination appears to be from an older middle range distillate fuel spill at the site.

A release of a hazardous substance including benzene (not associated with a fuel spill) also appears to have occurred. The concentration of benzene relative to toluene, ethylbenzene, xylenes, GRO, DRO, and RRO in sample SB-03-02-SO is much higher than would be expected for a fuel release (OASIS 2011). Benzene is volatile, dissolves readily in water, and (if oxygen is present and temperatures are above freezing) biodegrades readily in the environment.

Despite the low likelihood of contaminant migration, periodic monitoring of the surface water and drinking water for the well appears to be prudent. The number of surface water samples should be reduced from two to one, as the additional sample provides no significant value. To support calculation of TAH and TAqH values, surface water samples should be analyzed for BTEX and PAHs. Analysis of surface water samples for GRO and DRO should not be performed because AWQS values have not been established for these parameters.

A for sale sign was observed on the lodge. A notice of environmental contamination should be filed for the property to inform potential future buyers of the property that residual petroleum hydrocarbon contamination remains at the site.

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## 10. REFERENCES

- Alaska Department of Environmental Conservation (ADEC) 2017a. 18 AAC 75, *Oil and Other Hazardous Substances Pollution Control*. As amended through November 7, 2017.
- ADEC. 2017b. ADEC 18 AAC 70, *Alaska Water Quality Standards*. 5 February.
- ADEC. 2017c. ADEC 18 AAC 80, *Drinking Water*. 7 November.
- ADEC. 2017d. *ADEC Field Sampling Guidance*. August.
- Bear, J. (1972). *Dynamics of Fluids in Porous Media*. Dover Publications. ISBN 0-486-65675-6.
- ERM. 2017. *Addendum to the 2012 Groundwater and Surface Water Monitoring Work Plan*, Eureka Lodge, Alaska. ADEC Filed Number 210.28.006, Hazard ID 25595. 8 September.
- ERM. 2013. *2013 Water Monitoring Report*, Eureka Lodge, Alaska ADEC File Number 210.38.006, Hazard ID 25595. September.
- Michael L. Foster & Associates, Inc. (MLFA) 2010a. *Spill Response Report*. Eureka Lodge, Eureka, Alaska. Prepared for Crowley Petroleum Distribution. MLFA Job No. CPD-CPD-009-0001. 15 July.
- Michael L. Foster & Associates, Inc. (MLFA) 2010b. *Spill Response Remedial Action Report*. Eureka Lodge, Eureka, Alaska. Prepared for Crowley Petroleum Distribution. MLFA Job No. CPD-CPD-009-0002. 3 November.
- OASIS Environmental, an ERM Company. (OASIS). 2011. *Eureka Lodge Site Characterization Report*, Mile 128 Glenn Highway, Alaska. 28 November.
- OASIS. 2012a. *2012 Groundwater and Surface Water Monitoring Work Plan*, Eureka Lodge, Alaska. 4 June.
- OASIS. 2012b. *2012 Water Monitoring Report*, Eureka Lodge, Mile 128 Glenn Highway, Alaska. January.

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## **TABLES**

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**Tables Acronym Key  
Eureka Lodge  
Mile 128 Glenn Highway, Alaska**

< = Compound not detected at concentrations above the laboratory reporting detection limit. The laboratory reporting detection limit is shown.

**Value exceeds specified cleanup level**

ADEC GWCL = 18 AAC 75 Table C. Groundwater Cleanup Level.

DW MCL = 40 CFR 141.61 MCLs for organic contaminants. Drinking Water Cleanup Levels.

AWQS = results greater than or equal to Alaska Water Quality Standards (AWQS) (18 AAC 70.020(b))

<b>Acronym</b>	<b>Definition</b>
ADEC	Alaska Department of Environmental Conservation
AWQS	Alaska Water Quality Standards
BTEX	Benzene, Toluene, Ethylbenzene and Xylene Isomers (m&p- and o-)
°C	Degrees Celsius
CL	Cleanup Level
DRO	Diesel Range Organics
DTB	Depth to bottom
DTW	Depth to water
FD	Field Duplicate
ft	Feet
GRO	Gasoline Range Organics
GW	Groundwater
HC	Hydrocarbon
MDL	Method Detection Limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliter
µS/cm	Microsiemens per centimeter
µg/L	micrograms per liter
MS/MSD	matrix spike/matrix spike duplicate; triplicates required for MS/MSD analysis
mV	Millivolts
N	Normal / Primary
NA	Not Applicable
ND	Not Detected
PAH	Poly-cyclic Aromatic Hydrocarbon
pH	hydrogen potential
PHC	Petroleum Hydrocarbon
RL	Reporting Limit
SVOC	Semi-Volatile Organic Compound
TAH	Total Aromatic Hydrocarbons
TAqH	Total Aqueous Hydrocarbons
VOA	volatile organic analysis
VOC	Volatile Organic Compound

**Qualifiers - Organic:**

J	The analyte was positively identified; associated numerical value is the approximate concentration of the analyte in the sample.
UB	Result is reported as nondetect at the reporting limit due to blank contamination.
UJ-L	Not detected result is considered estimated due to LCS/LCSD not meeting quality control criteria.
UJ-C	Not detected result is considered estimated due to calibration not meeting the quality control standards.

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**Table 1: Sample Collection Summary  
Eureka Lodge  
Mile 128 Glenn Highway, Alaska**

Location ID	Sample ID	Sample Date	Sample Type	Matrix	Analysis
MW-1	17-ERK-MW-1	10/5/17	N	Water	BTEX, GRO, DRO, PAH
MW-3	17-ERK-MW-3	10/5/17	N	Water	GRO, DRO, PAH, VOC (8260C and 8260C SIM)
	17-ERK-MWZ	10/5/17	FD	Water	GRO, DRO, PAH, VOC (8260C and 8260C SIM)
SW-1	17-ERK-SW-01	10/5/17	N	Water	GRO, DRO, BTEX,PAH
SW-2	17-ERK-SW-02	10/5/17	N	Water	GRO, DRO, BTEX,PAH
	17-ERK-SWZ	10/5/17	FD	Water	GRO, DRO, BTEX,PAH
DW-01	17-ERK-DW-01	10/5/17	N	Water	PAH, VOC
	17-ERK-DWZ	10/5/17	FD	Water	PAH, VOC
TB-2	TB-2	10/4/17	N	Soil	Torkelson Fingerprinting, GC Characterization
TB-3	TB-3	10/4/17	N	Soil	Torkelson Fingerprinting, GC Characterization
TB-4	TB-4	10/4/17	N	Soil	Torkelson Fingerprinting, GC Characterization

**Table 2: Water Quality Parameters  
Eureka Lodge  
Mile 128 Glenn Highway, Alaska**

Parameter			Color	Conductivity	Dissolved Oxygen	Odor	Oxidation Reduction Potential	pH	Sheen	Temperature	Turbidity	Sample Depth	Total Depth
AWQS-Lowest - Fresh Water			NA	NA	>5mg/L	NA	NA	6.5 - 8.5	no HC Sheen	<15°C	NA		
Location ID	Sample Date	Matrix	Color	Conductivity μS/cm	Dissolved Oxygen mg/L	Odor	Oxidation Reduction Potential mV	pH Units	Sheen	Temperature °C	Turbidity	Sample Depth Feet	Total Depth Feet
MW-1	10/5/2017	Water	clear	804	1.77	None	-180	6.14	None	1.01	Low	18	19.1
MW-3	10/5/2017	Water	cloudy tan	396	7.23	None	-84.7	5.03	None	2.93	Medium	18.3	19.32
SW-1	10/5/2017	Water	clear	21	9.76	None	-89.3	8.74	None	4.22	Clear	0.16	4 to 5
SW-2	10/5/2017	Water	clear	22	10.83	None	-129.8	9.09	None	4.02	Low	0.16	4 to 5
DW-01	10/5/2017	Water	clear	21	10.19	None	-73.8	7.96	None	5.38	Clear	Unknown	125

**Table 3: Groundwater Laboratory Analytical Results**  
**Eureka Lodge**  
**Mile 128 Glenn Highway, Alaska**

Analyte	Location ID	MW-1	MW-3	
	Sample Date	5-Oct-17	5-Oct-17	5-Oct-17
	Sample Type	N	N	FD
	ADEC GW CL			
<b>Method AK101, µg/L</b>				
Gasoline Range Organics (C6-C10)	2,200	ND (1,000)	ND (1,000)	ND (1,000)
<b>Method AK102, µg/L</b>				
Diesel Range Organics (C10-C25)	<b>1,500</b>	<b>3,700</b>	ND (110) UB	ND (100) UB
<b>Method SW8260C, µg/L</b>				
1,1,1-Trichloroethane	8000	--	ND (3)	ND (3)
1,1-Dichloroethane	28	--	ND (2)	ND (2)
1,1-Dichloropropene		--	ND (3)	ND (3)
1,2,3-Trichlorobenzene	7	--	ND (5)	ND (5)
1,2,3-Trichloropropane	0.0075	--	ND (2)	ND (2)
1,2,4-Trichlorobenzene	4	--	ND (2)	ND (2)
1,2,4-Trimethylbenzene	15	--	ND (3)	ND (3)
1,2-Dibromo-3-Chloropropane	--	--	ND (10)	ND (10)
1,2-Dichlorobenzene	300	--	ND (2)	ND (2)
1,2-Dichloropropane	4.4	--	ND (1)	ND (1)
1,3,5-Trimethylbenzene	120	--	ND (3)	ND (3)
1,3-Dichlorobenzene	300	--	ND (2)	ND (2)
1,3-Dichloropropane	4.7	--	ND (2)	ND (2)
2,2-Dichloropropane	--	--	ND (3)	ND (3)
2-Butanone	5600	--	ND (20)	ND (20)
2-Chlorotoluene	--	--	ND (3)	ND (3)
4-Chlorotoluene	--	--	ND (2)	ND (2)
4-Isopropyltoluene	--	--	ND (3)	ND (3)
4-Methyl-2-pentanone	6300	--	ND (15)	ND (15)
Acetone	14000	--	ND (50)	ND (50)
Benzene	4.6	ND (2)	--	--
Bromobenzene	62	--	ND (2)	ND (2)
Bromochloromethane	1.3	--	ND (2)	ND (2)
Carbon disulfide	810	--	ND (1)	ND (1)
Carbon tetrachloride	4.6	--	ND (3)	ND (3)
Chlorobenzene	78	--	ND (2)	ND (2)
Chloroethane	21000	--	ND (5)	ND (5)
Chloromethane	--	--	ND (20)	ND (20)
Dichlorodifluoromethane	8.7	--	ND (5) UJ-C	ND (5) UJ-C
Ethylbenzene	15	ND (3)	ND (3)	ND (3)
Isopropylbenzene	450	--	ND (2)	ND (2)
Methyl tert-butyl ether	140	--	ND (2)	ND (2)
Methylene Chloride	110	--	ND (5)	ND (5)
m-Xylene & p-Xylene	--	ND (3)	ND (3)	ND (3)
n-Butylbenzene	1000	--	ND (3)	ND (3)
N-Propylbenzene	660	--	ND (3)	ND (3)
o-Xylene	--	ND (2)	ND (2)	ND (2)
sec-Butylbenzene	2000	--	ND (3)	ND (3)
Styrene	1200	--	ND (5)	ND (5)
t-Butylbenzene	690	--	ND (3)	ND (3)
Toluene	1,100	ND (2)	ND (2)	ND (2)
trans-1,2-Dichloroethene	360	--	ND (3)	ND (3)
Trichlorofluoromethane	5200	--	ND (3)	ND (3)
Total Xylenes	190	ND (5)	ND (5)	ND (5)
<b>Method SW8260C SIM, µg/L</b>				
1,1,1,2-Tetrachloroethane	5.7	--	ND (0.5)	ND (0.5)
1,1,1,2,2-Tetrachloroethane	0.76	--	ND (0.5)	ND (0.5)
1,1,2-Trichloroethane	0.41	--	ND (0.5)	ND (0.5)
1,1-Dichloroethene	280	--	ND (0.5)	ND (0.5)
1,2-Dibromoethane	--	--	ND (0.5)	ND (0.5)
1,2-Dichloroethane	1.7	--	ND (0.5)	ND (0.5)
1,4-Dichlorobenzene	4.8	--	ND (0.5)	ND (0.5)
2-Hexanone	38	--	ND (0.5)	ND (0.5)
Benzene	4.6	--	ND (0.5)	ND (0.5)
Bromodichloromethane	1.3	--	ND (0.5)	ND (0.5)
Bromoform	33	--	ND (0.5)	ND (0.5)
Bromomethane	7.5	--	ND (0.5)	ND (0.5)
Chloroform	2.2	--	ND (0.5)	ND (0.5)
cis-1,2-Dichloroethene	36	--	ND (0.5)	ND (0.5)
cis-1,3-Dichloropropene	4.7	--	ND (0.5)	ND (0.5)
Dibromochloromethane	8.7	--	ND (0.5)	ND (0.5)
Dibromomethane	8.3	--	ND (0.5)	ND (0.5)
Hexachlorobutadiene	1.4	--	ND (0.5)	ND (0.5)
Naphthalene	1.7	--	ND (0.5)	ND (0.5)
Tetrachloroethene	41	--	ND (0.5)	ND (0.57) UB
trans-1,3-Dichloropropene	4.7	--	ND (0.5)	ND (0.5)
Trichloroethene	2.8	--	ND (0.5)	ND (0.5)
Vinyl chloride	0.19	--	ND (0.5)	ND (0.5)
<b>Method SW8270D-SIM, µg/L</b>				
1-Methylnaphthalene	11	ND (0.016)	ND (0.017)	ND (0.017)
2-Methylnaphthalene	36	ND (0.024)	ND (0.025)	ND (0.026)
Acenaphthene	530	ND (0.016)	ND (0.017)	ND (0.017)
Acenaphthylene	260	ND (0.016)	ND (0.017)	ND (0.017)
Anthracene	43	ND (0.016)	ND (0.017)	ND (0.017)
Benzo(a)anthracene	0.12	ND (0.016)	ND (0.017)	ND (0.017)

**Table 3: Groundwater Laboratory Analytical Results  
Eureka Lodge  
Mile 128 Glenn Highway, Alaska**

Analyte	Location ID	MW-1	MW-3	
	Sample Date	5-Oct-17	5-Oct-17	5-Oct-17
	Sample Type	N	N	FD
	ADEC GW CL			
Benzo(a)pyrene	0.034	ND (0.016) UJ-L	ND (0.017) UJ-L	ND (0.017) UJ-L
Benzo(b)fluoranthene	0.34	ND (0.016)	ND (0.017)	ND (0.017)
Benzo(g,h,i)perylene	0.26	ND (0.016)	ND (0.017)	ND (0.017)
Benzo(k)fluoranthene	0.8	ND (0.024)	ND (0.025)	ND (0.026)
Chrysene	2	ND (0.016)	ND (0.017)	ND (0.017)
Dibenzo(a,h)anthracene	0.034	0.0019 J	ND (0.017)	ND (0.017)
Fluoranthene	260	ND (0.016)	ND (0.017)	ND (0.017)
Fluorene	290	ND (0.016)	ND (0.017)	ND (0.017)
Indeno(1,2,3-cd)pyrene	0.19	ND (0.016)	ND (0.017)	ND (0.017)
Naphthalene	1.7	ND (0.032)	ND (0.033)	ND (0.034)
Phenanthrene	170	ND (0.016)	ND (0.017)	ND (0.017)
Pyrene	120	ND (0.016)	ND (0.017)	ND (0.017)



**Table 4: Surface Water Laboratory Analytical Results  
Eureka Lodge  
Mile 128 Glenn Highway, Alaska**

Analyte	Location ID	SW-01	SW-02	
	Sample Date	5-Oct-17	5-Oct-17	5-Oct-17
	Sample Type	N	N	FD
	AWQS			
<b>Method AK101, µg/L</b>				
Gasoline Range Organics (C6-C10)	--	ND (1000)	ND (1000)	ND (1000)
<b>Method AK102, µg/L</b>				
Diesel Range Organics (C10-C25)	--	220	100	99 J
<b>Method E624, µg/L</b>				
Benzene	5	ND (2)	ND (2)	ND (2)
Ethylbenzene	700	ND (3)	ND (3)	ND (3)
m-Xylene & p-Xylene	--	ND (3)	ND (3)	ND (3)
o-Xylene	--	ND (2)	ND (2)	ND (2)
Toluene	1,000	ND (2)	ND (2)	ND (2)
Total Xylenes	10,000	ND (5)	ND (5)	ND (5)
<b>Method E625, µg/L</b>				
1-Methylnaphthalene	--	ND (4)	ND (4)	ND (4)
2-Methylnaphthalene	--	ND (1.6)	ND (1.6)	ND (1.6)
Acenaphthene	1,200	ND (1.6)	ND (1.6)	ND (1.6)
Acenaphthylene	--	ND (4)	ND (4)	ND (4)
Anthracene	9,600	ND (0.16)	ND (0.16)	ND (0.16)
Benzo[a]anthracene	--	ND (12)	ND (12)	ND (12)
Benzo[a]pyrene <sup>2</sup>	0.2	ND (4)	ND (4)	ND (4)
Benzo[g,h,i]perylene	--	ND (4)	ND (4)	ND (4)
Benzo[fluoranthene	--	ND (4)	ND (4)	ND (4)
Chrysene	--	ND (2.4)	ND (2.4)	ND (2.4)
Dibenz(a,h)anthracene	--	ND (2.4)	ND (2.4)	ND (2.4)
Fluoranthene	300	ND (12)	ND (12)	ND (12)
Fluorene	1,300	ND (8)	ND (8)	ND (8.1)
Indeno[1,2,3-cd]pyrene	--	ND (4)	ND (4)	ND (4)
Naphthalene	--	ND (1.6)	ND (1.6)	ND (1.6)
Phenanthrene	--	ND (4)	ND (4)	ND (4)
Pyrene	960	ND (8)	ND (8)	ND (8.1)
<b>Calculated values, µg/L</b>				
TAH <sup>1</sup>	10	3.5	3.5	3.5
TAqH <sup>1</sup>	15	6.9	6.9	6.9

<sup>1</sup> TAH and TAqH were calculated following ADEC guidance, using 2 times the MDL

<sup>2</sup> The LOD for benzo(a)pyrene (0.16 µg/L, calculated using 2 times the MDL) is below the AWQS

**Table 5: Drinking Water Laboratory Analytical Results  
Eureka Lodge  
Mile 128 Glenn Highway, Alaska**

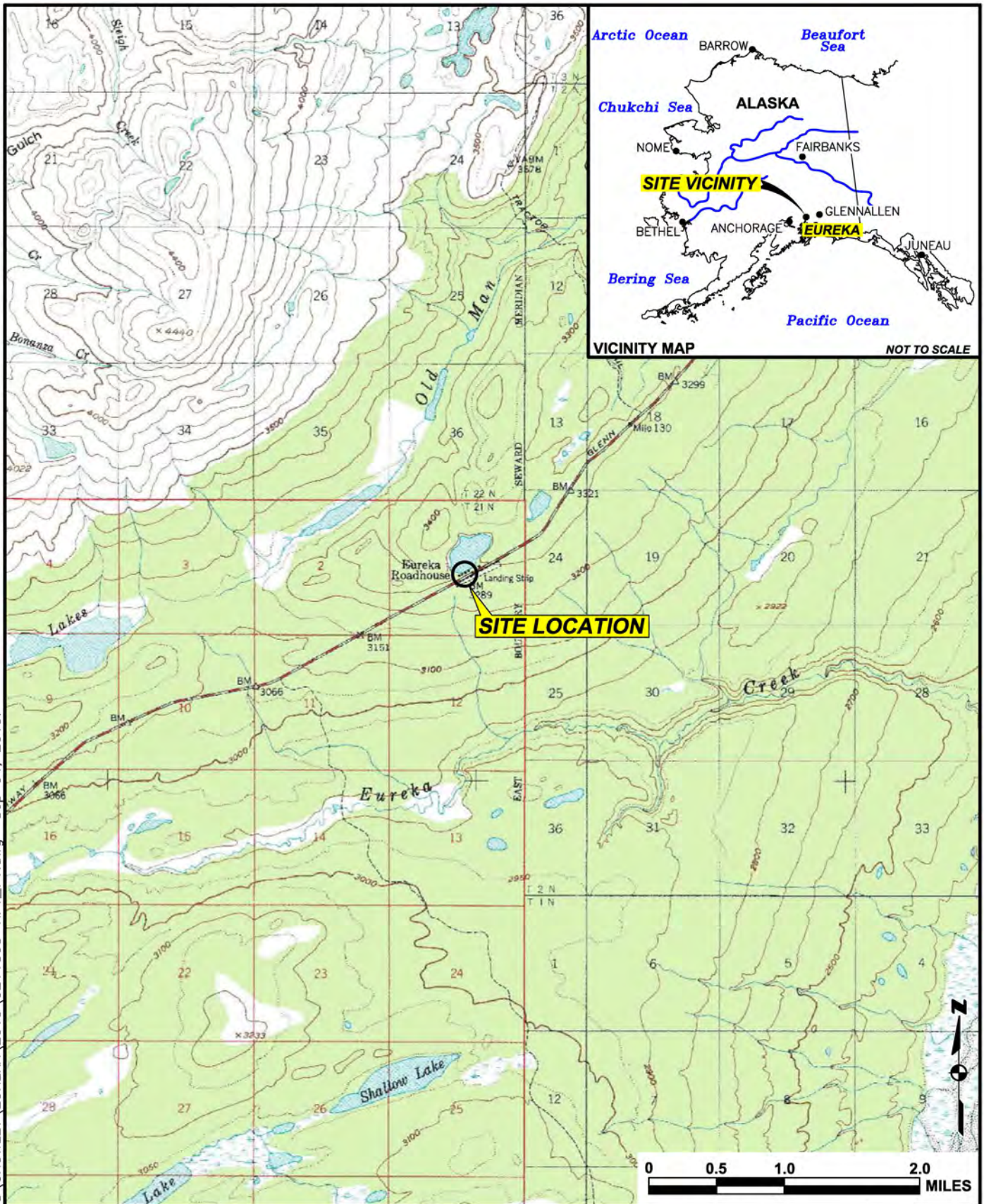
Analyte	Location ID	DW-01	
	Sample Date	5-Oct-17	5-Oct-17
	Sample Type	N	FD
	DW MCL		
<b>Method E524.2, µg/L</b>			
1,1,1-Trichloroethane	200	ND (0.5)	ND (0.5)
1,1,2-Trichloroethane	5	ND (0.5)	ND (0.5)
1,1-Dichloroethene	7	ND (0.5)	ND (0.5)
1,2,4-Trichlorobenzene	70	ND (0.5)	ND (0.5)
1,2-Dichlorobenzene	75	ND (0.5)	ND (0.5)
1,2-Dichloroethane	5	ND (0.5)	ND (0.5)
1,2-Dichloropropane	5	ND (0.5)	ND (0.5)
1,4-Dichlorobenzene	600	ND (0.5)	ND (0.5)
Benzene	5	ND (0.5)	ND (0.5)
Carbon tetrachloride	5	ND (0.5)	ND (0.5)
Chlorobenzene	100	ND (0.5)	ND (0.5)
cis-1,2-Dichloroethene	70	ND (0.5)	ND (0.5)
Ethylbenzene	700	ND (0.5)	ND (0.5)
Methylene Chloride	5	ND (0.5)	ND (0.5)
Styrene	100	ND (0.5)	ND (0.5)
Tetrachloroethene	5	ND (0.5)	ND (0.5)
Toluene	1,000	0.16 J	0.17 J
trans-1,2-Dichloroethene	100	ND (0.5)	ND (0.5)
Trichloroethene	5	ND (0.5)	ND (0.5)
Vinyl chloride	2	ND (0.5)	ND (0.5)
Xylenes, Total	10,000	ND (0.5)	ND (0.5)
<b>Method SW8270D-SIM, µg/L</b>			
1-Methylnaphthalene	--	ND (0.017)	ND (0.017)
2-Methylnaphthalene	--	ND (0.025)	ND (0.025)
Acenaphthene	--	ND (0.017)	ND (0.017)
Acenaphthylene	--	ND (0.017)	ND (0.017)
Anthracene	--	ND (0.017)	ND (0.017)
Benzo(a)anthracene	--	ND (0.017)	ND (0.017)
Benzo(a)pyrene	0.2	ND (0.017) UJ-L	ND (0.017) UJ-L
Benzo(b)fluoranthene	--	ND (0.017)	ND (0.017)
Benzo(g,h,i)perylene	--	ND (0.017)	ND (0.017)
Benzo(k)fluoranthene	--	ND (0.025)	ND (0.025)
Chrysene	--	ND (0.017)	ND (0.017)
Dibenzo(a,h)anthracene	--	ND (0.017)	ND (0.017)
Fluoranthene	--	ND (0.017)	ND (0.017)
Fluorene	--	ND (0.017)	ND (0.017)
Indeno(1,2,3-cd)pyrene	--	ND (0.017)	ND (0.017)
Naphthalene	--	ND (0.033)	ND (0.033)
Phenanthrene	--	ND (0.017)	ND (0.017)
Pyrene	--	ND (0.017)	ND (0.017)

Maximum contaminant levels (MCL) are from 40 CFR 141.61.

## FIGURES

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DATE: SEPT. 2013  
 CHKD: S.M.C.  
 DRAWN: D.R.F.  
 PROJ. No.: 0211803  
 825 W. 8th Ave., Anchorage, AK 99501, (907) 258-4880

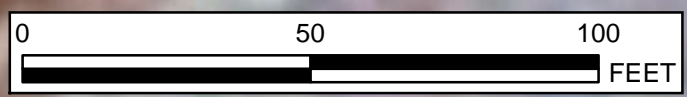
**SITE LOCATION MAP**  
 EUREKA LODGE - 2017 WATER MONITORING REPORT  
 CROWLEY LLC  
 Mile Post 128 – Glenn Highway, Alaska

FIGURE  
**1**

SOURCE: NATIONAL GEOGRAPHIC TOPO SOFTWARE PROGRAM 2007.

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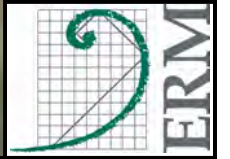
IMAGERY SOURCE: Digital Globe 2003.

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**LEGEND**

- MONITORING WELL LOCATION
- ELEVATION REFERENCE POINT
- DRINKING WATER LOCATION

DATE: NOV. 2017  
 CHKD: K.M.  
 DRWN: N.W.C.  
 PROJ. No.: 0424283  
 825 W. 8th Ave., Anchorage,  
 AK 99501, (907) 258-4880



**GROUNDWATER ANALYTICAL RESULTS**

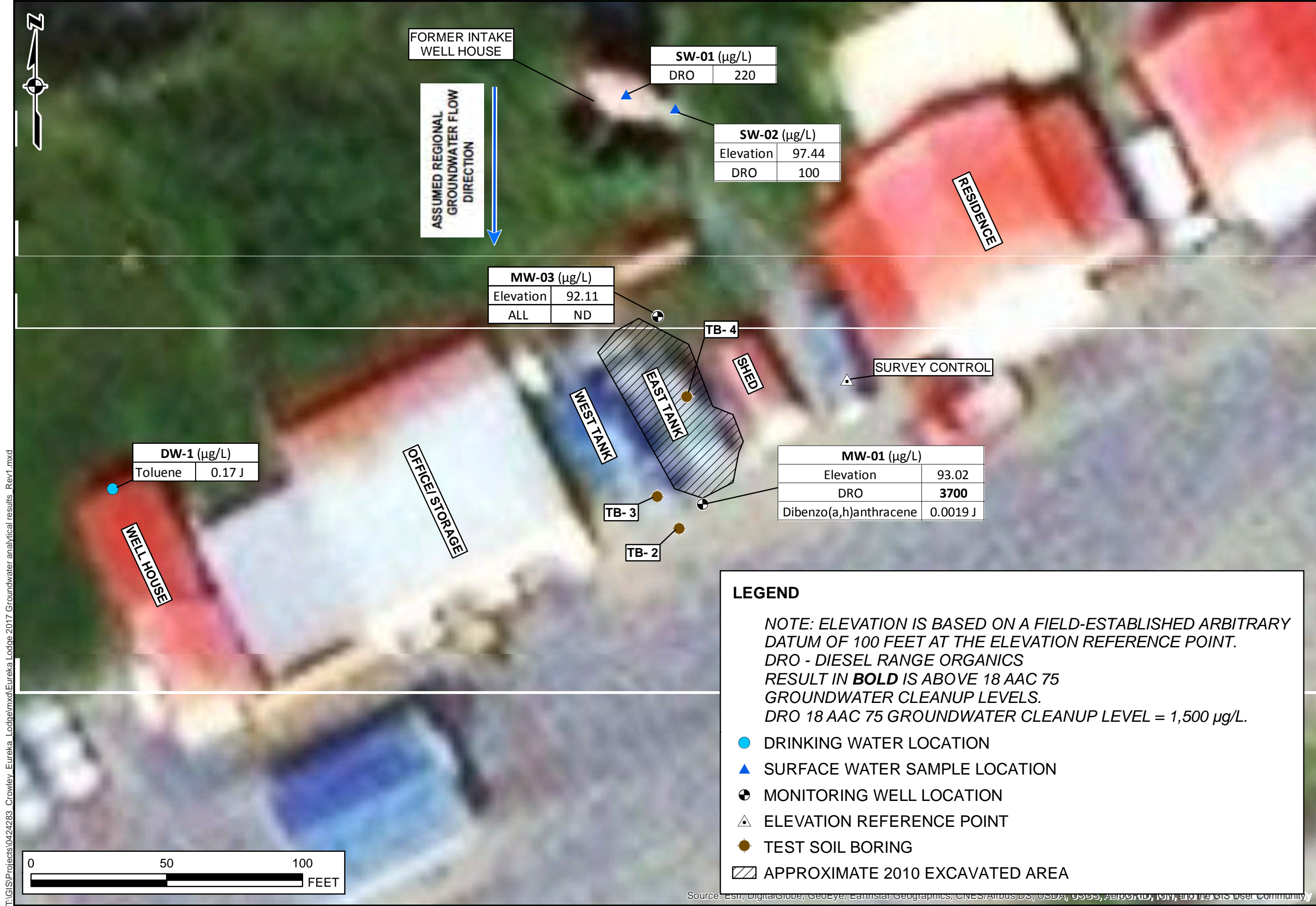
EUREKA LODGE - 2017 WATER MONITORING REPORT  
 CROWLEY LLC  
 Mile Post 128 - Glenn Highway, Alaska

FIGURE  
**2**

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FORMER INTAKE WELL HOUSE

ASSUMED REGIONAL GROUNDWATER FLOW DIRECTION

SW-01 (µg/L)	
DRO	220

SW-02 (µg/L)	
Elevation	97.44
DRO	100

RESIDENCE

MW-03 (µg/L)	
Elevation	92.11
ALL	ND

WEST TANK

EAST TANK

SHED

SURVEY CONTROL

DW-1 (µg/L)	
Toluene	0.17 J

WELL HOUSE

OFFICE STORAGE

TB-3

TB-2

TB-4

MW-01 (µg/L)	
Elevation	93.02
DRO	<b>3700</b>
Dibenzo(a,h)anthracene	0.0019 J

**LEGEND**

NOTE: ELEVATION IS BASED ON A FIELD-ESTABLISHED ARBITRARY DATUM OF 100 FEET AT THE ELEVATION REFERENCE POINT.  
 DRO - DIESEL RANGE ORGANICS  
 RESULT IN **BOLD** IS ABOVE 18 AAC 75 GROUNDWATER CLEANUP LEVELS.  
 DRO 18 AAC 75 GROUNDWATER CLEANUP LEVEL = 1,500 µg/L.

- DRINKING WATER LOCATION
- ▲ SURFACE WATER SAMPLE LOCATION
- ⊕ MONITORING WELL LOCATION
- △ ELEVATION REFERENCE POINT
- TEST SOIL BORING
- ▨ APPROXIMATE 2010 EXCAVATED AREA

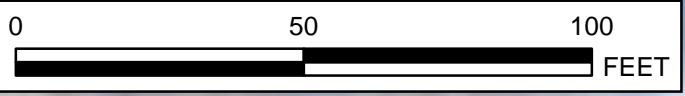
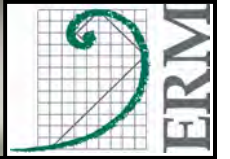


FIGURE  
**3**

**GROUNDWATER ANALYTICAL RESULTS**

EUREKA LODGE - 2017 WATER MONITORING REPORT  
 CROWLEY LLC  
 Mile Post 128 - Glenn Highway, Alaska

DATE: FEB. 2018  
 CHKD: K.M.  
 DRWN: N.W.C.  
 PROJ. No.: 0424283  
 825 W. 8th Ave., Anchorage, AK 99501, (907) 258-4880



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

IMAGERY SOURCE: Digital Globe 2003.

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## **APPENDIX A**

### **Sample Data Sheets**

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# GROUNDWATER SAMPLING FORM

CLIENT: Crowley

SAMPLER(S) NAME: Jeremy Stariwat/Kassi <sup>Murray Powers</sup>

SITE: Eureka Lodge

SAMPLE ID ON COC: 17-ERK-MW-1

DATE: 10/5/17

YSI #/SN: Y7

MONITORING WELL ID: MW-1

Weather: Partly Cloudy 40°

1 in = 0.083 ft; 2 in = 0.167 ft; 3 in = 0.25 ft; 4 in = 0.333 ft

PRODUCT PRESENT: NO

DIAMETER OF WELL: 0.167 (FT)

PURGE AND SAMPLE METHOD: Low Flow

RADIUS OF WELL (R): 0.083 (FT)

WATER LEVEL MEASURING DEVICE: Oil/Water Interface Probe

TOTAL DEPTH OF WELL BELOW MEASURING POINT (D): 19.10 (FT)

TYPE OF PUMP: ~~Peristaltic~~ Submersible Pump

DEPTH TO GW BELOW MEASURING POINT (d): 6.87 (FT)

WELL INTEGRITY: GOOD

LENGTH OF WATER COLUMN (L): (D-d) = 12.23 (FT)

REQUIRED REPAIRS: NO

VOLUME OF WATER COLUMN (V): (3.14xRxL) 0.26 (CUBIC FT)

PUMP INTAKE DEPTH: 18 feet because of practically no recharge as seen on well #13 and during previous sampling events.

WELL VOLUME: (7.48xV) = 1.98 (GAL) X3 = 5.94 (GAL)

Note: Groundwater volumes above were calculated in the field and used for approximate purge volumes; rounded values are shown for informational purposes only.

TIME	VOLUME (GAL)	WATER LEVEL (ft BTOC)	TEMP (deg C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)	TURBIDITY (Visual: High, Med, Low, Clear)	APPEARANCE OF WATER (Visual)	ODOR
1442	0	6.87								
1444	0	6.81								
1446	0.1	7.18	2.30	817	10.16	4.57	-48.5	Med	cloudy	NO
1451	0.4	7.82	1.97	853	1.59	5.62	-151.8	Med	cloudy	NO
1456	0.7	8.82	2.27	868	1.07	5.81	-166.4	"	"	"
1501	1.0	9.68	1.70	860	0.31	6.16	-179.4	"	"	"
1506	1.3	10.79	1.34	849	0.34	6.28	-185.6	Low	"	"
1511	1.6	11.47	1.37	850	0.42	6.55	-193.1	low	clear	NO
1516	1.9	12.12	1.26	844	0.53	6.42	-192.6	"	"	"
1521	2.2	12.86	1.19	817	1.62	6.32	-185.9	"	"	"
1526	2.5	14.95	1.01	801	1.84	6.21	-180.9	"	"	"
1531	2.8	15.5	1.01	804	1.77	6.14	-180.0	"	"	"
Stopped Purging because of inadequate sample volume										

(1) STABILIZATION is achieved when three (3) consecutive readings of pH, conductivity, and DO collected

in 3-5 minute intervals meet the following criteria:

- ±0.1 standard units for pH
- ±3% for temperature
- ±3% for conductivity
- ±10 mV for ORP or ±10% if between -100 mV and +100 mV
- ±10% for DO > 0.50 mg/L. Three DO readings < 0.50 mg/L can be considered stable.

PURGE UNTIL PARAMETER STABILIZATION or UNTIL 3 WELL VOLUMES ARE REMOVED

TOTAL VOLUME PURGED: 2.8 (GAL)

FLOW RATE (desired range is 100 to 500 mL/min): 240 ml/min <sup>ind. 0.0226 gal</sup> DT 0.3 gal/5min

SAMPLE TIME: 1535

QC SAMPLES COLLECTED: NA

ANALYSIS (fill in number of bottles collected)

URO (AK101)	3	40ml VOA (HCL)	
DRO (AK102)	2	250ml amber (HCL)	
PAH (6270DSIM)	2	1L (unpres)	
BTEX (8260C)	3	40ml VOA (HCL)	Other:

COMMENTS:

Note: Need 14mm socket to open well monument • Water level after samples = 18.08 ft

Turbidity (NTU):

Sampler Signature

*Kim Murray*

QC Check Signature

*[Signature]*

# GROUNDWATER SAMPLING FORM

CLIENT: Crowley

SITE: Eureka Lodge

DATE:

MONITORING WELL ID: *NW-2*

SHEET \_\_\_\_\_ OF \_\_\_\_\_

SAMPLER(S) NAME: Jeremy Stariwat/Kassi Powers

SAMPLE ID ON COC:

YSI #/SN:

Weather: \_\_\_\_\_ 1 in = 0.083 ft; 2 in = 0.167 ft; 3 in = 0.25 ft; 4 in = 0.333 ft

PRODUCT PRESENT: \_\_\_\_\_

DIAMETER OF WELL: \_\_\_\_\_ (FT)

PURGE AND SAMPLE METHOD: *Low Flow*

RADIUS OF WELL (R): \_\_\_\_\_ (FT)

WATER LEVEL MEASURING DEVICE: *Oil/Water Interface Probe*

TOTAL DEPTH OF WELL BELOW MEASURING POINT (D): \_\_\_\_\_ (FT)

TYPE OF PUMP: *Peristaltic*

DEPTH TO GW BELOW MEASURING POINT (d): \_\_\_\_\_ (FT)

WELL INTEGRITY: \_\_\_\_\_

LENGTH OF WATER COLUMN (L): (D-d)= \_\_\_\_\_ (FT)

REQUIRED REPAIRS: \_\_\_\_\_

VOLUME OF WATER COLUMN (V): (3.14xRxRxL) \_\_\_\_\_ (CUBIC FT)

PUMP INTAKE DEPTH: \_\_\_\_\_

WELL VOLUME: (7.48xV)= \_\_\_\_\_ (GAL) X3= \_\_\_\_\_ (GAL)

Min Purge Volume Max Purge Volume  
 Note: Groundwater volumes above were calculated in the field and used for approximate purge volumes; rounded values are shown for informational purposes only.

TIME	VOLUME (GAL)	WATER LEVEL (ft BTOC)	TEMP (deg C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)	TURBIDITY (Visual: High, Med, Low, Clear)	APPEARANCE OF WATER (Visual)	ODOR
<i>Well could not be located. D-1 gravel has been placed inhibiting locating.</i>										

(1) STABILIZATION is achieved when three (3) consecutive readings of pH, conductivity, and DO collected in 3-5 minute intervals meet the following criteria:

- ±0.1 standard units for pH
- ±3% for temperature
- ±3% for conductivity
- ±10 mV for ORP or ±10% if between -100 mV and +100 mV
- ±10% for DO > 0.50 mg/L. Three DO readings < 0.50 mg/L can be considered stable.

PURGE UNTIL PARAMETER STABILIZATION or UNTIL 3 WELL VOLUMES ARE REMOVED

TOTAL VOLUME PURGED: \_\_\_\_\_ (GAL) FLOW RATE (desired range is 100 to 500 mL/min): \_\_\_\_\_

SAMPLE TIME: \_\_\_\_\_ QC SAMPLES COLLECTED: \_\_\_\_\_

ANALYSIS (fill in number of bottles collected)

<i>GRO(AK101)</i>	<i>3</i>	<i>40ml VOA (HCL)</i>	
<i>DRO(AK102)</i>	<i>2</i>	<i>25ml amber (HCL)</i>	
<i>PAH (82700 SIM)</i>	<i>2</i>	<i>1L (unpres)</i>	
<i>BTEX(8260C)</i>	<i>3</i>	<i>40ml VOA (HCL)</i>	Other: _____

COMMENTS:

Turbidity (NTU): \_\_\_\_\_

Sampler Signature: *[Handwritten Signature]* QC Check Signature: \_\_\_\_\_

# GROUNDWATER SAMPLING FORM

CLIENT: Crowley

SITE: Eureka Lodge

DATE: 10/5/17

MONITORING WELL ID: MW-3

SHEET 1 OF 1

SAMPLER(S) NAME: Jeremy Stariwat/Kassi <sup>Murray Powers</sup> EM 10/5/17

SAMPLE ID ON COC: 17-ERK-MW-3

YSI #/SN: Y-7

Weather: Cloudy 1 in = 0.083 ft; 2 in = 0.167 ft; 3 in = 0.25 ft; 4 in = 0.333 ft

PRODUCT PRESENT: No

DIAMETER OF WELL: 2 in (FT)

PURGE AND SAMPLE METHOD: Low Flow

RADIUS OF WELL (R): 0.083 (FT)

WATER LEVEL MEASURING DEVICE: Oil/Water Interface Probe

TOTAL DEPTH OF WELL BELOW MEASURING POINT (D): 19.32 (FT)

TYPE OF PUMP: <sup>7/25/10/5/17</sup> Peristaltic submersible pump

DEPTH TO GW BELOW MEASURING POINT (d): 7.37 (FT)

WELL INTEGRITY: Good

LENGTH OF WATER COLUMN (L): (D-d) = 11.95 (FT)

REQUIRED REPAIRS: No

VOLUME OF WATER COLUMN (V): (3.14xRxL) 0.258 (CUBIC FT)

PUMP INTAKE DEPTH: 8.4

WELL VOLUME: (7.48xV) = 1.934 (GAL) X3 = 5.8 (GAL)

Pump intake dropped to 1 ft off bottom, ~18.3 ft. due slow recharge

Note: Groundwater volumes above were calculated in the field and used for approximate purge volumes; rounded values are shown for informational purposes only.

TIME	VOLUME (GAL)	WATER LEVEL (ft BTOC)	TEMP (deg C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)	TURBIDITY (Visual: High, Med, Low, Clear)	APPEARANCE OF WATER (Visual)	ODOR
1347		8.00	3.42							
1351		9.50	2.93	396	7.23	5.03	-84.7	Med	Cloudy <sup>fun</sup>	No
									had to put pump 1 foot off bottom of well because of such low flow <sup>9/25/17</sup>	
									low recharge	

(1) STABILIZATION is achieved when three (3) consecutive readings of pH, conductivity, and DO collected in 3-5 minute intervals meet the following criteria:

- ±0.1 standard units for pH
- ±3% for temperature
- ±3% for conductivity
- ±10 mV for ORP or ±10% if between -100 mV and +100 mV
- ±10% for DO > 0.50 mg/L. Three DO readings < 0.50 mg/L can be considered stable.

PURGE UNTIL PARAMETER STABILIZATION or UNTIL 3 WELL VOLUMES ARE REMOVED

TOTAL VOLUME PURGED: 14.15 (GAL)

FLOW RATE (desired range is 100 to 500 mL/min): 7/26/17

SAMPLE TIME: 14:15; dup = 14:25

QC SAMPLES COLLECTED: Partial Dup on Duplicate

ANALYSIS (fill in number of bottles collected)

GRO(AK10)	3	40ml VOA (HCL)	+ 3 = 6
DRO(AK102)	2	250ml (HCL)	+ 2 = 4
PAH(8270DSIM)	2	1L (unpres)	+ 2 = 4
VOL(8260C/8260C SIM)	3	40ml VOA (HCL)	+ 6 = 12

Other:

COMMENTS:

Note: used 14mm socket wrench for opening well monument.

No recharge depth at 8.47 with 0.5 gallon purged  
 Wait 5 minutes to see if there is any recharge  
 After ~45 min, 0.02 ft of recharge  
 H2O level after samples/duplicate was 15.02 ft

Turbidity (NTU):

Sampler Signature: *Kimi Murray*

QC Check Signature: *[Signature]*

## Surface Water Sampling Worksheet

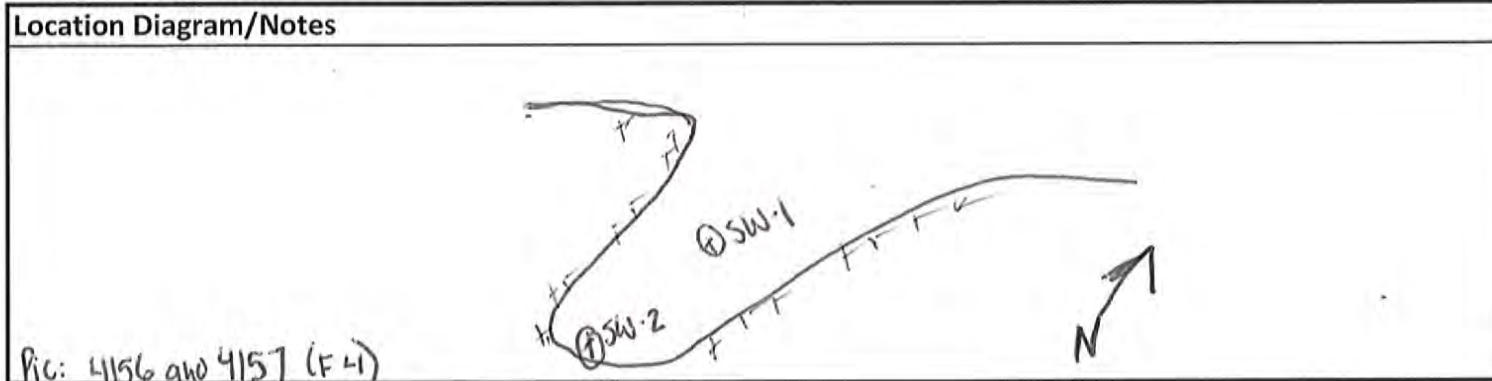
Project # : 424283	Location: <u>SW-2</u>
Project Name: <u>Eureka Lodge</u>	Date: <u>10/5/17</u>
Field Team: <u>Jeremy Stariwat/Kassi Powers</u>	Start Time: <u>1020</u>
Sample ID: <u>17-ERK-SW02</u> Time: <u>1035</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">primary</span> dup split ms/msd	End Time: _____
Sample ID: <u>17-ERK-SW7</u> Time: <u>1040</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">primary</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">dup</span> split ms/msd	
Weather Conditions: _____	

**Sensory Observations (circle all that apply)**

Color: <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Clear</span> , Amber, Tan, Brown, Grey, Milky White, Other:	Sheen: <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">No</span> , Petrogenic, Biogenic
Odor: <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">None</span> , Low, Medium, High, Very Strong, H2S, Fuel like, Chemical ?, Unknown	Debris: Yes, <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">No</span>
Turbidity: None, <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">low</span> , Medium, High, Very Turbid, Heavy Silts	
Marine <input type="checkbox"/> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Lake/Pond</span> <input type="checkbox"/> Seep/Spring <input type="checkbox"/>	
Brackish <input type="checkbox"/> River <input type="checkbox"/> Emergent Vegetation <input type="checkbox"/>	
Fresh Water <input type="checkbox"/> Stream/Creek <input type="checkbox"/> Submerged Vegetation <input type="checkbox"/>	

**Instrument Observations**

Temp (°C)	Spec. Cond. (mS/cm <sup>5</sup> )	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
4.02	0.036	22	9.76 <small>KM 10/5/17</small>	9.09 8.74 <small>KM 10/5/17</small>	-89.3 -129.8 <small>KM 10/5/17</small>
Sample Depth (ft) (Top of Lathe To Water Surface)	Total Depth (ft) (Top of Lathe to Bottom)	Flow Direction	Velocity (ft/sec)	Turbidity (NTU)	
2 inches	<small>(can't see bottom ~ 4-5 feet)</small>	None	NA	clear	



Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
GRO (AK101)	3+3 = 6	40ml VOA (HCL)	
DRO (AK102)	2+2 = 4	250ml amber (HCL)	
VOC-BTEX (E624)	3+3 = 6	40ml VOA (HCL)	
PAH (E625)	2+2 = 4	250ml amber (unpres)	

Signed:	Date: <u>10/5/17</u>
Signed/reviewer:	Date: <u>10/5/17</u>



### Surface Water Sampling Worksheet

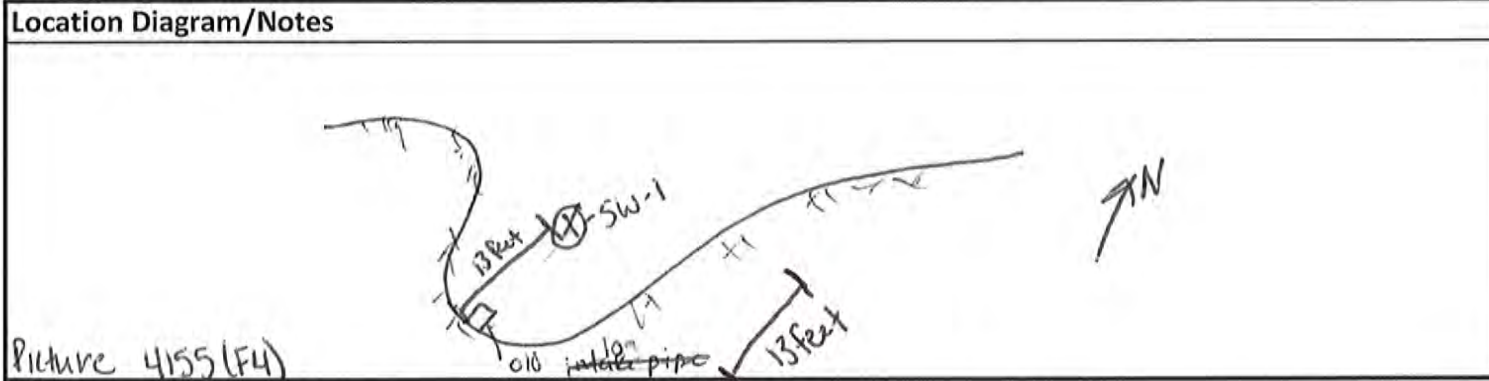
Project # : <u>424283</u>	Location <u>SW-1</u>
Project Name: <u>Eureka Lodge</u>	Date: <u>10/5/17</u>
Field Team: <u>Jeremy Stariwat/Kassi Powers</u>	Start Time: <u>1008</u>
Sample ID: <u>V7-ERIK-SW01</u> Time: <u>1025</u> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">primary</span> dup split ms/msd	End Time: <u>1030</u>
Sample ID: _____ Time: _____ primary dup split ms/msd	
Weather Conditions: <u>Partly cloudy 450</u>	

**Sensory Observations (circle all that apply)**

Color: <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Clear</span> , Amber, Tan, Brown, Grey, Milky White, Other:	Sheen: <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">No</span> , Petrogenic, Biogenic
Odor: <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">None</span> , Low, Medium, High, Very Strong, H2S, Fuel like, Chemical ?, Unknown	Debris: Yes, <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">No</span>
Turbidity: None, <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Low</span> , Medium, High, Very Turbid, Heavy Silts <u>Clear</u>	
Marine <input type="checkbox"/> <span style="border: 1px solid black; border-radius: 50%; padding: 2px;">Lake/Pond</span> <input type="checkbox"/> Seep/Spring <input type="checkbox"/>	
Brackish <input type="checkbox"/> River <input type="checkbox"/> Emergent Vegetation <input type="checkbox"/>	
Fresh Water <input type="checkbox"/> Stream/Creek <input type="checkbox"/> Submerged Vegetation <input type="checkbox"/>	

**Instrument Observations**

Temp (°C)	Spec. Cond. (mS/cm <sup>4</sup> )	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)
<u>4.22</u>	<u>6.036</u>	<u>21</u>	<u>9.76</u>	<u>8.74</u>	<u>-89.3</u>
Sample Depth (ft) (Top of Lathe To Water Surface)	Total Depth (ft) (Top of Lathe to Bottom)	Flow Direction	Velocity (ft/sec)	Turbidity (NTU)	
<u>2 inches</u>	<u>(can see bottom ~ 4-5 feet)</u>	<u>None</u>	<u>NA</u>	<u>Clear</u>	



Analyses	# of Bottles Collected	Bottle Type (preservative)	Comments:
<u>GRO (AK 101)</u>	<u>3 (40ml VOA w/ HCL)</u>	<u>40ml VOA (HCL)</u>	
<u>DRO (AK 102)</u>	<u>2</u>	<u>250ml amber (HCL)</u>	
<u>VOC-BTEX E624</u>	<u>3</u>	<u>40ml VOA (HCL)</u>	
<u>PAH (E625)</u>	<u>2</u>	<u>250ml amber (unpres)</u>	

Signed: <u>[Signature]</u>	Date: <u>10/5/17</u>
Signed/reviewer: <u>[Signature]</u>	Date: <u>10/5/17</u>

Drinking Water  
**GROUNDWATER SAMPLING FORM**

CLIENT: Crowley  
SITE: Eureka Lodge  
DATE: 10/5/17  
MONITORING WELL ID: Drinking Water well  
SHEET 1 OF 1

SAMPLER(S) NAME: Jeremy Stariwat/Kassi <sup>Murray</sup> Towers  
SAMPLE ID ON COC: 17 ERK-BW-01  
YSI #/SN: 4-7  
Weather: Cloudy ~37°F  
PRODUCT PRESENT: No  
PURGE AND SAMPLE METHOD: Low Flow <sup>205 10/5/17</sup> N/A  
WATER LEVEL MEASURING DEVICE: Oil/Water Interface Probe <sup>205 10/5/17</sup>  
TYPE OF PUMP: <sup>205 10/5/17</sup> Peristaltic well pump  
WELL INTEGRITY: NA  
REQUIRED REPAIRS: NA  
PUMP INTAKE DEPTH: NA

1 in = 0.083 ft; 2 in = 0.167 ft; 3 in = 0.25 ft; 4 in = 0.333 ft  
DIAMETER OF WELL: 6 in (FT)  
RADIUS OF WELL (R): 3 in (FT)  
TOTAL DEPTH OF WELL BELOW MEASURING POINT (D): 125 ft (FT)  
DEPTH TO GW BELOW MEASURING POINT (d): 125 ft (FT)  
LENGTH OF WATER COLUMN (L): (D-d) = Assume 125 ft (FT)  
VOLUME OF WATER COLUMN (V): (3.14xRxRxL) 24.5 (CUBIC FT)  
WELL VOLUME: (7.48xV) = 183.5 (GAL) X3 = 550.5 (GAL)  
Min Purge Volume Max Purge Volume

Note: Groundwater volumes above were calculated in the field and used for approximate purge volumes; rounded values are shown for informational purposes only.

TIME	VOLUME (GAL)	WATER LEVEL (ft BTOC)	TEMP (deg C)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)	TURBIDITY (Visual: High, Med, Low, Clear)	APPEARANCE OF WATER (Visual)	ODOR
0903	230	NA	5.59	21	9.78	7.20	-11.2	Clear	Clear	No
0908	268	NA	5.57	23	9.90	7.48	-33.9	"	"	"
0913	306	NA	5.54	23	9.95	7.64	-48.1	"	"	"
0918	344	NA	5.50	22	10.01	7.72	-56.3	"	"	"
0923	382	N/A	5.47	17	10.05	7.76	-61.4	"	"	"
0928	420	N/A	5.45	21	10.09	7.85	-66.5	"	"	"
0933	458	N/A	5.43	21	10.12	7.97	-72.7	"	"	"
0938	496	N/A	5.40	20	10.15	7.98	-74.2	"	"	"
0943	534	N/A	5.38	21	10.19	7.96	-73.8	"	"	"
Stabilization achieved. 9/5										

(1) STABILIZATION is achieved when three (3) consecutive readings of pH, conductivity, and DO collected in 3-5 minute intervals meet the following criteria:

- ±0.1 standard units for pH
- ±3% for temperature
- ±3% for conductivity
- ±10 mV for ORP or ±10% if between -100 mV and +100 mV
- ±10% for DO > 0.50 mg/L. Three DO readings < 0.50 mg/L can be considered stable.

PURGE UNTIL PARAMETER STABILIZATION or UNTIL 3 WELL VOLUMES ARE REMOVED

TOTAL VOLUME PURGED: 534 (GAL) FLOW RATE (desired range is 100 to 500 mL/min): 359 gal / 5 min  
SAMPLE TIME: 0945 QC SAMPLES COLLECTED: Duplicate 17-ERK-DW2@0930

ANALYSIS (fill in number of bottles collected)

PAH (8270D SIM) (2+2)	1 L amber
VOC (E524.2) (3+3)	40mL VOA (HCL)
Other:	

COMMENTS:  
• Purge began at 0825.  
• Sample taken before filtration system from spigot at well house.  
Turbidity (NTU): — • Photos: 4152 & 4153 & 4154 on camera F-4  
Sampler Signature: *[Signature]* QC Check Signature: *[Signature]*

## **APPENDIX B**

### **Field Notes**

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Name ERM Alaskan  
Eureka Lodge

Address 825 W. 8th Ave  
Anchorage AK 99501

Phone 907-258-4880

Project Eureka Lodge  
042428 Oct-2017

*Rite in the Rain* — A patented, environmentally responsible, all-weather writing paper that sheds water and enables you to write anywhere, in any weather. Using a pencil or all-weather pen, *Rite in the Rain* ensures that your notes survive the rigors of the field, regardless of the conditions.

[RiteintheRain.com](http://RiteintheRain.com)

CONTENTS		
PAGE	REFERENCE	DATE

Station  
K. Murray

Oct. 4

~40°F  
cloudy

- 0630 Jeremy left anchorage to pick up Kassi in Eagle River.
- 0715 Pick Kassi up and go get gas.
- 0730 Leave Eagle River for Eureka Lodge
- 1000 Arrive at lodge and complete safety tail gate
- 1010 Meet with knowledgeable site contact for utility locates. Darla Fimpel's son Ryan. Private utilities were marked by utility companies. Water line was marked by Ryan. There is no gas line. Lodge is heated by heating fuel.

Utilities	Location
Electrical	Overhead and NE of tanks
heating oil	ASTs at lodge and pump house
Water line	behind <del>between</del> utility pole to house
Com lines	underground marked on SSC

Walk out all utilities diagram.  
and fill out rest of SSC procedure. Identify all marked lines and potential for others.  
One dig location 7.5 feet from com line.

Page 1 of

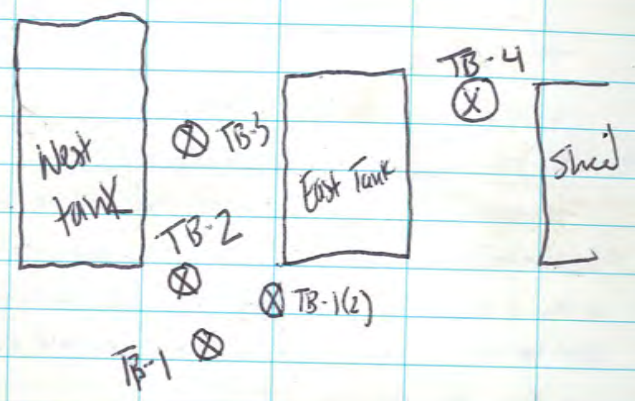
*[Signature]* *Rite in the Rain*

1140 Identifying Monitoring locations  
MW-2 and MW-3. Figure not to scale.

1200 SSC meeting call in with  
PIC (Jeff Leaty), Paul Hansmann.  
Approved our plan and they  
gave a verbal waiver for the  
backhole location that's NE  
of the East tank.

1230 Lunch and discuss plan for  
afternoon and safety considerations

1300 Start digging backhole locations.



TB = test boring  
Jeremy starts on TB-2 finds  
plastic sheeting at 1 foot depth  
(contamination) at 15 feet depth

Page 2 of 6 Tim Murray

Picture 104-4145 and 4146  
Kassi start digging at TB-1  
Jeremy start digging at TB-3 and  
sees plastic liner. Picture 104-4147 and 4148  
1400 Jeremy gets to 3.7 ft depth, Picture 449  
smells contamination so sample is collected.

Sample Location	Depth	Time
TB-2	1.5 feet	1430
TB-3	3.7 feet	1400
TB-4	2.15 feet	1700
TB-1	No Sample	

1405 Jeremy start @ TB-4. See liner  
at ~1 foot depth.

1420 Moved TB-1 (2) NE because TB-1  
was meeting refusal.

1430 Jeremy reached liner @ 1.5 feet  
dig pushed to about 3.2 feet and  
met clay layer with no obvious  
contamination.

1435 Jeremy <sup>expanded</sup> ~~moved~~ TB-4 in towards <sup>east</sup> tank directly  
west and did not find any staining.

Page 3 of 6 Tim Murray *Rite in the Rain*

- 1450 Kassi and Jeremy stop digging.  
Decide to try to find MW-2 and MW-3
- 1519 Try to call PM (Stephen Witzmann) to let him know we have at least one good soil sample and another that smells hot after heating.  
No answer
- 1520 Continue looking for MWs using figures. Having no luck.
- 1548 Stephen W. called back.  
He said take sample at TB-4 underneath liner.  
Also said to use swing ties to find MW's.  
Kassi + Jeremy informed Stephen old Drinking Water Well House is no longer in place. Stephen confirmed there will be two SW locations at points marked on map and only one drinking water from current drinking water well.
- 1600 Jeremy + Kassi measure out MW-3 with swing ties. End up finding well off of swing ties by 73-4 feet.

See photo 4150

Kim Murray

- 1630 Still searching for MW-2. Shed looks like it might have been moved. If that's the case MW could be underneath shed.
- 1640 Lodge owner Mr. Fimpel came by to see what we were doing. We asked if he knew where MW-2 was located. He didn't but he did confirm he had moved the shed since the excavation in 2011 so the MW should not be under the shed.
- 1700 Jeremy and Kassi sample TB-4 underneath liner at approximately 2.15 feet.
- 1710 Filled in TB holes.
- 1715 Start GPSing TB locations  
TB1(2) is called TB1-2  
TB-2, TB-3, TB-4, MW-3, Cannon Box, MW-1
- 1730 Depart to talk to Dark about drinking water well.  
Talked to Jim Fimpel (Dark's husband) about drinking water sample on how to purge the

Page 5 of 6 Kim Murray

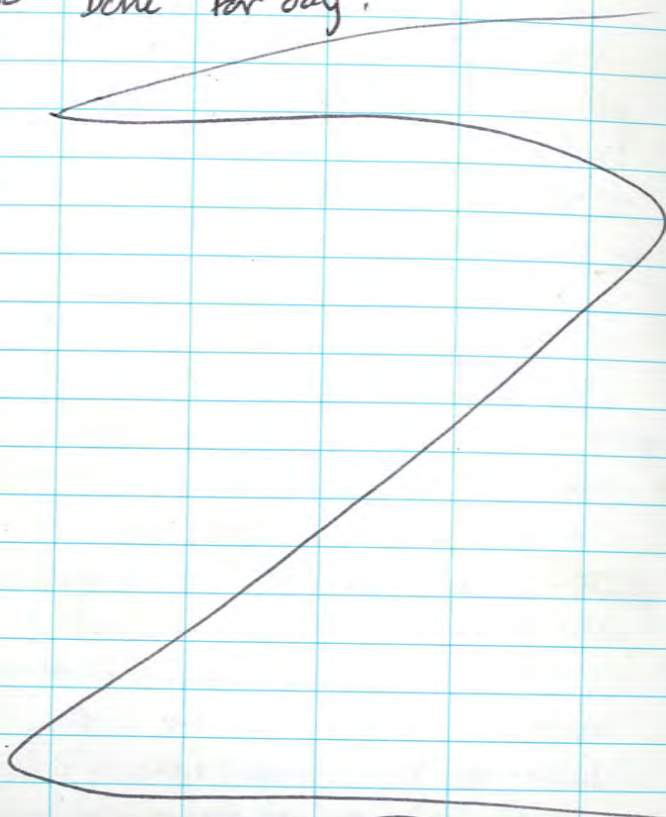
Rite in the Rain



Well. We will meet with his  
son tomorrow AM to take the sample

1815 Move soil gear into room, so  
car has more space for water  
samples

1830 Done for day.



*Kim Murray*  
Page 6086

Oct. 5th, 2017

400  
Partly Cloudy

0700 Breakfast and tailgate safety meeting.

0745 Meet with Ryan to go over process  
for collecting drinking water sample  
from before filter

0800 Calibrate YSI Kasi

Jeremy figure out well volume

125ft Gin well → 183 gallons

Flow rate 4 gal/min / 0.66 min

Purge 30 min for 1 well volume.

0825 Start purging well.

0850: Place YSI probe in bucket with  
running well water.

0900: Call Steve W. F. Z...  
No answer

0945: Samples & duplicate taken  
at drinking water well.

0954 Call PM (Stephen Witzmann)

Inform him that MW-02 went missing.

Believe its covered with D1 gravel that  
was put on site by Ryan Fimpel.

Informed him that during last  
sampling event MW-1 and MW-3 purged  
dry and were unamenable. 1

1002 Proceed to 2 MW locations and 2

Page 1085

Kim Murray

Rite in the Rain

## Surface Water Locations.

- 1008 Set up on SW-1. Sample location at 1625
- 1020 Set up on SW-2. Take sample at 1035. Take duplicate SW2 at 1040.
- 1040 Start setting up on MW-3
- 1125 Start pumping well. Well draws down fast. Drew down 1 foot with half a gallon purged. Crew will stand by for recharge
- 1218 Came back to MW-3 and the dept to water is 8.45. Well recharge by 0.02 in 43 minutes.
- 1222 Call Stephen Witzmann. No answer. We will auto level while we wait.
- 1232 Height from ground surface to laser point. GPS → auto level is 4.41 feet.  
MW-1 black notch on PVC is 4.52 feet.  
MW-3 black notch on PVC is 4.93 feet.  
No more lake. Surface water elevation near SW-2. 6.97 feet

Page 2 of 5

Thru Munn

- 1240 Done with auto leveler. Put away equipment.
- 1242 Set up decon station. One bucket Alconox, 2 DI water buckets.
- 1249 Decon water level meter and take depth to water & depth to bottom at MW-01. 12:23 Column of water
- 1300 Fill out COC and start filling out labels.
- 1312 Call Stephen to ask what the plan will be on for sampling no recharging wells.  
Reviewed past sampling data that indicated wells show low recharge and that samples were taken before purging dry. ERM team will proceed as previous sample teams.
- 1347 Start at MW-3  
Collect water level 8.00 feet  
Well recharged 0.4 feet in about 2 hours.
- 1351 Collect parameters and decided to collect sample because of low recharge.

Page 3 of 5

Thru Munn *Site in the Rain*

1415 Take Sample with full set of VOCs  
 1425 Take Duplicate Sample MWZ  
 GRO, DRO, PAH, VOC (8260C/8260C SIM)  
 for both samples.

Final water depth after both  
 samples was 15.02 feet.

1440 Setup on decon station. Decon  
 submersible pump in 3 bucket  
 system and a DI bottle rinse.

1442 Take water level at MW-1 - 6.57 feet.

1531 stopped purging because of  
 inadequate sample volume. The  
 water level depth was 15.5 feet when  
 started to sample

1535 Collect MW-1 for GRO, DRO, PAH,  
 BTEX. Final water depth 15.08 feet.

1545 Decon pump

1555 Set up for equipment blank

1440  
~~1440~~  
 1441

Take equipment blank  
 GRO, DRO, PAH, VOC (8260C/8260C SIM)

1620 Remobilize gear and pack  
 car for drive back to Anchorage.

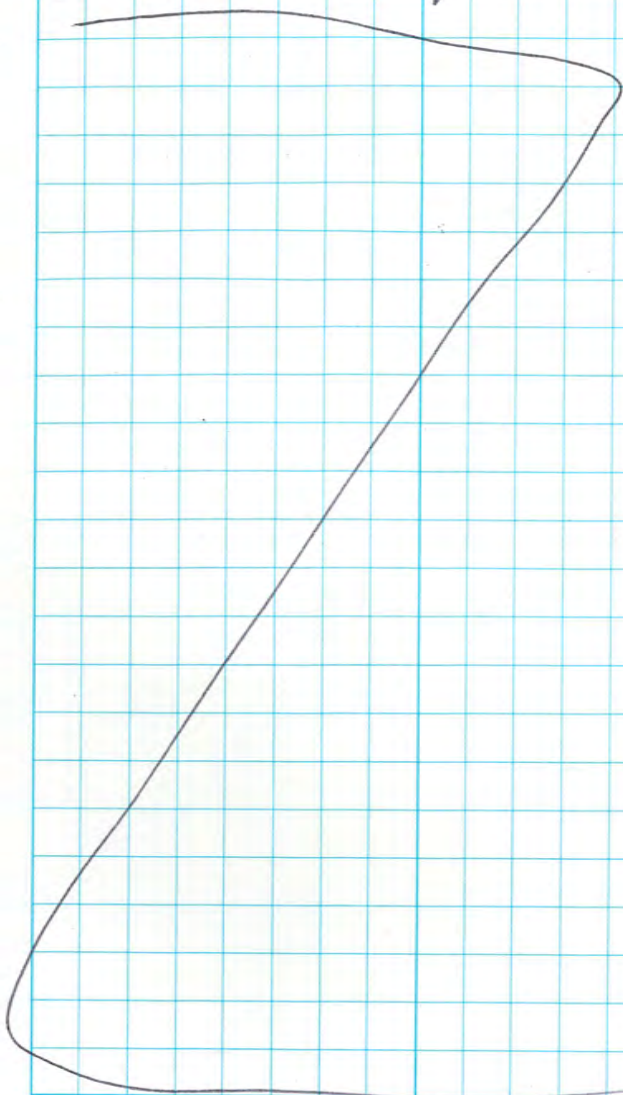
1645 Depart Eureka Lodge.

1830 Arrive in Eagle River. Murray gets dropped

Page 4 of 5

Zinn Pinn

1900 Arrive in Anchorage.



Zinn Pinn

Page 5 of 5 *Rite in the Rain*

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## **APPENDIX C**

### **Photographic Log**

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**Photograph 1: Communication Lines marked by public utility locates. Picture was taken facing north.**



**Photograph 2: Communication Utility Box and Utility Corridor located directly north of the fuel tanks and south of the Unnamed Lake. Picture was taken facing west.**



**Photograph 3: Communication Lines from Utility Box leading under shed and west towards the site shop building.**



**Photograph 4: Water Line drawn in yellow marking paint by site owner's son extends to the west, directly north of the fuel tanks.**





**Photograph 5: Fuel Tank Sump located southwest of the fuel tanks.**



**Photograph 6: Proposed test boring locations 1 and 2 (1 is furthest south) identified for collecting Torkelson soil samples.**



**Photograph 7: Proposed test boring location 3. Sample is between the West and East fuel tanks directly north of boring location 2.**



**Photograph 8: Location of test boring 3. Plastic sheet identifying the extent of contamination was encountered at approximately one foot below ground surface.**



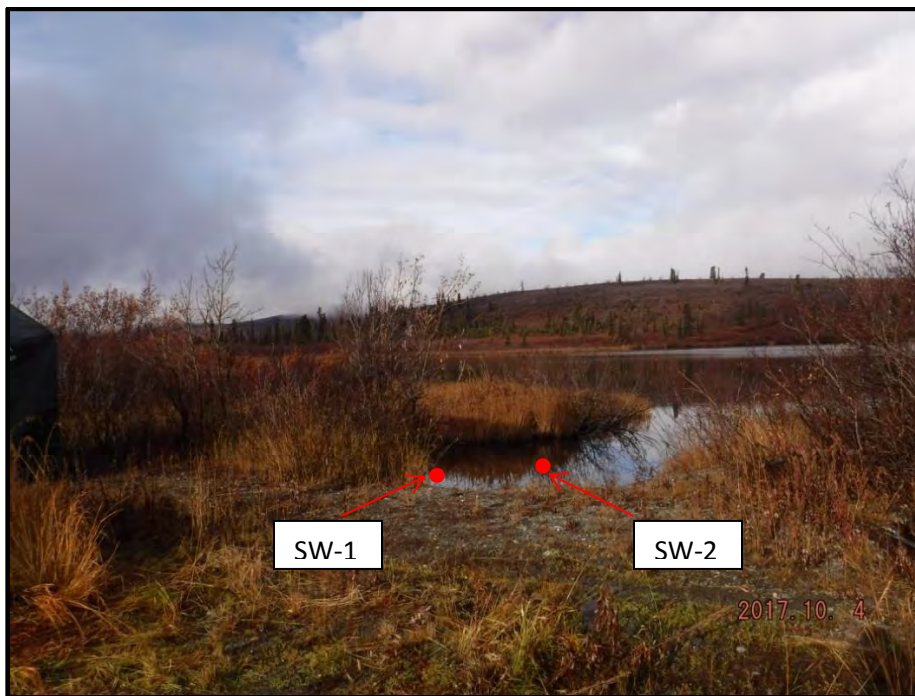
**Photograph 9: Location of test boring 4, approximately 7 feet 5 inches away from communication line identified in orange.**



**Photograph 10: Eureka Lodge's current drinking water well sample location from outside of well house. Photograph 11 shows the green hose connected this spout to the drinking water well.**



**Photograph 11: Inside of well house, PVC pipe leads from drinking water well to filtration system and the drinking water storage tanks. Once the system was purged, the sample was collected prior to the filters.**



**Photograph 12: Surface Water sampling locations, SW-1 and SW-2, facing north. West of sample location SW-1 is location of former Well House.**



**Photograph 13: Groundwater sampling location, MW-3, facing South.**

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## **APPENDIX D**

### **Laboratory Analytical Results**

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# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

TestAmerica Job ID: 580-71900-1

Client Project/Site: Eureka, Alaska 2017  
Revision: 1

For:

ERM Alaska, Inc.  
825 W 8th Ave, Suite 200  
Anchorage, Alaska 99501-4427

Attn: Stephen Witzmann



Authorized for release by:  
12/13/2017 3:57:25 PM

Kayse Zalmai, Project Manager I  
(253)922-2310

[kayse.zalmai@testamericainc.com](mailto:kayse.zalmai@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

1

2

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# Case Narrative

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Job ID: 580-71900-1**

**Laboratory: TestAmerica Seattle**

## Narrative

### Job Narrative 580-71900-1

#### Receipt

The samples were received on 10/7/2017 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were -0.9° C, -0.5° C and -0.4° C.

#### GC/MS VOA

Method(s) 524.2: The method blank for analytical batch 498776 contained 1,2,4-trichlorobenzene above the method detection limit (MDL). None of the samples associated with this method blank contained the target compound; therefore, re-analysis of samples were not performed.

Method(s) 8260C: The following continuing calibration verification (CCV) standard associated with batch 580-258603 recovered outside acceptance criteria for %D for surrogate Trifluorotoluene (Surr) which have %D 20.8 (%D Limit +/- 20 ). Since all the other surrogates were within %D criteria; therefore, the data have been reported. (CCVIS 580-258603/3)

Method(s) 8260C: The following continuing calibration verification (CCV) standard associated with batch 580-258504 recovered outside acceptance criteria for %D for surrogate Trifluorotoluene. Since none of the target analytes are associated with this surrogate, the data have been reported. (CCVIS 580-258504/3)

Method(s) 8260C: The continuing calibration verification (CCV) associated with batch 580-258603 recovered above the upper control limit for multiple analytes (8 compounds). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: 17-ERK-MWZ (580-71900-8), 17-ERK-MW-3 (580-71900-9), 17-ERK-EB (580-71900-10) and (CCVIS 580-258603/3).

Method(s) 8260C: The continuing calibration verification (CCV) associated with batch 580-258603 recovered outside acceptance criteria, low biased, for Dichlorodifluoromethane. A reporting limit (RL) standard was analyzed, and the target analyte was detected. Since the associated samples were non-detect for this analyte, the data have been reported.

Method(s) 8260C: Trifluorotoluene surrogate recovery for the LCS associated with analytical batch 580-258504 was outside the upper control limits. TFT is not associated to any of the target analytes. All associated sample surrogate fell within acceptance criteria; therefore, the data have been reported.

Method(s) 8260C: The surrogate recovery for the blank associated with analytical batch 580-258603 was outside the upper control limits.

Method(s) 8260C: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for analytical batch 580-258603 recovered outside control limits for the following analytes: 1,2,3-Trichlorobenzene, Acetone, Carbon tetrachloride, Chlorobromomethane and Methyl tert-butyl ether. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Method(s) 8260C SIM: The continuing calibration verification (CCV) associated with batch 580-259252 recovered above the upper control limit for hexachlorobutadiene. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: 17-ERK-TB (580-71900-6), 17-ERK-MWZ (580-71900-8), 17-ERK-MW-3 (580-71900-9), 17-ERK-EB (580-71900-10) and (CCVIS 580-259252/3).

Method(s) AK101: Surrogate TFT recovery for the following samples was outside the upper control limit: 17-ERK-SW-01 (580-71900-3), 17-ERK-SW-02 (580-71900-4), 17-ERK-SWZ (580-71900-5), 17-ERK-TB (580-71900-6), 17-ERK-MW-1 (580-71900-7), 17-ERK-MWZ (580-71900-8), 17-ERK-MW-3 (580-71900-9), 17-ERK-EB (580-71900-10) and (580-71843-A-11). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GC/MS Semi VOA

Method(s) 625: The following continuing calibration verification (CCV) standard associated with batch 580-258841 recovered outside acceptance criteria for %D for surrogate Nitrobenzene-d5 (25.0%D, Limit 20). The %Rec is within the acceptance criteria for the surrogate

# Case Narrative

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Job ID: 580-71900-1 (Continued)

### Laboratory: TestAmerica Seattle (Continued)

in the associated samples; therefore, the data have been reported. The following samples are impacted: (CCVIS 580-258841/3)

Method(s) 8270D SIM: The method blank for preparation batch 580-258594 and analytical batch 580-259300 contained Phenanthrene, Anthracene and Pyrene above the method detection limit. This target analyte concentration was less than half the reporting limit (1/2RL); therefore, re-extraction and re-analysis of samples was not performed.

Method(s) 8270D SIM: The following analyte(s) recovered outside control limits for the LCS associated with preparation batch 580-258594 and analytical batch 580-259300: Benzo[a]pyrene. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

Method(s) 8270D SIM: The opening DFTPP tune has a Benzidine Tailing Factor at 2.3 (8270D limit is 2.0). However for SIM analysis, Benzidine is not representative of any of the target analytes, and all other instrument QC (other DFTPP parameters and CCVIS) met acceptance criteria, therefore in the data is reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### GC Semi VOA

Method(s) AK102 & 103: Continuing calibration verification (CCV) recovered above %D control limits for n-Triacontane-d62 surrogate. The CCV and all associated samples passed within %R control limits; therefore the data are qualified and reported. 17-ERK-SW-01 (580-71900-3), (CCV 580-258895/14), (CCV 580-258895/32), (LCS 580-258753/2-A), (LCSD 580-258753/3-A) and (MB 580-258753/1-A)

Method(s) AK102 & 103: The method blank for preparation batch 580-258982 and analytical batch 580-259043 contained DRO (nC10-<nC25) above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

Method(s) AK102 & 103: The method blank for preparation batch preparation batch 580-258982 and analytical batch 580-259043 contained DRO (nC10-<nC25) above the reporting limit (RL). The samples associated with this method blank did not contain the target compound at or above the RL; therefore, re-extraction and re-analysis of samples were not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### Organic Prep

Method(s) CWA\_Prep\_CLLE: A deviation from the Standard Operating Procedure (SOP) occurred. Details are as follows: The samples were being extracted for 625 using the 3520 1 L method and the samples were received in LVI bottles. One of the LVI bottles was placed into the CLLE body and it was diluted up to 1 L using DI water.

Method(s) 3510C: A deviation from the Standard Operating Procedure (SOP) occurred. Details are as follows: Client provided 1 L amber unpreserved sample containers. Poured approximately 250 mL of each sample into separatory funnel for extraction.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Definitions/Glossary

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
*	LCS or LCSD is outside acceptance limits.
X	Surrogate is outside control limits

### GC/MS Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### GC VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### GC Semi VOA

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-DW-01**

**Lab Sample ID: 580-71900-1**

**Date Collected: 10/05/17 09:45**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

## Method: 524.2 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.50	0.15	ug/L			10/17/17 13:56	1
1,1,2-Trichloroethane	ND		0.50	0.16	ug/L			10/17/17 13:56	1
1,1-Dichloroethene	ND		0.50	0.15	ug/L			10/17/17 13:56	1
1,2,4-Trichlorobenzene	ND		0.50	0.12	ug/L			10/17/17 13:56	1
1,2-Dichlorobenzene	ND		0.50	0.16	ug/L			10/17/17 13:56	1
1,2-Dichloroethane	ND		0.50	0.086	ug/L			10/17/17 13:56	1
1,2-Dichloropropane	ND		0.50	0.096	ug/L			10/17/17 13:56	1
1,4-Dichlorobenzene	ND		0.50	0.13	ug/L			10/17/17 13:56	1
Benzene	ND		0.50	0.082	ug/L			10/17/17 13:56	1
Carbon tetrachloride	ND		0.50	0.11	ug/L			10/17/17 13:56	1
Chlorobenzene	ND		0.50	0.14	ug/L			10/17/17 13:56	1
cis-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/17/17 13:56	1
Ethylbenzene	ND		0.50	0.099	ug/L			10/17/17 13:56	1
Methylene Chloride	ND		0.50	0.20	ug/L			10/17/17 13:56	1
Styrene	ND		0.50	0.089	ug/L			10/17/17 13:56	1
Tetrachloroethene	ND		0.50	0.18	ug/L			10/17/17 13:56	1
<b>Toluene</b>	<b>0.16</b>	<b>J</b>	0.50	0.086	ug/L			10/17/17 13:56	1
trans-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/17/17 13:56	1
Trichloroethene	ND		0.50	0.13	ug/L			10/17/17 13:56	1
Vinyl chloride	ND		0.50	0.16	ug/L			10/17/17 13:56	1
Xylenes, Total	ND		0.50	0.086	ug/L			10/17/17 13:56	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene-d4 (Surr)	116		70 - 130					10/17/17 13:56	1
4-Bromofluorobenzene	96		70 - 130					10/17/17 13:56	1

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.017	0.0050	ug/L		10/11/17 13:53	10/19/17 21:27	1
2-Methylnaphthalene	ND		0.025	0.0075	ug/L		10/11/17 13:53	10/19/17 21:27	1
Acenaphthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:27	1
Acenaphthylene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:27	1
Anthracene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 21:27	1
Benzo[a]anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:27	1
Benzo[a]pyrene	ND	*	0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 21:27	1
Benzo[b]fluoranthene	ND		0.017	0.0067	ug/L		10/11/17 13:53	10/19/17 21:27	1
Benzo[g,h,i]perylene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 21:27	1
Benzo[k]fluoranthene	ND		0.025	0.0075	ug/L		10/11/17 13:53	10/19/17 21:27	1
Chrysene	ND		0.017	0.0050	ug/L		10/11/17 13:53	10/19/17 21:27	1
Dibenz(a,h)anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:27	1
Fluoranthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:27	1
Fluorene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 21:27	1
Indeno[1,2,3-cd]pyrene	ND		0.017	0.0058	ug/L		10/11/17 13:53	10/19/17 21:27	1
Naphthalene	ND		0.033	0.011	ug/L		10/11/17 13:53	10/19/17 21:27	1
Phenanthrene	ND		0.017	0.0033	ug/L		10/11/17 13:53	10/19/17 21:27	1
Pyrene	ND		0.017	0.0033	ug/L		10/11/17 13:53	10/19/17 21:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	76		53 - 112				10/11/17 13:53	10/19/17 21:27	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-DWZ**

**Lab Sample ID: 580-71900-2**

Date Collected: 10/05/17 09:50

Matrix: Water

Date Received: 10/07/17 10:10

## Method: 524.2 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.50	0.15	ug/L			10/17/17 14:19	1
1,1,2-Trichloroethane	ND		0.50	0.16	ug/L			10/17/17 14:19	1
1,1-Dichloroethene	ND		0.50	0.15	ug/L			10/17/17 14:19	1
1,2,4-Trichlorobenzene	ND		0.50	0.12	ug/L			10/17/17 14:19	1
1,2-Dichlorobenzene	ND		0.50	0.16	ug/L			10/17/17 14:19	1
1,2-Dichloroethane	ND		0.50	0.086	ug/L			10/17/17 14:19	1
1,2-Dichloropropane	ND		0.50	0.096	ug/L			10/17/17 14:19	1
1,4-Dichlorobenzene	ND		0.50	0.13	ug/L			10/17/17 14:19	1
Benzene	ND		0.50	0.082	ug/L			10/17/17 14:19	1
Carbon tetrachloride	ND		0.50	0.11	ug/L			10/17/17 14:19	1
Chlorobenzene	ND		0.50	0.14	ug/L			10/17/17 14:19	1
cis-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/17/17 14:19	1
Ethylbenzene	ND		0.50	0.099	ug/L			10/17/17 14:19	1
Methylene Chloride	ND		0.50	0.20	ug/L			10/17/17 14:19	1
Styrene	ND		0.50	0.089	ug/L			10/17/17 14:19	1
Tetrachloroethene	ND		0.50	0.18	ug/L			10/17/17 14:19	1
<b>Toluene</b>	<b>0.17</b>	<b>J</b>	0.50	0.086	ug/L			10/17/17 14:19	1
trans-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/17/17 14:19	1
Trichloroethene	ND		0.50	0.13	ug/L			10/17/17 14:19	1
Vinyl chloride	ND		0.50	0.16	ug/L			10/17/17 14:19	1
Xylenes, Total	ND		0.50	0.086	ug/L			10/17/17 14:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene-d4 (Surr)	116		70 - 130					10/17/17 14:19	1
4-Bromofluorobenzene	94		70 - 130					10/17/17 14:19	1

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.017	0.0050	ug/L		10/11/17 13:53	10/19/17 21:52	1
2-Methylnaphthalene	ND		0.025	0.0074	ug/L		10/11/17 13:53	10/19/17 21:52	1
Acenaphthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:52	1
Acenaphthylene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:52	1
Anthracene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 21:52	1
Benzo[a]anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:52	1
Benzo[a]pyrene	ND	*	0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 21:52	1
Benzo[b]fluoranthene	ND		0.017	0.0066	ug/L		10/11/17 13:53	10/19/17 21:52	1
Benzo[g,h,i]perylene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 21:52	1
Benzo[k]fluoranthene	ND		0.025	0.0074	ug/L		10/11/17 13:53	10/19/17 21:52	1
Chrysene	ND		0.017	0.0050	ug/L		10/11/17 13:53	10/19/17 21:52	1
Dibenz(a,h)anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:52	1
Fluoranthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 21:52	1
Fluorene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 21:52	1
Indeno[1,2,3-cd]pyrene	ND		0.017	0.0058	ug/L		10/11/17 13:53	10/19/17 21:52	1
Naphthalene	ND		0.033	0.011	ug/L		10/11/17 13:53	10/19/17 21:52	1
Phenanthrene	ND		0.017	0.0033	ug/L		10/11/17 13:53	10/19/17 21:52	1
Pyrene	ND		0.017	0.0033	ug/L		10/11/17 13:53	10/19/17 21:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	76		53 - 112				10/11/17 13:53	10/19/17 21:52	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-SW-01**

**Lab Sample ID: 580-71900-3**

**Date Collected: 10/05/17 10:25**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

## Method: 624 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			10/10/17 16:54	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/10/17 16:54	1
Toluene	ND		2.0	0.24	ug/L			10/10/17 16:54	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/10/17 16:54	1
o-Xylene	ND		2.0	0.15	ug/L			10/10/17 16:54	1
TAH	ND		3.0	0.42	ug/L			10/10/17 16:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	120		74 - 123		10/10/17 16:54	1
Toluene-d8 (Surr)	88		79 - 122		10/10/17 16:54	1
4-Bromofluorobenzene (Surr)	104		78 - 119		10/10/17 16:54	1
Dibromofluoromethane (Surr)	106		70 - 120		10/10/17 16:54	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 120		10/10/17 16:54	1

## Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		4.0	0.12	ug/L		10/11/17 13:11	10/13/17 17:06	1
2-Methylnaphthalene	ND		1.6	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Acenaphthene	ND		1.6	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Acenaphthylene	ND		4.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Anthracene	ND		0.16	0.040	ug/L		10/11/17 13:11	10/13/17 17:06	1
Benzo[a]anthracene	ND		12	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Benzo[a]pyrene	ND		4.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Benzo[g,h,i]perylene	ND		4.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Benzo[fluoranthene]	ND		4.0	0.20	ug/L		10/11/17 13:11	10/13/17 17:06	1
Chrysene	ND		2.4	0.040	ug/L		10/11/17 13:11	10/13/17 17:06	1
Dibenz(a,h)anthracene	ND		2.4	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Fluoranthene	ND		12	0.040	ug/L		10/11/17 13:11	10/13/17 17:06	1
Fluorene	ND		8.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Indeno[1,2,3-cd]pyrene	ND		4.0	0.20	ug/L		10/11/17 13:11	10/13/17 17:06	1
Naphthalene	ND		1.6	0.40	ug/L		10/11/17 13:11	10/13/17 17:06	1
Phenanthrene	ND		4.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:06	1
Pyrene	ND		8.0	0.16	ug/L		10/11/17 13:11	10/13/17 17:06	1
TPAH	ND		12	0.20	ug/L		10/11/17 13:11	10/13/17 17:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	70		56 - 124	10/11/17 13:11	10/13/17 17:06	1
Nitrobenzene-d5	96		59 - 123	10/11/17 13:11	10/13/17 17:06	1
Terphenyl-d14	79		60 - 135	10/11/17 13:11	10/13/17 17:06	1

## Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/10/17 02:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	125	X	75 - 120		10/10/17 02:30	1
4-Bromofluorobenzene (Surr)	103		68 - 119		10/10/17 02:30	1

TestAmerica Seattle



# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-SW-01**

**Lab Sample ID: 580-71900-3**

**Date Collected: 10/05/17 10:25**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	0.22		0.10	0.022	mg/L		10/13/17 08:49	10/17/17 03:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	83		50 - 150	10/13/17 08:49	10/17/17 03:18	1



# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-SW-02**

**Lab Sample ID: 580-71900-4**

**Date Collected: 10/05/17 10:35**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

## Method: 624 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			10/10/17 17:19	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/10/17 17:19	1
Toluene	ND		2.0	0.24	ug/L			10/10/17 17:19	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/10/17 17:19	1
o-Xylene	ND		2.0	0.15	ug/L			10/10/17 17:19	1
TAH	ND		3.0	0.42	ug/L			10/10/17 17:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	120		74 - 123		10/10/17 17:19	1
Toluene-d8 (Surr)	88		79 - 122		10/10/17 17:19	1
4-Bromofluorobenzene (Surr)	104		78 - 119		10/10/17 17:19	1
Dibromofluoromethane (Surr)	108		70 - 120		10/10/17 17:19	1
1,2-Dichloroethane-d4 (Surr)	95		70 - 120		10/10/17 17:19	1

## Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		4.0	0.12	ug/L		10/11/17 13:11	10/13/17 17:30	1
2-Methylnaphthalene	ND		1.6	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Acenaphthene	ND		1.6	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Acenaphthylene	ND		4.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Anthracene	ND		0.16	0.040	ug/L		10/11/17 13:11	10/13/17 17:30	1
Benzo[a]anthracene	ND		12	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Benzo[a]pyrene	ND		4.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Benzo[g,h,i]perylene	ND		4.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Benzo[fluoranthene]	ND		4.0	0.20	ug/L		10/11/17 13:11	10/13/17 17:30	1
Chrysene	ND		2.4	0.040	ug/L		10/11/17 13:11	10/13/17 17:30	1
Dibenz(a,h)anthracene	ND		2.4	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Fluoranthene	ND		12	0.040	ug/L		10/11/17 13:11	10/13/17 17:30	1
Fluorene	ND		8.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Indeno[1,2,3-cd]pyrene	ND		4.0	0.20	ug/L		10/11/17 13:11	10/13/17 17:30	1
Naphthalene	ND		1.6	0.40	ug/L		10/11/17 13:11	10/13/17 17:30	1
Phenanthrene	ND		4.0	0.080	ug/L		10/11/17 13:11	10/13/17 17:30	1
Pyrene	ND		8.0	0.16	ug/L		10/11/17 13:11	10/13/17 17:30	1
TPAH	ND		12	0.20	ug/L		10/11/17 13:11	10/13/17 17:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	66		56 - 124	10/11/17 13:11	10/13/17 17:30	1
Nitrobenzene-d5	89		59 - 123	10/11/17 13:11	10/13/17 17:30	1
Terphenyl-d14	74		60 - 135	10/11/17 13:11	10/13/17 17:30	1

## Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/10/17 03:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	128	X	75 - 120		10/10/17 03:01	1
4-Bromofluorobenzene (Surr)	105		68 - 119		10/10/17 03:01	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-SW-02**

**Lab Sample ID: 580-71900-4**

**Date Collected: 10/05/17 10:35**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	0.10		0.10	0.023	mg/L		10/18/17 12:07	10/19/17 01:44	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	76		50 - 150	10/18/17 12:07	10/19/17 01:44	1

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-SWZ**

**Lab Sample ID: 580-71900-5**

**Date Collected: 10/05/17 10:40**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

## Method: 624 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			10/10/17 17:45	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/10/17 17:45	1
Toluene	ND		2.0	0.24	ug/L			10/10/17 17:45	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/10/17 17:45	1
o-Xylene	ND		2.0	0.15	ug/L			10/10/17 17:45	1
TAH	ND		3.0	0.42	ug/L			10/10/17 17:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	120		74 - 123		10/10/17 17:45	1
Toluene-d8 (Surr)	87		79 - 122		10/10/17 17:45	1
4-Bromofluorobenzene (Surr)	104		78 - 119		10/10/17 17:45	1
Dibromofluoromethane (Surr)	108		70 - 120		10/10/17 17:45	1
1,2-Dichloroethane-d4 (Surr)	94		70 - 120		10/10/17 17:45	1

## Method: 625 - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		4.0	0.12	ug/L		10/11/17 13:11	10/13/17 17:55	1
2-Methylnaphthalene	ND		1.6	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Acenaphthene	ND		1.6	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Acenaphthylene	ND		4.0	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Anthracene	ND		0.16	0.040	ug/L		10/11/17 13:11	10/13/17 17:55	1
Benzo[a]anthracene	ND		12	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Benzo[a]pyrene	ND		4.0	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Benzo[g,h,i]perylene	ND		4.0	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Benzofluoranthene	ND		4.0	0.20	ug/L		10/11/17 13:11	10/13/17 17:55	1
Chrysene	ND		2.4	0.040	ug/L		10/11/17 13:11	10/13/17 17:55	1
Dibenz(a,h)anthracene	ND		2.4	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Fluoranthene	ND		12	0.040	ug/L		10/11/17 13:11	10/13/17 17:55	1
Fluorene	ND		8.1	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Indeno[1,2,3-cd]pyrene	ND		4.0	0.20	ug/L		10/11/17 13:11	10/13/17 17:55	1
Naphthalene	ND		1.6	0.40	ug/L		10/11/17 13:11	10/13/17 17:55	1
Phenanthrene	ND		4.0	0.081	ug/L		10/11/17 13:11	10/13/17 17:55	1
Pyrene	ND		8.1	0.16	ug/L		10/11/17 13:11	10/13/17 17:55	1
TPAH	ND		12	0.20	ug/L		10/11/17 13:11	10/13/17 17:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	66		56 - 124	10/11/17 13:11	10/13/17 17:55	1
Nitrobenzene-d5	84		59 - 123	10/11/17 13:11	10/13/17 17:55	1
Terphenyl-d14	70		60 - 135	10/11/17 13:11	10/13/17 17:55	1

## Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/10/17 03:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	126	X	75 - 120		10/10/17 03:32	1
4-Bromofluorobenzene (Surr)	104		68 - 119		10/10/17 03:32	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
 Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-SWZ**

**Lab Sample ID: 580-71900-5**

**Date Collected: 10/05/17 10:40**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	0.099	J	0.10	0.023	mg/L		10/18/17 12:07	10/19/17 02:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	80		50 - 150	10/18/17 12:07	10/19/17 02:28	1



# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-TB**

**Lab Sample ID: 580-71900-6**

**Date Collected: 10/05/17 08:00**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

## Method: 524.2 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.50	0.15	ug/L			10/18/17 10:43	1
1,1,2-Trichloroethane	ND		0.50	0.16	ug/L			10/18/17 10:43	1
1,1-Dichloroethene	ND		0.50	0.15	ug/L			10/18/17 10:43	1
1,2,4-Trichlorobenzene	ND		0.50	0.12	ug/L			10/18/17 10:43	1
1,2-Dichlorobenzene	ND		0.50	0.16	ug/L			10/18/17 10:43	1
1,2-Dichloroethane	ND		0.50	0.086	ug/L			10/18/17 10:43	1
1,2-Dichloropropane	ND		0.50	0.096	ug/L			10/18/17 10:43	1
1,4-Dichlorobenzene	ND		0.50	0.13	ug/L			10/18/17 10:43	1
Benzene	ND		0.50	0.082	ug/L			10/18/17 10:43	1
Carbon tetrachloride	ND		0.50	0.11	ug/L			10/18/17 10:43	1
Chlorobenzene	ND		0.50	0.14	ug/L			10/18/17 10:43	1
cis-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/18/17 10:43	1
Ethylbenzene	ND		0.50	0.099	ug/L			10/18/17 10:43	1
Methylene Chloride	ND		0.50	0.20	ug/L			10/18/17 10:43	1
Styrene	ND		0.50	0.089	ug/L			10/18/17 10:43	1
Tetrachloroethene	ND		0.50	0.18	ug/L			10/18/17 10:43	1
Toluene	ND		0.50	0.086	ug/L			10/18/17 10:43	1
trans-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/18/17 10:43	1
Trichloroethene	ND		0.50	0.13	ug/L			10/18/17 10:43	1
Vinyl chloride	ND		0.50	0.16	ug/L			10/18/17 10:43	1
Xylenes, Total	ND		0.50	0.086	ug/L			10/18/17 10:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene-d4 (Surr)	97		70 - 130					10/18/17 10:43	1
4-Bromofluorobenzene	104		70 - 130					10/18/17 10:43	1

## Method: 624 - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			10/10/17 16:28	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/10/17 16:28	1
Toluene	ND		2.0	0.24	ug/L			10/10/17 16:28	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/10/17 16:28	1
o-Xylene	ND		2.0	0.15	ug/L			10/10/17 16:28	1
TAH	ND		3.0	0.42	ug/L			10/10/17 16:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	120		74 - 123					10/10/17 16:28	1
Toluene-d8 (Surr)	89		79 - 122					10/10/17 16:28	1
4-Bromofluorobenzene (Surr)	100		78 - 119					10/10/17 16:28	1
Dibromofluoromethane (Surr)	105		70 - 120					10/10/17 16:28	1
1,2-Dichloroethane-d4 (Surr)	94		70 - 120					10/10/17 16:28	1

## Method: 8260C SIM - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.50	0.0090	ug/L			10/17/17 17:29	1
1,1,2,2-Tetrachloroethane	ND		0.50	0.049	ug/L			10/17/17 17:29	1
1,1,2-Trichloroethane	ND		0.50	0.017	ug/L			10/17/17 17:29	1
1,1-Dichloroethene	ND		0.50	0.014	ug/L			10/17/17 17:29	1
1,2-Dibromoethane	ND		0.50	0.014	ug/L			10/17/17 17:29	1
1,2-Dichloroethane	ND		0.50	0.024	ug/L			10/17/17 17:29	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-TB**

**Lab Sample ID: 580-71900-6**

**Date Collected: 10/05/17 08:00**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: 8260C SIM - Volatile Organic Compounds (GC/MS) (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.50	0.014	ug/L			10/17/17 17:29	1
2-Hexanone	ND		0.50	0.098	ug/L			10/17/17 17:29	1
Benzene	ND		0.50	0.0090	ug/L			10/17/17 17:29	1
Bromodichloromethane	ND		0.50	0.0060	ug/L			10/17/17 17:29	1
Bromoform	ND		0.50	0.013	ug/L			10/17/17 17:29	1
Bromomethane	ND		0.50	0.012	ug/L			10/17/17 17:29	1
Chloroform	ND		0.50	0.0090	ug/L			10/17/17 17:29	1
cis-1,3-Dichloropropene	ND		0.50	0.026	ug/L			10/17/17 17:29	1
Dibromochloromethane	ND		0.50	0.016	ug/L			10/17/17 17:29	1
Dibromomethane	ND		0.50	0.017	ug/L			10/17/17 17:29	1
Hexachlorobutadiene	ND		0.50	0.026	ug/L			10/17/17 17:29	1
Naphthalene	ND		0.50	0.013	ug/L			10/17/17 17:29	1
Tetrachloroethene	ND		0.50	0.017	ug/L			10/17/17 17:29	1
trans-1,3-Dichloropropene	ND		0.50	0.027	ug/L			10/17/17 17:29	1
Trichloroethene	ND		0.50	0.0090	ug/L			10/17/17 17:29	1
Vinyl chloride	ND		0.50	0.013	ug/L			10/17/17 17:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		65 - 143		10/17/17 17:29	1
4-Bromofluorobenzene (Surr)	103		75 - 125		10/17/17 17:29	1
Dibromofluoromethane (Surr)	101		77 - 118		10/17/17 17:29	1
Toluene-d8 (Surr)	100		82 - 122		10/17/17 17:29	1
Trifluorotoluene (Surr)	101		80 - 141		10/17/17 17:29	1

**Method: AK101 - Alaska - Gasoline Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/09/17 18:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	127	X	75 - 120		10/09/17 18:48	1
4-Bromofluorobenzene (Surr)	104		68 - 119		10/09/17 18:48	1

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MW-1**

**Lab Sample ID: 580-71900-7**

**Date Collected: 10/05/17 15:35**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

## Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			10/10/17 18:10	1
Toluene	ND		2.0	0.24	ug/L			10/10/17 18:10	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/10/17 18:10	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/10/17 18:10	1
o-Xylene	ND		2.0	0.15	ug/L			10/10/17 18:10	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	87		80 - 122		10/10/17 18:10	1
Trifluorotoluene (Surr)	120		80 - 120		10/10/17 18:10	1
4-Bromofluorobenzene (Surr)	104		75 - 125		10/10/17 18:10	1
Dibromofluoromethane (Surr)	108		77 - 120		10/10/17 18:10	1
1,2-Dichloroethane-d4 (Surr)	95		80 - 126		10/10/17 18:10	1

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.016	0.0048	ug/L		10/11/17 13:53	10/19/17 22:16	1
2-Methylnaphthalene	ND		0.024	0.0072	ug/L		10/11/17 13:53	10/19/17 22:16	1
Acenaphthene	ND		0.016	0.0016	ug/L		10/11/17 13:53	10/19/17 22:16	1
Acenaphthylene	ND		0.016	0.0016	ug/L		10/11/17 13:53	10/19/17 22:16	1
Anthracene	ND		0.016	0.0024	ug/L		10/11/17 13:53	10/19/17 22:16	1
Benzo[a]anthracene	ND		0.016	0.0016	ug/L		10/11/17 13:53	10/19/17 22:16	1
Benzo[a]pyrene	ND	*	0.016	0.0024	ug/L		10/11/17 13:53	10/19/17 22:16	1
Benzo[b]fluoranthene	ND		0.016	0.0064	ug/L		10/11/17 13:53	10/19/17 22:16	1
Benzo[g,h,i]perylene	ND		0.016	0.0024	ug/L		10/11/17 13:53	10/19/17 22:16	1
Benzo[k]fluoranthene	ND		0.024	0.0072	ug/L		10/11/17 13:53	10/19/17 22:16	1
Chrysene	ND		0.016	0.0048	ug/L		10/11/17 13:53	10/19/17 22:16	1
<b>Dibenz(a,h)anthracene</b>	<b>0.0019</b>	<b>J</b>	0.016	0.0016	ug/L		10/11/17 13:53	10/19/17 22:16	1
Fluoranthene	ND		0.016	0.0016	ug/L		10/11/17 13:53	10/19/17 22:16	1
Fluorene	ND		0.016	0.0024	ug/L		10/11/17 13:53	10/19/17 22:16	1
Indeno[1,2,3-cd]pyrene	ND		0.016	0.0056	ug/L		10/11/17 13:53	10/19/17 22:16	1
Naphthalene	ND		0.032	0.010	ug/L		10/11/17 13:53	10/19/17 22:16	1
Phenanthrene	ND		0.016	0.0032	ug/L		10/11/17 13:53	10/19/17 22:16	1
Pyrene	ND		0.016	0.0032	ug/L		10/11/17 13:53	10/19/17 22:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	65		53 - 112	10/11/17 13:53	10/19/17 22:16	1

## Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/10/17 04:34	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	126	X	75 - 120		10/10/17 04:34	1
4-Bromofluorobenzene (Surr)	105		68 - 119		10/10/17 04:34	1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>DRO (nC10-&lt;nC25)</b>	<b>3.7</b>	<b>B</b>	0.10	0.022	mg/L		10/17/17 08:55	10/17/17 20:01	1

TestAmerica Seattle



# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MW-1**

**Date Collected: 10/05/17 15:35**

**Date Received: 10/07/17 10:10**

**Lab Sample ID: 580-71900-7**

**Matrix: Water**

<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
<i>o-Terphenyl</i>	67		50 - 150	10/17/17 08:55	10/17/17 20:01	1

- 1
- 2
- 3
- 4
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- 8
- 9
- 10
- 11

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MWZ**

**Lab Sample ID: 580-71900-8**

**Date Collected: 10/05/17 14:25**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: 8260C SIM - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.50	0.0090	ug/L			10/17/17 17:52	1
1,1,2,2-Tetrachloroethane	ND		0.50	0.049	ug/L			10/17/17 17:52	1
1,1,2-Trichloroethane	ND		0.50	0.017	ug/L			10/17/17 17:52	1
1,1-Dichloroethene	ND		0.50	0.014	ug/L			10/17/17 17:52	1
1,2-Dibromoethane	ND		0.50	0.014	ug/L			10/17/17 17:52	1
1,2-Dichloroethane	ND		0.50	0.024	ug/L			10/17/17 17:52	1
1,4-Dichlorobenzene	ND		0.50	0.014	ug/L			10/17/17 17:52	1
2-Hexanone	ND		0.50	0.098	ug/L			10/17/17 17:52	1
Benzene	ND		0.50	0.0090	ug/L			10/17/17 17:52	1
Bromodichloromethane	ND		0.50	0.0060	ug/L			10/17/17 17:52	1
Bromoform	ND		0.50	0.013	ug/L			10/17/17 17:52	1
Bromomethane	ND		0.50	0.012	ug/L			10/17/17 17:52	1
Chloroform	ND		0.50	0.0090	ug/L			10/17/17 17:52	1
cis-1,3-Dichloropropene	ND		0.50	0.026	ug/L			10/17/17 17:52	1
Dibromochloromethane	ND		0.50	0.016	ug/L			10/17/17 17:52	1
Dibromomethane	ND		0.50	0.017	ug/L			10/17/17 17:52	1
Hexachlorobutadiene	ND		0.50	0.026	ug/L			10/17/17 17:52	1
Naphthalene	ND		0.50	0.013	ug/L			10/17/17 17:52	1
<b>Tetrachloroethene</b>	<b>0.57</b>		0.50	0.017	ug/L			10/17/17 17:52	1
trans-1,3-Dichloropropene	ND		0.50	0.027	ug/L			10/17/17 17:52	1
Trichloroethene	ND		0.50	0.0090	ug/L			10/17/17 17:52	1
Vinyl chloride	ND		0.50	0.013	ug/L			10/17/17 17:52	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		65 - 143		10/17/17 17:52	1
4-Bromofluorobenzene (Surr)	105		75 - 125		10/17/17 17:52	1
Dibromofluoromethane (Surr)	103		77 - 118		10/17/17 17:52	1
Toluene-d8 (Surr)	100		82 - 122		10/17/17 17:52	1
Trifluorotoluene (Surr)	101		80 - 141		10/17/17 17:52	1

**Method: 8260C - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		3.0	0.32	ug/L			10/11/17 21:21	1
1,1-Dichloroethane	ND		2.0	0.22	ug/L			10/11/17 21:21	1
1,1-Dichloropropene	ND		3.0	0.50	ug/L			10/11/17 21:21	1
1,2,3-Trichlorobenzene	ND	*	5.0	0.46	ug/L			10/11/17 21:21	1
1,2,3-Trichloropropane	ND		2.0	0.41	ug/L			10/11/17 21:21	1
1,2,4-Trichlorobenzene	ND		2.0	0.15	ug/L			10/11/17 21:21	1
1,2,4-Trimethylbenzene	ND		3.0	0.42	ug/L			10/11/17 21:21	1
1,2-Dibromo-3-Chloropropane	ND		10	1.8	ug/L			10/11/17 21:21	1
1,2-Dichlorobenzene	ND		2.0	0.20	ug/L			10/11/17 21:21	1
1,2-Dichloropropane	ND		1.0	0.18	ug/L			10/11/17 21:21	1
1,3,5-Trimethylbenzene	ND		3.0	0.26	ug/L			10/11/17 21:21	1
1,3-Dichlorobenzene	ND		2.0	0.18	ug/L			10/11/17 21:21	1
1,3-Dichloropropane	ND		2.0	0.35	ug/L			10/11/17 21:21	1
2,2-Dichloropropane	ND		3.0	0.32	ug/L			10/11/17 21:21	1
2-Butanone	ND		20	4.7	ug/L			10/11/17 21:21	1
2-Chlorotoluene	ND		3.0	0.30	ug/L			10/11/17 21:21	1
4-Chlorotoluene	ND		2.0	0.28	ug/L			10/11/17 21:21	1
4-Isopropyltoluene	ND		3.0	0.26	ug/L			10/11/17 21:21	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MWZ**

**Lab Sample ID: 580-71900-8**

Date Collected: 10/05/17 14:25

Matrix: Water

Date Received: 10/07/17 10:10

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methyl-2-pentanone	ND		15	2.5	ug/L			10/11/17 21:21	1
Acetone	ND	*	50	7.8	ug/L			10/11/17 21:21	1
Bromobenzene	ND		2.0	0.18	ug/L			10/11/17 21:21	1
Bromochloromethane	ND	*	2.0	0.29	ug/L			10/11/17 21:21	1
Carbon disulfide	ND		1.0	0.11	ug/L			10/11/17 21:21	1
Carbon tetrachloride	ND	*	3.0	0.30	ug/L			10/11/17 21:21	1
Chlorobenzene	ND		2.0	0.17	ug/L			10/11/17 21:21	1
Chloroethane	ND		5.0	1.1	ug/L			10/11/17 21:21	1
Chloromethane	ND		20	5.4	ug/L			10/11/17 21:21	1
cis-1,2-Dichloroethene	ND		1.0	0.21	ug/L			10/11/17 21:21	1
Dichlorodifluoromethane	ND		5.0	0.98	ug/L			10/11/17 21:21	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/11/17 21:21	1
Isopropylbenzene	ND		2.0	0.30	ug/L			10/11/17 21:21	1
Methyl tert-butyl ether	ND	*	2.0	0.44	ug/L			10/11/17 21:21	1
Methylene Chloride	ND		5.0	1.4	ug/L			10/11/17 21:21	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/11/17 21:21	1
n-Butylbenzene	ND		3.0	0.30	ug/L			10/11/17 21:21	1
N-Propylbenzene	ND		3.0	0.22	ug/L			10/11/17 21:21	1
o-Xylene	ND		2.0	0.15	ug/L			10/11/17 21:21	1
sec-Butylbenzene	ND		3.0	0.27	ug/L			10/11/17 21:21	1
Styrene	ND		5.0	1.0	ug/L			10/11/17 21:21	1
t-Butylbenzene	ND		3.0	0.27	ug/L			10/11/17 21:21	1
Toluene	ND		2.0	0.24	ug/L			10/11/17 21:21	1
trans-1,2-Dichloroethene	ND		3.0	0.71	ug/L			10/11/17 21:21	1
Trichlorofluoromethane	ND		3.0	0.63	ug/L			10/11/17 21:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	96		80 - 126		10/11/17 21:21	1
4-Bromofluorobenzene (Surr)	103		75 - 125		10/11/17 21:21	1
Dibromofluoromethane (Surr)	109		77 - 120		10/11/17 21:21	1
Toluene-d8 (Surr)	87		80 - 122		10/11/17 21:21	1
Trifluorotoluene (Surr)	119		80 - 120		10/11/17 21:21	1

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.017	0.0052	ug/L		10/11/17 13:53	10/19/17 22:41	1
2-Methylnaphthalene	ND		0.026	0.0077	ug/L		10/11/17 13:53	10/19/17 22:41	1
Acenaphthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 22:41	1
Acenaphthylene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 22:41	1
Anthracene	ND		0.017	0.0026	ug/L		10/11/17 13:53	10/19/17 22:41	1
Benzo[a]anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 22:41	1
Benzo[a]pyrene	ND	*	0.017	0.0026	ug/L		10/11/17 13:53	10/19/17 22:41	1
Benzo[b]fluoranthene	ND		0.017	0.0069	ug/L		10/11/17 13:53	10/19/17 22:41	1
Benzo[g,h,i]perylene	ND		0.017	0.0026	ug/L		10/11/17 13:53	10/19/17 22:41	1
Benzo[k]fluoranthene	ND		0.026	0.0077	ug/L		10/11/17 13:53	10/19/17 22:41	1
Chrysene	ND		0.017	0.0052	ug/L		10/11/17 13:53	10/19/17 22:41	1
Dibenz(a,h)anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 22:41	1
Fluoranthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 22:41	1
Fluorene	ND		0.017	0.0026	ug/L		10/11/17 13:53	10/19/17 22:41	1
Indeno[1,2,3-cd]pyrene	ND		0.017	0.0060	ug/L		10/11/17 13:53	10/19/17 22:41	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MWZ**

**Lab Sample ID: 580-71900-8**

Date Collected: 10/05/17 14:25

Matrix: Water

Date Received: 10/07/17 10:10

**Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	ND		0.034	0.011	ug/L		10/11/17 13:53	10/19/17 22:41	1
Phenanthrene	ND		0.017	0.0034	ug/L		10/11/17 13:53	10/19/17 22:41	1
Pyrene	ND		0.017	0.0034	ug/L		10/11/17 13:53	10/19/17 22:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	68		53 - 112				10/11/17 13:53	10/19/17 22:41	1

**Method: AK101 - Alaska - Gasoline Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/10/17 05:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	127	X	75 - 120					10/10/17 05:05	1
4-Bromofluorobenzene (Surr)	103		68 - 119					10/10/17 05:05	1

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	0.052	J	0.10	0.022	mg/L		10/18/17 12:07	10/19/17 02:50	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	73		50 - 150				10/18/17 12:07	10/19/17 02:50	1

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MW-3**

**Lab Sample ID: 580-71900-9**

**Date Collected: 10/05/17 14:15**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: 8260C SIM - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.50	0.0090	ug/L			10/17/17 18:17	1
1,1,2,2-Tetrachloroethane	ND		0.50	0.049	ug/L			10/17/17 18:17	1
1,1,2-Trichloroethane	ND		0.50	0.017	ug/L			10/17/17 18:17	1
1,1-Dichloroethene	ND		0.50	0.014	ug/L			10/17/17 18:17	1
1,2-Dibromoethane	ND		0.50	0.014	ug/L			10/17/17 18:17	1
1,2-Dichloroethane	ND		0.50	0.024	ug/L			10/17/17 18:17	1
1,4-Dichlorobenzene	ND		0.50	0.014	ug/L			10/17/17 18:17	1
2-Hexanone	ND		0.50	0.098	ug/L			10/17/17 18:17	1
Benzene	ND		0.50	0.0090	ug/L			10/17/17 18:17	1
Bromodichloromethane	ND		0.50	0.0060	ug/L			10/17/17 18:17	1
Bromoform	ND		0.50	0.013	ug/L			10/17/17 18:17	1
Bromomethane	ND		0.50	0.012	ug/L			10/17/17 18:17	1
Chloroform	ND		0.50	0.0090	ug/L			10/17/17 18:17	1
cis-1,3-Dichloropropene	ND		0.50	0.026	ug/L			10/17/17 18:17	1
Dibromochloromethane	ND		0.50	0.016	ug/L			10/17/17 18:17	1
Dibromomethane	ND		0.50	0.017	ug/L			10/17/17 18:17	1
Hexachlorobutadiene	ND		0.50	0.026	ug/L			10/17/17 18:17	1
Naphthalene	ND		0.50	0.013	ug/L			10/17/17 18:17	1
Tetrachloroethene	ND		0.50	0.017	ug/L			10/17/17 18:17	1
trans-1,3-Dichloropropene	ND		0.50	0.027	ug/L			10/17/17 18:17	1
Trichloroethene	ND		0.50	0.0090	ug/L			10/17/17 18:17	1
Vinyl chloride	ND		0.50	0.013	ug/L			10/17/17 18:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		65 - 143		10/17/17 18:17	1
4-Bromofluorobenzene (Surr)	105		75 - 125		10/17/17 18:17	1
Dibromofluoromethane (Surr)	102		77 - 118		10/17/17 18:17	1
Toluene-d8 (Surr)	101		82 - 122		10/17/17 18:17	1
Trifluorotoluene (Surr)	102		80 - 141		10/17/17 18:17	1

**Method: 8260C - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		3.0	0.32	ug/L			10/11/17 21:46	1
1,1-Dichloroethane	ND		2.0	0.22	ug/L			10/11/17 21:46	1
1,1-Dichloropropene	ND		3.0	0.50	ug/L			10/11/17 21:46	1
1,2,3-Trichlorobenzene	ND	*	5.0	0.46	ug/L			10/11/17 21:46	1
1,2,3-Trichloropropane	ND		2.0	0.41	ug/L			10/11/17 21:46	1
1,2,4-Trichlorobenzene	ND		2.0	0.15	ug/L			10/11/17 21:46	1
1,2,4-Trimethylbenzene	ND		3.0	0.42	ug/L			10/11/17 21:46	1
1,2-Dibromo-3-Chloropropane	ND		10	1.8	ug/L			10/11/17 21:46	1
1,2-Dichlorobenzene	ND		2.0	0.20	ug/L			10/11/17 21:46	1
1,2-Dichloropropane	ND		1.0	0.18	ug/L			10/11/17 21:46	1
1,3,5-Trimethylbenzene	ND		3.0	0.26	ug/L			10/11/17 21:46	1
1,3-Dichlorobenzene	ND		2.0	0.18	ug/L			10/11/17 21:46	1
1,3-Dichloropropane	ND		2.0	0.35	ug/L			10/11/17 21:46	1
2,2-Dichloropropane	ND		3.0	0.32	ug/L			10/11/17 21:46	1
2-Butanone	ND		20	4.7	ug/L			10/11/17 21:46	1
2-Chlorotoluene	ND		3.0	0.30	ug/L			10/11/17 21:46	1
4-Chlorotoluene	ND		2.0	0.28	ug/L			10/11/17 21:46	1
4-Isopropyltoluene	ND		3.0	0.26	ug/L			10/11/17 21:46	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MW-3**

**Lab Sample ID: 580-71900-9**

**Date Collected: 10/05/17 14:15**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methyl-2-pentanone	ND		15	2.5	ug/L			10/11/17 21:46	1
Acetone	ND	*	50	7.8	ug/L			10/11/17 21:46	1
Bromobenzene	ND		2.0	0.18	ug/L			10/11/17 21:46	1
Bromochloromethane	ND	*	2.0	0.29	ug/L			10/11/17 21:46	1
Carbon disulfide	ND		1.0	0.11	ug/L			10/11/17 21:46	1
Carbon tetrachloride	ND	*	3.0	0.30	ug/L			10/11/17 21:46	1
Chlorobenzene	ND		2.0	0.17	ug/L			10/11/17 21:46	1
Chloroethane	ND		5.0	1.1	ug/L			10/11/17 21:46	1
Chloromethane	ND		20	5.4	ug/L			10/11/17 21:46	1
cis-1,2-Dichloroethene	ND		1.0	0.21	ug/L			10/11/17 21:46	1
Dichlorodifluoromethane	ND		5.0	0.98	ug/L			10/11/17 21:46	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/11/17 21:46	1
Isopropylbenzene	ND		2.0	0.30	ug/L			10/11/17 21:46	1
Methyl tert-butyl ether	ND	*	2.0	0.44	ug/L			10/11/17 21:46	1
Methylene Chloride	ND		5.0	1.4	ug/L			10/11/17 21:46	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/11/17 21:46	1
n-Butylbenzene	ND		3.0	0.30	ug/L			10/11/17 21:46	1
N-Propylbenzene	ND		3.0	0.22	ug/L			10/11/17 21:46	1
o-Xylene	ND		2.0	0.15	ug/L			10/11/17 21:46	1
sec-Butylbenzene	ND		3.0	0.27	ug/L			10/11/17 21:46	1
Styrene	ND		5.0	1.0	ug/L			10/11/17 21:46	1
t-Butylbenzene	ND		3.0	0.27	ug/L			10/11/17 21:46	1
Toluene	ND		2.0	0.24	ug/L			10/11/17 21:46	1
trans-1,2-Dichloroethene	ND		3.0	0.71	ug/L			10/11/17 21:46	1
Trichlorofluoromethane	ND		3.0	0.63	ug/L			10/11/17 21:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	95		80 - 126		10/11/17 21:46	1
4-Bromofluorobenzene (Surr)	104		75 - 125		10/11/17 21:46	1
Dibromofluoromethane (Surr)	108		77 - 120		10/11/17 21:46	1
Toluene-d8 (Surr)	87		80 - 122		10/11/17 21:46	1
Trifluorotoluene (Surr)	120		80 - 120		10/11/17 21:46	1

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.017	0.0050	ug/L		10/11/17 13:53	10/19/17 23:05	1
2-Methylnaphthalene	ND		0.025	0.0075	ug/L		10/11/17 13:53	10/19/17 23:05	1
Acenaphthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:05	1
Acenaphthylene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:05	1
Anthracene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 23:05	1
Benzo[a]anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:05	1
Benzo[a]pyrene	ND	*	0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 23:05	1
Benzo[b]fluoranthene	ND		0.017	0.0066	ug/L		10/11/17 13:53	10/19/17 23:05	1
Benzo[g,h,i]perylene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 23:05	1
Benzo[k]fluoranthene	ND		0.025	0.0075	ug/L		10/11/17 13:53	10/19/17 23:05	1
Chrysene	ND		0.017	0.0050	ug/L		10/11/17 13:53	10/19/17 23:05	1
Dibenz(a,h)anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:05	1
Fluoranthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:05	1
Fluorene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 23:05	1
Indeno[1,2,3-cd]pyrene	ND		0.017	0.0058	ug/L		10/11/17 13:53	10/19/17 23:05	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MW-3**

**Lab Sample ID: 580-71900-9**

**Date Collected: 10/05/17 14:15**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	ND		0.033	0.011	ug/L		10/11/17 13:53	10/19/17 23:05	1
Phenanthrene	ND		0.017	0.0033	ug/L		10/11/17 13:53	10/19/17 23:05	1
Pyrene	ND		0.017	0.0033	ug/L		10/11/17 13:53	10/19/17 23:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	72		53 - 112				10/11/17 13:53	10/19/17 23:05	1

**Method: AK101 - Alaska - Gasoline Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/10/17 05:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	124	X	75 - 120					10/10/17 05:36	1
4-Bromofluorobenzene (Surr)	104		68 - 119					10/10/17 05:36	1

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>DRO (nC10-&lt;nC25)</b>	<b>0.058</b>	<b>J</b>	0.11	0.023	mg/L		10/18/17 12:07	10/19/17 03:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	82		50 - 150				10/18/17 12:07	10/19/17 03:13	1

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-EB**

**Lab Sample ID: 580-71900-10**

**Date Collected: 10/05/17 16:06**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: 8260C SIM - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.50	0.0090	ug/L			10/17/17 18:40	1
1,1,2,2-Tetrachloroethane	ND		0.50	0.049	ug/L			10/17/17 18:40	1
1,1,2-Trichloroethane	ND		0.50	0.017	ug/L			10/17/17 18:40	1
1,1-Dichloroethene	ND		0.50	0.014	ug/L			10/17/17 18:40	1
1,2-Dibromoethane	ND		0.50	0.014	ug/L			10/17/17 18:40	1
1,2-Dichloroethane	ND		0.50	0.024	ug/L			10/17/17 18:40	1
1,4-Dichlorobenzene	ND		0.50	0.014	ug/L			10/17/17 18:40	1
2-Hexanone	ND		0.50	0.098	ug/L			10/17/17 18:40	1
Benzene	ND		0.50	0.0090	ug/L			10/17/17 18:40	1
Bromodichloromethane	ND		0.50	0.0060	ug/L			10/17/17 18:40	1
Bromoform	ND		0.50	0.013	ug/L			10/17/17 18:40	1
Bromomethane	ND		0.50	0.012	ug/L			10/17/17 18:40	1
Chloroform	ND		0.50	0.0090	ug/L			10/17/17 18:40	1
cis-1,3-Dichloropropene	ND		0.50	0.026	ug/L			10/17/17 18:40	1
Dibromochloromethane	ND		0.50	0.016	ug/L			10/17/17 18:40	1
Dibromomethane	ND		0.50	0.017	ug/L			10/17/17 18:40	1
Hexachlorobutadiene	ND		0.50	0.026	ug/L			10/17/17 18:40	1
Naphthalene	ND		0.50	0.013	ug/L			10/17/17 18:40	1
<b>Tetrachloroethene</b>	<b>0.53</b>		0.50	0.017	ug/L			10/17/17 18:40	1
trans-1,3-Dichloropropene	ND		0.50	0.027	ug/L			10/17/17 18:40	1
Trichloroethene	ND		0.50	0.0090	ug/L			10/17/17 18:40	1
Vinyl chloride	ND		0.50	0.013	ug/L			10/17/17 18:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		65 - 143		10/17/17 18:40	1
4-Bromofluorobenzene (Surr)	97		75 - 125		10/17/17 18:40	1
Dibromofluoromethane (Surr)	102		77 - 118		10/17/17 18:40	1
Toluene-d8 (Surr)	99		82 - 122		10/17/17 18:40	1
Trifluorotoluene (Surr)	102		80 - 141		10/17/17 18:40	1

**Method: 8260C - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		3.0	0.32	ug/L			10/11/17 20:06	1
1,1-Dichloroethane	ND		2.0	0.22	ug/L			10/11/17 20:06	1
1,1-Dichloropropene	ND		3.0	0.50	ug/L			10/11/17 20:06	1
1,2,3-Trichlorobenzene	ND	*	5.0	0.46	ug/L			10/11/17 20:06	1
1,2,3-Trichloropropane	ND		2.0	0.41	ug/L			10/11/17 20:06	1
1,2,4-Trichlorobenzene	ND		2.0	0.15	ug/L			10/11/17 20:06	1
1,2,4-Trimethylbenzene	ND		3.0	0.42	ug/L			10/11/17 20:06	1
1,2-Dibromo-3-Chloropropane	ND		10	1.8	ug/L			10/11/17 20:06	1
1,2-Dichlorobenzene	ND		2.0	0.20	ug/L			10/11/17 20:06	1
1,2-Dichloropropane	ND		1.0	0.18	ug/L			10/11/17 20:06	1
1,3,5-Trimethylbenzene	ND		3.0	0.26	ug/L			10/11/17 20:06	1
1,3-Dichlorobenzene	ND		2.0	0.18	ug/L			10/11/17 20:06	1
1,3-Dichloropropane	ND		2.0	0.35	ug/L			10/11/17 20:06	1
2,2-Dichloropropane	ND		3.0	0.32	ug/L			10/11/17 20:06	1
2-Butanone	ND		20	4.7	ug/L			10/11/17 20:06	1
2-Chlorotoluene	ND		3.0	0.30	ug/L			10/11/17 20:06	1
4-Chlorotoluene	ND		2.0	0.28	ug/L			10/11/17 20:06	1
4-Isopropyltoluene	ND		3.0	0.26	ug/L			10/11/17 20:06	1

TestAmerica Seattle



# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-EB**

**Lab Sample ID: 580-71900-10**

**Date Collected: 10/05/17 16:06**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4-Methyl-2-pentanone	ND		15	2.5	ug/L			10/11/17 20:06	1
Acetone	ND	*	50	7.8	ug/L			10/11/17 20:06	1
Bromobenzene	ND		2.0	0.18	ug/L			10/11/17 20:06	1
Bromochloromethane	ND	*	2.0	0.29	ug/L			10/11/17 20:06	1
Carbon disulfide	ND		1.0	0.11	ug/L			10/11/17 20:06	1
Carbon tetrachloride	ND	*	3.0	0.30	ug/L			10/11/17 20:06	1
Chlorobenzene	ND		2.0	0.17	ug/L			10/11/17 20:06	1
Chloroethane	ND		5.0	1.1	ug/L			10/11/17 20:06	1
Chloromethane	ND		20	5.4	ug/L			10/11/17 20:06	1
cis-1,2-Dichloroethene	ND		1.0	0.21	ug/L			10/11/17 20:06	1
Dichlorodifluoromethane	ND		5.0	0.98	ug/L			10/11/17 20:06	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/11/17 20:06	1
Isopropylbenzene	ND		2.0	0.30	ug/L			10/11/17 20:06	1
Methyl tert-butyl ether	ND	*	2.0	0.44	ug/L			10/11/17 20:06	1
Methylene Chloride	ND		5.0	1.4	ug/L			10/11/17 20:06	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/11/17 20:06	1
n-Butylbenzene	ND		3.0	0.30	ug/L			10/11/17 20:06	1
N-Propylbenzene	ND		3.0	0.22	ug/L			10/11/17 20:06	1
o-Xylene	ND		2.0	0.15	ug/L			10/11/17 20:06	1
sec-Butylbenzene	ND		3.0	0.27	ug/L			10/11/17 20:06	1
Styrene	ND		5.0	1.0	ug/L			10/11/17 20:06	1
t-Butylbenzene	ND		3.0	0.27	ug/L			10/11/17 20:06	1
Toluene	ND		2.0	0.24	ug/L			10/11/17 20:06	1
trans-1,2-Dichloroethene	ND		3.0	0.71	ug/L			10/11/17 20:06	1
Trichlorofluoromethane	ND		3.0	0.63	ug/L			10/11/17 20:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	95		80 - 126		10/11/17 20:06	1
4-Bromofluorobenzene (Surr)	102		75 - 125		10/11/17 20:06	1
Dibromofluoromethane (Surr)	108		77 - 120		10/11/17 20:06	1
Toluene-d8 (Surr)	87		80 - 122		10/11/17 20:06	1
Trifluorotoluene (Surr)	120		80 - 120		10/11/17 20:06	1

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.017	0.0051	ug/L		10/11/17 13:53	10/19/17 23:30	1
2-Methylnaphthalene	ND		0.025	0.0076	ug/L		10/11/17 13:53	10/19/17 23:30	1
Acenaphthene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:30	1
Acenaphthylene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:30	1
<b>Anthracene</b>	<b>0.0036</b>	<b>J B</b>	0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 23:30	1
<b>Benzo[a]anthracene</b>	<b>0.0028</b>	<b>J</b>	0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:30	1
Benzo[a]pyrene	ND	*	0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 23:30	1
Benzo[b]fluoranthene	ND		0.017	0.0068	ug/L		10/11/17 13:53	10/19/17 23:30	1
Benzo[g,h,i]perylene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 23:30	1
Benzo[k]fluoranthene	ND		0.025	0.0076	ug/L		10/11/17 13:53	10/19/17 23:30	1
Chrysene	ND		0.017	0.0051	ug/L		10/11/17 13:53	10/19/17 23:30	1
Dibenz(a,h)anthracene	ND		0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:30	1
<b>Fluoranthene</b>	<b>0.0055</b>	<b>J</b>	0.017	0.0017	ug/L		10/11/17 13:53	10/19/17 23:30	1
Fluorene	ND		0.017	0.0025	ug/L		10/11/17 13:53	10/19/17 23:30	1
Indeno[1,2,3-cd]pyrene	ND		0.017	0.0059	ug/L		10/11/17 13:53	10/19/17 23:30	1

TestAmerica Seattle

# Client Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-EB**

**Lab Sample ID: 580-71900-10**

**Date Collected: 10/05/17 16:06**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

**Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	ND		0.034	0.011	ug/L		10/11/17 13:53	10/19/17 23:30	1
<b>Phenanthrene</b>	<b>0.0051</b>	<b>J B</b>	0.017	0.0034	ug/L		10/11/17 13:53	10/19/17 23:30	1
<b>Pyrene</b>	<b>0.0044</b>	<b>J B</b>	0.017	0.0034	ug/L		10/11/17 13:53	10/19/17 23:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Terphenyl-d14	70		53 - 112				10/11/17 13:53	10/19/17 23:30	1

**Method: AK101 - Alaska - Gasoline Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/10/17 06:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	123	X	75 - 120					10/10/17 06:07	1
4-Bromofluorobenzene (Surr)	105		68 - 119					10/10/17 06:07	1

**Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>DRO (nC10-&lt;nC25)</b>	<b>0.048</b>	<b>J B</b>	0.10	0.022	mg/L		10/17/17 08:55	10/17/17 21:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	75		50 - 150				10/17/17 08:55	10/17/17 21:29	1

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 524.2 - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 680-498776/9**

**Matrix: Water**

**Analysis Batch: 498776**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.50	0.15	ug/L			10/17/17 13:02	1
1,1,2-Trichloroethane	ND		0.50	0.16	ug/L			10/17/17 13:02	1
1,1-Dichloroethene	ND		0.50	0.15	ug/L			10/17/17 13:02	1
1,2,4-Trichlorobenzene	0.130	J	0.50	0.12	ug/L			10/17/17 13:02	1
1,2-Dichlorobenzene	ND		0.50	0.16	ug/L			10/17/17 13:02	1
1,2-Dichloroethane	ND		0.50	0.086	ug/L			10/17/17 13:02	1
1,2-Dichloropropane	ND		0.50	0.096	ug/L			10/17/17 13:02	1
1,4-Dichlorobenzene	ND		0.50	0.13	ug/L			10/17/17 13:02	1
Benzene	ND		0.50	0.082	ug/L			10/17/17 13:02	1
Carbon tetrachloride	ND		0.50	0.11	ug/L			10/17/17 13:02	1
Chlorobenzene	ND		0.50	0.14	ug/L			10/17/17 13:02	1
cis-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/17/17 13:02	1
Ethylbenzene	ND		0.50	0.099	ug/L			10/17/17 13:02	1
Methylene Chloride	ND		0.50	0.20	ug/L			10/17/17 13:02	1
Styrene	ND		0.50	0.089	ug/L			10/17/17 13:02	1
Tetrachloroethene	ND		0.50	0.18	ug/L			10/17/17 13:02	1
Toluene	ND		0.50	0.086	ug/L			10/17/17 13:02	1
trans-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/17/17 13:02	1
Trichloroethene	ND		0.50	0.13	ug/L			10/17/17 13:02	1
Vinyl chloride	ND		0.50	0.16	ug/L			10/17/17 13:02	1
Xylenes, Total	ND		0.50	0.086	ug/L			10/17/17 13:02	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene-d4 (Surr)	117		70 - 130		10/17/17 13:02	1
4-Bromofluorobenzene	99		70 - 130		10/17/17 13:02	1

**Lab Sample ID: LCS 680-498776/3**

**Matrix: Water**

**Analysis Batch: 498776**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	20.0	19.1		ug/L		95	70 - 130
1,1,2-Trichloroethane	20.0	18.0		ug/L		90	70 - 130
1,1-Dichloroethene	20.0	21.0		ug/L		105	70 - 130
1,2,4-Trichlorobenzene	20.0	22.9		ug/L		114	70 - 130
1,2-Dichlorobenzene	20.0	23.7		ug/L		118	70 - 130
1,2-Dichloroethane	20.0	17.9		ug/L		90	70 - 130
1,2-Dichloropropane	20.0	17.6		ug/L		88	70 - 130
1,4-Dichlorobenzene	20.0	23.1		ug/L		116	70 - 130
Benzene	20.0	18.6		ug/L		93	70 - 130
Carbon tetrachloride	20.0	19.8		ug/L		99	70 - 130
Chlorobenzene	20.0	20.6		ug/L		103	70 - 130
cis-1,2-Dichloroethene	20.0	20.4		ug/L		102	70 - 130
Ethylbenzene	20.0	22.0		ug/L		110	70 - 130
Methylene Chloride	20.0	20.6		ug/L		103	70 - 130
Styrene	20.0	22.4		ug/L		112	70 - 130
Tetrachloroethene	20.0	25.1		ug/L		125	70 - 130
Toluene	20.0	20.0		ug/L		100	70 - 130

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 524.2 - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-498776/3**  
**Matrix: Water**  
**Analysis Batch: 498776**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
trans-1,2-Dichloroethene	20.0	21.1		ug/L		106	70 - 130
Trichloroethene	20.0	22.2		ug/L		111	70 - 130
Vinyl chloride	20.0	20.0		ug/L		100	70 - 130
Xylenes, Total	40.0	44.3		ug/L		111	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichlorobenzene-d4 (Surr)	113		70 - 130
4-Bromofluorobenzene	103		70 - 130

**Lab Sample ID: LCSD 680-498776/4**  
**Matrix: Water**  
**Analysis Batch: 498776**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
1,1,1-Trichloroethane	20.0	19.4		ug/L		97	70 - 130	2	30
1,1,2-Trichloroethane	20.0	18.5		ug/L		93	70 - 130	3	30
1,1-Dichloroethene	20.0	21.3		ug/L		107	70 - 130	1	30
1,2,4-Trichlorobenzene	20.0	23.2		ug/L		116	70 - 130	1	30
1,2-Dichlorobenzene	20.0	23.7		ug/L		118	70 - 130	0	30
1,2-Dichloroethane	20.0	18.7		ug/L		94	70 - 130	5	30
1,2-Dichloropropane	20.0	18.1		ug/L		90	70 - 130	2	30
1,4-Dichlorobenzene	20.0	23.4		ug/L		117	70 - 130	1	30
Benzene	20.0	19.2		ug/L		96	70 - 130	3	30
Carbon tetrachloride	20.0	20.4		ug/L		102	70 - 130	3	30
Chlorobenzene	20.0	21.4		ug/L		107	70 - 130	4	30
cis-1,2-Dichloroethene	20.0	20.9		ug/L		104	70 - 130	2	30
Ethylbenzene	20.0	22.5		ug/L		112	70 - 130	2	30
Methylene Chloride	20.0	21.0		ug/L		105	70 - 130	2	30
Styrene	20.0	22.6		ug/L		113	70 - 130	1	30
Tetrachloroethene	20.0	25.4		ug/L		127	70 - 130	1	30
Toluene	20.0	20.4		ug/L		102	70 - 130	2	30
trans-1,2-Dichloroethene	20.0	20.8		ug/L		104	70 - 130	2	30
Trichloroethene	20.0	22.8		ug/L		114	70 - 130	3	30
Vinyl chloride	20.0	19.7		ug/L		98	70 - 130	2	30
Xylenes, Total	40.0	44.6		ug/L		111	70 - 130	1	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
1,2-Dichlorobenzene-d4 (Surr)	112		70 - 130
4-Bromofluorobenzene	99		70 - 130

**Lab Sample ID: MB 680-498911/9**  
**Matrix: Water**  
**Analysis Batch: 498911**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		0.50	0.15	ug/L			10/18/17 10:18	1
1,1,2-Trichloroethane	ND		0.50	0.16	ug/L			10/18/17 10:18	1
1,1-Dichloroethene	ND		0.50	0.15	ug/L			10/18/17 10:18	1

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 524.2 - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-498911/9**  
**Matrix: Water**  
**Analysis Batch: 498911**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2,4-Trichlorobenzene	ND		0.50	0.12	ug/L			10/18/17 10:18	1
1,2-Dichlorobenzene	ND		0.50	0.16	ug/L			10/18/17 10:18	1
1,2-Dichloroethane	ND		0.50	0.086	ug/L			10/18/17 10:18	1
1,2-Dichloropropane	ND		0.50	0.096	ug/L			10/18/17 10:18	1
1,4-Dichlorobenzene	ND		0.50	0.13	ug/L			10/18/17 10:18	1
Benzene	ND		0.50	0.082	ug/L			10/18/17 10:18	1
Carbon tetrachloride	ND		0.50	0.11	ug/L			10/18/17 10:18	1
Chlorobenzene	ND		0.50	0.14	ug/L			10/18/17 10:18	1
cis-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/18/17 10:18	1
Ethylbenzene	ND		0.50	0.099	ug/L			10/18/17 10:18	1
Methylene Chloride	ND		0.50	0.20	ug/L			10/18/17 10:18	1
Styrene	ND		0.50	0.089	ug/L			10/18/17 10:18	1
Tetrachloroethene	ND		0.50	0.18	ug/L			10/18/17 10:18	1
Toluene	ND		0.50	0.086	ug/L			10/18/17 10:18	1
trans-1,2-Dichloroethene	ND		0.50	0.090	ug/L			10/18/17 10:18	1
Trichloroethene	ND		0.50	0.13	ug/L			10/18/17 10:18	1
Vinyl chloride	ND		0.50	0.16	ug/L			10/18/17 10:18	1
Xylenes, Total	ND		0.50	0.086	ug/L			10/18/17 10:18	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichlorobenzene-d4 (Surr)	97		70 - 130		10/18/17 10:18	1
4-Bromofluorobenzene	107		70 - 130		10/18/17 10:18	1

**Lab Sample ID: LCS 680-498911/3**  
**Matrix: Water**  
**Analysis Batch: 498911**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	20.0	18.6		ug/L		93	70 - 130
1,1,2-Trichloroethane	20.0	18.5		ug/L		93	70 - 130
1,1-Dichloroethene	20.0	21.2		ug/L		106	70 - 130
1,2,4-Trichlorobenzene	20.0	20.6		ug/L		103	70 - 130
1,2-Dichlorobenzene	20.0	18.3		ug/L		91	70 - 130
1,2-Dichloroethane	20.0	17.4		ug/L		87	70 - 130
1,2-Dichloropropane	20.0	18.7		ug/L		93	70 - 130
1,4-Dichlorobenzene	20.0	19.0		ug/L		95	70 - 130
Benzene	20.0	18.5		ug/L		93	70 - 130
Carbon tetrachloride	20.0	19.6		ug/L		98	70 - 130
Chlorobenzene	20.0	19.2		ug/L		96	70 - 130
cis-1,2-Dichloroethene	20.0	20.4		ug/L		102	70 - 130
Ethylbenzene	20.0	19.0		ug/L		95	70 - 130
Methylene Chloride	20.0	22.2		ug/L		111	70 - 130
Styrene	20.0	19.3		ug/L		97	70 - 130
Tetrachloroethene	20.0	19.0		ug/L		95	70 - 130
Toluene	20.0	19.2		ug/L		96	70 - 130
trans-1,2-Dichloroethene	20.0	21.1		ug/L		105	70 - 130
Trichloroethene	20.0	19.4		ug/L		97	70 - 130
Vinyl chloride	20.0	22.1		ug/L		110	70 - 130

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 524.2 - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-498911/3**  
**Matrix: Water**  
**Analysis Batch: 498911**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Xylenes, Total	40.0	38.4		ug/L		96	70 - 130
<b>Surrogate</b>	<b>%Recovery</b>	<b>LCS Qualifier</b>	<b>Limits</b>				
1,2-Dichlorobenzene-d4 (Surr)	96		70 - 130				
4-Bromofluorobenzene	112		70 - 130				

**Lab Sample ID: LCSD 680-498911/4**  
**Matrix: Water**  
**Analysis Batch: 498911**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	20.0	18.3		ug/L		92	70 - 130	2	30
1,1,2-Trichloroethane	20.0	18.2		ug/L		91	70 - 130	2	30
1,1-Dichloroethene	20.0	21.3		ug/L		107	70 - 130	1	30
1,2,4-Trichlorobenzene	20.0	20.6		ug/L		103	70 - 130	0	30
1,2-Dichlorobenzene	20.0	18.3		ug/L		92	70 - 130	0	30
1,2-Dichloroethane	20.0	17.0		ug/L		85	70 - 130	2	30
1,2-Dichloropropane	20.0	18.1		ug/L		90	70 - 130	3	30
1,4-Dichlorobenzene	20.0	19.1		ug/L		95	70 - 130	1	30
Benzene	20.0	18.1		ug/L		90	70 - 130	2	30
Carbon tetrachloride	20.0	19.3		ug/L		96	70 - 130	2	30
Chlorobenzene	20.0	19.0		ug/L		95	70 - 130	1	30
cis-1,2-Dichloroethene	20.0	20.0		ug/L		100	70 - 130	2	30
Ethylbenzene	20.0	18.8		ug/L		94	70 - 130	1	30
Methylene Chloride	20.0	22.0		ug/L		110	70 - 130	1	30
Styrene	20.0	19.2		ug/L		96	70 - 130	0	30
Tetrachloroethene	20.0	19.1		ug/L		95	70 - 130	0	30
Toluene	20.0	19.0		ug/L		95	70 - 130	1	30
trans-1,2-Dichloroethene	20.0	21.0		ug/L		105	70 - 130	1	30
Trichloroethene	20.0	19.5		ug/L		98	70 - 130	0	30
Vinyl chloride	20.0	21.9		ug/L		109	70 - 130	1	30
Xylenes, Total	40.0	38.0		ug/L		95	70 - 130	1	30
<b>Surrogate</b>	<b>%Recovery</b>	<b>LCSD Qualifier</b>	<b>Limits</b>						
1,2-Dichlorobenzene-d4 (Surr)	96		70 - 130						
4-Bromofluorobenzene	115		70 - 130						

## Method: 624 - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 580-258507/5**  
**Matrix: Water**  
**Analysis Batch: 258507**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			10/10/17 13:32	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/10/17 13:32	1
Toluene	ND		2.0	0.24	ug/L			10/10/17 13:32	1

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 580-258507/5**  
**Matrix: Water**  
**Analysis Batch: 258507**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/10/17 13:32	1
o-Xylene	ND		2.0	0.15	ug/L			10/10/17 13:32	1
TAH	ND		3.0	0.42	ug/L			10/10/17 13:32	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	120		74 - 123		10/10/17 13:32	1
Toluene-d8 (Surr)	88		79 - 122		10/10/17 13:32	1
4-Bromofluorobenzene (Surr)	104		78 - 119		10/10/17 13:32	1
Dibromofluoromethane (Surr)	106		70 - 120		10/10/17 13:32	1
1,2-Dichloroethane-d4 (Surr)	92		70 - 120		10/10/17 13:32	1

**Lab Sample ID: LCS 580-258507/9**  
**Matrix: Water**  
**Analysis Batch: 258507**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	11.2		ug/L		112	37 - 151
Ethylbenzene	10.0	9.38		ug/L		94	37 - 162
Toluene	10.0	9.44		ug/L		94	47 - 150
m-Xylene & p-Xylene	10.0	9.17		ug/L		92	78 - 114
o-Xylene	10.0	9.14		ug/L		91	77 - 116
TAH	50.0	48.3		ug/L		97	37 - 162

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Trifluorotoluene (Surr)	121		74 - 123
Toluene-d8 (Surr)	88		79 - 122
4-Bromofluorobenzene (Surr)	101		78 - 119
Dibromofluoromethane (Surr)	105		70 - 120
1,2-Dichloroethane-d4 (Surr)	95		70 - 120

**Lab Sample ID: LCSD 580-258507/10**  
**Matrix: Water**  
**Analysis Batch: 258507**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	10.0	11.3		ug/L		113	37 - 151	1	30
Ethylbenzene	10.0	9.52		ug/L		95	37 - 162	2	30
Toluene	10.0	9.49		ug/L		95	47 - 150	1	30
m-Xylene & p-Xylene	10.0	9.37		ug/L		94	78 - 114	2	30
o-Xylene	10.0	9.53		ug/L		95	77 - 116	4	30
TAH	50.0	49.2		ug/L		98	37 - 162	2	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Trifluorotoluene (Surr)	118		74 - 123
Toluene-d8 (Surr)	86		79 - 122
4-Bromofluorobenzene (Surr)	103		78 - 119
Dibromofluoromethane (Surr)	107		70 - 120

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 624 - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCSD 580-258507/10**  
**Matrix: Water**  
**Analysis Batch: 258507**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	93		70 - 120

## Method: 8260C - Volatile Organic Compounds by GC/MS

**Lab Sample ID: MB 580-258504/5**  
**Matrix: Water**  
**Analysis Batch: 258504**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		2.0	0.42	ug/L			10/10/17 13:32	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/10/17 13:32	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/10/17 13:32	1
o-Xylene	ND		2.0	0.15	ug/L			10/10/17 13:32	1
Toluene	ND		2.0	0.24	ug/L			10/10/17 13:32	1

Surrogate	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	88		80 - 122		10/10/17 13:32	1
Trifluorotoluene (Surr)	120		80 - 120		10/10/17 13:32	1
4-Bromofluorobenzene (Surr)	104		75 - 125		10/10/17 13:32	1
Dibromofluoromethane (Surr)	106		77 - 120		10/10/17 13:32	1
1,2-Dichloroethane-d4 (Surr)	92		80 - 126		10/10/17 13:32	1

**Lab Sample ID: LCS 580-258504/9**  
**Matrix: Water**  
**Analysis Batch: 258504**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	11.2		ug/L		112	75 - 120
Ethylbenzene	10.0	9.38		ug/L		94	75 - 120
m-Xylene & p-Xylene	10.0	9.17		ug/L		92	75 - 120
o-Xylene	10.0	9.14		ug/L		91	74 - 120
Toluene	10.0	9.44		ug/L		94	75 - 120

Surrogate	LCS		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	88		80 - 122
Trifluorotoluene (Surr)	121	X	80 - 120
4-Bromofluorobenzene (Surr)	101		75 - 125
Dibromofluoromethane (Surr)	105		77 - 120
1,2-Dichloroethane-d4 (Surr)	95		80 - 126

**Lab Sample ID: LCSD 580-258504/10**  
**Matrix: Water**  
**Analysis Batch: 258504**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	
								RPD	Limit
Benzene	10.0	11.3		ug/L		113	75 - 120	1	14
Ethylbenzene	10.0	9.52		ug/L		95	75 - 120	2	14

TestAmerica Seattle



# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-258504/10**

**Matrix: Water**

**Analysis Batch: 258504**

**Client Sample ID: Lab Control Sample Dup**

**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
m-Xylene & p-Xylene	10.0	9.37		ug/L		94	75 - 120	2	14
o-Xylene	10.0	9.53		ug/L		95	74 - 120	4	16
Toluene	10.0	9.49		ug/L		95	75 - 120	1	13

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	86		80 - 122
Trifluorotoluene (Surr)	118		80 - 120
4-Bromofluorobenzene (Surr)	103		75 - 125
Dibromofluoromethane (Surr)	107		77 - 120
1,2-Dichloroethane-d4 (Surr)	93		80 - 126

**Lab Sample ID: MB 580-258603/5**

**Matrix: Water**

**Analysis Batch: 258603**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		3.0	0.32	ug/L			10/11/17 15:55	1
1,1-Dichloroethane	ND		2.0	0.22	ug/L			10/11/17 15:55	1
1,1-Dichloropropene	ND		3.0	0.50	ug/L			10/11/17 15:55	1
1,2,3-Trichlorobenzene	ND		5.0	0.46	ug/L			10/11/17 15:55	1
1,2,3-Trichloropropane	ND		2.0	0.41	ug/L			10/11/17 15:55	1
1,2,4-Trichlorobenzene	ND		2.0	0.15	ug/L			10/11/17 15:55	1
1,2,4-Trimethylbenzene	ND		3.0	0.42	ug/L			10/11/17 15:55	1
1,2-Dibromo-3-Chloropropane	ND		10	1.8	ug/L			10/11/17 15:55	1
1,2-Dichlorobenzene	ND		2.0	0.20	ug/L			10/11/17 15:55	1
1,2-Dichloropropane	ND		1.0	0.18	ug/L			10/11/17 15:55	1
1,3,5-Trimethylbenzene	ND		3.0	0.26	ug/L			10/11/17 15:55	1
1,3-Dichlorobenzene	ND		2.0	0.18	ug/L			10/11/17 15:55	1
1,3-Dichloropropane	ND		2.0	0.35	ug/L			10/11/17 15:55	1
2,2-Dichloropropane	ND		3.0	0.32	ug/L			10/11/17 15:55	1
2-Butanone	ND		20	4.7	ug/L			10/11/17 15:55	1
2-Chlorotoluene	ND		3.0	0.30	ug/L			10/11/17 15:55	1
4-Chlorotoluene	ND		2.0	0.28	ug/L			10/11/17 15:55	1
4-Isopropyltoluene	ND		3.0	0.26	ug/L			10/11/17 15:55	1
4-Methyl-2-pentanone	ND		15	2.5	ug/L			10/11/17 15:55	1
Acetone	ND		50	7.8	ug/L			10/11/17 15:55	1
Bromobenzene	ND		2.0	0.18	ug/L			10/11/17 15:55	1
Bromochloromethane	ND		2.0	0.29	ug/L			10/11/17 15:55	1
Carbon disulfide	ND		1.0	0.11	ug/L			10/11/17 15:55	1
Carbon tetrachloride	ND		3.0	0.30	ug/L			10/11/17 15:55	1
Chlorobenzene	ND		2.0	0.17	ug/L			10/11/17 15:55	1
Chloroethane	ND		5.0	1.1	ug/L			10/11/17 15:55	1
Chloromethane	ND		20	5.4	ug/L			10/11/17 15:55	1
cis-1,2-Dichloroethene	ND		1.0	0.21	ug/L			10/11/17 15:55	1
Dichlorodifluoromethane	ND		5.0	0.98	ug/L			10/11/17 15:55	1
Ethylbenzene	ND		3.0	0.21	ug/L			10/11/17 15:55	1
Isopropylbenzene	ND		2.0	0.30	ug/L			10/11/17 15:55	1
Methyl tert-butyl ether	ND		2.0	0.44	ug/L			10/11/17 15:55	1

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: MB 580-258603/5**  
**Matrix: Water**  
**Analysis Batch: 258603**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methylene Chloride	ND		5.0	1.4	ug/L			10/11/17 15:55	1
m-Xylene & p-Xylene	ND		3.0	0.72	ug/L			10/11/17 15:55	1
n-Butylbenzene	ND		3.0	0.30	ug/L			10/11/17 15:55	1
N-Propylbenzene	ND		3.0	0.22	ug/L			10/11/17 15:55	1
o-Xylene	ND		2.0	0.15	ug/L			10/11/17 15:55	1
sec-Butylbenzene	ND		3.0	0.27	ug/L			10/11/17 15:55	1
Styrene	ND		5.0	1.0	ug/L			10/11/17 15:55	1
t-Butylbenzene	ND		3.0	0.27	ug/L			10/11/17 15:55	1
Toluene	ND		2.0	0.24	ug/L			10/11/17 15:55	1
trans-1,2-Dichloroethene	ND		3.0	0.71	ug/L			10/11/17 15:55	1
Trichlorofluoromethane	ND		3.0	0.63	ug/L			10/11/17 15:55	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	87		80 - 122		10/11/17 15:55	1
Trifluorotoluene (Surr)	123	X	80 - 120		10/11/17 15:55	1
4-Bromofluorobenzene (Surr)	105		75 - 125		10/11/17 15:55	1
Dibromofluoromethane (Surr)	107		77 - 120		10/11/17 15:55	1
1,2-Dichloroethane-d4 (Surr)	95		80 - 126		10/11/17 15:55	1

**Lab Sample ID: LCS 580-258603/7**  
**Matrix: Water**  
**Analysis Batch: 258603**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	10.0	11.0		ug/L		110	74 - 130
1,1-Dichloroethane	10.0	10.9		ug/L		109	70 - 120
1,1-Dichloropropene	10.0	10.9		ug/L		109	75 - 120
1,2,3-Trichlorobenzene	10.0	19.5	*	ug/L		195	74 - 123
1,2,3-Trichloropropane	10.0	10.2		ug/L		102	76 - 124
1,2,4-Trichlorobenzene	10.0	10.4		ug/L		104	76 - 120
1,2,4-Trimethylbenzene	10.0	9.16		ug/L		92	75 - 121
1,2-Dibromo-3-Chloropropane	10.0	11.5		ug/L		115	58 - 133
1,2-Dichlorobenzene	10.0	9.55		ug/L		95	80 - 120
1,2-Dichloropropane	10.0	11.6		ug/L		116	72 - 120
1,3,5-Trimethylbenzene	10.0	9.13		ug/L		91	75 - 122
1,3-Dichlorobenzene	10.0	9.59		ug/L		96	80 - 121
1,3-Dichloropropane	10.0	9.22		ug/L		92	79 - 123
2,2-Dichloropropane	10.0	8.86		ug/L		89	43 - 140
2-Butanone	50.0	67.2		ug/L		134	58 - 135
2-Chlorotoluene	10.0	9.98		ug/L		100	80 - 120
4-Chlorotoluene	10.0	9.94		ug/L		99	80 - 121
4-Isopropyltoluene	10.0	9.35		ug/L		94	77 - 120
4-Methyl-2-pentanone	50.0	56.3		ug/L		113	76 - 124
Acetone	50.0	68.5	*	ug/L		137	60 - 136
Bromobenzene	10.0	9.87		ug/L		99	75 - 120
Bromochloromethane	10.0	12.2	*	ug/L		122	78 - 120
Carbon disulfide	10.0	10.4		ug/L		104	69 - 122
Carbon tetrachloride	10.0	13.1	*	ug/L		131	72 - 124

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCS 580-258603/7**  
**Matrix: Water**  
**Analysis Batch: 258603**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorobenzene	10.0	9.83		ug/L		98	80 - 120
Chloroethane	10.0	9.91		ug/L		99	65 - 126
Chloromethane	10.0	8.88	J	ug/L		89	25 - 149
cis-1,2-Dichloroethene	10.0	11.3		ug/L		113	76 - 120
Dichlorodifluoromethane	10.0	4.88	J	ug/L		49	20 - 150
Ethylbenzene	10.0	9.19		ug/L		92	75 - 120
Isopropylbenzene	10.0	9.31		ug/L		93	75 - 125
Methyl tert-butyl ether	10.0	11.8		ug/L		118	79 - 120
Methylene Chloride	10.0	10.9		ug/L		109	70 - 125
m-Xylene & p-Xylene	10.0	9.27		ug/L		93	75 - 120
n-Butylbenzene	10.0	9.14		ug/L		91	78 - 120
N-Propylbenzene	10.0	9.10		ug/L		91	80 - 124
o-Xylene	10.0	9.35		ug/L		94	74 - 120
sec-Butylbenzene	10.0	9.18		ug/L		92	78 - 125
Styrene	10.0	9.60		ug/L		96	76 - 121
t-Butylbenzene	10.0	9.66		ug/L		97	80 - 121
Toluene	10.0	9.37		ug/L		94	75 - 120
trans-1,2-Dichloroethene	10.0	11.2		ug/L		112	72 - 124
Trichlorofluoromethane	10.0	9.38		ug/L		94	49 - 144

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	87		80 - 122
Trifluorotoluene (Surr)	120		80 - 120
4-Bromofluorobenzene (Surr)	103		75 - 125
Dibromofluoromethane (Surr)	107		77 - 120
1,2-Dichloroethane-d4 (Surr)	91		80 - 126

**Lab Sample ID: LCSD 580-258603/8**  
**Matrix: Water**  
**Analysis Batch: 258603**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	10.0	11.5		ug/L		115	74 - 130	4	18
1,1-Dichloroethane	10.0	11.1		ug/L		111	70 - 120	2	20
1,1-Dichloropropene	10.0	11.0		ug/L		110	75 - 120	1	20
1,2,3-Trichlorobenzene	10.0	16.5	*	ug/L		165	74 - 123	17	17
1,2,3-Trichloropropane	10.0	10.4		ug/L		104	76 - 124	1	30
1,2,4-Trichlorobenzene	10.0	9.97		ug/L		100	76 - 120	4	22
1,2,4-Trimethylbenzene	10.0	9.30		ug/L		93	75 - 121	1	16
1,2-Dibromo-3-Chloropropane	10.0	11.1		ug/L		111	58 - 133	4	35
1,2-Dichlorobenzene	10.0	9.63		ug/L		96	80 - 120	1	15
1,2-Dichloropropane	10.0	11.8		ug/L		118	72 - 120	2	26
1,3,5-Trimethylbenzene	10.0	9.22		ug/L		92	75 - 122	1	14
1,3-Dichlorobenzene	10.0	9.81		ug/L		98	80 - 121	2	14
1,3-Dichloropropane	10.0	9.40		ug/L		94	79 - 123	2	35
2,2-Dichloropropane	10.0	9.01		ug/L		90	43 - 140	2	35
2-Butanone	50.0	63.7		ug/L		127	58 - 135	5	35
2-Chlorotoluene	10.0	9.96		ug/L		100	80 - 120	0	15

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

**Lab Sample ID: LCSD 580-258603/8**  
**Matrix: Water**  
**Analysis Batch: 258603**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4-Chlorotoluene	10.0	9.89		ug/L		99	80 - 121	1	34
4-Isopropyltoluene	10.0	9.45		ug/L		95	77 - 120	1	13
4-Methyl-2-pentanone	50.0	58.9		ug/L		118	76 - 124	4	30
Acetone	50.0	73.4	*	ug/L		147	60 - 136	7	35
Bromobenzene	10.0	9.88		ug/L		99	75 - 120	0	13
Bromochloromethane	10.0	12.4	*	ug/L		124	78 - 120	2	35
Carbon disulfide	10.0	10.5		ug/L		105	69 - 122	1	20
Carbon tetrachloride	10.0	13.6	*	ug/L		136	72 - 124	4	19
Chlorobenzene	10.0	9.93		ug/L		99	80 - 120	1	15
Chloroethane	10.0	10.5		ug/L		105	65 - 126	5	35
Chloromethane	10.0	9.27	J	ug/L		93	25 - 149	4	35
cis-1,2-Dichloroethene	10.0	11.1		ug/L		111	76 - 120	1	15
Dichlorodifluoromethane	10.0	5.15		ug/L		52	20 - 150	5	35
Ethylbenzene	10.0	9.29		ug/L		93	75 - 120	1	14
Isopropylbenzene	10.0	9.66		ug/L		97	75 - 125	4	20
Methyl tert-butyl ether	10.0	12.1	*	ug/L		121	79 - 120	3	18
Methylene Chloride	10.0	11.3		ug/L		113	70 - 125	4	29
m-Xylene & p-Xylene	10.0	9.39		ug/L		94	75 - 120	1	14
n-Butylbenzene	10.0	9.39		ug/L		94	78 - 120	3	14
N-Propylbenzene	10.0	9.20		ug/L		92	80 - 124	1	13
o-Xylene	10.0	9.41		ug/L		94	74 - 120	1	16
sec-Butylbenzene	10.0	9.21		ug/L		92	78 - 125	0	15
Styrene	10.0	9.88		ug/L		99	76 - 121	3	16
t-Butylbenzene	10.0	9.77		ug/L		98	80 - 121	1	14
Toluene	10.0	9.57		ug/L		96	75 - 120	2	13
trans-1,2-Dichloroethene	10.0	11.2		ug/L		112	72 - 124	0	21
Trichlorofluoromethane	10.0	9.64		ug/L		96	49 - 144	3	35

Surrogate	LCSD %Recovery	LCSD Qualifier	LCSD Limits
Toluene-d8 (Surr)	86		80 - 122
Trifluorotoluene (Surr)	120		80 - 120
4-Bromofluorobenzene (Surr)	104		75 - 125
Dibromofluoromethane (Surr)	107		77 - 120
1,2-Dichloroethane-d4 (Surr)	92		80 - 126

## Method: 8260C SIM - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 580-259252/5**  
**Matrix: Water**  
**Analysis Batch: 259252**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	ND		0.50	0.0090	ug/L			10/17/17 14:11	1
1,1,1,2,2-Tetrachloroethane	ND		0.50	0.049	ug/L			10/17/17 14:11	1
1,1,2-Trichloroethane	ND		0.50	0.017	ug/L			10/17/17 14:11	1
1,1-Dichloroethene	ND		0.50	0.014	ug/L			10/17/17 14:11	1
1,2-Dibromoethane	ND		0.50	0.014	ug/L			10/17/17 14:11	1
1,2-Dichloroethane	ND		0.50	0.024	ug/L			10/17/17 14:11	1

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 8260C SIM - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 580-259252/5**  
**Matrix: Water**  
**Analysis Batch: 259252**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.50	0.014	ug/L			10/17/17 14:11	1
2-Hexanone	ND		0.50	0.098	ug/L			10/17/17 14:11	1
Benzene	ND		0.50	0.0090	ug/L			10/17/17 14:11	1
Bromodichloromethane	ND		0.50	0.0060	ug/L			10/17/17 14:11	1
Bromoform	ND		0.50	0.013	ug/L			10/17/17 14:11	1
Bromomethane	ND		0.50	0.012	ug/L			10/17/17 14:11	1
Chloroform	ND		0.50	0.0090	ug/L			10/17/17 14:11	1
cis-1,3-Dichloropropene	ND		0.50	0.026	ug/L			10/17/17 14:11	1
Dibromochloromethane	ND		0.50	0.016	ug/L			10/17/17 14:11	1
Dibromomethane	ND		0.50	0.017	ug/L			10/17/17 14:11	1
Hexachlorobutadiene	ND		0.50	0.026	ug/L			10/17/17 14:11	1
Naphthalene	ND		0.50	0.013	ug/L			10/17/17 14:11	1
Tetrachloroethene	ND		0.50	0.017	ug/L			10/17/17 14:11	1
trans-1,3-Dichloropropene	ND		0.50	0.027	ug/L			10/17/17 14:11	1
Trichloroethene	ND		0.50	0.0090	ug/L			10/17/17 14:11	1
Vinyl chloride	ND		0.50	0.013	ug/L			10/17/17 14:11	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	109		65 - 143		10/17/17 14:11	1
4-Bromofluorobenzene (Surr)	104		75 - 125		10/17/17 14:11	1
Dibromofluoromethane (Surr)	103		77 - 118		10/17/17 14:11	1
Toluene-d8 (Surr)	104		82 - 122		10/17/17 14:11	1
Trifluorotoluene (Surr)	102		80 - 141		10/17/17 14:11	1

**Lab Sample ID: LCS 580-259252/6**  
**Matrix: Water**  
**Analysis Batch: 259252**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1,2-Tetrachloroethane	5.00	5.13		ug/L		103	64 - 130
1,1,1,2,2-Tetrachloroethane	5.00	4.69		ug/L		94	65 - 130
1,1,1,2-Trichloroethane	5.00	4.63		ug/L		93	69 - 135
1,1-Dichloroethene	5.00	5.47		ug/L		109	70 - 120
1,2-Dibromoethane	5.00	4.70		ug/L		94	66 - 133
1,2-Dichloroethane	5.00	5.47		ug/L		109	58 - 143
1,4-Dichlorobenzene	5.00	5.00		ug/L		100	75 - 130
2-Hexanone	25.0	21.1		ug/L		84	20 - 150
Benzene	5.00	5.52		ug/L		110	80 - 120
Bromodichloromethane	5.00	5.66		ug/L		113	75 - 120
Bromoform	5.00	5.06		ug/L		101	55 - 130
Bromomethane	5.00	4.76		ug/L		95	55 - 125
Chloroform	5.00	5.49		ug/L		110	80 - 120
cis-1,3-Dichloropropene	5.00	4.89		ug/L		98	77 - 130
Dibromochloromethane	5.00	4.99		ug/L		100	71 - 120
Dibromomethane	5.00	5.17		ug/L		103	61 - 142
Hexachlorobutadiene	5.00	5.82		ug/L		116	56 - 125
Naphthalene	5.00	5.12		ug/L		102	55 - 134
Tetrachloroethene	5.00	5.26		ug/L		105	70 - 124

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 8260C SIM - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 580-259252/6**  
**Matrix: Water**  
**Analysis Batch: 259252**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
trans-1,3-Dichloropropene	5.00	4.71		ug/L		94	73 - 122
Trichloroethene	5.00	5.85		ug/L		117	70 - 125
Vinyl chloride	5.00	5.17		ug/L		103	56 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	111		65 - 143
4-Bromofluorobenzene (Surr)	92		75 - 125
Dibromofluoromethane (Surr)	101		77 - 118
Toluene-d8 (Surr)	92		82 - 122
Trifluorotoluene (Surr)	101		80 - 141

**Lab Sample ID: LCSD 580-259252/7**  
**Matrix: Water**  
**Analysis Batch: 259252**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	5.00	5.20		ug/L		104	64 - 130	1	20
1,1,1,2,2-Tetrachloroethane	5.00	5.02		ug/L		100	65 - 130	7	18
1,1,1,2-Trichloroethane	5.00	4.70		ug/L		94	69 - 135	2	24
1,1-Dichloroethene	5.00	5.85		ug/L		117	70 - 120	7	21
1,2-Dibromoethane	5.00	4.86		ug/L		97	66 - 133	3	17
1,2-Dichloroethane	5.00	5.63		ug/L		113	58 - 143	3	17
1,4-Dichlorobenzene	5.00	5.23		ug/L		105	75 - 130	4	17
2-Hexanone	25.0	23.4		ug/L		94	20 - 150	10	30
Benzene	5.00	5.64		ug/L		113	80 - 120	2	14
Bromodichloromethane	5.00	5.76		ug/L		115	75 - 120	2	14
Bromoform	5.00	5.26		ug/L		105	55 - 130	4	20
Bromomethane	5.00	4.89		ug/L		98	55 - 125	3	30
Chloroform	5.00	5.60		ug/L		112	80 - 120	2	15
cis-1,3-Dichloropropene	5.00	4.91		ug/L		98	77 - 130	0	24
Dibromochloromethane	5.00	5.07		ug/L		101	71 - 120	2	21
Dibromomethane	5.00	5.32		ug/L		106	61 - 142	3	15
Hexachlorobutadiene	5.00	5.95		ug/L		119	56 - 125	2	19
Naphthalene	5.00	5.42		ug/L		108	55 - 134	6	30
Tetrachloroethene	5.00	5.36		ug/L		107	70 - 124	2	20
trans-1,3-Dichloropropene	5.00	4.72		ug/L		94	73 - 122	0	30
Trichloroethene	5.00	6.01		ug/L		120	70 - 125	3	23
Vinyl chloride	5.00	5.47		ug/L		109	56 - 130	6	23

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	111		65 - 143
4-Bromofluorobenzene (Surr)	98		75 - 125
Dibromofluoromethane (Surr)	100		77 - 118
Toluene-d8 (Surr)	89		82 - 122
Trifluorotoluene (Surr)	100		80 - 141

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 625 - Semivolatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 580-258585/1-A**  
**Matrix: Water**  
**Analysis Batch: 258841**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 258585**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		1.0	0.030	ug/L		10/11/17 13:11	10/13/17 14:58	1
2-Methylnaphthalene	ND		0.40	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Acenaphthene	ND		0.40	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Acenaphthylene	ND		1.0	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Anthracene	ND		0.040	0.010	ug/L		10/11/17 13:11	10/13/17 14:58	1
Benzo[a]anthracene	ND		3.0	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Benzo[a]pyrene	ND		1.0	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Benzo[g,h,i]perylene	ND		1.0	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Benzo[fluoranthene]	ND		1.0	0.050	ug/L		10/11/17 13:11	10/13/17 14:58	1
Chrysene	ND		0.60	0.010	ug/L		10/11/17 13:11	10/13/17 14:58	1
Dibenz(a,h)anthracene	ND		0.60	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Fluoranthene	ND		3.0	0.010	ug/L		10/11/17 13:11	10/13/17 14:58	1
Fluorene	ND		2.0	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Indeno[1,2,3-cd]pyrene	ND		1.0	0.050	ug/L		10/11/17 13:11	10/13/17 14:58	1
Naphthalene	ND		0.40	0.10	ug/L		10/11/17 13:11	10/13/17 14:58	1
Phenanthrene	ND		1.0	0.020	ug/L		10/11/17 13:11	10/13/17 14:58	1
Pyrene	ND		2.0	0.040	ug/L		10/11/17 13:11	10/13/17 14:58	1
TPAH	ND		3.0	0.050	ug/L		10/11/17 13:11	10/13/17 14:58	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl	73		56 - 124	10/11/17 13:11	10/13/17 14:58	1
Nitrobenzene-d5	86		59 - 123	10/11/17 13:11	10/13/17 14:58	1
Terphenyl-d14	72		60 - 135	10/11/17 13:11	10/13/17 14:58	1

**Lab Sample ID: LCS 580-258585/2-A**  
**Matrix: Water**  
**Analysis Batch: 258841**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 258585**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1-Methylnaphthalene	2.00	1.57		ug/L		79	20 - 150
2-Methylnaphthalene	2.00	1.54		ug/L		77	20 - 150
Acenaphthene	2.00	1.50		ug/L		75	47 - 145
Acenaphthylene	2.00	1.38		ug/L		69	33 - 145
Anthracene	2.00	1.47		ug/L		74	27 - 133
Benzo[a]anthracene	2.00	1.67	J	ug/L		83	33 - 143
Benzo[a]pyrene	2.00	1.66		ug/L		83	17 - 163
Benzo[g,h,i]perylene	2.00	1.82		ug/L		91	1 - 219
Benzo[fluoranthene]	4.00	3.72		ug/L		93	46 - 153
Chrysene	2.00	1.64		ug/L		82	17 - 168
Dibenz(a,h)anthracene	2.00	1.78		ug/L		89	1 - 227
Fluoranthene	2.00	1.77	J	ug/L		88	26 - 137
Fluorene	2.00	1.78	J	ug/L		89	59 - 121
Indeno[1,2,3-cd]pyrene	2.00	1.66		ug/L		83	1 - 171
Naphthalene	2.00	1.52		ug/L		76	21 - 133
Phenanthrene	2.00	1.58		ug/L		79	54 - 120
Pyrene	2.00	1.81	J	ug/L		90	52 - 115
TPAH	32.0	26.8		ug/L		84	50 - 150

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 625 - Semivolatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 580-258585/2-A**  
**Matrix: Water**  
**Analysis Batch: 258841**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 258585**

Surrogate	LCS		Limits
	%Recovery	Qualifier	
2-Fluorobiphenyl	70		56 - 124
Nitrobenzene-d5	92		59 - 123
Terphenyl-d14	78		60 - 135

**Lab Sample ID: LCSD 580-258585/3-A**  
**Matrix: Water**  
**Analysis Batch: 258841**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 258585**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec.		RPD	Limit
							Limits	RPD		
1-Methylnaphthalene	2.00	1.64		ug/L		82	20 - 150	4	50	
2-Methylnaphthalene	2.00	1.60		ug/L		80	20 - 150	4	50	
Acenaphthene	2.00	1.60		ug/L		80	47 - 145	6	50	
Acenaphthylene	2.00	1.46		ug/L		73	33 - 145	5	50	
Anthracene	2.00	1.45		ug/L		72	27 - 133	2	50	
Benzo[a]anthracene	2.00	1.70	J	ug/L		85	33 - 143	2	50	
Benzo[a]pyrene	2.00	1.60		ug/L		80	17 - 163	4	50	
Benzo[g,h,i]perylene	2.00	1.80		ug/L		90	1 - 219	2	50	
Benzofluoranthene	4.00	3.56		ug/L		89	46 - 153	4	50	
Chrysene	2.00	1.68		ug/L		84	17 - 168	3	50	
Dibenz(a,h)anthracene	2.00	1.78		ug/L		89	1 - 227	0	50	
Fluoranthene	2.00	1.75	J	ug/L		87	26 - 137	1	50	
Fluorene	2.00	1.88	J	ug/L		94	59 - 121	6	50	
Indeno[1,2,3-cd]pyrene	2.00	1.69		ug/L		85	1 - 171	2	50	
Naphthalene	2.00	1.59		ug/L		80	21 - 133	4	50	
Phenanthrene	2.00	1.58		ug/L		79	54 - 120	0	50	
Pyrene	2.00	1.75	J	ug/L		88	52 - 115	3	50	
TPAH	32.0	26.9		ug/L		84	50 - 150	0	50	

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
2-Fluorobiphenyl	73		56 - 124
Nitrobenzene-d5	95		59 - 123
Terphenyl-d14	75		60 - 135

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

**Lab Sample ID: MB 580-258594/1-A**  
**Matrix: Water**  
**Analysis Batch: 259300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 258594**

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1-Methylnaphthalene	ND		0.020	0.0060	ug/L		10/11/17 13:53	10/19/17 16:57	1
2-Methylnaphthalene	ND		0.030	0.0090	ug/L		10/11/17 13:53	10/19/17 16:57	1
Acenaphthene	ND		0.020	0.0020	ug/L		10/11/17 13:53	10/19/17 16:57	1
Acenaphthylene	ND		0.020	0.0020	ug/L		10/11/17 13:53	10/19/17 16:57	1
Anthracene	0.00440	J	0.020	0.0030	ug/L		10/11/17 13:53	10/19/17 16:57	1
Benzo[a]anthracene	ND		0.020	0.0020	ug/L		10/11/17 13:53	10/19/17 16:57	1
Benzo[a]pyrene	ND		0.020	0.0030	ug/L		10/11/17 13:53	10/19/17 16:57	1

TestAmerica Seattle



# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

**Lab Sample ID: MB 580-258594/1-A**  
**Matrix: Water**  
**Analysis Batch: 259300**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 258594**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzo[b]fluoranthene	ND		0.020	0.0080	ug/L		10/11/17 13:53	10/19/17 16:57	1
Benzo[g,h,i]perylene	ND		0.020	0.0030	ug/L		10/11/17 13:53	10/19/17 16:57	1
Benzo[k]fluoranthene	ND		0.030	0.0090	ug/L		10/11/17 13:53	10/19/17 16:57	1
Chrysene	ND		0.020	0.0060	ug/L		10/11/17 13:53	10/19/17 16:57	1
Dibenz(a,h)anthracene	ND		0.020	0.0020	ug/L		10/11/17 13:53	10/19/17 16:57	1
Fluoranthene	ND		0.020	0.0020	ug/L		10/11/17 13:53	10/19/17 16:57	1
Fluorene	ND		0.020	0.0030	ug/L		10/11/17 13:53	10/19/17 16:57	1
Indeno[1,2,3-cd]pyrene	ND		0.020	0.0070	ug/L		10/11/17 13:53	10/19/17 16:57	1
Naphthalene	ND		0.040	0.013	ug/L		10/11/17 13:53	10/19/17 16:57	1
Phenanthrene	0.00759	J	0.020	0.0040	ug/L		10/11/17 13:53	10/19/17 16:57	1
Pyrene	0.00462	J	0.020	0.0040	ug/L		10/11/17 13:53	10/19/17 16:57	1
Surrogate	MB	MB	Limits			D	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
Terphenyl-d14	84		53 - 112				10/11/17 13:53	10/19/17 16:57	1

**Lab Sample ID: LCS 580-258594/2-A**  
**Matrix: Water**  
**Analysis Batch: 259300**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 258594**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits			
								%Rec.	Limits	
1-Methylnaphthalene	4.00	2.80		ug/L		70	57 - 120			
2-Methylnaphthalene	4.00	2.54		ug/L		64	61 - 120			
Acenaphthene	4.00	2.65		ug/L		66	62 - 120			
Acenaphthylene	4.00	2.85		ug/L		71	63 - 120			
Anthracene	4.00	3.30		ug/L		83	69 - 120			
Benzo[a]anthracene	4.00	3.03		ug/L		76	71 - 120			
Benzo[a]pyrene	4.00	3.01	*	ug/L		75	76 - 120			
Benzo[b]fluoranthene	4.00	2.82		ug/L		71	66 - 120			
Benzo[g,h,i]perylene	4.00	2.71		ug/L		68	61 - 120			
Benzo[k]fluoranthene	4.00	2.80		ug/L		70	68 - 120			
Chrysene	4.00	2.66		ug/L		67	64 - 120			
Dibenz(a,h)anthracene	4.00	3.07		ug/L		77	60 - 125			
Fluoranthene	4.00	3.30		ug/L		82	70 - 120			
Fluorene	4.00	2.86		ug/L		72	68 - 120			
Indeno[1,2,3-cd]pyrene	4.00	2.84		ug/L		71	63 - 120			
Naphthalene	4.00	2.48		ug/L		62	62 - 120			
Phenanthrene	4.00	2.76		ug/L		69	65 - 120			
Pyrene	4.00	3.28		ug/L		82	69 - 120			
Surrogate	LCS	LCS	Limits			D	%Rec	Limits	RPD	Limit
	%Recovery	Qualifier								
Terphenyl-d14	74		53 - 112							

**Lab Sample ID: LCSD 580-258594/3-A**  
**Matrix: Water**  
**Analysis Batch: 259300**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 258594**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

**Lab Sample ID: LCSD 580-258594/3-A**

**Matrix: Water**

**Analysis Batch: 259300**

**Client Sample ID: Lab Control Sample Dup**

**Prep Type: Total/NA**

**Prep Batch: 258594**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec.		RPD	Limit
							Limits	RPD		
2-Methylnaphthalene	4.00	2.83		ug/L		71	61 - 120	11	16	
Acenaphthene	4.00	2.80		ug/L		70	62 - 120	5	13	
Acenaphthylene	4.00	3.03		ug/L		76	63 - 120	6	13	
Anthracene	4.00	3.40		ug/L		85	69 - 120	3	17	
Benzo[a]anthracene	4.00	3.23		ug/L		81	71 - 120	6	16	
Benzo[a]pyrene	4.00	3.25		ug/L		81	76 - 120	8	17	
Benzo[b]fluoranthene	4.00	3.03		ug/L		76	66 - 120	7	20	
Benzo[g,h,i]perylene	4.00	2.92		ug/L		73	61 - 120	8	16	
Benzo[k]fluoranthene	4.00	3.07		ug/L		77	68 - 120	9	20	
Chrysene	4.00	2.90		ug/L		73	64 - 120	9	16	
Dibenz(a,h)anthracene	4.00	3.33		ug/L		83	60 - 125	8	15	
Fluoranthene	4.00	3.50		ug/L		88	70 - 120	6	20	
Fluorene	4.00	2.97		ug/L		74	68 - 120	4	12	
Indeno[1,2,3-cd]pyrene	4.00	3.04		ug/L		76	63 - 120	7	15	
Naphthalene	4.00	2.74		ug/L		68	62 - 120	10	15	
Phenanthrene	4.00	2.91		ug/L		73	65 - 120	5	15	
Pyrene	4.00	3.45		ug/L		86	69 - 120	5	17	

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Terphenyl-d14	76		53 - 112

## Method: AK101 - Alaska - Gasoline Range Organics (GC)

**Lab Sample ID: MB 580-258416/6**

**Matrix: Water**

**Analysis Batch: 258416**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.0	0.33	mg/L			10/09/17 17:15	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	111		75 - 120		10/09/17 17:15	1
4-Bromofluorobenzene (Surr)	104		68 - 119		10/09/17 17:15	1

**Lab Sample ID: LCS 580-258416/7**

**Matrix: Water**

**Analysis Batch: 258416**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics (GRO) -C6-C10	1.00	0.957	J	mg/L		96	77 - 123

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Trifluorotoluene (Surr)	111		75 - 120
4-Bromofluorobenzene (Surr)	107		68 - 119

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC)

**Lab Sample ID: MB 580-258753/1-A**  
**Matrix: Water**  
**Analysis Batch: 258895**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 258753**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND		0.10	0.022	mg/L		10/13/17 08:49	10/16/17 22:14	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	101		50 - 150				10/13/17 08:49	10/16/17 22:14	1

**Lab Sample ID: LCS 580-258753/2-A**  
**Matrix: Water**  
**Analysis Batch: 258895**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 258753**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits		
DRO (nC10-<nC25)	2.00	1.71		mg/L		85	75 - 125		
Surrogate	LCS %Recovery	LCS Qualifier	Limits				%Rec.		
<i>o</i> -Terphenyl	94		50 - 150						

**Lab Sample ID: LCSD 580-258753/3-A**  
**Matrix: Water**  
**Analysis Batch: 258895**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 258753**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
DRO (nC10-<nC25)	2.00	1.90		mg/L		95	75 - 125	10	16
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits				%Rec.	RPD	Limit
<i>o</i> -Terphenyl	109		50 - 150						

**Lab Sample ID: MB 580-258982/1-A**  
**Matrix: Water**  
**Analysis Batch: 259043**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 258982**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	0.208		0.10	0.022	mg/L		10/17/17 08:55	10/17/17 17:26	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
<i>o</i> -Terphenyl	72		50 - 150				10/17/17 08:55	10/17/17 17:26	1

**Lab Sample ID: LCS 580-258982/2-A**  
**Matrix: Water**  
**Analysis Batch: 259043**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 258982**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits		
DRO (nC10-<nC25)	2.00	1.55		mg/L		77	75 - 125		
Surrogate	LCS %Recovery	LCS Qualifier	Limits				%Rec.		
<i>o</i> -Terphenyl	73		50 - 150						

TestAmerica Seattle

# QC Sample Results

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Method: AK102 & 103 - Alaska - Diesel Range Organics & Residual Range Organics (GC) (Continued)

**Lab Sample ID: LCSD 580-258982/3-A**  
**Matrix: Water**  
**Analysis Batch: 259043**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 258982**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
DRO (nC10-<nC25)	2.00	1.50		mg/L		75	75 - 125	3	16
<b>Surrogate</b>		<b>LCSD %Recovery</b>	<b>LCSD Qualifier</b>						<b>Limits</b>
<i>o</i> -Terphenyl		72							50 - 150

**Lab Sample ID: MB 580-259154/1-A**  
**Matrix: Water**  
**Analysis Batch: 259215**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 259154**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND		0.10	0.022	mg/L		10/18/17 12:07	10/18/17 18:19	1
<b>Surrogate</b>		<b>MB %Recovery</b>					<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
<i>o</i> -Terphenyl		82					10/18/17 12:07	10/18/17 18:19	1

**Lab Sample ID: LCS 580-259154/2-A**  
**Matrix: Water**  
**Analysis Batch: 259215**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 259154**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
DRO (nC10-<nC25)	2.00	1.62		mg/L		81	75 - 125		
<b>Surrogate</b>		<b>LCS %Recovery</b>	<b>LCS Qualifier</b>						<b>Limits</b>
<i>o</i> -Terphenyl		79							50 - 150

**Lab Sample ID: LCSD 580-259154/3-A**  
**Matrix: Water**  
**Analysis Batch: 259215**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 259154**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
DRO (nC10-<nC25)	2.00	1.67		mg/L		83	75 - 125	3	16
<b>Surrogate</b>		<b>LCSD %Recovery</b>	<b>LCSD Qualifier</b>						<b>Limits</b>
<i>o</i> -Terphenyl		83							50 - 150

# Lab Chronicle

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-DW-01**

**Date Collected: 10/05/17 09:45**

**Date Received: 10/07/17 10:10**

**Lab Sample ID: 580-71900-1**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	524.2		1	498776	10/17/17 13:56	DAS	TAL SAV
Total/NA	Prep	3510C			258594	10/11/17 13:53	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	259300	10/19/17 21:27	W1T	TAL SEA

**Client Sample ID: 17-ERK-DWZ**

**Date Collected: 10/05/17 09:50**

**Date Received: 10/07/17 10:10**

**Lab Sample ID: 580-71900-2**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	524.2		1	498776	10/17/17 14:19	DAS	TAL SAV
Total/NA	Prep	3510C			258594	10/11/17 13:53	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	259300	10/19/17 21:52	W1T	TAL SEA

**Client Sample ID: 17-ERK-SW-01**

**Date Collected: 10/05/17 10:25**

**Date Received: 10/07/17 10:10**

**Lab Sample ID: 580-71900-3**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	258507	10/10/17 16:54	P1P	TAL SEA
Total/NA	Prep	CWA_Prep_CLLE			258585	10/11/17 13:11	MRG	TAL SEA
Total/NA	Analysis	625		1	258841	10/13/17 17:06	ERZ	TAL SEA
Total/NA	Analysis	AK101		1	258416	10/10/17 02:30	RSB	TAL SEA
Total/NA	Prep	3510C			258753	10/13/17 08:49	NDB	TAL SEA
Total/NA	Analysis	AK102 & 103		1	258895	10/17/17 03:18	W1T	TAL SEA

**Client Sample ID: 17-ERK-SW-02**

**Date Collected: 10/05/17 10:35**

**Date Received: 10/07/17 10:10**

**Lab Sample ID: 580-71900-4**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	258507	10/10/17 17:19	P1P	TAL SEA
Total/NA	Prep	CWA_Prep_CLLE			258585	10/11/17 13:11	MRG	TAL SEA
Total/NA	Analysis	625		1	258841	10/13/17 17:30	ERZ	TAL SEA
Total/NA	Analysis	AK101		1	258416	10/10/17 03:01	RSB	TAL SEA
Total/NA	Prep	3510C			259154	10/18/17 12:07	NDB	TAL SEA
Total/NA	Analysis	AK102 & 103		1	259215	10/19/17 01:44	W1T	TAL SEA

TestAmerica Seattle

# Lab Chronicle

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-SWZ**

**Lab Sample ID: 580-71900-5**

**Date Collected: 10/05/17 10:40**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	624		1	258507	10/10/17 17:45	P1P	TAL SEA
Total/NA	Prep	CWA_Prep_CLLE			258585	10/11/17 13:11	MRG	TAL SEA
Total/NA	Analysis	625		1	258841	10/13/17 17:55	ERZ	TAL SEA
Total/NA	Analysis	AK101		1	258416	10/10/17 03:32	RSB	TAL SEA
Total/NA	Prep	3510C			259154	10/18/17 12:07	NDB	TAL SEA
Total/NA	Analysis	AK102 & 103		1	259215	10/19/17 02:28	W1T	TAL SEA

**Client Sample ID: 17-ERK-TB**

**Lab Sample ID: 580-71900-6**

**Date Collected: 10/05/17 08:00**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	524.2		1	498911	10/18/17 10:43	DAS	TAL SAV
Total/NA	Analysis	624		1	258507	10/10/17 16:28	P1P	TAL SEA
Total/NA	Analysis	8260C SIM		1	259252	10/17/17 17:29	IWH	TAL SEA
Total/NA	Analysis	AK101		1	258416	10/09/17 18:48	RSB	TAL SEA

**Client Sample ID: 17-ERK-MW-1**

**Lab Sample ID: 580-71900-7**

**Date Collected: 10/05/17 15:35**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	258504	10/10/17 18:10	P1P	TAL SEA
Total/NA	Prep	3510C			258594	10/11/17 13:53	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	259300	10/19/17 22:16	W1T	TAL SEA
Total/NA	Analysis	AK101		1	258416	10/10/17 04:34	RSB	TAL SEA
Total/NA	Prep	3510C			258982	10/17/17 08:55	APR	TAL SEA
Total/NA	Analysis	AK102 & 103		1	259043	10/17/17 20:01	W1T	TAL SEA

**Client Sample ID: 17-ERK-MWZ**

**Lab Sample ID: 580-71900-8**

**Date Collected: 10/05/17 14:25**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	258603	10/11/17 21:21	T1W	TAL SEA
Total/NA	Analysis	8260C SIM		1	259252	10/17/17 17:52	IWH	TAL SEA
Total/NA	Prep	3510C			258594	10/11/17 13:53	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	259300	10/19/17 22:41	W1T	TAL SEA
Total/NA	Analysis	AK101		1	258416	10/10/17 05:05	RSB	TAL SEA
Total/NA	Prep	3510C			259154	10/18/17 12:07	NDB	TAL SEA
Total/NA	Analysis	AK102 & 103		1	259215	10/19/17 02:50	W1T	TAL SEA

TestAmerica Seattle

# Lab Chronicle

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

**Client Sample ID: 17-ERK-MW-3**

**Lab Sample ID: 580-71900-9**

**Date Collected: 10/05/17 14:15**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	258603	10/11/17 21:46	T1W	TAL SEA
Total/NA	Analysis	8260C SIM		1	259252	10/17/17 18:17	IWH	TAL SEA
Total/NA	Prep	3510C			258594	10/11/17 13:53	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	259300	10/19/17 23:05	W1T	TAL SEA
Total/NA	Analysis	AK101		1	258416	10/10/17 05:36	RSB	TAL SEA
Total/NA	Prep	3510C			259154	10/18/17 12:07	NDB	TAL SEA
Total/NA	Analysis	AK102 & 103		1	259215	10/19/17 03:13	W1T	TAL SEA

**Client Sample ID: 17-ERK-EB**

**Lab Sample ID: 580-71900-10**

**Date Collected: 10/05/17 16:06**

**Matrix: Water**

**Date Received: 10/07/17 10:10**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	258603	10/11/17 20:06	T1W	TAL SEA
Total/NA	Analysis	8260C SIM		1	259252	10/17/17 18:40	IWH	TAL SEA
Total/NA	Prep	3510C			258594	10/11/17 13:53	NDB	TAL SEA
Total/NA	Analysis	8270D SIM		1	259300	10/19/17 23:30	W1T	TAL SEA
Total/NA	Analysis	AK101		1	258416	10/10/17 06:07	RSB	TAL SEA
Total/NA	Prep	3510C			258982	10/17/17 08:55	APR	TAL SEA
Total/NA	Analysis	AK102 & 103		1	259043	10/17/17 21:29	W1T	TAL SEA

**Laboratory References:**

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

# Accreditation/Certification Summary

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Laboratory: TestAmerica Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	UST-022	03-02-18
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	01-31-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-18

## Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Seattle



# Accreditation/Certification Summary

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

## Laboratory: TestAmerica Savannah (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Seattle

# Sample Summary

Client: ERM Alaska, Inc.  
Project/Site: Eureka, Alaska 2017

TestAmerica Job ID: 580-71900-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-71900-1	17-ERK-DW-01	Water	10/05/17 09:45	10/07/17 10:10
580-71900-2	17-ERK-DWZ	Water	10/05/17 09:50	10/07/17 10:10
580-71900-3	17-ERK-SW-01	Water	10/05/17 10:25	10/07/17 10:10
580-71900-4	17-ERK-SW-02	Water	10/05/17 10:35	10/07/17 10:10
580-71900-5	17-ERK-SWZ	Water	10/05/17 10:40	10/07/17 10:10
580-71900-6	17-ERK-TB	Water	10/05/17 08:00	10/07/17 10:10
580-71900-7	17-ERK-MW-1	Water	10/05/17 15:35	10/07/17 10:10
580-71900-8	17-ERK-MWZ	Water	10/05/17 14:25	10/07/17 10:10
580-71900-9	17-ERK-MW-3	Water	10/05/17 14:15	10/07/17 10:10
580-71900-10	17-ERK-EB	Water	10/05/17 16:06	10/07/17 10:10



Loc: 580  
71900

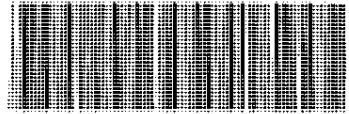
TestAmerica Seattle

5755 8th Street East  
Tacoma, WA 98424  
Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record



<b>Client Information</b>				Sampler: <i>K. Murray / J Stariwiat</i>		Lab PM: Zalmai, Kayse 1		Carrier Tracking No(s):		COC No: 580-26097-8604.1					
Client Contact: Stephen Witzmann				Phone: <i>907-264-4401</i>		E-Mail: kayse.zalmai@testamericainc.com				Page: Page 1 of 1					
Company: ERM Alaska, Inc.				<b>Analysis Requested</b>								Job #:			
Address: 825 W 8th Ave, Suite 200				Due Date Requested:		Field Filtered Sample (Yes or No) Perform MS/MSD (Yes or No)		8260C - BTEX 8260C - AK 8260C VOC 8260C_SIM - AK 8260CSIM VOC AK102_103 - Alaska - DRO AK101 - Alaska - GRO 8270D_SIM - 8270CSIM PAHs 524.2_Preserved - E524.2 VOCs 624_5ml - BTEX E624 625 - PAH E625 624_5ml, 8260C, AK101 8260C_SIM - AK 8260CSIM VOC - Trip Blank 524.2_Preserved - E524.2 - Trip Blank <i>624_Preserved - E624 - Trip Blank</i>		Total Number of containers		Preservation Codes:			
City: Anchorage				TAT Requested (days): <i>Standard</i>								A - HCL		M - Hexane	
State, Zip: AK, 99501-4427				PO #:								B - NaOH		N - None	
Phone: 907-264-4401(Tel)				Purchase Order Requested								C - Zn Acetate		O - AsNaO2	
Email: stephen.witzmann@erm.com				WO #:								D - Nitric Acid		P - Na2O4S	
Project Name: Eureka, Alaska 2017				Project #: 58011705				E - NaHSO4		Q - Na2SO3					
Site: <i>Eureka Lodge</i>				SSOW#:				F - MeOH		R - Na2S2O3					
								G - Amchlor		S - H2SO4					
								H - Ascorbic Acid		T - TSP Dodecahydrate					
								I - Ice		U - Acetone					
								J - DI Water		V - MCAA					
								K - EDTA		W - pH 4-5					
								L - EDA		Z - other (specify)					
								Other:							
<b>Sample Identification</b>				<b>Sample Date</b>		<b>Sample Time</b>		<b>Sample Type (C=comp, G=grab)</b>		<b>Matrix (W=water, S=solid, O=wastefl, BT=Tissue, A=Air)</b>		<b>Special Instructions/Note:</b>			
								Preservation Code:							
<i>17-ERK-DW-01</i>				<i>10/5/17</i>		<i>0945</i>				Water					
<i>17-ERK-DWZ</i>				<i>10/5/17</i>		<i>0950</i>				Water					
<i>17-ERK-SW-01</i>				<i>10/5/17</i>		<i>1025</i>				Water					
<i>17-ERK-SW-02</i>				<i>10/5/17</i>		<i>1035</i>				Water					
<i>17-ERK-SWZ</i>				<i>10/5/17</i>		<i>1040</i>				Water					
<i>17-ERK-TB</i>				<i>10/5/17</i>		<i>0800</i>				Water					
<i>17-ERK-MW-1</i>				<i>10/5/17</i>		<i>1535</i>				Water					
<i>17-ERK-MWZ</i>				<i>10/5/17</i>		<i>1425</i>				Water					
<i>17-ERK-MW-3</i>				<i>10/5/17</i>		<i>1415</i>				Water					
<i>17-ERK-EB</i>				<i>10/5/17</i>		<i>1606</i>				Water					
										Water					
<b>Possible Hazard Identification</b>				<input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological				<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>							
Deliverable Requested: I, II, III, IV, Other (specify)								<input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months							
Special Instructions/QC Requirements:															
Empty Kit Relinquished by:				Date:		Time:		Method of Shipment:							
Relinquished by: <i>Kim Pan</i>				Date/Time: <i>10/6/17 1000</i>		Company: <i>ERM</i>		Received by: <i>[Signature]</i>		Date/Time: <i>10/6/17 11:12</i>		Company: <i>TA AK</i>			
Relinquished by: <i>[Signature]</i>				Date/Time: <i>10/6/17 15:30</i>		Company: <i>TA AK</i>		Received by: <i>[Signature]</i>		Date/Time: <i>10/7/17 1010</i>		Company: <i>SEA TA</i>			
Relinquished by:				Date/Time:		Company:		Received by:		Date/Time:		Company:			
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No				Custody Seal No.:				Cooler Temperature(s) °C and Other Remarks: <i>58°C - 7:48</i>							



580-71900 Chain of Custody

TB <sup>A2</sup> Cooler Cor -0.4 Unc b-3  
Cooler Dsc L-3 Blue@Lab  
Wet/~~PACK~~ Packing Bubble  
G.S. Custody Seal  Yes \_\_\_ No

TB <sup>A2</sup> Cooler Cor -0.5 Unc 0.2  
Cooler Dsc L-3 Blue@Lab  
Wet/~~PACK~~ Packing Bubble  
G.S. Custody Seal  Yes \_\_\_ No

TB <sup>A2</sup> Cooler Cor -0.9 Unc -0.2  
Cooler Dsc L-3 Blue@Lab  
Wet/~~PACK~~ Packing Bubble  
G.S. Custody Seal  Yes \_\_\_ No

CLIENT: ERM, PROJECT: Eureka  
Date/Time Cooler Arrived 10/6/17 at 12 Cooler signed for by: Andrew P. Ick  
(Print name)

**Preliminary Examination Phase:**

Date cooler opened:  same as date received or \_\_\_/\_\_\_/\_\_\_  Cooler not opened

Cooler opened by (print) Andrew P. Ick (sign) [Signature]

1. Delivered by  ALASKA AIRLINES  Fed-EX  UPS  NAC  LYNDEN  CLIENT  Other: \_\_\_\_\_

Shipment Tracking # if applicable \_\_\_\_\_ (include copy of shipping papers in file)

2. Number of Custody Seals 0 Signed by \_\_\_\_\_ Date \_\_\_/\_\_\_/\_\_\_

Were custody seals unbroken and intact on arrival?  Yes  No

3. Were custody papers sealed in a plastic bag?  Yes  No  Not checked

4. Were custody papers filled out properly (ink, signed, etc.)?  Yes  No  Not checked

5. Did you sign the custody papers in the appropriate place?  Yes  No  Not checked

6. Was ice used?  Yes  No Type of ice:  blue ice  gel ice  real ice  dry ice Condition of ice: Soft

Temperature by Digi-Thermo Probe 4.8 °C Thermometer # Rec # 5  
Acceptance Criteria: 0 - 6°C

7. Was ice changed or added?  Yes  No  Not checked

8. Packing in Cooler:  bubble wrap  styrofoam  cardboard  Other: \_\_\_\_\_

9. Did samples arrive in plastic bags?  Yes  No  Not checked

10. Did all bottles arrive unbroken, and with labels in good condition?  Yes  No  Not checked

Comments  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



CLIENT: ERM PROJECT: Eureka  
 Date/Time Cooler Arrived 10/6/17 11:12 Cooler signed for by: Andrew Pilch  
 (Print name)

**Preliminary Examination Phase:**

Date cooler opened:  same as date received or \_\_\_/\_\_\_/\_\_\_  Cooler not opened

Cooler opened by (print) Andrew Pilch (sign) [Signature]

1. Delivered by  ALASKA AIRLINES  Fed-EX  UPS  NAC  LYNDEN  CLIENT  Other: \_\_\_\_\_

Shipment Tracking # if applicable \_\_\_\_\_ (include copy of shipping papers in file)

2. Number of Custody Seals 0 Signed by \_\_\_\_\_ Date \_\_\_/\_\_\_/\_\_\_

Were custody seals unbroken and intact on arrival?  Yes  No

3. Were custody papers sealed in a plastic bag?  Yes  No  Not checked

4. Were custody papers filled out properly (ink, signed, etc.)?  Yes  No  Not checked

5. Did you sign the custody papers in the appropriate place?  Yes  No  Not checked

6. Was ice used?  Yes  No Type of ice:  blue ice  gel ice  real ice  dry ice Condition of ice: Soft

Temperature by Digi-Thermo Probe 5.6 °C Thermometer # Rec # 5  
 Acceptance Criteria: 0 - 6°C

7. Was ice changed or added?  Yes  No  Not checked

8. Packing in Cooler:  bubble wrap  styrofoam  cardboard  Other: \_\_\_\_\_

9. Did samples arrive in plastic bags?  Yes  No  Not checked

10. Did all bottles arrive unbroken, and with labels in good condition?  Yes  No  Not checked

Comments  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



CLIENT: ERM PROJECT: Eureka  
 Date/Time Cooler Arrived 10/6/17 11:12 Cooler signed for by: Andrew Pilch  
 (Print name)

**Preliminary Examination Phase:**

Date cooler opened:  same as date received or \_\_\_/\_\_\_/\_\_\_  Cooler not opened

Cooler opened by (print) Andrew Pilch (sign) [Signature]

1. Delivered by  ALASKA AIRLINES  Fed-Ex  UPS  NAC  LYNDEN  CLIENT  Other: \_\_\_\_\_

Shipment Tracking # if applicable \_\_\_\_\_ (include copy of shipping papers in file)

2. Number of Custody Seals 0 Signed by \_\_\_\_\_ Date \_\_\_/\_\_\_/\_\_\_

Were custody seals unbroken and intact on arrival?  Yes  No

3. Were custody papers sealed in a plastic bag?  Yes  No  Not checked

4. Were custody papers filled out properly (ink, signed, etc.)?  Yes  No  Not checked

5. Did you sign the custody papers in the appropriate place?  Yes  No  Not checked

6. Was ice used?  Yes  No Type of ice:  blue ice  gel ice  real ice  dry ice Condition of ice: Soft

Temperature by Digi-Thermo Probe 3.3 °C Thermometer # Rec # 5  
 Acceptance Criteria: 0 - 6°C

7. Was ice changed or added?  Yes  No  Not checked

8. Packing in Cooler:  bubble wrap  styrofoam  cardboard  Other: \_\_\_\_\_

9. Did samples arrive in plastic bags?  Yes  No  Not checked

10. Did all bottles arrive unbroken, and with labels in good condition?  Yes  No  Not checked

Comments  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b> Client Contact: Shipping/Receiving Company: TestAmerica Laboratories, Inc. Address: 5102 LaRoche Avenue, City: Savannah State, Zip: GA, 31404 Phone: 912-354-7858(Tel) 912-352-0165(Fax) Email:		Lab PM: Zalmal, Kayse 1 E-Mail: kayse.zalmal@testamericainc.com Carrier Tracking No(s): 580-50400-1 State of Origin: Alaska Page 1 of 1 Job #: 580-71900-1	
Due Date Requested: 10/18/2017 TAT Requested (days): PO #: WO #: Project #: 58011705 SOW#:		Analysis Requested: Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Z - other (specify)	
Sample Identification - Client ID (Lab ID)			
Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=water/oil, BT=Tissue, AA=)
10/5/17	09:45 Alaskan	Water	Water
10/5/17	09:50 Alaskan	Water	Water
10/5/17	08:00 Alaskan	Water	Water
Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> Perform MS/MSD (Yes or No) <input checked="" type="checkbox"/> 524.2_Preserved/Regulated VOCs <input checked="" type="checkbox"/> Total Number of Containers: 3			
Special Instructions/Note:			

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

**Possible Hazard Identification**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

Special Instructions/QC Requirements: Primary Deliverable Rank: 2

Empty Kit Relinquished by: Tom Blankenship	Date: 10/9/17	Company: TA-Sea	Received by: [Signature]	Date/Time: 10-10-17/900	Company: TASA-V
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact:  Yes  No  Δ  No  
 Cooler Temperature(s) °C and Other Remarks: 0.4°C (CF) 0.7°C





## Login Sample Receipt Checklist

Client: ERM Alaska, Inc.

Job Number: 580-71900-1

**Login Number: 71900**

**List Source: TestAmerica Seattle**

**List Number: 1**

**Creator: Gall, Brandon A**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: ERM Alaska, Inc.

Job Number: 580-71900-1

**Login Number: 71900**  
**List Number: 2**  
**Creator: Anderson, Jordan K**

**List Source: TestAmerica Savannah**  
**List Creation: 10/10/17 10:51 AM**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## **APPENDIX E**

### **ADEC Checklist and Quality Assurance Report**

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## E. QUALITY ASSURANCE REVIEW

Laboratory quality assurance/quality control (QA/QC) data associated with the analysis of project samples has been reviewed to evaluate the usability of the analytical data generated during the October 2017 water monitoring event at the Eureka Lodge, Alaska for Crowley Maritime Corporation.

Water samples were collected, reported, and shipped in general accordance with the work plan (OASIS 2012, ERM 2017). Sample analysis was performed by Alaska Department of Environmental Conservation (ADEC) certified laboratories for applicable analytical methods.

All data were reviewed in accordance with United States Environmental Protection Agency (EPA) National Functional Guidelines for Organic Superfund Methods Data Review (EPA 2017), analytical methodology and ADEC regulatory guidance documents (ADEC 2017). This data review focused on the following QC parameters and impact on data quality objectives (DQOs): usability: sample handling and chain-of-custody documentation; holding time compliance; field QC (trip blanks, equipment blanks, field duplicates); laboratory QC (method blanks, laboratory control samples (LCS) and LCS duplicates (LCSD), surrogates, matrix spikes (MS) and MS duplicates [MSD]), method reporting limits; and completeness.

The samples were delivered to TestAmerica in Anchorage, Alaska.

Groundwater samples were analyzed for the following:

- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), EPA Method 8260C;
- Volatile Organic Compounds (VOCs), EPA Method 8260C;
- Gasoline Range Organics (GRO), AK101;
- Diesel Range Organics (DRO), AK102;
- Poly-cyclic Aromatic Hydrocarbons (PAHs), EPA Method 8270D SIM.

Surface water samples were analyzed for the following:

- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), EPA Method 624;
- GRO, AK101;
- DRO, AK102;
- PAHs, EPA Method 625.

Drinking water samples were analyzed for the following:

- VOCs, EPA Method 524.2;
- PAHs, EPA Method 8270D SIM.

Samples were shipped to TestAmerica in Tacoma, WA for analysis. TestAmerica in Savannah, GA performed the E524.2 analysis on drinking water samples. The October 2017 water sample results were reported in TestAmerica Job 580-71900-1.

Results that were detected at concentrations below the reporting limit (RL) but above the method detection limits (MDLs) are flagged "J" and considered estimated. Results detected at concentrations below the MDL are considered not detected (ND).

Some sample results were considered estimations due to QA/QC discrepancies. All results are suitable for use. The details of this review and qualification of the data are summarized in the following sections.

### **E.1. Sample Handling and Chain of Custody**

The sample coolers were shipped with custody seals intact. CoC forms, laboratory sample receipt forms, and case narratives were reviewed to evaluate the integrity of the samples and the quality of the associated data. All sample containers in the sample coolers were received at the laboratory intact and within the specified temperature range of <6°C.

### **E.2. Holding Time Compliance**

All samples were extracted, digested and analyzed within the holding time criteria for the applicable analytical methods and in accordance with work plan specifications.

### **E.3. Field QA/QC**

Field QA/QC protocols are designed to measure for potential sample bias as a result of sampling procedures and possible contamination during collection and transport of samples. Collection and analysis of field duplicates facilitates an evaluation of precision that takes into account potential variables associated with sampling procedures, site heterogeneity and laboratory analyses. Trip blanks are used to monitor sample containers and possible cross-contamination of samples. Field equipment blanks are used to assess the efficiency of field equipment decontamination procedures in preventing cross contamination between samples. During this sampling event, trip blanks, equipment blanks, and field duplicates were submitted for analysis.

#### ***E.3.1. Trip Blanks***

Trip blanks were prepared by the laboratory, shipped to the site with the empty sample bottles/containers, stored with sample containers during the field event, and transported with the collected samples back to the laboratory for analysis.

Trip blanks were placed in the cooler with associated matrix specific volatile organics samples (GRO/VOC) and analytes detected in the trip blanks were below the RL for all analytes.

### ***E.3.2. Equipment Blanks***

Equipment rinse blanks were prepared in the field for groundwater samples collected with the submersible pump.

Several compounds were detected above the method detection limit (MDL) in the equipment blanks at concentrations similar to method blank results. All analytes detected in the equipment blanks were below the reporting limit (RL). Sample results detected at similar concentrations were qualified (UB) as non-detected at the RL. The detected equipment blank results and qualified sample results are listed in Table QA-1.

### ***E.3.3. Field Duplicates***

Three field duplicates were submitted. The frequency of field duplicate collection met the 10% frequency requirements for each method and matrix specified in the work plan.

When analytes were present in concentrations below the RL in one or both samples, no valid comparison could be made. The primary sample and duplicate relative percent differences (RPDs) met applicable control limits.

Overall, there was adequate comparability of field duplicate results to meet project data quality objectives. The detected field duplicate results and RPD are listed in Table QA-2.

## **E.4. Laboratory QA/QC**

### ***E.4.1. Method Blanks***

Method blanks were analyzed concurrent with an analytical batch of 20 or fewer primary samples for each of the analytical methods performed on project samples. Target analytes were not detected (ND) in any method blanks, with the following exceptions listed in Table QA-2.

- 1,2,4-Trichlorobenzene was detected at a trace concentration above the MDL in the E524.2 method blank. All associated sample results for this compound were ND and were not affected.
- DRO was detected at a trace concentration above the MDL in one AK102 method blank. Since the result is less than half of the RL, no corrective action was required. The result for DRO in associated sample 17-ERK-EB was within five times the method blank concentration and qualified (UB) as non-detected at the RL due to laboratory contamination.
- Anthracene, phenanthrene and pyrene were detected at trace concentrations above the MDL in the 8270D SIM method blank. The results for these PAHs in associated sample 17-ERK-EB were within five times the method blank concentration and qualified (UB) as non-detected at the RL due to laboratory contamination. All associated sample results for these compounds were ND and were not affected.

#### ***E.4.2. Laboratory Control Samples***

The laboratory monitors internal precision and accuracy for each analytical batch with a set of laboratory control samples (LCS/LCSD). A known quantity of target analytes are added to blank laboratory control samples prior to extraction and analysis and recoveries are calculated. Acceptable recovery criteria vary with each analytical method and matrix. All LCS/LCSD samples met laboratory and project QC goals for target analytes, with the following exceptions listed in Table QA-3.

- Method 8260B LCS and/or LCSD %R were high for the following VOCs: 1,2,3-trichlorobenzene, acetone, bromochloromethane, carbon tetrachloride, and methyl tert-butyl ether. The associated VOC results were non-detect and not affected by the high %R.
- A method 8270D SIM LCS %R was low for benzo(a)pyrene. The LCSD %R was acceptable for this compound. The non-detect results for benzo(a)pyrene are flagged as estimated, UJ-L in the samples above.

#### ***E.4.3. Surrogates***

System Monitoring Compounds (Surrogates) are specified for organic chromatographic analytical procedures. Surrogates are compounds similar to target analytes and are added to each sample prior to collection or extraction. Subsequent surrogate recovery indicates overall method performance. Surrogate recoveries were within prescribed control limits for all primary samples, method blanks, LCS/LCSD, MS/MSD and other QA/QC samples, with several exceptions listed in Table QA-4.

- The surrogate trifluorotoluene recoveries were above the control limit for several QC and project samples. Qualifiers were not required for the QC sample results. The associated sample results for GRO were non-detect and not affected by the high %R.

#### ***E.4.4. Matrix Spikes***

Extra volumes of primary field samples were collected and submitted to the laboratory for matrix spike/matrix spike duplicate (MS/MSD) analyses. Matrix spikes have a known quantity of target analytes are added (spiked) to field samples. Spike recoveries are calculated and are used to evaluate both site conditions and laboratory quality control. Matrix spikes met recovery percentages (%R) and relative percent difference (RPD) limits.

#### ***E.4.5. Reporting and Method Detection Limits (Sensitivity)***

The RLs provided adequate sensitivity needed to meet project objectives for most target compounds. The reporting limits (RLs) were below ADEC groundwater cleanup levels (CL) in the project samples, with several exceptions listed in Table QA-6.

The results for the following VOCs in samples 17-ERK-MW-3 and 17-ERK-MWZ were reported as ND with RL above the ADEC groundwater CLs: 1,2,3-trichloropropane, 1,2-



dibromoethane, 1,1,2-trichloroethane and vinyl chloride. The limits of detection (LOD), calculated as twice the MDL, were also compared to the ADEC CLs. The LODs for 1,2-dibromoethane, 1,1,2-trichloroethane and vinyl chloride are below the ADEC groundwater CL and meet the sensitivity required to determine achievement of cleanup criteria.

The results for 1,2,3-trichloropropane do not meet the sensitivity required to determine achievement of cleanup criteria. Method 8260C does not currently achieve the GW CL of 0.0075 ug/L for 1,2,3-trichloropropane.

## **E.5. Precision and Accuracy**

Precision criteria monitor analytical reproducibility. Accuracy criteria monitor agreement of measured results with “true values” established by spiking applicable samples with a known quantity of analyte or surrogate. Precision and accuracy were evaluated by comparing LCS/LCSDs, MS/MSDs and field duplicate pairs for this project. Field duplicates and MS/MSD samples were collected in accordance with work plan specifications. Field duplicate RPDs met applicable control limits. Recoveries and RPDs for all LCS/LCSD and MS/MSD samples were within required limits, with any exceptions noted in the Laboratory QC section.

### ***E.5.1. Completeness***

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). The overall project completeness goal is 90%:

$$\% \text{ completeness} = \frac{\text{number of valid (i.e., non-R flagged) results}}{\text{number of possible results}}$$

All requested analyses were performed in accordance with Work Plan specifications. No results were qualified as unusable (i.e., “R”). Completeness for this project is 100%.

### ***E.5.2. Representativeness***

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or environmental condition. The number and selection of samples were specified in the work plan and verified in the field to account accurately for site variations and sample matrices. The DQO for representativeness was met.

### ***E.5.3. Comparability***

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this project followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

## **E.6. Data Summary**

In general, the overall quality of the data was acceptable. The data quality was determined as acceptable or estimated. Acceptable data are associated with QC data that meet all QC criteria or with QC samples that did not meet QC criteria but data quality objectives were not affected. Estimated J results are considered inaccurate due to a bias created by matrix interference or QC acceptance criteria which were not met. No results were rejected. The EPA National Functional Guidelines (EPA 2017) were used to evaluate the acceptability of the data.

Data quality meets established DQO established for this project. With the exceptions noted above, all data are suitable for their intended use.

## REFERENCES

- ADEC. 2017. Laboratory Data Review Checklist. July.
- ADEC. 2017. *Technical Memorandum: Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling*. March.
- ADEC. 2017. *Technical Memorandum: Guidelines for Treatment of Non-detect Values, Data Reduction for Multiple-Detections and Comparison of Quantitation Limits to Cleanup Values*. April.
- EPA. 2017. *Contract Laboratory Program National Functional Guidelines for Organic Superfund Methods Data Review* (EPA-540-R-2017-002). January.
- ERM Alaska, Inc. (ERM) 2017. *Addendum to the 2012 Groundwater and Surface Water Monitoring Work Plan, Eureka Lodge, Alaska*. ADEC Filed Number 210.28.006, Hazard ID 25595. 8 September.
- OASIS Environmental (OASIS). 2012. *2012 Groundwater and Surface Water Monitoring Work Plan, Eureka Lodge, Alaska*. 4 June.

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**Table QA-1**  
**Blank and Associated Suspect Sample Detections**  
**2017 Water Monitoring**  
**Crowley Eureka Lodge**  
**Eureka, Alaska**

Lab Package	Blank Type	Blank ID	Associated Samples	Detected Compound	Reported Concentration	Report Limit	Units	ERM Qualifier
580-71900-1	MB	MB 680-498776/9	--	1,2,4-Trichlorobenzene	0.13	0.50	µg/L	--
580-71900-1	MB	MB 580-258982/1-A	See below	DRO	0.208	0.10	mg/L	--
			17-ERK-EB	DRO	0.048	0.10	mg/L	UB
			17-ERK-MW-3	DRO	0.058	0.11	mg/L	UB
			17-ERK-MWZ	DRO	0.052	0.10	mg/L	UB
580-71900-1	MB	MB 580-258594/1-A	See below	Anthracene	0.00440	0.020	µg/L	--
		MB 580-258594/1-A	See below	Phenanthrene	0.00759	0.020	µg/L	--
		MB 580-258594/1-A	See below	Pyrene	0.00462	0.020	µg/L	--
		--	17-ERK-EB	Anthracene	0.0036	0.017	µg/L	UB
		--	17-ERK-EB	Phenanthrene	0.0051	0.017	µg/L	UB
		--	17-ERK-EB	Pyrene	0.0044	0.017	µg/L	UB
580-71900-1	EB	17-ERK-EB	17-ERK-EB	Tetrachloroethene	0.53	0.50	µg/L	--
		--	17-ERK-MWZ	Tetrachloroethene	0.57	0.50	µg/L	UB

Lab reports reviewed: 580-71900-1

**Key:**

MB = Method blank

EB = Equipment blank

µg/L = Micrograms per liter

mg/L = Milligrams per liter

UB = Result is reported non-detect due to blank contamination.

*Table QA-2  
Field Duplicate Results and Calculated Relative Percent Differences  
2017 Water Monitoring  
Crowley Eureka Lodge  
Eureka, Alaska*

Lab Package	Primary/ Duplicate	Compound	Concentration		Units	RPD limit (%)	RPD (%)	ERM Qualifier
			Sample	Duplicate				
580-71900-1	17-ERK-DW-01/17-ERK-DWZ	Toluene	0.16	0.17	µg/L	<30	6	--
580-71900-1	17-ERK-SW-02/17-ERK-SWZ	DRO	0.10	0.099	mg/L	<30	1	--

Lab reports reviewed: 580-71900-1

**Key:**

µg/L = Micrograms per liter

mg/L = Milligrams per liter

RPD = Relative percent difference

% = percent

*Table QA-3  
LCS/LCSD Recoveries Outside of Acceptable Limits  
2017 Water Monitoring  
Crowley Eureka Lodge  
Eureka, Alaska*

Lab Package	Spike Sample ID	Associated Sample	Compound	LCS (%R)	LCSD (%R)	Limit (%R)	RPD	RPD Limit	Result (µg/L)	ERM Qualifier
580-71900-1	LCS 580-258603/7; LCSD 580-258603/8	See below	1,2,3-Trichlorobenzene	195	165	74-123	17	<17	--	--
		See below	Acetone	137	147	60 - 136	7	<35	--	--
		See below	Bromochloromethane	122	124	78 - 120	2	<35	--	--
		See below	Carbon tetrachloride	131	136	72 - 124	4	<19	--	--
		See below	Methyl tert-butyl ether	118	121	79 - 120	3	<18	--	--
580-71900-1	LCS 580-258594/2-A; LCSD 320-170990/5-A	See below	Benzo[a]pyrene	75	81	76 - 120	8	<17	--	--
		17-ERK-DW-01	Benzo[a]pyrene	--	--	--	--	--	ND	UJ-L
		17-ERK-DWZ	Benzo[a]pyrene	--	--	--	--	--	ND	UJ-L
		17-ERK-EB	Benzo[a]pyrene	--	--	--	--	--	ND	UJ-L
		17-ERK-MW-1	Benzo[a]pyrene	--	--	--	--	--	ND	UJ-L
		17-ERK-MW-3	Benzo[a]pyrene	--	--	--	--	--	ND	UJ-L
		17-ERK-MWZ	Benzo[a]pyrene	--	--	--	--	--	ND	UJ-L

Lab reports reviewed: 580-71900-1

**Key:**

UJ-L = Result is not detected and considered estimated due to the LCS/LCSD not meeting quality control criteria.

µg/L = Micrograms per liter

ND = Not detected

RPD = Relative percent difference

%R - Percent recovery

**Table QA-4**  
**Surrogate Recovery Results out of Acceptable Limits**  
**2017 Water Monitoring**  
**Crowley Eureka Lodge**  
**Eureka, Alaska**

Lab Package	Sample ID	Method	Surrogate	Recovery (%)	Limit (%)	ERM Qualifier
580-71900-1	LCS 580-258504/9	8260C	Trifluorotoluene	121	80-120	--
	MB 580-258603/5	8260C	Trifluorotoluene	123	80-120	--
580-71900-1	17-ERK-EB	AK101	Trifluorotoluene	123	75-120	--
	17-ERK-MW-1	AK101	Trifluorotoluene	126	75-120	--
	17-ERK-MW-3	AK101	Trifluorotoluene	124	75-120	--
	17-ERK-MWZ	AK101	Trifluorotoluene	127	75-120	--
	17-ERK-SW-01	AK101	Trifluorotoluene	125	75-120	--
	17-ERK-SW-02	AK101	Trifluorotoluene	128	75-120	--
	17-ERK-SWZ	AK101	Trifluorotoluene	126	75-120	--
	17-ERK-TB	AK101	Trifluorotoluene	127	75-120	--

Lab reports reviewed: 580-71900-1

**Key:**

% = percent



**Table QA-5**  
**Continuing Calibration Recovery Results out of Acceptable Limits**  
**2017 Water Monitoring**  
**Crowley Eureka Lodge**  
**Eureka, Alaska**

Lab Package	Sample ID	Method	Compound	Drift (%)	Limit (%)	ERM Qualifier
580-71900-1	CCV 580-258603/3	8260C	Trifluorotoluene	20.8	20	--
	CCV 580-258504/3	8260C	Trifluorotoluene	> 20	20	--
	CCV 580-258603/3	8260C	8 VOCs	> 20	20	--
	CCV 580-258603/3	8260C	Dichlorodifluoromethane	<- 20	20	--
	17-ERK-EB	8260C	Dichlorodifluoromethane	--	--	UJ-C
	17-ERK-MW-3	8260C	Dichlorodifluoromethane	--	--	UJ-C
	17-ERK-MWZ	8260C	Dichlorodifluoromethane	--	--	UJ-C
	CCV 580-259252/3	8260C SIM	Hexachlorobutadiene	> 20	20	--
	CCV 580-258841/3	E625	Nitrobenzene-d5	25	20	--

Lab reports reviewed: 580-71900-1

**Key:**

UJ- = Result is not detected and estimated due to continuing calibration verification standard not meeting quality control criteria.

% = percent

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**TABLE QA-6**  
**Reporting Limit Exceeds Cleanup Level**  
**2017 Water Monitoring**  
**Crowley Eureka Lodge**  
**Eureka, Alaska**

Method	Analyte or Compound	ADEC CLs (ug/L)	Associated Sample IDs	Result (ug/L)	MDL (ug/L)	LOD (2x MDL) (ug/L)	RL (ug/L)
8260C	1,2,3-trichloropropane	0.0075	17-ERK-MW-3	ND (2)	0.41	0.82	2
8260C	1,2,3-trichloropropane	0.0075	17-ERK-MWZ	ND (2)	0.41	0.82	2
8260C SIM	1,2-Dibromoethane	0.075	17-ERK-MW-3	ND (0.5)	0.014	0.028	0.5
8260C SIM	1,2-Dibromoethane	0.075	17-ERK-MWZ	ND (0.5)	0.014	0.028	0.5
8260C SIM	1,1,2-Trichloroethane	0.41	17-ERK-MW-3	ND (0.5)	0.017	0.034	0.5
8260C SIM	1,1,2-Trichloroethane	0.41	17-ERK-MWZ	ND (0.5)	0.017	0.034	0.5
8260C SIM	Vinyl chloride	0.19	17-ERK-MW-3	ND (0.5)	0.013	0.026	0.5
8260C SIM	Vinyl chloride	0.19	17-ERK-MWZ	ND (0.5)	0.013	0.026	0.5

Lab reports reviewed: 580-71900-1

**Notes:**

µg/L = Micrograms per liter

LOD = Limit of Detection; calculated as 2 times the MDL

MDL = Method Detection Limit

RL = Reporting Limit

ND = Not detected at the RL.

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**Laboratory Data Review Checklist**

Completed By:

Elsie King

Title:

Project Chemist

Date:

11/1/2017

CS Report Name:

Crowley Eureka Lodge, Eureka, Alaska

Report Date:

11/6/2017

Consultant Firm:

ERM Alaska, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc., Tacoma, Washington

Laboratory Report Number:

580-71900-1

ADEC File Number:

Hazard Identification Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and
- perform
- all of the submitted sample analyses?

 Yes  No

Comments:

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

 Yes  No

Comments:

2. Chain of Custody (CoC)

- a. CoC information completed, signed, and dated (including released/received by)?

 Yes  No

Comments:

- b. Correct Analyses requested?

 Yes  No

Comments:

3. Laboratory Sample Receipt Documentation

- a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

 Yes  No

Comments:

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

 Yes  No

Comments:

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

 Yes  No

Comments:

- d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes  No

Comments:

A discrepancy was noted for the sample containers provided for methods E625 and SW8270D SIM. For method E625, samples were submitted in 250 mL containers, instead of 1L containers. The RLs for the E625 results have been elevated x4 as a result. For method 8270D SIM, the samples were submitted in 1 L containers, instead of the 250 mL containers. The laboratory extracted a 250 mL volume from the 1L bottle; the results are not affected.

- e. Data quality or usability affected?

Comments:

Data is acceptable.

#### 4. Case Narrative

- a. Present and understandable?

Yes  No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

Yes  No

Comments:

E524.2: Method blank results for a VOC compound was detected below the LOQ.  
 8260C: Several CCV recoveries were high, however, associated sample results were all ND and not affected. Surrogate trifluorotoluene (TFT) recoveries were high in several CCV, MB and LCS samples. A CCV recovery was low for dichlorodifluoromethane.  
 8260C SIM: A CCV recovery was high, however, associated sample results were all ND and not affected.  
 AK101: Surrogate recoveries were high in several samples; associated sample results were all ND and not affected.  
 625: Surrogate nitrobenzene-d<sub>5</sub> recovery was high in a CCV sample.  
 8270D SIM: Method blank results for three PAH compounds were detected below the LOQ. The LCS %R was low for benzo(a)pyrene. The opening DFTPP tune had a tailing factor exceedance for benzidine; however, this compound was not representative of target PAH analytes.  
 AK102: A method blank result for DRO was detected above the LOQ. Surrogate n-triacontane-d<sub>62</sub> recovery was high in a CCV.

c. Were all corrective actions documented?

Yes  No

Comments:

Corrective action was not performed for MB results that were detected below the LOQ. Corrective action was not performed for MB results that were detected above the LOQ if sample results were <LOQ or greater than 10x the method blank.

Corrective action was not performed for surrogate recoveries in batch QC (MB, LCS, and CCV) samples; all other surrogate %R recoveries were acceptable.

Corrective action was not performed for high CCV, LCS or surrogate recoveries when associated sample results were non-detect.

Corrective action was not performed for the single low 8270D SIM LCS recovery. The LCSD recovery was acceptable and all other PAH recoveries were acceptable. Data was qualified as estimated.

A reporting limit standard was analyzed for dichlorofluoromethane as confirmation of non-detect results associated with the low CCV recovery.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Several results were flagged due to method blank results (See section 6.a.) and LCS recoveries (See section 6.b.)

The dichlorofluoromethane results for samples 17-ERK-EB, 17-ERK-MW-3 and 17-ERK-MWZ were flagged as estimated UJ-C due to a low CCV.

No sample results required flags due to surrogate recoveries. (See section 6.c.)

## 5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes  No

Comments:

b. All applicable holding times met?

Yes  No

Comments:

c. All soils reported on a dry weight basis?

Yes  No

Comments:

NA- water samples



- d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes  No

Comments:

LOQ/RL were above the ADEC Method GW CLs for 1,1,2-trichloroethane, 1,2,3-trichloropropane, ethylene dibromide, and vinyl chloride, for ND results in the groundwater samples. The limits of detection (LOD as 2\*DL) were below the CLs, with the exception of 1,2,3-trichloropropane. The LOQ for PAHs by method E625 (GC/MS) were elevated x4 due to incorrect sample volume collected. The LOQ for total PAHs by E625 exceeds the criteria for TAQH criteria of 0.015 mg/L; however the LOD for the total PAHs meets the ADEC water quality criteria.

- e. Data quality or usability affected?

Yes  No

Comments:

The LOD for the ND results were below the ADEC CLs and water quality criteria for most results, indicating acceptable sensitivity.  
The sample results listed below were reported as ND with LOD above the ADEC CLs, and do not meet the sensitivity required to determine achievement of cleanup criteria. Method 8260C does not currently achieve the GW CL of 0.0075 ug/L for 1,2,3-trichloropropane.  
17-ERK-MW-3 and 17-ERK-MWZ: 1,2,3-trichloropropane ND (2).

## 6. QC Samples

### a. Method Blank

- i. One method blank reported per matrix, analysis and 20 samples?

Yes  No

Comments:

- ii. All method blank results less than limit of quantitation (LOQ)?

Yes  No

Comments:

524.2: 1,2,4-Trichlorobenzene was detected < ½ the LOQ at 0.130 ug/L.  
8270D SIM: The following PAH compounds were detected < ½ the LOQ: anthracene at 0.0040 ug/L; phenanthrene at 0.00759 ug/L; pyrene at 0.00462 ug/L.  
AK102: DRO was detected > the LOQ at 0.208 mg/L.

- iii. If above LOQ, what samples are affected?

Comments:

Samples associated with the 524.2 blank are: 17-ERK-DW-01, 17-ERK-DWZ, 17-ERK-DWZ, and 17-ERK-TB.  
Samples associated with the 8270D SIM blank are: 17-ERK-DW-01, 17-ERK-DWZ, 17-ERK-EB, 17-ERK-MW-1, 17-ERK-MW-3, and 17-ERK-MWZ.  
Samples associated with the DRO blank are: 17-ERK-EB and 17-ERK-MW-1.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

Method 524.2 1,2,4-trichlorobenzene results were not affected. All associated sample results for this compound were ND.

Associated PAH results reported below the LOQ in the equipment rinse sample were flagged as nondetected, UB at the LOQ/RL. All other associated sample results for these compounds were ND. The associated DRO result reported below the LOQ in the equipment rinse sample was flagged as nondetected, UB at the LOQ/RL. The other associated result was > 5x the blank concentration and not affected.

v. Data quality or usability affected?

Comments:

Results flagged UB may be biased high due to lab contamination and have been reported as ND at the LOQ/RL.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes  No

Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes  No

Comments:

NA – Organics only.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes  No

Comments:

8260B: The LCS and/or LCSD %R were high for the following VOCs: 1,2,3-trichlorobenzene, acetone, bromochloromethane, carbon tetrachloride, and methyl tert-butyl ether.

8270D SIM: A LCS %R was low for benzo(a)pyrene. The LCSD %R was acceptable for this compound.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes  No

Comments:

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

8260C: 17-ERK-EB, 17-ERK-MW-3, and 17-ERK-MWZ  
8270D SIM: 17-ERK-DW-01, 17-ERK-DWZ, 17-ERK-EB, 17-ERK-MW-1, 17-ERK-MW-3, 17-ERK-MWZ

- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

The non-detect results for benzo(a)pyrene are flagged as estimated, UJ-L in the samples above. The VOC results were non-detect and not affected by the high %R.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Results flagged UJ-L were estimated values with a low bias.

c. Surrogates – Organics Only

- i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

Yes  No

Comments:

- ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes  No

Comments:

AK101: Surrogate TFT %Rs were above the control limits for all samples, but results were ND and not affected by high %R. The other surrogate %R was within control limits.  
8260C: Surrogate trifluorotoluene (TFT) recoveries were high in several CCV, MB and LCS samples. This surrogate had acceptable %R in samples and was not associated with target compounds.  
AK102: Surrogate n-Triacontane-d62 recovery was high in a CCV. This surrogate was not associated with DRO. The other surrogate %R was within control limits.

- iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

Yes  No

Comments:

No sample results were qualified for surrogate recoveries.

- iv. Data quality or usability affected?

Comments:

Sample results are acceptable.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

- i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?  
(If not, enter explanation below.)

Yes  No

Comments:

- ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes  No

Comments:

- iii. All results less than LOQ?

Yes  No

Comments:

- iv. If above LOQ, what samples are affected?

Comments:

- v. Data quality or usability affected?

Comments:

e. Field Duplicate

- i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes  No

Comments:

- ii. Submitted blind to lab?

Yes  No

Comments:

- iii. Precision – All relative percent differences (RPD) less than specified DQOs?  
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where  $R_1$  = Sample Concentration  
 $R_2$  = Field Duplicate Concentration

Yes  No

Comments:

- iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data is acceptable.

- f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

Yes  No  Not Applicable

On equipment blank was collected for groundwater samples that were collected with the submersible pump.

- i. All results less than LOQ?

Yes  No

Comments:

8260C SIM: Tetrachloroethene was detected > LOQ, at 0.53 ug/L.  
 8270D SIM: The following PAH compounds were detected < 1/2 the LOQ: anthracene at 0.0036 ug/L; benzo(a)anthracene at 0.0028 ug/L, fluoranthene at 0.0055 ug/L, phenanthrene at 0.0051 ug/L; pyrene at 0.0044 ug/L. The results for anthracene, phenanthrene, and pyrene were reported as ND (0.017) ug/L and qualified UB due to method blank contamination.  
 AK102: DRO was detected < 1/2 the LOQ at 0.048 mg/L. The result was reported as ND (0.1) mg/L and qualified UB due to method blank contamination.

- ii. If above LOQ, what samples are affected?

Comments:

8260C SIM: 17-ERK-MW-3 and 17-ERK-MWZ  
 8270D SIM: 17-ERK-MW-1, 17-ERK-MW-3, and 17-ERK-MWZ  
 AK102: 17-ERK-MW-1, 17-ERK-MW-3, and 17-ERK-MWZ

iii. Data quality or usability affected?

Comments:

8260C SIM: The tetrachloroethene result in sample 17-ERK-MWZ was reported as ND (0.57) ug/L and qualified UB due to equipment blank contamination. The result in the parent sample 17-ERK-MW-3 was ND.  
8270D SIM: All associated PAH results were ND and not affected.  
AK102: The DRO results in samples 17-ERK-MW-3 and 17-ERK-MWZ were reported as ND (0.11 and 0.10, respectively) mg/L and qualified UB due to equipment blank contamination.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes     No

Comments:

Lab flags are defined in the laboratory report.

## **APPENDIX F**

### **Estimation of Fuel Contamination Removed**

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Appendix F  
Estimate of Volume Removed during 2010 Excavation

Item	Value	Units	Comment / Source
<b>Volume of Supreme Unleaded Gasoline Released</b>			
Volume released	10	gallons	Estimated by Crowley Petroleum Distribution, Inc. Page 1 of the 2010 <i>Spill Response Report</i>
Volume released	38	Liters	
<b>Soil removed on 15 and 16 June 2010</b>			
Amount of contaminated soil excavated	13	tons	Page 6 of the 2010 <i>Spill Response Report</i>
Amount of contaminated soil excavated	11,818	kg	
<b>Fuel Concentrations</b>			
Based on characterization Sample EL-5			
GRO	1,250	mg/kg	Table 2 of the 2010 <i>Spill Response Report</i>
DRO	7,670	mg/kg	Table 2 of the 2010 <i>Spill Response Report</i>
<b>Fuel Removed</b>			
GRO	15	kg	Published fuel density values have been used and represent the average of the lower and upper estimates Exxon SDS, Gasoline, Unleaded Automotive Exxon SDS, No. 1 Diesel Fuel
DRO	91	kg	
<b>Fuel Density</b>			
Gasoline	739	kg/m <sup>3</sup>	
Diesel Fuel	805	kg/m <sup>3</sup>	
<b>Fuel Volume in Removed Soil</b>			
Gasoline	20	Liters	
Diesel Fuel	113	Liters	
<b>Soil removed on 28 and 29 September 2010</b>			
Amount of contaminated soil excavated	86.23	tons	Page 4 of the 2010 <i>Spill Response Remedial Action Report</i>
Amount of contaminated soil excavated	78,391	kg	
<b>Fuel Concentrations</b>			
Two concentrations were averaged to estimate this concentration:			
- Concentration measured in Sample EL-5			
- Average concentrations from the excavation confirmation samples (Eureka-East, Eureka-South, Eureka-West, Eureka-North, Eureka-BTM-North, Eureka-BTM-South)			

Appendix F  
 Estimate of Volume Removed during 2010 Excavation

Item	Value	Units	Comment / Source
	GRO 683	mg/kg	Table 2 of the 2010 <i>Spill Response Report</i>
	DRO 4,814	mg/kg	Table 2 of the 2010 <i>Spill Response Report</i>
<b>Fuel Removed</b>			
	GRO 54	kg	
	Diesel Fuel 377	kg	
<b>Fuel Volume in Removed Soil</b>			
	Gasoline 72	Liters	
	Diesel Fuel 469	Liters	
<b>Total Fuel Volume in Removed Soil</b>			
	Gasoline 92	Liters	
	DRO 581	Liters	

## **APPENDIX G**

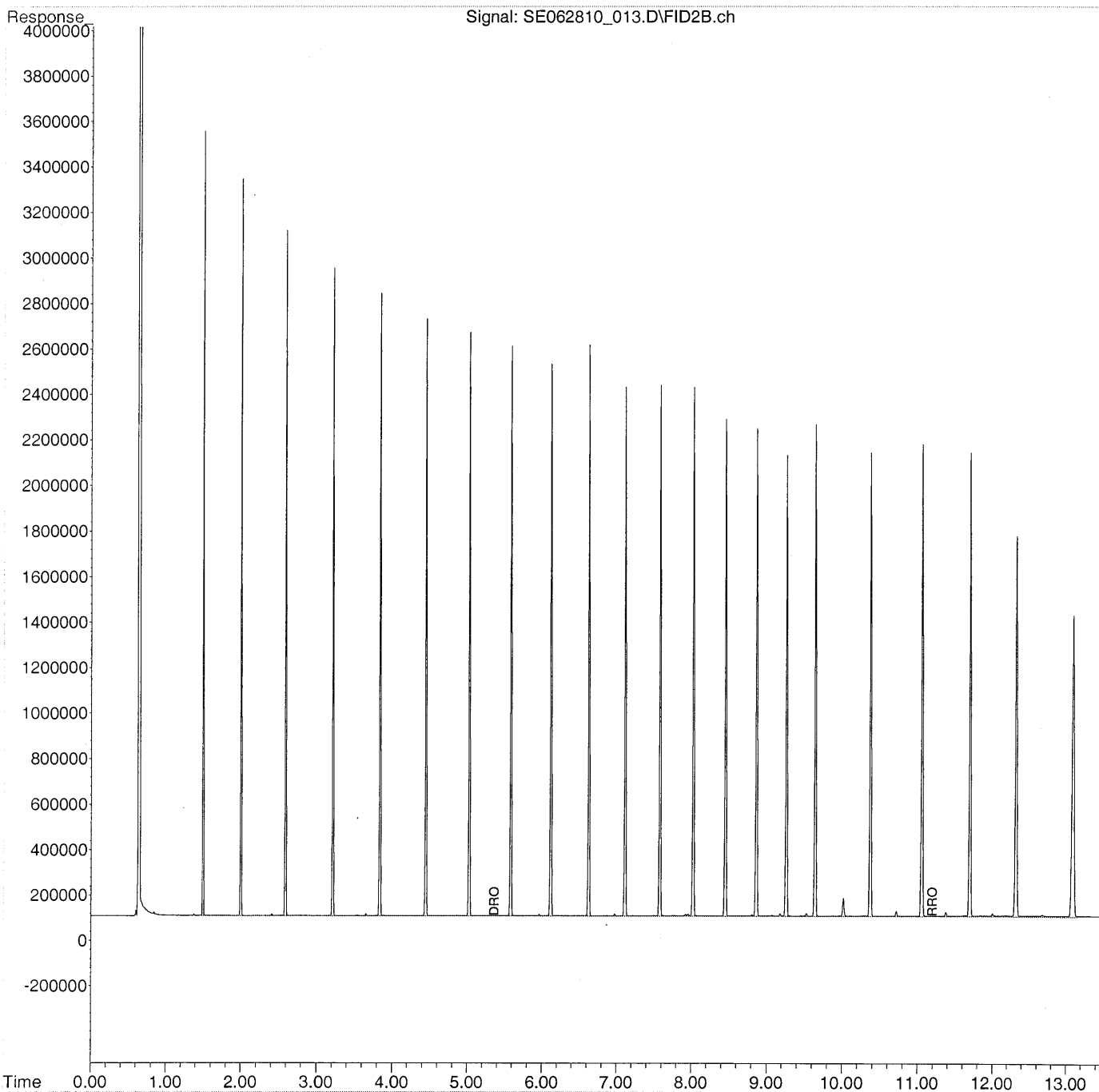
### **Historical Chromatographs**

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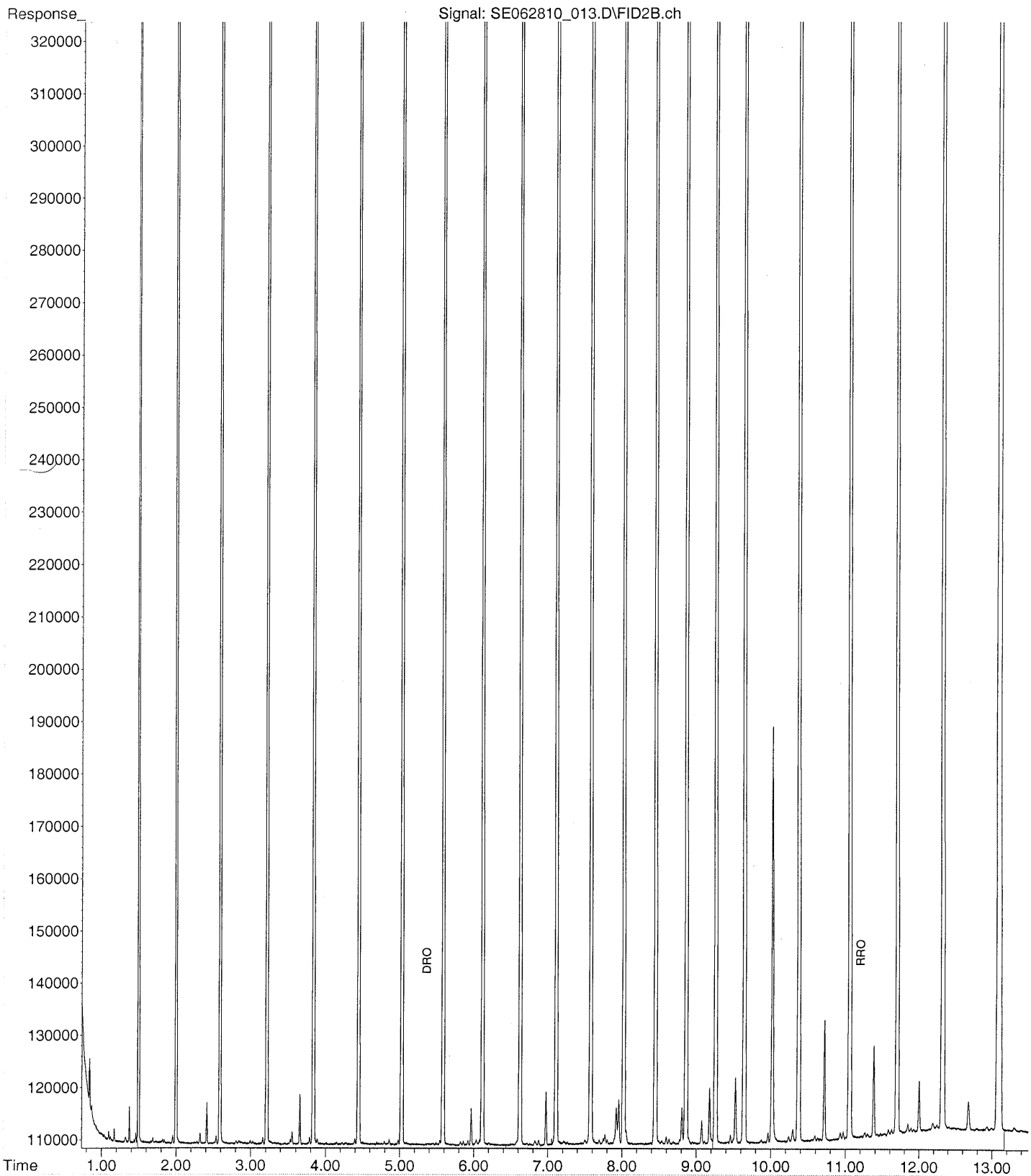
Data Path : H:\2010\06\SE\DATA\062810.SEC\  
Data File : SE062810\_013.D  
Signal(s) : FID2B.ch  
Acq On : 28 Jun 2010 1:18 pm  
Operator : LCE  
Sample : NAS  
Misc : VF2-63-2  
ALS Vial : 2 Sample Multiplier: 1

Integration File: events.e  
Quant Time: Jun 28 15:57:58 2010  
Quant Method : H:\2010\06\SE\METHOD\SER\_061810C.M  
Quant Title : DRO/RRO by Method AK 102/103  
QLast Update : Sun Jun 27 15:04:57 2010  
Response via : Initial Calibration  
Integrator: ChemStation

Volume Inj. :  
Signal Phase :  
Signal Info :



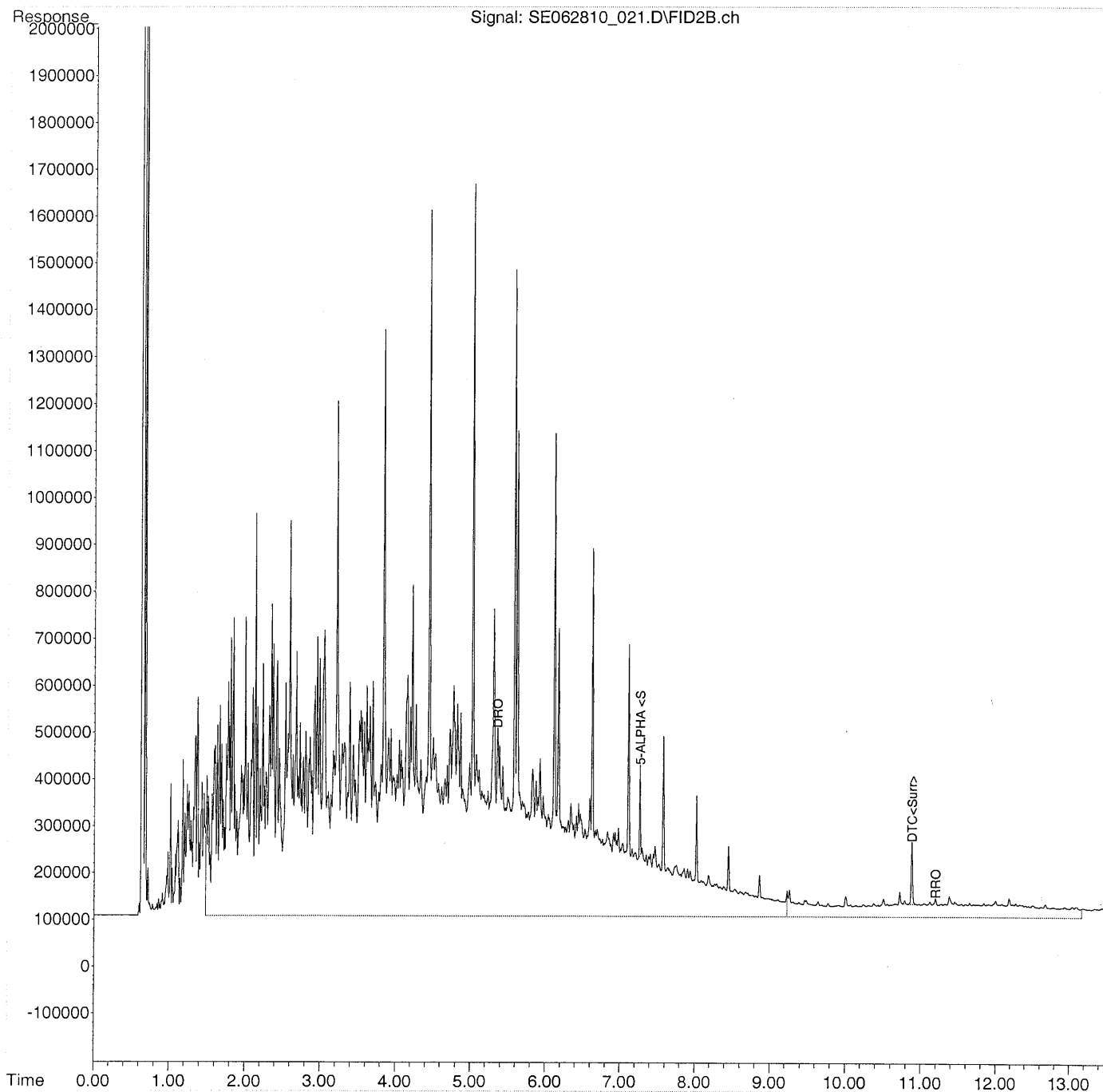
File :H:\2010\06\SE\DATA\062810.SEC\SE062810\_013.D  
Operator : LCE  
Acquired : 28 Jun 2010 1:18 pm using AcqMethod SE\_ACQ\_2009\_DUAL.M  
Instrument : SE  
Sample Name: NAS  
Misc Info : VF2-63-2  
Vial Number: 2



Data Path : H:\2010\06\SE\DATA\062810.SEC\  
Data File : SE062810\_021.D  
Signal(s) : FID2B.ch  
Acq On : 28 Jun 2010 2:43 pm  
Operator : LCE  
Sample : 1102801001 \*4X  
Misc : M\*2 RR 250/1  
ALS Vial : 52 Sample Multiplier: 4

Integration File: events.e  
Quant Time: Jun 28 16:03:32 2010  
Quant Method : H:\2010\06\SE\METHOD\SER\_061810C.M  
Quant Title : DRO/RRO by Method AK 102/103  
QLast Update : Sun Jun 27 15:04:57 2010  
Response via : Initial Calibration  
Integrator: ChemStation

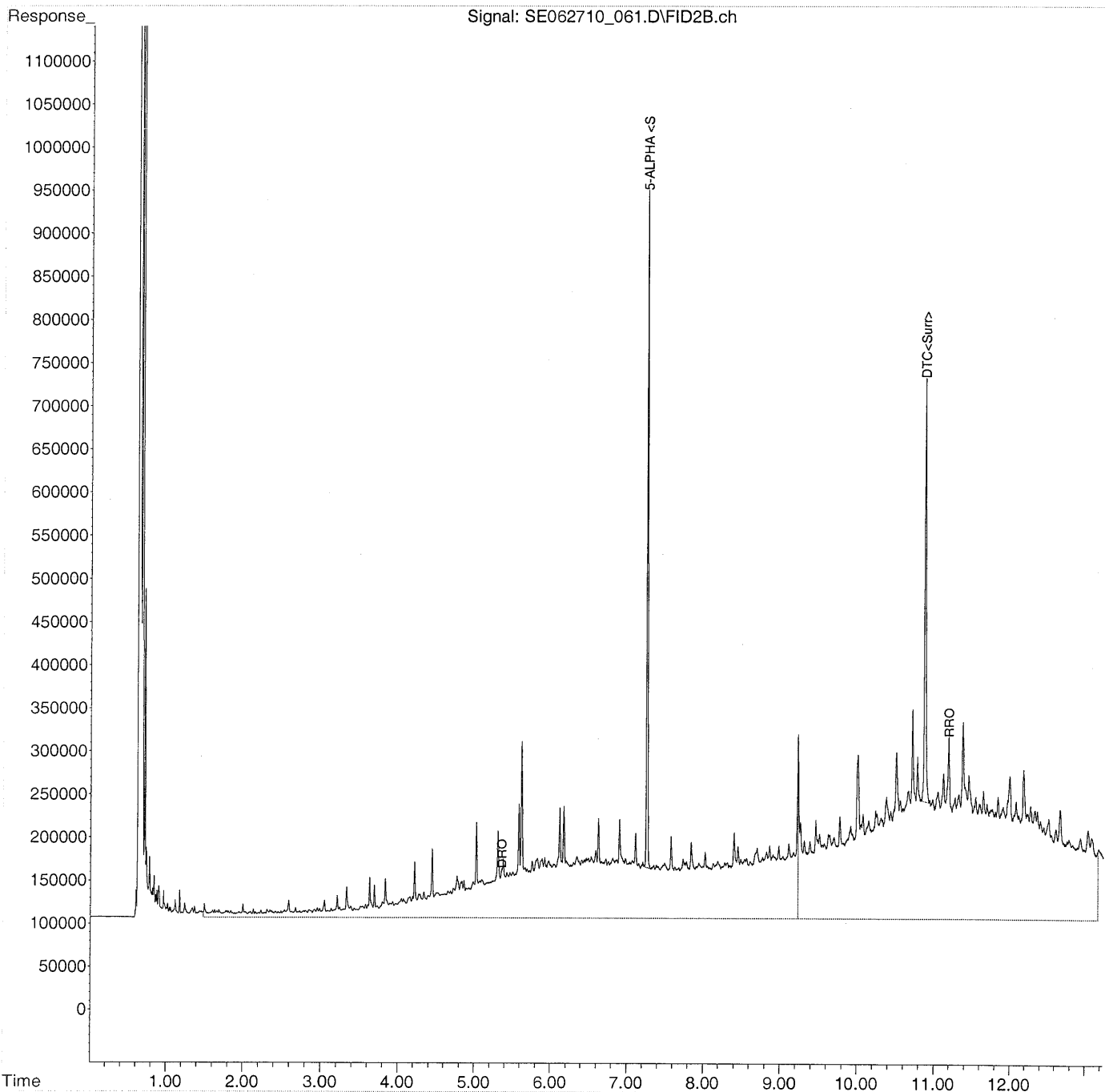
Volume Inj. :  
Signal Phase :  
Signal Info :



Data Path : H:\2010\06\SE\DATA\062710.SEC\  
Data File : SE062710\_061.D  
Signal(s) : FID2B.ch  
Acq On : 28 Jun 2010 6:58 am  
Operator : LCE  
Sample : 1102801002  
Misc : M\*2  
ALS Vial : 68 Sample Multiplier: 1

Integration File: events.e  
Quant Time: Jun 28 10:49:01 2010  
Quant Method : H:\2010\06\SE\METHOD\SER\_061810C.M  
Quant Title : DRO/RRO by Method AK 102/103  
QLast Update : Sun Jun 27 15:04:57 2010  
Response via : Initial Calibration  
Integrator: ChemStation

Volume Inj. :  
Signal Phase :  
Signal Info :

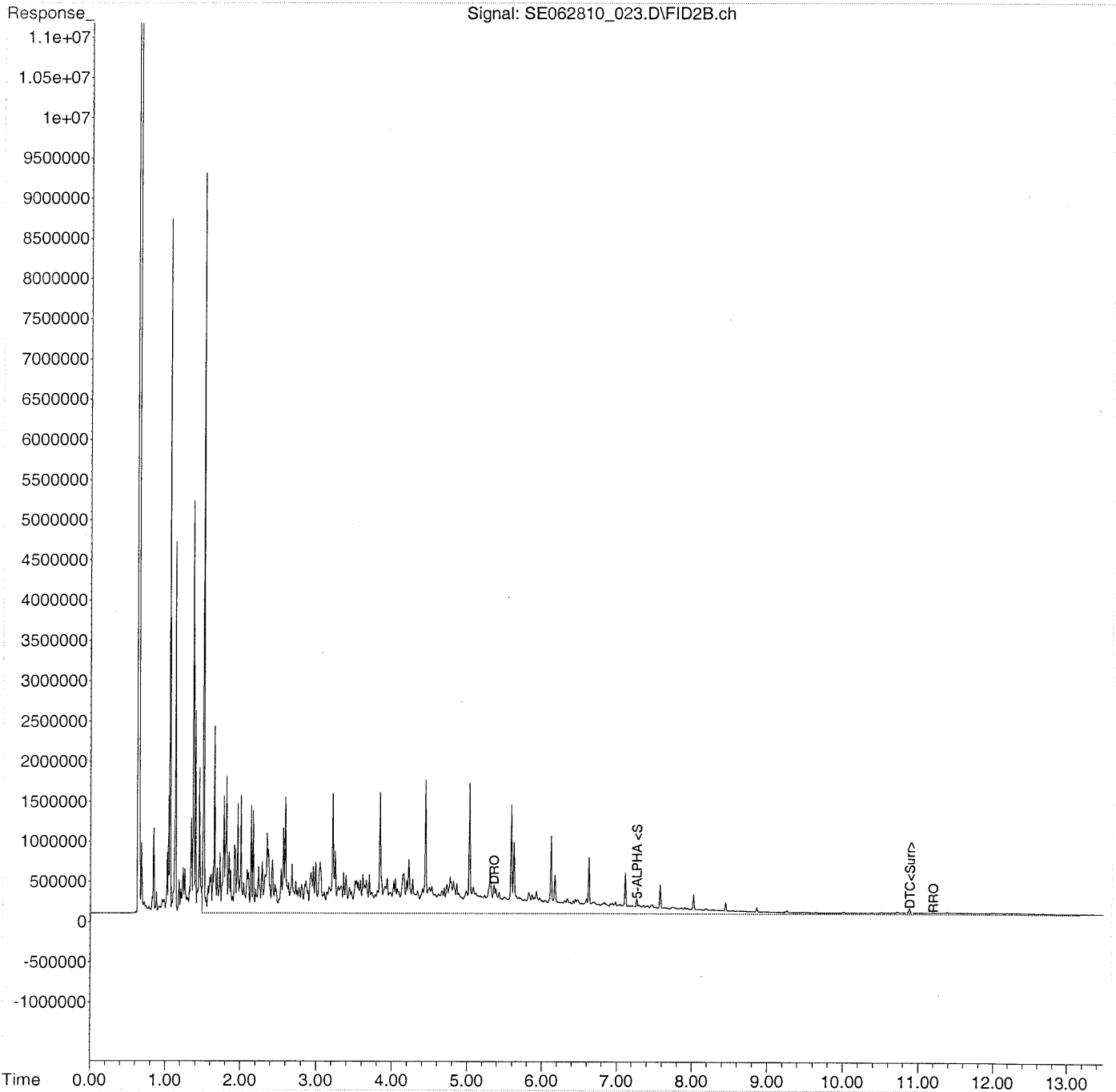




Data Path : H:\2010\06\SE\DATA\062810.SEC\  
 Data File : SE062810\_023.D  
 Signal(s) : FID2B.ch  
 Acq On : 28 Jun 2010 3:04 pm  
 Operator : LCE  
 Sample : 1102801003 \*10X  
 Misc : M\*2 RR 100/1  
 ALS Vial : 53 Sample Multiplier: 10

Integration File: events.e  
 Quant Time: Jun 28 16:04:17 2010  
 Quant Method : H:\2010\06\SE\METHOD\SER\_061810C.M  
 Quant Title : DRO/RRO by Method AK 102/103  
 QLast Update : Sun Jun 27 15:04:57 2010  
 Response via : Initial Calibration  
 Integrator: ChemStation

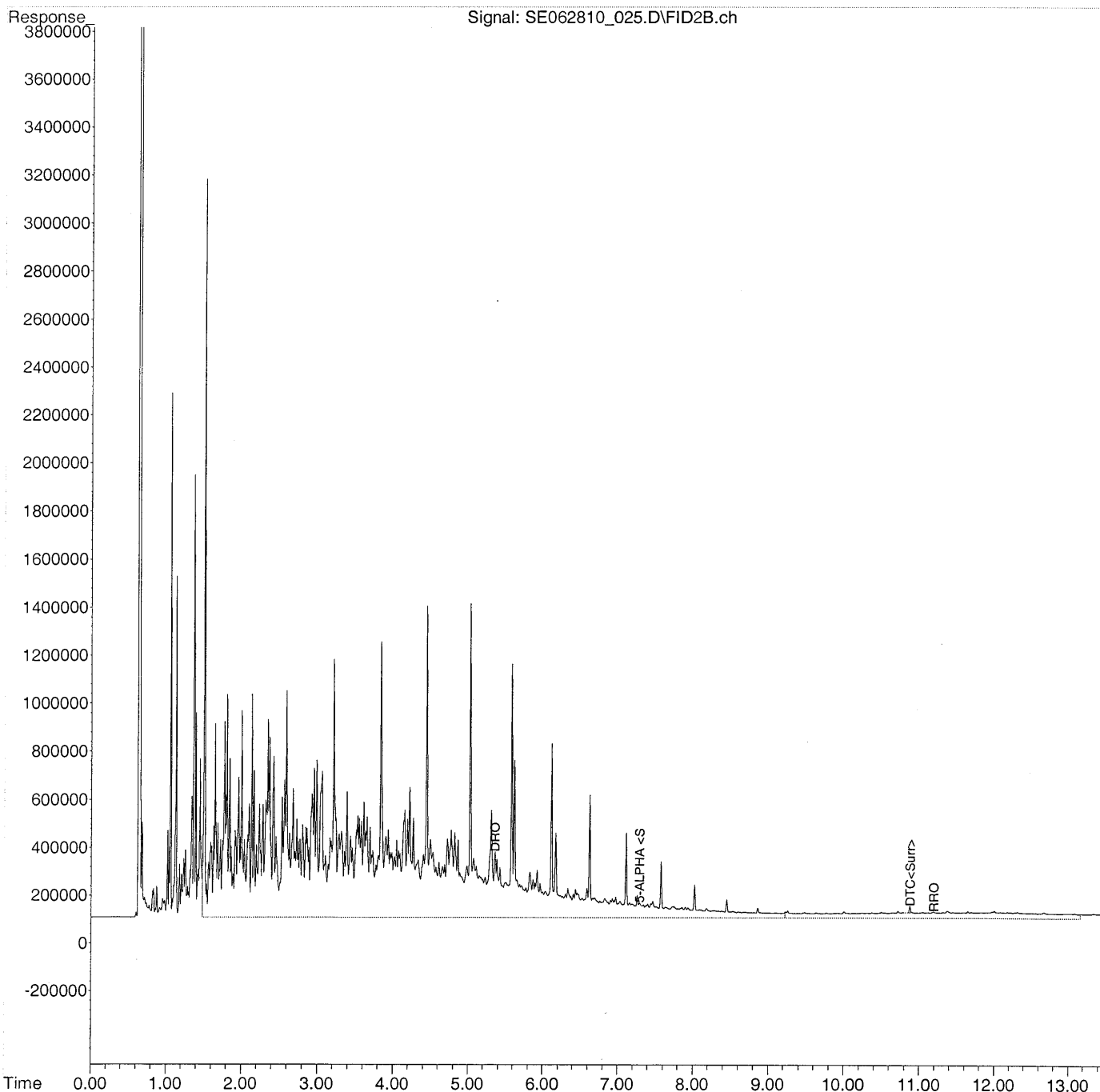
Volume Inj. :  
 Signal Phase :  
 Signal Info :



Data Path : H:\2010\06\SE\DATA\062810.SEC\  
Data File : SE062810\_025.D  
Signal(s) : FID2B.ch  
Acq On : 28 Jun 2010 3:25 pm  
Operator : LCE  
Sample : 1102801004 \*20X  
Misc : M\*2 RR 50/1  
ALS Vial : 54 Sample Multiplier: 20

Integration File: events.e  
Quant Time: Jun 28 16:04:44 2010  
Quant Method : H:\2010\06\SE\METHOD\SER\_061810C.M  
Quant Title : DRO/RRO by Method AK 102/103  
QLast Update : Sun Jun 27 15:04:57 2010  
Response via : Initial Calibration  
Integrator: ChemStation

Volume Inj. :  
Signal Phase :  
Signal Info :



Data Path : H:\2010\06\SE\DATA\062910\  
Data File : SE062910\_020.D  
Signal(s) : FID1A.ch  
Acq On : 29 Jun 2010 4:17 pm  
Operator : LCE/HM  
Sample : 1102853001\*20X dark  
Misc : M\*2 RR 50/1  
ALS Vial : 8 Sample Multiplier: 20

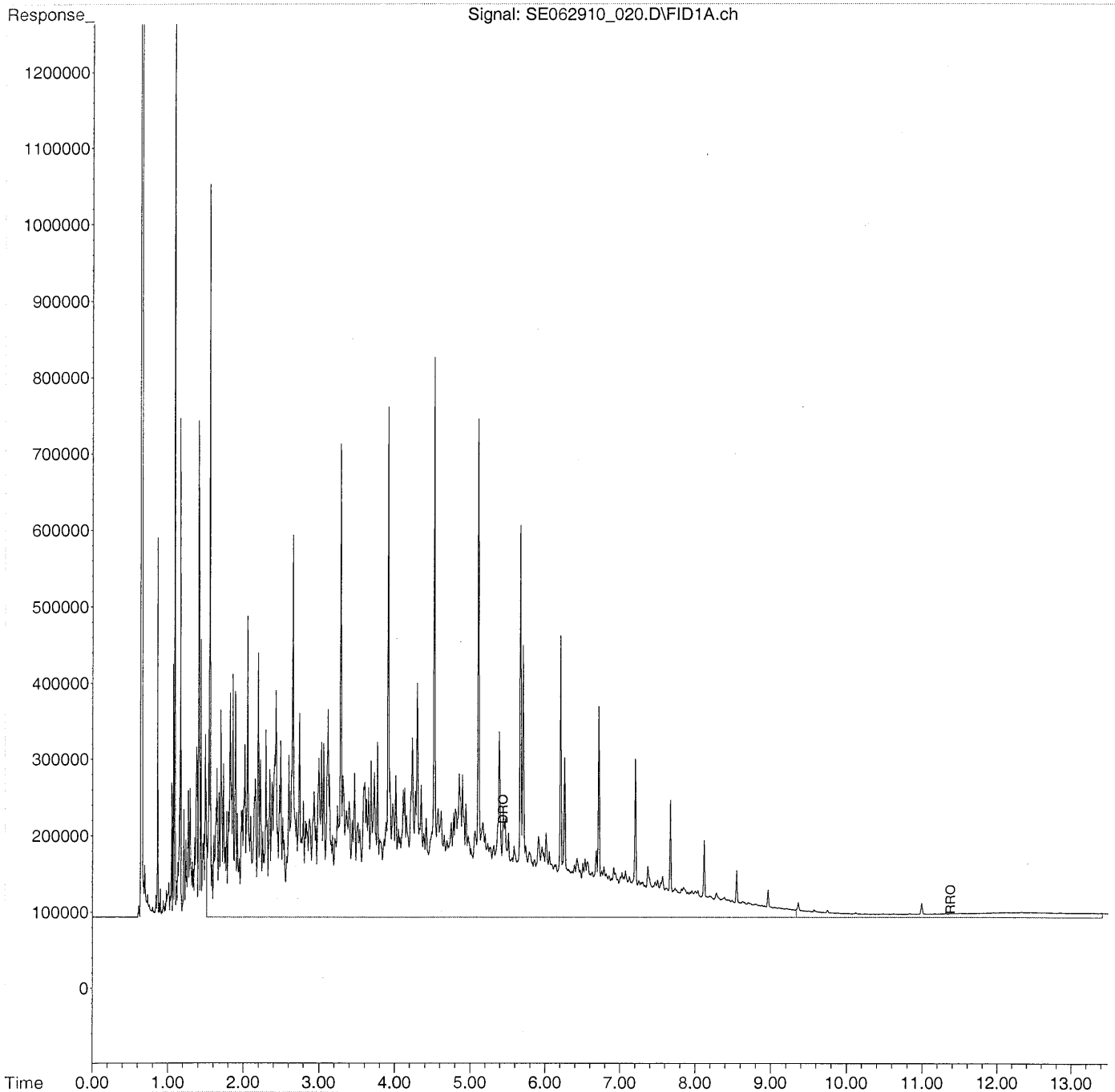
Lab Sample ID 1102853001 = Client Sample ID Eureka  
Lodge-EL-5

Analytical Results were:

Gasoline Range Organics 1,250 mg/Kg  
Benzene 20,700 ug/Kg  
Toluene 204,000 ug/Kg  
Ethylbenzene 47,700 ug/Kg  
o-Xylene 102,000 ug/Kg  
P & M Xylene 229,000 ug/Kg  
Diesel Range Organics 7,670 mg/Kg

Integration File: events.e  
Quant Time: Jun 30 11:36:48 2010  
Quant Method : H:\2010\06\SE\METHOD\SEF\_062810.M  
Quant Title : DRO/RRO by Method AK 102/103  
QLast Update : Tue Jun 29 10:54:37 2010  
Response via : Initial Calibration  
Integrator: ChemStation

Volume Inj. :  
Signal Phase :  
Signal Info :



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## **APPENDIX H**

### **Torkelson Forensic Soil Sample Results**

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**Torkelson Geochemistry, Inc.**

2528 South Columbia Place, Tulsa, Oklahoma 74114-3233  
Voice 918-749-8441, Fax 918-749-6005

October 25, 2017

Stephen Witzmann  
ERM  
825 West 8<sup>th</sup> Ave.  
Anchorage, AK 99501

**Subject: Hydrocarbon fingerprint analysis and evaluation of three soil samples from the Eureka Lodge, Eureka, Alaska.**

### Introduction

Three soil samples were submitted to Torkelson Geochemistry by ERM. for extraction, hydrocarbon fingerprint (capillary gas chromatography) analysis and interpretation of results, see chain of Custody, Figure 1.

The following are my interpretations/opinions of the data. Please keep in mind that these interpretations are made without any hands on knowledge of the site or other analyses done on the samples. In addition, the petroleum in the samples has probably been altered/weathered which can make an accurate interpretation of product type somewhat more difficult since some of the key features of the product have been altered or removed by the evaporation, water washing and perhaps bacterial processes.

### Discussion of Gas Chromatography Results

The material extracted from soil sample TB-2 appears to be a mixture of extremely weathered middle distillate, either diesel fuel or fuel oil, and a smaller amount of unidentifiable heavier material. The gas chromatogram of the TB-2 extract (Figures 2 and 7) shows a series of peaks that starts at about nC9 and continues to the end of the chromatogram and an unresolved hump that starts at about nC10, reaches a maximum at about nC14 or nC15 and continues to about nC24. The range, types of peaks, proportions of peaks and unresolved hump from nC9 to nC24 are typical of an extremely weathered middle distillate probably a diesel fuel or fuel oil. The most noticeable weathering of middle distillates is biodegradation which selectively reduces the size of the normal paraffin peaks (labeled nC8 to nC25) relative to other peaks such as the isoprenoid peaks (labeled IP13, IP14, IP15, IP16, IP18, Pristane and Phytane). Based on the degree of biodegradation and the technique first developed by Christensen and Larsen (1993) and later confirmed and expanded upon by Schmidt, Beckmann and Torkelson (1999) and Hurst and Schmidt (2005), sample TB-2 is estimated to have been released about 16 +/-2 years ago. The identity of the material from nC24 to the end of the chromatogram is not clear, one possibility is weathered lube oil.

The material extracted from the TB-3 soil sample appears to be a moderately weathered middle distillate, either diesel fuel or fuel oil. The gas chromatogram of the TB-3 extract (Figures 3 and 8) shows a series of peaks that starts at about ethylbenzene (EB) and continues to about nC26 and an unresolved hump that starts at about nC10, reaches a maximum at about nC14 or nC15 and continues to about nC26. The range, types of peaks, proportions of peaks and unresolved hump are typical of a moderately weathered middle distillate probably a diesel fuel or fuel oil. The most noticeable weathering of middle distillates is biodegradation which selectively reduces the size of the normal paraffin peaks (labeled nC8 to nC25) relative to other peaks such as the isoprenoid peaks (labeled IP13, IP14, IP15, IP16, IP18, Pristane and Phytane). Based on the degree of biodegradation and the technique first developed by Christensen and Larsen (1993) and later confirmed and expanded upon by Schmidt, Beckmann and Torkelson (1999) and Hurst and Schmidt (2005), the extract from soil sample TB-3 is estimated to have been released about 3 +/-2 years ago.

The material extracted from the TB-4 soil sample appears to be a mixture of severely weathered middle distillate, either diesel fuel or fuel oil and a much smaller amount of unidentifiable heavier material. The gas chromatogram of the TB-4 extract (Figures 4 and 9) shows a series of peaks that starts at about nC11 and continues to about

nC36 and an unresolved hump that starts at about nC11, reaches a maximum at about nC16 or nC17 and continues to about nC26. The range, types of peaks, proportions of peaks and unresolved hump from nC11 to nC26 are typical of an severely weathered middle distillate probably a diesel fuel or fuel oil. The most noticeable weathering of middle distillates is biodegradation which selectively reduces the size of the normal paraffin peaks (labeled nC8 to nC25) relative to other peaks such as the isoprenoid peaks (labeled IP13, IP14, IP15, IP16, IP18, Pristane and Phytane. Based on the degree of biodegradation and the technique first developed by Christensen and Larsen (1993) and later confirmed and expanded upon by Schmidt, Beckmann and Torkelson (1999) and Hurst and Schmidt (2005), sample TB-4 is estimated to have been released about 12 +/-2 years ago. The identity of the material from nC26 to the end of the chromatogram is not clear, one possibility is weathered lube oil.

Please let me know if you have any questions regarding this preliminary interpretation.



Bruce Torkelson

Christensen, L. B. and Larsen, T. H., "Method for Determining the Age of Diesel Oil Spills in the Soil, Ground Water Monitoring and Remediation," Vol.. 13, No. 4, pp. 1420-149 (1993).

Schmidt, G.W., Beckmann, D.D., and Torkelson, B.E., "Advances in Correlation and Age Dating of Petroleum Products Released to Soils and Groundwater", proceedings of the IPEC meeting, Houston, TX, November, 1999.

Hurst, R.W. and Schmidt, G.W., "Age significance of nC17/Pr ratios in forensic investigations of refined product and crude oil releases", Environmental Geosciences, Vol 12, No. 3, September 2005, pp. 177-192.





# Torkelson Geochemistry, Inc.

2528 S. Columbia Place  
Tulsa, OK 74114-3233

Phone: 918-749-8441  
Fax: 918-749-6005

e-mail: BTorkelson@torkelsongeochemistry.com

## CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Project: Eureka Lodge

Location: Eureka Alaska

Proj. No.: 0424283

P.O.:

Sampled By: Jeremy Staview / Kasi Murray

Report/Bill To: ERM (Stephen Witzmann)

Address: 825 W. 5th Ave  
Anchorage AK 99501

Phone: 907-258-4880 <sup>204</sup> 907-258-4401

Fax: 907-258-4033

e-mail: Stephen.Witzmann@erm.com

### Additional Instructions

Requested Turn-Around Time: Standard

ITEM NO.	SAMPLE DESCRIPTION	DATE	MATRIX	LAB NO.	Total # OF Vials	PRESERVATIVES		ANALYSES REQUESTED										REMARKS			
						None		GC Characterization	Density	Viscosity	Water Surface Tension	NAPL Surface Tension	NAPL/Water Interfac. Tens.	Lead	Sulfur						
1	TB-2	10/4/17	Soil		1	X			X												@ 1320
2	TB-3	10/4/17	Soil		1	X			X												@ 1400
3	TB-4	10/4/17	Soil		1	X			X												@ 1700
4																					
5																					
6																					
7																					
8																					
9																					
10																					

RELINQUISHED BY	DATE	TIME	ACCEPTED BY	DATE	TIME
<u>Kasi Murray</u>	<u>10/6/2017</u>	<u>1000</u>	<u>Bruce Torkelson</u>	<u>10-10-17</u>	<u>1508</u>

Figure 1, Chain of Custody.

# Torkelson Geochemistry, Inc. GC/FID

Eureka Lodge, Eureka, Alaska  
Sample ID : TB-2  
Acquired : Oct 24, 2017 12:36:14

c:\ezchrom\chrom\17117\tb-2.sl -- Channel A

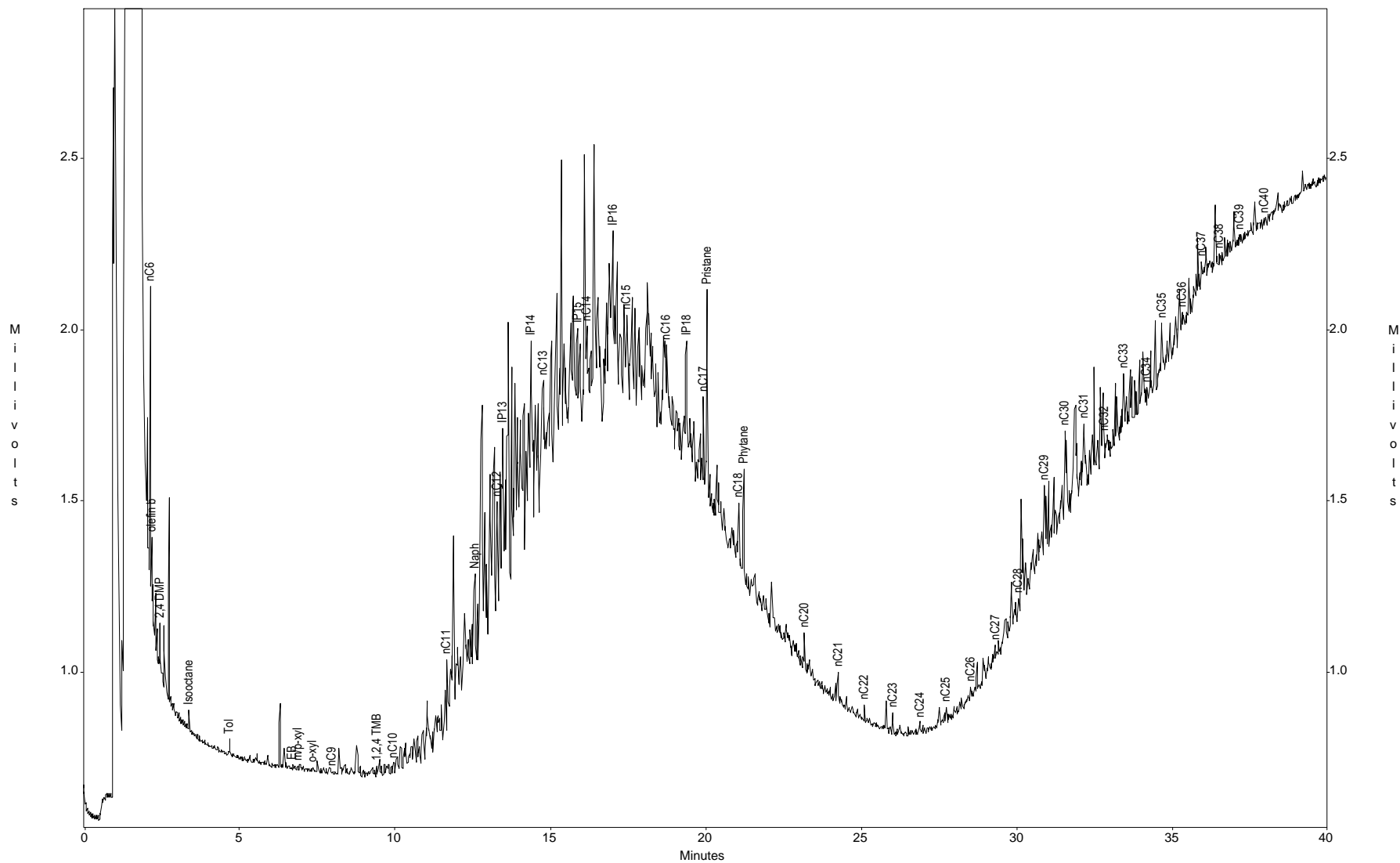


Figure 2, Gas chromatogram of extract of the extract from soil sample TB-2.

Torkelson Geochemistry, Inc.  
GC/FID

Eureka Lodge, Eureka, Alaska  
Sample ID : TB-3  
Acquired : Oct 24, 2017 10:58:38

c:\ezchrom\chrom\17117\tb-3.sl -- Channel A

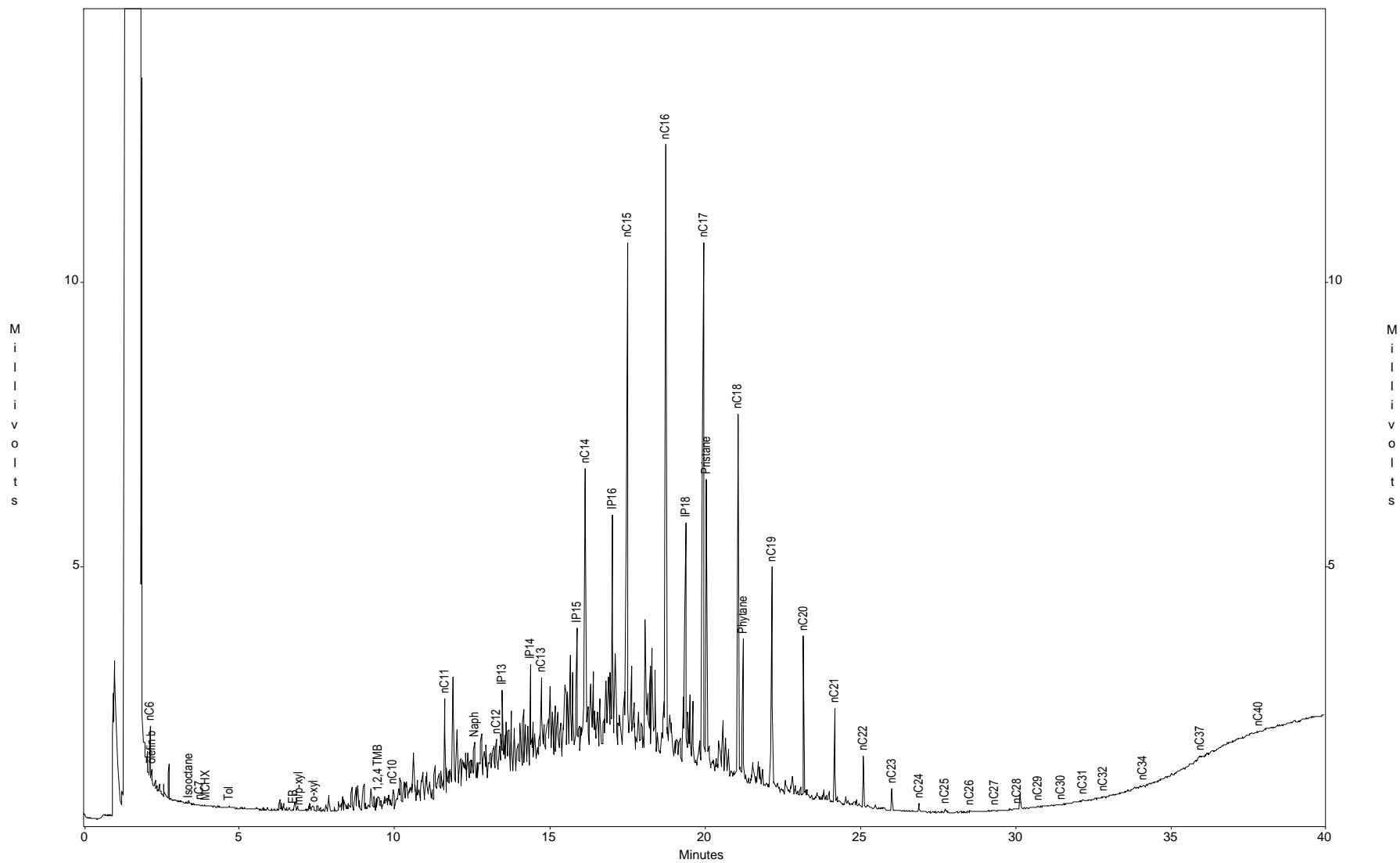


Figure 3, Gas chromatogram of extract of the extract from soil sample TB-3.

Torkelson Geochemistry, Inc.  
GC/FID

Eureka Lodge, Eureka, Alaska  
Sample ID : TB-4  
Acquired : Oct 24, 2017 11:48:22

c:\ezchrom\chrom\17117\tb-4.sl -- Channel A

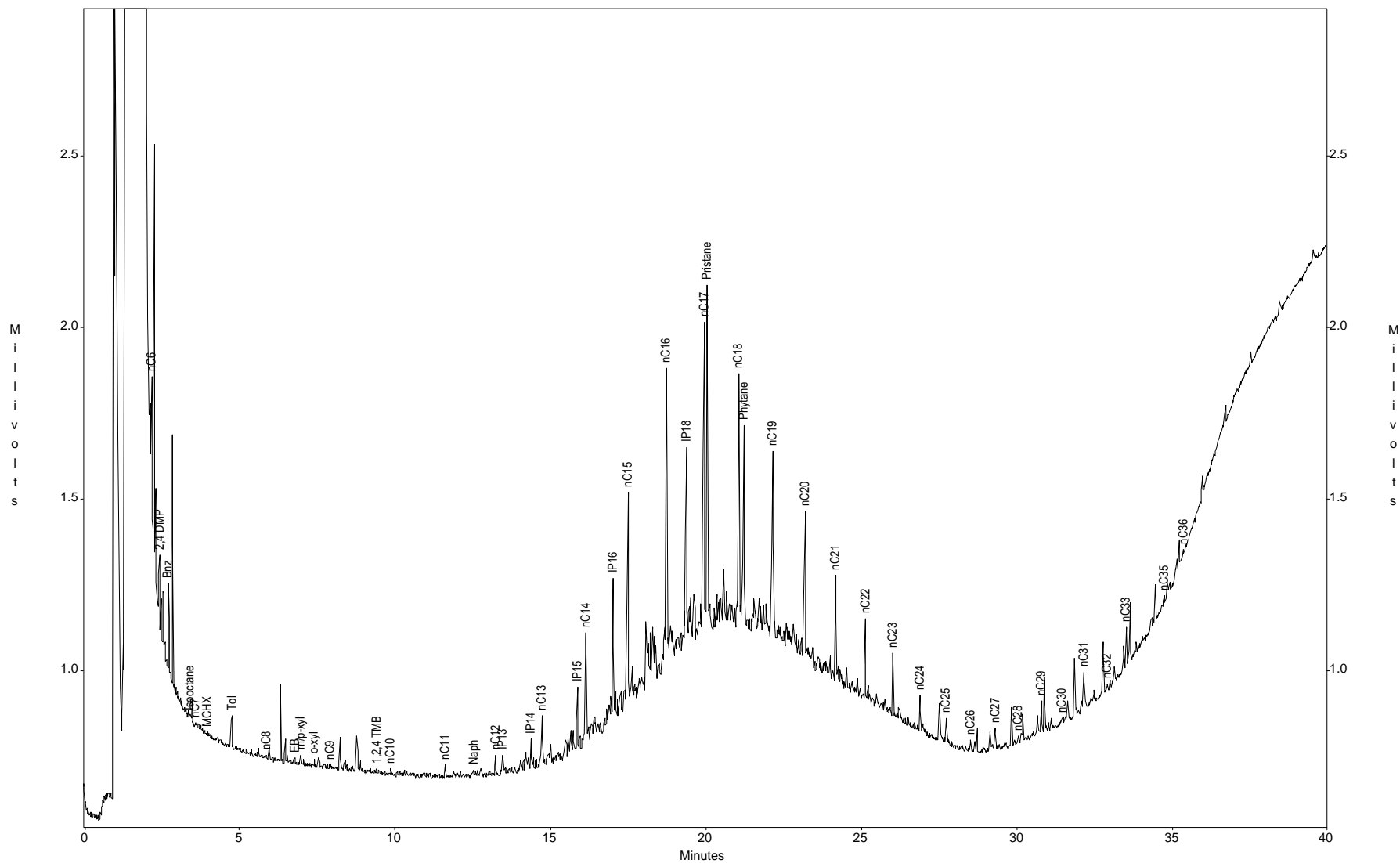


Figure 4, Gas chromatogram of extract of the extract from soil sample TB-4.

Torkelson Geochemistry, Inc.  
GC/FID

Eureka Lodge, Eureka, Alaska  
Sample ID : Gas/Dies/Wax std  
Acquired : Oct 24, 2017 08:36:16

c:\ezchrom\chrom\17117\gadiwax.sl -- Channel A

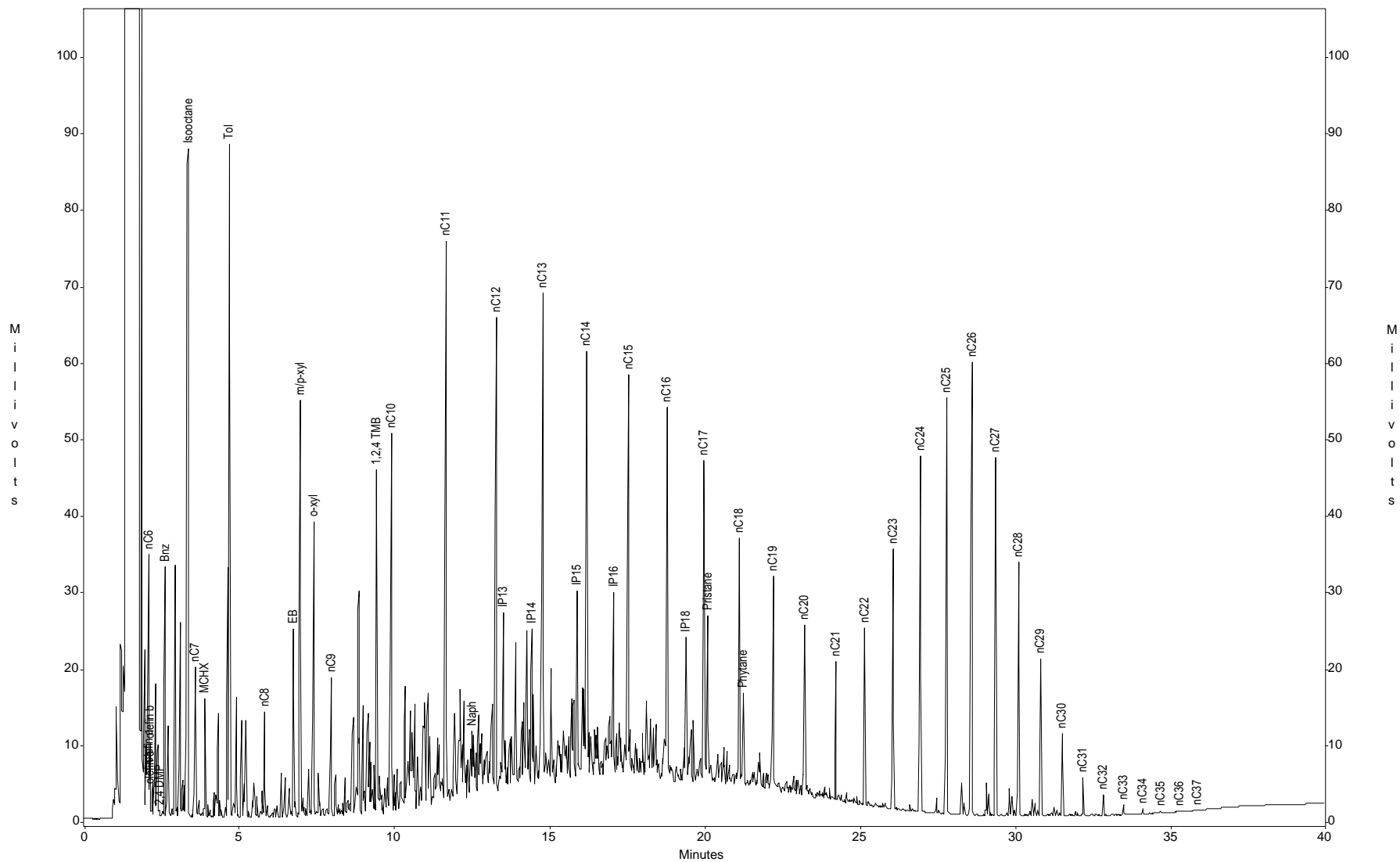


Figure 5, Gas chromatogram of laboratory standard (gasoline/diesel/wax mixture).

Torkelson Geochemistry, Inc.  
GC/FID

Eureka Lodge, Eureka, Alaska  
Sample ID : Blank  
Acquired : Oct 24, 2017 09:23:39

c:\ezchrom\chrom\171117\blank.sl -- Channel A

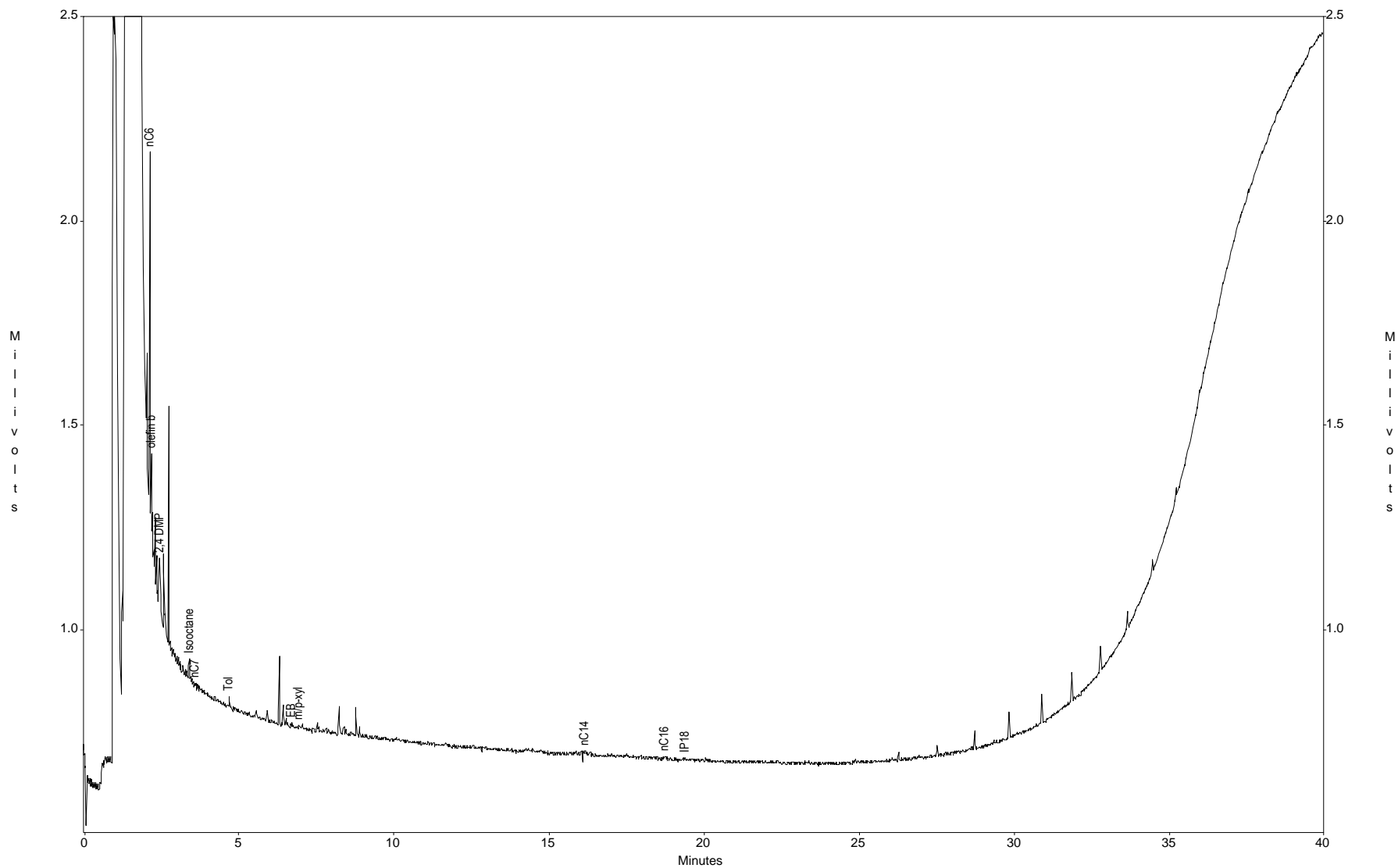
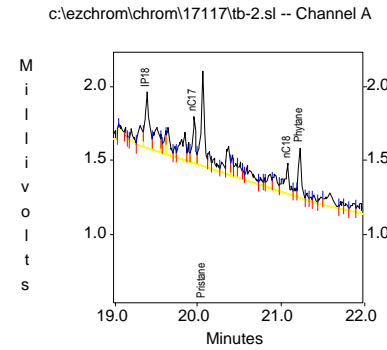
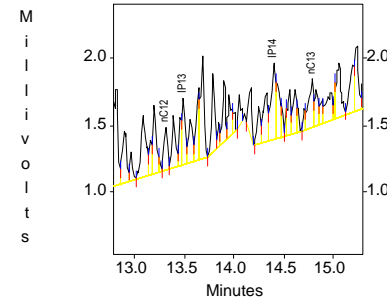
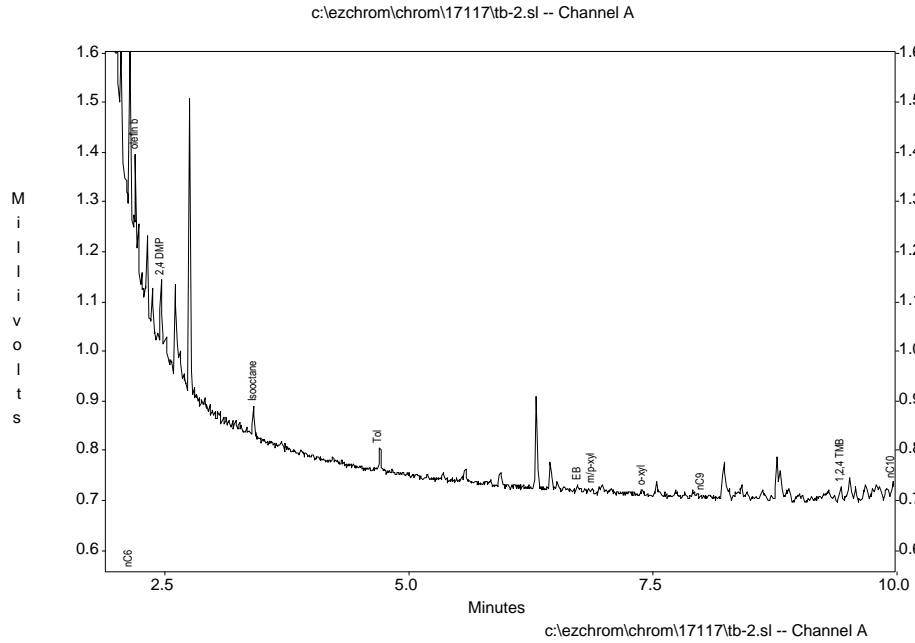


Figure 6, Gas chromatogram of laboratory Blank.

Eureka Lodge, Eureka, Alaska  
 Sample ID : TB-2  
 Acquired : Oct 24, 2017 12:36:14

c:\ezchrom\chrom\17117\tb-2.sl -- Channel A

Channel A Results



Peak	Area	Height
nC6	596	862
olefin a	0	0
olefin b	160	201
olefin c	0	0
2,4 DMP	188	139
Bnz	0	0
Isooctane	80	59
nC7	0	0
MCHX	0	0
Tol	57	42
nC8	0	0
EB	25	14
m/p-xyl	11	8
o-xyl	19	11
nC9	19	7
1,2,4 TMB	65	32
nC10	125	32
nC11	434	204
Naph	748	260
nC12	811	322
IP13	1038	497
IP14	1631	565
nC13	1307	357
IP15	375	210
nC14	510	227
IP16	1288	541
nC15	889	278
nC16	527	274
IP18	1247	370
nC17	762	310
Pristane	1702	646
nC18	785	208
Phytane	791	333
nC19	0	0
nC20	312	114
nC21	248	94
nC22	86	52
nC23	122	66
nC24	118	36
nC25	78	44
nC26	57	38
nC27	162	55
nC28	183	67
nC29	784	254
nC30	768	299
nC31	855	216
nC32	121	71
nC33	239	146
nC34	99	44
nC35	264	130
nC36	65	39
nC37	47	48
nC38	100	32
nC39	43	24
nC40	48	25

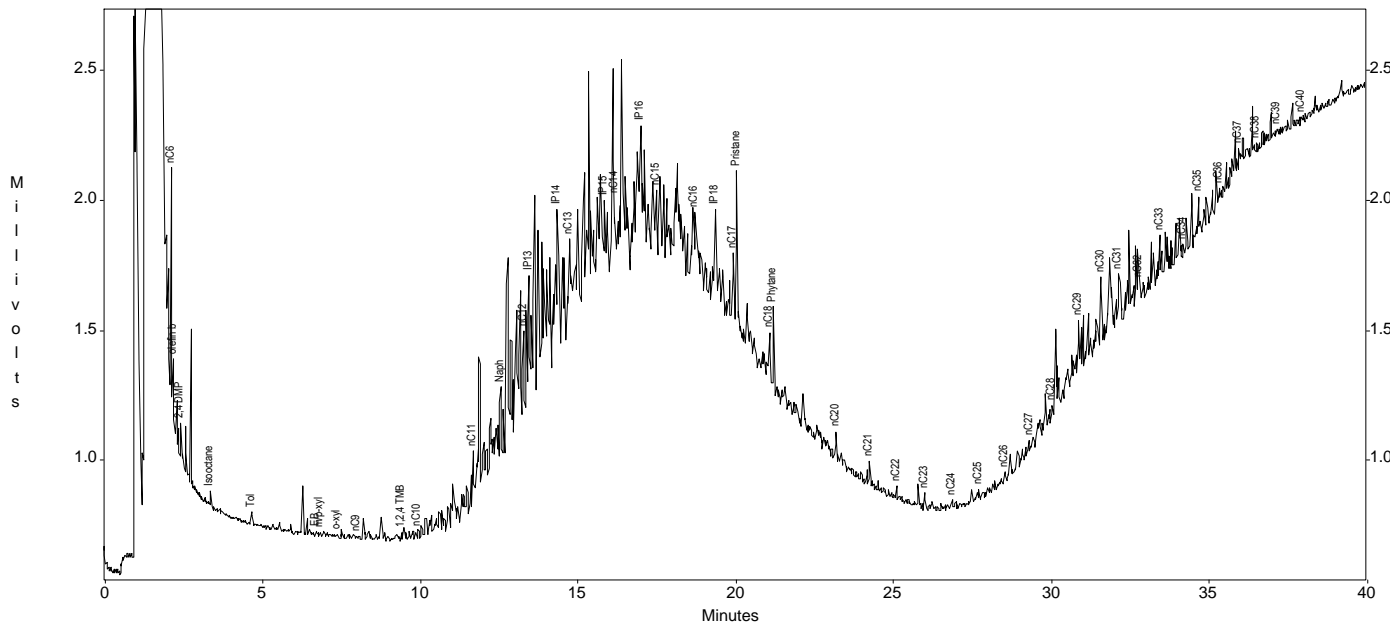


Figure 7, Multipanel display of gas chromatogram of the extract from soil sample TB-2.

Eureka Lodge, Eureka, Alaska  
 Sample ID : TB-3  
 Acquired : Oct 24, 2017 10:58:38

c:\ezchrom\chrom\17117\tb-3.sl -- Channel A

Channel A Results

Peak	Area	Height
nC6	581	892
olefin a	0	0
olefin b	151	207
olefin c	0	0
2,4 DMP	0	0
Bnz	0	0
Isocotane	11	17
nC7	25	12
MCHX	22	12
Tol	40	35
nC8	0	0
EB	67	36
m/p-xy1	50	16
o-xy1	115	72
nC9	0	0
1,2,4 TMB	408	218
nC10	269	192
nC11	2984	1697
Naph	2721	752
nC12	2168	670
IP13	3361	1484
IP14	2970	1771
nC13	3571	1477
IP15	3728	2183
nC14	10318	4878
IP16	8368	4100
nC15	16259	8899
nC16	17518	10735
IP18	9464	4199
nC17	15614	9215
Pristane	11007	5082
nC18	9714	6430
Phytane	5459	2500
nC19	7328	3912
nC20	4576	2837
nC21	2563	1650
nC22	1472	896
nC23	683	393
nC24	301	149
nC25	101	55
nC26	43	24
nC27	23	15
nC28	45	10
nC29	67	24
nC30	130	9
nC31	138	34
nC32	68	15
nC33	0	0
nC34	168	27
nC35	0	0
nC36	0	0
nC37	235	35
nC38	0	0
nC39	0	0
nC40	85	21

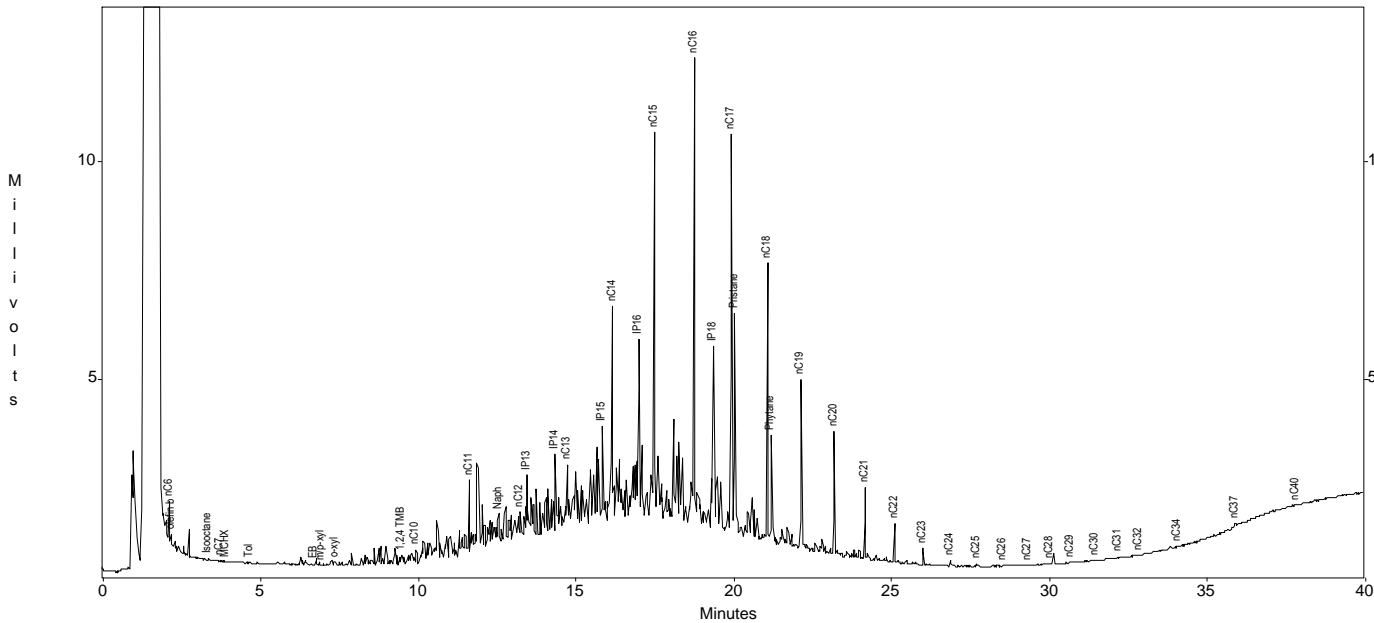
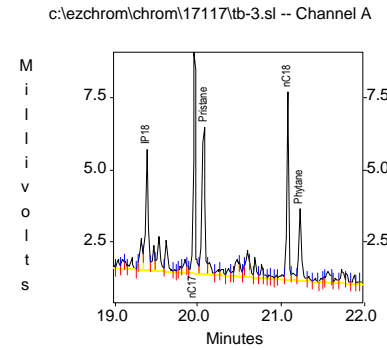
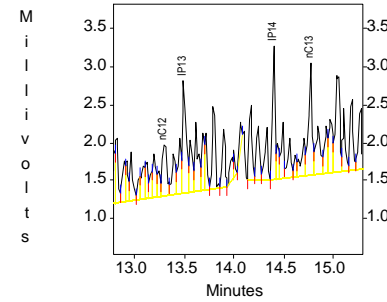
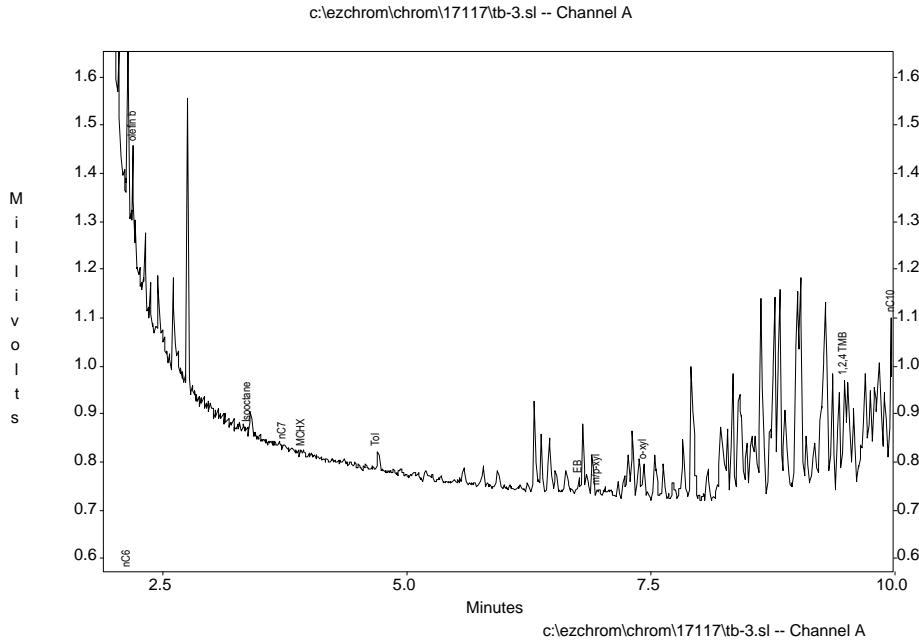


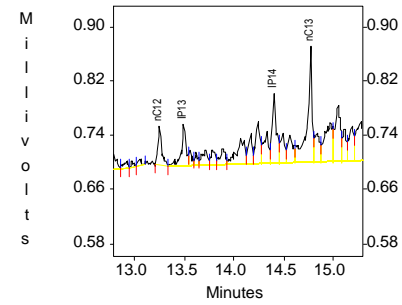
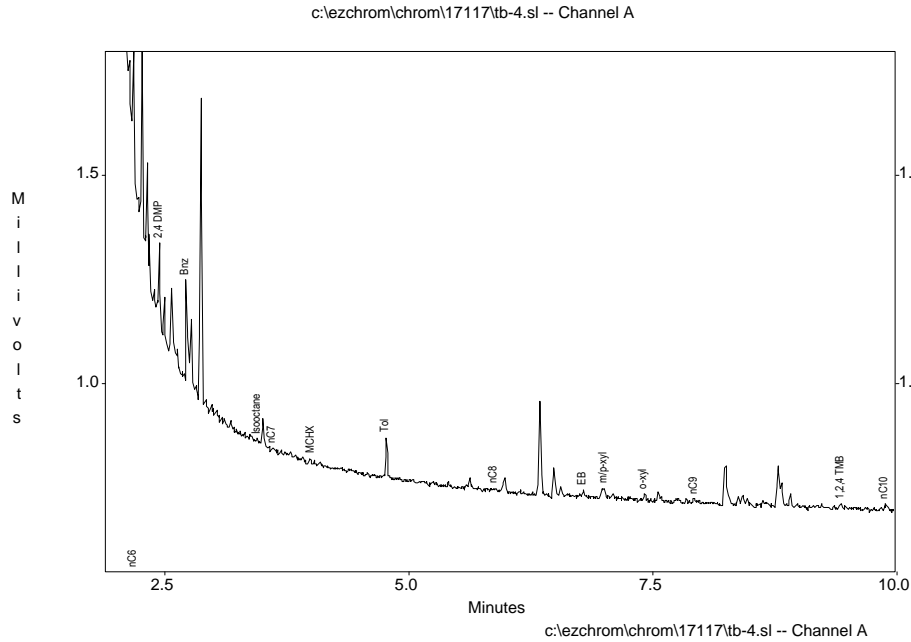
Figure 8, Multipanel display of gas chromatogram of the extract from soil sample TB-3.



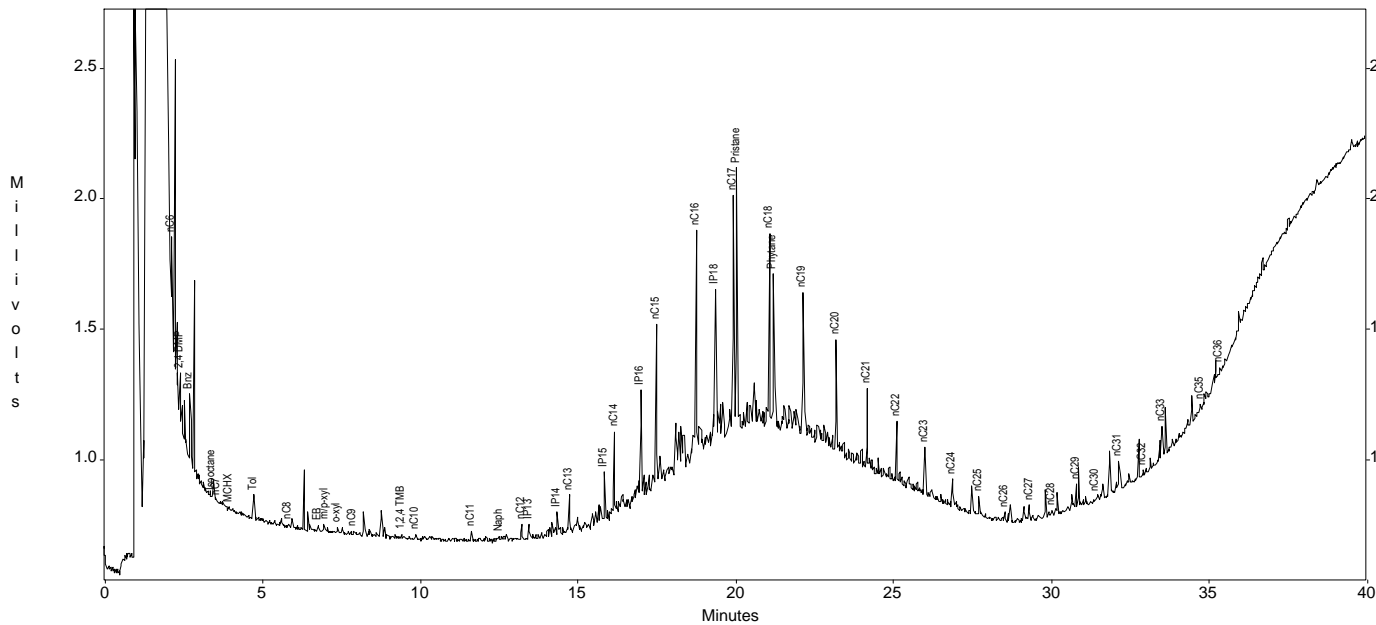
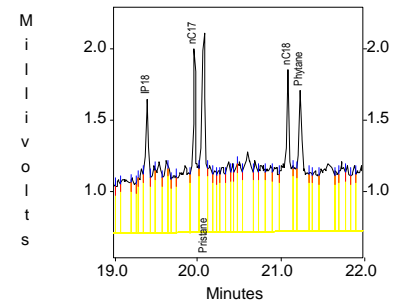
Eureka Lodge, Eureka, Alaska  
 Sample ID : TB-4  
 Acquired : Oct 24, 2017 11:48:22

c:\ezchrom\chrom\17117\tb-4.sl -- Channel A

Channel A Results



c:\ezchrom\chrom\17117\tb-4.sl -- Channel A



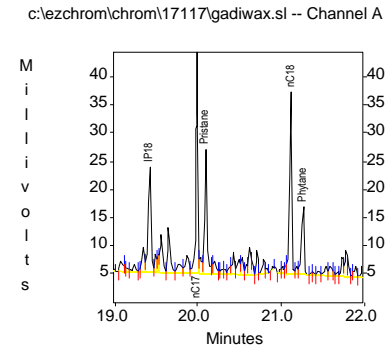
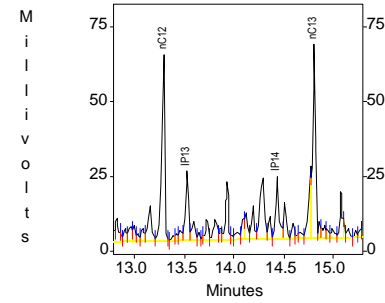
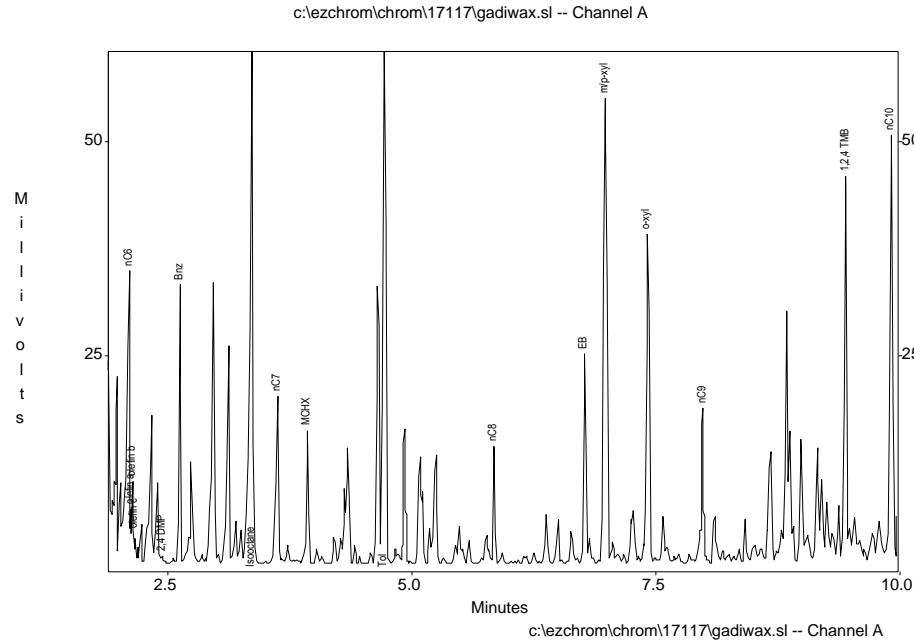
Peak	Area	Height
olefin a	0	0
nC6	202	295
olefin b	0	0
olefin c	0	0
2,4 DMP	163	193
Bnz	329	247
Isooctane	34	14
nC7	19	11
MCHX	13	11
Tol	135	93
nC8	12	6
EB	21	14
m/p-xy1	47	28
o-xy1	30	17
nC9	22	11
1,2,4 TMB	43	17
nC10	41	16
nC11	95	38
Naph	139	22
nC12	151	58
IP13	200	61
IP14	314	104
nC13	625	171
IP15	826	250
nC14	1856	405
IP16	1656	560
nC15	2731	811
nC16	4025	1166
IP18	3465	934
nC17	4403	1296
Pristane	4699	1404
nC18	5883	1140
Phytane	4984	988
nC19	3939	909
nC20	2729	729
nC21	2205	539
nC22	2127	407
nC23	937	304
nC24	624	177
nC25	244	108
nC26	100	40
nC27	189	66
nC28	56	22
nC29	217	98
nC30	132	20
nC31	393	111
nC32	58	19
nC33	232	112
nC34	0	0
nC35	93	25
nC36	39	19
nC37	0	0
nC38	0	0
nC39	0	0
nC40	0	0

Figure 9, Multipanel display of gas chromatogram of the extract from soil sample TB-4.

Eureka Lodge, Eureka, Alaska  
 Sample ID : Gas/Dies/Wax std  
 Acquired : Oct 24, 2017 08:36:16

c:\ezchrom\chrom\17117\gadiwax.sl -- Channel A

Channel A Results



Peak	Area	Height
nC6	31030	31571
olefin a	3237	4246
olefin b	5322	7986
olefin c	1529	2503
2,4 DMP	714	668
Bnz	30309	32550
Isooctane	156348	87319
nC7	30558	19496
MCHX	23339	15427
Tol	143612	87973
nC8	19601	13646
EB	34846	24437
m/p-xy	97884	54457
o-xy	67174	38568
nC9	35003	18088
1,2,4 TMB	82516	44989
nC10	97305	49345
nC11	156156	72727
Naph	14544	8572
nC12	128604	62070
IP13	47182	23312
IP14	43985	20629
nC13	110710	64289
IP15	42204	24223
nC14	115987	55047
IP16	54386	24038
nC15	115253	52758
nC16	99838	48895
IP18	43349	18888
nC17	78911	42287
Pristane	47482	22027
nC18	56641	32330
Phytane	27349	12200
nC19	49086	28229
nC20	40913	22368
nC21	28282	18219
nC22	36917	23360
nC23	59127	34088
nC24	91210	46547
nC25	111743	54376
nC26	117430	59200
nC27	92146	46808
nC28	59167	33191
nC29	33490	20586
nC30	17024	10731
nC31	8303	4981
nC32	4188	2595
nC33	2164	1359
nC34	1103	653
nC35	558	310
nC36	249	142
nC37	115	65
nC38	0	0
nC39	0	0
nC40	0	0

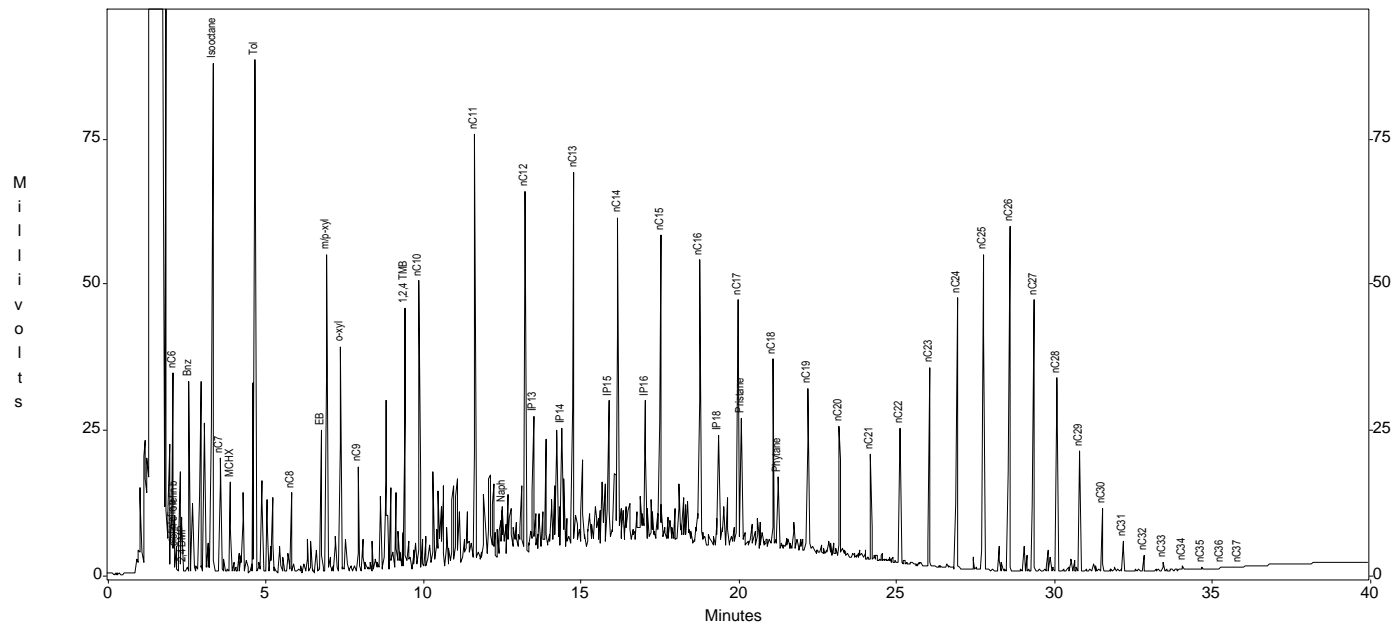


Figure 10, Multipanel display of gas chromatogram of laboratory standard (gasoline/diesel/wax mixture).

Eureka Lodge, Eureka, Alaska  
 Sample ID : Blank  
 Acquired : Oct 24, 2017 09:23:39

c:\ezchrom\chrom\17117\blank.sl -- Channel A

Channel A Results

Peak	Area	Height
nC6	579	868
olefin a	0	0
olefin b	167	196
olefin c	0	0
2,4 DMP	154	121
Bnz	0	0
Isooctane	71	50
nC7	13	14
MCHX	0	0
Tol	25	22
nC8	0	0
EB	19	9
m/p-xy1	25	8
o-xy1	0	0
nC9	0	0
1,2,4 THB	0	0
nC10	0	0
nC11	0	0
Naph	0	0
nC12	0	0
IP13	0	0
IP14	0	0
nC13	0	0
IP15	0	0
nC14	81	18
IP16	0	0
nC15	0	0
nC16	23	7
IP18	10	6
nC17	0	0
Pristane	0	0
nC18	0	0
Phytane	0	0
nC19	0	0
nC20	0	0
nC21	0	0
nC22	0	0
nC23	0	0
nC24	0	0
nC25	0	0
nC26	0	0
nC27	0	0
nC28	0	0
nC29	0	0
nC30	0	0
nC31	0	0
nC32	0	0
nC33	0	0
nC34	0	0
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nC36	0	0
nC37	0	0
nC38	0	0
nC39	0	0
nC40	0	0

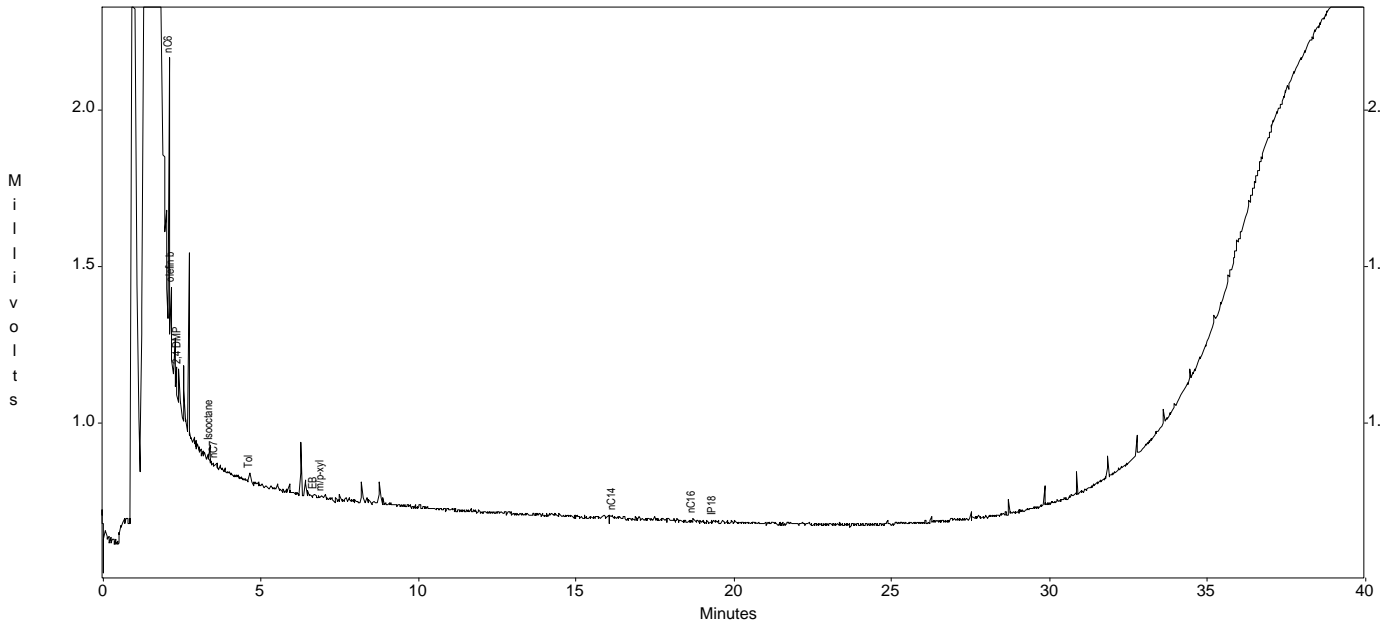
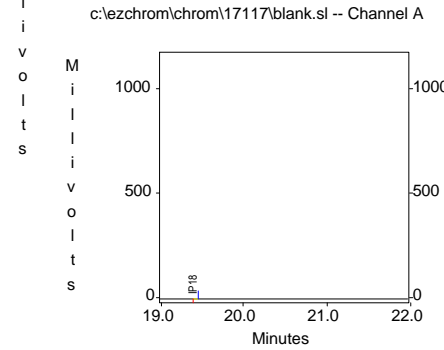
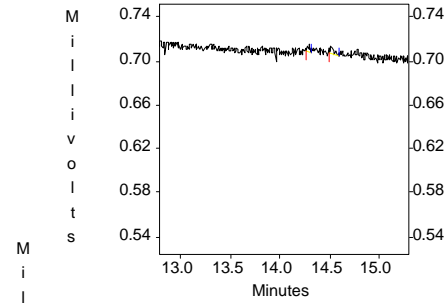
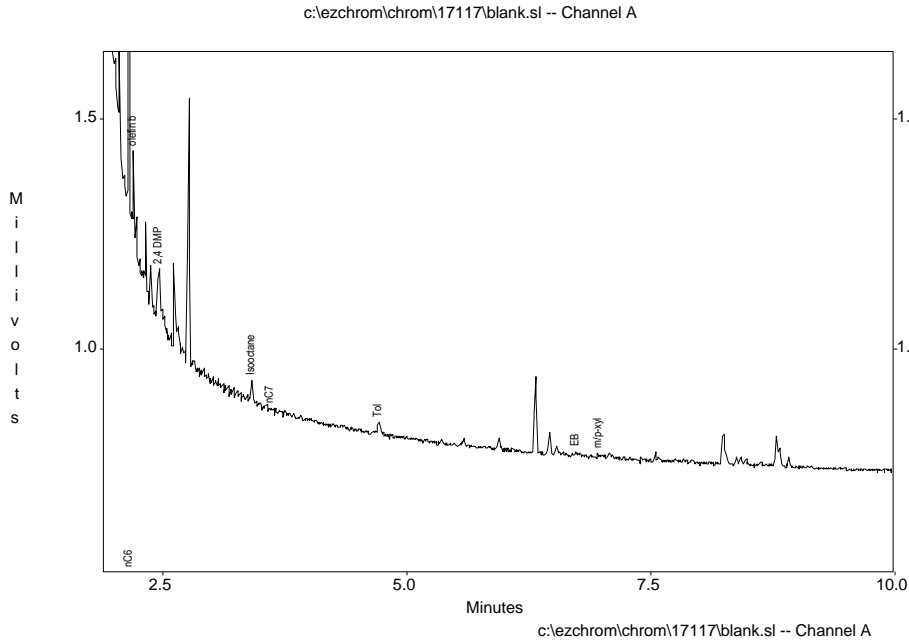


Figure 11, Multipanel display of gas chromatogram of laboratory Blank.

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## **APPENDIX I**

### **Responses to ADEC Comments**

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## Stephen Witzmann

---

**From:** Lidren, Grant M (DEC) <grant.lidren@alaska.gov>  
**Sent:** Tuesday, May 22, 2018 11:20 AM  
**To:** Stephen Witzmann  
**Cc:** Prathap Kodial (prathap.kodial@crowley.com); Carrie Godden (carrie.godden@crowley.com); Jeff Leety  
**Subject:** RE: Eureka Lodge Report: Draft Responses to ADEC Comments

Stephen, I have no objections to ERM's response to DEC comments. Please finalize the document and submit an electronic copy.

Thanks, Grant

---

**From:** Stephen Witzmann [mailto:Stephen.Witzmann@erm.com]  
**Sent:** Tuesday, May 22, 2018 11:15 AM  
**To:** Lidren, Grant M (DEC) <grant.lidren@alaska.gov>  
**Cc:** Prathap Kodial (prathap.kodial@crowley.com) <prathap.kodial@crowley.com>; Carrie Godden (carrie.godden@crowley.com) <carrie.godden@crowley.com>; Jeff Leety <Jeff.Leety@erm.com>  
**Subject:** FW: Eureka Lodge Report: Draft Responses to ADEC Comments

Hi Grant,

Please find the modified response to comments form attached.

Please let me know if it is OK to finalize the document.

Thanks, Stephen

---

**From:** Lidren, Grant M (DEC) <grant.lidren@alaska.gov>  
**Sent:** Friday, May 18, 2018 2:28 PM  
**To:** Stephen Witzmann <Stephen.Witzmann@erm.com>  
**Cc:** Prathap Kodial (prathap.kodial@crowley.com) <prathap.kodial@crowley.com>; Carrie Godden (carrie.godden@crowley.com) <carrie.godden@crowley.com>; Jeff Leety <Jeff.Leety@erm.com>  
**Subject:** RE: Eureka Lodge Report: Draft Responses to ADEC Comments

Stephen, see my response to ERM comments and one additional DEC comment.

Thanks, Grant

---

**From:** Lidren, Grant M (DEC)  
**Sent:** Friday, May 18, 2018 11:12 AM  
**To:** 'Stephen Witzmann' <Stephen.Witzmann@erm.com>  
**Cc:** Prathap Kodial (prathap.kodial@crowley.com) <prathap.kodial@crowley.com>; Carrie Godden (carrie.godden@crowley.com) <carrie.godden@crowley.com>; Jeff Leety <Jeff.Leety@erm.com>  
**Subject:** RE: Eureka Lodge Report: Draft Responses to ADEC Comments

Received, thanks. I'm just starting to review, but I went ahead and updated the problem comment on the public CS database. Note: Crowley was RP for 2008 release:

...In 2002, 450 gallons of heating oil spilled "several hundred feet east of the gasoline and diesel storage tanks" and the lake (closed spill No. 02239912002). In 2008, three gallons of diesel were released(closed spill No 08239905002). The Eureka Lodge has been selling fuel since at least 1948 (Anchorage Museum of History & Art. Library & Archives).



---

**From:** Stephen Witzmann [<mailto:Stephen.Witzmann@erm.com>]

**Sent:** Friday, May 18, 2018 8:45 AM

**To:** Lidren, Grant M (DEC) <[grant.lidren@alaska.gov](mailto:grant.lidren@alaska.gov)>

**Cc:** Prathap Kodial ([prathap.kodial@crowley.com](mailto:prathap.kodial@crowley.com)) <[prathap.kodial@crowley.com](mailto:prathap.kodial@crowley.com)>; Carrie Godden ([carrie.godden@crowley.com](mailto:carrie.godden@crowley.com)) <[carrie.godden@crowley.com](mailto:carrie.godden@crowley.com)>; Jeff Leety <[Jeff.Leety@erm.com](mailto:Jeff.Leety@erm.com)>

**Subject:** Eureka Lodge Report: Draft Responses to ADEC Comments

Good morning Grant,

Attached please find the following documents relating to the Eureka Lodge Report:

- Draft responses to ADEC comments
- An updated version of Figure 3
- 2002 Spill Report (details are in SearchedSpills.xlsx)

You had provided the 2010 Spill Summary Report with your comments. It provides additional information on the 2002 spill. Based on that information we located the 2002 spill report on the ADEC website.

The available data indicates that a large (at least 450 gallon) spill occurred in 2002 due to corrosion of structural/mechanical components. No responsible party was identified, no cleanup was done, and the case was closed with no further action.

Two removal actions were conducted to address the 2010 spill, which appears to have been much smaller. That work was followed up with site characterization and monitoring in 2012, 2013, and 2017. As stated in the draft report, based on the estimated volume of fuel removed in soil excavated after the 2010 spill (MLFA 2010a, 2010b), the results of forensic analysis, and review of a chromatograph from the soil removed in 2010, residual fuel contamination appears to be from an older middle range distillate fuel spill at the site. The new information provides further support for that conclusion.



Once you have had a chance to review this material, please let us know if you would like to discuss it, or whether the responses to ADEC's comments are acceptable.

Thanks, Stephen

Stephen Witzmann, PE  
Board Certified Environmental Engineer

**ERM Alaska, Inc.**

825 W. 8<sup>th</sup> Avenue | Anchorage, AK, 99501

**T** 907 264 4401 | **M** 907 444 4391 (cell)

**Main** 907 258 4800

[stephen.witzmann@erm.com](mailto:stephen.witzmann@erm.com)

[www.erm.com](http://www.erm.com)



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**Responses to ADEC Comments on the 2017 Monitoring Report Eureka Lodge  
Comments provided by Grant Lidren**

Comment #	Section	Page	ADEC Comment	Response	ADEC Comment and Final Resolution
1			<p>Crowley initially estimated amount of premium gasoline spilled was up to 20 gallons, but the exact amount is unknown. The tank was not gauged prior to the filling of the AST. Additionally, it took five days before any soil was excavated(see attached PERP spill report).</p>	<p>The 2010 second sentence of Section 2.1 will be replaced with the following text, "Based on the Spill Summary Report (Spill Number 10239916202), Crowley personnel initially estimated that 20 gallons of supreme unleaded gasoline were released to the soil beneath the tank. This estimate was based on the flow rate of the pump and estimated reaction time for the truck driver. The 2010 <i>Spill Response Report</i> estimated the release volume as ten gallons. The exact amount of fuel released is unknown."</p> <p>The Spill Summary Report (PERP spill report) will be included in Appendix I of the report: Responses to ADEC Comments.</p> <p>The 2010 Spill Summary Report references the 2002 spill case file, which also contains pertinent information. The following information concerning the 2002 spill will be added to the text: "The release occurred on approximately April 29th, 2002, included 450 gallons of home heating oil (or diesel fuel), and was recorded as case file 02239912002. The location of the 2002 spill is unknown and variously reported as "some distance east of gasoline tank" and "several hundred feet east." The following data is listed in the ADEC Spill Prevention and Response Spill Database:</p> <ul style="list-style-type: none"> <li>a. Responsible party for the 2002 spill: unknown</li> <li>b. Response: "Field Visit/s"</li> <li>c. Cause: Corrosion (Mechanical/Structural)</li> <li>d. Status: Case Closed, No Further Action on September 5th, 2002.</li> </ul>	<p>OK. This additional background information should be added to the report: In 2008, three gallons of diesel were released(closed spill No 08239905002). The Eureka Lodge has been selling fuel since at least 1948 (Anchorage Museum of History &amp; Art. Library &amp; Archives).</p> <p>==&gt; The recommended changes will be made.</p> <p>The Spill Summary Report provided by ADEC will be included in an appendix to the report.</p>
2	General	General	Note: ADEC did not review or approve the soil sampling documented in the report.	Comment noted.	OK
3	3.5	14	Where were the forensic soil samples collected and by what means (note: the report states the locations are displayed on figure 3, but I am unable to locate)? Note, the final excavation depths, completed in September 2010, were 3 ft bgs on north end and max depth of excavation was 6-7 ft bgs on other boundaries. The 2017 forensic samples were collected 1.5, 2.15 and 3.7 ft. bgs.	<p>The sample locations were added to Figure 3 (attached). The following text will be added to document where and how the samples were collected. "To assess impacted soil, sample locations and depths were determined based on two factors. First, the extent and distribution of residual contamination as documented in the 2010 <i>Spill Response Remedial Action Report</i> and the 2011 <i>Site Characterization Report</i> was considered. Second, because the September 2010 removal action excavation was lined with polyethylene sheeting prior to backfill, the sheeting was used to distinguish impacted soil from backfill. Samples TB-2 and TB-3 were collected outside of the footprint of the September 2010 excavation; sample TB-4 was collected beneath the backfill from the 2010 excavation. Samples were collected using a soil auger and clean sample spoon. Unpreserved 4 ounce jars were filled with soil and submitted to Torkelson Geochemistry, Inc., a firm that specializes in forensic evaluation. "</p>	OK

**Responses to ADEC Comments on the 2017 Monitoring Report Eureka Lodge  
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4	3.1.1	11	<p>Groundwater sample collection: ADEC regulates the groundwater pathway unless we are in the arctic zone, in an area of continuous permafrost, or a 350 determination has been made. Since these situations do not apply to this site, ADEC will regulate the groundwater in the monitoring wells as a potential drinking water source, which appear hydraulically connected to surface water.</p>	<p>Groundwater at the site is used for a drinking water system. Thus, groundwater at the site is considered to be a drinking water source, and the provisions of 18 AAC 75.350 are not applicable to the site.</p> <p>ERM concurs that there is a hydrologic connection present at the site. This connection is very limited and appears to run from the nearby lake, downgradient to the drinking water well. This connection is limited to a gravel lens from 20 feet bgs to 22 feet bgs that intercepts the drinking water well.</p> <p>The hydrologic connection does not extend to the monitoring wells. These wells do not intercept any geological stratum that would be recognized as productive aquifer material. Instead, water accumulating in the monitoring wells appears to be stagnant water accumulating slowly over time from precipitation and snow melt. This water is not associated with an aquifer, and continued monitoring of these wells is providing no useful data. According to ADEC Monitoring Well Guidance, "The goal is to obtain reliable and representative information regarding aquifer characteristics, groundwater flow directions, groundwater chemical and physical characteristics, and groundwater samples." The soils in the area of the monitoring wells have essentially no transmissivity or storativity (per the definitions in 18 AAC 75.990). No aquifer is present. Data from the monitoring wells cannot contribute to the goal.</p>	<p>Comment noted. The sentence at the end of 3.1.1.1. states "...drinking water is not a valid exposure pathway." this should be changed to "drinking water does not appear to be a valid exposure pathway." As stated in the previous comment, DEC regulates groundwater at this site as a potential drinking water source. Current and additional data could lead to a decision that this suspected melt water lense is not a transport mechanism that could transport contaminants to surface water and/or the 20 foot bgs Eureka lodge drinking water well located approximately 200 feet away. This than leads to the potential need for further evaluation including the advancement of additionally borings/MWs to determine the extent of soil contamination to the south and west and extent of potential groundwater contamination and flow direction.</p> <p>==&gt; The recommended rewording to the sentence at the end of Section 3.1.1.1 will be made.</p>
5	3.2	12	<p>Surface Water Sample Collection: section states samples were collected as shown on figure 3. Explain where/how the samples were collected(i.e. reference photo 12). Are there other people using the surface water at this area? It is my understanding this is a community drinking water source.</p>	<p>Please refer to the updated version of Figure 3 for sample collection locations.</p> <p>Section 3.2 will be revised to add reference to photograph 12 and explain how samples were collected: "Surface water samples 17-ERK-SW-01 and 17-ERK-SW-02 (and duplicate sample 17-ERK-SWZ ) were collected at the locations shown on Figure 3 and Photograph 12. These samples were collected using an extended pole with a beaker on the end. The beaker was dipped into the surface water to about 0.5 inches deep. The sample containers were filled up one by one starting with the volatile samples: GRO and BTEX."</p> <p>The following text will also be added to this section, "This surface water body is no longer used as a drinking water source. The Eureka Lodge now uses their drinking water well described in Section 3.3 and shown in Photographs 10 and 11. Based on input from the owners of the lodge, no other community members drink from the surface water body." Under 18 AAC 70.020, the State of Alaska protects surface waters for a variety of designated uses, including use of fresh water as a potential drinking water supply.</p>	<p>OK</p>

**Responses to ADEC Comments on the 2017 Monitoring Report Eureka Lodge  
Comments provided by Grant Lidren**

6	3.3	12	<p>Drinking Water Sample Collection: explain how/where the drinking water sample was collected(i.e. reference photo 11).</p>	<p>The following text will be added to Section 3.3: "Photograph 11 of Appendix C, was taken inside of the drinking water well house. The picture shows the top of the drinking water well with a PVC pipe connecting into the drinking water well filtration system. Located on the PVC pipe before the filtration system is a red valve with a hose connection. The hose connection leads outside of the well house. In order to bypass the filtration system and the collection storage tanks, once the system was fully purged, the drinking water sample was collected directly from the hose connection on the outside of the well house. Volatile samples were collected first, followed by nonvolatile samples. "</p> <p>Photograph 11 description was also updated to provide more detail: "Photograph 11: Inside of well house, PVC pipe leads from drinking water well to filtration system and the drinking water storage tanks. Once the system was purged, the sample was collected prior to the filters."</p>	OK
7	7	22	<p>Forensic Sample Analysis and Interpretation states "Three subsurface soil samples were collected at the site for forensic analysis." However, only two soil samples were collected from subsurface, one soil sample was collected from the surface.</p>	<p>Sentence was updated to, "Three soil samples were collected at the site for forensic analysis."</p>	OK
8	8.3		<p>Drinking Water states "Analytical results from the Eureka Lodge drinking water well indicated no impact from petroleum contamination. Toluene was the only constituent detected and it was three orders of magnitude lower than the drinking water maximum contaminant level." However, since toluene was detected, this pathway is considered complete for petroleum constituents. Additionally, where is that toluene result coming from? Contaminated groundwater could be impacting the drinking water well. Revise</p>	<p>Section 8.3 will be rewritten: "Analytical results from the Eureka Lodge drinking water well indicated no significant impact from petroleum contamination. Possible sources of the contamination may include the 2010 spill, other spills known to have occurred at the site, other unidentified releases, or components of the drinking water system. Given the extremely low concentration of toluene detected (0.17J µg/L) relative to the drinking water maximum contaminant level (1,000 µg/L), the proposal for periodic monitoring appears to be more than adequate. "</p> <p>The Human Health Conceptual Site Model included in the 2011 Site Characterization Report shows ingestion of groundwater and dermal absorption of contaminants in groundwater as potentially complete. Previous reports were reviewed for information on toluene. Toluene appears to have been a compound released in the 2010 spill (2010 <i>Spill Response Report</i> ). However, it appears to have been removed to concentrations below the cleanup level (2010 <i>Spill Response Remedial Action Report</i> ). The 2011 Site Characterization Report found toluene present in soils, but at concentrations below the cleanup level. Photograph 11 of the 2017 <i>Monitoring Report</i> , shows that the drinking water system appears to be built with PVC piping. PVC pipe joint compounds generally contain petroleum distillates.</p> <p>As mentioned in response to comment 6, the description for Photograph 11 was updated with more detail.</p>	OK

**Responses to ADEC Comments on the 2017 Monitoring Report Eureka Lodge  
Comments provided by Grant Lidren**

9	Figure 3		The units should be ug/L not mg/L.	Figure 3 Updated	OK
10	Figure 3		The drinking water well sample and duplicate contained toluene at 0.16J ug/L and 0.17J ug/L. DEC regulates off the higher of the two. Please update the figure to the higher toluene result of 0.17J	Figure 3 Updated	OK
11	Figure 3 and section 3.4		3.4. Groundwater Flow Assessment. With only two MWs surveyed, it is hard to discern true groundwater flow. Additionally, if this is just a localized melt lense as discussed in the report, there is minimal, if any, association with the surface water. This section needs to be updated. any references to groundwater flow should state it is estimated due to lack of data	Figure 3 will be modified to show the "Assumed Regional Groundwater Flow" direction.  The following text will be added to Section 3.4: "The geological stratum below the site (primarily silt that is likely frozen most of the year) is generally not recognized as productive aquifer material. Monitoring wells exhibited negligible recharge. Water accumulating in the monitoring wells appears to be stagnant water accumulating slowly over time from precipitation and snow melt and does not appear to be hydraulically connected with the unnamed lake. At the drinking water well, a gravel lens from 20 feet bgs to 22 feet bgs may be hydraulically connected with the unnamed lake, which is located approximately 140 feet up hill."	OK



# Alaska Department of Environmental Conservation SPILL PREVENTION AND RESPONSE

[CONTAMINATED SITES](#)   [PREVENTION PREPAREDNESS & RESPONSE](#)   [RESPONSE FUND ADMIN](#)   [REPORT A SPILL](#)

**Eureka Lodge**

You are here: [DEC](#) / [SPAR](#) / [PPR](#) / [SPAR Online Services](#) / [Spill Search](#) / Spill Details

<b>Spill Name:</b>	Eureka Lodge
<b>Spill Date:</b>	4/30/2002 12:00:00 AM
<b>Spill Number:</b>	02239912002
<b>Area:</b>	Central Alaska
<b>Subarea:</b>	Cook Inlet
<b>Region:</b>	Mat-Su Valley
<b>Location:</b>	EUREKA ROADHOUSE
<b>Media Impacted:</b>	—

<b>Facility Name:</b>	EUREKA LODGE
<b>Facility Address:</b>	MP 128 Glenn Hwy Glennallen, 99588
<b>Responsible Party:</b>	Unknown
<b>Facility Type:</b>	Other

[More Information on Facility](#)

[More Information on Responsible Party](#)

SUBSTANCE	RELEASED	CONTAINED	RECOVERED	UNIT	DISPOSAL METHOD
Diesel	450.000	—	—	Gallons	—

ACTION	ACTION DATE
Case Closed, No Further Action	9/5/2002

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State of Alaska Department of Environmental Conservation

410 Willoughby Suite 303  
P.O. Box 1111800  
Juneau, AK 99811  
Phone: 907-465-5066





# Spill Summary Report

08239905002

**Spill Number:** 08239905002  
**Spill Date/Time:** 02/19/2008 12:00  
**Case Closed Date:** 10/14/2008  
**File Number:**  
**Ledger Code:**  
**IRIS Location:**  
**Comment:**

**Spill Name:** Eureka Lodge Overfill Crowley  
**Primary Responsible Party:** Crowley Petroleum Distribution, Inc.  
**Reporter:** Bob Cox  
**Response Type:** Phone Follow-up  
**Staff Name:** Brown, John  
**IRIS Sublocation:**

## Facility/Site Location

**Facility/Site Name:** Eureka Lodge  
**Address Line #1:** MP 128  
**Address Line #2:**  
**City/State/ZIP Code:** None Specified, AK  
**Facility Type:** Other  
**Facility Note:** Resturant

**Area:** Central Alaska  
**Sub-Area:** Cook Inlet  
**Region:** Glenn Highway North  
**Location:** GLENN HWY N. UNKNOWN  
**Facility Subtype:**

## Product Released

Substance Subtype Name	Qty Released	Unit	Disposal Description	Disposal Note
Diesel	3.000	Gallons	INCINERATED	Trasported to ASR

**Substance Note:**

## Cause/Source

### Contibuting Cause

Overfill, Human Factors (Primary)

**Cause Note:** Accidental Overfill of above ground heating oil tank

**Source Note:**

## Spill Cleanup Actions

Action Description	Staff Name	Action Date	Action Due Date	Completed	Action Note
Complaint/Report Received	Brown, John	09/18/2008		Yes	
Communication, Other	Brown, John	09/30/2008		Yes	Crowley advises that additiona historcal contamination has been verified.
Case Closed, No Further Action	Brown, John	10/14/2008		Yes	

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# Spill Summary Report

10239916202

<b>Spill Number:</b> 10239916202	<b>Spill Name:</b> Crowley Eureka Lodge gasoline overfill
<b>Spill Date/Time:</b> 06/11/2010 17:45	<b>Primary Responsible Party:</b> Crowley Petroleum Distribution, Inc.
<b>Case Closed Date:</b> 12/08/2010	<b>Reporter:</b> Virgin, Beth (Crowley)
<b>File Number:</b>	<b>Response Type:</b> Field Visit/s
<b>Ledger Code:</b>	<b>Staff Name:</b> Huddleston, Neil
<b>IRIS Location:</b>	<b>IRIS Sublocation:</b>
<b>Comment:</b>	

## Facility/Site Location

<b>Facility/Site Name:</b> EUREKA LODGE	<b>Area:</b> Central Alaska
<b>Address Line #1:</b> MP 128 Glenn Hwy	<b>Sub-Area:</b> Cook Inlet
<b>Address Line #2:</b> HC01 Box 2240	<b>Region:</b> Mat-Su Valley
<b>City/State/ZIP Code:</b> Glennallen, AK 99588	<b>Location:</b> EUREKA ROADHOUSE
<b>Facility Type:</b> Gas Station	<b>Facility Subtype:</b>
<b>Facility Note:</b>	

## Product Released

Substance Subtype Name	Qty Released	Qty Unit	Disposal Description	Disposal Note
Gasoline	20.000	Gallons	MULTIPLE	Crowley qty estimate based on pump rate, driver reaction time (rough). Pooled liquid recovered with absorbents, burned at Crowley Glenallen shop; soil to ASR.

**Substance Note:**

## Cause/Source

### Contributing Cause

Overfill, Human Factors (Primary)

**Cause Note:** Tank was not gauged prior to fill. Fuel escaped from vent as tank was being filled from header.

**Source Note:** 2000 gal premium gasoline compartment of 6000 gal storage tank.

## Spill Cleanup Actions

Action Description	Staff Name	Action Date	Action Due Date	Completed	Action Note
Complaint/Report Received	Huddleston, Neil	06/14/2010		Yes	Recd by phone.
Communication, Other	Huddleston, Neil	06/14/2010		Yes	Call to Darla Fimpel, lodge owner. Recd permission for site visit 6/15. Ms Fimpel said she had not been aware of the spill before I called.
Communication, Other	Huddleston, Neil	06/14/2010		Yes	Follow-up phone call to Beth Virgin. Est. tank ~100 ft from lake; stain ~4 x 5 ft; premium tank compartment = 2k gal. Recd 6/11 photos from Virgin by email. *Arranged to meet Crowley rep on-site 6/15.

Action Description	Staff Name	Action Date	Action Due Date	Completed	Action Note
Field Visit	Huddleston, Neil	06/15/2010		Yes	[1 of 2] Arrived 1145, intro to Darla in lodge, met Crowley and Michael Foster & Assoc. reps at spill site. 1 Crowley employee excavating stained soil from under tank by shovel to supersack on flatbed truck. Stained area larger than reported, primarily under N 1/2 of tank, extends ~1-2 ft beyond skids either side. Soil wet with fuel to 10 in depth, odor to ~18 in at silt layer (historical spills?). Crowley truck on site 1430 to remove fuel from tank to aid excavation.
Field Visit	Huddleston, Neil	06/15/2010		Yes	[2 of 2] *Recommended bringing in addl crew to remove contam ASAP given unknown spill qty, sand/gravel soil and proximity to lodge water source (in lake ~40 ft from N edge of tank); OKd removing soil only above less permeable silt layer. Foster & Assoc will provide cleanup plan. 2 supersacks of soil to Crowley Palmer for temp storage.
Cleanup Plan Received	Huddleston, Neil	06/16/2010		Yes	By email from Greg Cvitash, Foster & Assoc. (6/15 on-site rep). Addl personnel to do hand excavation today; will request soil transport auth once volume determined.
Communication, Other	Huddleston, Neil	06/17/2010		Yes	Call from Cvitash asking about info for soil transport form. I requested he obtain a soil sample known to contain fuel from 6/11 spill from sacked soil for comparison to pit-bottom samples he thinks may have contam from previous event. Will need good evidence of historical contam if responsibility for addl cleanup to move from Crowley.
Soil Transport Letter	Huddleston, Neil	06/21/2010		Yes	8.5 yds to ASR.
Other	Huddleston, Neil	06/21/2010		Yes	Reviewed case file 02239912101, 450 gal HHO release at Eureka Lodge bunkhouse April 29, 2002. Site appears to have been some distance east of gasoline tank. Confirmed 6/22 by Cvitash: MLFA was contractor on 02 spill; staff report it was several hundred feet east.
Communication, Other	Huddleston, Neil	06/25/2010		Yes	Signed, returned ASR closure request for 13.05 tons of soil.
Communication, Other	Huddleston, Neil	07/06/2010		Yes	Call to Virgin for status update. Cvitash reported 7/1 that lab results were in, should have report prepared week of 7/5.
Communication, Other	Huddleston, Neil	07/09/2010		Yes	Cvitash response to 7/1 email req status update. Lab results in, report expected early next week. Site checked by Crowley multi times weekly; cover intact, will check under next week.
Communication, Other	Huddleston, Neil	07/15/2010		Yes	Email exch w/ Cvitash: Crowley looked at site 7/13, found excavation dry, cover intact. Report finalized, to be delivered ASAP.

Action Description	Staff Name	Action Date	Action Due Date	Completed	Action Note
Interim Report	Huddleston, Neil	07/30/2010		Yes	MLFA report received. GRO and/or BTEX components above migration to g/w levels in 3 of 4 samples. High DRO also present in same samples. Sample closest to lake ND for all.
Cleanup Plan Requested	Huddleston, Neil	08/02/2010		Yes	Call to Virgin to request additional cleanup based on GRO/BTEX sampling results.
Meeting	Huddleston, Neil	08/02/2010		Yes	Met w/ Linda Neuchterlein, CS. May have interest in historical DRO once gasoline is cleaned up. Keather McLoone will consult on continuing cleanup.
Communication, Other	Huddleston, Neil	08/04/2010		Yes	Call from Cvitash (w/ McLoone, CS). Need additional gasoline cleanup - explore moving tank(s), in-place treatment, proximal excavation to determine spread.
Communication, Other	Huddleston, Neil	08/11/2010		Yes	Email exch w/ Cvitash: workplan with Crowley for review.
Communication, Other	Huddleston, Neil	08/13/2010		Yes	Call to Jim Fimpel, lodge owner. Has had no contact from Crowley or MLFA. He has been at lodge for 17 years, in area for 40. USTs at site in 70s, other tanks there in the 60s - probably decades worth of spills there. *I told him after gasoline is cleaned up, his involvement in further cleanup will likely be sought. I recommended he add addl containment to prevent spill to lake, though we dont regulate his tanks; he said he had considered it.
Communication, Other	Huddleston, Neil	08/13/2010		Yes	Call from Cvitash asking if DRO sampling required. *Sampling guidelines dont require for gasoline, but would prefer it to reduce uncertainties in results and to note level of historical DRO contam.
Cleanup Plan Approved	Huddleston, Neil	08/23/2010		Yes	
Cleanup Plan Received	Huddleston, Neil	08/23/2010		Yes	Recd by email from Cvitash. Plan to move tank to continue excavation.
Communication, Other	Huddleston, Neil	08/31/2010		Yes	Email from Cvitash saying work tentatively sched for 9/22.
Communication, Other	Huddleston, Neil	09/21/2010		Yes	Call from Cvitash. When equipment arrived on site 9/20 to move tank, owner said he wants 5 more days of fuel sales to finish busy season. Cleanup delayed 1 week - tank to move 9/27, excavation 9/28.
Field Visit	Huddleston, Neil	09/28/2010		Yes	Arrived 12:15. Cvitash and 3 Crowley employees at site with excavator. Excavation ~10x12x4 ft deep; 1 side-dump semi-trailer (~17 cy) filled and sent to Wasilla 11:50; waiting on empty truck. N sidewall PID 150, E 100, S 3,000 (! beyond original surface stain), W dark w/ odor (PID missing). Trucks wont arrive til 17:00; departed 15:00. Backfill gravel coming in on trucks from Wasilla.
Communication, Other	Huddleston, Neil	09/28/2010		Yes	Late voice msg from Cvitash. 3 trucks filled 9/28, another on-site 9/29 for addl excavation. 5 cy stockpiled on liner. Expect total 68 cy. Tracy Bradford will be on-site 9/29 for MLFA.

Action Description	Staff Name	Action Date	Action Due Date	Completed	Action Note
Communication, Other	Huddleston, Neil	09/29/2010		Yes	Call from Bradford w/ final soil vol. Will collect confirmation samples and backfill. W excav sidewall (by 2nd storage tank) still looks contaminated; asserts it must be historical.
Soil Transport Letter	Huddleston, Neil	09/29/2010		Yes	Recd form from Cvitash 9/24. Soil volume of 100 tons called in from excavation 9/29 by Bradford. *Emailed to Bradford, Cvitash, cc: ASR.
Final Report	Huddleston, Neil	11/08/2010		Yes	From Cvitash. 6 of 6 samples above mig-to-gw for benzene (range .04 - 21.2 mg/kg); 1 also high for DRO (558); 1 also high for ethylben., xyl., GRO (604) and DRO (10,900). Highest DRO at west & south sides.
Communication, Other	Huddleston, Neil	12/06/2010		Yes	MLFA reports and draft CS site intake form to Keather McLoone for review > OK to submit.
Case Closed, Transferred To CS	Huddleston, Neil	12/08/2010		Yes	Transfer approved by John Brown. Electronic case file and intake form to Mitzi Read; copy of paper file to Sue Carberry.