# FINAL REPORT FOR
# FAIRVIEW REDEVELOPMENT AREA
# CHLORINATED SOLVENT INVESTIGATION
# ANCHORAGE, ALASKA

**ADEC SPAR TERM CONTRACT #18-8036-03**
**APRIL 2016**

**Prepared For:**

**Alaska Department of Environmental Conservation**
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**APPROVAL PAGE**

This report for the sampling and analysis of soil gas and groundwater in the Fairview community of Anchorage, Alaska has been prepared for the Alaska Department of Environmental Conservation by Ahtna Engineering Services, LLC, with support from their teaming partner Geosyntec Consultants, Inc.

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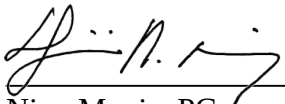

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## ACRONYMS AND ABBREVIATIONS

AAC .....Alaska Administrative Code
ADEC.....Alaska Department of Environmental Conservation
Ahtna.....Ahtna Engineering Services, LLC
bgs .....below ground surface
°C .....degrees Celsius
cDCE.....cis-1,2-dichloroethene
COPC .....contaminant of potential concern
CSM .....conceptual site model
1,1-DCE .....1,1-dichloroethene
EPA .....Environmental Protection Agency
GeoTek.....GeoTek Alaska, Inc.
Geosyntec.....Geosyntec Consultants, Inc.
µg/L.....microgram per liter
µg/$m^3$.....microgram per cubic meter
OnSite .....OnSite Environmental Laboratories
PCE .....tetrachloroethene
PPE.....personal protective equipment
PVC.....polyvinyl chloride
ROW .....right-of-way
1,1,1-TCA .....1,1,1-trichloroethane
TCE.....trichloroethene
tDCE .....trans-1,2-dichloroethene
VC.....vinyl chloride
WMS .....Waterloo Membrane Sampler

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# 1.0 INTRODUCTION AND BACKGROUND

Ahtna Engineering Services, LLC (Ahtna), with support from their teaming partner Geosyntec Consultants, Inc. (Geosyntec), has prepared this report for the Fairview Redevelopment Area – Chlorinated Solvent Investigation in Anchorage, Alaska (Figure 1). The work has been conducted for the Alaska Department of Environmental Conservation (ADEC) under Notice to Proceed Number 18-8036-01-015, Contract Number CT 160001126. This report summarizes the study objectives, investigative strategy, field activities, laboratory results, and conclusions.

## 1.1 Site Summary

The study area as outlined in Figure 2 is approximately 240 acres (0.4 square miles) in the Fairview and downtown neighborhoods of Anchorage, Alaska. The study area is comprised of nearly 600 property parcels; approximately 15 percent are residential and 85 percent are commercial. Of the residential properties, approximately 70 percent (about 60 properties) are single family homes with the remainder being multi-unit homes (about 30). Approximately 40 percent (about 200) of the commercial lots are categorized as vacant lots or parking areas. Other commercial lots include retail, office buildings, automobile dealers, automobile service centers, and restaurants.

## 1.2 Environmental Setting

The study area is located in Anchorage, Alaska, at approximately latitude 61.2 degrees north and longitude of 149.9 degrees west (Figure 1). The City of Anchorage is located on moderately broad lowland bounded on the east by the Chugach Mountains, on the west by Cook Inlet, and by Knik Arm and Turnagain Arm of Cook Inlet to the north and south, respectively. Unconsolidated deposits in this area include glacial, alluvial, colluvial, and lacustrine deposits. The unconsolidated deposits were placed during multiple glacial and non-glacial geologic events, resulting in a complex, vertically discontinuous stratigraphy, measuring from 650 feet thick near Anchorage to only several feet thick along the Chugach Mountains (Miller and Dobrovolny, 1959).

The surficial geological conditions primarily consist of quaternary glacial outwash deposits comprised of gravel, sand, silt, and clay. The deposits vary in thickness depending on location. These deposits are interfingered with thin silt and fine sand lenses. The entire area is underlain with a layer of poorly permeable silty-clay, known locally as the Bootlegger Cove Formation. The Bootlegger Cove Formation was deposited over older sand, gravel, and glaciofluvial silt which were then subjected to a period of erosion before deposition of the Bootlegger Cove Formation. The cohesive facies of this formation have been referred to as the Bootlegger Cove clay or the "blue clay." The Bootlegger Cove Formation ranges in thickness from zero up to about 300 feet and averages about 100 to 150 feet (Miller and Dobrovolny, 1959).

## 1.3 Project Objectives

The project objective was to determine if significant releases of chlorinated solvents had occurred in the Fairview community of Anchorage, and if so does the contamination pose a risk to human health or the environment, especially related to potential redevelopment of Fairview.

The investigation focused on current and former dry cleaning operations, which were previously documented throughout the study area as the sources of potential contamination.

## 1.4 Scope of Work

Ahtna executed the following tasks to meet the project objectives:

- Installed and developed soil gas monitoring wells in the study area within public right-of-way.
- Deployed Waterloo Membrane Samplers (WMS) in the soil gas monitoring wells for 3 days and analyzed for a select list of volatile organic compounds (VOCs).
- Sampled two temporary groundwater monitoring wells and analyzed for VOCs.

## 1.5 Conceptual Site Model

A generalized conceptual site model (CSM) was developed by Ahtna in the spring of 2015 for the area-wide property assessment report (Ahtna, 2015a). The CSM examined several contaminants, including petroleum hydrocarbons, metals, and chlorinated solvents. This investigation only examined chlorinated solvents. The results of this investigation did not necessitate any changes to the CSM.

## 1.6 Regulatory Framework

### 1.6.1 Contaminants of Potential Concern

This study's primary focus was to investigate for chlorinated solvents related to dry cleaning operations in soil gas and groundwater in the study area. The list of contaminants of potential concerns (COPCs) was taken from the ADEC-approved *State Coalition for Remediation of Drycleaners* (2010). The primary COPC is tetrachloroethene (PCE). The breakdown or degradation products of PCE are also considered COPCs and include trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cDCE), trans-1,2-dichloroethene (tDCE), and vinyl chloride (VC). Carbon tetrachloride and its degradation product, 1,1,1-trichloroethane (1,1,1-TCA), also are included given the historical use of carbon tetrachloride as a dry cleaning solvent.

### 1.6.2 Cleanup Criteria

A regulatory framework for this project was developed by considering the following regulations and guidance documents.

- 18 Alaska Administrative Code (AAC) 75, Oil and Other Hazardous Substances Pollution Control, June 17, 2015
- Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites, ADEC Division of Spill Prevention and Response, Contaminated Sites Program, September 23, 2009
- *Draft* Field Sampling Guidance, ADEC Division of Spill Prevention and Response, Contaminated Sites Program, May 2010

- Monitoring Well Guidance, ADEC Division of Spill Prevention and Response, Contaminated Sites Program, September 2013
- Vapor Intrusion Guidance for Contaminated Sites, ADEC Division of Spill Prevention and Response, Contaminated Sites Program, October 2012

Table 2-1 lists the current cleanup levels for the COPC by media.

**TABLE 1-1: CLEANUP AND TARGET LEVELS FOR CONTAMINANTS OF CONCERN**

| Compound | Vapor Intrusion Target Levels | | | | Groundwater Cleanup Level (µg/L) |
|---|---|---|---|---|---|
| | Shallow Soil Gas (µg/m$^3$) | | Groundwater (µg/L) | | |
| | Residential | Commercial | Residential | Commercial | |
| PCE | 420 | 1,800 | 58 | 240 | 5 |
| TCE | 21 | 88 | 5.2 | 22 | 5 |
| cDCE | 73 | 310 | 44 | 180 | 70 |
| tDCE | 630 | 2,600 | 380 | 1,580 | 100 |
| 1,1-DCE | 2,100 | 8,800 | 200 | 820 | 7 |
| VC | 16 | 280 | 1.4 | 2.5 | 2 |
| Carbon Tetrachloride | 41 | 200 | 3.6 | 18 | 5 |
| 1,1,1-TCA | 52,100 | 219,000 | 7,410 | 31,100 | 200 |

**Key:**

| | |
|---|---|
| PCE | tetrachloroethylene |
| TCE | trichloroethylene |
| cDCE | cis-1,2-dichloroethylene |
| tDCE | trans-1,2-dichloroethylene |
| 1,1-DCE | 1,1-dichloroethylene |
| VC | vinyl chloride |
| 1,1,1-TCA | 1,1,1-trichloroethane |
| µg/L | micrograms per liter |
| µg/m$^3$ | micrograms per cubic meter |

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# 2.0 HISTORICAL INFORMATION REVIEW AND LOCATION SELECTION

Ahtna performed a historical information review prior to selecting sample locations. A more detailed summary of the historical information review is available in Section 3 of the project work plan (Ahtna, 2015b). The review resulted in identification of 30 historical locations of known or suspected former drycleaners. Table 2-1 summarizes the 30 historical locations and identifies the associated nearby soil gas sampling location(s). Figure 2 shows the historical locations of known or suspected former drycleaners, and Figure 3 presents the soil gas sampling locations.

**TABLE 2-1: KNOWN OR SUSPECTED FORMER DRYCLEANER ADDRESSES**

| Site Name(s) | Historical Address | Associated Soil Gas Sampling Locations |
|---|---|---|
| Absher's Cleaners; Ray's Personal Cleaning Service | 337 East 4th Avenue | SV-05 |
| Alaska Cleaners & Laundry - Gambell Branch | 636 East 15th Avenue | SV-39, SV-41, SV-43 |
| K Speed Wash | 600 East 6th Avenue | SV-19 |
| C & K Sanitary Cleaners | 4th Avenue & Gambell Street | NA – Known site, chlorinated solvents previously documented |
| Snow White Laundry & Cleaners - Fairview Office | 11th Avenue & Gambell Street | SV-47 |
| Washeteria; Fifth Ave Laundry & Cleaners | 120 / 122 5th Avenue | SV-09 |
| Rainbow Cleaners | 12th Avenue & Gambell Street | SV-30, SV-31, SV-32 |
| Snow White Laundry & Cleaners | 13th Avenue & Gambell Street | SV-33 |
| Alaska Cleaners | 15th Avenue & Gambell Street | SV-38, SV-41, SV-42 |
| Alaska Cleaners; Alaska Cleaning & Pressing; Alaska Cleaners | 201 / 205 East 4th Avenue | SV-46 |
| Tidy Dy-Dee | 220 5th Avenue | SV-09, SV-10 |
| Snow White | 300 East 5th Avenue | NA – Known site, under investigation |
| E. Side Laundry; George's Tailor Shop & Star Laundry; American Cleaners & Laundry; Brown's Cleaning Shop | 231 / 234 4th Avenue | SV-46 |
| Cole's Service Cleaners; Service Cleaners | 232/236/240 East 5th Avenue | SV-10 |
| Anchorage Hand Laundry; Anchorage Laundry | 333 4th Avenue | SV-05 |
| Alaska Carpet Cleaners | 407 5th Avenue | SV-13 |
| Paris Dry Cleaners | 419 4th Avenue | SV-06, SV-12 |
| Clean Shirts | 516 5th Avenue | SV-18 |
| Peacock Cleaners | 526 East 10th Avenue | SV-26 |
| A & B Cleaners | 538 5th Avenue | SV-15, SV-18 |
| New Method Cleaners | 715 4th Avenue | SV-16 |
| Olson Bros. Tailors Cleaners; O K Cleaners | 727 4th Avenue | SV-16 |
| New Method Cleaners | 732 4th Avenue | SV-16 |
| Pioneer Laundry & Cleaners aka Pioneer Cleaners | 739 4th Avenue | SV-16 |
| Pioneer Laundry | 1107 East 7th Avenue | SV-22 |
| Tidy Didy Diaper Service | 1236 East 7th Avenue | SV-23 |
| Davis; Miss Mary | 145 West 4th Avenue | SV-01 |

| Site Name(s) | Historical Address | Associated Soil Gas Sampling Locations |
|---|---|---|
| Waddling's Fur House | 410 East 4th Avenue | SV-12 |
| Wilsyk Alaska | 744 East 13th Avenue | SV-36 |
| Bendix Help Yourself Laundry; Bendix Launderall | 944 East 4th Avenue | SV-17 |

As depicted in Figure 2, many of the suspected or known former drycleaners were grouped within the study area; therefore, additional soil gas sampling locations were selected to provide a more comprehensive investigation of the entire study area. These locations are SV-17, SV-20, SV-21, SV-24, SV-37, SV-44, and SV-45 and are presented in Figure 3.

# 3.0 FIELD ACTIVITIES

Field activities were performed in November 2015 and March 2016. In November, 28 soil gas samples and four duplicates were collected. In March, four soil gas samples and one duplicate were collected, and two groundwater samples plus one duplicate were collected. Field notes and a photo log are included in Appendices A and B, respectively.

## 3.1 Site Access

Soil gas and groundwater sampling locations were in municipal right-of-ways (ROWs) with preference for alley locations to minimize traffic disruptions and traffic control requirements. Prior to performing the field work, ROW permits were acquired from the Municipality of Anchorage. The subcontractors Work Zone (in November) and Shaman Traffic (in March) provided traffic control for all installation, sampling, and decommissioning activities based on the specifics of each individual location. Copies of the permits used during this investigation are included in Appendix C.

## 3.2 Utility Locates

Prior to drilling, utility locates were performed to ensure clearance for drilling activities. Locate requests were called into the AK DigLine, which then notified utilities of the potential drill locations. Utilities included water, sewer, electricity, natural gas, and telephone. Ahtna and GeoTek Alaska, Inc. (GeoTek) only drilled in areas cleared by the utility locate.

## 3.3 Soil Gas

The following sections summarize the installation, sampling, and retrieval methodologies associated with the soil gas sampling. The activities were documented on the field sampling forms (Appendix D).

In November 2015, 28 locations were installed and sampled. Originally, 44 locations had been planned, but due to utility conflicts or shallow subsurface water, 16 of the locations were not sampled. In March 2016, four locations were installed and sampled, including two locations near a previous sample from November 2015 and two new locations to examine areas not previously evaluated during the November investigation because of utility conflicts.

### 3.3.1 Installation and Purging

GeoTek was subcontracted to drill 10-foot borings at selected locations (Figure 3). The boreholes were advanced using direct push technology and MacroCore tooling. Ahtna installed 1-inch diameter polyvinyl chloride (PVC) soil gas wells with one-foot screens at the bottom to sample soil gas from 9 to 10 feet below ground surface (bgs). The wells were completed with sand pack around the screens and hydrated bentonite seals to approximately one foot bgs.

A modified surface completion was used for the soil gas wells. The surface completion terminated at approximately eight inches bgs and the well was covered with loose sand and gravel. A small metallic object, such as a washer, was placed in the top of the borehole, which

assisted in the relocation of the sampling location through the use of a metal detector. A global positioning system unit was used to record the location. Field notes, locational data, and a metal detector were used to return to the well location.

Following installation, Ahtna purged the soil gas wells of 10 volumes of combined inner and outer annulus to remove atmospheric air that may have been entrained in the subsurface during drilling. The air was purged through the use of a sealing well cap with appropriate connections, peristaltic pump, and a rotameter to control flow rate.

### 3.3.2 Sampler Deployment

Following the purge, Ahtna deployed a WMS within the screened portion of each well using string to suspend the sampler from a compression cap. The date and time of deployment were noted in the field logbook. The WMSs remained deployed for three days. Ahtna collected duplicate soil gas samples at 10% of the wells. For duplicates, the two WMSs were hung in the well at the same time and depth.

A datalogger was deployed into one of the wells for the duration of the sampling event. This was used to record temperature data, which was included in the laboratory submission of WMSs. The site specific temperature data provides more accurate uptake rates for the samplers which in turn yields more accurate concentration data from the laboratory.

### 3.3.3 Sampler Retrieval and Well Decommissioning

After three days, the WMSs were retrieved and placed into the laboratory-supplied vials and sealed with the provided Teflon tape. The date and time of the retrieval was recorded in the field notebook as well as on the sample label with the deployment information. A trip blank was included for the WMSs to ensure cross contamination did not occur during sample handling and transport. The trip blank sampler was placed directly into the vial, sealed, and shipped with the other samplers. The samples were sent to Eurofins/Air Toxics in Folsom, California, for analysis.

When all passive soil gas sampling was completed, the soil gas monitoring points were decommissioned following standard practice as contained in ADEC's *Monitoring Well Guidance (2013)*. The PVC wells were lifted out of the ground manually or with the use of the drill rig. The used PVC was disposed of as non-hazardous solid waste. The borehole was filled with bentonite chips and gravel, and closed in place with an asphalt patch were applicable.

## 3.4 Groundwater

Groundwater sampling locations were selected after the November 2015 soil gas sampling results were evaluated. Two temporary groundwater monitoring locations were sampled (Figure 3).

### 3.4.1 Installation

GeoTek, as a subcontractor to Ahtna, installed temporary groundwater monitoring points using a Geoprobe 66DT rig and SP-16 tooling. The field team drilled to 35 feet bgs and began collecting MacroCore samples to determine the depth of the groundwater table. After groundwater was

encountered, the SP-16 tooling was advanced to the appropriate depth within the top five feet of the groundwater table. Location GW-48 had the screen set from 38.4 to 42.4 feet bgs. Location GW-49 had the screen set from 40.1 to 44.1 feet bgs. The drill rod was then raised to expose the sampling screen and allow groundwater infiltration.

### 3.4.2 Sampling

Groundwater sampling was performed using check valve pumps. Due to the lack of storage options for waste water, no-purge sampling was conducted. The pump intake was placed beneath the water surface at approximately the midpoint of the screened interval, about 2 to 3 feet below the water table, to ensure that groundwater most likely to contribute to the soil gas pathway was sampled.

Dedicated sample tubing and check valves were used to prevent cross-contamination between sampling points. The samples were collected from the pump outflow into laboratory-provided, clean volatile organic analysis (VOA) vials with septa lids. The vials were completely filled to eliminate headspace and prevent volatilization. The vials were inverted and tapped to confirm that no air bubbles were present. After the containers were appropriately filled, they were labeled and placed into a cooler with ice and maintained at 4 ± 2 degrees Celsius (°C). The samples were analyzed by OnSite Environmental of Redmond, Washington, an ADEC-approved laboratory, for COPCs using EPA Method 8260C.

### 3.4.3 Decommissioning

The temporary wells were decommissioned after sampling was completed. The drilling equipment and SP-16 tooling were removed from the borehole. The hole was backfilled with any soil from MacroCore sampling and the remaining space was filled with bentonite. An asphalt patch was used to repair the surface of the road.

## 3.5 Decontamination

Disposable or dedicated sampling and personal protective equipment (PPE) was used for field activities. No decontamination of equipment was necessary.

## 3.6 Waste Management

The investigation-derived waste generated during the field event includes the following:

- Used soil gas monitoring wells
- Used disposable sampling equipment
- Used PPE

All waste was consolidated and disposed of via the Municipality of Anchorage waste disposal system.

## 3.7 Work Plan Deviations

The work plan established 44 soil gas sampling locations for the November 2015 sampling event. Due to presence of utilities or shallow subsurface water, 16 of these locations were not sampled. The second round of sampling was originally meant to be only groundwater sampling to further investigate potential impacts from elevated soil gas results. However, four soil gas samples were collected in March 2016: two to further examine soil gas sample location SV-20 and two to replace potentially significant locations that were skipped during the first sampling event because of utility issues.

The groundwater sampling methodology was adjusted to a no-purge sampling procedure. This was changed due to the lack of purge water storage options in the study area.

# 4.0 RESULTS

## 4.1 Soil Gas

In November 2015, 28 locations were sampled and analyzed for the eight COPCs. Detection and reporting limits were sufficiently low to compare results to the shallow soil gas target levels with one exception. The detection and reporting limits for vinyl chloride exceeded the residential shallow soil gas target level. This issue was known and documented in the project work plan. Vinyl chloride was not detected in any of the samples. The complete laboratory results are summarized in Table 1. The following analytes were detected at one or more locations:

- PCE at SV-22, SV-26, SV-37, and SV-38
- Carbon tetrachloride at SV-20
- 1,1,1-trichloroethane at SV-09 and SV-18

All detections were below the ADEC target levels with one exception: a carbon tetrachloride concentration of 1,600 µg/$m^3$ at SV-20, which exceeded both residential and commercial target levels for shallow soil gas (Figure 4).

In March 2016, four locations were sampled. Two locations (SV-46 and SV-47) were selected to sample areas that were not sampled in November; no COPCs were detected in these samples. Two locations (SV-44 and SV-45) were collected in the vicinity of SV-20 to further examine the carbon tetrachloride concentration previously measured (Figure 4). SV-45 had a carbon tetrachloride concentration of 210 µg/$m^3$, which is nearly an order of magnitude less than the result (1,600 µg/$m^3$) from SV-20 in November 2015, but still above both the residential and commercial target levels. The March 2016 sample results are summarized in Table 2.

The temperature data collected at the site remained fairly consistent between 2.5°C and 6.5°C, although air temperature during this timeframe varied much more significantly. This indicates that the surface seals for the soil gas wells are competent, and there was no intrusion of atmospheric air into the well.

Laboratory reports for both sample events are available in Appendix E.

## 4.2 Groundwater

Two groundwater sampling locations were selected based on the November 2015 soil gas results. Two samples and one duplicate were collected. One groundwater sample was collected in the vicinity of SV-22 to further examine the PCE soil gas detection and one was collected at the same location as SV-45 and SV-20 to further examine the carbon tetrachloride exceedance. Analytical results for all COPCs were below detection limits and all reporting limits were below the GCLs and VI target levels. The data are provided in Table 3. The laboratory report is provided in Appendix E.

## 4.3 Data Quality Review

The ADEC Data Quality Review Checklists are included in Appendix F. The data quality is sufficient for the requirements of this project. The following items are of note for usability of the data.

The second soil gas sampling event did not have a trip blank sent to the laboratory. However, three of the field samples and the field duplicate had no detectable concentrations of COPCs. This demonstrates that cross-contamination likely did not occur during field activities or during sample shipping.

The groundwater data are suspected to be biased low for the collected samples. This is due to the work plan deviation related to no-purge sampling, which resulted in the presence of sediment in the laboratory sample containers. The laboratory had to combine vials with sediment to obtain sufficient water for analyses. This process exposed the sample to the atmosphere and volatiles may have been lost in the transfer process. As the nature of this project was to investigate potential large-scale contamination in the study area, these samples are believed to provide sufficient information indicating that the area is not significantly contaminated.

# 5.0 CONCLUSIONS

The purpose of this investigation was to examine potential impacts to the Fairview Redevelopment Area from former dry cleaning operations. The 25 soil gas and one groundwater sampling locations associated with the 30 suspected or known former drycleaner addresses did not have chlorinated solvent concentrations above shallow target levels or groundwater cleanup levels, respectively. These findings indicate that there are likely no significant source areas in the vicinity of these sampling locations, and redevelopment near these areas probably would not encounter soil vapor concerns. The disclaimer, however, associated with this conclusion is that the investigation was conducted solely in ROWs with sampling locations that were widely dispersed in the study area. Any specific redevelopment project should evaluate the project location using standards of practice for environmental site assessments.

For the seven other soil gas sampling locations that were not located near a suspected or known former drycleaners, two locations collected in close proximity, SV-20 and SV-45, contained carbon tetrachloride concentrations that exceeded ADEC shallow soil gas levels. An additional soil gas sample, SV-44, was collected approximately 500 ft to the east and a groundwater sample, GW-49, was also collected at the location where the highest carbon tetrachloride concentration (1,600 $\mu g/m^3$) was measured. Both of these samples did not contain detectable concentrations of COPCs. These findings indicate that the carbon tetrachloride concentrations detected at SV-20 and SV-45 are likely not representative of large scale contamination, but rather may represent a discrete area, or hot spot, of carbon tetrachloride and redevelopment would likely be affected only if the project occurred at or very near the locations of SV-20 and SV-45.

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# 6.0 REFERENCES

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# TABLES

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**Table 1**

**November 2015 Soil Gas Results**

| | | | | Location | SV-01 | SV-05 | SV-06 | SV-09 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow | | Sample ID | 15-FVOC-SV01 | 15-FVOC-SV05 | 15-FVOC-SV06 | 15-FVOC-SV09 |
| | | Soil Gas Target Level | | Date | 11/19/15 16:47 | 11/20/2015 11:49 | 11/20/2015 11:55 | 11/19/2015 16:07 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | | | | |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | *<8.7* | *<7.0* | *<8.6* | *<8.3* |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<13* | *<10* | *<13* | *<12* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<18* | *<14* | *<17* | *<17* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<42* | *<34* | *<41* | *<40* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<99* | *<79* | *<97* | *<94* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<110* | *<89* | *<110* | *<100* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<19* | *<15* | *<19* | *<18* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<23* | *<18* | *<22* | **28** |

| | | | | Location | SV-10 | SV-12 | SV-13 | SV-15 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow | | Sample ID | 15-FVOC-SV10 | 15-FVOC-SV12 | 15-FVOC-SV13 | 15-FVOC-SV15 |
| | | Soil Gas Target Level | | Date | 11/19/2015 16:33 | 11/20/2015 11:15 | 11/20/2015 11:04 | 11/20/2015 12:01 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | | | | |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | *<8.4* | *<6.8* | *<6.9* | *<8.7* |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<12* | *<10* | *<10* | *<13* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<17* | *<14* | *<14* | *<18* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<40* | *<33* | *<33* | *<42* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<95* | *<77* | *<78* | *<98* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<110* | *<87* | *<87* | *<110* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<18* | *<15* | *<15* | *<19* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<22* | *<18* | *<18* | *<23* |

| **Detected concentration** |
|---|
| *Below reporting limit* |
| Reporting limit exceeds Residential Target Level |
| Detection exceeds target level |

**Table 1**

**November 2015 Soil Gas Results**

| | | | | Location | SV-15 | SV-16 | SV-17 | SV-18 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow | | Sample ID | 15-FVOC-SV50 | 15-FVOC-SV16 | 15-FVOC-SV17 | 15-FVOC-SV18 |
| | | Soil Gas Target Level | | Date | 11/20/2015 12:02 | 11/20/2015 12:11 | 11/20/2015 13:15 | 11/21/2015 13:50 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | | | | |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | *<8.7* | *<8.8* | *<8.8* | *<6.8* |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<13* | *<13* | *<13* | *<10* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<18* | *<18* | *<18* | *<14* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<42* | *<42* | *<42* | *<33* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<98* | *<100* | *<99* | *<77* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<110* | *<110* | *<110* | *<86* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<19* | *<19* | *<19* | *<15* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<23* | *<23* | *<23* | **51** |

| | | | | Location | SV-19 | SV-20 | SV-21 | SV-21 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow | | Sample ID | 15-FVOC-SV19 | 15-FVOC-SV20 | 15-FVOC-SV21 | 15-FVOC-SV51 |
| | | Soil Gas Target Level | | Date | 11/21/2015 14:11 | 11/21/2015 15:17 | 11/21/2015 14:50 | 11/21/2015 14:51 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | | | | **duplicate** |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | *<6.8* | *<8.3* | *<6.8* | *<6.8* |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<10* | *<12* | *<10* | *<10* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<14* | *<17* | *<14* | *<14* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<33* | *<40* | *<33* | *<33* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<77* | *<93* | *<77* | *<77* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<86* | *<100* | *<87* | *<87* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<15* | **1600** | *<15* | *<15* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<18* | *<21* | *<18* | *<18* |

| **Detected concentration** |
|---|
| *Below reporting limit* |
| Reporting limit exceeds Residential Target Level |
| Detection exceeds target level |

**Table 1**

**November 2015 Soil Gas Results**

| | | | | Location | SV-22 | SV-23 | SV-24 | SV-26 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow | | Sample ID | 15-FVOC-SV22 | 15-FVOC-SV23 | 15-FVOC-SV24 | 15-FVOC-SV26 |
| | | Soil Gas Target Level | | Date | 11/21/2015 14:35 | 11/21/2015 14:40 | 11/21/2015 15:26 | 11/22/2015 12:40 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | | | | |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | **13** | *<8.5* | *<8.6* | *<6.8* |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<12* | *<12* | *<13* | *<10* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<17* | *<17* | *<17* | *<14* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<40* | *<41* | *<41* | *<33* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<95* | *<96* | *<97* | *<77* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<110* | *<110* | *<110* | *<86* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<18* | *<19* | *<19* | *<15* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<22* | *<22* | *<22* | *<18* |

| | | | | Location | SV-26 | SV-30 | SV-31 | SV-32 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow | | Sample ID | 15-FVOC-SV52 | 15-FVOC-SV30 | 15-FVOC-SV31 | 15-FVOC-SV32 |
| | | Soil Gas Target Level | | Date | 11/22/2015 12:41 | 11/21/2015 16:15 | 11/21/2015 16:27 | 11/23/2015 08:16 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | **duplicate** | | | |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | **8** | *<8.9* | *<8.8* | *<6.8* |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<10* | *<13* | *<13* | *<10* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<14* | *<18* | *<18* | *<14* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<33* | *<43* | *<42* | *<33* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<77* | *<100* | *<99* | *<77* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<86* | *<110* | *<110* | *<86* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<15* | *<20* | *<19* | *<15* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<18* | *<23* | *<23* | *<18* |

| **Detected concentration** |
|---|
| *Below reporting limit* |
| Reporting limit exceeds Residential Target Level |
| Detection exceeds target level |

**Table 1**

**November 2015 Soil Gas Results**

| | | | | Location | SV-33 | SV-36 | SV-37 | SV-38 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow | | Sample ID | 15-FVOC-SV33 | 15-FVOC-SV36 | 15-FVOC-SV37 | 15-FVOC-SV38 |
| | | Soil Gas Target Level | | Date | 11/22/2015 14:58 | 11/23/2015 10:33 | 11/23/2015 10:27 | 11/22/2015 14:05 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | | | | |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | *<8.2* | *<8.9* | **10** | **12** |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<12* | *<13* | *<13* | *<13* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<17* | *<18* | *<18* | *<17* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<40* | *<43* | *<42* | *<41* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<93* | *<100* | *<99* | *<97* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<100* | *<110* | *<110* | *<110* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<18* | *<20* | *<19* | *<19* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<21* | *<23* | *<23* | *<22* |

| | | | | Location | SV-41 | SV-41 | SV-42 | SV-43 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow | | Sample ID | 15-FVOC-SV41 | 15-FVOC-SV53 | 15-FVOC-SV42 | 15-FVOC-SV43 |
| | | Soil Gas Target Level | | Date | 11/22/2015 14:20 | 11/22/2015 14:21 | 11/22/2015 15:15 | 11/22/2015 14:36 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | | **duplicate** | | |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | *<8.7* | *<8.7* | *<8.9* | *<8.8* |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<13* | *<13* | *<13* | *<13* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<18* | *<18* | *<18* | *<18* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<42* | *<42* | *<43* | *<43* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<98* | *<98* | *<100* | *<100* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<110* | *<110* | *<110* | *<110* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<19* | *<19* | *<20* | *<20* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<22* | *<22* | *<23* | *<23* |

| **Detected concentration** |
|---|
| *Below reporting limit* |
| Reporting limit exceeds Residential Target Level |
| Detection exceeds target level |

**Table 2**
**March 2016 Soil Gas Results**

| | | | | Location | SV-44 | SV-44 | SV-45 | SV-46 | SV-47 |
|---|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Shallow Soil Gas Target Level | | Sample ID | 16-FVOC-SV44 | 16-FVOC-SV54 | 16-FVOC-SV45 | 16-FVOC-SV46 | 16-FVOC-SV47 |
| | | | | Date | 3/4/16 12:50 | 3/4/16 12:45 | 3/4/16 13:00 | 3/4/16 12:35 | 3/4/16 12:20 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | **Units** | | **duplicate** | | | |
| Tetrachloroethene | 127-18-4 | 420 | 1,800 | µg/m$^3$ | *<8.7* | *<8.7* | *<8.8* | *<8.6* | *<8.5* |
| Trichloroethene | 79-01-6 | 21 | 88 | µg/m$^3$ | *<13* | *<13* | *<13* | *<13* | *<12* |
| cis-1,2-Dichloroethene | 156-59-2 | 73 | 310 | µg/m$^3$ | *<18* | *<18* | *<18* | *<17* | *<17* |
| trans-1,2-Dichloroethene | 156-60-5 | 630 | 2,600 | µg/m$^3$ | *<42* | *<42* | *<42* | *<41* | *<41* |
| 1,1-Dichloroethene | 75-35-4 | 2,100 | 8,800 | µg/m$^3$ | *<98* | *<99* | *<99* | *<97* | *<96* |
| Vinyl Chloride | 75-01-4 | 16 | 280 | µg/m$^3$ | *<110* | *<110* | *<110* | *<110* | *<110* |
| Carbon Tetrachloride | 56-23-5 | 41 | 200 | µg/m$^3$ | *<19* | *<19* | **210** | *<19* | *<19* |
| 1,1,1-Trichloroethane | 71-55-6 | 52,100 | 219,000 | µg/m$^3$ | *<23* | *<23* | *<23* | *<22* | *<22* |

| **Detected concentration** |
|---|
| *Below reporting limit* |
| Reporting limit exceeds Residential Target Level |
| Detection exceeds target level |

**Table 3**
**March 2016 Groundwater Results**

| | | | | | Location | GW-48 | GW-48 | GW-49 |
|---|---|---|---|---|---|---|---|---|
| | | Vapor Intrusion Groundwater Target Level (µg/L) | | Groundwater Cleanup Level (µg/L) | Sample ID | 16-FVOC-GW48 | 16-FVOC-GW55 | 16-FVOC-GW49 |
| | | | | | Sample Date | 3/2/16 11:10 | 3/2/16 12:00 | 3/1/16 15:55 |
| **Analyte** | **CAS** | **Residential** | **Commercial** | | **Units** | | **duplicate** | |
| Tetrachloroethene | 127-18-4 | 58 | 240 | 5 | µg/L | *<0.2* | *<0.2* | *<0.2* |
| Trichloroethene | 79-01-6 | 5.2 | 22 | 5 | µg/L | *<0.2* | *<0.2* | *<0.2* |
| cis-1,2-Dichloroethene | 156-59-2 | 44 | 180 | 70 | µg/L | *<0.2* | *<0.2* | *<0.2* |
| trans-1,2-Dichloroethene | 156-60-5 | 380 | 1,580 | 100 | µg/L | *<0.2* | *<0.2* | *<0.2* |
| 1,1-Dichloroethene | 75-35-4 | 200 | 820 | 7 | µg/L | *<0.2* | *<0.2* | *<0.2* |
| Vinyl Chloride | 75-01-4 | 1.4 | 2.5 | 2 | µg/L | *<0.1* | *<0.1* | *<0.1* |
| Carbon Tetrachloride | 56-23-5 | 3.6 | 18 | 5 | µg/L | *<0.2* | *<0.2* | *<0.2* |
| 1,1,1-Trichloroethane | 71-55-6 | 7,410 | 31,100 | 200 | µg/L | *<0.2* | *<0.2* | *<0.2* |

# FIGURES

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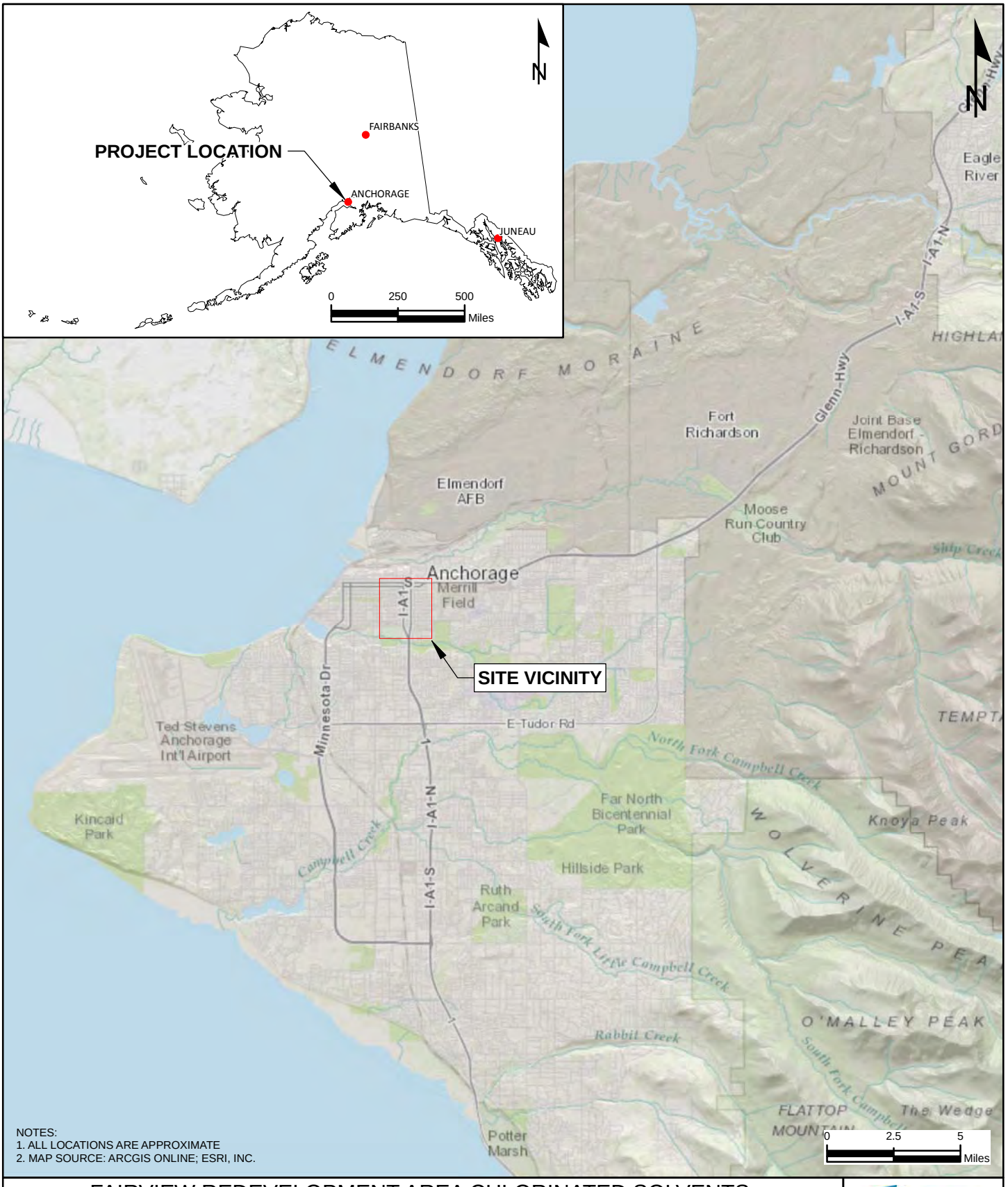


NOTES:
1. ALL LOCATIONS ARE APPROXIMATE
2. MAP SOURCE: ARCGIS ONLINE; ESRI, INC.

# FAIRVIEW REDEVELOPMENT AREA CHLORINATED SOLVENTS INVESTIGATION REPORT ANCHORAGE, ALASKA

Ahtna Engineering

## STATE AND SITE VICINITY

| Project Number: | Figure Number: |
|---|---|
| 20266.015 | 1 |
| Date: 3/11/2016 | |
| Drafted By: sfox | |

Prepared by sfox, 3/11/2016; C:\Users\sfox\Documents\Projects\GIS\Anchorage\Fairview\MXD\PNG0688_Drycleaning\Report\Fig1_Fairview_State_Site.mxd

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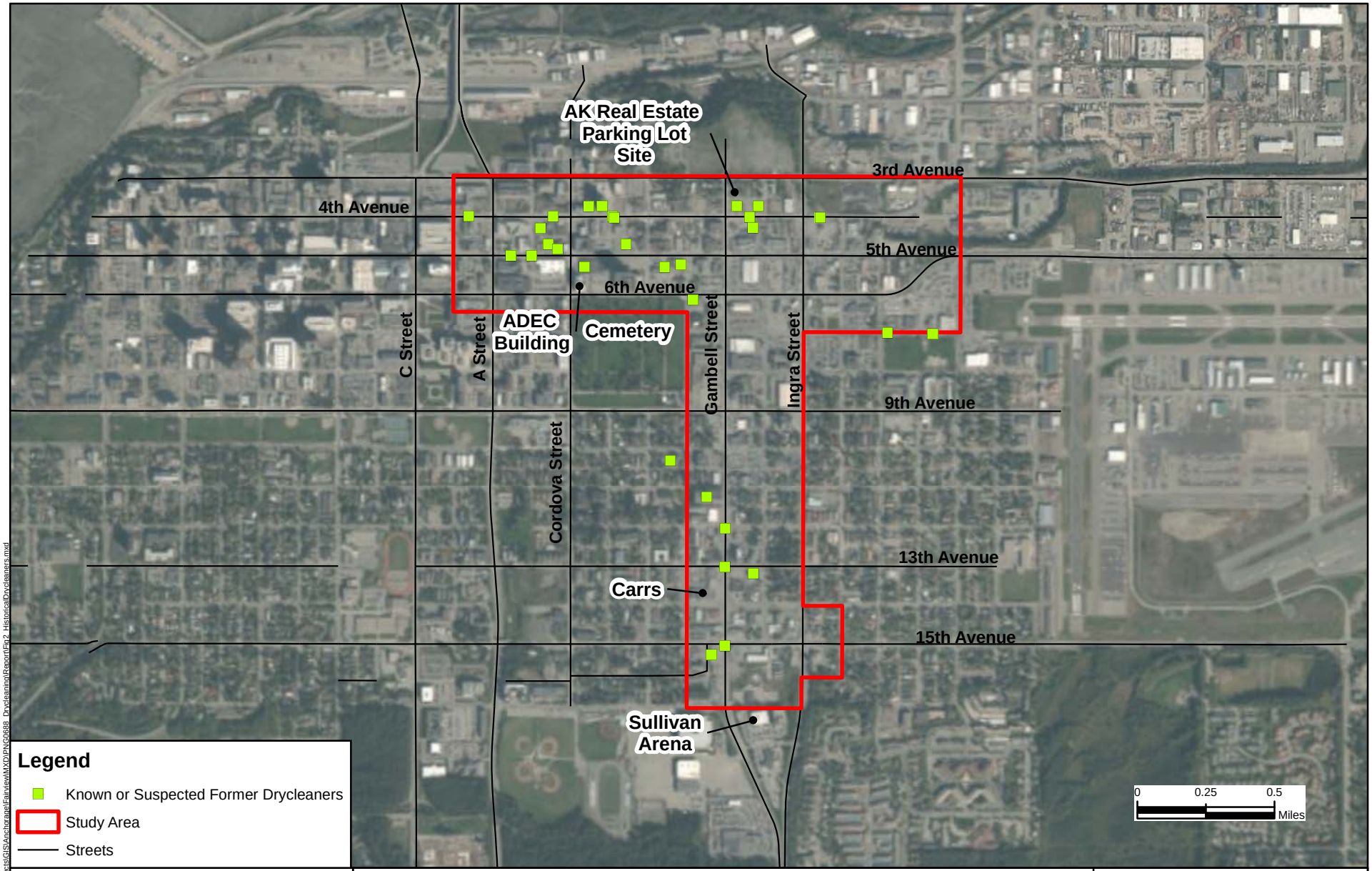


**Legend**

- Known or Suspected Former Drycleaners
- Study Area
- Streets

NOTES:
1. Unconfirmed Contaminated Site not displayed on this map.
2. Locations are approximate.

# FAIRVIEW REDEVELOPMENT AREA CHLORINATED SOLVENTS INVESTIGATION REPORT ANCHORAGE, ALASKA

## Known or Suspected Former Drycleaner Locations

Ahtna Engineering

| | |
|---|---|
| Project Number: 20266.015 | Figure Number: 2 |
| Date: 3/22/2016 | |
| Drafted By: sfox | |

Document Path: C:\Users\sfox\Documents\Projects\GIS\Anchorage\Fairview\MXD\PNG\0688_Drycleaning\Report\Fig2_HistoricalDrycleaners.mxd

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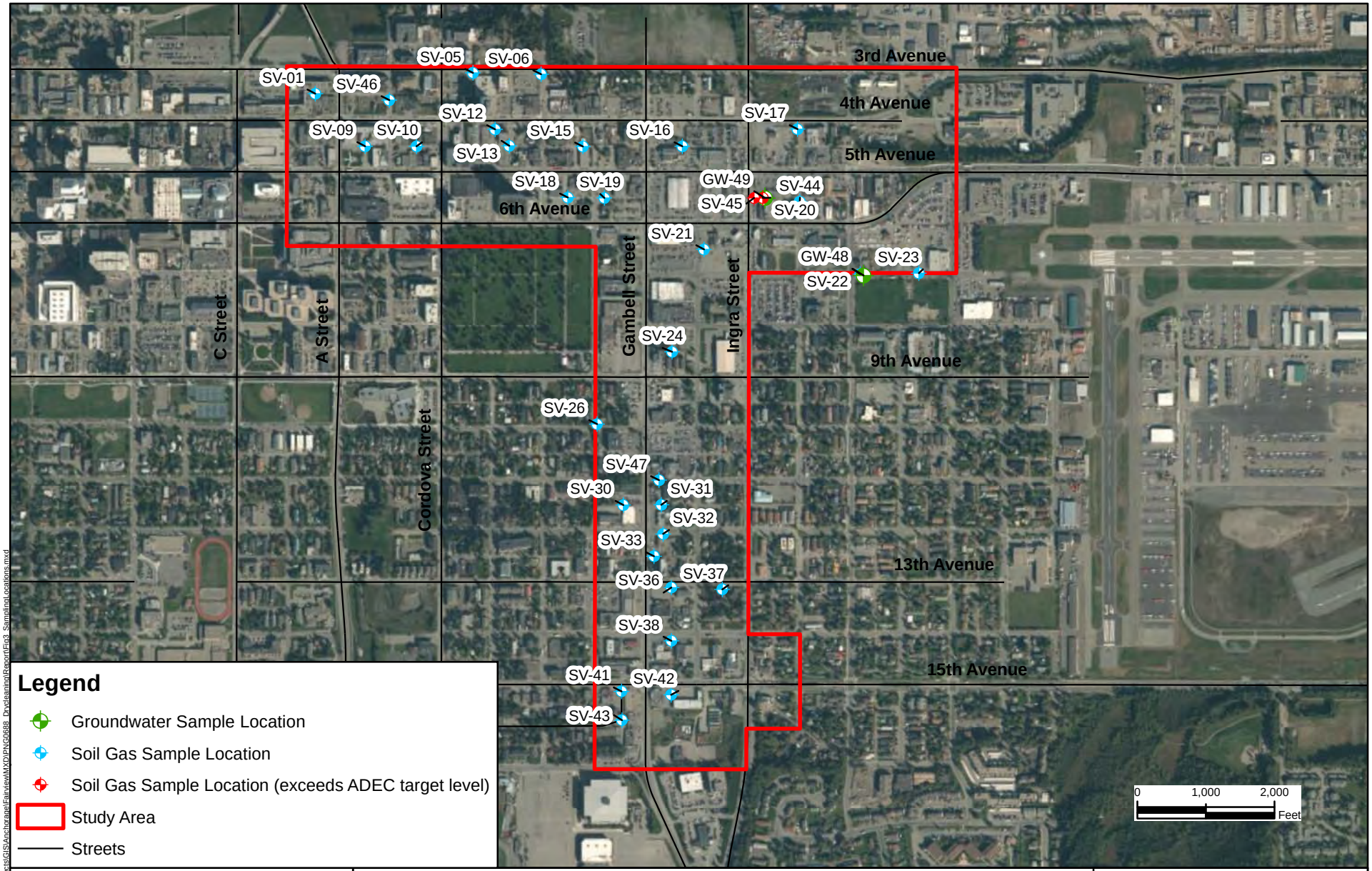


## Legend

- Groundwater Sample Location
- Soil Gas Sample Location
- Soil Gas Sample Location (exceeds ADEC target level)
- Study Area
- Streets

NOTES:
Sample locations are approximate.

# FAIRVIEW REDEVELOPMENT AREA CHLORINATED SOLVENTS INVESTIGATION REPORT ANCHORAGE, ALASKA

## SOIL GAS AND GROUNDWATER SAMPLING LOCATIONS

Ahtna Engineering

| Project Number: | Figure Number: |
|---|---|
| 20266.015 | 3 |
| Date: 3/22/2016 | |
| Drafted By: sfox | |

Document Path: C:\Users\sfox\Documents\Projects\GIS\Anchorage\Fairview\MXD\PNG0688_DrydeannonReport\Fig3_SamplingLocations.mxd

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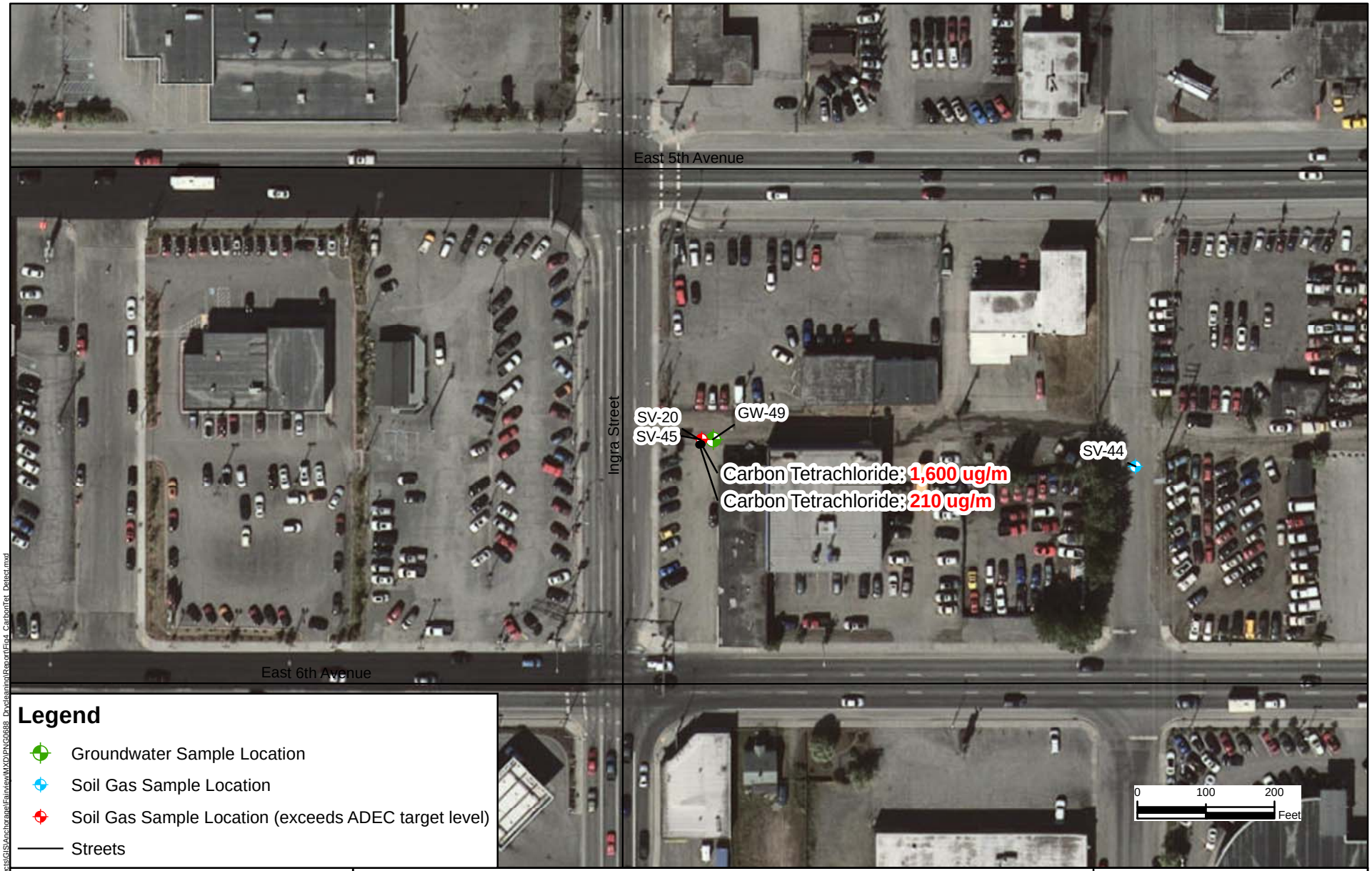


## Legend

- Groundwater Sample Location
- Soil Gas Sample Location
- Soil Gas Sample Location (exceeds ADEC target level)
- Streets

NOTES:
Sample locations are approximate.

FAIRVIEW REDEVELOPMENT AREA CHLORINATED SOLVENTS INVESTIGATION REPORT
ANCHORAGE, ALASKA

Ahtna Engineering

**CARBON TETRACHLORIDE DETECTIONS IN SOIL GAS**

| Project Number: | Figure Number: |
|---|---|
| 20266.015 | 4 |
| Date: 4/19/2016 | |
| Drafted By: sfox | |

Document Path: C:\Users\sfox\Documents\Projects\GIS\Anchorage\Fairview\MXD\PNG\0688_DrydeannonReport\Fig4_CarbonTet_Detect.mxd

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# APPENDIX A

FIELD NOTES

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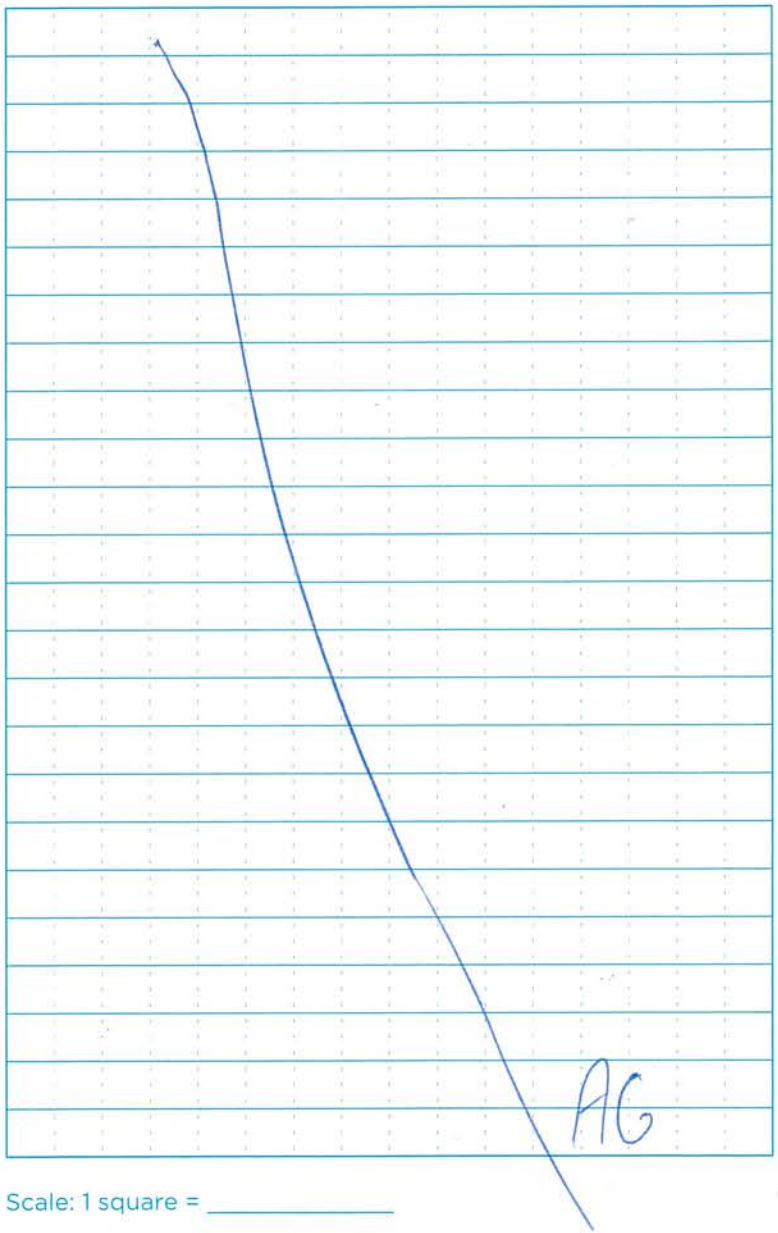



Scale: 1 square = _____



0900 Geotex, Workzone, Altius, Geosyntec on site. Workzone crew will set up traffic control.

0900 Get to location 08. Check utilities and decide there is no location to safely drill. Move on to location 09 and set up traffic control

0930 Begin drilling at location 09
Finish drilling and installation of vapor well
Purge 10 well volumes = ~17.1 liters purging at ~2 L/min

1052 Install sampler in well at 9.5 ft
sample = 15-FVOC-SV09

1110 Move to location 10 to begin drilling start location 11. Decide that well cannot be placed in right of way with location of utilities. will skip this boring and move to 12 after Geotex installs vapor well at location.

1150 Purge well and deploy sampler (details on well construction and sampling can be found on log

Scale: 1 square = _____

11/16/15 AGeilich 5°F clear

sheets for each well
1206 Sample 15-FVOC-SV10 deployed
1250 Begin drilling at location 12
1325 Well installed, purge well
1341 Sample 15-FVOC-SV12 deployed
1345 Begin drilling at location 13
Well installed, begin purge
1357 Deploy sampler 15-FVOC-SV13
1430 move to location 01 and
begin drilling
1510 Well installed, begin purge
1522 Deploy sampler 15-FVOC-SV01
1545 Cannot drill in right of way
for locations 2, 3, 4 due to
utility conflicts. Will skip these
locations
1600 Move to location 05 to begin drilling
1620 Finish well installation and begin
purge of 10 well vols
1633 Deploy sampler. Sample name =
15-FVOC-SV05
End of day

Scale: 1 square = _____

11/17/15 5°F Clear



AGeilich
0800 on site at location 06, meet
w/ contact & work zone
0820 conduct safety meeting. discuss
slips on ice and working
near traffic
0835 Begin drilling at location 06
0905 Well installed, begin purge
of 10 well volumes
0921 Deploy sampler. 15-FVOC-SV06
~~0921~~ A6
0940 Move to location 15. Location
14 is skipped due to utility conflicts
0950 Begin drilling at location 15
1015 Begin purge, well install completed
1025 Deploy sample. 15-FVOC-SV15
a) duplicate 15-FVOC-SV50
1040 Begin drilling at location 16
1055 Well is installed, ~~beg purge~~ A6
~~1123 Begin purge~~ A6
1110 Begin purge 10 well vols
1123 Deploy sampler 15-FVOC-SV16
1130 Move to location 17

Scale: 1 square = _____

~~11/16/15~~ 11/17/15

A Geitek 5°F

1140 Begin drilling at location 17
1200 Well installed
1212 Begin purge of 10 well vols
1225 Deploy sampler 15-FVOC-SV17
Move to location 07. Begin drilling
1358 Well installed at location 07
~~Begin Purge at 07. Purge 10 well vols~~ AG
~~Deploy sample 15-FVOC-SV07~~ AG
During installation Geitek had problems with rods freezing together. When checking well construction discover water in well to approx 2 Ft bgs. This installation cannot be used for vapor sampling. Crew will move on to next location until it is determined if another vapor well will be drilled here.
1425 Move to location 18
1430 Begin drilling at location 18
1500 Install vapor well, begin purge
1515 Deploy sampler 15-FVOC-SV18
1520 Move to location 19
1525 Begin drilling at location
1545 Install vapor well

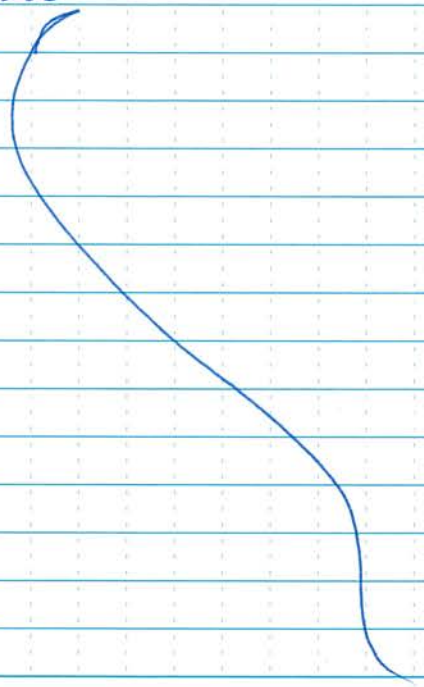
Scale: 1 square = _____



~~11/16/15~~ 11/17/15 AG

A Geitek 5°F

1555 Purge 10 well vols
1608 Deploy sample. 15-FVOC-SV19
Move to location 21
1620 Begin drilling at location 21
1640 Well installed
1642 Purge vapor well
1700 Deploy sampler 15-FVOC-SV21
1701 Deploy duplicate sampler 15-FVOC-SV51
1710 EOD



Scale: 1 square = _____

11/18/15 Abeilich 5°F, Clear

| | |
|---|---|
| 0520 | Meet at site, conduct safety meeting, talk about days activities. |
| 0530 | Mobilize to location 20 |
| 0900 | Begin drilling at location 20 |
| 0930 | Well installed, begin purge |
| 0941 | Deploy sampler 15-FVOC-SV20 |
| 1000 | Move to location 22, begin drilling |
| 1020 | Begin purge 10 well vols |
| 1032 | Deploy sample. 15-FVOC-SV22 |
| 1040 | Move to and begin drilling at location 23 |
| 1100 | Finish drilling, install well |
| 1103 | Begin purge |
| 1115 | Deploy sample. 15-FVOC-SV23 |
| 1130 | Move to location 24 |
| 1140 | Begin drilling at location 24 |
| 1215 | Well installed, purge 10 well volumes of air |
| 1231 | Deploy sample. 15-FVOC-SV24 |
| 1240 | Move to location 25, begin drilling |
| 1300 | Well installed, purge 10 well vols |
| 1313 | ~~Deploy sample. 15-FVOC-SV25~~ AG (deployment delayed) |
| | While deploying sample. discover water in bottom of well ~1-2 ft of water |

Scale: 1 square = _____

11/18/15 A Geilich 5°F, clear



| | |
|---|---|
| | Will check well to determine if the water leaked in during bentonite hydration. Delay sampler retrieval until ~~this~~ it is determined if well drains |
| | Mobilize to location 26 |
| 1330 | Begin drilling |
| 1358 | Purge 10 well vols of air |
| 1410 | Deploy sampler 15-FVOC-SV26 |
| 1420 | Move to location 27 decide that utilities prevent drilling. |
| 1430 | Move to location 28. Utilities also prevent drilling in right of way |
| 1445 | Move to location 31 and begin drilling |
| | Install well, Purge well |
| | Deploy sampler 15-FVOC-SV31 |
| | Move to location 30 |
| | Purge well 10 well vols |
| 1604 | Deploy sampler 15-FVOC-SV30 |
| 1610 | Move to location 29 |
| 1630 | ~~Begin Purge~~ AG |
| | ~~Deploy sampler 15-FVOC-SV29~~ AG |
| | While setting up purge equipment notice water in well. Measure at approx 4 ft bgs. Will not |

Scale: 1 square = _____

Rite in the Rain.

11/19/15 Abeilich 10-15°F, snow

Hydration. Will not deploy sampler

1030 move to location 35. Begin drilling

1040 Stop drilling. Trent (Geotek) reports that after 2 feet of relatively easy drilling the rods will not advance further even with full geoprobe weighting. He is concerned it is due to concrete (possible unmarked storm drain or similar) Decide that it will not be attempted to drill through or move further along roadway due to utility concerns.

1055 move to location 38

1100 Begin drilling

1120 Well installed, begin purge

1133 Deploy sampler 15-FVOC-SV38

1140 Move to location 39. Overhead utilities / underground utils prevent drilling. Move to location 41.

Begin drilling location 41

Purge 10 well vols of air

1222 Deploy sampler - 15-FVOC-SV41

1223 Deploy duplicate - 15-FVOC-SV53

AC

Scale: 1 square = _____

11/18/15 Abeilich 15°F snow



1320 Set up at location 43

1335 Begin drilling

1400 Install well, purge 10 well vols

1412 Deploy sampler 15-FVOC-SV43

1415 Move to location 42

1420 Begin drilling

1440 Install well at 42.

1450 Begin purge

1503 Deploy sampler 15-FVOC-SV42

1510 Geotek moves to location 44 and begins drilling. After installation of well notice water in bottom of well. Do not deploy sampler.

Retrieve sampler 15-FVOC-SV09

Move to location 10, retrieve 15-FVOC-SV10

Cannot find sampler at location 12, 13 will try again tmrw morning

Retrieve sampler at 01, 15-FVOC-SV01

Cannot find sampler at 05, will try tmrw

EOD

AC

Scale: 1 square = _____

11/20/15 A Golich 25°F, cloudy

0400 Meet w/ Geotek and WorkZone crew to conduct safety meeting and go over days activities.

0830 meet w/ Olga (Geosyntec) and Noelle to go over H+S plan and what we will be doing

0900 Begin drilling at location 37

0920 Well is installed to 10 ft. Purge 10 well vols of air from well

0934 Deploy sampler 15-FVOC-SV37

0940 Move to location 36

1010 Install well, begin air purge

1024 Deploy sampler 15-FVOC-SV36

1045 Move to location 13 to remove sampler.

1104 Retrieve 15-FVOC-SV13

1115 Move to loc 12, retrieve 15-FVOC-SV12

Geotek begins well decommissioning. They are pulling PVC well out manually and then filling empty hole w/ bentonite. Then hydrate bentonite, place asphalt over and heat/compact.

1135 Well 12, 13 decommissioned.

Scale: 1 square = _____



11/20/15 A Golich, 25°F, cloudy

1149 retrieve 15-FVOC-SV05, decom well

1155 retrieve 15-FVOC-SV06, decom well

1201 retrieve 15-FVOC-SV15

1202 retrieve 15-FVOC-SV50 (duplicate at 15) and decom well

1211 retrieve 15-FVOC-SV16, decom well

1315 retrieve 15-FVOC-SV17, decom well

1330 End of day

AG

Scale: 1 square = _____

A Geilich 11/21/15 15-20°F, cloudy, snow

| | |
|---|---|
| 1300 | on site to begin sampler retrieval no decon taking place, will come back w/ geotek on monday to decon all wells |
| 1350 | retrieve 15-FVOC-SV18 |
| 1411 | retrieve 15-FVOC-SV19 |
| 1435 | retrieve 15-FVOC-SV22 |
| 1440 | retrieve 15-FVOC-SV23 |
| 1450 | retrieve 15-FVOC-SV21 |
| 1451 | retrieve 15-FVOC-SV51 (dup of SV21) |
| 1517 | retrieve 15-FVOC-SV20 |
| 1526 | retrieve 15-FVOC-SV24 |
| 1540 | attempt to retriele sampler at location 26. can not find in snow. Will try tomorrow |
| 1615 | retrieve 15-FVOC-SV30 |
| 1627 | retrieve 15-FVOC-SV31 |
| 1630 | End of day |

AG

Scale: 1 square = _____



11/22/15 A Geilich ~~15~~20°F, cloudy, snow

| | |
|---|---|
| 1230 | on site to continue sampler removal |
| 1240 | retrieve 15-FVOC-SV26 |
| 1241 | retrieve 15-FVOC-SV52 (dup of location 26) |
| 1330 | attempt to retrieve sampler and data logger from loc 32. String gets stuck and cannot pull sampler out. Will retrieve sampler when well is removed tomorrow. |
| 1405 | retrieve sampler 15-FVOC-SV38 |
| 1420 | retrieve 15-FVOC-SV41 |
| 1421 | retrieve 15-FVOC-SV53 (dup of location 41) |
| 1436 | retrieve 15-FVOC-SV43 |
| 1458 | retrieve 15-FVOC-SV33 |
| 1515 | retrieve 15-FVOC-SV42 |
| 1530 | off site, EOD |

AG

Scale: 1 square = _____

11/23/15 Abelich 25°F, cloudy

0800 on site w/ Geotek and Workzone crew, go over safety issues and plan for day

0815 Decommission well at location 32. when well is pulled out, retrieve sample 15-FVOC-SV32 and data logger

0825 Decom well at loc 33

0840 Decom well 38

0850 Decom well 42

0905 Decom well 44

0915 Decom well 41

0925 Decom well 43

0940 Decom well 31

1000 Decom well 30

1015 Decom well 29

1027 Retrieve sample 15-FVOC-SV37 & decom well

1033 Retrieve sample 15-FVOC-SV36 and decom well

1045 Decom well 25

1055 Decom well 26

1105 Decom well 24

1110 Decom well 22

1120 Decom well 23

Scale: 1 square = _____



11/23/15 Abelich 25°F, cloudy

1130 Decom well 21

1140 Decom well 20

1150 Decom well 28

1200 Decom well 29

1220 Decom well 01. Finish decommissioning wells, EOD

AC

Scale: 1 square = _____

3/1/16 A Gelich Clear 30°F

0800 Meet with Geotek and Shannon traffic. Discuss plan for day.
0820 Move to first site at 11th/Gambell Conduct safety briefing with crew
0830 Geotek begins drilling at location ~~46~~ 47 (Ac)
0855 Geotek finishes installing well, begin purging at 2 L/min for 10 minutes
0905 Finish purge, deploy soil vapor sampler in well 16-FVOC-SV47
0930 Move to location 46
0950 begin purge for 10 min
1005 deploy sampler 16-FVOC-SV46 also deploy temperature datalogger in well 46
1020 move to location 44 and begin drilling
1100 begin air purge at 2 L/min for 10 min
1115 deploy sampler 16-FVOC-SV44
1 also deploy duplicate sampler 16FVOC-SV54 with time 1120
1125 move to location 45, begin drilling
1140 begin purge
1155 deploy sampler 16-FVOC-SV45

Scale: 1 square = _____



3/1/16 A Gelich clear 30°F

1200 Geotek off site to get extra drill rods to prepare for water sampling
1300 Geotek begins macrocore drilling at location 49 to determine water level
1410 Macrocore shows water level at 38 ft in sand directly beneath silt layer. Geotek will now drill SB-16 to collect water sample
1555 Collect ground water sample 16-FVOC-GW49 screen set at 40.1 to 44.1 ft bgs. Water level in screen 35.72 ft. Soil in core was dry at this depth, water likely confined by silt layer so sampled water represents water within 5 ft of water table
1630 Clean up site and leave

AG

Scale: 1 square = _____

3/2/16 AGeitch Clear 30°F

0800 Meet at site to mobilize to determine water level at location 48

0820 traffic control set up on wrong intersection, wait for them to arrive to move blockade.

0910 traffic control set up, begin drilling at location 48

1020 Geotek pulls up macrocore from ~35-40 ft. Plastic liner melted so cannot get core out of drill rod. Evidence of water visible in section of soil visible at end of rod. Geotek will ~~get~~ SP-16 point with bottom at 40 ft. Soil visible in end of rod was sand/silt

1100 Geotek sets SP16. DTW = 39.21 ft bgs. Total well depth = 42.43 ft bgs.

1110 Sample water 16-EVOC-GW48 and duplicate 16-EVOC-GW55 with time = 1200

1140 Geotek pulls rods, backfills hole, repairs asphalt. Will meet Friday to pull vapor samplers

SAG

Scale: 1 square = _____

3/4/16 AGeitch Snow 25°F



1200 meet to remove vapor samplers and decommission wells, discuss health safety issues with snow and traffic

1220 Retrieve sampler at location 47

~~Repair~~ AG Decommission well by pulling out and filling hole with bentonite and repairing surface with asphalt patch.

1235 Retrieve sampler 46 and get dataloger from well. Doron well

1250 Retrieve sampler at location 44 and

1245 duplicate sampler. Doron well

1300 Retrieve sampler at location 45 Doron well

1320 All samplers retrieved and wells decommissioned

1330 Leave site

AG

Scale: 1 square = _____

# APPENDIX B

PHOTO LOG

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Photograph 1: Looking north. Geotek personnel performing vapor monitoring well installation.

Photograph 2: Vapor monitoring well screen and casing.

Photograph 3: Purging vapor well and collection of GPS information.

Photograph 4: Looking east. Removal of a vapor monitoring well.

Photograph 5: Filling empty borehole with bentonite chips.

Photograph 6: Close up of asphalt patch applied during decommissioning.

Photograph 7: Looking west. Geotek personnel drilling at location GW-48 during Round 2 sampling.

Photograph 8: View of soil core at GW-49. Silt to saturated sand transition visible.

# APPENDIX C

ROW PERMITS

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**MOA RIGHT OF WAY**
**INSPECTION REQUEST LINE**
**343-8206**

Requests must be received 2 working days in advance of starting work and 2 working days in advance for final inspection. Permit is not valid without the call-in and the utility locate number.

Call the voice message system at 343-8206 and give the following information in the order listed below:

1. Permit Number
2. Contractor Name
3. Contact Person
4. Phone Number
5. Start Date
6. Start Time
7. Project Location
8. Utility Locate Ticket Number

Utility companies (ACS, GCI, ML&P, AWWU, ENSTAR, CEA, MEA, MTA) must notify the Right of Way office a minimum of 24 hours prior of starting work.

Municipality of Anchorage – Right of Way Section
Main Phone 343-8240 Fax 343-8250 7:30am – 4:30pm

**POST IN A CONSPICUOUS PLACE**
**ALL WORK MUST BE INSPECTED**

Field Inspection Request required 2 working days in advance of starting work and 2 working days in advance for final inspection. Call (907) 343-8206 (voice recorder) for scheduling. Permit is not valid without the call-in and also must include the one-call ticket (utility locate) number.

Development Services Department

MUNICIPALITY OF ANCHORAGE
RIGHT OF WAY DIVISION
4700 ELMORE ROAD
TELEPHONE (907) 343-8240

POST POST

# RIGHT OF WAY PERMIT R152610

**Type:** General **Grid:** SW1932 **Date Issued:** 11/6/2015

**Construction Start:** **Last Update by:** PWDEW

**Last Updated:** 11/06/2015

**Permittee:** GEOTEK ALASKA, INC.

**Contact Person:** Katherine Smith, 569-5900 **Primary Inspector:** 343-8240

**Site Address:** 907 E DOWLING RD, STE 000016, Anchorage - @ Various location within Municipality of Anchorage

**Legal Description:** T13N R3W SEC 32 E2SW4SW4SW4 PTN PARCEL 1-11 G:1932

**Original Work Description:** Drill 44 boreholes in various locations for soil sampling 10' below ground surface. Locations are listed on attachment.

**Most Recent Summary**

| Work Area | | | | | |
|---|---|---|---|---|---|
| various locations/see map | ROW | Boring | Full | 11/7/2015 7:00:00AM | 12/31/2015 9:00:00PM |
| vrious locations/see map | ROW | Boring | Partial | 11/7/2015 7:00:00AM | 12/31/2015 9:00:00PM |

**Financial Summary**

| Fee Description | QTY | AMT |
|---|---|---|
| Construction Method | 1.00 | 225.00 |
| Road Closure | 1.00 | 280.00 |
| | **Total Fees:** | **505.00** |

POST

**See reverse for requirements/remarks.**

I have read and understand both sides of this permit. I agree to the terms and conditions; and I certify that all work will comply with federal, state, and municipal codes and regulations and the provisions of this permit.

**Signature:** Katherine D Smith Date: 11/06/2015

www.invarion.com

**Date:** 10/29/2015 **Author:** Work Zone TCM/Trisha Early ATSSA# 27410 **Project:** Geosyntic Fairview Soil Gas & GW
**Project NO:** 15-220

**Comments:**

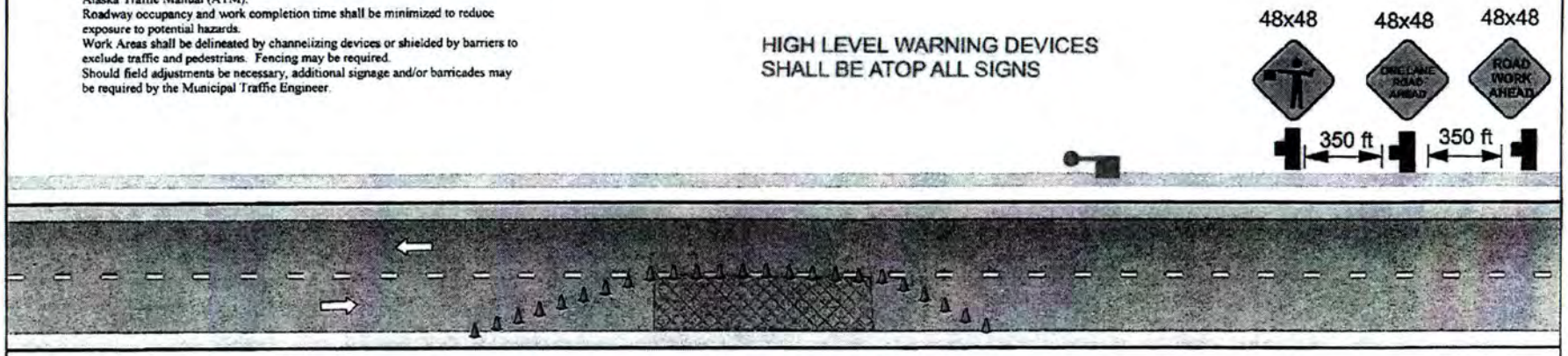
TCP#1 Lane Closure on a Two Lane Road Using Flaggers
Contractor: GeoTek Alaska Inc
Project superintendent: Alex Geilich 908-256-2885
TCS: Trisha Early 907-232-4536
24 Hour contact: Alex Geilich 908-256-2885
Effective date: 11/4/2015 - 12/31/2015
Work hours: 7:00 am - 7:00 pm

APPROVED
MUNICIPALITY OF ANCHORAGE
TRAFFIC ENGINEERING
11/6/15
EXPIRES 12/31/15

Legend
- Work Area
- Cone
- road work ahead W20-1
- one lane road ahead W20-4
- flagger symbol

Notes:
Pedestrians shall be provided with access and safe passage through or around the work zone at all times.
Emergency vehicle access through the work zone must be maintained at all times.
All signs and devices shall conform to the standards and specifications of the Alaska Traffic Manual (ATM).
Roadway occupancy and work completion time shall be minimized to reduce exposure to potential hazards.
Work Areas shall be delineated by channelizing devices or shielded by barriers to exclude traffic and pedestrians. Fencing may be required.
Should field adjustments be necessary, additional signage and/or barricades may be required by the Municipal Traffic Engineer.

HIGH LEVEL WARNING DEVICES
SHALL BE ATOP ALL SIGNS




This Traffic Control Plan conforms with the Alaska Traffic Manual (ATM), which is the MUTCD with the Alaska supplement and the contract specifications.

Worksite supervisor: [signature]
Date: 11.2.15

Notes:
1. Cone spacing 20 ft apart
2. Urban area
3. Light plants shall be used for flagger during dusk/dark working hours

www.invarion.com

**Date:** 10/28/2015 **Author:** Work Zone TCM/Trisha Early ATSSA# 27410 **Project:** Geosyntic Fairview Soil Gas & GW
**Project No:** 15-220

**Comments:**

TCP# 2 Shoulder Work
Contractor: GeoTek Alaska Inc
Project superintendent: Alex Geilich 908-256-2885
TCS: Trisha Early 907-232-4536
24 Hour contact: Alex Geilich 908-256-2885
Effective date: 11/4/2015 - 12/31/2015
Work hours: 7:00 am - 7:00 pm

APPROVED
MUNICIPALITY OF ANCHORAGE
TRAFFIC ENGINEERING
11/6/15

EXPIRES 12/31/15

HIGH LEVEL WARNING DEVICES
SHALL BE ATOP ALL SIGNS

This Traffic Control Plan conforms with the Alaska Traffic Manual (ATM), which is the MUTCD with the Alaska supplement and the contract specifications.

Worksite supervisor:
Date: 11-2-15

Notes:
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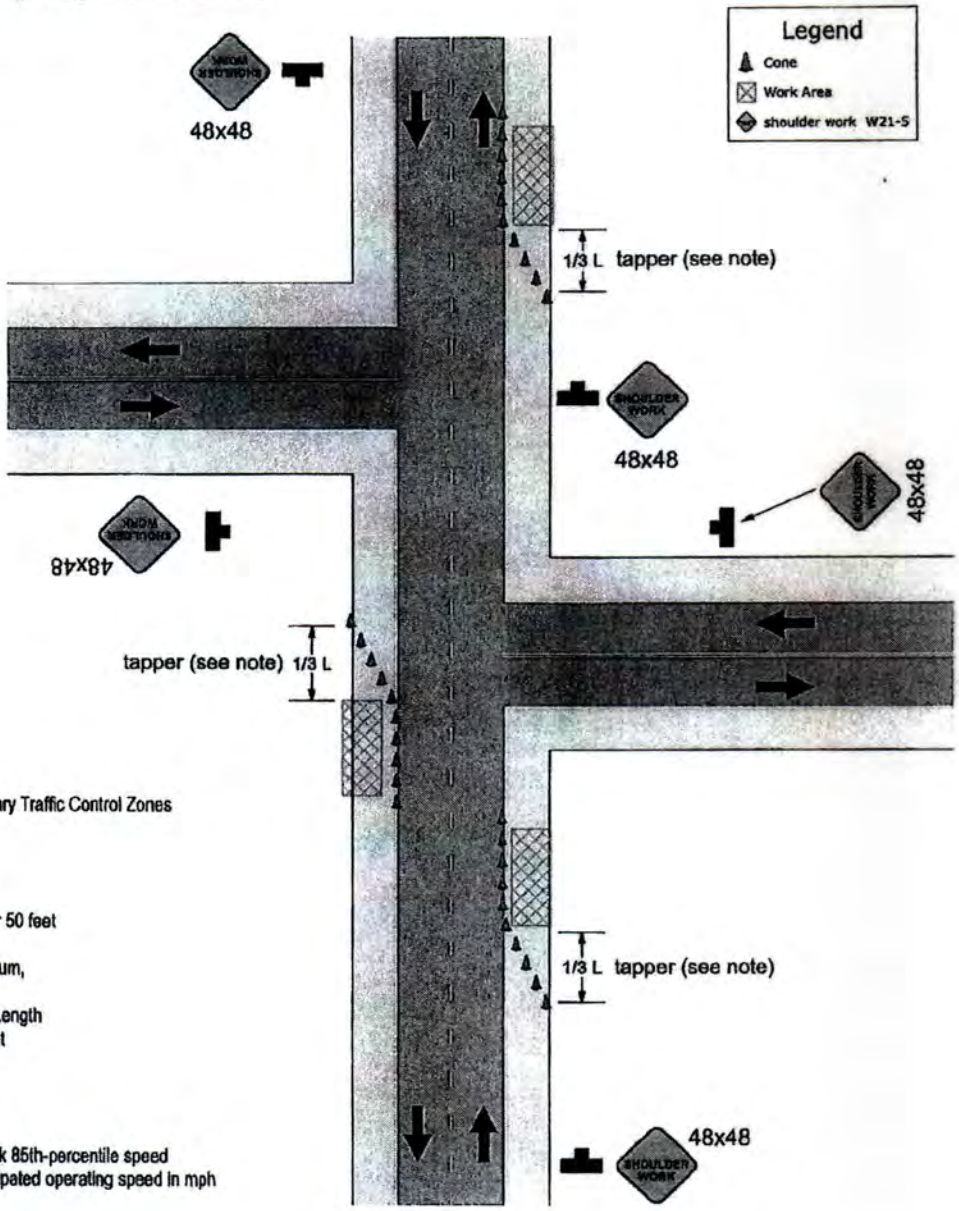



Note:
Taper Length Criteria for Temporary Traffic Control Zones
Type of Taper Taper Length
Merging Taper at least L
Shifting Taper at least 0.5 L
Shoulder Taper at least 0.33 L
One-Lane, Two-Way Traffic Taper 50 feet minimum, 100 feet maximum
Downstream Taper 50 feet minimum, 100 feet maximum
Formulas for Determining Taper Length
Speed (S) Taper Length (L) In feet
40 mph or less L =WS2 x 60
45 mph or more L = WS
Where: L = taper length In feet
W = width of offset In feet
S = posted speed limit, or off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

www.invarion.com

**Date:** 10/28/2015 **Author:** Work Zone TCM/Trisha Early ATSSA#27410 **Project:** Geosyntic Fairview Soil Gas & GW
**Project NO.:** 15-220

**Comments:**

TCP#3 Detour
Contractor: GeoTek Alaska Inc
Project superintendent: Alex Geilich 908-256-2885
TCS: Trisha Early 907-232-4536
24 hour contact: Alex Geilich 908-256-2885
Effective date: 11/4/2015 - 12/31/2015
Work hours: 7:00 am - 7:00 pm

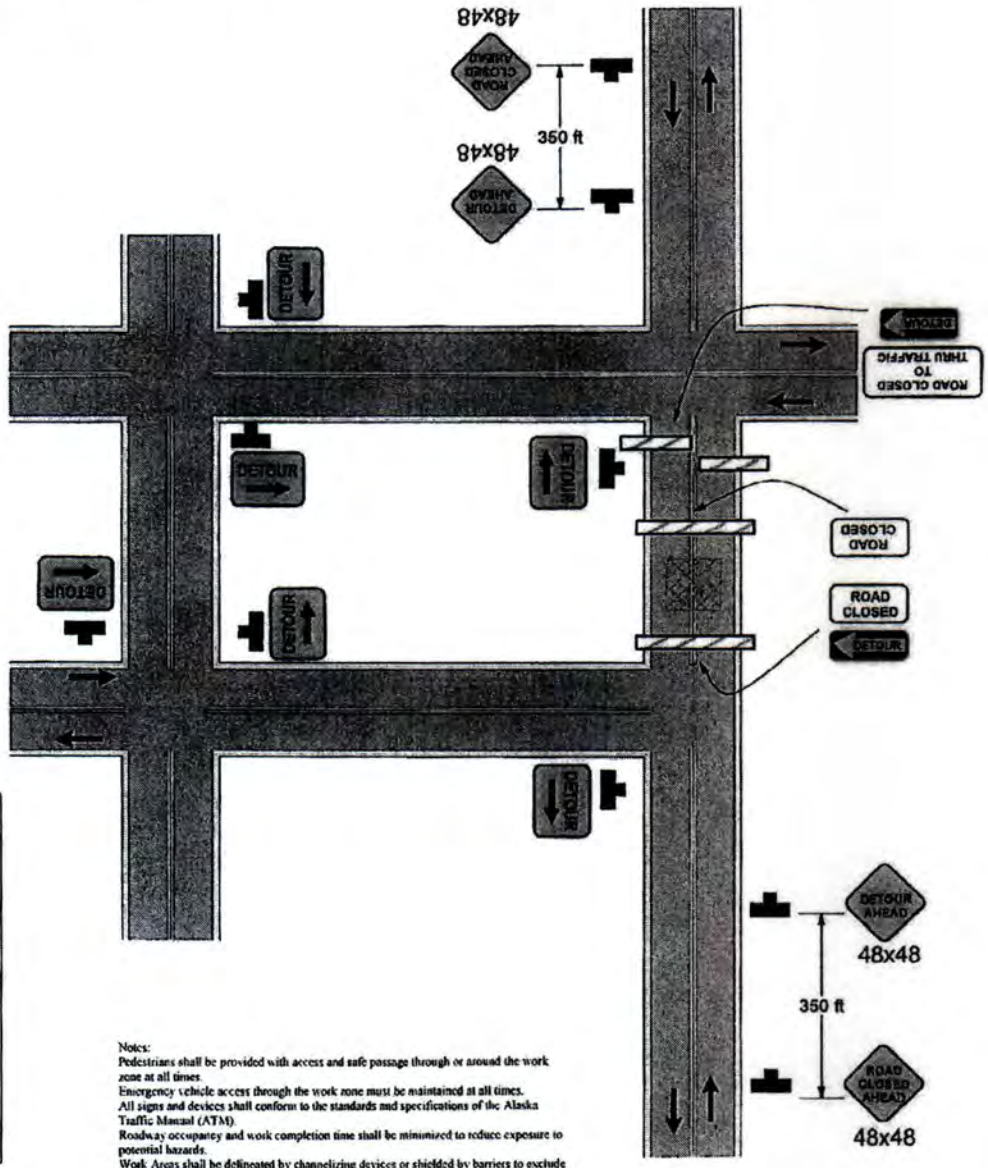
APPROVED
MUNICIPALITY OF ANCHORAGE
TRAFFIC ENGINEERING
11/6/15
EXPIRES 12/31/15

This Traffic Control Plan conforms with the Alaska Traffic Manual (ATM), which is the MUTCD with the Alaska supplement and the contract specifications.

Worksite supervisor: _____ Date: 11.2.15

HIGH LEVEL WARNING DEVICES SHALL BE ATOP ALL SIGNS

The Contractor shall conduct the work in such a manner as to cause minimum inconvenience to pedestrians and vehicular traffic and to persons conducting commercial enterprises or residing along the route of Work. Without prior approval of the Engineer, entrances or driveways of all kinds shall not be blocked for more than three (3) hours. The Contractor shall provide the property owners and/or tenants written notification no less than forty-eight (48) hours prior to any closure of access. The Contractor shall conduct his work to insure that there is no disruption of mail service, school bus service as applicable, trash collection, access by emergency vehicles, or any unnecessary disruption of general access to any business or private residence.




Legend

- Work Area
- Type III
- road closed ROAD
- road closed to thru traffic R11-4
- detour (R) M4-10
- Type II
- detour ahead W20-2
- road closed ahead W20-3
- detour (L) M4-10
- detour (R) OC-29R
- detour (L) OC-29L

Notes:
Pedestrians shall be provided with access and safe passage through or around the work zone at all times.
Emergency vehicle access through the work zone must be maintained at all times.
All signs and devices shall conform to the standards and specifications of the Alaska Traffic Manual (ATM).
Roadway occupancy and work completion time shall be minimized to reduce exposure to potential hazards.
Work Areas shall be delineated by channelizing devices or shielded by barriers to exclude traffic and pedestrians. Fencing may be required.
Should field adjustments be necessary, additional signage and/or barricades may be required by the Municipal Traffic Engineer.

www.invarion.com

**Date:** 10/28/2015 **Author:** Work Zone TCM/Trisha Early ATSSA#27410 **Project:** Geosyntic Fairview Soil Gas & GW
**Project NO.:** 15-220

**Comments:**

TCP#4 Sidewalk Closed
Contractor: GeoTek Alaska Inc
Project superintendent: Alex Geilich 908-256-2885
TCS: Trisha Early 907-232-4536
24 hour contact: Alex Geilich 908-256-2885
Effective date: 11/4/2015 - 12/31/2015
Work hours: 7:00 am - 7:00 pm

APPROVED
MUNICIPALITY OF ANCHORAGE
TRAFFIC ENGINEERING
11/6/15
EXPIRES 12/31/15

This Traffic Control Plan conforms with the Alaska Traffic Manual (ATM), which is the MUTCD with the Alaska supplement and the contract specifications.

Worksite supervisor: Trisha Early
Date: 11.2.15

## Legend

- road work ahead W20-1
- Work Area
- Type II Barricade
- sidewalk closed cross here (L) R9-11a
- sidewalk closed cross here (R) R9-11a
- sidewalk closed R9-9

Notes:
Pedestrians shall be provided with access and safe passage through or around the work zone at all times.
Emergency vehicle access through the work zone must be maintained at all times.
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Roadway occupancy and work completion time shall be minimized to reduce exposure to potential hazards.
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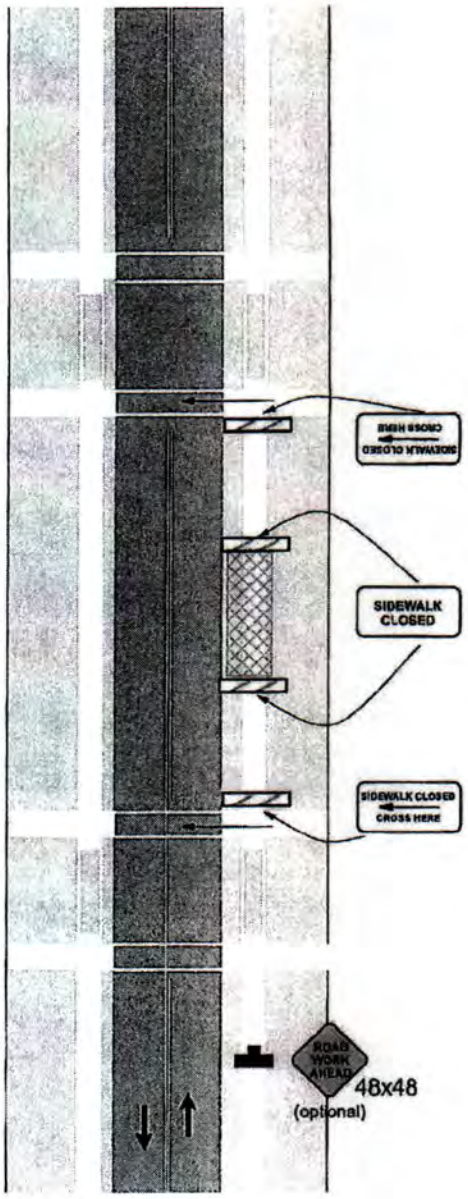



**SIDEWALK DETOUR**

www.invarion.com

**Date:** 10/28/2015 **Author:** Work Zone TCM/Trisha Early ATSSA #27410 **Project:** Geosyntic Fairview Soil Gas & GW
**Project NO:** 15-220

**Comments:**

TCP# 5 Lane Closure
Contractor: GeoTek Alaska Inc
Project superintendent: Alex Geilich 908-256-2885
TCS: Trisha Early 907-232-4536
24 Hour contact: Alex Geilich 908-256-2885
Effective date: 11/4/2015 - 12/31/2015
Work hours: 7:00 am - 7:00 pm

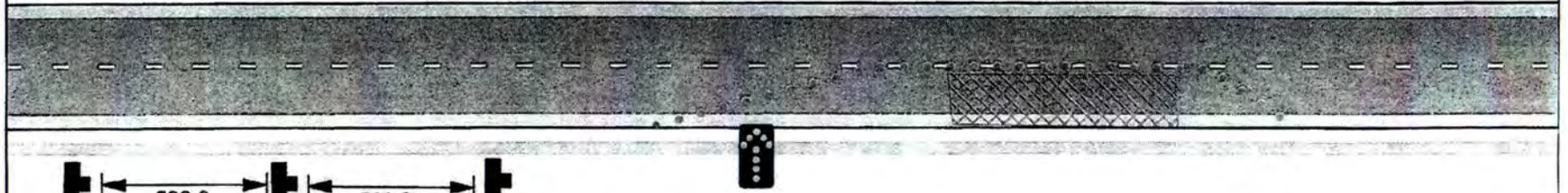
APPROVED
MUNICIPALITY OF ANCHORAGE
TRAFFIC ENGINEERING
11/6/15
EXPIRES 12/31/15

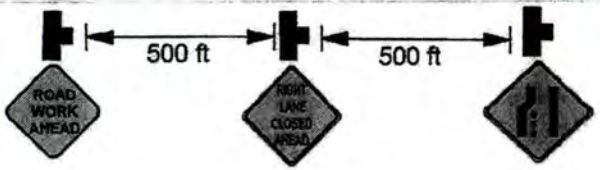
HIGH LEVEL WARNING DEVICES SHALL BE ATOP ALL SIGNS

Notes:
1. Taper length 540 ft
2. Barrel spacing 25 ft
3. Construction signs 48x48

This Traffic Control Plan conforms with the Alaska Traffic Manual (ATM), which is the MUTCD with the Alaska supplement and the contract specifications.

Worksite supervisor:
Date: 11.2.15




Notes:
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Work Areas shall be delineated by channelizing devices or shielded by barriers to exclude traffic and pedestrians. Fencing may be required.
Should field adjustments be necessary, additional signage and/or barricades may be required by the Municipal Traffic Engineer.

Legend
- road work ahead W20-1
- CW4-2L CW4-2L
- Work Area
- Barrel
- CW9-3R CW9-3R
- Arrowboard (Single)

| Location ID | SampleType | Borhole Depth | Location description | Potential Grouping | |
|---|---|---|---|---|---|
| 1 | Soil Vapor | 10' | 3rd/4th Alley between A/B Streets | 1 | Full |
| 2 | Soil Vapor | 10' | 3rd/4th Alley between A/Barrow Streets | 1 | Full |
| 3 | Soil Vapor | 10' | 3rd/4th Alley between Barrow/Cordova Streets (west) | 1 | Full |
| 4 | Soil Vapor | 10' | 3rd/4th Alley between Barrow/Cordova Streets (east) | 1 | Full |
| 5 | Soil Vapor | 10' | 3rd Avenue between Cordova/Eagle Streets | | Part |
| 6 | Soil Vapor | 10' | Eagle St and 3rd Avenue | | Part |
| 7 | Soil Vapor | 10' | Latouche Street between 3rd Ave/ Post Road | | Part |
| 8 | Soil Vapor | 10' | 4th/5th Alley between A/B Streets | 1 | Full |
| 9 | Soil Vapor | 10' | 4th/5th Alley between A/Barrow Streets | 1 | Full |
| 10 | Soil Vapor | 10' | 4th/5th Alley between Barrow/Cordova Streets | 1 | Full |
| 11 | Soil Vapor | 10' | 4th/5th Alley between Cordova/Denali Streets | 1 | Full |
| 12 | Soil Vapor | 10' | Denali Street and 4th Avenue | | Part |
| 13 | Soil Vapor | 10' | 4th/5th Alley between Cordova/Denali Streets | 1 | Full |
| 14 | Soil Vapor | 10' | 4th/5th Alley between Eagle/Gambell Streets (west) | 2 | Full |
| 15 | Soil Vapor | 10' | 4th/5th Alley between Eagle/Gambell Streets (east) | 2 | Full |
| 16 | Soil Vapor | 10' | 4th/5th Alley between Gambell/Ingra Streets | 2 | Full |
| 17 | Soil Vapor | 10' | Juneau Street and 4th Avenue | | Part |
| 18 | Soil Vapor | 10' | 5th/6th Alley between Eagle/Fairbanks Streets | 2 | Full |
| 19 | Soil Vapor | 10' | 5th/6th Alley between Fairbanks/Gambell Streets | 2 | Full |
| 20 | Soil Vapor | 10' | 5th/6th Alley between Ingra/Juneau Streets | | Full |
| 21 | Soil Vapor | 10' | 6th/7th Alley between Hyder/Ingra streets | | Full |
| 22 | Soil Vapor | 10' | 7th Avenue between Karluk/Latouche Streets | 3 | Part |
| 23 | Soil Vapor | 10' | 7th Avenue between Latouche/Medfra Streets | 3 | Part |
| 24 | Soil Vapor | 10' | 8th/9th Alley between Gambell/Hyder Streets | | Full |
| 25 | Soil Vapor | 10' | 9th/10th Alley between Gambell/Hyder Streets | 4 | Full |
| 26 | Soil Vapor | 10' | 10th Avenue and Fairbanks Street | 4 | Part |
| 27 | Soil Vapor | 10' | 10th/11th Alley between Fairbanks/Gambell Streets | 4 | Full |
| 28 | Soil Vapor | 10' | 10th/11th Alley between Gambell/Hyder Streets | 4 | Full |
| 29 | Soil Vapor | 10' | 11th Avenue between Fairbanks/Gambell Streets | 4 | Part |
| 30 | Soil Vapor | 10' | 11th/12th Alley between Fairbanks/Gambell Streets | 4 | Full |
| 31 | Soil Vapor | 10' | 11th/12th Alley between Gambell/Hyder Streets | 4 | Full |
| 32 | Soil Vapor | 10' | 12th Avenue between Gambell/Hyder Streets | | Part |
| 33 | Soil Vapor | 10' | 12th/13th Alley between Gambell/Hyder Streets | 5 | Full |

9 AM - 4 PM M-F

9 AM - 4 PM M-F

9 AM - 4 PM M-F

APPROVED
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TRAFFIC ENGINEERING
SKS 11/6/15
EXPIRES 12/31/15

| | | | | | |
|---|---|---|---|---|---|
| 34 | Soil Vapor | 10' | 12th/13th Alley between Hyder/Ingra Streets | 5 | Full |
| 35 | Soil Vapor | 10' | 13th Avenue between Fairbanks/Gambell Streets | | Park |
| 36 | Soil Vapor | 10' | Hyder/Gambell Alley between 13th/14th Avenue | 5 | Full |
| 37 | Soil Vapor | 10' | Hyder/Ingra Alley between 13th/14th Avenue | 5 | Full |
| 38 | Soil Vapor | 10' | Hyder/Gambell Alley between 14th/15th Avenue | 5 | Full |
| 39 | Soil Vapor | 10' | 14th/15th Alley between Fairbanks/Gambell Streets | 5 | Full |
| 40 | Soil Vapor | 10' | Hyder/Ingra Alley between 14th/15th Avenue | 5 | Full |
| 41 | Soil Vapor | 10' | East 15th Terrace between 15th and East 15th Terrace (north) | 6 | Full |
| 42 | Soil Vapor | 10' | Gambell/Hyder Alley south of 15th | 6 | Full |
| 43 | Soil Vapor | 10' | East 15th Terrace between 15th and East 15th Terrace (south) | 6 | Full |
| 44 | Soil Vapor | 10' | Unnamed Road north of Sullivan Arena | 6 | N/A |

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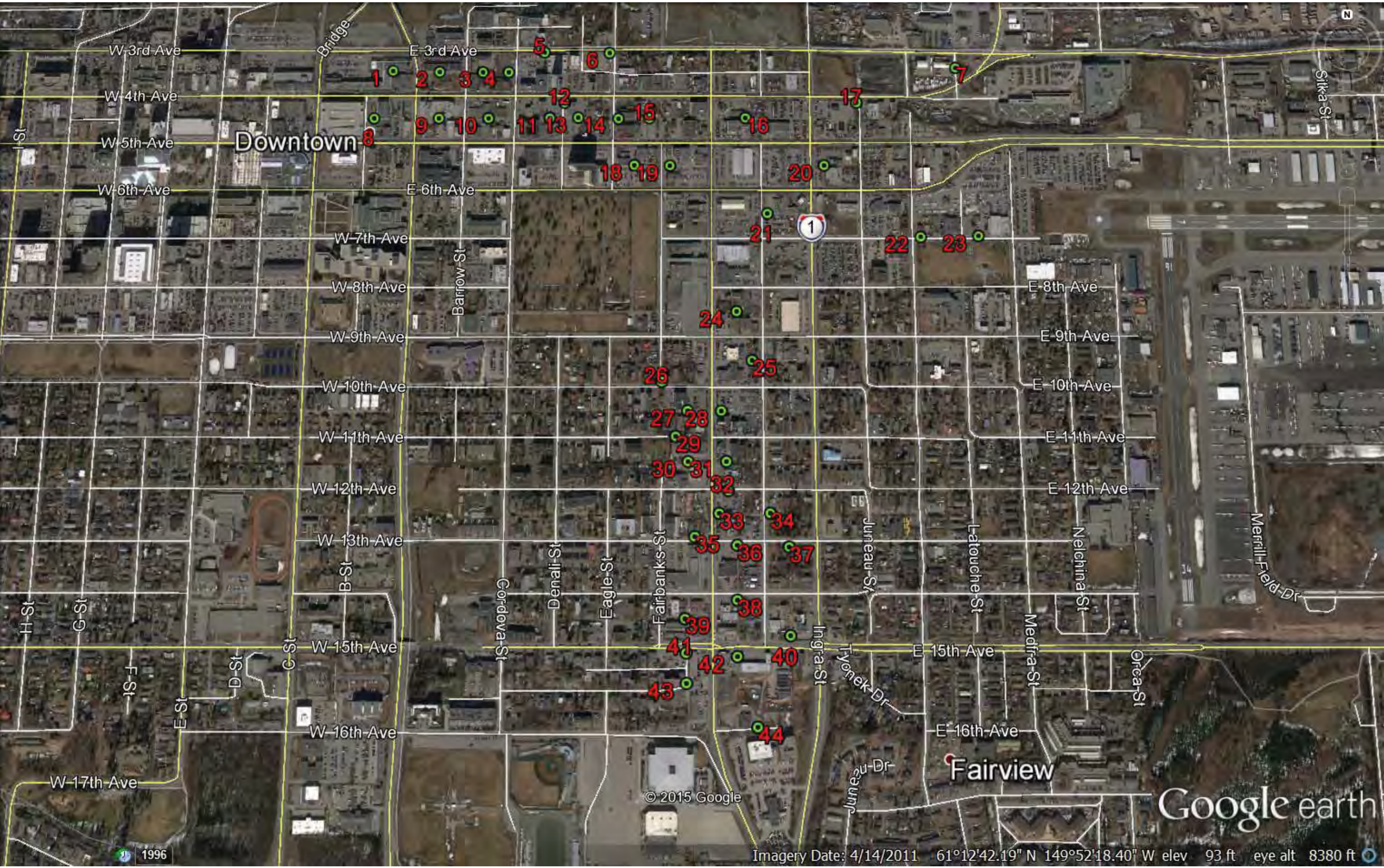
TRAFFIC ENGINEERING
11/6/15
EXP 12/31/15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© 2015 Google
Google earth
Imagery Date: 4/14/2011 61°12'42.19" N 149°52'18.40" W elev 93 ft eye alt 8380 ft
1996

**MOA RIGHT OF WAY**
**INSPECTION REQUEST LINE**
**343-8206 or MOAROWrequests@muni.org**

Requests must be received 2 working days in advance of starting work and 2 working days in advance for final inspection. Permit is not valid without the call-in and the utility locate number.

Call the voice message system at 343-8206 or email to MOAROWrequests@muni.org and give the following information in the order listed below:

1. Permit Number
2. Contractor Name
3. Contact Person
4. Phone Number
5. Start Date
6. Start Time
7. Project Location
8. Utility Locate Ticket Number

Utility companies (ACS, GCI, ML&P, AWWU, ENSTAR, CEA, MEA, MTA) must notify the Right of Way office a minimum of 24 hours prior of starting work.

Municipality of Anchorage – Right of Way Section
Main Phone 343-8240 Fax 343-8250 7:30am – 4:30pm

**POST IN A CONSPICUOUS PLACE**
**ALL WORK MUST BE INSPECTED**

Field Inspection Request required 2 working days in advance of starting work and 2 working days in advance for final inspection. Call (907) 343-8206 (voice recorder) for scheduling. Permit is not valid without the call-in and also must include the one-call ticket (utility locate) number.

Development Services Department

MUNICIPALITY OF ANCHORAGE
RIGHT OF WAY DIVISION
4700 ELMORE ROAD
TELEPHONE (907) 343-8240

POST POST

# RIGHT OF WAY PERMIT R161133

**Type:** General **Grid:** SW1231 **Date Issued:** 2/9/2016

**Construction Start:** **Last Update by:** PWDEW

**Last Updated:** 02/09/2016

**Permittee:** Geotek Alaska,, Inc.

**Contact Person:** Katherine Smith, 569-5900 **Primary Inspector:** F.Kelly 343-8436

**Site Address:** 325 BARROW ST, Anchorage - @ various locations

**Legal Description:** ORIGINAL BLK 116 LT 7, 8 & 9 G:1231

**Original Work Description:** Drilling 9 boreholes in 5 locations for soil and water sampling. Borehole depth ranging from 10 - 60 feet.

Borehole locations: Barrow Street between 3rd & 4th Avenues; Alley off Ingra between 5th & 6th Avenues; Juneau Street between 5th & 6th Avenues; East 7th Avenue between Karluk and Latouche Streets and East 11th Avenue between Gambell and Hyder Street.

**Most Recent Summary**

| Work Area | | | | | |
|---|---|---|---|---|---|
| 11th@Gambell-Hyder | ROW | Boring | Full | 2/22/2016 12:00:00AM | 3/7/2016 12:00:00AM |
| 7th@ Karluk-Juneau | ROW | Boring | Full | 2/22/2016 12:00:00AM | 3/7/2016 12:00:00AM |
| Barrow@3rd-4th | ROW | Boring | Full | 2/22/2016 12:00:00AM | 3/7/2016 12:00:00AM |
| Juneau@5th-6th | ROW | Boring | Full | 2/22/2016 12:00:00AM | 3/7/2016 12:00:00AM |
| alley@5th-6th&Ingra-Juneau | ROW | Boring | Full | 2/22/2016 12:00:00AM | 3/7/2016 12:00:00AM |

**Financial Summary**

| Fee Description | QTY | AMT |
|---|---|---|
| Construction Method | 1.00 | 225.00 |
| Road Closure | 1.00 | 395.00 |
| Pavement Age | 1.00 | 130.00 |
| | **Total Fees:** | **750.00** |

POST

**See reverse for requirements/remarks.**

I have read and understand both sides of this permit. I agree to the terms and conditions; and I certify that all work will comply with federal, state, and municipal codes and regulations and the provisions of this permit.

**Signature:** _____ Date: 2-12-16

Notes:
Pedestrians shall be provided with access and safe passage through or around the work zone at all times.
Emergency vehicle access through the work zone must be maintained at all times.
All signs and devices shall conform to the standards and specifications of the Alaska Traffic Manual (ATM).
Roadway occupancy and work completion time shall be minimized to reduce exposure to potential hazards.
Work Areas shall be delineated by channelizing devices or shielded by barriers to exclude traffic and pedestrians. Fencing may be required.
Should field adjustments be necessary, additional signage and/or barricades may be required by the Municipal Traffic Engineer.

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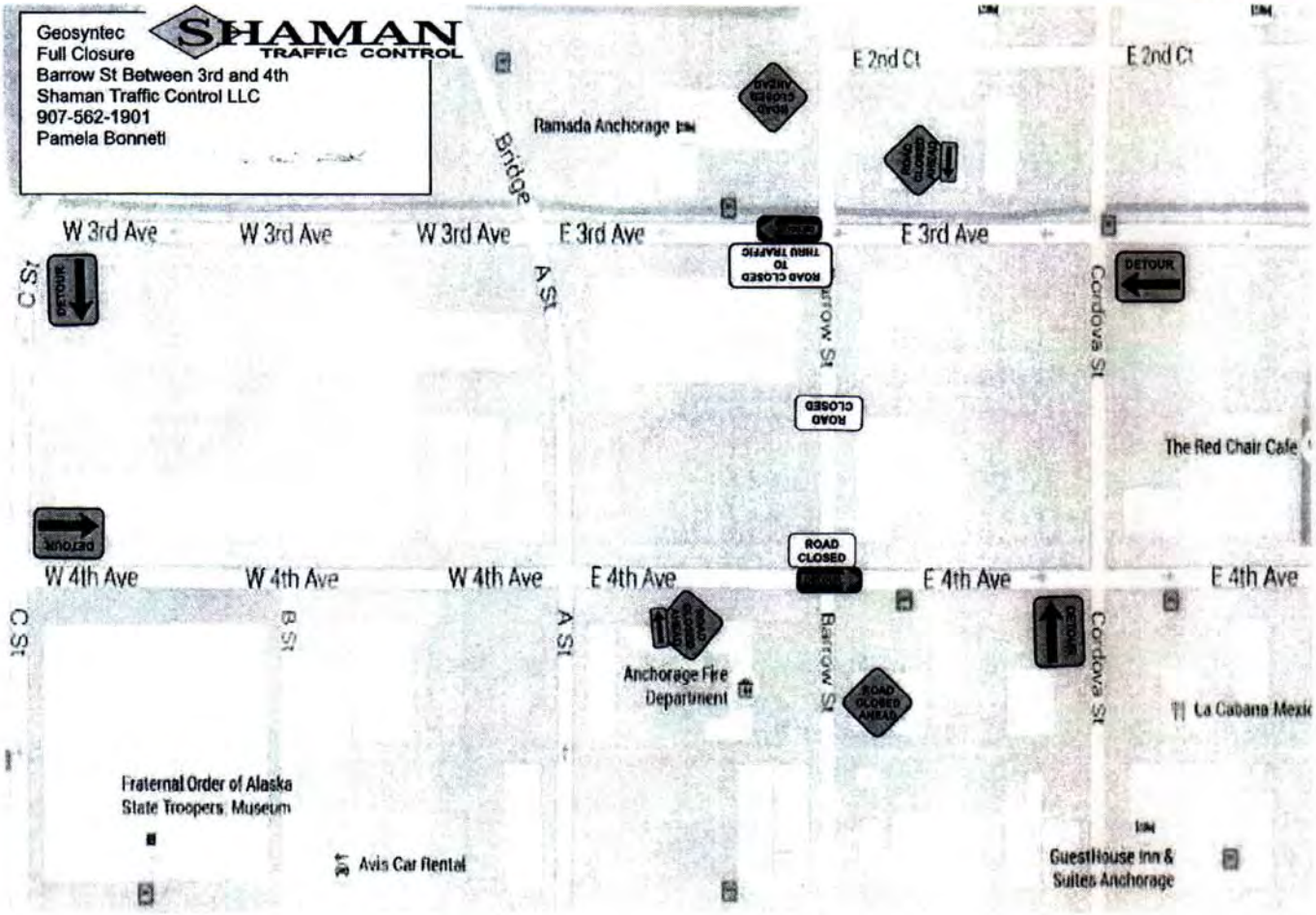
2/9/16
ok 2/22 - 3/7/16

www.invarion.com

Geosyntec
Full Closure
Barrow St Between 3rd and 4th
Shaman Traffic Control LLC
907-562-1901
Pamela Bonnett

SHAMAN TRAFFIC CONTROL



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Emergency vehicle access through the work zone must be maintained at all times.
All signs and devices shall conform to the standards and specifications of the Alaska Traffic Manual (ATM).
Roadway occupancy and work completion time shall be minimized to reduce exposure to potential hazards.
Work Areas shall be delineated by channelizing devices or shielded by barriers to exclude traffic and pedestrians. Fencing may be required.
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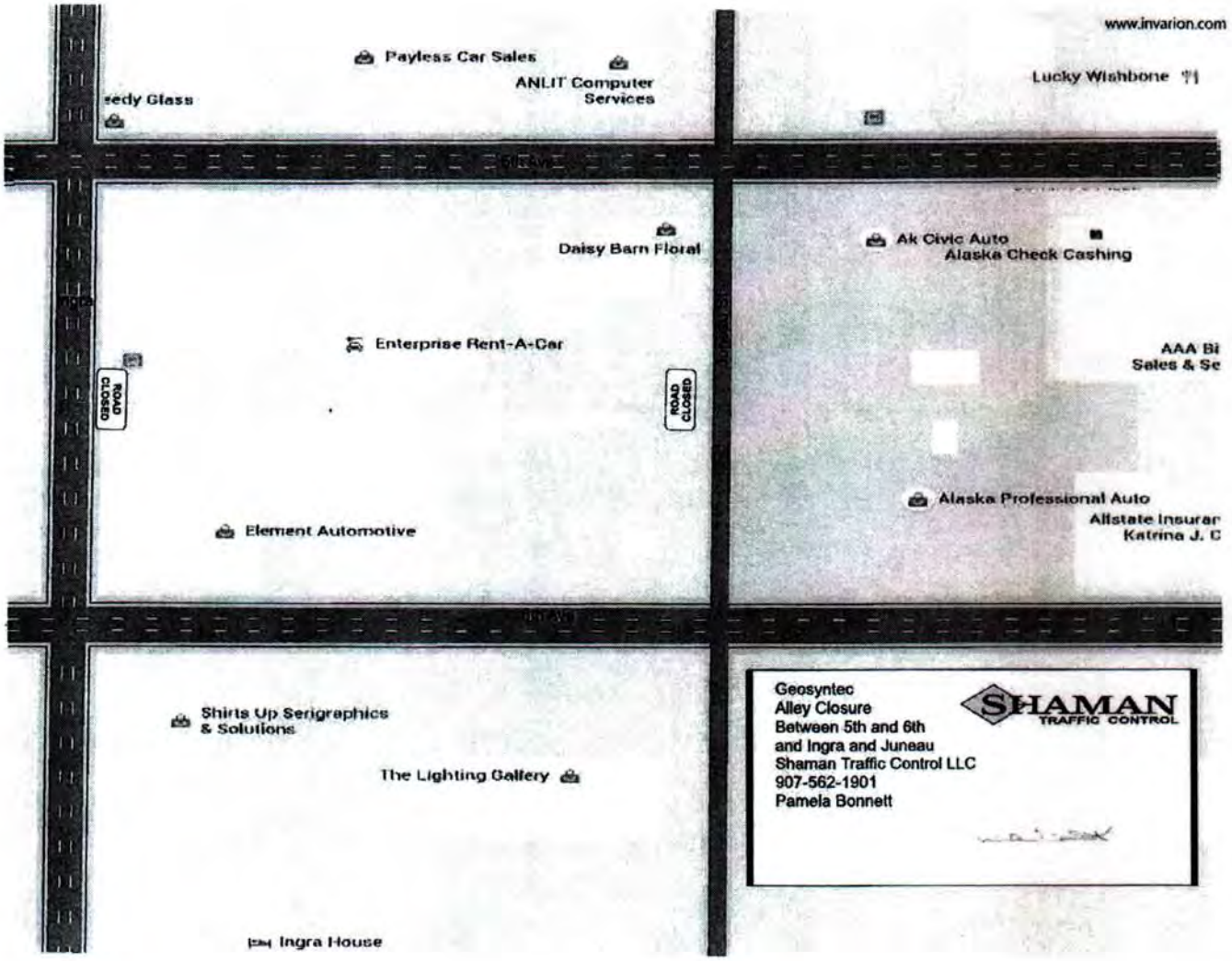
2/9/16
OK 2/22 - 3/7/16

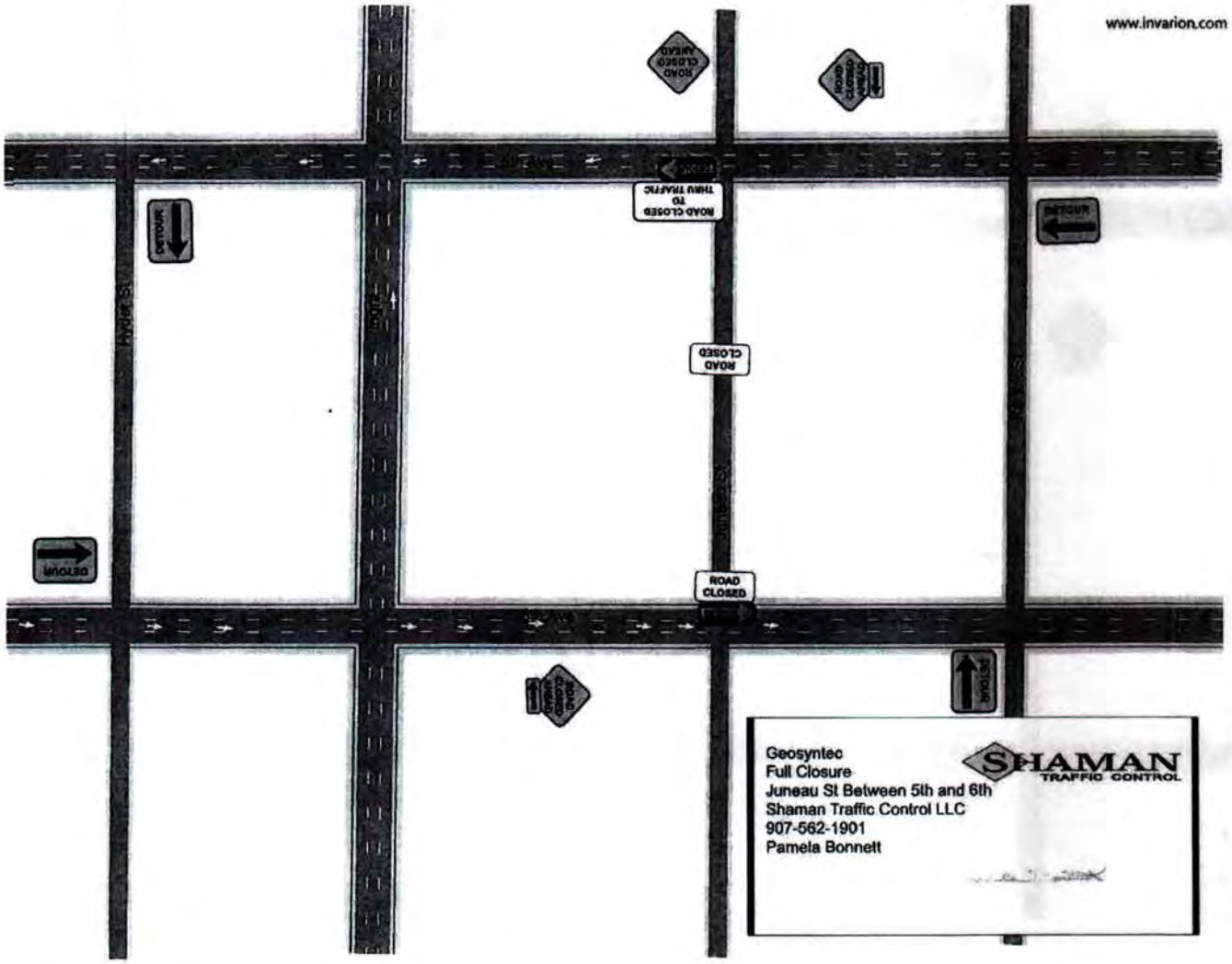



The Contractor shall conduct the work in such a manner as to cause minimum inconvenience to pedestrians and vehicular traffic and to persons conducting commercial enterprises or residing along the route of Work. Without prior approval of the Engineer, entrances or driveways of all kinds shall not be blocked for more than three (3) hours. The Contractor shall provide the property owners and/or tenants written notification no less than forty-eight (48) hours prior to any closure of access. The Contractor shall conduct his work to insure that there is no disruption of mail service, school bus service as applicable, trash collection, access by emergency vehicles, or any unnecessary disruption of general access to any business or private residence.

Notes:
Pedestrians shall be provided with access and safe passage through or around the work zone at all times.
Emergency vehicle access through the work zone must be maintained at all times.
All signs and devices shall conform to the standards and specifications of the Alaska Traffic Manual (ATM).
Roadway occupancy and work completion time shall be minimized to reduce exposure to potential hazards.
Work Areas shall be delineated by channelizing devices or shielded by barriers to exclude traffic and pedestrians. Fencing may be required.
Should field adjustments be necessary, additional signage and/or barricades may be required by the Municipal Traffic Engineer.

Approved for Municipality of Anchorage Right-Of-Way ONLY. Additional AKDOT approval may be required.

APPROVED
MUNICIPALITY OF ANCHORAGE
TRAFFIC ENGINEERING
2/9/16
OK 2/22 - 3/7/16



Notes:
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Approved for Municipality of Anchorage Right-Of-Way ONLY. Additional AKDOT approval may be required.

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MUNICIPALITY OF ANCHORAGE
TRAFFIC ENGINEERING
2/9/16
OK 2/22 – 3/7/16

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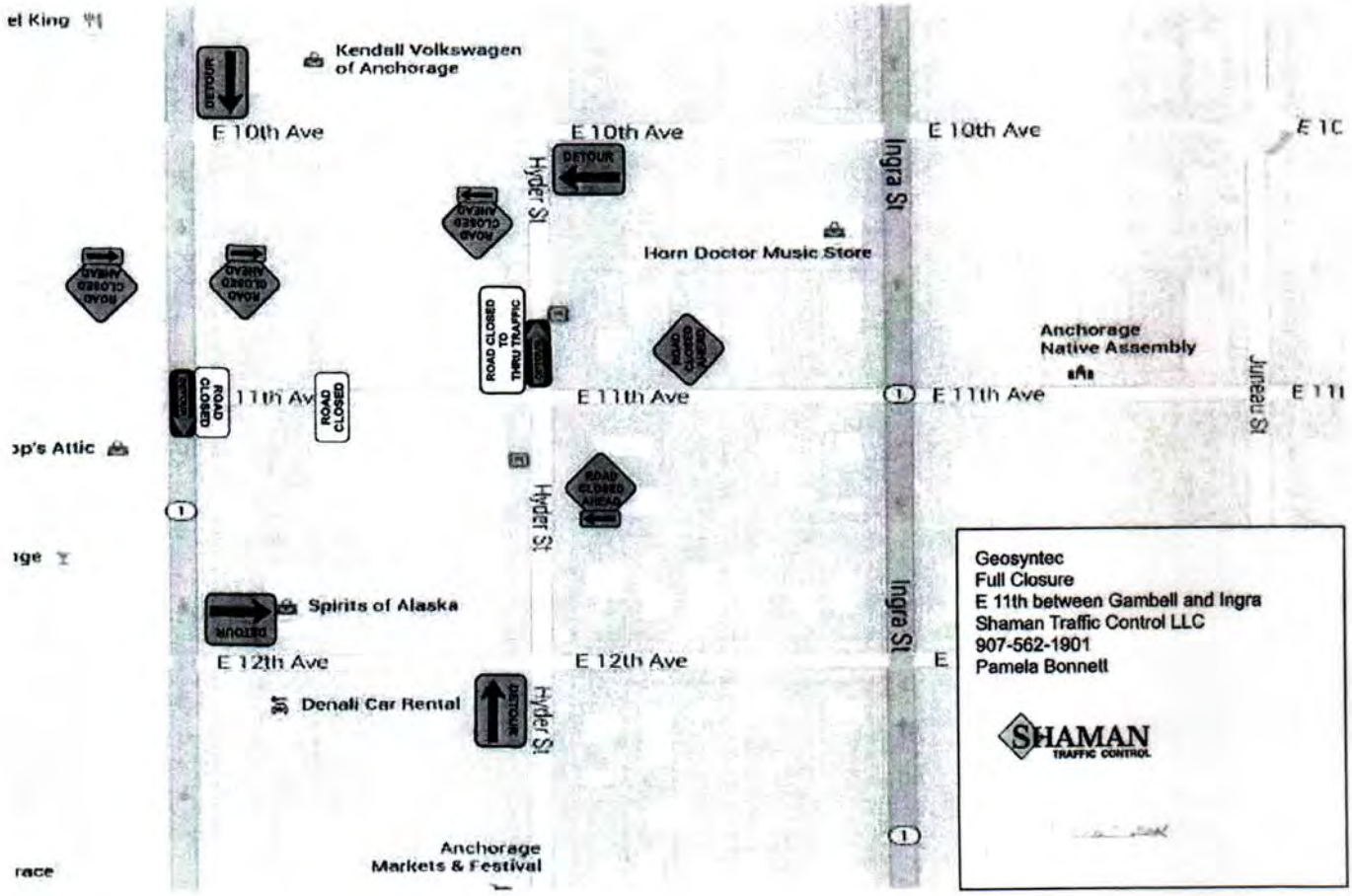

Cordova St
Barrow St
E 3rd Ave
E 4th Ave
A St
Bridge
W 3rd Ave


5th Ave
E 6th Ave
Ingra St
Karluk St
1

Latouche St
E 7th Ave
Karluk St


Cambell St
Hyde St
Ingra St
E 11th Ave
E 12th Ave
1

# APPENDIX D

FIELD SAMPLING FORMS

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| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 01 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters (1)

### Outer Well Annulus

Boring Radius (in) ~~2.25~~ 1.125 Ac Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (2)

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (3)

(2) 0.47 liters - (3) 0.31 liters = 0.16 liters (4)

### Total Purge Volume

(1) - Inner Well Annulus 1.71 liters + (4) Outer Well Annulus 10 liters x 10 = = 17.1 liters

## PURGING

Start Time: 1510 Flow Rate: 2 liters/min Start Time: _____

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV01 Sampler Serial No: 1513-AN-LV-028

Sample Start Date: 11/16/15 Start Time: 1522

Sample Start Date: 11/19 End Time: 1647

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 05 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1620 Flow Rate: 2 liters/min

End Time: 1630

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV05 Sampler Serial No: 1513-AN-2U-013

Sample Start Date: 11/16/15 Start Time: 1633

Sample End Date: 11/20/15 End Time: 1149

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 06 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.196 liters

## PURGING

Start Time: 0905 Flow Rate: 2 liters/min

End Time: 0915

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV06 Sampler Serial No: 1513-AN-LV-061

Sample Start Date: 11/17/15 Start Time: 0921

Sample End Date: 11/20 End Time: 1155

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 09 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters (1)

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (2)

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (3)

(2) 0.47 liters - (3) 0.31 liters = 0.16 liters (4)

### Total Purge Volume

(1) - Inner Well Annulus 1.71 liters + (4) Outer Well Annulus 10 liters x 10 = = 17.1 liters

## PURGING

Start Time: 1035 Flow Rate: 2 liters/min Start Time: /

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV09 Sampler Serial No: 1513-AN-LU-060

Sample Start Date: 11/16/15 Start Time: 1052

Sample Start Date: 11/19 End Time: 1607

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 10 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters (1)

### Outer Well Annulus

Boring Radius (in) ~~2.25~~ 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (2)

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (3)

(2) 0.47 liters - (3) 0.31 liters = 0.16 liters (4)

### Total Purge Volume

(1) - Inner Well Annulus 1.71 liters + (4) Outer Well Annulus 10 liters x 10 = = 17.1 liters

## PURGING

Start Time: 1150 Flow Rate: 2 liters/min Start Time: _____

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV10 Sampler Serial No: 1513-AN-LV-056

Sample Start Date: 11/16 Start Time: 1206

Sample Start Date: 11/19 End Time: 1633

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 12 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters (1)

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (2)

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (3)

(2) 0.47 liters - (3) 0.31 liters = 0.16 liters (4)

### Total Purge Volume

(1) - Inner Well Annulus 1.71 liters + (4) Outer Well Annulus 10 liters x 10 = = 17.1 liters

## PURGING

Start Time: 1325 Flow Rate: 2 liters/min Start Time: ~~____~~

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV12 Sampler Serial No: 1513-AN-LV-055

Sample Start Date: 11/16/15 Start Time: 1341

Sample Start Date: 11/20 End Time: 1115

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 13 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters (1)

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (2)

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (3)

(2) 0.47 liters - (3) 0.31 liters = 0.16 liters (4)

### Total Purge Volume

(1) - Inner Well Annulus 1.71 liters + (4) Outer Well Annulus 10 liters x 10 = = 17.1 liters

## PURGING

Start Time: 1357 Flow Rate: 2 liters/min Start Time: _____

Purging Notes and Observations:

## SAMPLING

Sample No: 15-~~BVOC~~-SV13 Sampler Serial No: 1513-AN-LV-058

Sample Start Date: 11/16/15 Start Time: ~~13~~ AM 1409

Sample Start Date: 11/20/15 End Time: 1104

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 4c 06 15 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1015 Flow Rate: 2 liters/min

End Time: 1025

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV05 Sampler Serial No: 1513-AN-LV-029

Sample Start Date: 11/17/15 Start Time: 1025

Sample End Date: 11/20 End Time: 1201

Sampling Notes and Observations:

Duplicate Sample: (Yes) No

If yes:

Sample No: 15-FVOC-SV50 Sampler Serial No: 1513-AN-LV-051

time start = 1026

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 16 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1110 Flow Rate: 2 liters/min

End Time: 1120

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV16 Sampler Serial No: 1513-AN-LU-062

Sample Start Date: 11/17/15 Start Time: 1123

Sample End Date: 11/20 End Time: 1211

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 17 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 A / 16 liters

## PURGING

Start Time: 1213 Flow Rate: 2 liters/min

End Time: 1223

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV17 Sampler Serial No: 1513-AN-LV-063

Sample Start Date: 11/17 Start Time: 1225

Sample End Date: 11/20 End Time: 1315

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 18 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1500 Flow Rate: 2 liters/min

End Time: 1510

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV18 Sampler Serial No: 1513-AN-LV-054

Sample Start Date: 11/17/15 Start Time: 1515

Sample End Date: 11/20 End Time: 1350

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: Sampler Serial No:

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 19 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~46~~ 17.1 ~~1.71~~ liters

## PURGING

Start Time: 1555 Flow Rate: 2 liters/min

End Time: 1605

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV19 Sampler Serial No: 1513-AN-LV-057

Sample Start Date: 11/17/15 Start Time: 1608

Sample End Date: 11/20 End Time: 1411

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 20 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 0930 Flow Rate: 2 liters/min

End Time: 0940

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV20 Sampler Serial No: 1513-AN-LU-027

Sample Start Date: 11/18/15 Start Time: 0941

Sample End Date: 11/21/15 End Time: 1517

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 21 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1642 Flow Rate: 2 liters/min

End Time: 1652

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV21 Sampler Serial No: 1513-AN-LU-052

Sample Start Date: 11/17/15 Start Time: 1700

Sample End Date: 11/21 End Time: 1450

Sampling Notes and Observations:

Duplicate Sample: (Yes) No

If yes:

Sample No: 15-FVOC-SV51 Sampler Serial No: 1513-AN-LU-059

start time = 1701

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 22 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.02 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1020 Flow Rate: 2 liters/min

End Time: 1020

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV22 Sampler Serial No: 1513-AN-LU-030

Sample Start Date: 11/18/15 Start Time: 1032

Sample End Date: 11/21/15 End Time: 1435

Sampling Notes and Observations:

**Duplicate Sample:** Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 23 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1055 Flow Rate: 2 liters/min

End Time: 1105

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV23 Sampler Serial No: 1513-AN-LV-020

Sample Start Date: 11/15/15 Start Time: 1115

Sample End Date: 11/21/15 End Time: 1440

Sampling Notes and Observations:

**Duplicate Sample:** Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 24 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1215 Flow Rate: 2 liters/min

End Time: 1225

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV24 Sampler Serial No: 1513-AN-LU-026

Sample Start Date: 11/18/15 Start Time: 1231

Sample End Date: 11/21/15 End Time: 1526

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 26 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = 17.1 1.71 liters

## PURGING

Start Time: 1358 Flow Rate: 2 liters/min

End Time: 1404

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV26 Sampler Serial No: 1513-AN-LU-031

Sample Start Date: 11/18/15 Start Time: 1410

Sample End Date: 11/22/15 End Time: 1240

Sampling Notes and Observations:

Duplicate Sample: (Yes) No

If yes:

Sample No: 15-FVOC-SV52 Sampler Serial No: 1513-AN-LU-021

start time = 1411

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 30 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

17.1

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ liters

## PURGING

Start Time: 1555 Flow Rate: 2 liters/min

End Time: 1605

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV30 Sampler Serial No: 1513-AN-LV-050

Sample Start Date: 11/18/15 Start Time: 1608

Sample End Date: 11/21/15 End Time: 1615

Sampling Notes and Observations:

**Duplicate Sample:** Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 31 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1510 Flow Rate: 2 liters/min

End Time: 1520

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV31 Sampler Serial No: 1513-AN-LU-034

Sample Start Date: ~~1523~~ 16 11/18/15 Start Time: 1523

Sample End Date: 11/21/15 End Time: 1627

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: Sampler Serial No:

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 32 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1000 Flow Rate: 2 liters/min

End Time: 1010

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV32 Sampler Serial No: 1513-AN-LV-025

Sample Start Date: 11/19/15 Start Time: 1012

Sample End Date: 11/23/15 End Time: 0816

Sampling Notes and Observations: also put temperature datalogger in this

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 33 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 0856 Flow Rate: 2 liters/min

End Time: 0906

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV33 Sampler Serial No: 1513-AN-LV-045

Sample Start Date: 11/19/15 Start Time: 0909

Sample End Date: 11/22/15 End Time: 1458

Sampling Notes and Observations:

**Duplicate Sample:** Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 36 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1010 Flow Rate: 2 liters/min

End Time: 1020

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV36 Sampler Serial No: 1513-AN-LV-035

Sample Start Date: 4/20/15 Start Time: 1024

Sample End Date: 10/23/15 End Time: 1033

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 37 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = 17.1 1.71 liters

## PURGING

Start Time: 0920 Flow Rate: 2 liters/min

End Time: 0930

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV37 Sampler Serial No: 1513-AN-LV-032

Sample Start Date: 11/20/15 Start Time: 0934

Sample End Date: 11/23/15 End Time: 1027

Sampling Notes and Observations:

**Duplicate Sample:** Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 38 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = 1.71 liters

## PURGING

Start Time: 1120 Flow Rate: 2 liters/min

End Time: 1130

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV38 Sampler Serial No: 1513-AN-LV-042

Sample Start Date: 11/19/15 Start Time: 1133

Sample End Date: 11/22/15 End Time: 1405

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 41 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1210 Flow Rate: 2 liters/min

End Time: 1220

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV41 Sampler Serial No: 1513-AN-LU-023

Sample Start Date: 11/19/15 Start Time: 1222

Sample End Date: 11/22/15 End Time: 1420

Sampling Notes and Observations:

Duplicate Sample: (Yes) No

If yes:

Sample No: 15-FVOC-SV53 Sampler Serial No: 1513-AN-LU-037

time start = 1223

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 42 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1450 Flow Rate: 2 liters/min

End Time: 1500

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SU42 Sampler Serial No: 1513-AN-LU-022

Sample Start Date: 11/19/15 Start Time: 1503

Sample End Date: 11/22/15 End Time: 1515

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 43 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) .5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = ~~1.71~~ 17.1 liters

## PURGING

Start Time: 1400 Flow Rate: 2 liters/min

End Time: 1410

Purging Notes and Observations:

## SAMPLING

Sample No: 15-FVOC-SV43 Sampler Serial No: 1513-AN-LV-033

Sample Start Date: 11/19/15 Start Time: 1412

Sample End Date: 11/22/15 End Time: 1436

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: Sampler Serial No:

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: SV44 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) ____ x Well Radius (in) ____ x Well Depth (ft) ____ x 0.62 = ____ liters

### Outer Well Annulus

Boring Radius (in) ____ Boring Radius (in) ____ x Sand Pack Height (ft) ____ x 0.186 = ____ liters (1)

Well Radius (in) ____ x Well Radius (in) ____ x Sand Pack Height (ft) ____ x 0.62 = ____ liters (2)

(1) ____ liters - (2) ____ liters = ____ liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = 17.1 liters

## PURGING

Start Time: 1160 Flow Rate: 2 liters/min ~~Start~~ end Time: 1110

Purging Notes and Observations:

## SAMPLING

Sample No: 16-FVOC-SV44 Sampler Serial No: 1520-AN-LV-069

Sample Start Date: 3/1/16 Start Time: 1115

Sample Start Date: ____ End Time: ____

Sampling Notes and Observations:

Duplicate Sample: (Yes) No

If yes:

Sample No: 16-FVOC-SV54 Sampler Serial No: 1520-AN-LV-068

start time = 1120

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 4647 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Well Depth (ft) 10 x 0.62 = 1.55 liters

### Outer Well Annulus

Boring Radius (in) 1.125 Boring Radius (in) 1.125 x Sand Pack Height (ft) 2 x 0.186 = 0.47 liters (1)

Well Radius (in) 0.5 x Well Radius (in) 0.5 x Sand Pack Height (ft) 2 x 0.62 = 0.31 liters (2)

(1) 0.47 liters - (2) 0.31 liters = 0.16 liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = 17.1 liters

## PURGING

Start Time: 0855 Flow Rate: 2 liter/min end Start Time: 0905

Purging Notes and Observations:

## SAMPLING

Sample No: 16-FVOC-SV47 Sampler Serial No: 1520-AN-LV-067

Sample Start Date: 3/1/16 Start Time: 0905

Sample Start Date: _____ End Time: _____

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: _____ Sampler Serial No: _____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 45 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) ____ x Well Radius (in) ____ x Well Depth (ft) ____ x 0.62 = ____ liters

### Outer Well Annulus

Boring Radius (in) ____ Boring Radius (in) ____ x Sand Pack Height (ft) ____ x 0.186 = ____ liters (1)

Well Radius (in) ____ x Well Radius (in) ____ x Sand Pack Height (ft) ____ x 0.62 = ____ liters (2)

(1) ____ liters - (2) ____ liters = ____ liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = 17.1 liters

## PURGING

Start Time: 1140 Flow Rate: 2 liters/min ~~Start Time:~~ 1150

Purging Notes and Observations:

## SAMPLING

Sample No: 16-FVOC-SV45 Sampler Serial No: 1520-AN-LV-070

Sample Start Date: 3/1/16 Start Time: ~~1140~~ AG 1155

Sample Start Date: ____ End Time: ____

Sampling Notes and Observations:

Duplicate Sample: Yes (No)

If yes:

Sample No: ____ Sampler Serial No: ____

| Ahtna Engineering | SOIL GAS WELL CONSTRUCTION and PASSIVE SOIL GAS SAMPLING LOG | WELL NUMBER: 46 | PAGE NO 1 OF 1 |
|---|---|---|---|

## PURGE VOLUME

### Inner Well Annulus

Well Radius (in) ____ x Well Radius (in) ____ x Well Depth (ft) ____ x 0.62 = ____ liters

### Outer Well Annulus

Boring Radius (in) ____ Boring Radius (in) ____ x Sand Pack Height (ft) ____ x 0.186 = ____ liters (1)

Well Radius (in) ____ x Well Radius (in) ____ x Sand Pack Height (ft) ____ x 0.62 = ____ liters (2)

(1) ____ liters + (2) ____ liters = ____ liters (3)

### Total Purge Volume

(3) - Total Well Annulus Volume 1.71 liters x Required # of Purge Volumes 10 = 17.1 liters

## PURGING

Start Time: 0950 Flow Rate: 2 liters/min ~~Start Time~~ end: 1000

Purging Notes and Observations:

## SAMPLING

Sample No: 16-FVOC-SH6 Sampler Serial No: 1520-AN-LU-066

Sample Start Date: 3/1/16 Start Time: 1005

Sample Start Date: ____ End Time: ____

Sampling Notes and Observations:

Insert temperature logger in this well

Duplicate Sample: Yes (No)

If yes:

Sample No: ____ Sampler Serial No: ____

# GROUNDWATER SAMPLING FORM

Ahtna Engineering

| PROJECT NUMBER: | WELL NUMBER: | SHEET: |
|---|---|---|
| | 48 | 1 of 1 |

| | | | |
|---|---|---|---|
| PROJECT NAME | Fairview | WELL CONDITION | — |
| CLIENT | ADEC | DAMAGE PRESENT | — |
| DATE | 3/2/16 | DEPTH TO WATER (FROM TOC) 6gs' | 39.21 |
| SITE | Fairview | DEPTH TO BASE (FROM TOC) 6gs | 42.43 |
| GEOLOGIST | A Geilich | HEIGHT OF WATER COLUMN | 3.22 |
| WEATHER/ TEMPERATURE | clear 30°F | WELL VOLUME | |
| WIND | no | | |

| NOMINAL DIAMETER | O.D. | I.D. | VOLUME (GAL/LIN FT) |
|---|---|---|---|
| 2" | 2.375" | 2.067" | 0.17 |
| 3" | 3.5" | 3.068" | 0.38 |
| 4" | 4.5" | 4.026" | 0.66 |
| 6" | 6.625" | 6.065" | 1.50 |
| 8" | 8.625" | 7.981" | 2.60 |

## SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW

SAMPLE COLLECTED WITH: __ Bailer; X Pump, Type: Check valve; __ Other, Specify:

MADE OF: X Stainless Steel; __ PVC; __ Teflon; __ Disposable LDPE; __ Other, Specify:

SAMPLING DECON PROCEDURE: alcon & water

SAMPLE DESCRIPTION: (color, free product thickness, odor, turbidity) large amount of sand/silt in sample

## FIELD WATER QUALITY PARAMETERS

| Time | Flow Rate (mL/min) | Water Level | Draw Down | Temperature (°C) | Spec. Cond. (µS/cm)[c] | D.O. (%) | D.O. (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Color | Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
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## ANALYTICAL SAMPLE INFORMATION

| Analyte | Time | Identification | Additional Sample | Time | Identification |
|---|---|---|---|---|---|
| (VOC) | 1110 | 16-FVOC-GW48 | Duplicate | 1200 | AO ~~16-FVOC-Gw55~~ |
| DHC | | | | | 16-FVOC-Gw55 |
| MNA | | | | | |
| CSIA | | | | | |
| Other | | | | | |

Sampling Notes: No purge sampling

# GROUNDWATER SAMPLING FORM

Ahtna Engineering

| PROJECT NUMBER: | WELL NUMBER: | SHEET: |
|---|---|---|
| | 49 | 1 of 1 |

| | | | |
|---|---|---|---|
| PROJECT NAME | Fairview | WELL CONDITION | — |
| CLIENT | ADEC | DAMAGE PRESENT | — |
| DATE | 3/1/16 | DEPTH TO WATER (FROM TOC) 655 | 35.72 |
| SITE | Fairview | DEPTH TO BASE (FROM TOC) 655 | 44.1 |
| GEOLOGIST | A Gelich | HEIGHT OF WATER COLUMN | 8.38 |
| WEATHER/ TEMPERATURE | Clear 30°F | WELL VOLUME | |
| WIND | 10 | | |

| NOMINAL DIAMETER | O.D. | I.D. | VOLUME (GAL/LIN FT) |
|---|---|---|---|
| 2" | 2.375" | 2.067" | 0.17 |
| 3" | 3.5" | 3.068" | 0.38 |
| 4" | 4.5" | 4.026" | 0.66 |
| 6" | 6.625" | 6.065" | 1.50 |
| 8" | 8.625" | 7.981" | 2.60 |

## SAMPLING DATA

SAMPLE TYPE (GW, PRODUCT, OTHER): GW

SAMPLE COLLECTED WITH: __ Bailer X Pump, Type: check valve __ Other, Specify:

MADE OF: Y Stainless Steel ___ PVC

__ Teflon ___ Disposable LDPE __ Other, Specify:

SAMPLING DECON PROCEDURE: alconox + water

SAMPLE DESCRIPTION: (color, free product thickness, odor, turbidity)

## FIELD WATER QUALITY PARAMETERS

| Time | Flow Rate (mL/min) | Water Level | Draw Down | Temperature (°C) | Spec. Cond. (µS/cm)[C] | D.O. (%) | D.O. (mg/L) | pH | ORP (mV) | Turbidity (NTU) | Color | Odor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
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## ANALYTICAL SAMPLE INFORMATION

| Analyte | Time | Identification | Additional Sample | Time | Identification |
|---|---|---|---|---|---|
| VOC | 1555 | 16-FVOC-GW49 | Duplicate | | |
| Dhc | | | | | |
| MNA | | | | | |
| CSIA | | | | | |
| Other | | | | | |

Sampling Notes:

no purge sampling

# APPENDIX E

LABORATORY RESULTS

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12/11/2015
Ms. Samantha Fox
GeoSyntec Consultants
4101 Arctic Blvd.
Suite 206
Anchorage AK 99503

Project Name: Fairview
Project #: 20266.015.01
Workorder #: 1511467

Dear Ms. Samantha Fox

The following report includes the data for the above referenced project for sample(s) received on 11/30/2015 at Air Toxics Ltd.

The data and associated QC analyzed by Passive S.E. WMS are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

eurofins | Air Toxics

# WORK ORDER #: 1511467

Work Order Summary

| | | | |
|---|---|---|---|
| **CLIENT:** | Ms. Samantha Fox<br>GeoSyntec Consultants<br>4101 Arctic Blvd.<br>Suite 206<br>Anchorage, AK 99503 | **BILL TO:** | Accounts Payable<br>AHTNA<br>110 West 38th Ave<br>Suite 200A<br>Anchorage, AK 99503 |
| **PHONE:** | 907-754-9679 | **P.O. #** | 20266.015.01 |
| **FAX:** | | **PROJECT #** | 20266.015.01 Fairview |
| **DATE RECEIVED:** | 11/30/2015 | **CONTACT:** | Kelly Buettner |
| **DATE COMPLETED:** | 12/11/2015 | | |

| FRACTION # | NAME | TEST |
|---|---|---|
| 01A | 15-FVOC-SV01 | Passive S.E. WMS |
| 02A | 15-FVOC-SV05 | Passive S.E. WMS |
| 03A | 15-FVOC-SV06 | Passive S.E. WMS |
| 04A | 15-FVOC-SV09 | Passive S.E. WMS |
| 05A | 15-FVOC-SV10 | Passive S.E. WMS |
| 06A | 15-FVOC-SV12 | Passive S.E. WMS |
| 07A | 15-FVOC-SV13 | Passive S.E. WMS |
| 08A | 15-FVOC-SV15 | Passive S.E. WMS |
| 09A | 15-FVOC-SV16 | Passive S.E. WMS |
| 10A | 15-FVOC-SV17 | Passive S.E. WMS |
| 11A | 15-FVOC-SV18 | Passive S.E. WMS |
| 12A | 15-FVOC-SV19 | Passive S.E. WMS |
| 13A | 15-FVOC-SV20 | Passive S.E. WMS |
| 14A | 15-FVOC-SV21 | Passive S.E. WMS |
| 15A | 15-FVOC-SV22 | Passive S.E. WMS |
| 16A | 15-FVOC-SV23 | Passive S.E. WMS |
| 17A | 15-FVOC-SV24 | Passive S.E. WMS |
| 18A | 15-FVOC-SV26 | Passive S.E. WMS |
| 19A | 15-FVOC-SV30 | Passive S.E. WMS |
| 20A | 15-FVOC-SV31 | Passive S.E. WMS |
| 21A | Lab Blank | Passive S.E. WMS |
| 22A | LCS | Passive S.E. WMS |
| 22AA | LCSD | Passive S.E. WMS |

CERTIFIED BY: Heidi Mayo DATE: 12/11/15

Technical Director



180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE**
**Passive SE by Mod EPA TO-17**
**GeoSyntec Consultants**
**Workorder# 1511467**

Twenty WMS-PH samples were received on November 30, 2015. The laboratory analyzed the charcoal sorbent bed of the passive sampler following modified method EPA TO-17. The VOCs were chemically extracted using carbon disulfide and an aliquot of the extract was injected into a GC/MS for identification and quantification of volatile organic compounds (VOCs).

The mass of each target compound adsorbed by the sampler was converted to units of concentration using the sample deployment time and the sampling rate for each VOC. If sampling rates were calculated by the lab or the manufacturer, the concentration result has been flagged as an estimated value. Results are not corrected for desorption efficiency.

The reference method used for this procedure is EPA TO-17, which describes the collection of VOCs in ambient air using sorbents and analysis by GC/MS. Because TO-17 describes active sample collection using a pump and thermal desorption as the preparation step, several modifications are required. Modifications to TO-17 are listed in the table below:

| ***Requirement*** | ***TO-17*** | ***ATL Modifications*** |
|---|---|---|
| Sample Collection | Pump pulls measured air volume through sorbent tube | VOCs in air adsorbed onto sorbent bed passively through diffusion |
| Sample Preparation | Thermal extraction | Solvent extraction |
| Sorbent tube conditioning | Condition newly packed tubes prior to use | Charcoal-based sorbent is a single use media and conditioning is conducted by vendor. |
| Instrumentation | Thermal desorption introduction system | Liquid injection introduction system |
| Internal Standard | Gas-phase internal standard introduced on the tube or focusing trap during analysis | Liquid-phase internal standard introduced on the tube at the time of extraction |
| Media and sample storage | <4 deg C, 30 days | Media shelf life is determined by vendor; sample hold-time is 6 months for the RAD130 and WMS. Sample preservation requirements are storage in a cool, solvent-free refrigerator and optional use of ice during shipping. |
| Internal Standard Recovery | +/-40% of daily CCV area | -50% to +100% of daily CCV area |

**Receiving Notes**

There were no receiving discrepancies.

**Analytical Notes**

To calculate ug/m3 concentrations in the Lab Blank, a sampling duration of 5675 minutes was applied. The assumed temperature used for the uptake rate is listed on the data page. If the field temperatures

were provided, the rate was adjusted in the same manner as the field samples.

**Definition of Data Qualifying Flags**

Nine qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

C - Estimated concentration due to calculated sampling rate

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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# Summary of Detected Compounds
# VOC BY PASSIVE SAMPLER - GC/MS

**Client Sample ID: 15-FVOC-SV01**

**Lab ID#: 1511467-01A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV05**

**Lab ID#: 1511467-02A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV06**

**Lab ID#: 1511467-03A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV09**

**Lab ID#: 1511467-04A**

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | 0.050 | 22 | 0.065 | 28 |

**Client Sample ID: 15-FVOC-SV10**

**Lab ID#: 1511467-05A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV12**

**Lab ID#: 1511467-06A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV13**

**Lab ID#: 1511467-07A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV15**

**Lab ID#: 1511467-08A**

No Detections Were Found.

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# Summary of Detected Compounds
# VOC BY PASSIVE SAMPLER - GC/MS

**Client Sample ID: 15-FVOC-SV16**

**Lab ID#: 1511467-09A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV17**

**Lab ID#: 1511467-10A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV18**

**Lab ID#: 1511467-11A**

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| 1,1,1-Trichloroethane | 0.050 | 18 | 0.14 | 51 |

**Client Sample ID: 15-FVOC-SV19**

**Lab ID#: 1511467-12A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV20**

**Lab ID#: 1511467-13A**

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Carbon Tetrachloride | 0.050 | 18 | 4.4 | 1600 |

**Client Sample ID: 15-FVOC-SV21**

**Lab ID#: 1511467-14A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV22**

**Lab ID#: 1511467-15A**

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Tetrachloroethene | 0.050 | 8.4 | 0.076 | 13 |

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# Summary of Detected Compounds
# VOC BY PASSIVE SAMPLER - GC/MS

**Client Sample ID: 15-FVOC-SV23**

**Lab ID#: 1511467-16A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV24**

**Lab ID#: 1511467-17A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV26**

**Lab ID#: 1511467-18A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV30**

**Lab ID#: 1511467-19A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV31**

**Lab ID#: 1511467-20A**

No Detections Were Found.

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**Client Sample ID: 15-FVOC-SV01**

**Lab ID#: 1511467-01A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121024sim** | **Date of Collection: 11/19/15 4:47:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 04:36 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 99 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.7 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4405 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

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**Client Sample ID: 15-FVOC-SV05**

**Lab ID#: 1511467-02A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121025sim** | **Date of Collection: 11/20/15 11:49:00 A** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 05:00 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 89 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 79 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 34 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 7.0 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 5476 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 106 | 70-130 |

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**Client Sample ID: 15-FVOC-SV06**

**Lab ID#: 1511467-03A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121026sim** | **Date of Collection: 11/20/15 11:55:00 A** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 05:24 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 97 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 41 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.6 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4474 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 102 | 70-130 |

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**Client Sample ID: 15-FVOC-SV09**

**Lab ID#: 1511467-04A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121027sim** | **Date of Collection: 11/19/15 4:07:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 05:48 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 100 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 94 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 40 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | 0.065 | 28 |
| Carbon Tetrachloride | 0.050 | 18 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 12 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.3 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4621 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

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**Client Sample ID: 15-FVOC-SV10**

**Lab ID#: 1511467-05A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121028sim** | **Date of Collection: 11/19/15 4:33:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 06:13 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 95 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 40 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 18 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 12 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.4 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4587 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 102 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV12**

**Lab ID#: 1511467-06A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121029sim** | **Date of Collection: 11/20/15 11:15:00 A** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 06:37 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 87 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 5614 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV13**

**Lab ID#: 1511467-07A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121030sim** | **Date of Collection: 11/20/15 11:04:00 A** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 07:01 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 87 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 78 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.9 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 5575 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 106 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV15**

**Lab ID#: 1511467-08A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121031sim** | **Date of Collection: 11/20/15 12:01:00 P** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 07:26 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 98 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.7 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4416 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 102 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV16**

**Lab ID#: 1511467-09A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121032sim** | **Date of Collection: 11/20/15 12:11:00 P** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 07:50 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 100 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4368 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV17**

**Lab ID#: 1511467-10A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121033sim** | **Date of Collection: 11/20/15 1:15:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 08:14 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 99 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4370 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV18**

**Lab ID#: 1511467-11A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121034sim** | **Date of Collection: 11/21/15 1:50:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 08:38 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 86 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | 0.14 | 51 |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 5675 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 101 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV19**

**Lab ID#: 1511467-12A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121035sim** | **Date of Collection: 11/21/15 2:11:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 09:03 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 86 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 5643 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV20**

**Lab ID#: 1511467-13A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121036sim** | **Date of Collection: 11/21/15 3:17:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 09:27 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 100 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 93 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 40 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 21 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 18 | 4.4 | 1600 |
| Trichloroethene | 0.050 | 12 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.3 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4656 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV21**

**Lab ID#: 1511467-14A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121037sim** | **Date of Collection: 11/21/15 2:50:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 09:51 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 87 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 5630 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV22**

**Lab ID#: 1511467-15A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121038sim** | **Date of Collection: 11/21/15 2:35:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 10:15 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 95 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 40 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 18 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 12 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.4 | 0.076 | 13 |

Temperature = 44.6F , duration time = 4563 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV23**

**Lab ID#: 1511467-16A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121039sim** | **Date of Collection: 11/21/15 2:40:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 10:39 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 96 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 41 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 12 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.5 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4525 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 106 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV24**

**Lab ID#: 1511467-17A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121040sim** | **Date of Collection: 11/21/15 3:26:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 11:03 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 97 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 41 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.6 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4495 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV26**

**Lab ID#: 1511467-18A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121041sim** | **Date of Collection: 11/22/15 12:40:00 P** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 11:27 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 86 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 5670 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV30**

**Lab ID#: 1511467-19A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121042sim** | **Date of Collection: 11/21/15 4:15:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 11:52 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 100 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 43 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 20 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.9 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4327 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV31**

**Lab ID#: 1511467-20A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121043sim** | **Date of Collection: 11/21/15 4:27:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/11/15 12:16 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 99 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 4384 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 107 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: Lab Blank**

**Lab ID#: 1511467-21A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121023sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 04:12 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 86 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.6F , duration time = 5675 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 106 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: LCS**

**Lab ID#: 1511467-22A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121021sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 03:23 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | %Recovery | Method Limits |
|---|---|---|
| Vinyl Chloride | 101 | 50-140 |
| 1,1-Dichloroethene | 106 | 70-130 |
| trans-1,2-Dichloroethene | 88 | 70-130 |
| cis-1,2-Dichloroethene | 95 | 70-130 |
| 1,1,1-Trichloroethane | 102 | 70-130 |
| Carbon Tetrachloride | 103 | 70-130 |
| Trichloroethene | 101 | 70-130 |
| Tetrachloroethene | 90 | 70-130 |

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 107 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: LCSD**

**Lab ID#: 1511467-22AA**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121022sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 03:48 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | %Recovery | Method Limits |
|---|---|---|
| Vinyl Chloride | 91 | 50-140 |
| 1,1-Dichloroethene | 100 | 70-130 |
| trans-1,2-Dichloroethene | 96 | 70-130 |
| cis-1,2-Dichloroethene | 92 | 70-130 |
| 1,1,1-Trichloroethane | 106 | 70-130 |
| Carbon Tetrachloride | 105 | 70-130 |
| Trichloroethene | 104 | 70-130 |
| Tetrachloroethene | 90 | 70-130 |

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

**PASSIVE SAMPLE COLLECTION**

# @Air Toxics LTD.

## CHAIN-OF-CUSTODY RECORD

**Sample Transportation Notice**
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

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FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020



Project Manager: Sam Fox
Collected by: (Print and Sign) Alex Gelvich
Company: Ahtna Engineering Email:
Address: 110 W 38th Ave City: Anchorage State: AK Zip: 99503
Phone: 907 754 9679 Fax:

**Project Info:**
P.O. #: 20266.015.01
Project #: 20266.015.01
Project Name: Fairview

**Turn Around Time:** [X] Normal [ ] Rush ____ specify

**Reporting Units:** [ ] ppmv [ ] ppbv [X] µg/m3 [ ] mg/m3

| Lab I.D. | Field Sample I.D. (Location) | Sampler # | Date of Deployment (mm/dd/yy) | Time of Deployment (hr:min) | Date of Retrieval (mm/dd/yy) | Time of Retrieval (hr:min) | Analysis Requested | Indoor Air | Outdoor Air | Workplace Monitoring | Other (Soil Gas) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01A | 15-FVOC-SV01 | 28 | 11/16/15 | 1522 | 11/19/15 | 1647 | VOC by SOP #100 GC/MS | [ ] | [ ] | [ ] | [X] |
| 02A | 15-FVOC-SV05 | 13 | 11/16/15 | 1633 | 11/20/15 | 1149 | | [ ] | [ ] | [ ] | [X] |
| 03A | 15-FVOC-SV06 | 61 | 11/17/15 | 0921 | 11/20/15 | 1155 | | [ ] | [ ] | [ ] | [X] |
| 04A | 15-FVOC-SV09 | 60 | 11/16/15 | 1106 | 11/19/15 | 1607 | | [ ] | [ ] | [ ] | [X] |
| 05A | 15-FVOC-SV10 | 56 | 11/16/15 | 1206 | 11/19/15 | 1633 | | [ ] | [ ] | [ ] | [X] |
| 06A | 15-FVOC-SV12 | 55 | 11/16/15 | 1341 | 11/20/15 | 1115 | | [ ] | [ ] | [ ] | [X] |
| 07A | 15-FVOC-SV13 | 58 | 11/16/15 | 1409 | 11/20/15 | 1104 | | [ ] | [ ] | [ ] | [X] |
| 08A | 15-FVOC-SV15 | 29 | 11/17/15 | 1025 | 11/20/15 | 1201 | | [ ] | [ ] | [ ] | [X] |
| 09A | 15-FVOC-SV16 | 62 | 11/17/15 | 1123 | 11/20/15 | 1211 | | [ ] | [ ] | [ ] | [X] |
| 10A | 15-FVOC-SV17 | 63 | 11/17/15 | 1225 | 11/20/15 | 1315 | | [ ] | [ ] | [ ] | [X] |

| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
|---|---|---|---|
| | 11/25/15 1130 | | 11/30/15 1045 |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |

**Sample Site Air Temperature:** 44.5 °F

Notes:

| Lab Use Only | Shipper Name | Air Bill # | Temp (°C) | Condition | Custody Seals Intact? | Work Order # |
|---|---|---|---|---|---|---|
| | FedEx | | NA | Good | Yes No (None) | 1511467 |

PASSIVE SAMPLE COLLECTION

# Air Toxics LTD.

## CHAIN-OF-CUSTODY RECORD

**Sample Transportation Notice**
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

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FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020



Project Manager _____

Collected by: (Print and Sign) _____

Company _____ Email _____

Address _____ City _____ State ____ Zip _____

Phone _____ Fax _____

**Project Info:**
P.O. # _____
Project # _____
Project Name _____

**Turn Around Time:** ❑ Normal ❑ Rush _____ specify

**Reporting Units:** ❑ ppmv ❑ ppbv ❑ µg/m3 ❑ mg/m3

| Lab I.D. | Field Sample I.D. (Location) | Sampler # | Date of Deployment (mm/dd/yy) | Time of Deployment (hr : min) | Date of Retrieval (mm/dd/yy) | Time of Retrieval (hr : min) | Analysis Requested | Indoor Air | Outdoor Air | Workplace Monitoring | Other (Soil Gas) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11A | 15-FVOC-SV18 | 54 | 11/17/15 | 1515 | 11/21/15 | ~~1450~~ 1350 | VOC | ❑ | ❑ | ❑ | ☑ |
| 12A | 15-FVOC-SV19 | 57 | 11/17/15 | 1608 | 11/~~21~~/15 | ~~1435~~ 1411 | | ❑ | ❑ | ❑ | ☒ |
| 13A | 15-FVOC-SV20 | 27 | 11/18/15 | 0941 | 11/21/15 | ~~1440~~ 1517 | | ❑ | ❑ | ❑ | ☒ |
| 14A | 15-FVOC-SV21 | 52 | 11/17/15 | 1700 | 11/21/15 | 1450 | | ❑ | ❑ | ❑ | ☑ |
| 15A | 15-FVOC-SV22 | 30 | 11/18/15 | 1032 | 11/21/15 | 1435 | | ❑ | ❑ | ❑ | ☑ |
| 16A | 15-FVOC-SV23 | 20 | 11/18/15 | 1115 | 11/21/15 | 1440 | | ❑ | ❑ | ❑ | ☑ |
| 17A | 15-FVOC-SV24 | 26 | 11/18/15 | 1231 | 11/21/15 | 1526 | | ❑ | ❑ | ❑ | ☑ |
| 18A | 15-FVOC-SV26 | 31 | 11/18/15 | 1410 | 11/22/15 | 1240 | | ❑ | ❑ | ❑ | ☒ |
| 19A | 15-FVOC-SV30 | 50 | 11/18/15 | 1608 | 11/21/15 | 1615 | | ❑ | ❑ | ❑ | ☑ |
| 20A | 15-FVOC-SV31 | 34 | 11/18/15 | 1523 | 11/21/15 | 1627 | | ❑ | ❑ | ❑ | ☒ |

| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
|---|---|---|---|
| [signature] | 11/25/15 1130 | [signature] | 11/30/15 1045 |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |

**Sample Site Air Temperature:** 44.5 F

Notes:

| Lab Use Only | Shipper Name | Air Bill # | Temp (°C) | Condition | Custody Seals Intact? | Work Order # |
|---|---|---|---|---|---|---|
| | FedEx | | NA | Good | Yes No (None) | 1511467 |

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12/11/2015
Ms. Samantha Fox
GeoSyntec Consultants
4101 Arctic Blvd.
Suite 206
Anchorage AK 99503

Project Name: Fairview
Project #: 20266.015.01
Workorder #: 1511468

Dear Ms. Samantha Fox

The following report includes the data for the above referenced project for sample(s) received on 11/30/2015 at Air Toxics Ltd.

The data and associated QC analyzed by Passive S.E. WMS are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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# WORK ORDER #: 1511468

Work Order Summary

| | | | |
|---|---|---|---|
| **CLIENT:** | Ms. Samantha Fox<br>GeoSyntec Consultants<br>4101 Arctic Blvd.<br>Suite 206<br>Anchorage, AK 99503 | **BILL TO:** | Accounts Payable<br>AHTNA<br>110 West 38th Ave<br>Suite 200A<br>Anchorage, AK 99503 |
| **PHONE:** | 907-754-9679 | **P.O. #** | 20266.015.01 |
| **FAX:** | | **PROJECT #** | 20266.015.01 Fairview |
| **DATE RECEIVED:** | 11/30/2015 | **CONTACT:** | Kelly Buettner |
| **DATE COMPLETED:** | 12/11/2015 | | |

| FRACTION # | NAME | TEST |
|---|---|---|
| 01A | 15-FVOC-SV32 | Passive S.E. WMS |
| 02A | 15-FVOC-SV33 | Passive S.E. WMS |
| 03A | 15-FVOC-SV36 | Passive S.E. WMS |
| 04A | 15-FVOC-SV37 | Passive S.E. WMS |
| 05A | 15-FVOC-SV38 | Passive S.E. WMS |
| 06A | 15-FVOC-SV41 | Passive S.E. WMS |
| 07A | 15-FVOC-SV42 | Passive S.E. WMS |
| 08A | 15-FVOC-SV43 | Passive S.E. WMS |
| 09A | 15-FVOC-SV50 | Passive S.E. WMS |
| 10A | 15-FVOC-SV51 | Passive S.E. WMS |
| 11A | 15-FVOC-SV52 | Passive S.E. WMS |
| 12A | 15-FVOC-SV53 | Passive S.E. WMS |
| 13A | 15-FVOC-TB01 | Passive S.E. WMS |
| 14A | Lab Blank | Passive S.E. WMS |
| 15A | LCS | Passive S.E. WMS |
| 15AA | LCSD | Passive S.E. WMS |

CERTIFIED BY: Heidi Mayo DATE: 12/11/15

Technical Director



180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE**
**Passive SE by Mod EPA TO-17**
**GeoSyntec Consultants**
**Workorder# 1511468**

Thirteen WMS-PH samples were received on November 30, 2015. The laboratory analyzed the charcoal sorbent bed of the passive sampler following modified method EPA TO-17. The VOCs were chemically extracted using carbon disulfide and an aliquot of the extract was injected into a GC/MS for identification and quantification of volatile organic compounds (VOCs).

The mass of each target compound adsorbed by the sampler was converted to units of concentration using the sample deployment time and the sampling rate for each VOC. If sampling rates were calculated by the lab or the manufacturer, the concentration result has been flagged as an estimated value. Results are not corrected for desorption efficiency.

The reference method used for this procedure is EPA TO-17, which describes the collection of VOCs in ambient air using sorbents and analysis by GC/MS. Because TO-17 describes active sample collection using a pump and thermal desorption as the preparation step, several modifications are required. Modifications to TO-17 are listed in the table below:

| ***Requirement*** | ***TO-17*** | ***ATL Modifications*** |
|---|---|---|
| Sample Collection | Pump pulls measured air volume through sorbent tube | VOCs in air adsorbed onto sorbent bed passively through diffusion |
| Sample Preparation | Thermal extraction | Solvent extraction |
| Sorbent tube conditioning | Condition newly packed tubes prior to use | Charcoal-based sorbent is a single use media and conditioning is conducted by vendor. |
| Instrumentation | Thermal desorption introduction system | Liquid injection introduction system |
| Internal Standard | Gas-phase internal standard introduced on the tube or focusing trap during analysis | Liquid-phase internal standard introduced on the tube at the time of extraction |
| Media and sample storage | <4 deg C, 30 days | Media shelf life is determined by vendor; sample hold-time is 6 months for the RAD130 and WMS. Sample preservation requirements are storage in a cool, solvent-free refrigerator and optional use of ice during shipping. |
| Internal Standard Recovery | +/-40% of daily CCV area | -50% to +100% of daily CCV area |

**Receiving Notes**

There were no receiving discrepancies.

**Analytical Notes**

To calculate ug/m3 concentrations in the Lab Blank, a sampling duration of 5670 minutes was applied. The assumed temperature used for the uptake rate is listed on the data page. If the field temperatures

were provided, the rate was adjusted in the same manner as the field samples.

**Definition of Data Qualifying Flags**

Nine qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

C - Estimated concentration due to calculated sampling rate

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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# Summary of Detected Compounds
# VOC BY PASSIVE SAMPLER - GC/MS

**Client Sample ID: 15-FVOC-SV32**

**Lab ID#: 1511468-01A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV33**

**Lab ID#: 1511468-02A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV36**

**Lab ID#: 1511468-03A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV37**

**Lab ID#: 1511468-04A**

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Tetrachloroethene | 0.050 | 8.8 | 0.060 | 10 |

**Client Sample ID: 15-FVOC-SV38**

**Lab ID#: 1511468-05A**

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Tetrachloroethene | 0.050 | 8.6 | 0.067 | 12 |

**Client Sample ID: 15-FVOC-SV41**

**Lab ID#: 1511468-06A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV42**

**Lab ID#: 1511468-07A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV43**

**Lab ID#: 1511468-08A**

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# Summary of Detected Compounds
# VOC BY PASSIVE SAMPLER - GC/MS

**Client Sample ID: 15-FVOC-SV43**

**Lab ID#: 1511468-08A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV50**

**Lab ID#: 1511468-09A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV51**

**Lab ID#: 1511468-10A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-SV52**

**Lab ID#: 1511468-11A**

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Tetrachloroethene | 0.050 | 6.8 | 0.059 | 8.0 |

**Client Sample ID: 15-FVOC-SV53**

**Lab ID#: 1511468-12A**

No Detections Were Found.

**Client Sample ID: 15-FVOC-TB01**

**Lab ID#: 1511468-13A**

No Detections Were Found.

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**Client Sample ID: 15-FVOC-SV32**

**Lab ID#: 1511468-01A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121006sim** | **Date of Collection: 11/23/15 8:16:00 AM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 09:30 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 86 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 5644 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

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**Client Sample ID: 15-FVOC-SV33**

**Lab ID#: 1511468-02A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121007sim** | **Date of Collection: 11/22/15 2:58:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 09:54 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 100 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 93 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 40 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 21 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 18 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 12 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.2 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 4669 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

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**Client Sample ID: 15-FVOC-SV36**

**Lab ID#: 1511468-03A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121008sim** | **Date of Collection: 11/23/15 10:33:00 A** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 10:18 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 100 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 43 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 20 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.9 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 4329 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

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**Client Sample ID: 15-FVOC-SV37**

**Lab ID#: 1511468-04A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121009sim** | **Date of Collection: 11/23/15 10:27:00 A** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 10:43 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 99 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.8 | 0.060 | 10 |

Temperature = 44.5F , duration time = 4373 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

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**Client Sample ID: 15-FVOC-SV38**

**Lab ID#: 1511468-05A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121010sim** | **Date of Collection: 11/22/15 2:05:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 11:07 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 97 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 41 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.6 | 0.067 | 12 |

Temperature = 44.5F , duration time = 4472 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 110 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV41**

**Lab ID#: 1511468-06A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121011sim** | **Date of Collection: 11/22/15 2:20:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 11:31 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 98 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.7 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 4438 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 102 | 70-130 |

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**Client Sample ID: 15-FVOC-SV42**

**Lab ID#: 1511468-07A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121012sim** | **Date of Collection: 11/22/15 3:15:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 11:56 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 100 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 43 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 20 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.9 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 4332 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

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**Client Sample ID: 15-FVOC-SV43**

**Lab ID#: 1511468-08A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121013sim** | **Date of Collection: 11/22/15 2:36:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 12:20 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 100 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 43 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 20 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.8 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 4344 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV50**

**Lab ID#: 1511468-09A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121014sim** | **Date of Collection: 11/20/15 12:02:00 P** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 12:44 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 98 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.7 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 4416 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 101 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 15-FVOC-SV51**

**Lab ID#: 1511468-10A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121015sim** | **Date of Collection: 11/21/15 2:51:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 01:08 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 87 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 5630 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

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**Client Sample ID: 15-FVOC-SV52**

**Lab ID#: 1511468-11A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121016sim** | **Date of Collection: 11/22/15 12:41:00 P** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 01:33 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 86 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | 0.059 | 8.0 |

Temperature = 44.5F , duration time = 5670 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 101 | 70-130 |

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**Client Sample ID: 15-FVOC-SV53**

**Lab ID#: 1511468-12A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121017sim** | **Date of Collection: 11/22/15 2:21:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 01:57 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 98 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.7 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 4438 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

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**Client Sample ID: 15-FVOC-TB01**

**Lab ID#: 1511468-13A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121018sim** | **Date of Collection: 11/19/15 8:00:00 AM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 02:21 PM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 100 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 43 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 20 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.9 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 4320 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

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**Client Sample ID: Lab Blank**

**Lab ID#: 1511468-14A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121005sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 09:02 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 86 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 77 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 33 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 14 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 18 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 15 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 10 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 6.8 | Not Detected | Not Detected |

Temperature = 44.5F , duration time = 5670 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

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**Client Sample ID: LCS**

**Lab ID#: 1511468-15A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121003sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 08:14 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | %Recovery | Method Limits |
|---|---|---|
| Vinyl Chloride | 91 | 50-140 |
| 1,1-Dichloroethene | 102 | 70-130 |
| trans-1,2-Dichloroethene | 94 | 70-130 |
| cis-1,2-Dichloroethene | 94 | 70-130 |
| 1,1,1-Trichloroethane | 100 | 70-130 |
| Carbon Tetrachloride | 98 | 70-130 |
| Trichloroethene | 103 | 70-130 |
| Tetrachloroethene | 88 | 70-130 |

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

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**Client Sample ID: LCSD**

**Lab ID#: 1511468-15AA**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c121004sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 12/10/15 08:38 AM** | |
| | | **Date of Extraction: 12/10/15** | |

| Compound | %Recovery | Method Limits |
|---|---|---|
| Vinyl Chloride | 92 | 50-140 |
| 1,1-Dichloroethene | 102 | 70-130 |
| trans-1,2-Dichloroethene | 86 | 70-130 |
| cis-1,2-Dichloroethene | 92 | 70-130 |
| 1,1,1-Trichloroethane | 107 | 70-130 |
| Carbon Tetrachloride | 104 | 70-130 |
| Trichloroethene | 99 | 70-130 |
| Tetrachloroethene | 90 | 70-130 |

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

**PASSIVE SAMPLE COLLECTION**

# Air Toxics LTD.
## CHAIN-OF-CUSTODY RECORD

**Sample Transportation Notice**
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020



Project Manager _____
Collected by: (Print and Sign) _____
Company _____ Email _____
Address _____ City _____ State ____ Zip _____
Phone _____ Fax _____

**Project Info:**
P.O. # _____
Project # _____
Project Name _____

**Turn Around Time:** ❑ Normal ❑ Rush _____ specify

**Reporting Units:** ❑ ppmv ❑ ppbv ❑ µg/m3 ❑ mg/m3

| Lab I.D. | Field Sample I.D. (Location) | Sampler # | Date of Deployment (mm/dd/yy) | Time of Deployment (hr:min) | Date of Retrieval (mm/dd/yy) | Time of Retrieval (hr:min) | Analysis Requested | Indoor Air | Outdoor Air | Workplace Monitoring | Other (Soil Gas) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01A | 15-FVOC-SV32 | 25 | 11/19/15 | 1012 | 11/23/15 | 0816 | VOC | ❑ | ❑ | ❑ | ☒ |
| 02A | 15-FVOC-SV33 | 45 | 11/19/15 | 0909 | 11/22/15 | 1458 | | ❑ | ❑ | ❑ | ☒ |
| 03A | 15-FVOC-SV36 | 35 | 11/20/15 | 1024 | 11/23/15 | 1033 | | ❑ | ❑ | ❑ | ☒ |
| 04A | 15-FVOC-SV37 | 32 | 11/20/15 | 0934 | 11/23/15 | 1027 | | ❑ | ❑ | ❑ | ☒ |
| 05A | 15-FVOC-SV38 | 42 | 11/19/15 | 1133 | 11/22/15 | 1405 | | ❑ | ❑ | ❑ | ☒ |
| 06A | 15-FVOC-SV41 | 23 | 11/19/15 | 1222 | 11/22/15 | 1420 | | ❑ | ❑ | ❑ | ☒ |
| 07A | 15-FVOC-SV42 | 22 | 11/19/15 | 1503 | 11/22/15 | 1515 | | ❑ | ❑ | ❑ | ☒ |
| 08A | 15-FVOC-SV43 | 33 | 11/19/15 | 1412 | 11/22/15 | 1436 | | ❑ | ❑ | ❑ | ☒ |
| 09A | 15-FVOC-SV50 | 51 | 11/17/15 | 1026 | 11/20/15 | 1202 | | ❑ | ❑ | ❑ | ☒ |
| 10A | 15-FVOC-SV51 | 59 | 11/17/15 | 1701 | 11/21/15 | 1451 | | ❑ | ❑ | ❑ | ☒ |

| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
|---|---|---|---|
| [signature] | 11/25/15 1130 | [signature] | 11/30/15 0945 |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |

**Sample Site Air Temperature:** 44.5 F

Notes:

| Lab Use Only | Shipper Name | Air Bill # | Temp (°C) | Condition | Custody Seals Intact? | Work Order # |
|---|---|---|---|---|---|---|
| | FedEx | | NA | Good | Yes No (None) | 1511468 |

**PASSIVE SAMPLE COLLECTION**

# @Air Toxics LTD.

## CHAIN-OF-CUSTODY RECORD

**Sample Transportation Notice**
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

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FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020



Project Manager _____

Collected by: (Print and Sign) _____

Company _____ Email _____

Address _____ City _____ State ____ Zip _____

Phone _____ Fax _____

**Project Info:**
P.O. # _____
Project # _____
Project Name _____

**Turn Around Time:**
❑ Normal
❑ Rush
_____ specify

**Reporting Units:**
❑ ppmv
❑ ppbv
❑ µg/m3
❑ mg/m3

| Lab I.D. | Field Sample I.D. (Location) | Sampler # | Date of Deployment (mm/dd/yy) | Time of Deployment (hr : min) | Date of Retrieval (mm/dd/yy) | Time of Retrieval (hr : min) | Analysis Requested | Indoor Air | Outdoor Air | Workplace Monitoring | Other (Soil Gas) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11A | 15-FVOC-SV52 | 21 | 11/18/15 | 1415 | 11/22/15 | 1241 | VOC | ❑ | ❑ | ❑ | ☒ |
| 12A | 15-FVOC-SV53 | 37 | 11/19/15 | 1223 | 11/22/15 | 1421 | ↓ | ❑ | ❑ | ❑ | ☒ |
| 13A | 15-FVOC-TB01 | 43 | 11/16/15 | 0800 | 11/19/15 | 0800 | ↓ | ❑ | ❑ | ❑ | ☒ |
| | | | | | | | | ❑ | ❑ | ❑ | ❑ |
| | | | | | | | | ❑ | ❑ | ❑ | ❑ |
| | | | | | | | | ❑ | ❑ | ❑ | ❑ |
| | | | | | | | | ❑ | ❑ | ❑ | ❑ |
| | | | | | | | | ❑ | ❑ | ❑ | ❑ |
| | | | | | | | | ❑ | ❑ | ❑ | ❑ |
| | | | | | | | | ❑ | ❑ | ❑ | ❑ |

| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
|---|---|---|---|
| [signature] | 11/25/15 1130 | [signature] FEDEX | 11/30/15 1045 |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |

**Sample Site Air Temperature:** 44.5 F

Notes:

| Lab Use Only | Shipper Name | Air Bill # | Temp (°C) | Condition | Custody Seals Intact? | Work Order # |
|---|---|---|---|---|---|---|
| | FedEx | | NA | Good | Yes No (None) | 15114G8 |

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3/18/2016
Ms. Samantha Fox
GeoSyntec Consultants
4101 Arctic Blvd.
Suite 206
Anchorage AK 99503

Project Name: Fairview
Project #: 20266.015.01
Workorder #: 1603160

Dear Ms. Samantha Fox

The following report includes the data for the above referenced project for sample(s) received on 3/7/2016 at Air Toxics Ltd.

The data and associated QC analyzed by Passive S.E. WMS are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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# WORK ORDER #: 1603160

Work Order Summary

| | | | |
|---|---|---|---|
| **CLIENT:** | Ms. Samantha Fox<br>GeoSyntec Consultants<br>4101 Arctic Blvd.<br>Suite 206<br>Anchorage, AK 99503 | **BILL TO:** | Accounts Payable<br>AHTNA<br>110 West 38th Ave<br>Suite 200A<br>Anchorage, AK 99503 |
| **PHONE:** | 907-754-9679 | **P.O. #** | PO02001831 |
| **FAX:** | | **PROJECT #** | 20266.015.01 Fairview |
| **DATE RECEIVED:** | 03/07/2016 | **CONTACT:** | Kelly Buettner |
| **DATE COMPLETED:** | 03/18/2016 | | |

| FRACTION # | NAME | TEST |
|---|---|---|
| 01A | 16-FVOC-SV46 | Passive S.E. WMS |
| 02A | 16-FVOC-SV47 | Passive S.E. WMS |
| 03A | 16-FVOC-SV45 | Passive S.E. WMS |
| 04A | 16-FVOC-SV44 | Passive S.E. WMS |
| 05A | 16-FVOC-SV54 | Passive S.E. WMS |
| 06A | Lab Blank | Passive S.E. WMS |
| 07A | LCS | Passive S.E. WMS |
| 07AA | LCSD | Passive S.E. WMS |

CERTIFIED BY:  DATE: 03/18/16

Technical Director



180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE**
**Passive SE by Mod EPA TO-17**
**GeoSyntec Consultants**
**Workorder# 1603160**

Five WMS-PH samples were received on March 07, 2016. The laboratory analyzed the charcoal sorbent bed of the passive sampler following modified method EPA TO-17. The VOCs were chemically extracted using carbon disulfide and an aliquot of the extract was injected into a GC/MS for identification and quantification of volatile organic compounds (VOCs).

The mass of each target compound adsorbed by the sampler was converted to units of concentration using the sample deployment time and the sampling rate for each VOC. If sampling rates were calculated by the lab or the manufacturer, the concentration result has been flagged as an estimated value. Results are not corrected for desorption efficiency.

The reference method used for this procedure is EPA TO-17, which describes the collection of VOCs in ambient air using sorbents and analysis by GC/MS. Because TO-17 describes active sample collection using a pump and thermal desorption as the preparation step, several modifications are required. Modifications to TO-17 are listed in the table below:

| ***Requirement*** | ***TO-17*** | ***ATL Modifications*** |
|---|---|---|
| Sample Collection | Pump pulls measured air volume through sorbent tube | VOCs in air adsorbed onto sorbent bed passively through diffusion |
| Sample Preparation | Thermal extraction | Solvent extraction |
| Sorbent tube conditioning | Condition newly packed tubes prior to use | Charcoal-based sorbent is a single use media and conditioning is conducted by vendor. |
| Instrumentation | Thermal desorption introduction system | Liquid injection introduction system |
| Internal Standard | Gas-phase internal standard introduced on the tube or focusing trap during analysis | Liquid-phase internal standard introduced on the tube at the time of extraction |
| Media and sample storage | <4 deg C, 30 days | Media shelf life is determined by vendor; sample hold-time is 6 months for the RAD130 and WMS. Sample preservation requirements are storage in a cool, solvent-free refrigerator and optional use of ice during shipping. |
| Internal Standard Recovery | +/-40% of daily CCV area | -50% to +100% of daily CCV area |

**Receiving Notes**

There were no receiving discrepancies.

**Analytical Notes**

To calculate ug/m3 concentrations in the Lab Blank, a sampling duration of 4515 minutes was applied. The assumed temperature used for the uptake rate is listed on the data page. If the field temperatures

were provided, the rate was adjusted in the same manner as the field samples.

**Definition of Data Qualifying Flags**

Ten qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

C - Estimated concentration due to calculated sampling rate

CN - See case narrative explanation.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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# Summary of Detected Compounds
# VOC BY PASSIVE SAMPLER - GC/MS

**Client Sample ID: 16-FVOC-SV46**

**Lab ID#: 1603160-01A**

No Detections Were Found.

**Client Sample ID: 16-FVOC-SV47**

**Lab ID#: 1603160-02A**

No Detections Were Found.

**Client Sample ID: 16-FVOC-SV45**

**Lab ID#: 1603160-03A**

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Carbon Tetrachloride | 0.050 | 19 | 0.55 | 210 |

**Client Sample ID: 16-FVOC-SV44**

**Lab ID#: 1603160-04A**

No Detections Were Found.

**Client Sample ID: 16-FVOC-SV54**

**Lab ID#: 1603160-05A**

No Detections Were Found.

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**Client Sample ID: 16-FVOC-SV46**

**Lab ID#: 1603160-01A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c031012sim** | **Date of Collection: 3/4/16 12:35:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 3/10/16 11:59 AM** | |
| | | **Date of Extraction: 3/10/16** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 97 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 41 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.6 | Not Detected | Not Detected |

Temperature = 37.4F , duration time = 4470 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 106 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 16-FVOC-SV47**

**Lab ID#: 1603160-02A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c031013sim** | **Date of Collection: 3/4/16 12:20:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 3/10/16 12:24 PM** | |
| | | **Date of Extraction: 3/10/16** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 96 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 41 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 12 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.5 | Not Detected | Not Detected |

Temperature = 37.4F , duration time = 4515 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 16-FVOC-SV45**

**Lab ID#: 1603160-03A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c031014sim** | **Date of Collection: 3/4/16 1:00:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 3/10/16 12:48 PM** | |
| | | **Date of Extraction: 3/10/16** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 99 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | 0.55 | 210 |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.8 | Not Detected | Not Detected |

Temperature = 37.4F , duration time = 4385 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 103 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 16-FVOC-SV44**

**Lab ID#: 1603160-04A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c031015sim** | **Date of Collection: 3/4/16 12:50:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 3/10/16 01:12 PM** | |
| | | **Date of Extraction: 3/10/16** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 98 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.7 | Not Detected | Not Detected |

Temperature = 37.4F , duration time = 4415 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: 16-FVOC-SV54**

**Lab ID#: 1603160-05A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c031016sim** | **Date of Collection: 3/4/16 12:45:00 PM** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 3/10/16 01:36 PM** | |
| | | **Date of Extraction: 3/10/16** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 99 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 42 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 18 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 23 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 13 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.7 | Not Detected | Not Detected |

Temperature = 37.4F , duration time = 4405 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: Lab Blank**

**Lab ID#: 1603160-06A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c031011sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 3/10/16 11:35 AM** | |
| | | **Date of Extraction: 3/10/16** | |

| Compound | Rpt. Limit (ug) | Rpt. Limit (ug/m3) | Amount (ug) | Amount (ug/m3) |
|---|---|---|---|---|
| Vinyl Chloride | 0.20 | 110 | Not Detected | Not Detected |
| 1,1-Dichloroethene | 0.20 | 96 | Not Detected | Not Detected |
| trans-1,2-Dichloroethene | 0.10 | 41 | Not Detected | Not Detected |
| cis-1,2-Dichloroethene | 0.050 | 17 | Not Detected | Not Detected |
| 1,1,1-Trichloroethane | 0.050 | 22 | Not Detected | Not Detected |
| Carbon Tetrachloride | 0.050 | 19 | Not Detected | Not Detected |
| Trichloroethene | 0.050 | 12 | Not Detected | Not Detected |
| Tetrachloroethene | 0.050 | 8.5 | Not Detected | Not Detected |

Temperature = 37.4F , duration time = 4515 minutes.

**Container Type: WMS-PH**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 106 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: LCS**

**Lab ID#: 1603160-07A**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c031009sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 3/10/16 10:43 AM** | |
| | | **Date of Extraction: 3/10/16** | |

| Compound | %Recovery | Method Limits |
|---|---|---|
| Vinyl Chloride | 94 | 50-140 |
| 1,1-Dichloroethene | 98 | 70-130 |
| trans-1,2-Dichloroethene | 93 | 70-130 |
| cis-1,2-Dichloroethene | 89 | 70-130 |
| 1,1,1-Trichloroethane | 100 | 70-130 |
| Carbon Tetrachloride | 100 | 70-130 |
| Trichloroethene | 99 | 70-130 |
| Tetrachloroethene | 91 | 70-130 |

**Container Type: NA - Not Applicable**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 104 | 70-130 |

eurofins | Air Toxics

**Client Sample ID: LCSD**

**Lab ID#: 1603160-07AA**

**VOC BY PASSIVE SAMPLER - GC/MS**

| | | | |
|---|---|---|---|
| **File Name:** | **c031010sim** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 3/10/16 11:07 AM** | |
| | | **Date of Extraction: 3/10/16** | |

| Compound | %Recovery | Method Limits |
|---|---|---|
| Vinyl Chloride | 84 | 50-140 |
| 1,1-Dichloroethene | 92 | 70-130 |
| trans-1,2-Dichloroethene | 92 | 70-130 |
| cis-1,2-Dichloroethene | 85 | 70-130 |
| 1,1,1-Trichloroethane | 96 | 70-130 |
| Carbon Tetrachloride | 97 | 70-130 |
| Trichloroethene | 98 | 70-130 |
| Tetrachloroethene | 90 | 70-130 |

**Container Type: NA - Not Applicable**

| Surrogates | %Recovery | Method Limits |
|---|---|---|
| Toluene-d8 | 105 | 70-130 |

PASSIVE SAMPLE COLLECTION

# Air Toxics LTD.
## CHAIN-OF-CUSTODY RECORD

**Sample Transportation Notice**
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020



Project Manager: Sam Fox
Collected by: (Print and Sign) A Gelich
Company: Antea Engineering Email: agelich@aheng.net
Address: 110 W 38th St City: Anchorage State: AK Zip: 99503
Phone: 907 646 2969 Fax:

**Project Info:**
P.O. #:
Project #: 20266.015.01
Project Name: Fairview

**Turn Around Time:** ☒ Normal ☐ Rush (specify)

**Reporting Units:** ☐ ppmv ☐ ppbv ☒ µg/m3 ☐ mg/m3

| Lab I.D. | Field Sample I.D. (Location) | Sampler # | Date of Deployment (mm/dd/yy) | Time of Deployment (hr : min) | Date of Retrieval (mm/dd/yy) | Time of Retrieval (hr : min) | Analysis Requested | Indoor Air | Outdoor Air | Workplace Monitoring | Other (Soil Vapor) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01A | 16-FVOC-SV46 | 1520-AN-LV-066 | 3/1/16 | 1005 | 3/4/16 | 1235 | VOC by SOP #100, GC/ms | ☐ | ☐ | ☐ | ☒ |
| 02A | 16-FVOC-SV47 | 1520-AN-LV-067 | 3/1/16 | 0905 | 3/4/16 | 1220 | ↓ | ☐ | ☐ | ☐ | ☒ |
| 03A | 16-FVOC-SV45 | 1520-AN-LV-070 | 3/1/16 | 1155 | 3/4/16 | 1300 | | ☐ | ☐ | ☐ | ☒ |
| 04A | 16-FVOC-SV44 | 1520-AN-LV-069 | 3/1/16 | 1115 | 3/4/16 | 1250 | | ☐ | ☐ | ☐ | ☒ |
| 05A | 16-FVOC-SV54 | 1520-AN-LV-068 | 3/1/16 | 1120 | 3/4/16 | 1245 | | ☐ | ☐ | ☐ | ☐ |
| | | | | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | | | | ☐ | ☐ | ☐ | ☐ |
| | | | | | | | | ☐ | ☐ | ☐ | ☐ |

| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
|---|---|---|---|
| [signature] | 3/4/16 1530 | [signature] | 3/7/16 1010 |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |
| Relinquished by: (signature) | Date/Time | Received by: (signature) | Date/Time |

**Sample Site Air Temperature:** 2.75 °C

Notes:

| Lab Use Only | Shipper Name | Air Bill # | Temp (°C) | Condition | Custody Seals Intact? | Work Order # |
|---|---|---|---|---|---|---|
| | FedEx | | NA | Good | Yes No None | 1603160 |

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

March 9, 2016

Sam Fox
Ahtna Environmental, Inc.
110 West 38th Avenue, Suite 200B
Anchorage, AK 99503

Re: Analytical Data for Project 20266.015.01
Laboratory Reference No. 1603-040

Dear Sam:

Enclosed are the analytical results and associated quality control data for samples submitted on March 3, 2016.

CS Laboratory Approval Number: UST-039

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 9, 2016
Samples Submitted: March 3, 2016
Laboratory Reference: 1603-040
Project: 20266.015.01

**Case Narrative**

Samples were collected on March 1, 2016 and received by the laboratory on March 3, 2016. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Volatiles EPA 8260C Analysis

Due to the levels of sediment present in the VOAs provided for samples 16-FVOC-GW48 and 16-FVOC-GW55, the aqueous layers from two VOAs for each sample were combined to perform the requested analysis. Some loss of volatiles may have occurred.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: March 9, 2016
Samples Submitted: March 3, 2016
Laboratory Reference: 1603-040
Project: 20266.015.01

Analyst's Signature

Stacey Duran

Stacey Duran, GC/MS Volatiles Chemist

3-9-16

Date

Date of Report: March 9, 2016
Samples Submitted: March 3, 2016
Laboratory Reference: 1603-040
Project: 20266.015.01

**VOLATILES EPA 8260C/SIM**

Matrix: Water
Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **16-FVOC-GW49** | | | | | |
| Laboratory ID: | 03-040-01 | | | | | |
| Vinyl Chloride | ND | 0.10 | EPA 8260C/SIM | 3-8-16 | 3-8-16 | |
| 1,1-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (trans) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (cis) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| 1,1,1-Trichloroethane | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Carbon Tetrachloride | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Trichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Tetrachloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| ***Surrogate:*** | ***Percent Recovery*** | ***Control Limits*** | | | | |
| ***Dibromofluoromethane*** | ***98*** | ***71-131*** | | | | |
| ***Toluene-d8*** | ***98*** | ***80-120*** | | | | |
| ***4-Bromofluorobenzene*** | ***89*** | ***80-120*** | | | | |

Date of Report: March 9, 2016
Samples Submitted: March 3, 2016
Laboratory Reference: 1603-040
Project: 20266.015.01

**VOLATILES EPA 8260C/SIM**

Matrix: Water
Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **16-FVOC-GW48** | | | | | |
| Laboratory ID: | 03-040-02 | | | | | |
| Vinyl Chloride | ND | 0.10 | EPA 8260C/SIM | 3-8-16 | 3-8-16 | |
| 1,1-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (trans) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (cis) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| 1,1,1-Trichloroethane | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Carbon Tetrachloride | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Trichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Tetrachloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| ***Surrogate:*** | ***Percent Recovery*** | ***Control Limits*** | | | | |
| ***Dibromofluoromethane*** | ***102*** | ***71-131*** | | | | |
| ***Toluene-d8*** | ***99*** | ***80-120*** | | | | |
| ***4-Bromofluorobenzene*** | ***93*** | ***80-120*** | | | | |

Date of Report: March 9, 2016
Samples Submitted: March 3, 2016
Laboratory Reference: 1603-040
Project: 20266.015.01

**VOLATILES EPA 8260C/SIM**

Matrix: Water
Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **16-FVOC-GW55** | | | | | |
| Laboratory ID: | 03-040-03 | | | | | |
| Vinyl Chloride | ND | 0.10 | EPA 8260C/SIM | 3-8-16 | 3-8-16 | |
| 1,1-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (trans) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (cis) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| 1,1,1-Trichloroethane | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Carbon Tetrachloride | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Trichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Tetrachloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| ***Surrogate:*** | ***Percent Recovery*** | ***Control Limits*** | | | | |
| ***Dibromofluoromethane*** | ***101*** | ***71-131*** | | | | |
| ***Toluene-d8*** | ***101*** | ***80-120*** | | | | |
| ***4-Bromofluorobenzene*** | ***96*** | ***80-120*** | | | | |

Date of Report: March 9, 2016
Samples Submitted: March 3, 2016
Laboratory Reference: 1603-040
Project: 20266.015.01

**VOLATILES EPA 8260C/SIM**

Matrix: Water
Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **16-FVOC-TB01** | | | | | |
| Laboratory ID: | 03-040-04 | | | | | |
| Vinyl Chloride | ND | 0.10 | EPA 8260C/SIM | 3-8-16 | 3-8-16 | |
| 1,1-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (trans) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (cis) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| 1,1,1-Trichloroethane | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Carbon Tetrachloride | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Trichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Tetrachloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| ***Surrogate:*** | ***Percent Recovery*** | ***Control Limits*** | | | | |
| ***Dibromofluoromethane*** | ***104*** | ***71-131*** | | | | |
| ***Toluene-d8*** | ***98*** | ***80-120*** | | | | |
| ***4-Bromofluorobenzene*** | ***91*** | ***80-120*** | | | | |

Date of Report: March 9, 2016
Samples Submitted: March 3, 2016
Laboratory Reference: 1603-040
Project: 20266.015.01

**VOLATILES by EPA 8260C/SIM**
**METHOD BLANK QUALITY CONTROL**

Matrix: Water
Units: ug/L

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| Laboratory ID: | MB0308W1 | | | | | |
| Vinyl Chloride | ND | 0.10 | EPA 8260C/SIM | 3-8-16 | 3-8-16 | |
| 1,1-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (trans) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| (cis) 1,2-Dichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| 1,1,1-Trichloroethane | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Carbon Tetrachloride | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Trichloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| Tetrachloroethene | ND | 0.20 | EPA 8260C | 3-8-16 | 3-8-16 | |
| ***Surrogate:*** | ***Percent Recovery*** | ***Control Limits*** | | | | |
| ***Dibromofluoromethane*** | ***104*** | ***71-131*** | | | | |
| ***Toluene-d8*** | ***101*** | ***80-120*** | | | | |
| ***4-Bromofluorobenzene*** | ***94*** | ***80-120*** | | | | |

Date of Report: March 9, 2016
Samples Submitted: March 3, 2016
Laboratory Reference: 1603-040
Project: 20266.015.01

**VOLATILES by EPA 8260C/SIM**
**SB/SBD QUALITY CONTROL**

Matrix: Water
Units: ug/L

| Analyte | Result | | Spike Level | | Percent Recovery | | Recovery Limits | RPD | RPD Limit | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| **SPIKE BLANKS** | | | | | | | | | | |
| Laboratory ID: | SB0308W1 | | | | | | | | | |
| | SB | SBD | SB | SBD | SB | SBD | | | | |
| 1,1-Dichloroethene | **9.04** | **8.53** | 10.0 | 10.0 | 90 | 85 | 62-132 | 6 | 20 | |
| Benzene | **10.1** | **9.61** | 10.0 | 10.0 | 101 | 96 | 75-121 | 5 | 15 | |
| Trichloroethene | **9.53** | **9.26** | 10.0 | 10.0 | 95 | 93 | 65-115 | 3 | 15 | |
| Toluene | **10.4** | **10.2** | 10.0 | 10.0 | 104 | 102 | 78-120 | 2 | 15 | |
| Chlorobenzene | **10.2** | **9.62** | 10.0 | 10.0 | 102 | 96 | 77-118 | 6 | 15 | |
| ***Surrogate:*** | | | | | | | | | | |
| ***Dibromofluoromethane*** | | | | | ***97*** | ***99*** | ***71-131*** | | | |
| ***Toluene-d8*** | | | | | ***96*** | ***99*** | ***80-120*** | | | |
| ***4-Bromofluorobenzene*** | | | | | ***90*** | ***93*** | ***80-120*** | | | |

OnSite Environmental Inc.

**Data Qualifiers and Abbreviations**

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C/SIM, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

# Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com



Company: Ahtna Engineering
Project Number: 20266.015.01
Project Name: Fairview
Project Manager: Sam Fox
Sampled by: A Geilich

**Turnaround Request (in working days)**

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

**Laboratory Number:** 03-040

| Lab ID | Sample Identification | Date Sampled | Time Sampled | Matrix | Number of Containers | NWTPH-HCID | NWTPH-Gx/BTEX | NWTPH-Gx | NWTPH-Dx | Volatiles 8260C | Halogenated Volatiles 8260C | Semivolatiles 8270D/SIM (with low-level PAHs) | PAHs 8270D/SIM (low-level) | PCBs 8082A | Organochlorine Pesticides 8081B | Organophosphorus Pesticides 8270D/SIM | Chlorinated Acid Herbicides 8151A | Total RCRA Metals | Total MTCA Metals | TCLP Metals | HEM (oil and grease) 1664A | % Moisture |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 16-FVOC-GW49 | 3/1/16 | 1555 | W | 3 | | | | | X | | | | | | | | | | | | |
| 2 | 16-FVOC-GW48 | 3/2/16 | 1110 | W | 3 | | | | | X | | | | | | | | | | | | |
| 3 | 16-FVOC-GW55 | 3/2/16 | 1200 | W | 3 | | | | | X | | | | | | | | | | | | |
| 4 | 16-FVOC-TB01 | 3/1/16 | 1200 | W | 3 | | | | | X | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | |

| | Signature | Company | Date | Time |
|---|---|---|---|---|
| Relinquished | | Ahtna Engineering | 3/2/16 | 1330 |
| Received | | OSE | 3/3/16 | 1000 |
| Relinquished | | | | |
| Received | | | | |
| Relinquished | | | | |
| Received | | | | |
| Reviewed/Date | | Reviewed/Date | | |

**Comments/Special Instructions**

16-FVOC-TB01 = Trip blank

Chromatograms with final report ☐

Data Package: Standard ☒ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☐ _____

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# APPENDIX F

ADEC DATA QUALITY REVIEW CHECKLISTS

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# Laboratory Data Review Checklist for Air Samples

| | | | |
|---|---|---|---|
| Completed by: | Sam Fox | | |
| Title: | Junior Engineer | Date: | 3/24/2016 |
| CS Report Name: | Fairview Chlorinated Solvents Investigation | Report Date: | April 2016 |
| Consultant Firm: | Ahtna Engineering Services, LLC (partnered with Geosyntec Consultants) | | |
| Laboratory Name: | Eurofins Air Toxics | Laboratory Report Number: | 1511467 |
| ADEC File Number: | N/A | ADEC Haz ID: | N/A |

1. Laboratory

a. Did a NELAP certified laboratory receive and perform all of the submitted sample analyses?

(•) Yes ( ) No ( ) NA (Please explain.) Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP approved?

( ) Yes ( ) No (•) NA (Please explain.) Comments:

Not transferred to separate laboratory.

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

(•) Yes ( ) No ( ) NA (Please explain.) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample condition documented -Samples collected in gas tight, opaque/dark Summa canisters or other ADEC approved container? Canister vacuum/pressure checked, recorded upon receipt and contained no open valves?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. If there were any discrepancies, were they documented? For example, incorrect sample containers/ preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum etc.?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

"No receiving discrepancies." noted in Lab Report

c. Data quality or usability affected? (Please explain.)

( ) Yes (•) No ( ) NA (Please explain) Comments:

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Discrepancies, errors or QC failures identified by the lab?

( ) Yes (•) No ( ) NA (Please explain) Comments:

No discrepancies, errors, or QC failures noted.

c. Were all corrective actions documented?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data quality is sufficient and data is usable.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Samples analyzed within 30 days of collection or within the time required by the method?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Vinyl Chloride is the only exception and this was documented in the work plan.

d. Data quality or usability affected?

Comments:

No

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. If above PQL, what samples are affected?

Comments:

Not applicable

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

( ) Yes ( ) No (•) NA (Please explain) Comments:

All samples are not detected

v. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable.

( ) Yes (•) No ( ) NA (Please explain) Comments:

RPD is not reported for LCS/LCSD results.

iv. If %R or RPD is outside of acceptable limits, what samples are affected?

○ Yes ◉ No ○ NA (Please explain) Comments:

%R not outside acceptable limits. RPD not reported

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No affected samples.

vi. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

c. Surrogates

i. Are surrogate recoveries reported for field, QC and laboratory samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

◉ Yes ○ No ○ NA (Please explain) Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No failed surrogate recoveries.

iv. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 type (soil gas, indoor air etc.) samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

Duplicates are on the second lab report from these samples.

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain) Comments:

Duplicates are on the second lab report from these samples.

iii. Precision - All relative percent differences (RPD) less than specified DQOs? (Recommended: 25 %)

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Duplicates are on the second lab report from these samples.

iv. Data quality or usability affected? (Please explain.) Comments:

No impacts to data quality or usability.

e. Field Blank (If not used explain why).

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Trip blank is on the second lab report from these samples

i. All results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Trip blank is on the second lab report from these samples

ii. If above PQL, what samples are affected? Comments:

iii. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

( ) Yes ( ) No (•) NA (Please explain) Comments:

Reset Form

# Laboratory Data Review Checklist for Air Samples

| | | | |
|---|---|---|---|
| Completed by: | Sam Fox | | |
| Title: | Junior Engineer | Date: | 3/24/2016 |
| CS Report Name: | Fairview Chlorinated Solvents Investigation | Report Date: | April 2016 |
| Consultant Firm: | Ahtna Engineering Services, LLC (partnered with Geosyntec Consultants) | | |
| Laboratory Name: | Eurofins Air Toxics | Laboratory Report Number: | 1511468 |
| ADEC File Number: | N/A | ADEC Haz ID: | N/A |

1. Laboratory

a. Did a NELAP certified laboratory receive and perform all of the submitted sample analyses?

(•) Yes ( ) No ( ) NA (Please explain.) Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP approved?

( ) Yes ( ) No (•) NA (Please explain.) Comments:

Not transferred to separate laboratory.

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

(•) Yes ( ) No ( ) NA (Please explain.) Comments:

b. Correct analyses requested?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample condition documented -Samples collected in gas tight, opaque/dark Summa canisters or other ADEC approved container? Canister vacuum/pressure checked, recorded upon receipt and contained no open valves?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. If there were any discrepancies, were they documented? For example, incorrect sample containers/ preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum etc.?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

"No receiving discrepancies." noted in Lab Report

c. Data quality or usability affected? (Please explain.)

( ) Yes (•) No ( ) NA (Please explain) Comments:

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Discrepancies, errors or QC failures identified by the lab?

( ) Yes (•) No ( ) NA (Please explain) Comments:

No discrepancies, errors, or QC failures noted.

c. Were all corrective actions documented?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data quality is sufficient and data is usable.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Samples analyzed within 30 days of collection or within the time required by the method?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Vinyl Chloride is the only exception and this was documented in the work plan.

d. Data quality or usability affected?

Comments:

No

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. If above PQL, what samples are affected?

Comments:

Not applicable

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

( ) Yes ( ) No (•) NA (Please explain) Comments:

All samples are not detected

v. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable.

( ) Yes (•) No ( ) NA (Please explain) Comments:

RPD is not reported for LCS/LCSD results.

iv. If %R or RPD is outside of acceptable limits, what samples are affected?

○ Yes ○ No ◉ NA (Please explain) Comments:

%R not outside acceptable limits. RPD not reported.

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No affected samples.

vi. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

c. Surrogates

i. Are surrogate recoveries reported for field, QC and laboratory samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

◉ Yes ○ No ○ NA (Please explain) Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No failed surrogate recoveries.

iv. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 type (soil gas, indoor air etc.) samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

Duplicates are also for the first lab report from these samples.

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain) Comments:

Duplicates are also for the first lab report from these samples.

iii. Precision - All relative percent differences (RPD) less than specified DQOs? (Recommended: 25 %)

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iv. Data quality or usability affected? (Please explain.) Comments:

No impacts to data quality or usability.

e. Field Blank (If not used explain why).

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Trip blank submitted with samples

i. All results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. If above PQL, what samples are affected? Comments:

iii. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

( ) Yes ( ) No (•) NA (Please explain) Comments:

Reset Form

# Laboratory Data Review Checklist for Air Samples

| | | | |
|---|---|---|---|
| Completed by: | Sam Fox | | |
| Title: | Junior Engineer | Date: | 3/24/2016 |
| CS Report Name: | Fairview Chlorinated Solvents Investigation | Report Date: | April 2016 |
| Consultant Firm: | Ahtna Engineering Services, LLC (partnered with Geosyntec Consultants) | | |
| Laboratory Name: | Eurofins Air Toxics | Laboratory Report Number: | 1603160 |
| ADEC File Number: | N/A | ADEC Haz ID: | N/A |

1. Laboratory

a. Did a NELAP certified laboratory receive and perform all of the submitted sample analyses?

(●) Yes ( ) No ( ) NA (Please explain.) Comments:

b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP approved?

( ) Yes ( ) No (●) NA (Please explain.) Comments:

Not transferred to separate laboratory.

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

(●) Yes ( ) No ( ) NA (Please explain.) Comments:

b. Correct analyses requested?

(●) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample condition documented -Samples collected in gas tight, opaque/dark Summa canisters or other ADEC approved container? Canister vacuum/pressure checked, recorded upon receipt and contained no open valves?

(●) Yes ( ) No ( ) NA (Please explain) Comments:

b. If there were any discrepancies, were they documented? For example, incorrect sample containers/ preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum etc.?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

"No receiving discrepancies." noted in Lab Report

c. Data quality or usability affected? (Please explain.)

( ) Yes (•) No ( ) NA (Please explain) Comments:

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Discrepancies, errors or QC failures identified by the lab?

( ) Yes (•) No ( ) NA (Please explain) Comments:

No discrepancies, errors, or QC failures noted.

c. Were all corrective actions documented?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data quality is sufficient and data is usable.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Samples analyzed within 30 days of collection or within the time required by the method?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Vinyl Chloride is the only exception and this was documented in the work plan.

d. Data quality or usability affected?

Comments:

No

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. If above PQL, what samples are affected?

Comments:

Not applicable

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

( ) Yes ( ) No (•) NA (Please explain) Comments:

All samples are not detected

v. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. Precision - All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable.

( ) Yes (•) No ( ) NA (Please explain) Comments:

RPD is not reported for LCS/LCSD results.

iv. If %R or RPD is outside of acceptable limits, what samples are affected?

○ Yes ○ No ◉ NA (Please explain) Comments:

%R not outside acceptable limits. RPD not reported

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No affected samples.

vi. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

c. Surrogates

i. Are surrogate recoveries reported for field, QC and laboratory samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Accuracy - All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable.

◉ Yes ○ No ○ NA (Please explain) Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No failed surrogate recoveries.

iv. Data quality or usability affected? (Please explain.)

Comments:

No impacts to data quality or usability.

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 type (soil gas, indoor air etc.) samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain) Comments:

iii. Precision - All relative percent differences (RPD) less than specified DQOs? (Recommended: 25 %)

$$RPD\ (\%) = \text{Absolute Value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where $R_1$ = Sample Concentration

$R_2$ = Field Duplicate Concentration

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iv. Data quality or usability affected? (Please explain.) Comments:

No impacts to data quality or usability.

e. Field Blank (If not used explain why).

( ) Yes (•) No ( ) NA (Please explain) Comments:

Insufficient samplers available for both field duplicate and field blank.

i. All results less than PQL?

( ) Yes ( ) No (•) NA (Please explain) Comments:

No field blank submitted for these samples.

ii. If above PQL, what samples are affected? Comments:

iii. Data quality or usability affected? (Please explain.)

Comments:

Since four of five samples were all non-detect, assumed no cross-contamination even though no trip blank

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

( ) Yes ( ) No (•) NA (Please explain) Comments:

Reset Form

# Laboratory Data Review Checklist

| | | | |
|---|---|---|---|
| Completed by: | Sam Fox | | |
| Title: | Junior Engineer | Date: | 3/24/2016 |
| CS Report Name: | Fairview Chlorinated Solvents Investigation | Report Date: | April 2016 |
| Consultant Firm: | Ahtna Engineering Services, LLC (partnered with Geosyntec Consultants) | | |
| Laboratory Name: | Eurofins Air Toxics | Laboratory Report Number: | 1603-040 |
| ADEC File Number: | N/A | ADEC RecKey Number: | N/A |

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

(●) Yes ( ) No ( ) NA (Please explain.) 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 (●) NA (Please explain) Comments:

Samples were not transferred.

2. Chain of Custody (COC)

a. COC information completed, signed, and dated (including released/received by)?

(●) Yes ( ) No ( ) NA (Please explain) Comments:

b. Correct analyses requested?

(●) Yes ( ) No ( ) NA (Please explain) Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

(●) Yes ( ) No ( ) NA (Please explain) Comments:

b. Sample preservation acceptable - acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. Sample condition documented - broken, leaking (Methanol), zero headspace (VOC vials)?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

d. If there were any discrepancies, were they documented? - For example, incorrect sample containers/ preservation, sample temperature outside of acceptance range, insufficient or missing samples, etc.?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

Sediment was noted inside vials for two samples.

e. Data quality or usability affected? (Please explain)

Comments:

The data is likely biased low due to laboratory combination of vials due to sediment

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. Discrepancies, errors or QC failures identified by the lab?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. Were all corrective actions documented?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The data is likely biased low due to laboratory combination of vials due to sediment

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

b. All applicable holding times met?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

c. All soils reported on a dry weight basis?

( ) Yes ( ) No (•) NA (Please explain) Comments:

No soil submitted to laboratory.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

e. Data quality or usability affected? (Please explain)

Comments:

Data quality and usability were not impacted.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

ii. All method blank results less than PQL?

(•) Yes ( ) No ( ) NA (Please explain) Comments:

iii. If above PQL, what samples are affected? Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No method blank results exceeded detection limits.

v. Data quality or usability affected? (Please explain) Comments:

Data quality and usability were not impacted.

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 ○ NA (Please explain) Comments:

ii. Metals/Inorganics - One LCS and one sample duplicate reported per matrix, analysis and 20 samples?

○ Yes ○ No ◉ NA (Please explain) Comments:

No metal or inorganic analyses requested.

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 ○ NA (Please explain) Comments:

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/DMSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

◉ Yes ○ No ○ NA (Please explain) Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No information is outside acceptable limits.

vi. Do the affected samples(s) have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No affected samples.

vii. Data quality or usability affected? (Please explain) Comments:

Data quality and usability were not impacted.

c. Surrogates - Organics Only

i. Are surrogate recoveries reported for organic analyses - field, QC and laboratory samples?

◉ Yes ○ No ○ NA (Please explain) 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 ○ NA (Please explain) Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ○ No ◉ NA (Please explain) Comments:

No failed surrogate recoveries.

iv. Data quality or usability affected? (Use the comment box to explain.). Comments:

Data quality and usability were not impacted.

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 ○ NA (Please explain.) 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 ○ NA (Please explain.) Comments:

iii. All results less than PQL?

◉ Yes ○ No ○ NA (Please explain.) Comments:

iv. If above PQL, what samples are affected?

Comments:

Not applicable.

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not impacted.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

◉ Yes ○ No ○ NA (Please explain) Comments:

ii. Submitted blind to lab?

◉ Yes ○ No ○ NA (Please explain.) 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 ○ NA (Please explain) Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

○ Yes ◉ No ○ NA (Please explain) Comments:

Data quality and usability were not impacted. Original sample and field duplicate were all not detected.

f. Decontamination or Equipment Blank (if applicable)

○ Yes ◉ No ○ NA (Please explain) Comments:

i. All results less than PQL?

○ Yes ○ No ◉ NA (Please explain) Comments:

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not impacted.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

◉ Yes ○ No ○ NA (Please explain) Comments:

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