Ahtna
Engineering Services, LLC

FINAL

ST. PAUL WEATHER SERVICE OFFICE
INDOOR AIR AND CRAWLSPACE AIR SAMPLING REPORT
ST. PAUL ISLAND, ALASKA
MAY 2018

Prepared For:
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APPROVAL PAGE

Ahtna Engineering Services, LLC (Ahtna) has prepared this report to document indoor air and crawlspace air sampling activities conducted at the St. Paul Weather Service Office (WSO) Composite Building located in the Pribilof Islands, Alaska. The following people have reviewed and approved this report.

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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
BSE ..... Bering Sea Ecotech
COPC ..... Contaminant of potential concern
CSM ..... conceptual site model
DP ..... Differential pressure
DQO ..... data quality objective
DRO ..... diesel range organics
EPA ..... U.S. Environmental Protection Agency
GRO ..... Gasoline range organics
ID ..... identification
LOD ..... Limit of detection
mg/kg ..... milligrams per kilogram
NOAA ..... National Oceanic and Atmospheric Administration
NWS..... National Weather Service
PAH..... polynuclear aromatic hydrocarbon
PID ..... photoionization detector
ppb..... parts per billion
RRO ..... Residual range organics
SIM ..... selected ion monitoring
SOP ..... standard operating procedure
UFP-QAPP..... Uniform Federal Policy-Quality Assurance Project Plan
UST ..... underground storage tank
VOC ..... volatile organic compound
WSO..... Weather Service Office
$\mu g/m^3$ ..... micrograms per cubic meter
µg/L ..... micrograms per liter

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EXECUTIVE SUMMARY

This report documents results from indoor air and crawlspace air sampling conducted at the Weather Service Office (WSO) Composite Building on St. Paul Island (Figure 1). Ahtna Engineering Services, LLC performed these services for the National Oceanic and Atmospheric Administration in November, 2017.

Vapor intrusion became a concern at the WSO Composite Building when a 500-gallon UST used for diesel fuel was removed from the south side of the building in 2000. Free product was observed flowing into the excavation and approximately 35 cubic yards of contaminated soil were removed and treated off-site, but the extent of contamination was not delineated at the time. A site characterization investigation was completed by Bethel Environmental Solutions in 2012 (Bethel, 2016), but ADEC did not accept the air sampling results due to quality control issues.

The purpose of this project was to evaluate the vapor intrusion pathway at the Composite Building to fill the data gap in the previous site characterization report. Evaluation of the vapor intrusion pathway was accomplished by collecting air samples at the same locations as the 2012 investigation and comparing results to the current ADEC Vapor Intrusion Guidance that was updated in November 2017. A total of seven samples were collected: one outdoor ambient air sample, three crawlspace air samples, two indoor air samples, and one duplicate. Sample locations are depicted on Figure 2. Samples were analyzed for volatile compounds associated with petroleum contamination by Methods TO-15 and TO-13A.

All air sample result concentrations were less than current ADEC residential indoor air target levels.

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1.0 INTRODUCTION

The purpose of this report is to document the work performed and analytical results associated with the vapor sampling conducted in November 2017 for the St. Paul Weather Service Office (WSO) Composite building.

1.1 Site Location and Description

The National Weather Service (NWS) Station site is approximately 3 miles northeast of the City of St. Paul and approximately one half-mile northwest of the island's coastline at 57° 9'22.31"N, 170°13'5.23"W (Figure 1). The area of concern is approximately 5 acres and is centered in the vicinity of the NWS Station's Composite Building. The buildings at the site include the Composite Building (comprised of the NWS office, NWS transient quarters, attached garage, and recreation room), Old Quarters buildings, new and old inflation buildings, a hydrogen generator building, a warehouse, and an engine generator building.

1.2 Site History

In 1999, Tetra Tech decommissioned a 10,000-gallon diesel fuel above ground storage tank and three 3,000-gallon diesel fuel underground storage tanks (USTs) that were located approximately 75 feet southwest of the Composite Building and advanced soil borings to delineate an area contaminated from releases from those tanks (Tetra Tech, 2000). In 2000, Bering Sea Ecotech (BSE) removed a 500-gallon UST from the south side of the Composite building and observed free product flowing into the excavation. Approximately 35 cubic yards of contaminated soil were removed and treated off-site, but the extent of contamination was not delineated at the time (BSE, 2001). In 2004, monitoring well MWNWS-2 was installed by the National Oceanic and Atmospheric Administration (NOAA) approximately 150 feet north of the NWS Composite Building. This well was intended to be used as a clean sentinel well; however, 6 inches of free product was measured in the well after installation (Tetra Tech, 2004).

Contamination at the site was fully characterized in 2012 (Bethel, 2016). DRO contamination greater than ADEC Method 2 cleanup levels was found in the soil. DRO and RRO contamination greater than ADEC Table C cleanup levels were discovered in the groundwater. Indoor air, outdoor air, and crawlspace samples were collected from the Composite Building in July and November of 2012. Naphthalene and chloroform were detected at greater concentrations than target levels in one crawlspace sample in July. However, the air results were considered unusable due to data quality issues.

1.3 Regulatory Setting

Air sample results are compared to current ADEC residential indoor air target levels, given in Table 1.

1.4 Conceptual Site Model

The site-specific conceptual site model (CSM) for the St. Paul NWS Station site was developed in accordance with ADEC's Policy Guidance on Developing Conceptual Site Models (ADEC,

2017a). It was adapted from the CSM by Bethel Environmental Solutions in the Site Characterization Report (Bethel, 2016), and is summarized in this section.

Surface and subsurface soil was directly impacted by the UST leaks. The contamination migrated to groundwater and could potentially volatilize to indoor or outdoor air.

The direct contact exposure pathways of incidental soil ingestion and dermal adsorption are considered complete. Contaminants of potential concern (COPCs) present at the site are those associated with petroleum contamination, as listed in 18 AAC 75.341, Table B1 with footnote 7. COPCs are present in the soil within the top 15 feet below ground surface.

The ingestion and dermal adsorption of groundwater exposure pathways are considered complete because free product has been observed in monitoring wells at the site.

The inhalation of outdoor air pathway is considered complete because volatile organic compounds (VOCs) are present in soil above 15 feet below ground surface. The inhalation of indoor air exposure pathway is considered complete because petroleum contamination is present in soil within 30 feet of the Composite Building.

The wild plant ingestion route is considered to be complete because several polynuclear aromatic hydrocarbons (PAHs) are determined to bioaccumulate and are listed in Appendix C of the ADEC CSM Guidance (ADEC 2017a).

Additional pathways are not considered complete. Precipitation runoff and sheet wash are not interpreted to be significant transport routes because the site is relatively flat and vegetated, which limits runoff and sheet wash.. The wild meat ingestion route is interpreted to be incomplete at the St. Paul NWS Site because small soil dwelling animals (worms, voles, etc.) are not consumed by reindeer or fur seals, the only animals normally harvested on St. Paul Island for human consumption. It must be stated, however, that St. Paul Island residents also use birds as a source of food, including freshly laid eggs. This potential exposure route is not considered complete because these birds typically feed on marine fish and, although they may periodically forage on ground-dwelling invertebrates at the site (i.e. worms), they would not make up a significant portion of the birds' diet (Bethel, 2016).

Potential receptors to contamination include:

- Future residents (no one currently resides at the site)
- Current and future commercial or industrial workers
- Current and future site visitors, trespassers, or recreational users
- Current and future construction workers.
- Future farmers or subsistence harvesters
- Future subsistence consumers

2.0 FIELD ACTIVITIES

Fieldwork was conducted on behalf of NOAA at the St. Paul WSO Composite Building located within the NWS station on St. Paul Island in November 2017. Field activities consisted of collecting indoor air, crawlspace air, and outdoor air samples in and around the WSO building. All work was conducted in accordance with ADEC's Field Sampling Guidance (ADEC, 2017b) and the approved work plan (Ahtna, 2017a and 2017b). Field notes are included in Appendix A. A photographic log is included as Appendix B.

The field crew, consisting of an Ahtna Engineering Services, LLC (Ahtna) environmental scientist, mobilized to St. Paul Island via Pen Air on November 15, 2017. Field supplies and equipment were mobilized from Anchorage via Ace Air Cargo prior to arrival on the island. All equipment was mobilized to the worksite and stored onsite at the WSO Building. Ahtna's environmental scientist returned to Anchorage, Alaska after the completion of field activities on November 17, 2017.

2.1 Building Survey

A building survey was completed to document the structural conditions and chemicals that were present within the WSO Building. The survey was comprised of a visual inspection of the foundation and walls for potential pathways for vapor, a photographic log of the chemicals present within the building, screening the building with a photoionization detector (PID) capable of parts per billion (ppb) precision, and interviews with personnel familiar with the building to ascertain any historical information that may indicate vapor intrusion. The ADEC Building Inventory and Indoor Air Sampling Questionnaire is included in Appendix A.

The WSO is a multi-use commercial and residential building with varying numbers of workers and families living and working in the building.

A Cirrus™ wind indicator was used to create tracer smoke to determine air flow within the building. Air flowed up from the first floor to the second floor during the survey. No air flow was indicated between the first floor and the crawlspace. Air flow in the crawlspace was observed to be affected by strong gusts of wind. The wind likely pushed air through cracks in the foundation; the cracks also currently have grass growing into the crawlspace (Photo #11, Appendix B). Outdoor air flowed into the building on the upwind (west) side and out of the building on the downwind side through gaps around doors and windows. No movement of air was shown through air ducts, which are no longer in use. The building is heated by baseboard heaters.

The building occupant interviewed for the building survey reported to have noticed a fuel oil smell in the pool room. This is likely due to the proximity of this room to the garage and furnace room. This area was not sampled in order to avoid bias from fuel vapors associated with vehicles or the furnace. All chemicals inside the building were removed from the building by NOAA personnel greater than 24 hours before sampling was commenced.

A PID capable of reading ppb was used to screen indoor air in the entire building, including sample locations. All readings were zero ppb except inside the empty hazmat locker inside the garage, which read 167 ppb.

No cuts or tears were observed in the crawlspace vapor barrier.

2.2 Differential Pressure Measurements

Differential pressure (DP) measurements were conducted between the indoor and outdoor air to determine if the heating and ventilation system is creating a positive pressure in the building. The field scientist connected tubing to one of the hose barbs on a Dwyer® Series 475 Mark III digital manometer and placed the open end of the tubing outdoors, so that one end of the manometer was open to the indoors and the other end was open to the outdoors. At the time of the measurements, the wind was blowing 20-30 miles per hour from the west. On the upwind side, a positive pressure outside of 0.03 to 0.05 inches of water was recorded. At the cross-wind sides of the building (north and south), DP was variable from 0.02 to -0.06 inches of water. DP was not measured on the downwind side because the window was unable to be opened, but the wind indicator showed outward air flow at the windows, indicating a negative pressure outside.

2.3 Air Sampling

Air samples were collected at two indoor locations, three crawlspace locations, and one outdoor location. Samples were collected at each location for volatile compounds associated with petroleum sites by TO-15 and TO-13A analyses. Sample locations were the same as those collected during the 2012 site characterization, and are depicted on Figure 2. Air sampling forms are included in Appendix A.

TO-15 samples were collected using 6-liter SUMMA canisters with 8-hour flow controllers. Ahtna began air sampling by first measuring and recording the vacuum in the laboratory-provided canisters. The canister flow controller connections were checked for leaks by placing the flow controller on each canister and placing a cap on the flow controller. The sample valve was opened and shut, so that the flow controller gauge read vacuum. The field scientist ensured the vacuum remained constant for one minute. Ahtna then deployed the air samplers by uncapping the flow controller and opening the sample valve. The air intakes for the indoor air samples were elevated between three and five feet above the ground to capture the breathing zone. Crawlspace and outdoor air sampling locations were placed on the ground. The sample valve was shut when the gauge indicated the vacuum in the canister was between three and five inches of mercury. The time, date, initial vacuum, final vacuum, and canister ID were recorded.

Samples to be analyzed for PAHs by TO-13A were collected using XAD sorbent tubes. Tubing was connected to the sorbent tube with a high volume air sampling pump connected to the other end, followed by a calibrator to allow for more precise flow measurements. The field scientist turned on the pump at a rate of approximately 5 L/min for a minimum of 22 minutes to equal a total of at least 110 liters of air pumped through the sampler. Leak tests were completed at each sample location and no leaks were detected, indicating that ambient air was not pulled into the sample. Flow rates were recorded on sample forms to two decimal places and sample times recorded to the minute. These were used to calculate final volume of air sampled to one hundredth of a liter and included on the chain of custody.

2.4 Deviations from the Work Plan

Sample 17-VS2 could not be placed at the location specified in the work plan. Walls in the crawlspace prohibited entry to the east side of the building. The sampler was placed on the west side of the crawlspace wall next to an opening in the wall that allowed free flow of air from the section to be sampled.

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3.0 RESULTS

It was not definitive if the building was under-pressurized or over-pressurized when measuring differential pressures, due to the high wind speeds. The building was measured at a negative pressure on the upwind (west) side and a positive pressure on the downwind (east) side compared to outside pressure.

All analytical results were less than ADEC residential indoor air target levels. Analytical results are summarized in Table 1. Complete laboratory reports are included in Appendix C. A data quality assessment report and ADEC checklists are included in Appendix D.

Samples 17-VS6 and 17-VS7 were indoor air samples collected from the first floor of the WSO Composite building. 1,2,4-trimethylbenzene was detected at 4.7 and 2.5 micrograms per cubic meter ($\mu g/m^3$), less than the target level of 7.3 $\mu g/m^3$. Benzene was detected in both samples at 3.5 and 3.0 $\mu g/m^3$, less than the residential target level of 3.6 $\mu g/m^3$. Chloroform (target level of 1.2 $\mu g/m^3$) was detected at 0.23 and 0.12 $\mu g/m^3$. Ethylbenzene (target level of 11 $\mu g/m^3$) was detected at 3.9 and 2.9 $\mu g/m^3$. Total xylenes (target level of 100 $\mu g/m^3$) were detected at 20.5 and 15.9 $\mu g/m^3$. All other results were either not detected, or were detected at concentrations less than $1/10^{th}$ the target level.

Samples 17-VS2, primary and duplicate samples 17-VS3 and 17-VS4, and 17-VS5 were crawlspace air samples. Benzene (target level of 3.6 $\mu g/m^3$) was detected in all four samples at 0.62 to 1.7 $\mu g/m^3$, highest in the south, near the UST source area. Chloroform (target level of 1.2 $\mu g/m^3$) was detected in all four samples at 0.099 to 0.24 $\mu g/m^3$. Ethylbenzene (target level of 11 $\mu g/m^3$) was detected greater than $1/10^{th}$ the target level in 17-VS4 at 1.3 $\mu g/m^3$. All other crawlspace air detections were less than $1/10^{th}$ of the indoor air residential target level.

Sample 17-VS1 was an outdoor air sample. Compounds detected in outdoor air were similar to those detected in the indoor and crawlspace samples. The highest concentrations were from common fuel-related compounds: benzene at 0.53 $\mu g/m^3$, toluene at 2.3 $\mu g/m^3$, ethylbenzene at 0.38 $\mu g/m^3$, and xylenes at 2.03 $\mu g/m^3$. Also, hexane was detected at 2.0 $\mu g/m^3$.

No PAHs were detected in any samples by TO-13A. Reporting limits for benzo(a)anthracene were greater than the ADEC residential target level of 0.092 $\mu g/m^3$, but were less than the commercial target level of 1.1 $\mu g/m^3$.

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4.0 CONCLUSIONS

Indoor air sampling and crawlspace air sampling were completed in the WSO building in November 2017. Samples were analyzed for volatile compounds associated with petroleum-contaminated sites (ADEC, 2017d). All results were less than ADEC target levels for residential indoor air.

In general, detections were greater in indoor air samples than crawlspace samples. This suggests that there could be indoor sources causing the higher levels. The field scientist verified that all chemicals were removed from the building prior to sampling; however, vehicles in the attached garage, the boiler room, and any locations in the garage or boiler room where fuel could have spilled in the past could contribute to background concentrations. The indoor air benzene results of 3.0 and 3.5 $\mu g/m^3$ are within the 50^{th} percentile range of average indoor air background levels of less than the reporting limit to 4.7 $\mu g/m^3$ as documented in an EPA report summarizing 2,615 sample results from 14 studies (EPA, 2011; ADEC, 2017d). Also, Alaskan homes with attached garages have been shown to have significantly higher benzene levels compared to homes without garages (Schlapia and Morris, 1998).

No PAHs were detected by TO-13A; Benzo(a)anthracene was not detected in any air sample, but reporting limits were greater than the ADEC residential target level of 0.092 $\mu g/m^3$. It is unlikely that benzo(a)anthracene is a risk driver at this site because this compound was not detected in any soil or groundwater samples during the site characterization (Bethel, 2016).

Outdoor air background concentrations also likely contribute to indoor air concentrations. Fumes from fuel storage tanks, passing or idling vehicles, and equipment can enter the building through open doors or windows or cracks around their seals. Outdoor air concentrations can be subtracted from the indoor air concentrations to obtain a result representative of concentrations from indoor and subsurface vapor intrusion sources. For example, the outdoor air benzene result of 0.53 $\mu g/m^3$, subtracted from the indoor air samples, results in indoor air concentrations of 2.47 and 2.97 $\mu g/m^3$.

Ahtna reviewed the results for all indoor air sampling results to date (July 2012, November 2012, and November 2017) for VOC results above or near the residential indoor air target levels. Naphthalene and chloroform exceeded target levels in July 2012 and benzene was detected just slightly below ADEC residential target levels in 2017. Ahtna reviewed the concentrations of these compounds in groundwater and soil results from the 2012 Site Characterization from locations adjacent to the Composite Building. These data were used to determine the contribution of subsurface VOCs to indoor air and crawlspace air concentrations. No soil gas data are available for this site.

Monitoring well MWNWS-14 is in the source area from the former UST on the south side of the Composite Building and likely provides the best representation of groundwater beneath the building. Depth to groundwater was approximately 20 feet below ground surface during sampling in 2012, and assumed to be representative of concentrations at the top of the groundwater table. In 2012, the benzene concentration was estimated at 0.18 micrograms per liter (µg/L), less than the ADEC residential groundwater VI target of 16 µg/L. The naphthalene concentration was 87.8 µg/L, above the residential target level of 46 µg/L and below the commercial target level of 200 µg/L. These targets are based on a groundwater temperature of 25 degrees Celsius. Using the EPA

Vapor Intrusion Screening Level Calculator to calculate a naphthalene indoor air concentration based on a Henry's Constant at 6.37 degrees Celsius (see Appendix E), the resultant naphthalene indoor air concentration is calculated to be 0.368 ug/m^3, less than the ADEC residential indoor air target of 0.83 ug/m^3. Chloroform was not detected in groundwater. These data suggest that groundwater is likely not a benzene, naphthalene, or chloroform source for indoor air or crawlspace air concentrations.

Although soil sample results should not be used as a predictor of vapor intrusion potential, they can provide qualitative information on the site. Soil boring B21 located at the former UST source area was sampled in 2012 at three, 15, and 22 feet below ground surface (bgs). The sample from three feet bgs had gasoline range organics (GRO), diesel range organics (DRO), and residual range organics (RRO) concentrations of non-detect, 213, and 91.9 milligrams per kilogram (mg/kg), respectively. There were no detections of individual VOCs, although limits of detection (LODs) were as high as 72 micrograms per kilogram. This is a relatively clean sample, so oxygen would likely be above 3% in soil gas, and it would likely not be a large vapor source. Concentrations increase with depth to a maximum of 1,210 mg/kg DRO, 195 mg/kg RRO, and 6.07 mg/kg GRO, representative of saturated smear zone contamination. Benzene was not detected in any of the samples, with LODs less than the cleanup level. There were no exceedances of the naphthalene cleanup level of 20 mg/kg, with a maximum detection of 0.915 mg/kg. Although these soil results do not rule out vapor intrusion, they are not indicative of a large vapor source.

In locations of active aerobic biodegradation, microbes degrade vapor phase petroleum hydrocarbons rather quickly when there is sufficient oxygen. Table 6 in the ADEC VI Guidance shows estimates of required thicknesses of soil with greater than 3% oxygen in soil gas in order for petroleum hydrocarbon vapors to attenuate. There are several variables affecting the required soil thickness estimate such as soil porosity, temperature, and the health of the local aerobic microbial community. The 20 feet depth to groundwater and relatively clean soil to 15 feet bgs suggests that there would be a sufficient thickness of clean soil to attenuate VOC vapors emanating from groundwater; however, we do not know the oxygen content of the soil and therefore cannot make a definitive evaluation of attenuations of VOC.

The chloroform exceedance in a July 2012 sample was not related to UST releases. Vapor phase chloroform is commonly found when chlorine is used as a disinfectant for water systems, where it is formed as a by-product. Chloroform concentrations in drinking water are not singularly regulated, but are summed with other trihalomethane concentrations, which are then regulated as Total Trihalomethanes. Site management decisions typically should not be based on chloroform results in air samples, unless there is documentation of a large chlorine release, such as at a chemical manufacturing plant.

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TABLES

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Table 1: Air Sample Analytical Results

St. Paul WSO Indoor Air and Crawlspace Air Sampling Report

St. Paul Island, Alaska

	Location	Outdoor	Crawlspace East	Crawlspace South		Crawlspace North	Indoor East	Indoor South
Analyte	Indoor Air Residential Target Level	17-VS1	17-VS2	17-VS3	17-VS4	17-VS5	17-VS6	17-VS7
TO-15 - VOCs								
1,2,4-Trimethylbenzene	7.3	**0.47 J**	**0.41 J**	**0.57 J**	**1.3 J**	**0.55 J**	**4.7 J**	**2.5**
1,3,5-Trimethylbenzene	N/A	**0.18 J**	ND (0.79)	ND (0.76)	**0.37 J**	**0.19 J**	**1.2 J**	**0.53 J**
Benzene	3.6	**0.53**	**0.62**	**0.88 J**	**1.7 J**	**0.78**	**3.5 J**	**3.0**
Butylbenzene	N/A	ND (4.2)	ND (4.4)	ND (4.2)	ND (3.8) UJ	ND (4.3)	ND (3.7) UJ	ND (4.6)
Chloroform	1.2	**0.095 J**	**0.099 J**	**0.12 J**	**0.24 J**	**0.12 J**	**0.23 J**	**0.12 J**
Cumene	420	ND (0.75)	ND (0.79)	ND (0.76)	ND (0.68) UJ	ND (0.78)	**0.38 J**	ND (0.82)
Cyclohexane	6300	**0.21 J**	**0.17 J**	**0.38 J**	**0.54 J**	**0.22 J**	**2.1 J**	**1.2**
Ethylbenzene	11	**0.38**	**0.77**	**0.90**	**1.3 J**	**0.65**	**3.9 J**	**2.9**
Hexane	730	**2.0 J**	**0.66**	**1.3 J**	**2.6 J**	**0.92**	**4.3 J**	**3.7**
m,p-Xylene	N/A	**1.5**	**1.9**	**2.4 J**	**4.0 J**	**2.0**	**15 J**	**12**
Naphthalene	0.83	ND (0.40) UB	ND (0.42) UB	ND (0.41) UB	ND (0.36) UB	ND (0.41) UB	ND (0.41) UB	ND (0.44) UB
o-Xylene	N/A	**0.53**	**0.66**	**0.85 J**	**1.5 J**	**0.71**	**5.5 J**	**3.9**
Propylbenzene	1000	**0.13 J**	**0.14 J**	**0.17 J**	**0.24 J**	**0.11 J**	**0.87 J**	**0.42 J**
sec-Butylbenzene	N/A	ND (4.2)	ND (4.4)	ND (4.2)	ND (3.8) UJ	ND (4.3)	ND (3.7)	ND (4.6)
Styrene	1000	ND (0.65)	ND (0.68)	ND (0.66)	**0.24 J**	ND (0.67)	**0.89 J**	**0.62 J**
tert-Butylbenzene	N/A	ND (4.2)	ND (4.4)	ND (4.2)	ND (3.8) UJ	ND (4.3)	ND (3.7)	ND (4.6)
Toluene	5200	**2.3**	**4.6**	**5.8 J**	**9.8 J**	**4.9**	**31 J**	**20**
Xylenes, total	100	**2.03**	**2.56**	**3.25 J**	**5.5 J**	**2.71**	**20.5 J**	**15.9**
TO-13A - PAHs								
Acenaphthene	N/A	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.80)
Acenaphthylene	N/A	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.80)
Anthracene	N/A	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.80)
Benzo(a)anthracene	0.092	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.80)
Fluorene	N/A	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.80)
Naphthalene	0.83	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.80)
Phenanthrene	N/A	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.80)
Pyrene	N/A	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.79)	ND (0.80)

Notes:

All results in micrograms per cubic meter ($\mu g/m^3$)

Light blue shading refers to a reporting limit that is greater than the target level

J = Estimated concentration; analyte was detected between the DL and the limit of quantitation (LOQ), or was affected by QC failures.

N/A = Not applicable, no cleanup level

ND = Not detected at the listed reporting limit

WSO = Weather Service Office

UB = Result considered not detected due to contamination identified at a similar concentration in a corresponding blank sample.

UJ = The analyte was not detected; however, the reporting limit is estimated because of QC failures or sample handling anomalies.

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FIGURES

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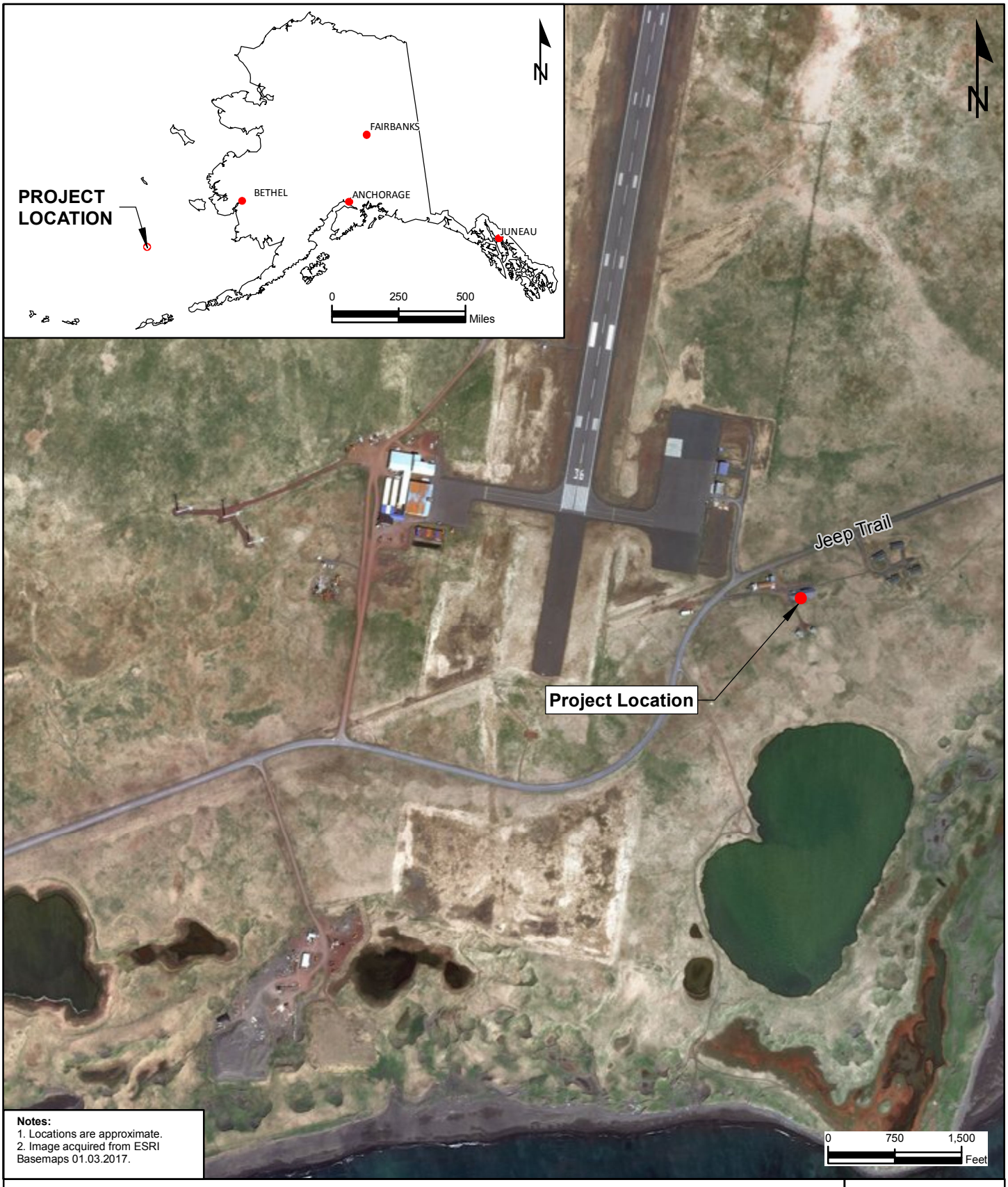


Notes:
1. Locations are approximate.
2. Image acquired from ESRI Basemaps 01.03.2017.

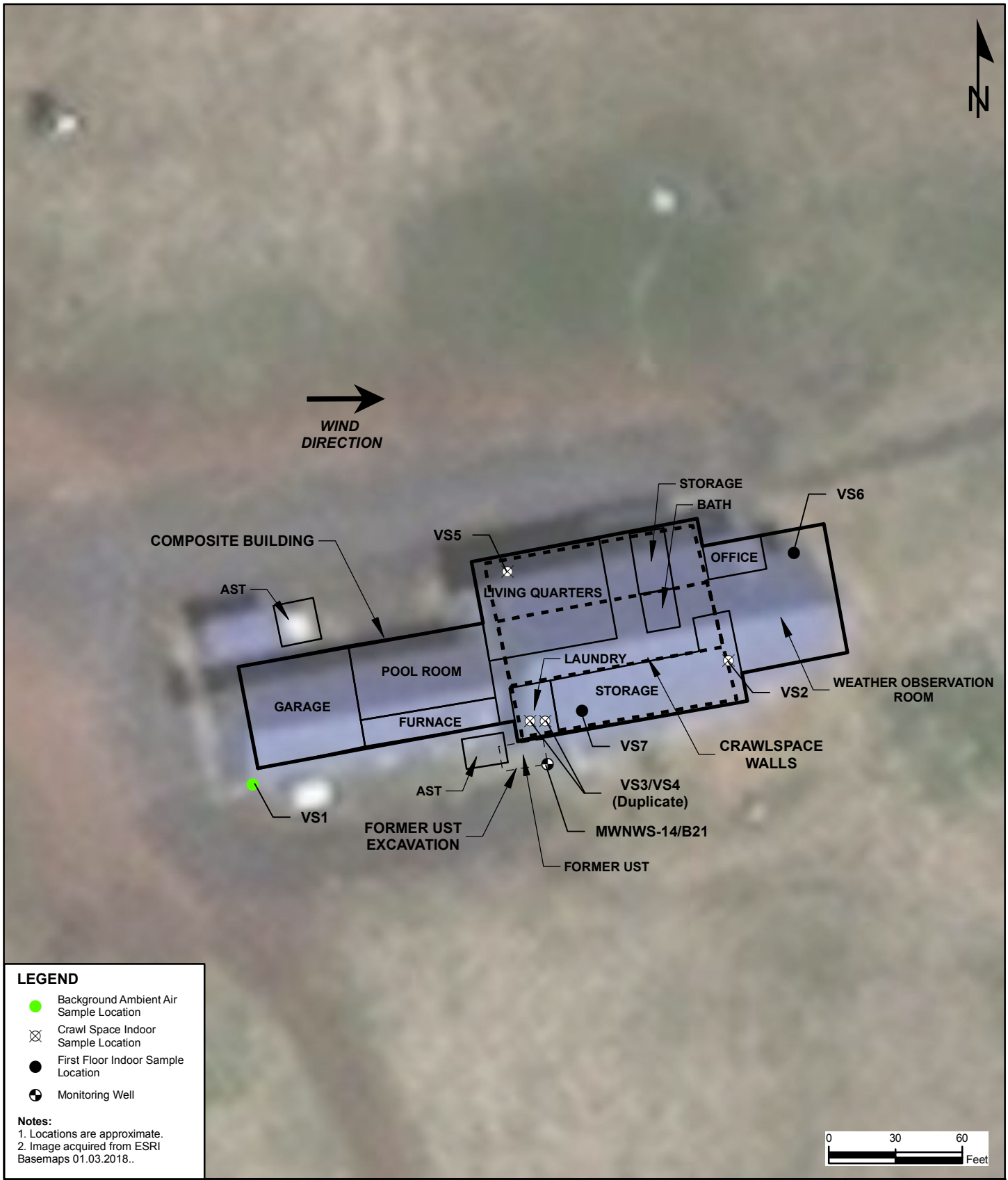
St. Paul Weather Service Station
St. Paul Island, Alaska

Ahtna Engineering Services, LLC

State & Site Vicinity Maps

Project Number: 20293.009	Figure Number: 1
Date: 1/3/2018	
Drafted By: R.F.	

Prepared by rfrye, 1/3/2018, C:\Users\rfrye\Desktop\GIS\Projects\GIS\MXD\Report\F1_State&Site Vicinity.mxd



LEGEND

- Background Ambient Air Sample Location
- Crawl Space Indoor Sample Location
- First Floor Indoor Sample Location
- Monitoring Well

Notes:
1. Locations are approximate.
2. Image acquired from ESRI Basemaps 01.03.2018..

St. Paul Weather Service Station
St. Paul Island, Alaska

Ahtna Engineering Services, LLC

Weather Service Office Composite Building Site Plan

Project Number:	Figure Number:
20293.009	2
Date: 3/26/2018	
Drafted By: R.F.	

Prepared by rfrye, 3/26/2018; C:\Users\rfrye\Desktop\GIS\Pribilofs\GIS\MXD\Report\F2StPaulWSOCompositeBuilding.mxd

APPENDIX A

FIELD NOTES AND FORMS

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28 A Gelich
11/15/17 NOAA St Paul Cloudy, wind to 20 mph ~45°F

1600 Land in St Paul. Get bags and truck from Eduard. Go to housing in town. Fabius will be available to get ACE cargo tommorrow morning.

1800 Review WP for sampling. EOD

AG

A Gelich
11/16/17 NOAA St Paul Cloudy, wind to 30 mph ~45°F 29

0830 Contact Fabius, cargo will be available at 1000

0845 Go to NWS office to conduct building walkthrough and interview staff.

0915 conduct interview with Ashley Hamer and Fill out ADEC Building Inventory and Indoor Air Sampling Questionnaire

0945 walk through building, identify vapor sampling locations

1015 Pick up cargo from ACE

1045 Get key to NMFS lab building

1115 Back at NWS office to start TO-13 samples. Will sample each location for 25 min at ~5 L/min

Conduct PID screening of building
- Every location in building and crawl space is 0ppb except inside haz mat cabinet (empty) which is 167 ppb.

Conduct manometer readings
- upwind (west) side of building positive pressure outside at

Rite in the Rain

A Geilich wind to 30 mph
11/16/17 NOAA St Paul 45°F

0.03 to 0.05 in H_2O.
- Cross wind locations (North and south) variable w/ wind gusts 0.02 to -0.06 in H_2O
- Downwind not measured but smoke pen indicates outward flow from bldg at windows

1200 open field blank 17-FB1
1246 begin purge for TO-13 at VS7
1311 stop purge 17-VS7
1316 begin purge for VS3
1341 ~~beg~~ stop purge for VS3 17-VS3
1342 begin purge for VS4 *
1407 stop purge 17-VS4
1420 begin purge for VS2
1445 stop purge 17-VS2
1453 begin purge for VS6
1516 stop purge 17-VS6
1525 begin purge for VS1
While sample collects at VS1, begin to set out 8 hr summa cans for TO-15. Set cans out at 1540-1550. See sampling sheets for details.

A Geilich wind to 20 mph
11/16/17 NOAA St Paul 45°F

1550 stop purge at VS1 17-VS1
1555 purge TO-13 at VS5
1620 stop purge 17-VS5
1640 clean up, coordinate to return at ~2300 to check summa can pressures
1700 Back at housing. Prep for sampling at NOAA lab building
1800 Break for dinner
2000 Arrive at NOAA lab building. Locate previous sample locations and drill through slab
2105 Set outside air sample to purge on upwind side of building for TO-13. These samples will purge for 25 min at 5 L/min as well.
~~2105~~ AC stop purge for 17-STP-0A
2140 purge sub slab sample at SG1
2205 stop purge at 17-STP-SG1
2212 begin purge at SG2
2237 stop purge at 17-STP-SG2
2242 begin purge at SG3
2307 stop purge at 17-STP-SG3
2310 Go back to NWS office

32 A Geilich — wind to 15 mph

11/16/17 - 11/17/17 NOAA St Paul

to check on Summa cans and stop collection. Summa cans closed at 2319 to 2325.

2335 Back to NOAA lab

2348 purge sample at SG4

0013 stop purge at 17-STP-SG4

0030 clean up, EOD.

AG

A Geilich — windy to 15 cloudy, rainy 45° — 33

11/17/17 NOAA St Paul

0900 Arrive at NOAA lab bldg. concrete holes in slab. fill out COC's clean up, pack equipment for shipment

1400 Ship at cargo via ACE

1800 Leave St Paul on Pen Air Flight

AG

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ALASKA DEPARTMENT OF ENVIRONMENAL CONSERVATION
BUILDING INVENTORY AND INDOOR AIR SAMPLING QUESTIONNAIRE

This form should be prepared by a person familiar with indoor air assessments with assistance from a person knowledgeable about the building. Complete this form for each building in which interior samples (e.g., indoor air, crawl space, or subslab soil gas samples) will be collected. Section I of this form should be used to assist in choosing an investigative strategy during workplan development. Section II should be used to assist in identification of complicating factors during a presampling building walkthrough.

Preparer's Name Alex Geilich Date/Time Prepared 11/16/17 1200

Preparer's Affiliation Ahtna Engineering Phone No. 907 646 2969

Purpose of Investigation VI investigation

SECTION I: BUILDING INVENTORY

1. OCCUPANT OR BUILDING PERSONNEL:

Interviewed: (Y) / N

Last Name Hanner First Name Ashley

Address 980 NE Airport Rd, St Paul

County

Phone No.

Number of Occupants/persons at this location varies Age of Occupants children - adults

2. OWNER or LANDLORD: (Check if same as occupant ____)

Interviewed: Y / N

Last Name First Name

Address

County

Phone No.

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

(Residential) School (Commercial/Multi-use)
Industrial Church Other

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other_____

If multiple units, how many?_____

If the property is commercial, type?

Business Types(s) National Weather Service

Does it include residences (i.e., multi-use)? (Y) / N If yes, how many? 2 transient quarters housing

Other characteristics:

Number of floors 2 Building age_____

Is the building insulated? (Y) / N How air tight? Tight / Average / Not Tight

Have occupants noticed chemical odors in the building? (Y) / N

If yes, please describe: fuel oil smell in pool room

4. AIRFLOW

Use air current tubes, tracer smoke, or knowledge about the building to evaluate airflow patterns and qualitatively describe:

Airflow between floors: airflow up from 1st floor to 2nd

Airflow in building near suspected source: none / variable at crawlspace walls due to wind

Outdoor air infiltration: into building on upwind side, variable on crosswind sides, at on downwind side
wind blowing 20-30 mph from the west

Infiltration into air ducts: not measured, ducts taped with no airflow through them. 2nd floor duct open but not in use

5. **BASEMENT AND CONSTRUCTION CHARACTERISTICS** (Circle all that apply)

a. Above grade construction:	(wood frame)	log	concrete	brick
	constructed on pilings with enclosed air space		constructed on pilings with open air space	
b. Basement type:	full	(crawlspace)	slab-on-grade	other_____
c. Basement floor:	concrete	dirt	stone	other liner on dirt
d. Basement floor:	unsealed	sealed	sealed with	partially sealed w/ liner.
e. Foundation walls:	poured	block	stone	other could not determine, covered with drywall
f. Foundation walls:	unsealed	sealed	sealed with	_____
g. The basement is:	wet	damp	(dry)	
h. The basement is:	finished	(unfinished)	partially finished	
i. Sump present?	Y / N	Unknown		
j. Water in sump?	Y / N / not applicable			

Basement/Lowest level depth below grade ~ 2 (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

grass growing into crawlspace from outside

6. **HEATING, VENTING and AIR CONDITIONING** (Circle all that apply)

Type of heating system(s) used in this building: (Circle all that apply – not primary)

(Hot air circulation)	Heat pump	(Hot water baseboard)	vents on 1st floor taped
Space Heaters	Stream radiation	Radiant floor	Ashley says only baseboard used
Electric baseboard	Wood stove	Outdoor wood boiler	Other_____

The primary type of fuel used is:

Natural Gas	(Fuel Oil)	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by fuel oil

Boiler/furnace located in: Basement Outdoors (Main Floor) Other_____

Do any of the heating appliances have cold-air intakes? Y / N

Type of air conditioning or ventilation used in this building:

Central Air	Window units	Open Windows	(None)

Commercial HVAC Heat-recovery system Passive air system

Are there air distribution ducts present? (Y) / N

Describe the ventilation system in the building, its condition where visible, and the tightness of duct joints. Indicate the locations of air supply and exhaust points on the floor plan.

Ventilation system apparently not in use, taped vents on 1st floor vents in furnace room

Is there a radon mitigation system for the building/structure? Y / (N) Date of Installation_____

Is the system active or passive? Active/Passive

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom (Almost Never)

Level	**General Use of Each Floor (e.g. family room, bedroom, laundry, workshop, storage)**
Basement	none, asbestos concerns
1st Floor	Work space
2nd Floor	workout room, apartment
3rd Floor	no 3rd floor

8. WATER AND SEWAGE

Water Supply: Public Water Drilled Well Driven Well Dug Well Other Tank in garage

Sewage Disposal: Public Sewer (Septic Tank) Leach Field Dry Well Other_____

9. FLOOR PLANS See marked up figure

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:

First Floor:

10. OUTDOOR PLOT see marked up Figure

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.

SECTION II: INDOOR AIR SAMPLING QUESTIONNAIRE

This section should be completed during a presampling walkthrough. If indoor air sources of COCs are identified and removed, consider ventilating the building prior to sampling. However, ventilation and heating systems should be operating normally for 24 hours prior to sampling.

a) 1. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

Is there an attached garage? (Y) / N

Does the garage have a separate heating unit? Y / N / NA

Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, ATV, car) (Y) / N / NA

Please specify truck

Has the building ever had a fire? Y / (N) When?_____

Is a kerosene or unvented gas space heater present? Y / (N) Where?_____

Is there a workshop or hobby/craft area? Y / (N) Where & Type_____

Is there smoking in the building? Y / (N) How frequently?_____

Has painting/staining been done in the last 6 months? (Y) / N Where & When? small water damage spot 2nd floor

Is there new carpet, drapes or other textiles? Y / (N) Where & When?_____

Is there a kitchen exhaust fan? (Y) / N If yes, where vented?_____

Is there a bathroom exhaust fan? Y / (N) If yes, where vented?_____

Is there a clothes dryer? (Y) / N If yes, is it vented outside? (Y) / N

Are cleaning products, cosmetic products, or pesticides used that could interfere with indoor air sampling? Y / (N)

If yes, please describe_____

_____

_____

Do any of the building occupants use solvents at work? Y / (N)

(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used?_____

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) (No)

Yes, use dry-cleaning infrequently (monthly or less) Unknown

Yes, work at a dry-cleaning services

2. **PRODUCT INVENTORY FORM** (For use during building walkthrough)

Make & Model of field instrument used RAE ppbRAE 3000

List specific products found in the residence that have the potential to affect indoor air quality:

Location	Product Description	Site (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo ** Y / N
Garage	Hazmat cabinit	1	good	none	167 ppb	Y
Garage	truck	1	good	gasoline	0 ppb	Y

* Describe the condition of the product containers **as Unopened (UO), Used (U),** or **Deteriorated (D)**

** Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

This form modified from:

ITRC (Interstate Technology & Regulatory Council). 2007. *Vapor Intrusion Pathway: A Practical Guideline*. VI-1. Washington, D.C.: Interstate Technology & Regulatory Council, Vapor Intrusion Team. www.itrcweb.org.

Ahtna Engineering Services, LLC	AIR SAMPLING LOG	PROJECT NUMBER:	SAMPLE LOCATION: VS 1

				LOCATION SKETCH/EXTRA FIELD NOTES: [surface condition, ie. Asphalt, grass] N ↑
Project Name	NOAA NWS	Site	Composite	
Client	NOAA	Scientist	A Gelich	
Date	11/16/17	Weather	cloudy 20-30 mph	

Summa Can Sampling

Sampling Start Time	1540	Canister ID	00405
Initial Canister Vacuum	-26	Flow Controller ID	23334
Sampling End Time	~~2324~~ 2324	Analysis Method	TO 15
Final Canister Vacuum	-6.5	Volume of Sample Container	6 L

Sorbent Tube Sampling

Sampling Start Time	1525	Total Volume Sampled	126.5 L
Sampling End Time	1550	Analysis Method	TO 13A
Flow Rate	5.06	Pump Type	Air Con 2
Sample ID		17-VS1	

Ahtna Engineering Services, LLC	AIR SAMPLING LOG	PROJECT NUMBER:	SAMPLE LOCATION: VS2

Project Name: St Paul NWS Site: Composite

Client: NOAA Scientist: A Geilich

Date: 11/16/17 Weather: Cloudy 20-30 mph

LOCATION SKETCH/EXTRA FIELD NOTES: [surface condition, ie. Asphalt, grass] N ↑

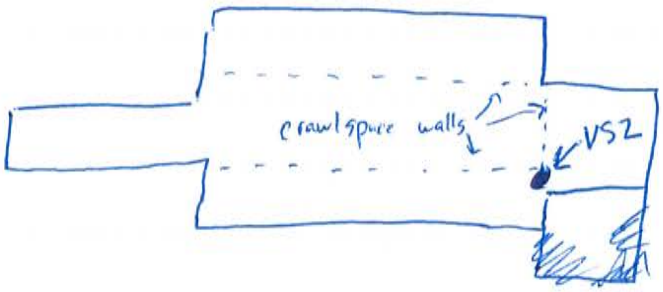
Summa Can Sampling

Sampling Start Time	1546	Canister ID	N2501
Initial Canister Vacuum	-28	Flow Controller ID	21331
Sampling End Time	2323	Analysis Method	TO 15
Final Canister Vacuum	-7	Volume of Sample Container	6 L

Sorbent Tube Sampling

Sampling Start Time	1420	Total Volume Sampled	126.25 L
Sampling End Time	1445	Analysis Method	TO 13 A
Flow Rate	5.05 L/min	Pump Type	Air Con 2
Sample ID		17-VS2	

Note: Sample not able to be collected at location depicted on figure due to crawlspace walls. It was collected near a small opening from one crawl space room to another



Ahtna Engineering Services, LLC

AIR SAMPLING LOG

PROJECT NUMBER:	SAMPLE LOCATION:
	VS 3

Project Name: St Paul NWS Site: Composite

Client: NOAA Scientist: A Gelich

Date: 11/16/17 Weather: Cloudy 20-30 mph

LOCATION SKETCH/EXTRA FIELD NOTES: [surface condition, ie. Asphalt, grass] N ↑

Summa Can Sampling

Sampling Start Time	1545	Canister ID	10 ~~27420~~ N0450
Initial Canister Vacuum	-27	Flow Controller ID	23331
Sampling End Time	2321	Analysis Method	TO 15
Final Canister Vacuum	-5	Volume of Sample Container	6L

Sorbent Tube Sampling

Sampling Start Time	1316	Total Volume Sampled	126 L
Sampling End Time	1341	Analysis Method	TO 13A
Flow Rate	5.04 L/min	Pump Type	Air con 2
Sample ID		17-VS3	

Ahtna Engineering Services, LLC

AIR SAMPLING LOG

PROJECT NUMBER:	SAMPLE LOCATION:
	VS4

Project Name: St Paul NWS | Site: Composite
Client: NOAA | Scientist: A Geilich
Date: 11/16/17 | Weather: cloudy 20-30 mph

LOCATION SKETCH/EXTRA FIELD NOTES: [surface condition, ie. Asphalt, grass] N ⬆

Summa Can Sampling

Sampling Start Time	1545	Canister ID	1623
Initial Canister Vacuum	-27	Flow Controller ID	23823
Sampling End Time	2322	Analysis Method	TO 15
Final Canister Vacuum	-7	Volume of Sample Container	6 L

Sorbent Tube Sampling

Sampling Start Time	1342	Total Volume Sampled	126.75 L
Sampling End Time	1407	Analysis Method	TO 13A
Flow Rate	5.07 L/min	Pump Type	Air Con 2
Sample ID	17-VS4		

Ahtna Engineering Services, LLC

AIR SAMPLING LOG

PROJECT NUMBER:	SAMPLE LOCATION:
	VSS

Project Name: St Paul NWS Site: Composite

Client: NOAA Scientist: A Geilich

Date: 11/16/17 Weather: cloudy 20-30 mph

LOCATION SKETCH/EXTRA FIELD NOTES: [surface condition, ie. Asphalt, grass] N ⇑

Summa Can Sampling

Sampling Start Time	1548	Canister ID	00207
Initial Canister Vacuum	-27.5	Flow Controller ID	21903
Sampling End Time	2325	Analysis Method	TO 15
Final Canister Vacuum	-7	Volume of Sample Container	6 L

Sorbent Tube Sampling

Sampling Start Time	1555	Total Volume Sampled	126.5 L
Sampling End Time	1620	Analysis Method	TO 13A
Flow Rate	5.06	Pump Type	Air Con 2
Sample ID		17-VSS	

Ahtna Engineering Services, LLC

AIR SAMPLING LOG

PROJECT NUMBER:	SAMPLE LOCATION:
	VS6

Project Name: St Paul NWS Site: Compost

Client: NOAA Scientist: A Geilich

Date: 11/16/17 Weather: Cloudy 20-30 mph

LOCATION SKETCH/EXTRA FIELD NOTES: [surface condition, ie. Asphalt, grass] N ↑

Summa Can Sampling

Sampling Start Time	1550	Canister ID	27420
Initial Canister Vacuum	-28.5	Flow Controller ID	22705
Sampling End Time	2319	Analysis Method	TO 15
Final Canister Vacuum	-7	Volume of Sample Container	6 L

Sorbent Tube Sampling

Sampling Start Time	1453	Total Volume Sampled	126 L
Sampling End Time	1518	Analysis Method	TO 13A
Flow Rate	5.04	Pump Type	Air Con 2
Sample ID		17-VS6	

Ahtna Engineering Services, LLC

AIR SAMPLING LOG

PROJECT NUMBER:	SAMPLE LOCATION:
	VS 7

Project Name	St Paul WSO	Site	Composite
Client	NOAA	Scientist	A Geilich
Date	11/16/17	Weather	Partly cloudy windy

LOCATION SKETCH/EXTRA FIELD NOTES: [surface condition, ie. Asphalt, grass]

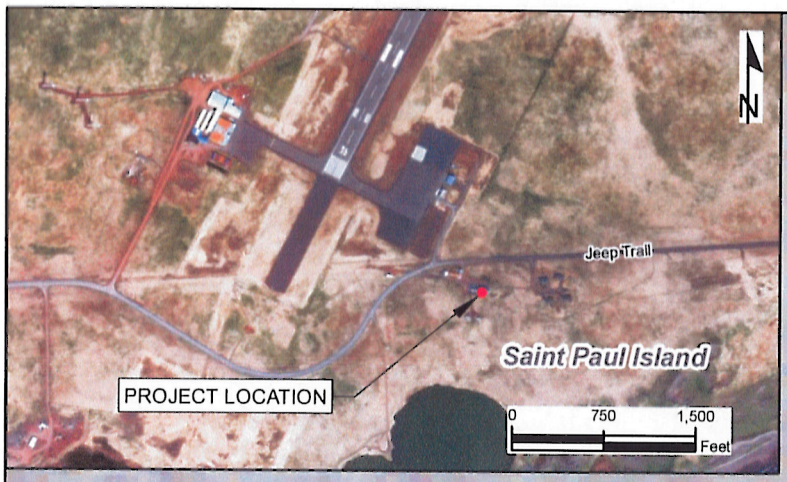
N ↑

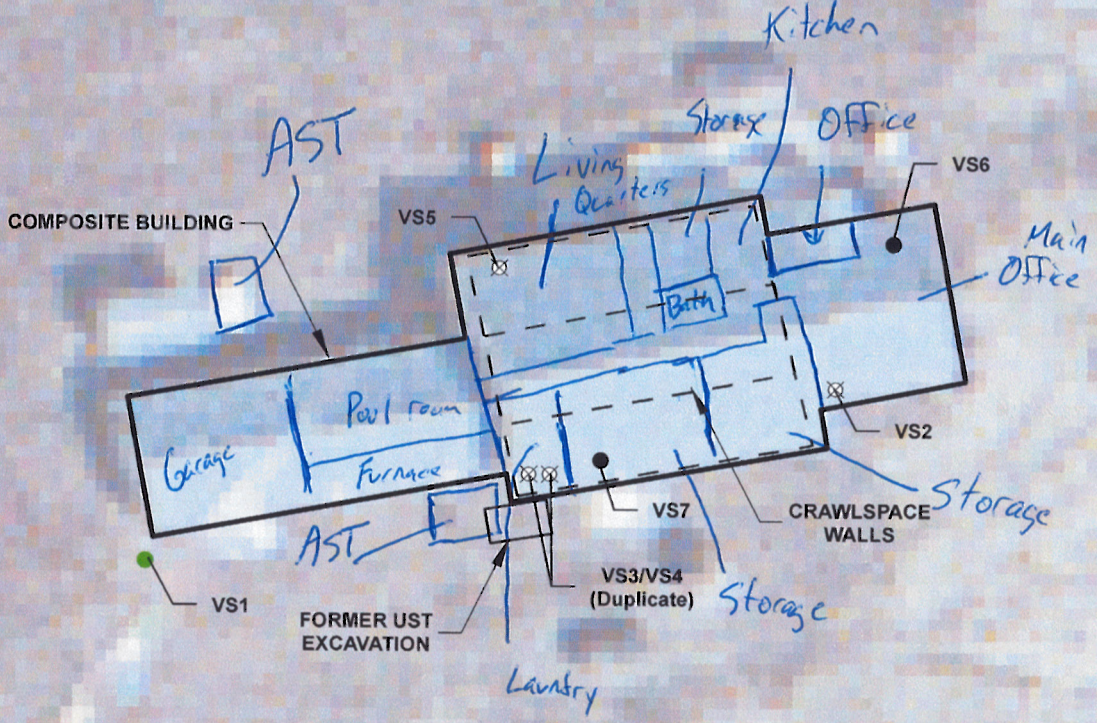
Summa Can Sampling

Sampling Start Time	1543	Canister ID	N 0446
Initial Canister Vacuum	-28.5	Flow Controller ID	23328
Sampling End Time	2320	Analysis Method	TO 15
Final Canister Vacuum	-7.5	Volume of Sample Container	6 L

Sorbent Tube Sampling

Sampling Start Time	1246	Total Volume Sampled	125.5 L
Sampling End Time	1311	Analysis Method	TO 13A
Flow Rate	5.02 L/min	Pump Type	Air Con 2
Sample ID		17 - VS 7	





LEGEND

- Background Ambient Air Sample Location
- Crawl Space Indoor Sample Location
- First Floor Indoor Sample Location

Notes:
1. Locations are approximate.
2. Image acquired from GeoNorth BDL 06.21.2017.

St. Paul Weather Service Station
St. Paul Island, Alaska

Ahtna Engineering Services, LLC

Weather Service Office Composite Building Site Plan

Project Number: 20293.009	Figure Number: 1
Date: 10/9/2017	
Drafted By: R.F.	

Prepared by rfrye, 10/9/2017, L:\Projects\GIS\MXD\F1StPaulWSOCompositeBuilding.mxd

APPENDIX B

PHOTOGRAPHIC LOG

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Photograph 1: West storage room. VS-7 collected in this room.

Photograph 2: East storage room.

Photograph 3: Attached garage.

Photograph 4: Hazardous materials cabinet in garage.

Photograph 5: Inside the empty hazardous materials cabinet.

Photograph 6: Furnace room. Looking east.

Photograph 7: Furnace room. Looking west.

Photograph 8: Pool room. Looking east.

Photograph 9: VS1 outdoor air sample location. Looking east.

Photograph 10: Primary and duplicate samples VS3 and VS4. Looking west.

Photograph 11: Grass growing through foundation wall in crawlspace. Looking east.

Photograph 12: VS2 sample location. Hole through wall to east is visible. Looking northeast.

Photograph 13: Crawlspace vapor barrier. Looking east.

Photograph 14: VS6 sample location. Looking northeast.

Photograph 15: VS5 sample location. Looking west.

APPENDIX C

LABORATORY REPORTS

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eurofins | Air Toxics

12/7/2017
Mr. Joel Brann
AHTNA
110 West 38th Avenue
Suite 200A
Anchorage AK 99503

Project Name: St Paul WSO
Project #: 20293.00
Workorder #: 1711358

Dear Mr. Joel Brann

The following report includes the data for the above referenced project for sample(s) received on 11/21/2017 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-13A 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 to contact 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 #: 1711358

Work Order Summary

CLIENT:	Mr. Joel Brann AHTNA 110 West 38th Avenue Suite 200A Anchorage, AK 99503	**BILL TO:**	Mr. Joel Brann AHTNA 110 West 38th Avenue Suite 200A Anchorage, AK 99503
PHONE:	907-646-2969	**P.O. #**	20293.007.02
FAX:		**PROJECT #**	20293.00 St Paul WSO
DATE RECEIVED:	11/21/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	12/07/2017		

FRACTION #	NAME	TEST
01A	17-VS1	Modified TO-13A
02A	17-VS2	Modified TO-13A
03A	17-VS3	Modified TO-13A
04A	17-VS4	Modified TO-13A
05A	17-VS5	Modified TO-13A
06A	17-VS6	Modified TO-13A
07A	17-VS7	Modified TO-13A
08A	17-FB1	Modified TO-13A
09A	Lab Blank	Modified TO-13A
10A	CCV	Modified TO-13A
10B	CCV	Modified TO-13A
11A	LCS	Modified TO-13A
11AA	LCSD	Modified TO-13A

CERTIFIED BY:  DATE: 12/07/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified TO-13A (SIM)
AHTNA
Workorder# 1711358

Eight XAD Tube samples were received on November 21, 2017. The laboratory performed the analysis for polycyclic aromatic hydrocarbons in air by modified EPA Method TO-13A. The XAD samples were extracted using Pressurized Fluid Extraction (PFE) by EPA Method 3545A. The sample extract was then concentrated to 1.0 mL and analyzed by GC/MS in the SIM mode. See the data sheets for the reporting limits for each compound.

Method modifications taken to run these samples include:

Requirement	***TO-13A***	***ATL Modifications***
Extraction Solvent	10% ether in hexane for PUF; DCM for XAD sorbent. Final extract in hexane.	DCM for PUF/XAD cartridge and XAD sorbent. Final extract in DCM.
Extraction technique	Soxhlet extraction	Soxhlet extraction or accelerated solvent extractor.
MS Detection Mode	Full Scan	SIM
Solvent Process Blank	Required each analytical batch.	Not performed; each solvent lot is certified prior to use.
Method Blank	<MDL	<Reporting Limit
Quantitation	Use RRF of CCV RRT +/-0.01 unit of the ICAL or CCV.	Use average RRF of the ICAL Absolute RT +/-0.06 min of CCV.
Surrogate Recoveries	60-120%	50-150% for Field Surrogates Fluoranthene-d10 and Benzo(a)pyrene-d12
Extract cleanup	Elute extract through silica gel prior to analysis.	No clean up used, experience shows that step does not improve method performance for typical air samples.
Glassware Cleaning	Muffle furnace is utilized.	Solvent cleaning procedure is used.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The sample cartridges were pre-spiked with Fluoranthene-d10 and Benzo(a)Pyrene-d12 on 11/03/2017.

Sampling volumes were supplied by the client. A sample volume of 127 L was used for Lab Blank and field blank sample 17-FB1.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is

defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Due to laboratory error, the field surrogates Benzo(a)pyrene-d12 and Fluoranthene-d10 were inadvertently spiked at 50ug, which exceeded the instrument's calibration range. The surrogates were flagged accordingly in all samples.

The Relative Response Factor (RRF) for Indeno (1,2,3-cd)pyrene in the Initial calibration (ICAL) was below the EPA method TO-13A minimum requirement of 0.5 at 0.43.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
E - Exceeds instrument calibration range.
Q - Exceeds quality control limits.
S - Saturated peak.
J - Estimated value.
B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
U - Compound analyzed for but not detected above the reporting limit.
N - The identification is based on presumptive evidence.

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
MODIFIED EPA METHOD TO-13A GC/MS SIM

Client Sample ID: 17-VS1

Lab ID#: 1711358-01A
No Detections Were Found.

Client Sample ID: 17-VS2

Lab ID#: 1711358-02A
No Detections Were Found.

Client Sample ID: 17-VS3

Lab ID#: 1711358-03A
No Detections Were Found.

Client Sample ID: 17-VS4

Lab ID#: 1711358-04A
No Detections Were Found.

Client Sample ID: 17-VS5

Lab ID#: 1711358-05A
No Detections Were Found.

Client Sample ID: 17-VS6

Lab ID#: 1711358-06A
No Detections Were Found.

Client Sample ID: 17-VS7

Lab ID#: 1711358-07A
No Detections Were Found.

Client Sample ID: 17-FB1

Lab ID#: 1711358-08A
No Detections Were Found.

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Client Sample ID: 17-VS1

Lab ID#: 1711358-01A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120623**	**Date of Collection: 11/16/17 3:50:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 05:01 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.79	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.79	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.79	Not Detected	Not Detected
Acenaphthylene	0.10	0.79	Not Detected	Not Detected
Acenaphthene	0.10	0.79	Not Detected	Not Detected
Fluorene	0.10	0.79	Not Detected	Not Detected
Phenanthrene	0.10	0.79	Not Detected	Not Detected
Anthracene	0.10	0.79	Not Detected	Not Detected
Fluoranthene	0.10	0.79	Not Detected	Not Detected
Pyrene	0.10	0.79	Not Detected	Not Detected
Chrysene	0.10	0.79	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.79	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.79	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.79	Not Detected	Not Detected

Air Sample Volume(L): 126

E = Exceeds instrument calibration range.

Container Type: XAD Tube

Surrogates	%Recovery	Method Limits
Fluorene-d10	74	60-120
Pyrene-d10	83	60-120
Benzo(a)pyrene-d12	77 E	50-150
Fluoranthene-d10	79 E	50-150

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Client Sample ID: 17-VS2

Lab ID#: 1711358-02A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120625**	**Date of Collection: 11/16/17 2:45:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 06:01 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.79	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.79	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.79	Not Detected	Not Detected
Acenaphthylene	0.10	0.79	Not Detected	Not Detected
Acenaphthene	0.10	0.79	Not Detected	Not Detected
Fluorene	0.10	0.79	Not Detected	Not Detected
Phenanthrene	0.10	0.79	Not Detected	Not Detected
Anthracene	0.10	0.79	Not Detected	Not Detected
Fluoranthene	0.10	0.79	Not Detected	Not Detected
Pyrene	0.10	0.79	Not Detected	Not Detected
Chrysene	0.10	0.79	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.79	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.79	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.79	Not Detected	Not Detected

Air Sample Volume(L): 126

E = Exceeds instrument calibration range.

Container Type: XAD Tube

Surrogates	%Recovery	Method Limits
Fluorene-d10	73	60-120
Pyrene-d10	91	60-120
Benzo(a)pyrene-d12	81 E	50-150
Fluoranthene-d10	80 E	50-150

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Client Sample ID: 17-VS3

Lab ID#: 1711358-03A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120626**	**Date of Collection: 11/16/17 1:41:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 06:31 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.79	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.79	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.79	Not Detected	Not Detected
Acenaphthylene	0.10	0.79	Not Detected	Not Detected
Acenaphthene	0.10	0.79	Not Detected	Not Detected
Fluorene	0.10	0.79	Not Detected	Not Detected
Phenanthrene	0.10	0.79	Not Detected	Not Detected
Anthracene	0.10	0.79	Not Detected	Not Detected
Fluoranthene	0.10	0.79	Not Detected	Not Detected
Pyrene	0.10	0.79	Not Detected	Not Detected
Chrysene	0.10	0.79	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.79	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.79	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.79	Not Detected	Not Detected

Air Sample Volume(L): 126

E = Exceeds instrument calibration range.

Container Type: XAD Tube

Surrogates	%Recovery	Method Limits
Fluorene-d10	67	60-120
Pyrene-d10	84	60-120
Benzo(a)pyrene-d12	74 E	50-150
Fluoranthene-d10	72 E	50-150

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Client Sample ID: 17-VS4

Lab ID#: 1711358-04A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120627**	**Date of Collection: 11/16/17 2:07:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 07:01 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.79	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.79	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.79	Not Detected	Not Detected
Acenaphthylene	0.10	0.79	Not Detected	Not Detected
Acenaphthene	0.10	0.79	Not Detected	Not Detected
Fluorene	0.10	0.79	Not Detected	Not Detected
Phenanthrene	0.10	0.79	Not Detected	Not Detected
Anthracene	0.10	0.79	Not Detected	Not Detected
Fluoranthene	0.10	0.79	Not Detected	Not Detected
Pyrene	0.10	0.79	Not Detected	Not Detected
Chrysene	0.10	0.79	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.79	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.79	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.79	Not Detected	Not Detected

Air Sample Volume(L): 127

E = Exceeds instrument calibration range.

Container Type: XAD Tube

Surrogates	%Recovery	Method Limits
Fluorene-d10	68	60-120
Pyrene-d10	86	60-120
Benzo(a)pyrene-d12	74 E	50-150
Fluoranthene-d10	72 E	50-150

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Client Sample ID: 17-VS5

Lab ID#: 1711358-05A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120628**	**Date of Collection: 11/16/17 4:20:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 07:31 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.79	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.79	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.79	Not Detected	Not Detected
Acenaphthylene	0.10	0.79	Not Detected	Not Detected
Acenaphthene	0.10	0.79	Not Detected	Not Detected
Fluorene	0.10	0.79	Not Detected	Not Detected
Phenanthrene	0.10	0.79	Not Detected	Not Detected
Anthracene	0.10	0.79	Not Detected	Not Detected
Fluoranthene	0.10	0.79	Not Detected	Not Detected
Pyrene	0.10	0.79	Not Detected	Not Detected
Chrysene	0.10	0.79	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.79	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.79	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.79	Not Detected	Not Detected

Air Sample Volume(L): 126

E = Exceeds instrument calibration range.

Container Type: XAD Tube

Surrogates	%Recovery	Method Limits
Fluorene-d10	71	60-120
Pyrene-d10	82	60-120
Benzo(a)pyrene-d12	75 E	50-150
Fluoranthene-d10	75 E	50-150

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Client Sample ID: 17-VS6

Lab ID#: 1711358-06A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120629**	**Date of Collection: 11/16/17 3:18:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 08:01 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.79	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.79	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.79	Not Detected	Not Detected
Acenaphthylene	0.10	0.79	Not Detected	Not Detected
Acenaphthene	0.10	0.79	Not Detected	Not Detected
Fluorene	0.10	0.79	Not Detected	Not Detected
Phenanthrene	0.10	0.79	Not Detected	Not Detected
Anthracene	0.10	0.79	Not Detected	Not Detected
Fluoranthene	0.10	0.79	Not Detected	Not Detected
Pyrene	0.10	0.79	Not Detected	Not Detected
Chrysene	0.10	0.79	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.79	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.79	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.79	Not Detected	Not Detected

Air Sample Volume(L): 126

E = Exceeds instrument calibration range.

Container Type: XAD Tube

Surrogates	%Recovery	Method Limits
Fluorene-d10	70	60-120
Pyrene-d10	87	60-120
Benzo(a)pyrene-d12	74 E	50-150
Fluoranthene-d10	73 E	50-150

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Client Sample ID: 17-VS7

Lab ID#: 1711358-07A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120630**	**Date of Collection: 11/16/17 1:11:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 08:31 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.80	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.80	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.80	Not Detected	Not Detected
Acenaphthylene	0.10	0.80	Not Detected	Not Detected
Acenaphthene	0.10	0.80	Not Detected	Not Detected
Fluorene	0.10	0.80	Not Detected	Not Detected
Phenanthrene	0.10	0.80	Not Detected	Not Detected
Anthracene	0.10	0.80	Not Detected	Not Detected
Fluoranthene	0.10	0.80	Not Detected	Not Detected
Pyrene	0.10	0.80	Not Detected	Not Detected
Chrysene	0.10	0.80	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.80	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.80	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.80	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.80	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.80	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.80	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.80	Not Detected	Not Detected

Air Sample Volume(L): 126

E = Exceeds instrument calibration range.

Container Type: XAD Tube

Surrogates	%Recovery	Method Limits
Fluorene-d10	71	60-120
Pyrene-d10	84	60-120
Benzo(a)pyrene-d12	74 E	50-150
Fluoranthene-d10	72 E	50-150

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Client Sample ID: 17-FB1

Lab ID#: 1711358-08A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120631**	**Date of Collection: 11/16/17**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 09:01 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.79	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.79	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.79	Not Detected	Not Detected
Acenaphthylene	0.10	0.79	Not Detected	Not Detected
Acenaphthene	0.10	0.79	Not Detected	Not Detected
Fluorene	0.10	0.79	Not Detected	Not Detected
Phenanthrene	0.10	0.79	Not Detected	Not Detected
Anthracene	0.10	0.79	Not Detected	Not Detected
Fluoranthene	0.10	0.79	Not Detected	Not Detected
Pyrene	0.10	0.79	Not Detected	Not Detected
Chrysene	0.10	0.79	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.79	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.79	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.79	Not Detected	Not Detected

Air Sample Volume(L): 127

E = Exceeds instrument calibration range.

Container Type: XAD Tube

Surrogates	%Recovery	Method Limits
Fluorene-d10	75	60-120
Pyrene-d10	97	60-120
Benzo(a)pyrene-d12	80 E	50-150
Fluoranthene-d10	80 E	50-150

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Client Sample ID: Lab Blank

Lab ID#: 1711358-09A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120613**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 12:09 PM**	
		Date of Extraction: 11/21/17	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Naphthalene	0.10	0.79	Not Detected	Not Detected
2-Methylnaphthalene	0.10	0.79	Not Detected	Not Detected
2-Chloronaphthalene	0.10	0.79	Not Detected	Not Detected
Acenaphthylene	0.10	0.79	Not Detected	Not Detected
Acenaphthene	0.10	0.79	Not Detected	Not Detected
Fluorene	0.10	0.79	Not Detected	Not Detected
Phenanthrene	0.10	0.79	Not Detected	Not Detected
Anthracene	0.10	0.79	Not Detected	Not Detected
Fluoranthene	0.10	0.79	Not Detected	Not Detected
Pyrene	0.10	0.79	Not Detected	Not Detected
Chrysene	0.10	0.79	Not Detected	Not Detected
Benzo(a)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(b)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(k)fluoranthene	0.10	0.79	Not Detected	Not Detected
Benzo(a)pyrene	0.10	0.79	Not Detected	Not Detected
Indeno(1,2,3-c,d)pyrene	0.10	0.79	Not Detected	Not Detected
Dibenz(a,h)anthracene	0.10	0.79	Not Detected	Not Detected
Benzo(g,h,i)perylene	0.10	0.79	Not Detected	Not Detected

Air Sample Volume(L): 127

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorene-d10	74	60-120
Pyrene-d10	77	60-120
Benzo(a)pyrene-d12	75	50-150
Fluoranthene-d10	84	50-150

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Client Sample ID: CCV

Lab ID#: 1711358-10A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120607a**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 09:07 AM**
		Date of Extraction: NA

Compound	%Recovery
Naphthalene	96
2-Methylnaphthalene	101
2-Chloronaphthalene	97
Acenaphthylene	103
Acenaphthene	97
Fluorene	101
Phenanthrene	96
Anthracene	105
Fluoranthene	103
Pyrene	101
Chrysene	95
Benzo(a)anthracene	104
Benzo(b)fluoranthene	115
Benzo(k)fluoranthene	104
Benzo(a)pyrene	111
Indeno(1,2,3-c,d)pyrene	105
Dibenz(a,h)anthracene	115
Benzo(g,h,i)perylene	106

Air Sample Volume(L): 1.00

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorene-d10	98	70-130
Pyrene-d10	99	70-130
Benzo(a)pyrene-d12	104	70-130
Fluoranthene-d10	98	70-130

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Client Sample ID: CCV

Lab ID#: 1711358-10B

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120621**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 04:01 PM**
		Date of Extraction: NA

Compound	%Recovery
Naphthalene	95
2-Methylnaphthalene	93
2-Chloronaphthalene	95
Acenaphthylene	111
Acenaphthene	99
Fluorene	103
Phenanthrene	97
Anthracene	105
Fluoranthene	104
Pyrene	100
Chrysene	95
Benzo(a)anthracene	109
Benzo(b)fluoranthene	115
Benzo(k)fluoranthene	102
Benzo(a)pyrene	108
Indeno(1,2,3-c,d)pyrene	127
Dibenz(a,h)anthracene	119
Benzo(g,h,i)perylene	106

Air Sample Volume(L): 1.00

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorene-d10	97	70-130
Pyrene-d10	96	70-130
Benzo(a)pyrene-d12	107	70-130
Fluoranthene-d10	98	70-130

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Client Sample ID: LCS

Lab ID#: 1711358-11A

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120611**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 11:09 AM**	
		Date of Extraction: 11/21/17	

Compound	%Recovery	Method Limits
Naphthalene	68	60-120
2-Methylnaphthalene	66	60-120
2-Chloronaphthalene	72	60-120
Acenaphthylene	78	60-120
Acenaphthene	76	60-120
Fluorene	79	60-120
Phenanthrene	78	60-120
Anthracene	81	60-120
Fluoranthene	79	60-120
Pyrene	86	60-120
Chrysene	79	60-120
Benzo(a)anthracene	87	60-120
Benzo(b)fluoranthene	94	60-120
Benzo(k)fluoranthene	86	60-120
Benzo(a)pyrene	74	60-120
Indeno(1,2,3-c,d)pyrene	99	60-120
Dibenz(a,h)anthracene	104	60-120
Benzo(g,h,i)perylene	92	60-120

Air Sample Volume(L): 1.00

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorene-d10	69	60-120
Pyrene-d10	78	60-120
Benzo(a)pyrene-d12	58	50-150
Fluoranthene-d10	73	50-150

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Client Sample ID: LCSD

Lab ID#: 1711358-11AA

MODIFIED EPA METHOD TO-13A GC/MS SIM

File Name:	**12120612**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 12/6/17 11:39 AM**	
		Date of Extraction: 11/21/17	

Compound	%Recovery	Method Limits
Naphthalene	64	60-120
2-Methylnaphthalene	65	60-120
2-Chloronaphthalene	69	60-120
Acenaphthylene	79	60-120
Acenaphthene	75	60-120
Fluorene	78	60-120
Phenanthrene	74	60-120
Anthracene	80	60-120
Fluoranthene	81	60-120
Pyrene	80	60-120
Chrysene	78	60-120
Benzo(a)anthracene	87	60-120
Benzo(b)fluoranthene	94	60-120
Benzo(k)fluoranthene	84	60-120
Benzo(a)pyrene	75	60-120
Indeno(1,2,3-c,d)pyrene	96	60-120
Dibenz(a,h)anthracene	95	60-120
Benzo(g,h,i)perylene	82	60-120

Air Sample Volume(L): 1.00

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorene-d10	69	60-120
Pyrene-d10	73	60-120
Benzo(a)pyrene-d12	66	50-150
Fluoranthene-d10	78	50-150

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12/8/2017
Mr. Joel Brann
AHTNA
110 West 38th Avenue
Suite 200A
Anchorage AK 99503

Project Name: St Paul WSO
Project #: 20293.009
Workorder #: 1711424

Dear Mr. Joel Brann

The following report includes the data for the above referenced project for sample(s) received on 11/27/2017 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 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 to contact 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 #: 1711424

Work Order Summary

CLIENT:	Mr. Joel Brann AHTNA 110 West 38th Avenue Suite 200A Anchorage, AK 99503	**BILL TO:**	Mr. Joel Brann AHTNA 110 West 38th Avenue Suite 200A Anchorage, AK 99503
PHONE:	907-646-2969	**P.O. #**	20293.007.02
FAX:		**PROJECT #**	20293.009 St Paul WSO
DATE RECEIVED:	11/27/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	12/08/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	17-VS1	Modified TO-15	3.5 "Hg	5 psi
01AA	17-VS1 Lab Duplicate	Modified TO-15	3.5 "Hg	5 psi
01B	17-VS1	Modified TO-15	3.5 "Hg	5 psi
01BB	17-VS1 Lab Duplicate	Modified TO-15	3.5 "Hg	5 psi
02A	17-VS2	Modified TO-15	5.0 "Hg	5 psi
02B	17-VS2	Modified TO-15	5.0 "Hg	5 psi
03A	17-VS3	Modified TO-15	4.0 "Hg	5 psi
03B	17-VS3	Modified TO-15	4.0 "Hg	5 psi
04A	17-VS4	Modified TO-15	1.0 "Hg	5 psi
04B	17-VS4	Modified TO-15	1.0 "Hg	5 psi
05A	17-VS5	Modified TO-15	4.5 "Hg	5 psi
05B	17-VS5	Modified TO-15	4.5 "Hg	5 psi
06A	17-VS6	Modified TO-15	0.0 "Hg	5 psi
06B	17-VS6	Modified TO-15	0.0 "Hg	5 psi
07A	17-VS7	Modified TO-15	6.0 "Hg	5 psi
07B	17-VS7	Modified TO-15	6.0 "Hg	5 psi
08A	Lab Blank	Modified TO-15	NA	NA
08B	Lab Blank	Modified TO-15	NA	NA
09A	CCV	Modified TO-15	NA	NA
09B	CCV	Modified TO-15	NA	NA
10A	LCS	Modified TO-15	NA	NA
10AA	LCSD	Modified TO-15	NA	NA
10B	LCS	Modified TO-15	NA	NA

Continued on next page

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WORK ORDER #: 1711424

Work Order Summary

CLIENT:	Mr. Joel Brann AHTNA 110 West 38th Avenue Suite 200A Anchorage, AK 99503	**BILL TO:**	Mr. Joel Brann AHTNA 110 West 38th Avenue Suite 200A Anchorage, AK 99503
PHONE:	907-646-2969	**P.O. #**	20293.007.02
FAX:		**PROJECT #**	20293.009 St Paul WSO
DATE RECEIVED:	11/27/2017	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	12/08/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
10BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: _____ DATE: 12/08/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
DoD QSM 5.0 TO-15 LL/SIM
AHTNA
Workorder# 1711424

Seven 6 Liter Summa Canister (SIM Certified) samples were received on November 27, 2017. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liter of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications and DoD QSM 5.0 modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the modifications.

Requirement	***TO-15 LL/SIM DoD QS***	***ATL Modifications***
Blank and standards	Zero air	UHP Nitrogren provides a higher purity gas matrix than zero air
Daily Calibration	+- 30% Difference	For Std. Full Scan: </= 30% Difference with two allowed out up to </=40%.; flag and narrate outliers For SIM: Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
DoD QSM 5.0 Module 4 (1.7.1.1.j, 1.5.2.1.b, 1.5.2.2.c) Surrogates	Quantification of surrogates requires a multi-point calibration and determination of DL and LOQ.	Quantification achieved using a multipoint calibration at a single concentration, analogous to internal standards. DLs and LOQs are not established.
DoD QSM 5.0 Section 1.7.4.1 Lab Blank	No analytes detected at >1/2 LOQ	No analytes detected at >/=LOQ.
Initial Calibration	</=30%RSD with 2 compounds out up to 40%RSD	(Full Scan): </=30%RSD with 4 compounds out up to 40%RSD SIM: Default criterion is </=30%RSD with 10% VOCs out up to 40%RSD.

Receiving Notes

Despite the use of flow controllers for sample collection, the final canister vacuum for sample 17-VS6 was measured at ambient pressure at the laboratory.

There was a difference (greater than or equal to 5.0" Hg) between the measured canister receipt vacuum and that which was reported on the Chain of Custody (COC) for samples 17-VS4 and

17-VS6. A leak test indicated that the valve was functioning properly.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. All The canisters used for this project have been certified to the Reporting Limit for the target analytes included in this workorder. Concentrations that are below the level at which the canister was certified may be false positives.

Chloroform was manually integrated in the initial calibration.

The results for each sample in this report were acquired from two separate data files originating from the same analytical run. The two data files have the same base file name and are differentiated with a "sim" extension on the SIM data file.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds. Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

A Limit of Detection (LOD) study is not maintained for non-standard compounds.

Due to limitations with the LIM system, Method Detection Limit values for non-standard compounds may be included in the final report. Results for the non-standard compounds however were not evaluated below the reporting limit per project requirement.

Definition of Data Qualifying Flags

Eight 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.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

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

N - The identification is based on presumptive evidence.

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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MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS1		
Lab ID:	1711424-01A	**Date/Time Analyzed:**	11/28/17 01:18 PM
Date/Time Collecte	11/16/17 11:24 PM	**Dilution Factor:**	1.52
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112807

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.095	0.60	0.75	0.47 J
1,3,5-Trimethylbenzene	108-67-8	0.16	0.60	0.75	0.18 J
Butylbenzene	104-51-8	0.68	D	4.2	Not Detected U
Cumene	98-82-8	0.19	0.60	0.75	Not Detected U
Cyclohexane	110-82-7	0.098	0.42	0.52	0.21 J
Hexane	110-54-3	0.10	0.43	0.54	2.0
Propylbenzene	103-65-1	0.10	0.60	0.75	0.13 J
sec-Butylbenzene	135-98-8	0.46	D	4.2	Not Detected U
Styrene	100-42-5	0.20	0.52	0.65	Not Detected U
tert-Butylbenzene	98-06-6	0.59	D	4.2	Not Detected U

J = Estimated value.
U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	93
4-Bromofluorobenzene	460-00-4	81-120	102
Toluene-d8	2037-26-5	87-110	91

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS1 Lab Duplicate		
Lab ID:	1711424-01AA	**Date/Time Analyzed:**	11/28/17 02:12 PM
Date/Time Collecte	11/16/17 11:24 PM	**Dilution Factor:**	1.52
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112808

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.095	0.60	0.75	0.48 J
1,3,5-Trimethylbenzene	108-67-8	0.16	0.60	0.75	0.24 J
Butylbenzene	104-51-8	0.68	D	4.2	Not Detected U
Cumene	98-82-8	0.19	0.60	0.75	Not Detected U
Cyclohexane	110-82-7	0.098	0.42	0.52	0.27 J
Hexane	110-54-3	0.10	0.43	0.54	1.4
Propylbenzene	103-65-1	0.10	0.60	0.75	0.12 J
sec-Butylbenzene	135-98-8	0.46	D	4.2	Not Detected U
Styrene	100-42-5	0.20	0.52	0.65	Not Detected U
tert-Butylbenzene	98-06-6	0.59	D	4.2	Not Detected U

J = Estimated value.
U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	100
4-Bromofluorobenzene	460-00-4	81-120	105
Toluene-d8	2037-26-5	87-110	99

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS1		
Lab ID:	1711424-01B	**Date/Time Analyzed:**	11/28/17 01:18 PM
Date/Time Collecte	11/16/17 11:24 PM	**Dilution Factor:**	1.52
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112807sim

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0080	0.019	0.24	0.53
Chloroform	67-66-3	0.010	0.030	0.74	0.095 J
Ethyl Benzene	100-41-4	0.014	0.026	0.13	0.38
m,p-Xylene	108-38-3	0.012	0.026	0.26	1.5
Naphthalene	91-20-3	0.019	0.019	0.40	0.095 J
o-Xylene	95-47-6	0.015	0.026	0.13	0.53
Toluene	108-88-3	0.020	0.023	0.11	2.3

J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	97
4-Bromofluorobenzene	460-00-4	78-116	97
Toluene-d8	2037-26-5	89-111	91

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS1 Lab Duplicate		
Lab ID:	1711424-01BB	**Date/Time Analyzed:**	11/28/17 02:12 PM
Date/Time Collecte	11/16/17 11:24 PM	**Dilution Factor:**	1.52
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112808sim

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0080	0.019	0.24	0.54
Chloroform	67-66-3	0.010	0.030	0.74	0.10 J
Ethyl Benzene	100-41-4	0.014	0.026	0.13	0.38
m,p-Xylene	108-38-3	0.012	0.026	0.26	1.5
Naphthalene	91-20-3	0.019	0.019	0.40	0.085 J
o-Xylene	95-47-6	0.015	0.026	0.13	0.54
Toluene	108-88-3	0.020	0.023	0.11	2.3

J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	97
4-Bromofluorobenzene	460-00-4	78-116	102
Toluene-d8	2037-26-5	89-111	97

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS2		
Lab ID:	1711424-02A	**Date/Time Analyzed:**	11/28/17 07:23 PM
Date/Time Collecte	11/16/17 11:23 PM	**Dilution Factor:**	1.61
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112815

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.10	0.63	0.79	0.41 J
1,3,5-Trimethylbenzene	108-67-8	0.17	0.63	0.79	Not Detected U
Butylbenzene	104-51-8	0.72	D	4.4	Not Detected U
Cumene	98-82-8	0.20	0.63	0.79	Not Detected U
Cyclohexane	110-82-7	0.10	0.44	0.55	0.17 J
Hexane	110-54-3	0.11	0.45	0.57	0.66
Propylbenzene	103-65-1	0.11	0.63	0.79	0.14 J
sec-Butylbenzene	135-98-8	0.49	D	4.4	Not Detected U
Styrene	100-42-5	0.21	0.55	0.68	Not Detected U
tert-Butylbenzene	98-06-6	0.63	D	4.4	Not Detected U

J = Estimated value.
U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	95
4-Bromofluorobenzene	460-00-4	81-120	106
Toluene-d8	2037-26-5	87-110	97

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS2		
Lab ID:	1711424-02B	**Date/Time Analyzed:**	11/28/17 07:23 PM
Date/Time Collecte	11/16/17 11:23 PM	**Dilution Factor:**	1.61
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112815sim

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0084	0.020	0.26	0.62
Chloroform	67-66-3	0.011	0.031	0.79	0.099 J
Ethyl Benzene	100-41-4	0.015	0.028	0.14	0.77
m,p-Xylene	108-38-3	0.013	0.028	0.28	1.9
Naphthalene	91-20-3	0.020	0.020	0.42	0.073 J
o-Xylene	95-47-6	0.016	0.028	0.14	0.66
Toluene	108-88-3	0.021	0.024	0.12	4.6

J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	94
4-Bromofluorobenzene	460-00-4	78-116	104
Toluene-d8	2037-26-5	89-111	96

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS3		
Lab ID:	1711424-03A	**Date/Time Analyzed:**	11/28/17 03:23 PM
Date/Time Collecte	11/16/17 11:21 PM	**Dilution Factor:**	1.55
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112809

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.097	0.61	0.76	0.57 J
1,3,5-Trimethylbenzene	108-67-8	0.16	0.61	0.76	Not Detected U
Butylbenzene	104-51-8	0.69	D	4.2	Not Detected U
Cumene	98-82-8	0.19	0.61	0.76	Not Detected U
Cyclohexane	110-82-7	0.10	0.43	0.53	0.38 J
Hexane	110-54-3	0.11	0.44	0.55	1.3
Propylbenzene	103-65-1	0.11	0.61	0.76	0.17 J
sec-Butylbenzene	135-98-8	0.47	D	4.2	Not Detected U
Styrene	100-42-5	0.20	0.53	0.66	Not Detected U
tert-Butylbenzene	98-06-6	0.60	D	4.2	Not Detected U

J = Estimated value.
U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	97
4-Bromofluorobenzene	460-00-4	81-120	102
Toluene-d8	2037-26-5	87-110	95

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS3		
Lab ID:	1711424-03B	**Date/Time Analyzed:**	11/28/17 03:23 PM
Date/Time Collecte	11/16/17 11:21 PM	**Dilution Factor:**	1.55
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112809sim

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0081	0.020	0.25	0.88
Chloroform	67-66-3	0.011	0.030	0.76	0.12 J
Ethyl Benzene	100-41-4	0.014	0.027	0.13	0.90
m,p-Xylene	108-38-3	0.012	0.027	0.27	2.4
Naphthalene	91-20-3	0.019	0.019	0.41	0.14 J
o-Xylene	95-47-6	0.016	0.027	0.13	0.85
Toluene	108-88-3	0.020	0.023	0.12	5.8

J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	94
4-Bromofluorobenzene	460-00-4	78-116	103
Toluene-d8	2037-26-5	89-111	97

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS4		
Lab ID:	1711424-04A	**Date/Time Analyzed:**	11/28/17 04:37 PM
Date/Time Collecte	11/16/17 11:22 PM	**Dilution Factor:**	1.39
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112811

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.087	0.55	0.68	1.3
1,3,5-Trimethylbenzene	108-67-8	0.14	0.55	0.68	0.37 J
Butylbenzene	104-51-8	0.62	D	3.8	Not Detected U
Cumene	98-82-8	0.17	0.55	0.68	Not Detected U
Cyclohexane	110-82-7	0.090	0.38	0.48	0.54
Hexane	110-54-3	0.095	0.39	0.49	2.6
Propylbenzene	103-65-1	0.097	0.55	0.68	0.24 J
sec-Butylbenzene	135-98-8	0.42	D	3.8	Not Detected U
Styrene	100-42-5	0.18	0.47	0.59	0.24 J
tert-Butylbenzene	98-06-6	0.54	D	3.8	Not Detected U

J = Estimated value.
U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	96
4-Bromofluorobenzene	460-00-4	81-120	102
Toluene-d8	2037-26-5	87-110	96

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS4		
Lab ID:	1711424-04B	**Date/Time Analyzed:**	11/28/17 04:37 PM
Date/Time Collecte	11/16/17 11:22 PM	**Dilution Factor:**	1.39
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112811sim

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0073	0.018	0.22	1.7
Chloroform	67-66-3	0.0096	0.027	0.68	0.24 J
Ethyl Benzene	100-41-4	0.013	0.024	0.12	1.3
m,p-Xylene	108-38-3	0.011	0.024	0.24	4.0
Naphthalene	91-20-3	0.017	0.017	0.36	0.16 J
o-Xylene	95-47-6	0.014	0.024	0.12	1.5
Toluene	108-88-3	0.018	0.021	0.10	9.8

J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	97
4-Bromofluorobenzene	460-00-4	78-116	103
Toluene-d8	2037-26-5	89-111	96

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS5		
Lab ID:	1711424-05A	**Date/Time Analyzed:**	11/28/17 03:58 PM
Date/Time Collecte	11/16/17 11:25 PM	**Dilution Factor:**	1.58
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112810

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.099	0.62	0.78	0.55 J
1,3,5-Trimethylbenzene	108-67-8	0.16	0.62	0.78	0.19 J
Butylbenzene	104-51-8	0.70	D	4.3	Not Detected U
Cumene	98-82-8	0.20	0.62	0.78	Not Detected U
Cyclohexane	110-82-7	0.10	0.44	0.54	0.22 J
Hexane	110-54-3	0.11	0.44	0.56	0.92
Propylbenzene	103-65-1	0.11	0.62	0.78	0.11 J
sec-Butylbenzene	135-98-8	0.48	D	4.3	Not Detected U
Styrene	100-42-5	0.20	0.54	0.67	Not Detected U
tert-Butylbenzene	98-06-6	0.62	D	4.3	Not Detected U

J = Estimated value.
U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	86
4-Bromofluorobenzene	460-00-4	81-120	103
Toluene-d8	2037-26-5	87-110	96

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS5		
Lab ID:	1711424-05B	**Date/Time Analyzed:**	11/28/17 03:58 PM
Date/Time Collecte	11/16/17 11:25 PM	**Dilution Factor:**	1.58
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112810sim

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0083	0.020	0.25	0.78
Chloroform	67-66-3	0.011	0.031	0.77	0.12 J
Ethyl Benzene	100-41-4	0.014	0.027	0.14	0.65
m,p-Xylene	108-38-3	0.013	0.027	0.27	2.0
Naphthalene	91-20-3	0.020	0.020	0.41	0.090 J
o-Xylene	95-47-6	0.016	0.027	0.14	0.71
Toluene	108-88-3	0.020	0.024	0.12	4.9

J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	92
4-Bromofluorobenzene	460-00-4	78-116	104
Toluene-d8	2037-26-5	89-111	96

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS6		
Lab ID:	1711424-06A	**Date/Time Analyzed:**	11/28/17 06:41 PM
Date/Time Collecte	11/16/17 11:19 PM	**Dilution Factor:**	1.34
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112814

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.084	0.53	0.66	4.7
1,3,5-Trimethylbenzene	108-67-8	0.14	0.53	0.66	1.2
Butylbenzene	104-51-8	0.60	D	3.7	Not Detected U
Cumene	98-82-8	0.17	0.53	0.66	0.38 J
Cyclohexane	110-82-7	0.087	0.37	0.46	2.1
Hexane	110-54-3	0.092	0.38	0.47	4.3
Propylbenzene	103-65-1	0.093	0.53	0.66	0.87
sec-Butylbenzene	135-98-8	0.41	D	3.7	Not Detected U
Styrene	100-42-5	0.17	0.46	0.57	0.89
tert-Butylbenzene	98-06-6	0.52	D	3.7	Not Detected U

J = Estimated value.
U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	96
4-Bromofluorobenzene	460-00-4	81-120	100
Toluene-d8	2037-26-5	87-110	96

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS6		
Lab ID:	1711424-06B	**Date/Time Analyzed:**	11/28/17 06:41 PM
Date/Time Collecte	11/16/17 11:19 PM	**Dilution Factor:**	1.34
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112814sim

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0070	0.017	0.21	3.5
Chloroform	67-66-3	0.0093	0.026	0.65	0.23 J
Ethyl Benzene	100-41-4	0.012	0.023	0.12	3.9
m,p-Xylene	108-38-3	0.011	0.023	0.23	15
Naphthalene	91-20-3	0.017	0.017	0.35	0.34 J
o-Xylene	95-47-6	0.014	0.023	0.12	5.5
Toluene	108-88-3	0.017	0.020	0.10	31

J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	95
4-Bromofluorobenzene	460-00-4	78-116	98
Toluene-d8	2037-26-5	89-111	97

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS7		
Lab ID:	1711424-07A	**Date/Time Analyzed:**	11/28/17 05:52 PM
Date/Time Collecte	11/16/17 11:20 PM	**Dilution Factor:**	1.68
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112813

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.10	0.66	0.82	2.5
1,3,5-Trimethylbenzene	108-67-8	0.18	0.66	0.82	0.53 J
Butylbenzene	104-51-8	0.75	D	4.6	Not Detected U
Cumene	98-82-8	0.21	0.66	0.82	Not Detected U
Cyclohexane	110-82-7	0.11	0.46	0.58	1.2
Hexane	110-54-3	0.12	0.47	0.59	3.7
Propylbenzene	103-65-1	0.12	0.66	0.82	0.42 J
sec-Butylbenzene	135-98-8	0.51	D	4.6	Not Detected U
Styrene	100-42-5	0.22	0.57	0.72	0.62 J
tert-Butylbenzene	98-06-6	0.66	D	4.6	Not Detected U

J = Estimated value.
U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	97
4-Bromofluorobenzene	460-00-4	81-120	101
Toluene-d8	2037-26-5	87-110	97

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	17-VS7		
Lab ID:	1711424-07B	**Date/Time Analyzed:**	11/28/17 05:52 PM
Date/Time Collecte	11/16/17 11:20 PM	**Dilution Factor:**	1.68
Media:	6 Liter Summa Canister (SIM Certified)	**Instrument/Filename:**	msdv.i / v112813sim

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0088	0.021	0.27	3.0
Chloroform	67-66-3	0.012	0.033	0.82	0.12 J
Ethyl Benzene	100-41-4	0.015	0.029	0.14	2.9
m,p-Xylene	108-38-3	0.013	0.029	0.29	12
Naphthalene	91-20-3	0.021	0.021	0.44	0.34 J
o-Xylene	95-47-6	0.017	0.029	0.14	3.9
Toluene	108-88-3	0.022	0.025	0.13	20

J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	95
4-Bromofluorobenzene	460-00-4	78-116	102
Toluene-d8	2037-26-5	89-111	95

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	Lab Blank		
Lab ID:	1711424-08A	**Date/Time Analyzed:**	11/28/17 11:42 AM
Date/Time Collecte	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v112806a

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2,4-Trimethylbenzene	95-63-6	0.062	0.39	0.49	Not Detected U
1,3,5-Trimethylbenzene	108-67-8	0.10	0.39	0.49	Not Detected U
Butylbenzene	104-51-8	0.45	D	2.7	Not Detected U
Cumene	98-82-8	0.12	0.39	0.49	Not Detected U
Cyclohexane	110-82-7	0.065	0.28	0.34	Not Detected U
Hexane	110-54-3	0.068	0.28	0.35	Not Detected U
Propylbenzene	103-65-1	0.070	0.39	0.49	Not Detected U
sec-Butylbenzene	135-98-8	0.30	D	2.7	Not Detected U
Styrene	100-42-5	0.13	0.34	0.42	Not Detected U
tert-Butylbenzene	98-06-6	0.39	D	2.7	Not Detected U

U = The analyte was not detected above the MDL.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	100
4-Bromofluorobenzene	460-00-4	81-120	106
Toluene-d8	2037-26-5	87-110	100

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	Lab Blank		
Lab ID:	1711424-08B	**Date/Time Analyzed:**	11/28/17 11:42 AM
Date/Time Collecte	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v112806sima

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	71-43-2	0.0052	0.013	0.16	0.021 J
Chloroform	67-66-3	0.0069	0.020	0.49	Not Detected U
Ethyl Benzene	100-41-4	0.0091	0.017	0.087	Not Detected U
m,p-Xylene	108-38-3	0.0080	0.017	0.17	0.010 J
Naphthalene	91-20-3	0.012	0.012	0.26	0.038 J
o-Xylene	95-47-6	0.010	0.017	0.087	0.011 J
Toluene	108-88-3	0.013	0.015	0.075	Not Detected U

U = The analyte was not detected above the MDL.
J = Estimated value.
D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	98
4-Bromofluorobenzene	460-00-4	78-116	107
Toluene-d8	2037-26-5	89-111	96

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	CCV		
Lab ID:	1711424-09A	**Date/Time Analyzed:**	11/28/17 08:00 AM
Date/Time Collecte	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v112802a

Compound	CAS#	%Recovery
1,2,4-Trimethylbenzene	95-63-6	100
1,3,5-Trimethylbenzene	108-67-8	95
Butylbenzene	104-51-8	124
Cumene	98-82-8	92
Cyclohexane	110-82-7	94
Hexane	110-54-3	98
Propylbenzene	103-65-1	93
sec-Butylbenzene	135-98-8	107
Styrene	100-42-5	100
tert-Butylbenzene	98-06-6	108

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	102
4-Bromofluorobenzene	460-00-4	81-120	97
Toluene-d8	2037-26-5	87-110	100

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	CCV		
Lab ID:	1711424-09B	**Date/Time Analyzed:**	11/28/17 08:00 AM
Date/Time Collecte	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v112802sima

Compound	CAS#	%Recovery
Benzene	71-43-2	89
Chloroform	67-66-3	93
Ethyl Benzene	100-41-4	98
m,p-Xylene	108-38-3	93
Naphthalene	91-20-3	92
o-Xylene	95-47-6	96
Toluene	108-88-3	95

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	98
4-Bromofluorobenzene	460-00-4	78-116	98
Toluene-d8	2037-26-5	89-111	99

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	LCS		
Lab ID:	1711424-10A	**Date/Time Analyzed:**	11/28/17 09:00 AM
Date/Time Collecte	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v112803a

Compound	CAS#	%Recovery
1,2,4-Trimethylbenzene	95-63-6	104
1,3,5-Trimethylbenzene	108-67-8	95
Butylbenzene	104-51-8	Not Spiked
Cumene	98-82-8	88
Cyclohexane	110-82-7	93
Hexane	110-54-3	92
Propylbenzene	103-65-1	90
sec-Butylbenzene	135-98-8	Not Spiked
Styrene	100-42-5	94
tert-Butylbenzene	98-06-6	Not Spiked

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	98
4-Bromofluorobenzene	460-00-4	81-120	95
Toluene-d8	2037-26-5	87-110	98

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	LCSD		
Lab ID:	1711424-10AA	**Date/Time Analyzed:**	11/28/17 09:49 AM
Date/Time Collecte	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v112804a

Compound	CAS#	%Recovery
1,2,4-Trimethylbenzene	95-63-6	106
1,3,5-Trimethylbenzene	108-67-8	94
Butylbenzene	104-51-8	Not Spiked
Cumene	98-82-8	93
Cyclohexane	110-82-7	94
Hexane	110-54-3	99
Propylbenzene	103-65-1	93
sec-Butylbenzene	135-98-8	Not Spiked
Styrene	100-42-5	98
tert-Butylbenzene	98-06-6	Not Spiked

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	85-130	102
4-Bromofluorobenzene	460-00-4	81-120	104
Toluene-d8	2037-26-5	87-110	102

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	LCS		
Lab ID:	1711424-10B	**Date/Time Analyzed:**	11/28/17 09:00 AM
Date/Time Collecte	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v112803sima

Compound	CAS#	%Recovery
Benzene	71-43-2	88
Chloroform	67-66-3	90
Ethyl Benzene	100-41-4	94
m,p-Xylene	108-38-3	87
Naphthalene	91-20-3	73
o-Xylene	95-47-6	93
Toluene	108-88-3	92

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	98
4-Bromofluorobenzene	460-00-4	78-116	93
Toluene-d8	2037-26-5	89-111	98

* % Recovery is calculated using unrounded analytical results.

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN
St Paul WSO

Client ID:	LCSD		
Lab ID:	1711424-10BB	**Date/Time Analyzed:**	11/28/17 09:49 AM
Date/Time Collecte	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v112804sima

Compound	CAS#	%Recovery
Benzene	71-43-2	88
Chloroform	67-66-3	91
Ethyl Benzene	100-41-4	98
m,p-Xylene	108-38-3	93
Naphthalene	91-20-3	69
o-Xylene	95-47-6	99
Toluene	108-88-3	94

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	90-127	98
4-Bromofluorobenzene	460-00-4	78-116	102
Toluene-d8	2037-26-5	89-111	99

* % Recovery is calculated using unrounded analytical results.

APPENDIX D

DATA QUALITY ASSESSMENT AND ADEC CHECKLISTS

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Laboratory Data Review Checklist For Air Samples

Completed by:	Rodney Guritz
Title:	Chemist
Date:	December 7, 2017
CS Report Name:	St. Paul Weather Service Office VI Sampling Report
Report Date:	January 2017
Consultant Firm:	Arctic Data Services, LLC for Ahtna Engineering Services, LLC
Laboratory Name:	Eurofins Air Toxics, Inc.
Laboratory Report Number:	1711358
ADEC File Number:	2644.38.004
ADEC Hazard ID:	3208

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:

   All samples were analyzed by Eurofins Air Toxics in Folsom, CA; no samples were transferred to another 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:

TO-13A SIM analysis was requested for all samples.

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:

Samples were received in good condition, at 3.2 °C.

b. If there were any discrepancies, were they documented? For example, incorrect sample containers, sample holding times outside of acceptable range, insufficient or missing samples, canister not holding a vacuum etc.?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

There were no sample-receiving discrepancies.

c. Data quality or usability affected? Explain.

Comments:

Data quality and usability were not affected.

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The laboratory documented the following anomalies in the case narrative:
"Due to laboratory error, the field surrogates Benzo(a)pyrene-d12 and Fluoranthene-d10 were inadvertently spiked at 50ug, which exceeded the instrument's calibration range. The surrogates were flagged accordingly in all samples." – See Section 6.c. for evaluation of surrogate recovery.
"The Relative Response Factor (RRF) for Indeno (1,2,3-cd)pyrene in the Initial calibration (ICAL) was below the EPA method TO-13A minimum requirement of 0.5 at 0.43." – While the laboratory's ability to accurately quantitate indeno(1,2,3-cd)pyrene may have been affected, the analyte was not detected in any project samples, so data quality was not affected. The listed reporting limits should not have been affected by this failure.

b. Discrepancies, errors or QC failures identified by the lab?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

See above.

c. Were all corrective actions documented?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

No corrective actions were performed.

d. What is the effect on data quality/usability according to the case narrative?
Comments:

The case narrative makes no conclusions regarding data quality or usability.

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. Is the data reported in micrograms per cubic meter volume (µg/m^3)?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

d. 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:

Reporting limits were compared to ADEC Target Levels for Indoor Air (November 2017). Reporting limits were below relevant commercial indoor air target levels for each sample and analyte. However, reporting limits for benzo(a)anthracene exceeded the residential indoor air target level for all samples.

e. Data quality or usability affected? Explain.

Comments:

Data quality affected as described above. Results should not be used to rule out the potential presence of benzo(a)anthracene above residential indoor air target levels.

6. QC Samples

a. Method Blank

i. One method blank reported per analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Also, 17-FB1 was submitted as a field blank for the sample delivery group.

ii. All method blank results less than PQL?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

No analytes were detected in the method blank or field blank.

iii. If above PQL, what samples are affected?

Comments:

No sample results were affected.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

See above.

v. Data quality or usability affected? Please Explain.

Comments:

Data quality and usability were not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – 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:

The lab provided LCS/LCSD RPDs separately. There were no RPD failures.

iv. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No sample results were affected.

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

See above.

vi. Data quality or usability affected? Explain.

Comments:

Data quality and usability were not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – 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:

The case narrative notes that the sample cartridges were pre-spiked with fluoranthene-d10 and benzo(a)pyrene-d12 on 11/3/2017. They also note that these surrogates were spiked at 50 µg, outside the instrument's calibration range. They qualify the surrogate recovery with an 'E' flag in the report.
While accurate quantitation of the field surrogates was not possible, all estimated recoveries were within control limits. The lab also used lab surrogates (spiked after receiving the collected samples) that were accurately quantitated and within control limits. There were no indications of matrix interference and all measures of analytical accuracy were acceptable, so data were not qualified based on this anomaly.

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:

See above.

iv. Data quality or usability affected? Explain.

Comments:

Data quality and usability were not affected.

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 soil gas or indoor air samples?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Sample 17-VS4 was submitted as a field duplicate of 17-VS3.

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 (%) = 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:

No analytes were detected in the primary sample or field duplicate.

iv. Data quality or usability affected? Explain.

Comments:

Data quality and usability were not affected.

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

The laboratory E-flagged surrogates that were outside calibration range, but no project sample data were flagged.

Laboratory Data Review Checklist For Air Samples

Completed by:	Rodney Guritz
Title:	Chemist
Date:	December 7, 2017
CS Report Name:	St. Paul Weather Service Office VI Sampling Report
Report Date:	January 2017
Consultant Firm:	Arctic Data Services, LLC for Ahtna Engineering Services, LLC
Laboratory Name:	Eurofins Air Toxics, Inc.
Laboratory Report Number:	1711424
ADEC File Number:	2644.38.004
ADEC Hazard ID:	3208

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:

   All samples were analyzed by Eurofins Air Toxics in Folsom, CA; no samples were transferred to another 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:

TO-15 analysis was requested for all samples.

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:

Samples were received in good condition. Final canister vacuums at receipt were not recorded on the COC, but the laboratory documented discrepancies in the case narrative. The lab indicated that sample 17-VS6 was received without vacuum (at ambient pressure) and that there was a significant discrepancy between final collection vacuum and receipt vacuum for 17-VS4. These discrepancies may be indicative of a leak during shipping/storage. Detected results for these samples are conservatively qualified 'J' as estimated; non-detect results are qualified 'UJ.'

b. If there were any discrepancies, were they documented? For example, incorrect sample containers, sample holding times outside of acceptable range, insufficient or missing samples, canister not holding a vacuum etc.?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The above-listed discrepancies were documented.

c. Data quality or usability affected? Explain.

Comments:

Data quality is affected as described above. Results for the affected samples should be considered estimated and used with caution, due to the potential for target analyte loss or sample contamination from leakage during sample shipping and/or storage.

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The laboratory documented the sample receiving anomalies discussed above. There were no analytical anomalies documented that had an impact on project sample data quality.

b. Discrepancies, errors or QC failures identified by the lab?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

See above.

c. Were all corrective actions documented?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

No corrective actions were performed.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative makes no conclusions regarding data quality or usability.

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. Is the data reported in micrograms per cubic meter volume ($\mu g/m^3$)?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

d. 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:

Reporting limits were compared to ADEC Target Levels for Commercial Indoor Air (November 2017). Reporting limits were below relevant target levels for each sample and analyte.

e. Data quality or usability affected? Explain.

Comments:

Data quality and usability were not affected.

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:

However, benzene, m,p-xylene, o-xylene, and naphthalene were detected below the LOQ in the method blank associated with project samples. Note that Summa canisters are only certified to the LOQ, so any detections below the LOQ may be false positives from trace contamination in the sample canister.

iii. If above PQL, what samples are affected?

Comments:

Benzene, m,p-xylene, and o-xylene results for associated projects samples were above the LOQ and above 5 times the MB concentration, and were thus not affected. Naphthalene results for all project samples were below the LOQ and should be considered attributable to laboratory-based sample contamination. Naphthalene results are qualified ‘UB’ at the LOQ.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

See above.

v. Data quality or usability affected? Please Explain.

Comments:

Data quality affected as described above. Impact to data usability was minor as affected results were below the LOQ and at least an order of magnitude below the relevant target level.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

The following analytes were not spiked in the LCS/LCSD: butylbenzene, sec-butylbenzene, and tert-butylbenzene. CCV recovery is the only measure of the analytical accuracy of results for these compounds. While no results are qualified based on this omission, results for these analytes should be considered with some degree of caution.

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:

The lab provided RPDs in a separate report. They also calculated RPDs for a laboratory duplicate analysis of sample 17-VS1. Laboratory duplicate RPDs for 1,3,5-trimethylbenzene and hexane were outside control limits. 1,3,5-Trimethylbenzene was below the LOQ; results for this analyte are not considered affected, and are already qualified 'J' as estimated. The hexane result for sample 17-VS1 is qualified 'J' as estimated based on the laboratory duplicate RPD failure.

iv. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

See above.

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

See above.

vi. Data quality or usability affected? Explain.

Comments:

Data quality affected as described above. Impact to data usability was minor as the affected results were several orders of magnitude below the relevant target level for hexane.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – 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:

See above.

iv. Data quality or usability affected? Explain.

Comments:

Data quality and usability were not affected.

d. Field Duplicate

i. One field duplicate submitted per analysis and 10 soil gas or indoor air samples?

☒ Yes ☐ No ☐ NA (Please explain.) Comments:

Sample 17-VS4 was submitted as a field duplicate of 17-VS3.

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 (%) = 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:

Field duplicate RPDs were above the DQO of 25% for all analytes that were quantitatively detected (above the LOQ) in the primary and field duplicate sample. Results were consistently higher in the duplicate (17-VS4). This suggest a problem with duplicate sample collection. All results for the primary (17-VS3) and duplicate (17-VS4) samples are qualified 'J' as estimated.

iv. Data quality or usability affected? Explain.

Comments:

Data quality affected as described above. The higher of duplicate results should be used for decision-making purposes.

7. Other Data Flags/Qualifiers

a. Defined and appropriate?

☐ Yes ☐ No ☒ NA (Please explain.) Comments:

There were no other data flags or qualifiers applied by the laboratory or in the course of this review.

Arctic Data Services LLC

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ESTER, AK 99725
907-457-3147

Date:	1/2/2018
Project name:	St. Paul Weather Service Office VI Sampling Report
Laboratory:	Eurofins Air Toxics, Inc. (EAT)
Sample Delivery Groups:	1711358, 1711424
Reviewed by:	Rodney Guritz
Title:	Principal Chemist

To: Mr. Joel Brann
Ahtna Engineering Services, LLC
110 W 38th Avenue, Suite 200B
Anchorage, Alaska 99503

Data Quality Assessment

This letter summarizes the findings of a data quality assessment (DQA) conducted by Arctic Data Services, LLC (ADS) on behalf of Ahtna Engineering Services, LLC (Ahtna) for the above-referenced project data. Precision, accuracy, sensitivity, representativeness, comparability, and completeness of the data were evaluated by reviewing laboratory-supplied quality assurance/quality control (QA/QC) information as well as conducting independent QC checks on the data. A Stage 2A validation was conducted in general accordance with the ADS Standard Operating Procedure for Stage 2A Data Validation (2017). Stage 2A validation includes reviewing sample handling, custody, and sample-batch level QC information and applying data qualifiers to sample results affected by anomalies and QC failures, and summarizing the impacts to data quality. Instrument-level QC information is not reviewed. This validation meets the requirements of the Alaska Department of Environmental Conservation (ADEC) *Technical Memorandum on Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling* (March 2017). In the absence of project-specific control limits or measurement quality objectives (MQOs), QC-sample recoveries and relative percent differences (RPDs) were compared to laboratory control limits. Field-duplicate RPDs were compared to ADEC-recommended MQOs.

ADEC laboratory data review checklists for air samples (checklists) were completed for each sample delivery group (SDG), and are provided as attachments. A Summary of Qualified Data is provided as Table 1 (attached). In the case where a sample result was affected by more than one sample-handling anomaly or QC failure, a determination was made as to which qualifier is most conservative, and only that qualifier is retained for reporting. The following sections provide a summary of our findings for each QA/QC element reviewed; anomalies that had no impact to data quality are discussed in the checklists, and are not further described herein.

Sample Analysis Summary

Analytical data for seven indoor air samples (including a duplicate) were reviewed. Samples were analyzed for polycyclic aromatic hydrocarbons (PAH) by modified EPA Method TO-13A SIM and volatile organic compounds

(VOCs) by modified EPA Method TO-15. PAH results were reported in laboratory work order 1711358, and VOC results were reported in laboratory work order 1711424. Note that for the TO-15 analysis, the laboratory reported detection limits (DLs) and limits of detection (LODs) in the laboratory report, but not in the electronic data provided. Thus, this DQA and the attached Table 1 only list the limit of quantitation (LOQ), not the LOD.

Sample Preservation, Handling, Custody, and Holding Times

Sample receipt forms were reviewed to check that samples were received in good condition and within the required temperature range, where applicable. Chain of custody forms were reviewed to confirm that custody was not breached during sample handling. Dates of sample collection, preparation, and analysis were compared to check that method holding times were not exceeded. For air samples collected using Summa canisters, canister vacuums recorded following sample collection and upon receipt at the laboratory were compared.

Air samples collected in carbon sorbent tubes for TO-13A analysis were received in good condition, with no sample receiving anomalies. Two air samples collected in Summa canisters for TO-15 analysis were received at the laboratory with substantially less vacuum than was measured following sample collection, indicating potential leakage during shipping and/or storage. Sample 17-VS6 had a post-collection vacuum of 7 inches mercury (in. Hg), but was received at ambient pressure (0.0 in. Hg). Sample 17-VS4 had a post-collection vacuum of 7 in. Hg, but was received with a vacuum of 1.0 in. Hg. Results for these two samples are conservatively qualified as estimates (detections qualified 'J,' non-detects qualified 'UJ'). No bias is imparted since the concentrations of target analytes in air exposed to the canisters during sample shipping and storage are unknown.

Analytical Sensitivity

Analytical sensitivity was evaluated by checking that analytical reporting limits were below project action limits. Reporting limits (also known as limits of quantitation [LOQs]) were compared to ADEC target levels for residential and commercial indoor air, referenced in ADEC's *Vapor Intrusion Guidance* (November 2017). Reporting limits were below commercial target levels for each sample and analyte. However, reporting limits for benzo(a)anthracene exceeded the residential indoor air target level of 0.092 µg/m^3 for each sample. Results with reporting limits exceeding target levels should be identified in results tables in the project report.

Method Blanks

The laboratories analyzed and reported method blanks (MBs) for each preparatory batch, to check for laboratory-based sample contamination. No analytes were detected in the method blanks for the TO-13A analysis. Benzene, m,p-xylene, o-xylene, and naphthalene were detected below the LOQ in the method blank associated with project samples for the TO-15 SIM (low-level) analysis. Note that Summa canisters are only certified to the LOQ, so any detections below the LOQ may be false positives from trace contamination in the sample canister. Benzene, m,p-xylene, and o-xylene results for associated projects samples were above the LOQ and greater than 5 times

the MB concentration, and were thus not affected. Naphthalene results for all project samples were below the LOQ and should be considered attributable to laboratory-based sample contamination (or residual contamination in canisters following cleaning). Naphthalene results are qualified 'UB' at the LOQ.

Field Blanks

A field blank was submitted with the air samples for TO-13A analysis. Field blanks are used to check for potential contamination of samples from an outside source during sample collection, shipping, or storage. No analytes were detected in the field blank.

Laboratory Control Samples

The laboratories analyzed and reported laboratory control samples (LCSs) for each preparatory batch, to assess laboratory extraction efficiency and analytical accuracy. In some cases, LCS duplicates (LCSDs) were used to assess analytical precision. LCS and LCSD recovery information and LCS/LCSD RPD information (where available) were reviewed.

There were no LCS/LCSD recovery or RPD failures affecting project-sample data for either SDG.

Laboratory Duplicates

The laboratory analyzed 17-VS1 twice, as a laboratory duplicate for the TO-15 analysis. Laboratory duplicate RPDs for 1,3,5-trimethylbenzene and hexane were outside control limits. 1,3,5-Trimethylbenzene was below the LOQ; results for this analyte are already qualified 'J' as estimated, and are not considered further affected. The hexane result for sample 17-VS1 is qualified 'J' as estimated based on the laboratory duplicate RPD failure.

Surrogate Recovery

Samples submitted for analysis of organic compounds were spiked with analyte surrogates to evaluate extraction efficiency and to check for matrix interference. Surrogate recoveries were reviewed for each project sample and analysis.

The laboratory noted in the case narrative for 1711358 that the TO-13A sample cartridges were pre-spiked with fluoranthene-d10 and benzo(a)pyrene-d12 at 50 µg, outside the instrument's calibration range. They qualified the reported recoveries for these surrogates with an 'E' flag in the report.

While accurate quantitation of the field surrogates was not possible, all estimated recoveries were within control limits. The laboratory also spiked project samples with two other surrogates following receipt; these surrogates were accurately quantitated and were within control limits. There were no indications of matrix interference and all measures of analytical accuracy were acceptable, so data were not qualified based on this anomaly.

All surrogate recoveries were within control limits for the TO-15 analysis (SDG 1711424).

Field Duplicates

Sample 17-VS4 was submitted as a field duplicate of 17-VS3 for both TO-13A and TO-15 analysis, meeting the minimum field duplicate collection frequency of 10%. RPDs between field-duplicate results were calculated where at least one result was quantitatively detected (above the LOQ). Duplicate sample results were also checked for disagreement; that is, where one result is above the LOQ and the other result is less than the DL (non-detect).

No analytes were detected for the TO-13A analysis, so no RPDs could be calculated. RPDs exceeded the MQO (25% for air) for the TO-15 analysis for every quantitatively detected (above LOQ) analyte. Results were consistently higher in the duplicate (17-VS4). As noted below, the discrepancy between duplicate results may be related to potential canister leakage for sample 17-VS4. All detected results for the primary (17-VS3) and duplicate (17-VS4) samples are qualified 'J' as estimated.

Other QC Anomalies

The laboratory reported the following calibration failure in the case narrative: "The Relative Response Factor (RRF) for Indeno(1,2,3-cd)pyrene in the Initial calibration (ICAL) was below the EPA method TO-13A minimum requirement of 0.5 at 0.43." While the laboratory's ability to accurately quantitate indeno(1,2,3-cd)pyrene may have been affected, the analyte was not detected in any project samples, so data quality was not affected. The listed reporting limits should not have been affected by this failure, so no data are qualified based on this anomaly.

The following analytes were not spiked in the LCS/LCSD for TO-15 analysis: butylbenzene, sec-butylbenzene, and tert-butylbenzene. CCV recovery is the only measure of the analytical accuracy of results for these compounds. While no results are qualified based on this omission, results for these analytes should be considered with some degree of caution due to the inability to evaluate preparatory-batch level accuracy.

Resolution of Multiple Qualifiers

Detected results for the TO-15 analysis of 17-VS4 were qualified as estimates due to sample handling anomalies (vacuum discrepancy) as well as field duplicate imprecision. It is possible that canister leakage for 17-VS4 contributed to the discrepancy between primary sample (17-VS3) and field duplicate (17-VS4) results. However, the ultimate impact to data usability is the same, and results for 17-VS4 should be considered estimated (flagged 'J') and used with caution. In general, results for 17-VS4 were higher, and should be used for decision-making purposes to represent the duplicate sampling location (south crawlspace).

Naphthalene results for samples 17-VS4 and 17-VS6 were affected by method blank contamination and sample handling anomalies. The 'UB' flag is retained as the more conservative and final flag, and is applied at the sample reporting limit (LOQ).

Summary of Data Quality Indicators

The following sections summarize the findings of the above review with respect to the six data quality indicators: sensitivity, precision, accuracy, representativeness, comparability, and completeness. Note that our evaluation of representativeness, comparability, and completeness is limited to consideration of analytical data quality only. Assessment of data usability in the context of the project must be conducted by the project team as a whole, taking into account the data quality issues summarized herein, as well as overall project objectives.

Sensitivity

Sensitivity describes the ability of the sampling and analytical methodology to meet detection and/or quantitation limit objectives. Air sample reporting limits met project-specific requirements and relevant target levels for non-detect results, with the exception of benzo(a)anthracene, for which TO-13A reporting limits exceeded residential indoor air target levels. With this one exception, analytical sensitivity was adequate for the purposes of this project.

Precision

Precision is a measure of the reproducibility of repetitive measurements. Precision was evaluated based on laboratory QC-sample and field-duplicate sample RPDs. In general, laboratory QC-sample RPDs indicated adequate analytical precision, though one result was qualified due to a laboratory duplicate RPD failure. Field duplicate RPDs for the TO-15 analysis indicated poor overall precision for the duplicate sampling location. Field-duplicate RPDs exceeded the MQO of 25% for all quantitatively detected analytes. This issue is likely confined to the primary and field duplicate sample and may be related to leakage of the field duplicate sample canister. Results were qualified as estimates and the higher of duplicate results should be used for decision-making purposes. Overall precision for remaining sample results was deemed generally acceptable.

Accuracy

Accuracy is a measure of the correctness, or the closeness, between the true value and the quantity detected. Accuracy was evaluated based on analyte recoveries for laboratory QC samples and recovery of surrogate spikes for project samples. Sample handling and preservation anomalies that may have impacted data accuracy are also taken into consideration.

Laboratory QC information indicated that the analyses reported were generally in control. Results for two samples were qualified as estimated due to sample handling anomalies (canister vacuum discrepancies), though the direction of bias is unknown. With these exceptions, analytical accuracy was deemed acceptable for purposes of this project.

Representativeness

Representativeness describes the degree to which data accurately and precisely represent site characteristics. Representativeness is affected by factors such as sample frequency and matrix or contaminant heterogeneity, as well as analytical performance (including sensitivity, accuracy, and precision) and sample cross-contamination. Samples were collected in accordance with an approved work plan. Several results were affected by sample contamination identified in the TO-15 method blank, but affected results were below the LOQ and the certification concentration of the sample canisters. Field duplicate RPD failures suggest results for the primary and field duplicate samples collected from the south crawlspace may not be representative of site conditions.

Overall representativeness should be evaluated by the project team considering sample collection methodology and site conditions alongside data quality concerns discussed above.

Comparability

Comparability describes whether two data sets can be considered equivalent with respect to project goals. Comparability is affected by factors such as sampling methodology and analytical performance (including sensitivity, accuracy, and precision). Comparability was evaluated by checking that standard analytical methods were employed and analytical performance was acceptable. Data review findings generally support that the dataset is comparable; however, comparability should be evaluated by the project team considering sample collection methodology and historic results alongside data quality and analytical methodology.

Completeness

Completeness describes the amount of valid data obtained from the sampling event(s). It is calculated as the percentage of valid measurements compared to the total number of measurements. Any rejection of project sample data must be done by the project team in the context of broader project data quality objectives, so a completeness score is not calculated as part of this DQA. However, there were no serious QC failures that should result in compromised usability of the data, and we do not recommend rejection of any sample results for this project.

Conclusions

Precision, accuracy, and sensitivity were deemed generally acceptable, and the data, as qualified, are usable for the purposes of this project. Data review findings support that the dataset is generally representative of site conditions (see above for exceptions) and comparable to other similar datasets. The project team should evaluate completeness in the context of broader project data quality objectives, taking into account the quality of the data as presented in this DQA.

Limitations

Our review was based solely on information provided by the analytical laboratory in the laboratory reports for the SDGs reviewed. We did not review instrument-level QC elements, such as calibration verification or internal standard response, except to the extent that the laboratory identified instrument-level anomalies in the case narratives. We did not conduct independent validation of the data (e.g. recalculating results based on instrument responses) or review any raw chemical data (e.g. chromatograms).

Attachments:

Table 1	Summary of Qualified Data
ADEC Air Data Review Checklists:	EAT 1711358
	EAT 1711424

Table 1
Summary of Qualified Data
St. Paul Weather Service Office VI Sampling Report
Data Quality Assessment

Lab	Sample ID	Matrix	Method	Analyte	Units	RL	Result	Lab flags	Original Result	QC Flags	Note	Final Qualified Result
EAT	17-VS1	AIR	TO-15	Hexane	µg/m^3	0.54	2.0		2.0	J	3	2.0 J
EAT	17-VS1	AIR	TO-15	Naphthalene	µg/m^3	0.40	0.095	J	0.095 J	UB	2	0.40 UB
EAT	17-VS2	AIR	TO-15	Naphthalene	µg/m^3	0.42	0.073	J	0.073 J	UB	2	0.42 UB
EAT	17-VS3	AIR	TO-15	Hexane	µg/m^3	0.55	1.3		1.3	J	4	1.3 J
EAT	17-VS3	AIR	TO-15	Cyclohexane	µg/m^3	0.53	0.38	J	0.38 J	J	4	0.38 J
EAT	17-VS3	AIR	TO-15	Propylbenzene	µg/m^3	0.76	0.17	J	0.17 J	J	4	0.17 J
EAT	17-VS3	AIR	TO-15	1,2,4-Trimethylbenzene	µg/m^3	0.76	0.57	J	0.57 J	J	4	0.57 J
EAT	17-VS3	AIR	TO-15	Chloroform	µg/m^3	0.76	0.12	J	0.12 J	J	4	0.12 J
EAT	17-VS3	AIR	TO-15	Benzene	µg/m^3	0.25	0.88		0.88	J	4	0.88 J
EAT	17-VS3	AIR	TO-15	Toluene	µg/m^3	0.12	5.8		5.8	J	4	5.8 J
EAT	17-VS3	AIR	TO-15	Ethyl Benzene	µg/m^3	0.13	0.90		0.90	J	4	0.90 J
EAT	17-VS3	AIR	TO-15	m,p-Xylene	µg/m^3	0.27	2.4		2.4	J	4	2.4 J
EAT	17-VS3	AIR	TO-15	o-Xylene	µg/m^3	0.13	0.85		0.85	J	4	0.85 J
EAT	17-VS3	AIR	TO-15	Naphthalene	µg/m^3	0.41	0.14	J	0.14 J	UB	2	0.41 UB
EAT	17-VS4	AIR	TO-15	Hexane	µg/m^3	0.49	2.6		2.6	J	1,4	2.6 J
EAT	17-VS4	AIR	TO-15	Cyclohexane	µg/m^3	0.48	0.54		0.54	J	1,4	0.54 J
EAT	17-VS4	AIR	TO-15	Styrene	µg/m^3	0.59	0.24	J	0.24 J	J	1	0.24 J
EAT	17-VS4	AIR	TO-15	Cumene	µg/m^3	0.68		ND,U	0.68 U	UJ	1	0.68 UJ
EAT	17-VS4	AIR	TO-15	Propylbenzene	µg/m^3	0.68	0.24	J	0.24 J	J	1,4	0.24 J
EAT	17-VS4	AIR	TO-15	1,3,5-Trimethylbenzene	µg/m^3	0.68	0.37	J	0.37 J	J	1	0.37 J
EAT	17-VS4	AIR	TO-15	1,2,4-Trimethylbenzene	µg/m^3	0.68	1.3		1.3	J	1,4	1.3 J
EAT	17-VS4	AIR	TO-15	Butylbenzene	µg/m^3	3.8		ND,U	3.8 U	UJ	1	3.8 UJ
EAT	17-VS4	AIR	TO-15	sec-Butylbenzene	µg/m^3	3.8		ND,U	3.8 U	UJ	1	3.8 UJ
EAT	17-VS4	AIR	TO-15	tert-Butylbenzene	µg/m^3	3.8		ND,U	3.8 U	UJ	1	3.8 UJ
EAT	17-VS4	AIR	TO-15	Chloroform	µg/m^3	0.68	0.24	J	0.24 J	J	1,4	0.24 J
EAT	17-VS4	AIR	TO-15	Benzene	µg/m^3	0.22	1.7		1.7	J	1,4	1.7 J
EAT	17-VS4	AIR	TO-15	Toluene	µg/m^3	0.10	9.8		9.8	J	1,4	9.8 J
EAT	17-VS4	AIR	TO-15	Ethyl Benzene	µg/m^3	0.12	1.3		1.3	J	1,4	1.3 J

Table 1
Summary of Qualified Data
St. Paul Weather Service Office VI Sampling Report
Data Quality Assessment

Lab	Sample ID	Matrix	Method	Analyte	Units	RL	Result	Lab flags	Original Result	QC Flags	Note	Final Qualified Result
EAT	17-VS4	AIR	TO-15	m,p-Xylene	µg/m^3	0.24	4.0		4.0	J	1,4	4.0 J
EAT	17-VS4	AIR	TO-15	o-Xylene	µg/m^3	0.12	1.5		1.5	J	1,4	1.5 J
EAT	17-VS4	AIR	TO-15	Naphthalene	µg/m^3	0.36	0.16	J	0.16 J	J,UB	1,2	0.36 UB
EAT	17-VS5	AIR	TO-15	Naphthalene	µg/m^3	0.41	0.090	J	0.090 J	UB	2	0.41 UB
EAT	17-VS6	AIR	TO-15	Hexane	µg/m^3	0.47	4.3		4.3	J	1	4.3 J
EAT	17-VS6	AIR	TO-15	Cyclohexane	µg/m^3	0.46	2.1		2.1	J	1	2.1 J
EAT	17-VS6	AIR	TO-15	Styrene	µg/m^3	0.57	0.89		0.89	J	1	0.89 J
EAT	17-VS6	AIR	TO-15	Cumene	µg/m^3	0.66	0.38	J	0.38 J	J	1	0.38 J
EAT	17-VS6	AIR	TO-15	Propylbenzene	µg/m^3	0.66	0.87		0.87	J	1	0.87 J
EAT	17-VS6	AIR	TO-15	1,3,5-Trimethylbenzene	µg/m^3	0.66	1.2		1.2	J	1	1.2 J
EAT	17-VS6	AIR	TO-15	1,2,4-Trimethylbenzene	µg/m^3	0.66	4.7		4.7	J	1	4.7 J
EAT	17-VS6	AIR	TO-15	Butylbenzene	µg/m^3	3.7		ND,U	3.7 U	UJ	1	3.7 UJ
EAT	17-VS6	AIR	TO-15	sec-Butylbenzene	µg/m^3	3.7		ND,U	3.7 U	UJ	1	3.7 UJ
EAT	17-VS6	AIR	TO-15	tert-Butylbenzene	µg/m^3	3.7		ND,U	3.7 U	UJ	1	3.7 UJ
EAT	17-VS6	AIR	TO-15	Chloroform	µg/m^3	0.65	0.23	J	0.23 J	J	1	0.23 J
EAT	17-VS6	AIR	TO-15	Benzene	µg/m^3	0.21	3.5		3.5	J	1	3.5 J
EAT	17-VS6	AIR	TO-15	Toluene	µg/m^3	0.10	31		31	J	1	31 J
EAT	17-VS6	AIR	TO-15	Ethyl Benzene	µg/m^3	0.12	3.9		3.9	J	1	3.9 J
EAT	17-VS6	AIR	TO-15	m,p-Xylene	µg/m^3	0.23	15		15	J	1	15 J
EAT	17-VS6	AIR	TO-15	o-Xylene	µg/m^3	0.12	5.5		5.5	J	1	5.5 J
EAT	17-VS6	AIR	TO-15	Naphthalene	µg/m^3	0.35	0.34	J	0.34 J	J,UB	1,2	0.35 UB
EAT	17-VS7	AIR	TO-15	Naphthalene	µg/m^3	0.44	0.34	J	0.34 J	UB	2	0.44 UB

Table 1
Summary of Qualified Data
St. Paul Weather Service Office VI Sampling Report
Data Quality Assessment

Notes

1 Sample handling anomaly (canister vacuum discrepancy)
2 Method blank contamination
3 Laboratory duplicate RPD failure
4 Field duplicate RPD failure

Abbreviations

RL	reporting limit (limit of quantitation)
µg/m^3	micrograms per liter
RPD	relative percent difference
QC	quality control
EAT	Eurofins Air Toxics, Inc. - Folsom, CA

Flag definitions

B	The analyte was detected above the LOQ but may be affected by blank-associated sample contamination (biased high).
UB	Result considered not detected due to contamination identified at a similar concentration in a corresponding blank sample.
J	Estimated concentration; analyte was detected between the DL and the limit of quantitation (LOQ), or was affected by QC failures.
UJ	The analyte was not detected; however, the reporting limit is estimated because of QC failures or sample handling anomalies.
U	The analyte was analyzed for, but not detected.

APPENDIX E

VAPOR INTRUSION SCREENING LEVEL CALCULATOR

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OSWER VAPOR INTRUSION ASSESSMENT

Vapor Intrusion Screening Level (VISL) Calculator Version 3.5, June 2017 RSLs

The primary objective of risk-based screening is to identify sites or buildings unlikely to pose a health concern through the vapor intrusion pathway. Generally, at properties where subsurface concentrations of vapor-forming chemicals (e.g., groundwater or "near source" soil gas concentrations) fall below screening levels (i.e., VISLs), no further action or study is warranted, so long as the exposure assumptions match those taken into account by the calculations and the site fulfills the conditions and assumptions of the generic conceptual model underlying the screening levels. In a similar fashion, the results of risk-based screening can help the data review team identify areas, buildings, and/or chemicals that can be eliminated from further assessment. The generic conceptual model underlying these screening levels is described in OSWER Publication 9200.2-154 (OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway From Subsurface Vapor Sources to Indoor Air) (EPA 2015; Section 6.5)

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens
Average Groundwater Temperature (°C)	Tgw	6.37	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1) Yes/No	Does chemical have inhalation toxicity data? (IUR and/or RfC) Yes/No	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? Csvo > Cia,target? Yes/No	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? Chc > Cia,target? Yes/No	Target Indoor Air Conc. @ TCR = 10E-06 or THQ = 1 MIN(Cia,c;Cia,nc) (ug/m^3)	Toxicity Basis C/NC	Target Sub-Slab and Exterior Soil Gas Conc. @ TCR = 10E-06 or THQ = 1 (ug/m^3)	Target Ground Water Conc. @ TCR = 10E-06 or THQ = 1 (ug/L)	Is Target Ground Water Conc. < MCL? Yes/No (MCL ug/L)	Pure Phase Vapor Conc. @ 25°C (ug/m^3)	Maximum Groundwater Vapor Conc. (ug/m^3)	Temperature for Max. Groundwater Vapor Conc. C	Lower Explosive Limit** (% by vol)	LEL Source	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration (mg/m^3)	RFC Source*	Mutagenic Indicator	Target Indoor Air Conc. for Carcinogens @ TCR = 10E-06 (ug/m^3)	Target Indoor Air Conc. for Non-Carcinogens @ THQ = 1 (ug/m^3)
91-20-3	Naphthalene	Yes	No	Yes	Yes	8.3E-01	C	2.8E+01	2.0E+02	--	5.86E+05	1.30E+05	6.37	0.9	N	3.40E-05	CA	3.00E-03	I		8.3E-01	3.1E+00

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario in cell G10) Symbol	Selected (based on scenario in cell G10) Value
Averaging time for carcinogens	(yrs)	ATc R	70	ATc C	70	ATc	70
Averaging time for non-carcinogens	(yrs)	ATnc R	26	ATnc C	25	ATnc	26
Exposure duration	(yrs)	ED R	26	ED C	25	ED	26
Exposure frequency	(days/yr)	EF R	350	EF C	250	EF	350
Exposure time	(hr/day)	ET R	24	ET C	8	ET	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario in cell G10) Symbol	Selected (based on scenario in cell G10) Value
Groundwater (-)	AFgw R	0.001	AFgw C	0.001	AFgw	0.001
Sub-Slab and Exterior Soil Gas (-)	AFss R	0.03	AFss C	0.03	AFss	0.03

(3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario in cell G10) Symbol	Selected (based on scenario in cell G10) Value
	mIURTCE R	1.00E-06	mIURTCE C	0.00E+00	mIURTCE	1.00E-06
	IURTCE R	3.10E-06	IURTCE C	4.10E-06	IURTCE	3.10E-06

Mutagenic Chemicals

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

The exposure durations and age-dependent adjustment factors for mutagenic mode-of-action are listed in the table below:

Age Cohort	Exposure Duration (years)	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 This factor is used in the equations for mutagenic chemicals.

See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:

NVT = Not sufficiently volatile and/or toxic to pose inhalation risk in selected exposure scenario for the indicated medium
C = Carcinogenic
NC = Non-carcinogenic
I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
E = The Engineering ToolBox. Available online at http://www.engineeringtoolbox.com/explosive-concentration-limits-d_423.html
N = Centers for Disease Control and Prevention (CDC) National Institute for Occupational Safety and Health (NIOSH). Pocket Guide to Chemical Hazards. Available online at: http://www.cdc.gov/niosh/npg/default.html http://www.cdc.gov/niosh/npg/default.html
M = Chemical-specific MSDS
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
**Lower explosive limit is the minimum concentration of the compound in air (% by volume) that is needed for the gas to ignite and explode.

OSWER VAPOR INTRUSION ASSESSMENT
Groundwater Concentration to Indoor Air Concentration (GWC-IAC) Calculator Version 3.5, June 2017 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR	1.00E-05	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)
Average Groundwater Temperature (^{o}C)	Tgw	6.37	Enter average of the stabilized groundwater temperature to correct Henry's Law Constant for groundwater target concentrations

CAS	Chemical Name	Site Groundwater Concentration Cgw (ug/L)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR ($(ug/m^3)^{-1}$)	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator
91-20-3	Naphthalene	8.8E+01	3.68E-01	4.5E-06	1.2E-01	3.40E-05	CA	3.00E-03	I	

Notes:

(1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc R GW	70	ATc C GW	70	ATc GW	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_GW	26	ATnc_C_GW	25	Atnc_GW	26
Exposure duration	(yrs)	ED R GW	26	ED C GW	25	ED GW	26
Exposure frequency	(days/yr)	EF R GW	350	EF C GW	250	EF GW	350
Exposure time	(hr/day)	ET R GW	24	ET C GW	8	ET GW	24

(2) **Generic Attenuation Factors:**

Source Medium of Vapors	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater (-)	AFgw R GW	0.001	AFgw C GW	0.001	AFgw GW	0.001
Sub-Slab and Exterior Soil Gas (-)	AFss R GW	0.03	AFss C GW	0.03	AFss GW	0.03

(3) **Formulas**
Cia, target = MIN(Cia,c; Cia,nc)
Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)
Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

(4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE R GW	1.00E-06	IURTCE C GW	0.00E+00	mIURTCE GW	1.00E-06
	IURTCE_R_GW	3.10E-06	IURTCE_C_GW	4.10E-06	IURTCE_GW	3.10E-06

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 26 years	10	1

Mutagenic-mode-of-action (MMOA) adjustment factor 72 — This factor is used in the equations for mutagenic chemicals.

Vinyl Chloride — See the Navigation Guide equation for Cia,c for vinyl chloride.

Notation:
I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html
P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml
A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html
CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp
H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml
S = See RSL User Guide, Section 5
X = PPRTV Appendix
Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).
VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).
TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).
Yellow highlighting indicates site-specific parameters that may be edited by the user.
Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be changed.
Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

APPENDIX F

ADEC COMMENTS

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Alaska Department of Environmental Conservation
Comments on the Draft 2018 STP WS Office Air Sampling Report for St. Paul Island January 2018
Commenter: Louis Howard (ADEC) Comments Developed: March 13, 2018

Cmt. No.	Pg. & Line	Sec.	Comment/Recommendation	Response
1.	vii		**Executive Summary** The text states: "Vapor intrusion became a concern at the WSO Composite Building when a 500-gallon UST was removed from the south side of the building in 2000." Please clarify in the text what type of product was used in the 500-gallon underground storage tank (UST).	Added: …"used for diesel fuel"…
2.	1	1.2	**Site History** The text states: "In 1999, Tetra Tech decommissioned a 10,000-gallon above ground storage tank and three 3,000-gallon underground storage tanks (USTs) that were located approximately 75 feet southwest of the Composite Building and advanced soil borings to delineate an area contaminated from releases from those tanks (Tetra Tech, 2000)." Please clarify in the text what type of product was in the aboveground storage tank and the three USTs.	Changed to …"a 10,000-gallon diesel fuel above ground storage tank and three 3,000-gallon diesel fuel underground storage tanks (USTs)…"
3.	3	2.1	**Building Survey** The text states: "The building occupant interviewed for the building survey reported to have noticed a fuel oil smell in the pool room." Given the interview response above, ADEC requests an explanation be provided in the text on why the pool room indoor air not sampled.	The intent of this sampling event was to re-collect samples as collected during the 2012 Site Characterization. Also, since the pool room is located adjacent to the furnace room and the garage, the smell is likely coming from fuel associated with these areas and not from vapor intrusion resulting from contaminated soil or groundwater. Added to the text: "This area was not sampled in order to avoid bias from fuel vapors associated with vehicles or the furnace."
4.	4	2.3	**Air Sampling** The text states: "Crawlspace and outdoor air sampling locations were placed on the ground."	ASTs were near the building, so those areas were avoided to avoid bias. The sample was placed upwind of the building

Cmt. No.	Pg. & Line	Sec.	Comment/Recommendation	Response
			Please explain why the outdoor air sample was collected from the ground. Typically outdoor air samples are collected from the roof or near a building air intake. The text states: "The field scientist turned on the pump at a rate of approximately 5 L/min for a minimum of 22 minutes to equal a total of at least 110 liters of air pumped through the sampler." Please clarify in the text why a flow rate of 5 L/min was utilized to collect air samples and not a flow rate of 0.2 L/min which is more consistent with the ADEC 2017 Vapor Intrusion Guidance recommendations. "DEC recommends purging and sampling at rates between 100 to 200 milliliters per minute to limit stripping, prevent ambient air from diluting the soil gas samples, and to reduce the variability of purging rates. This equates to collection of a 6-liter summa canister over at least 30 minutes. The low-flow purge rate increases the likelihood that representative samples may be collected. The purge/sample rate may be modified based on conditions encountered in individual soil gas probes with DEC approval; however, low flow rates are particularly important when soil gas samples are being collected from a shallow depth"	to capture outdoor air which may flow into the building through multiple possible entrances. A high volume of soil gas was required in the XAD tubes to achieve the required LODs. Higher flow rates were used because of time constraints. Sampling was performed as stated in the approved work plan. Summa can sampling was collected in conformance with ADEC guidance. From WS#17 in the QAPP: "The team member will turn on the pump at a rate of 5 L/min for at least 22 minutes to equal a total of at least 110 liters of air pumped through the sampler." Added: "Leak tests were completed at each sample location and no leaks were detected, indicating that ambient air was not pulled into the sample."
5.	7	3.0	**Results** The text states: "It was not definitive if the building was under-pressurized or over-pressurized when measuring differential pressures, due to the high wind speeds." ADEC requests further clarification in the text on why it was not definitive that the building was under-pressurized or over-pressurized.	Added: "The building was measured at a negative pressure on the upwind (west) side and a positive pressure on the downwind (east) side compared to outside pressure."

Alaska Department of Environmental Conservation
Comments on the Draft 2018 STP WS Office Air Sampling Report for St. Paul Island January 2018
Commenter: Louis Howard (ADEC) Comments Developed: March 13, 2018

Cmt. No.	Pg. & Line	Sec.	Comment/Recommendation	Response
6.	9	4.0	**Conclusions** The text states: "No PAHs were detected by TO-13A; Benzo(a)anthracene was not detected in any air sample, but reporting limits were greater than the ADEC residential target level of 0.092 µg/m3." ADEC requests clarification on whether there was a limit of detection (LOD) reported by the laboratory for benz[a]anthracene. If so, please compare the LOD to the indoor air target level of 0.092 µg/m^3.	A detection limit was not provided by the laboratory for TO-13A.
7.		Table 1	**Air Sample Analytical Results** **Analyte** **Styrene** The correct indoor air residential target level is 850 µg/m^3 not 1,000 µg/m^3. Correct table value. **Toluene** The correct indoor air residential target level is 3,800 µg/m^3 not 5,200 µg/m^3. Correct table value.	Target levels changed as suggested.
8.		Fig. 2	**Weather Service Office Composite Building Plan** Please indicate the prevailing wind pattern in this figure.	Added arrow on figure pointing east.
9.	I-5	9	**Building Survey** **Floor Plans** There is no plan view of the basement and first floor of the building in the building survey. This section of the building survey suggested to see marked up figure. ADEC requests clarification in this section where the marked up figure is located.	Marked up figure was missing and has been added to Appendix A.

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From:	Anne Delp - NOAA Federal
To:	Joel Brann
Subject:	Fwd: 2018.03.22 STP VI RTC (Final)-ADEC Approved.
Date:	Monday, May 14, 2018 3:15:51 PM

Anne H. Delp
Environmental Engineer
Environmental Compliance Division
National Oceanic & Atmospheric Administration (NOAA)
U.S. Department of Commerce
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301.628.0959 (office)

---------- Forwarded message ----------
From: **Howard, Louis R (DEC)** <louis.howard@alaska.gov>
Date: Mon, May 14, 2018 at 7:06 PM
Subject: RE: 2018.03.22 STP VI RTC (Final)-ADEC Approved.
To: Anne Delp - NOAA Federal <anne.delp@noaa.gov>

ADEC has reviewed the responses to ADEC's comments on the STP VI report and finds the responses satisfactory. ADEC will approve the RTCs for incorporation into the final document.

Louis Howard

Alaska Department of Environmental Conservation

Division of Spill Prevention and Response

Contaminated Sites Program

555 Cordova Street 2nd Floor, Anchorage AK 99501-2617

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From: Anne Delp - NOAA Federal [mailto:anne.delp@noaa.gov]
Sent: Monday, May 14, 2018 2:52 PM
To: Howard, Louis R (DEC) <louis.howard@alaska.gov>
Subject: 2018.03.22 STP VI RTC (Final)

Attached is the updated Response to Comments for the NOAA NWS VI Report.

Thanks

Anne