HALEY & ALDRICH, INC.
6420 S Macadam Avenue
Suite 100
Portland, OR 97239
503.620.7284

10 July 2024
File No. 0209772-004

City of Portland, Bureau of Environmental Services
1120 SW 5th Avenue, Room 1000
Portland, Oregon 97204

Attention: Taryn Meyer

Subject: Soil Vapor Investigation
West Property - TASS 2 Site
10505 North Portland Road
Portland, Oregon
ECSI No. 0186

Dear Taryn Meyer:

Haley & Aldrich, Inc. (Haley & Aldrich) is pleased to submit this report summarizing the results of a soil vapor investigation (SVI) of the West Property - Temporary Alternative Shelter Site (TASS) 2 located in Portland, Oregon (site). The area that was investigated is an approximately 6-acre portion of the West Property, located at 10505 North Portland Road (tax lot 1000 of Multnomah County tax map 1N1E05B). The City of Portland (City) intends to construct a TASS facility (TASS 2) at the site. Environmental services in preparation for construction of the TASS 2 site are being funded using U.S. Environmental Protection Agency (EPA) Brownfield Grant funding.

Preliminary plans indicate that TASS 2 will consist of recreational vehicle storage areas; car parking areas; mobile manufactured housing pods; tents for common areas including kitchen areas, trash areas, picnic areas, and gathering areas; and sewage and stormwater infrastructure. The entirety of the site will be paved following the completion of construction activities, except for stormwater swales and a small, forested area along the east boundary of the site. The average duration of occupancy for TASS 2 residents is anticipated to be 90 days, with a maximum duration of six months.

Background

A detailed site history, summaries of previous investigations, and a Conceptual Site Model have been presented in previous reports and are not discussed herein. Briefly, the West Property use has been industrial since at least the 1940s, including use as a shingle mill, a boat manufacture and repair facility, a tank-truck washing facility, and for materials storage, welding, and diesel engine repair and rebuilding. The Columbia Slough adjoins the north boundary of the West Property. The West Property, also referred

to as the North Larsen Property, was listed on the Oregon Department of Environmental Quality (DEQ) Environmental Cleanup Site Information (ECSI) database (ECSI No. 0186) because of the presence or suspected presence of metals, and petroleum hydrocarbons and associated constituents in soil and/or groundwater. The historical sources of the contamination at the West Property included discharge of wastewater to on-site ponds, product spillage, leaking underground storage tanks, contaminated stormwater runoff, and contaminants released to an on-site drywell. Historical industrial features are depicted on the figures included in Attachment A of the Contaminated Media Management Plan (CMMP).

Haley & Aldrich prepared a draft Remedial Action Plan (RAP) dated 27 March 2024 (Haley & Aldrich, 2024a), a draft Risk Assessment (RA) dated 19 April 2024 (Haley & Aldrich, 2024b), and a Contaminated Media Management Plan for the site dated 3 May 2024 (Haley & Aldrich, 2024c). DEQ provided preliminary comments to the draft RA that identified data gaps associated with potential vapor intrusion at the site and requested the City conduct a SVI of the TASS 2 site to evaluate potential vapor intrusion risk to future site occupants and workers.

Haley & Aldrich prepared a draft SVI Work Plan for this investigation dated 5 April 2024. DEQ approved the draft work plan in email correspondence dated 16 April 2024, with some minor requested revisions to the draft SVI work plan. Haley & Aldrich incorporated DEQ's requested edits into the SVI Work Plan and issued the final SVI Work Plan on 23 April 2024. The final SVI Work Plan is included in Attachment A.

Scope of Services

The purpose of the SVI was to evaluate potential volatilization risk to future site occupants and workers. The specific scope of services for the SVI, which was conducted in general accordance with the final SVI Work plan (except for the deviations identified in the "Work Plan Deviations" section of this report) and DEQ's March 2024 draft *Guidance for Assessing and Remediating Vapor Intrusion into Buildings*, was as follows:

- Prepared a health and safety plan that addressed utility locating and field activities in general accordance with the Occupational Safety and Health Act and Oregon Administrative Rules.
- Coordinated with the Oregon Utility Notification Center to have public utilities located at the site.
- Subcontracted with a private utility locator to clear planned soil vapor probe locations of potential utility conflicts.
- Coordinated with an analytical laboratory licensed in Oregon to provide sampling media and analytical services.
- Subcontracted with Cascade Environmental of Clackamas, Oregon to install 10 soil vapor probes (SV-1 through SV-10) at the site in general accordance with the SVI Work Plan. Key protocols included:
  - Attempted to install 10 soil vapor probes (SV-1 through SV-10) at a depth of 5.5 feet below ground surface (bgs). Each soil vapor probe consisted of Teflon tubing fitted to an approximately 6-inch stainless-steel screen at the bottom of each probe. Each probe

was placed at the target depth and the exterior rod retracted to expose the approximately 6-inch stainless-steel screen. Each borehole was then filled with a sand filter pack and bentonite plug. A two-way valve was fitted to the top of the tubing and was kept closed prior to purging and sampling.

  - Prior to sample collection, performed a Summa cannister vacuum hold test, helium leak test, and a sample train shut-in test.
  - Purged a minimum of two probe volumes before sampling. Purging was completed during the helium leak test using an external pump. During purging, volatile organic compound (VOC) concentrations were measured and recorded using a calibrated photoionization detector with a 10.6-electron volt lamp, and methane, carbon dioxide, and oxygen concentrations were measured with a multi-gas meter at each soil vapor probe prior to collection of VOC data.
  - Collected soil vapor samples from the probes using a 1-liter, laboratory-provided Summa canister with a flow controller set to a flow rate of 200 milliliters per minute or less, as well as a sorbent-packed thermal desorption tube at each location plus one field duplicate tube.
  - Following sample collection, the vapor probes were removed and the boreholes abandoned in accordance with Oregon Water Resources Department regulations.
- Transported the soil vapor samples under chain of custody to Eurofins USA for chemical analysis.
- Submitted the soil vapor samples for analysis of:
  - Total petroleum hydrocarbons (TPH) as gasoline (TPH-G) and VOCs by EPA Method TO-15 to evaluate potential volatilization risks at the TASS 2 site, and
  - TPH as diesel (TPH-D) and VOCs by EPA Method TO-17.
- Presented the results of the SVI in this report.

Field Activities

SITE PREPARATION

Sample locations were marked in the field by Haley & Aldrich personnel and cleared of potential utility conflicts by APS Locating of Portland, Oregon on 22 April 2024.

SOIL VAPOR PROBE INSTALLATION

Soil vapor probe installation was conducted on 22 April 2024 and included installing 10 soil vapor probes (SV-1 through SV-10) at the approximate locations shown on Figure 1 in general accordance with DEQ's March 2024 draft Guidance for Assessing and Remediating Vapor Intrusion into Buildings and the May 2024 SVI Work Plan.

The drilling subcontractor attempted to install the soil vapor probes with hand auger borings to satisfy drilling subcontractor utility avoidance policies. The hand auger borings encountered refusal due to apparent debris, so the soil vapor probes were installed with a direct-push drill rig. Except for soil vapor probe SV-3, each soil vapor probe was set at a depth of 5.5 feet bgs, and the outer rod retracted to 5 feet bgs to expose the 6-inch stainless-steel screen. Due to the presence of apparent perched groundwater, soil vapor probe SV-3 was set at a depth of 3.5 feet bgs before the outer rod was retracted to 3 feet bgs to expose the stainless-steel screen.

MULTI-METER SCREENING AND VOC SAMPLING

The soil vapor probes were allowed to sit and equilibrate for two days after installation on 22 April 2024. Haley & Aldrich personnel returned to the site on 24 April 2024 to begin collecting soil vapor samples. Prior to installing the sampling assemblies at each soil vapor probe, a multi-gas meter was used to measure concentrations of methane, carbon dioxide, and oxygen in each soil vapor probe, as shown on Table 1, attached. Methane was measured at concentrations up to 50 percent in each of the soil vapor probes; therefore, methane was added as an analyte during analysis of the TO-15 sample canisters. Methane was not detected in ambient air during VOC sampling activities.

A leak-check system was used that consisted of a shroud placed over each sampling assembly and charged with helium. A sample was collected from each assembly into a 1-liter Tedlar bag after purging approximately one void volume, and a helium detector was used to measure potential concentrations of helium in the Tedlar bag sample. The thermal conductivity detector of the helium analyzer will respond to methane and the relatively high methane readings at several locations led to false positive readings for helium. This was checked in the field by making “helium” measurements directly from the soil vapor probes without a shroud present.

Definitive helium measurements were conducted in the off-site analytical laboratory. This provided accurate leak check results, but the results were not available to the field crew at the time of sampling. Little or no helium was detected in seven of the eight samples (as discussed in the *Work Plan Deviations* section of this report, helium was not used for leak detection at soil vapor probe SV-3). Overall, valid VOC data were collected for eight out of 10 locations (80 percent data capture), including valid data from all 10 planned soil vapor probes except for soil vapor probes SV-7 and SV-10. As discussed in the *Work Plan Deviations* section of this report, a sample could not be collected from soil vapor probe SV-7 because of faulty probe installation, and ambient air contribution at soil vapor probe SV-10 was found to be approximately 40 percent, indicating that the results for sample SV-10-TO-15 are likely biased low. Field data sheets from the SVI are included in Attachment B.

SAMPLE SHIPPING - CHAIN OF CUSTODY

The soil vapor samples were transported under standard chain-of-custody protocols to Eurofins Air Toxics, LLC of Folsom, California for analysis of helium and/or methane by modified ASTM Method D-1946, VOCs and TPH-G by EPA Method TO-15, and TPH-D and VOCs by EPA Method TO-17. As discussed in the *Work Plan Deviations* section of this report, during transport to the laboratory, United Parcel Service lost the cooler containing the TO-17 sample containers. Therefore, the laboratory was unable to analyze the TO-17 samples collected during this investigation. The helium and methane analytical results

are presented on Table 1, attached. VOCs with site-specific risk-based concentrations (RBCs) and TPH-G analytical results are presented on Table 2, attached. The laboratory analytical report is included in Attachment C.

ADDITIONAL METHANE INVESTIGATION AND SCREENING ACTIVITIES

Because of the detected concentrations of subsurface methane, Haley & Aldrich personnel returned to the TASS 2 site on 6 June 2024, and collected ambient air measurements for methane, hydrogen sulfide, and carbon dioxide at the ground surface at 18 locations throughout the West Property. Measurements were also collected from three septic treatment tanks, an open excavation for eight septic holding tanks, the eight septic holding tanks inside of this excavation, a portable restroom, a plumbing system standpipe, and three office spaces inside of a closed, unoccupied Conex box-type mobile office. Methane was not detected at the site, except for at two ground surface locations near the west boundary of the TASS 2 site (#7 and #8). The detected concentrations of methane at locations #7 and #8 were 0.07 and 0.08 percent, respectively. Hydrogen sulfide was not detected at any of the measurement locations. Carbon dioxide was detected at each measurement location at concentrations ranging from 0.02 to 0.10 parts per million. Field data and a site plan showing measurement locations from the 6 June 2024 air measurements are presented in Attachment B.

Work Plan Deviations

During the course of this investigation, Haley & Aldrich personnel encountered conditions outside of their control, which resulted in deviations from the DEQ-approved work plan. Following is a summary of work plan deviations encountered during this investigation:

- Apparent perched groundwater was encountered in soil vapor probe SV-3 at 5.5 feet bgs, the planned depth of soil vapor probe SV-3. Therefore, soil vapor probe SV-3 was retracted and set at a depth of 3.5 feet bgs before the outer rod was retracted to 3 feet bgs to expose the stainless-steel screen. This deviation from the work plan is not expected to affect the results of this investigation.
- A helium leak check could not be performed at soil vapor probe SV-3 because after retracting the probe to 3.5 feet bgs, the upper portion of the soil vapor probe protruded too far above ground to affix the shroud. Therefore, for soil vapor probe SV-3, a qualitative leak check was performed using rags soaked with 2-propanol placed at each sampling assembly connection. A very low concentration of 2-propanol (6.4 micrograms per cubic meter [µg/mg^3]) was detected at SV-3, and the detected concentration of 2-propanol in SV-3 was similar to or less than 2-propanol detections in other soil vapor probes, where 2-propanol was not used. Therefore, this deviation from the work plan is not expected to affect the results of this investigation.
- One of the laboratory-provided TO-15 sample containers did not contain adequate vacuum for sampling; and therefore, could not be used during the sampling event. Additionally, the connection between the sampling manifold and a second TO-15 sample container failed while collecting soil vapor sample SV-2, which allowed ambient air to enter the sample container. Another TO-15 sample container was used to collect the soil vapor sample from soil vapor probe SV-2. Because two of the laboratory-provided sample containers could not be used, sufficient

sample containers were not available to collect a field duplicate sample for TO-15 analysis. One field duplicate sample for TO-17 analysis was collected from soil vapor probe SV-10. However, as explained below, this field duplicate sample could not be analyzed. While field duplicate samples are useful in documenting the precision of the sample collection process, the absence of a field duplicate sample is not expected to affect the results of this investigation.

- During transport to the laboratory, United Parcel Service lost the cooler containing the TO-17 sample containers. Therefore, the laboratory was unable to analyze the TO-17 samples collected during this investigation. Naphthalene is included on the TO-15 analytical list and is frequently considered an indicator of the potential presence of diesel-range hydrocarbons. Naphthalene was not detected in any of the soil vapor samples analyzed, and the method reporting limits for naphthalene during the TO-15 analysis were several orders of magnitude less than the DEQ-developed RBCs. Additionally, the carcinogenic VOCs included in the TO-17 analysis are captured in the TO-15 analysis. Therefore, the absence of TO-17 analytical data is not expected to affect the results of this investigation.
- Ambient air contribution at soil vapor probe SV-10 was found to be approximately 40 percent. The typical acceptance criterion for leak rate tests is 10 percent and that value was exceeded, so the analytical results for the sample collected from SV-10 are considered biased low. Nonetheless, the SV-10 result still can be used to yield insights. Very few VOCs were detected at SV-10, so even if the detected concentrations were increased by a factor of two to account for the leakage, the detected VOC concentrations at SV-10 would still be far less than one percent of the site-specific RBCs. Therefore, the ambient air contribution at soil vapor probe SV-10 is not expected to significantly affect the results of this investigation.
- During sampling of soil vapor probe SV-7, Haley & Aldrich field staff observed that the end of the Teflon tubing in the soil vapor probe was not connected to the base of the soil vapor probe, which would allow ambient air to be drawn into the sample. Haley & Aldrich field staff attempted to connect the tubing to the base of the soil vapor probe for approximately one hour but were unsuccessful. Because the drilling contractor was no longer on site, a replacement probe could not be installed at SV-7 and a soil vapor sample could not be collected at that location. However, the detected concentrations of VOCs in soil vapor samples collected from probes SV-3, SV-4, SV-6, and SV-9, located approximately 180, 130, 140, and 180 feet from soil vapor probe SV-7, were generally between three and five orders of magnitude less than the DEQ-developed, site-specific RBCs. Additionally, petroleum hydrocarbons and VOCs were not detected in groundwater at previous boring B-2, located approximately 80 feet east of soil vapor probe SV-7. Therefore, the lack of a sample from soil vapor probe SV-7 is not expected to significantly affect the results of this investigation.

Risk Screening Levels

DEQ has not established generic RBCs for soil vapor volatilization to outdoor air. Therefore, for select VOCs, DEQ developed site-specific RBCs for soil vapor volatilization to outdoor air. DEQ's draft memorandum dated 26 April 2024 presenting the rationale behind the site-specific RBCs for soil vapor volatilization to outdoor air is included in Attachment D. The DEQ-developed, site-specific RBCs for the TASS 2 site and a comparison of detected VOC and TPH-G results to these RBCs are presented on

Table 2, attached. The full lists of VOCs analyzed during this investigation are included in the laboratory reports, presented in Attachment C.

Methane is a non-toxic compound that does not have established human-health-based screening levels. It can, however, pose a fire or explosion risk and can act as a simple asphyxiant. Methane was evaluated following the precepts set forth in ASTM International (ASTM) E2993-23, Standard Guide for Evaluating Potential Hazard as a Result of Methane in the Vadose Zone. This calls for evaluating methane based on concentration, volume, and pressure. Due to the lack of oxygen, methane in a typical soil matrix will not burn or explode, but methane can be an issue if it migrates into subsurface structures or structures affixed to the ground surface and is present at concentrations between its lower explosion limit (LEL) and upper explosion limit (UEL) of 5 percent and 15 percent, respectively. The LEL and UEL apply to concentrations of methane in air and do not apply to methane concentrations in soil. The natural aeration of soil containing methane gas is not likely to generate hazardous atmospheres with respect to flammability. Additionally, except for two minor detections at the ground surface, methane was not detected in ambient air, excavations, or enclosed spaces during the 6 June 2024 monitoring event.

As seen in Table 1, attached, the measured methane concentration was up to 50 percent in soil vapor samples collected from soil vapor probe locations (SV-1 through SV-6 and SV-8 through SV-10). Significant concentrations of methane were not detected at the ground surface. The amount of biogas that is produced will affect its transport through the soil. If the gas production is small, the gas typically will move via diffusion. If the gas proctor is large; however, the gas may build up to the point where the internal pressure at the location where it is being produced will support advective transport. At this site, the total biogas concentration (i.e., methane plus carbon dioxide) never reached even 60 percent, indicating that the biogas is diluted with nitrogen and other atmospheric gases. Therefore, the amount of biogas that has been generated appears to be too small to result in internal pressure associated with an increase in gas volume. Gas transport to the ground surface will be limited by diffusion rather than advection. As the gas diffuses towards the ground surface, there should be more than sufficient oxygen to support aerobic biodegradation. However, even if there is no biodegradation, the future TASS 2 structures will have air gaps of between 5 and 18 inches above the ground surface, so any methane should not pose a risk to future occupants of TASS 2.

Methane generation can begin or increase in the future if there is organic carbon present in the subsurface and the right conditions exist (e.g., no oxygen or other electron acceptors, moisture). A plot of TPH versus methane based on soil vapor sample analytical results, shown below in Exhibit 1, is strong evidence that the TPH is the food source for the methanogenic microbes at the site. There is no additional TPH or other organic matter being added to the subsurface and the existing TPH has long been present, which indicates that methane generation is unlikely to increase in the future.

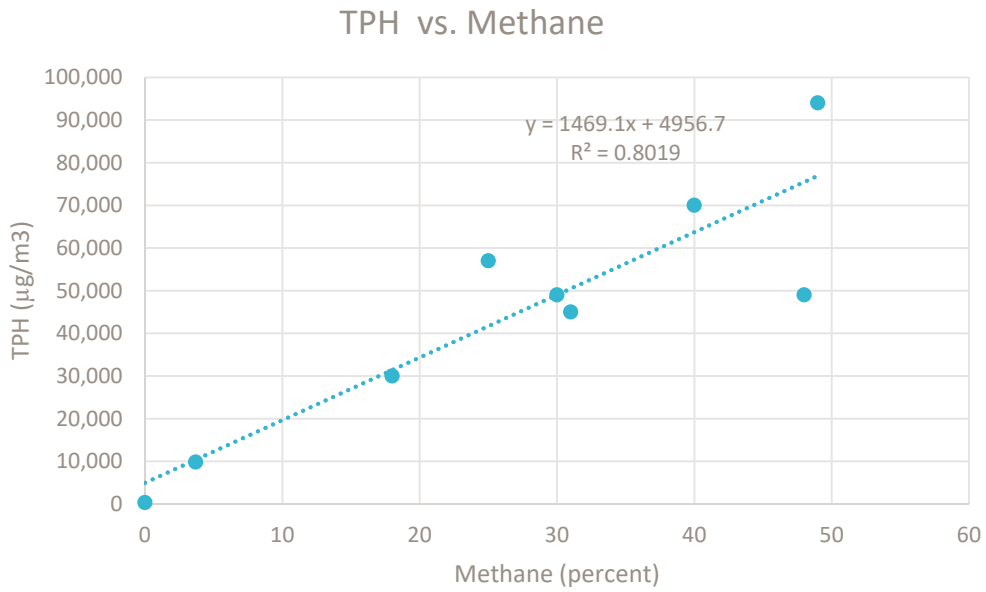


Exhibit 1. TPH versus Methane

To mitigate risks associated with potential methane accumulation in future utility vaults and/or subsurface conduits at the TASS 2 site, proposed methane mitigation includes installation of utility trench plugs consisting of controlled density fill or similar in underground utility trenches at the point where they exit the property and/or exit the subsurface, and passively vented utility boxes present at the TASS 2 site to prevent potential methane accumulation in the utility boxes. Additionally, methane monitoring of on-site structures, including bathrooms and kitchens, and accessible subsurface features may be conducted as part of routine cap inspection and maintenance activities. Details of the proposed methane mitigation measures and routine cap inspection and maintenance activities will be presented in a forthcoming RAP for the TASS 2 development.

Significant concentrations of methane were not detected during ambient air monitoring and monitoring of excavations and enclosed spaces at the site conducted in late April 2024 and throughout June 2024, by Haley & Aldrich, City personnel, and PBS personnel. Additionally, the contractor has recently been measuring methane concentrations in excavations and ambient air daily. Methane has not been detected after the 6 June 2024 monitoring event. Regardless, the City developed a Methane in Soil Health and Safety Plan (PBS, 2024) for use by the contractor during earthwork activities, included in Attachment E. The contractor is following the Methane in Soil Health and Safety Plan during construction activities and has updated their site-specific Health and Safety Plan to include methane as a contaminant of concern at the site. The CMMP, RA, and RAP either have been or will be updated to include methane as a contaminant of concern at the site.

Chemical Analytical Results

Methane was detected in each of the soil vapor samples analyzed except for soil vapor sample TO-10-TO-15. The detected concentrations of methane ranged from 3.7 to 49 percent. Helium was detected in soil vapor samples SV-6-TO-15 and SV-10-TO-15 at concentrations of 0.19 and 13 percent, respectively. All samples except for SV-10-TO-15 had a leak rate of less than 10 percent and passed the leak check. The leak rate for sample SV-10-TO-15 was about 40 percent (the 13 percent detected in the sample is divided by the 32 percent to 36 percent helium in the shroud). As previously discussed, this sample did not pass the leak check and may be biased low.

Relatively small amounts of benzene and other petroleum hydrocarbons were detected in the samples. Relatively small amounts of TCE and cis-1,2-DCE also were detected. Overall, up to 14 VOCs were detected in each of the nine soil vapor samples analyzed. The detected concentrations of these VOCs were between three and five orders of magnitude less than the corresponding DEQ-established site-specific volatilization to outdoor air RBCs. TPH-G was detected in each of the nine soil vapor samples analyzed. The detected concentrations of TPH-G were between three and five orders of magnitude less than the DEQ established site-specific volatilization to outdoor air RBCs. The data are consistent with the known site history and the existing groundwater and soils data sets.

Conclusions

Haley & Aldrich conducted a soil vapor investigation at the TASS 2 site in general accordance DEQ's March 2024 draft *Guidance for Assessing and Remediating Vapor Intrusion into Buildings* and the May 2024 SVI Work Plan. The purpose of the soil vapor investigation was to evaluate potential risks to future workers and/or occupants of the planned TASS 2 facility. The results of this investigation are summarized below.

- Although deviations from the work plan and shipping issues were experienced, a comprehensive soil vapor data set was collected across the TASS 2 site.
- Soil vapor concentrations of VOCs are well below DEQ site-specific RBCs and do not pose a risk to site workers or future site occupants.
- Elevated concentrations of subsurface methane were detected in the subsurface, but follow-up analysis did not indicate that volatilization to ambient or indoor air is a concern at the TASS 2 site. However, to prevent potential future methane accumulation in future utility vaults and/or subsurface conduits at the TASS 2 site, utility trench plugs consisting of controlled density fill or similar materials will likely be installed in underground utility trenches at the point where they exit the property and/or exit the subsurface, and utility boxes present at the TASS 2 site will likely be passively vented to prevent potential methane accumulation in the utility boxes. Additionally, methane monitoring of accessible subsurface features will likely be conducted as part of routine cap inspection and maintenance activities. Details of the proposed methane mitigation measures and routine cap inspection and maintenance activities will be presented in a forthcoming RAP for the TASS 2 development.

- Safety of site workers and future occupants is of paramount importance to the City. To mitigate potential risks to construction workers during development of TASS 2, the contractor will adhere to the Methane in Soil Health and Safety Plan (PBS, 2024) during earthwork activities.
- Field methane monitoring has not indicated the presence of methane at concentrations that could pose an ignitability risk. Therefore, there is little risk of accumulation of methane in on-site utility conduits, future living spaces, or future common spaces at ignitable concentrations.

Please contact the undersigned if you have questions or require additional information on this project.

Sincerely yours,
HALEY & ALDRICH, INC.

Colby R. Hunt, C.H.M.M.
Client Leader/Senior Associate

Bart Eklund, C.I.H.
Senior Technical Expert

Attachments:
References

Table 1 - Soil Gas Monitoring and Sample Analytical Results
Table 2 - Soil Gas Chemical Analytical Results

Figure 1 - Site Plan

Attachment A - SVI Work Plan
Attachment B - Field Data Sheets
Attachment C - Analytical Laboratory Reports
Attachment D - Draft Site-Specific RBC Memorandum
Attachment E - Methane in Soil Health and Safety Plan

c: Oregon Department of Environmental Quality; Attn.: Sarah Greenfield, P.E.

References

1. PBS, 2024. *Methane in Soil Health and Safety Plan, West Property - TASS 2 Site, 10505 North Portland Road, Portland, Oregon*. June.

2. Haley & Aldrich, 2024a. *Draft Remedial Action Plan, West Property - TASS 2 Site, 10505 North Portland Road, Portland, Oregon*. 27 March.

3. Haley & Aldrich, 2024b. *Draft Risk Assessment, West Property - TASS 2 Site, 10505 North Portland Road, Portland, Oregon*. 19 April.

4. Haley & Aldrich, 2024c. *Contaminated Media Management Plan, West Property - TASS 2 Site, 10505 North Portland Road, Portland, Oregon*. 10 June.

TABLES

TABLE 1
SOIL GAS SAMPLE ANALYTICAL RESULTS
WEST PROPERTY - TASS 2
PORTLAND, OREGON

Sample Name Sample Date Sample Depth (bgs)	SV-1-TO-15 4/24/2024 5 ft	SV-2-TO-15 4/24/2024 5 ft	SV-3-TO-15 4/25/2024 5 ft	SV-4-TO-15 4/24/2024 5 ft	SV-5-TO-15 4/24/2024 5 ft	SV-6-TO-15 4/25/2024 5 ft	SV-8-TO-15 4/25/2024 5 ft	SV-9-TO-15 4/25/2024 5 ft	SV-10-TO-15 4/25/2024 5 ft	Lower Explosive Limit (percent)	Upper Explosive Limit (percent)
Field Measurements (percent)											
Methane	**50.05**	**37.29**	**18.92**	**42.00**	**31.50**	**24.86**	**32.98**	**3.88**	**0.01**	5	15
Carbon Dioxide	**8.13**	**6.78**	**5.25**	**4.60**	**4.62**	**0.26**	**2.67**	**5.29**	**4.76**	NA	NA
Oxygen	**0.1**	**19.5**	**0.36**	**3.62**	**0.08**	**3.95**	**0.08**	**0.14**	**10.10**	NA	NA
Methane and Helium Analytical Results (percent)											
Methane	**49**	**40**	**18**	**48**	**30**	**25**	**31**	**3.7**	<0.00021	5	15
Helium	<0.11	<0.099	--	<0.10	<0.10	**0.19**	<0.097	<0.099	**13**	NA	NA

ABBREVIATIONS AND NOTES:

-: Not Analyzed

<: Not detected, value is the laboratory reporting limit

bgs: below ground surface

ft: feet

ug/m ^{3} : micrograms per cubic meter

NR: Not Reported

NA: Not applicable

Bolding denotes detected concentration.

TABLE 2
SOIL GAS CHEMICAL ANALYTICAL RESULTS
WEST PROPERTY - TASS 2
PORTLAND, OREGON

Sample Name Sample Date Sample Depth (bgs)	SV-1-TO-15 4/24/2024 5 ft	SV-2-TO-15 4/24/2024 5 ft	SV-3-TO-15 4/25/2024 5 ft	SV-4-TO-15 4/24/2024 5 ft	SV-5-TO-15 4/24/2024 5 ft	SV-6-TO-15 4/25/2024 5 ft	SV-8-TO-15 4/25/2024 5 ft	SV-9-TO-15 4/25/2024 5 ft	SV-10-TO-15 4/25/2024 5 ft	DEQ Site-Specific RBCs
Volatile Organic Compounds (ug/m^3)										
Benzene	**340**	**29**	**2.7**	**54**	<4.4	**46**	**8.1 J**	**6.3**	**5.2**	36,000 (cancer) 3,100,00 (non-cancer)
Chlorobenzene	<10	<5.5	<0.87	<5.7	<5.7	<5.8	<5.4	<0.26	<0.27	6,400,000
1,2-Dichlorobenzene	<17	<9.1	<0.80	<9.5	<9.5	<9.7	<9.0	<0.24	<0.25	33,000,000
1,4-Dichlorobenzene	<22	<11	<0.66	<12	<12	<8.4	<11	<0.19	<0.20	42,000
cis-1,2-Dichloroethene	**180**	**50**	<1.4	**350**	<5.1	<5.2	<4.8	<0.40	<0.42	4,200,000
Ethylbenzene	**23 J**	<5.8	**0.95 J**	<6.1	<6.1	<6.2	<5.7	**2.3**	**3.0**	140,000 (cancer) 130,000,000 (non-cancer)
n-Hexane	**670**	**860**	**87**	**200**	**130**	**610**	**480**	**21**	**3.2 J**	89,000,000
Naphthalene	<8.8	<4.7	<2.1	<4.9	<4.9	<5.0	<4.6	<0.62	<0.65	12,000 (cancer) 450,000 (non-cancer)
2-Propanol	**82 J**	<19	**6.4 J**	**24 J**	<20	<20	<19	**5.0 J**	**2.4 J**	NE
n-Propylbenzene	<12	<6.2	<0.99	<6.5	<6.5	<6.6	<6.1	**0.57 J**	<0.30	150,000,000
Styrene	<8.0	<4.2	<0.78	<4.4	<4.4	<4.5	<4.2	<0.23	**0.32 J**	120,000,000
Tetrachloroethene	<18	<9.9	<1.1	**38 J**	<10	<10	<9.7	<0.32	**3.0**	1,900,000
Toluene	**35 J**	**8.2 J**	**4.1 J**	**53**	**8.8 J**	**26 J**	<5.2	**12**	**28**	590,000,000
1,1,1-Trichloroethane	<14	<7.5	<0.71	<7.8	<7.8	<8.0	<7.4	<0.21	<0.22	710,000,000
1,1,2-Trichloroethane	<19	<10	<1.1	<11	<11	<11	<10	<0.34	<0.35	24,000
Trichloroethene	**36 J**	**11 J**	<0.42	**69**	<9.5	<9.6	<8.9	<0.12	<0.13	62,000
1,2,4-Trimethylbenzene	<14	<7.5	**1.6 J**	<7.8	<7.8	<8.0	<7.4	**1.3**	**0.65 J**	9,200,000
1,3,5-Trimethylbenzene	<14	<7.4	<0.81	<7.8	<7.8	<7.9	<7.3	**0.44 J**	**0.28 J**	9,300,000
m,p-Xylene	**31 J**	**11 J**	**1.4 J**	**19 J**	<3.7	**4.0 J**	**4.2 J**	**5.8**	**9.0**	13,000,000
o-Xylene	**23 J**	**6.9 J**	<0.90	<6.1	<6.1	<6.2	<5.8	**2.5**	**3.2**	13,000,000
Total Xylenes	NR	NR	NR	NR	NR	NR	NR	NR	NR	13,000,000
Total Petroleum Hydrocarbons as Gasoline	**94,000**	**70,000**	**30,000**	**49,000**	**49,000**	**57,000**	**45,000**	**9,800**	**310**	24,000,000

ABBREVIATIONS AND NOTES:

-: Not Analyzed

<: Not detected, value is the laboratory reporting limit

bgs: below ground surface

ft: feet

ug/m^3: micrograms per cubic meter

NR: Not Reported

Bolding denotes detected concentration.

FIGURE

LEGEND

- SOIL VAPOR SAMPLE LOCATION
- MAY 2000 GROUNDWATER SAMPLE
- SITE BOUNDARY
- PARCEL BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. UST = UNDERGROUND STORAGE TANK
3. ASSESSOR PARCEL DATA SOURCE: REGIONAL LAND INFORMATION SYSTEM (RLIS)
4. AERIAL IMAGERY SOURCE: NEARMAP, 14 AUGUST 2023

N

0 150 300
SCALE IN FEET

HALEY ALDRICH

SOIL VAPOR INVESTIGATION WORK PLAN
WEST PROPERTY - TASS 2
10505 N PORTLAND ROAD
PORTLAND, OREGON 97203

SITE PLAN

JUNE 2024

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0209772\GIS\209772_COP_WEST_PARCEL.aprx - USER: ayabu - LAST SAVED: 6/7/2024 4:12 PM

ATTACHMENT A
SVI Work Plan

HALEY & ALDRICH, INC.
6420 S Macadam Avenue
Suite 100
Portland, OR 97239
503.620.7284

23 April 2024
File No. 0209772-004

City of Portland, Bureau of Environmental Services
1120 SW 5th Avenue, Room 1000
Portland, Oregon 97204

Attention: Taryn Meyer

Subject: Work Plan for Soil Vapor Investigation
West Property - TASS 2 Site
10505 North Portland Road
Portland, Oregon
ECSI No. 0186

Dear Taryn Meyer:

Haley & Aldrich, Inc. (Haley & Aldrich) is pleased to submit this work plan presenting a scope of services for a soil vapor investigation (SVI) of the West Property - Temporary Alternative Shelter Site (TASS) 2 site located at 10505 North Portland Road in Portland, Oregon (site). The site is an approximately 6-acre portion of the West Property, located at 10505 North Portland Road (tax lot 1000 of Multnomah County tax map 1N1E05B). The City of Portland (City) intends to construct its second TASS facility at the site (TASS 2). Environmental services, in preparation for construction of the TASS 2 site, are being funded using U.S. Environmental Protection Agency (EPA) Brownfield Grant funding. Preliminary plans indicate that TASS 2 will consist of Recreational Vehicle storage areas; car parking areas; mobile manufactured housing pods; tents for common areas including kitchen areas, trash areas, picnic areas, and gathering areas; and sewage and stormwater infrastructure. Except for stormwater swales and a small, forested area along the east boundary of the site, the entirety of the site will be paved following the completion of construction activities. The average duration of occupancy for TASS 2 residents is anticipated to be 90 days, with a maximum duration of occupancy for TASS 2 residents of six months.

Background

Based on information obtained from the Oregon Department of Environmental Quality (DEQ), the site operated as an industrial site since at least the 1940s, including use as a shingle mill, a boat manufacture and repair facility, a tank-truck washing facility, and for materials storage, welding, and diesel engine repair and rebuilding. The Columbia Slough adjoins the north boundary of the West Property. The West Property, also referred to as the North Larsen Property, was listed on the DEQ Environmental Cleanup Site Information (ECSI) database (ECSI No. 0186) because of the presence or suspected presence of

phenols, phthalates, heavy metals, polychlorinated biphenyls, pesticides, petroleum hydrocarbons and associated constituents, and cyanide in soil and/or groundwater. The historical sources of the contamination included discharge of wastewater to on-site ponds, product spillage, leaking underground storage tanks, contaminated stormwater runoff, and contaminants released to an on-site drywell.

Haley & Aldrich prepared a draft Risk Assessment (RA), a draft Contaminated Media Management Plan, and a Remedial Action Plan (RAP) for the site dated 1 March, 25 March, and 27 March 2024, respectively. DEQ provided preliminary comments to the draft RA that identified data gaps associated with potential vapor intrusion at the site and requested the City conduct a SVI of the site to evaluate potential vapor intrusion risk to future site occupants and workers.

Scope of Services

The purpose of the SVI is to evaluate potential volatilization risk to future site occupants and workers. The specific scope of services for the SVI is as follows:

PRE-FIELDWORK ACTIVITIES

Pre-fieldwork activities will generally consist of project coordination, Health and Safety Plan (HASP) preparation, and coordination with subcontractors.

- **Prepare HASP**. Prepare a HASP that will address utility locating and field activities in general accordance with the Occupational Safety and Health Act and Oregon Administrative Rules. Haley & Aldrich personnel will have a copy of the HASP on the site for their use during the field activities.
- **Coordinate Subcontractors**. Prior to conducting field activities, procure and coordinate the following subcontracted services.
  - **Utility locates.** Coordinate with the Oregon Utility Notification Center to have public utilities located at the site. Additionally, all sample locations will be cleared by a private utility locator prior to installation of soil vapor probes.
  - **Drilling Services.** Subcontract a driller licensed by the Oregon Water Resources Department (OWRD) for installing and abandoning the soil vapor probes and filing OWRD hole reports.
  - **Laboratory Services.** Coordinate with an analytical laboratory licensed in Oregon to provide sampling media and analytical services.

FIELD INVESTIGATION

Install 10 soil vapor probes at the locations shown on the attached site plan (Figure 1). Collect soil vapor samples at a depth of 5 feet below ground surface (bgs). The samples will be collected in 1.0-liter summa canisters for analysis of volatile organic compounds (VOCs) using EPA Method TO-15. Installation and sampling of soil vapor probes will be conducted in general accordance with DEQ's March 2024 draft Guidance for Assessing and Remediating Vapor Intrusion into Buildings and Haley & Aldrich's Operating

Procedure 3031: Soil Vapor Sampling (Attachment 1). A summary of these procedures is presented below.

- Hand auger each soil vapor sample location to a depth of approximately 5 feet bgs, according to Haley & Aldrich and the drilling subcontractor's policies for avoiding subsurface utilities. The soil vapor probes will be installed in the open borehole.
- Install soil vapor probes consisting of Teflon tubing fitted with an approximately 6-inch stainless-steel screen at the bottom of each probe. The probe will be placed at the target depth and then the borehole filled with a sand filter pack and bentonite plug. A two-way valve will be fitted to the top of the tubing and will be kept closed prior to purging and sampling. Completed vapor probes will be allowed to equilibrate for at least 48 hours prior to sampling, according to the 2024 draft DEQ guidance.
- Perform a summa cannister vacuum hold test, helium leak check, and a sample train shut-in test prior to sample collection as quality control/quality assurance (QA/QC) activities.
- Purge a minimum of two probe volumes before sampling. Purging will be completed during the helium leak test using an external pump. During purging, measure and record VOC concentrations using a calibrated photoionization detector (PID) with a 10.6-electron volt (eV) lamp.
- Collect each soil vapor sample using a 1-liter, laboratory-provided summa canister with a flow controller set to a flow rate of 200-milliliter-per-minute or less.
- Collect a field duplicate sample from 1 of the 10 soil vapor probes. In total, 11 soil vapor samples will be collected.
- Following sample collection, the vapor probes will be removed, and the boreholes will be abandoned.

Soil vapor samples will be transported under chain of custody to Eurofins USA for chemical analysis of gasoline-range organics and VOCs by EPA Method TO-15 and diesel-range organics and VOCs by EPA Method TO-17.

REPORTING

The results of the SVI will be presented as a report that will include figures showing sample locations and data tables comparing soil vapor sample analytical results to screening levels to be developed in consultation with DEQ. The report will be submitted to Bureau of Environmental Services (BES) and DEQ for review. Following receipt of comments from BES and DEQ, we will prepare the final report incorporating these comments.

Schedule

Soil vapor sample collection is currently scheduled for 24 April 2024. Soil vapor sample analytical results should be available within two weeks of the completion of field activities. A draft report summarizing the results of the SVI investigation will be provided within two weeks of receipt of the final laboratory

analytical report. The final SVI report will be provided within one week of receipt of City and/or DEQ comments to the SVI report.

Please contact the undersigned if you have questions or require additional information on this project.

Sincerely yours,
HALEY & ALDRICH, INC.

Colby R. Hunt, C.H.M.M.
Client Leader/Senior Associate

Jennifer A. Casler, R.G., P.G.
Client Leader/Senior Associate

Attachments:
Figure 1 - Site Plan
Attachment 1 - Operating Procedure 3031: Soil Vapor Sampling

c: Oregon Department of Environmental Quality; Attn.: Sarah Greenfield, P.E.

https://haleyaldrich.sharepoint.com/sites/CityofPortlandBureauofEnvironmentalServices/Shared Documents/0209772.COP West Parcel/0209772-004 Soil Gas/Deliverables/Work Plan/Final/2024_0423_HAI_WPropSVIWorkPlan_F.docx

LEGEND

- PLANNED SOIL VAPOR SAMPLE LOCATION
- SITE BOUNDARY
- PARCEL BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. UST = UNDERGROUND STORAGE TANK
3. ASSESSOR PARCEL DATA SOURCE: REGIONAL LAND INFORMATION SYSTEM (RLIS)
4. AERIAL IMAGERY SOURCE: NEARMAP, 14 AUGUST 2023

N

0 150 300
SCALE IN FEET

HALEY ALDRICH

SOIL VAPOR INVESTIGATION WORK PLAN
WEST PROPERTY - TASS 2
10505 N PORTLAND ROAD
PORTLAND, OREGON 97203

SITE PLAN

APRIL 2024

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0209772\GIS\209772_COP_WEST_PARCEL aprx - USER: ayabu - LAST SAVED: 4/5/2024 10:15 AM

ATTACHMENT 1
Operating Procedure 3031: Soil Vapor Sampling

OPERATING PROCEDURE 3031:

SOIL VAPOR SAMPLING

PREPARATION AND APPROVALS

VERSION	AUTHORED/DATE	REVIEWED / DATE	REVIEWED / DATE	REVIEWED / DATE	APPROVED / DATE
2.0	**Gina Plantz**	**Rich Rago**			**10/9/2018**

Total Pages: 17

HALEY ALDRICH

TABLE OF CONTENTS

Version Date: October 2018

Soil Vapor Sampling

LIST OF EQUIPMENT NEEDED

Forms

1. *Soil Vapor Probe Construction Form*
2. *Soil Vapor Purge Calculations*
3. *Soil Vapor Probe Sampling Record*
4. *Chain of Custody*

Laboratory

1. Summa canisters
2. Flow controllers
3. Compression fittings (nut and ferrules)
4. Pressure gauge
5. Chain of custody

Supplies

1. ¼-inch (O.D) x 3/16-inch (I.D.) Teflon® tubing (rigid for sampling)
2. ¼-inch (O.D) x 3/16-inch (I.D.) Tygon® tubing (soft for connections)
3. ¼-inch PVDF barbed T-fitting
4. ¼-inch polycarbonate stopcock
5. Tedlar® bags
6. Nitrile gloves

Compressed Air Supply

1. Helium tank (~60 cubic foot)
2. Cylinder stand

Tools

1. 9/16-inch fixed wrench
2. >8-inch adjustable wrench
3. Tubing cutter
4. Needle-nose pliers
5. Low-flow inert gas regulator
6. Helium shroud or tent

*Rental Instruments/Equipment**

1. Dielectric MGD-2002 Helium Detector
2. RAE Systems ppbRAE Photoionization Detector with calibration kit
3. Landtec GEM 2000 Multi-gas Meter with calibration kit
4. Vacuum Box (a.k.a. "Lung Box")
5. Vacuum Pump
   a. Sensydine GilAir 5 Personal Air Sampling Pump with Low-Flow Modulator (200 mL/min)
   b. Equipco Portavac2 (7 L/min)

*A list of suppliers is available in Attachment A.

INTRODUCTION

This sampling procedure is for soil vapor investigations that are designed to collect data to evaluate the potential for vapor intrusion into current or future building(s). A separate sampling procedure has been created for sub-slab soil vapor sampling. For the purpose of this procedure, soil vapor samples can be collected next to (e.g., within 10 feet of slab, when possible) the exterior of the buildings to minimize disruption to the occupants.

The soil vapor sampling procedure summarized herein is based on current best practice techniques and guidance provided in the following documents or presentations:

- U.S. Environmental Protection Agency (USEPA), 21-22 March 2007. Workshop/Presentations on Soil Gas Sample Collection and Analysis, San Diego, California.
- Interstate Technology and Regulatory Council, January 2007. "Vapor Intrusion Pathway: A Practical Guideline."
- California Environmental Protection Agency, Department of Toxic Substances Control, Los Angeles Regional Water Quality Control Board, San Francisco Regional Water Quality Control Board, July 2015. Document entitled "Advisory – Active Soil Gas Investigations."

Version Date: October 2018

- Massachusetts Department of Environmental Protection, October 2016. "Vapor Intrusion Guidance, Site Assessment, Mitigation and Closure, Policy #WSC-16-435."

Please contact Rich Rago or Gina Plantz if you have technical questions that are not covered in this procedure.

SAMPLE LOCATION, DENSITY, AND ANALYSIS

Select soil vapor sampling locations based on the initial evaluation of site and building-specific information as well as professional judgment and applicable regulatory guidance. Determine the number of soil vapor samples and depths collected for each building/property based on several factors, including the size of the property, characterization of source areas, and the site geology. For a future development where no buildings yet exist, soil vapor samples should be collected on a grid no more than 100 feet apart.

Soil vapor samples adjacent to a small structure should be collected on all four sides of the building (if possible) or, at a minimum, on the two sides closest to the source area or higher groundwater concentration area. Sampling points should be located within approximately 10 feet of the structure, if possible, and below hard standing (paved areas) where possible.

For soil vapor samples adjacent to a large commercial facility, it may not be necessary or practical to collect samples on all four sides of the facility. Understand the potential interior and exterior source areas to develop the sampling plan.

Depending on the data quality objectives and target analyte lists, soil vapor sampling and analysis can be completed using USEPA modified analytical methods 8260B, TO-15, TO-17, or equivalent. Collect quality control samples, including the greater of one field duplicate sample per day or one field duplicate per 20 samples. Collect and analyze duplicate soil vapor samples using the same field collection procedures and analysis as the primary samples. Most commonly, field duplicates are obtained by collecting two samples simultaneously using a T-connector.

This operating procedure focuses on collection of soil vapor samples using passivated canisters according to modified EPA method TO-15. Soil vapor samples can be collected in various sized 1-liter passivated canisters (e.g., 1-liter, 2.7-liter, or 6-liter). **Technical staff should confirm in advance that the laboratory providing the canisters and sample analysis can achieve the required data quality objectives, reporting limits, and equipment certification.**

Before soil vapor sampling, complete the following a minimum of one day before field mobilization:

- Review the field and sampling data. This should be available during field sampling as well.
- Inspect and test instrumentation and rental equipment.
- Charge the batteries of instrumentation and rental equipment overnight prior to bringing them into the field.
- Review the Soil Vapor Probe Construction Form (copy provided in Attachment B) and use it to check the purge volume of each probe. An example of the Soil Vapor Purge Calculations is included in Attachment C.
- Review the sampling equipment to confirm that appropriate fittings and tubing are available. A list of example equipment is included on p.1 and in Attachment A.

SOIL VAPOR PROBE INSTALLATION

This procedure describes soil vapor sampling via use of small diameter inert tubing fitted with subsurface filter implants. We recognize that other apparatuses have been used for other data quality objectives such as landfill soil gas collection (e.g., small diameter slotted PVC pipe).

1. Regardless of specific implant design, review available sources of information regarding underground utilities and clear the selected sample locations prior to installation. This may require the engagement of a local underground utility clearance service and/or a private utility locator. Adjust the proposed sample locations as necessary to avoid potential subsurface structures and utilities and to minimize disturbance to sensitive landscape features. If applicable, sampling locations should be coordinated with company or building-specific health and safety coordinators.
2. If the proposed soil vapor sampling location is beneath a sidewalk or other hardscape, the hardscape can be cored with a diamond drill bit or other concrete-type coring device.
3. Advance borings until the target depth is reached.
4. At the bottom of the boring, place a new, disposable, small-diameter (e.g., ¼-inch inside diameter) Teflon® tubing, fitted with a filter at the bottom to prevent particulate infiltration.
5. Place approximately 12 inches of filter pack sand in the bottom of the boring (e.g., from 4.5 to 5.5 feet below ground surface) with the bottom of the Teflon tubing placed midway through the filter pack sand.
6. After installation of the sand pack, grout the borehole to the surface in approximately 6-inch lifts with hydrated bentonite. Dry granular bentonite can be emplaced between the sand pack and the hydrated bentonite grout to prevent infiltration of the hydrated bentonite into the sand pack.
7. Fit a valve to the aboveground end of the tubing, which should be kept closed prior to purging and sampling.
8. After installation, place a temporary cover or semi-permanent well box over the soil vapor probe for probe protection.

Soil vapor probes installed by hand augering should be allowed to equilibrate for a minimum of 48 hours prior to purging and sampling, if possible. Soil vapor probes installed using a direct-push drill rig should be allowed to equilibrate for a minimum of two hours prior to purging and sampling, if possible.

Fill out a standard Soil Vapor Probe Construction Form during installation.

SAMPLING SOIL VAPOR PROBES

The procedures described below are technically-based and practical. The team should review applicable state guidance for any additional considerations (e.g., in California, a rain event producing greater than 0.5 inches of rain during a 24-hour period would preclude sampling for a minimum of five days after the rain event).

Shut-in Test

Prior to purging or sampling, conduct a shut-in test to check for leaks in the aboveground sampling system. To conduct a shut-in test, assemble the aboveground valves, lines and fittings downstream from the top of the probe. The procedure described herein uses a “lung box” to create a vacuum, although other methods can be used (e.g., hand-pump with vacuum gauge or disposable 60-cc luer-lock syringe). We also recognize that certain types of flow controllers that are fitted with vacuum gauges can be used for shut-in tests.

Regardless of the specific vacuum gauge and vacuum source, the next step is to evacuate the system to a measured vacuum of at least 100 inches of water (approximately 7 inches Hg). Conduct the test while the sampling canister, if used, is attached with its valve in the closed position. Observe the vacuum gauge connected to the system for approximately 30 seconds. If there is observable loss of vacuum, adjust the fittings until the vacuum in the sample train does not noticeably dissipate. After the shut-in test is acceptable, the sampling train should not be altered. The vacuum gauge should be calibrated and sensitive enough to indicate a pressure change (i.e., capable of measuring in the 0-50 inches Hg range).

The shut-in test steps are listed below for the example set-up shown on Figure 1:

1. Valves 1 and 2 are closed and Valve 3 is open to pump.
2. Turn on pump and achieve vacuum between 5 and 10 inches of Hg.
3. Close Valve 3 and monitor vacuum for approximately 30 seconds.
4. The vacuum should not noticeably dissipate; if it does, tighten fittings between Valve 1 and 3 (including canister and flow controller fittings).
5. Repeat steps 2 through 4 until vacuum is stable for approximately 30 seconds.
6. Document that acceptable shut-in test has been performed including the applied field vacuum.

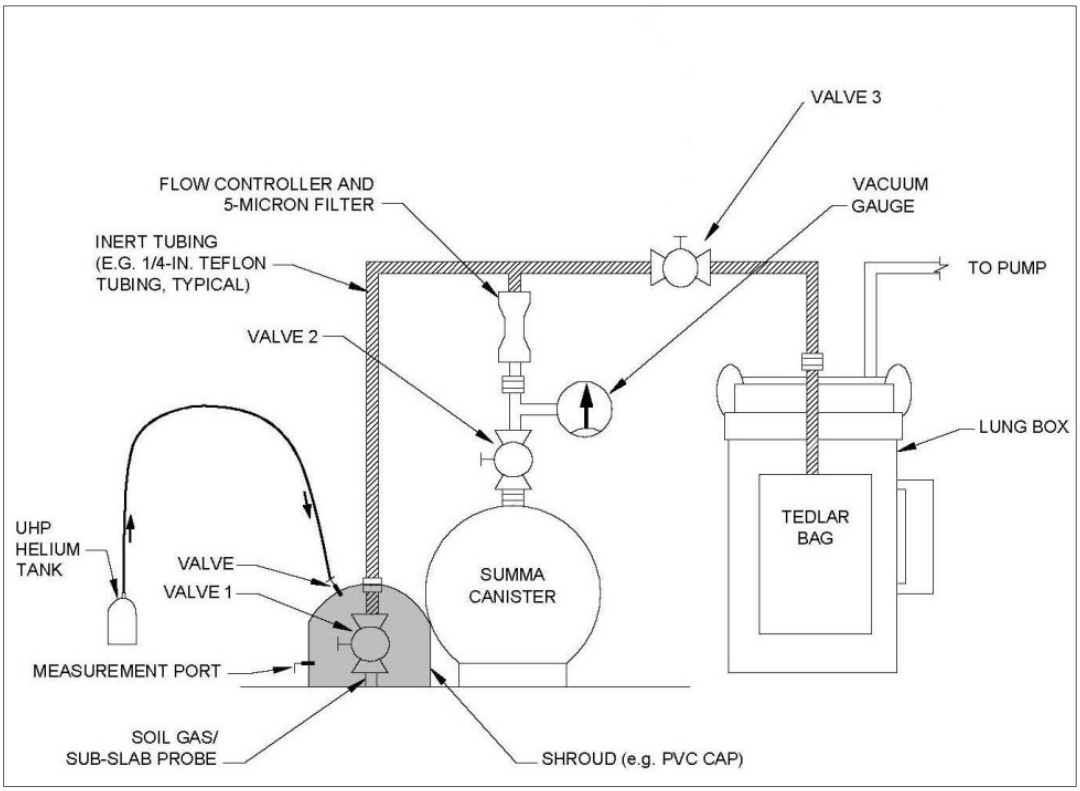


Figure 1: Soil vapor sampling train and equipment

Probe Purging, Leak Checking and Sampling Procedures

Each probe should be leak-checked using helium as a tracer compound and purged prior to sample collection. To do so, place a shroud to encompass the sampling probe and introduce helium into the shroud. Monitor the concentration of helium with a handheld helium detector and record the readings.

Follow this procedure:

1. Place a shroud over the soil vapor probe (see Figure 1).
2. Visually confirm that the shroud is sufficiently sealed to the ground surface.
3. Introduce helium around the sample probe by filling the shroud. Helium should be injected into the shroud at very low pressure of less than 1 pound per square inch (psi). The shroud apparatus has tubing at the top of the chamber to introduce the tracer gas into the shroud and a valve fitting at the bottom to let ambient air and helium into the shroud during introduction of the tracer gas. Monitor the helium concentration within the shroud with a handheld field helium detector, typically until a shroud concentration of approximately 30 percent is achieved.
4. The shroud should have a gas-tight fitting or sealable penetration to allow soil vapor sample probe tubing to pass through and exit the chamber. Attach the sample probe tube exiting the shroud to a pump that will sample soil vapor at a vacuum of no more than 100 inches of water.
5. Before collecting the sample in the canister, purge and leak check the probe by collecting samples in a 1L Tedlar bag. (For shallow probes, a purge and leak check via direct connection with the field instrument may be considered.) A target purge rate of less than 200 mL/minute has been cited as a guideline, although faster purge rates may be acceptable, especially for deep soil vapor sampling.
6. After one purge volume (internal volume of tubing plus the annular pore space around probe tip) is collected from the probe, collect each purge volume (at least two) in a Tedlar bag and screen with the helium detector. Record the measurements. Additional field screening of the Tedlar bags may also be conducted using a field meter (for VOCs) and a multi-gas meter (for oxygen, carbon dioxide and methane) with screening measurements recorded.
    - Monitoring vacuum during purging provides important information and can also alert the technician when low permeability soils are present, which may preclude soil gas sampling entirely or otherwise greatly extend the time required to complete sampling. Where measurements are required, the purge vacuum should not exceed 100 inches of water. For shallower sampling in locales where purge vacuum measurements are not required, technicians are still encouraged to check that sampling flows will be adequate for sampling, either by vacuum measurement or by use of large volume disposable syringes.
7. If the concentration of helium is greater than 10 percent of the concentration that was measured in the shroud, re-seal the probe. Then perform the tracer test again. Do not begin collecting samples until after the tracer concentration in the sample probe is less than 10 percent of the measured concentration in the shroud.
    - **Note: If methane is expected and has elevated detections by the multi-gas meter, the helium detector measurements may be biased high and may not be representative of an accurate leak check. When elevated methane is present in the purge samples,**

Version Date: October 2018

consider submitting the canister sample to the lab for helium analysis to assess whether a competent seal was achieved.

8. After achieving confirmation of acceptable leak test and, if conducted, generally consistent field screening measurements (e.g., within approximately 10%), sample collection can proceed.
9. To begin collection of air samples, open the canister valve by turning the valve ¼-turn counterclockwise. Record the initial vacuum and start time on the Soil Vapor Probe Sampling Record. A copy of this form is included as Attachment D.
10. Record the temperature, wind direction and wind speed at the beginning of sampling. There are many weather applications which can be reviewed for meteorological conditions, such as weatherunderground.com.
11. Upon sample completion, record the final canister vacuum, close the canister valve, and record the final time on the sampling record.
12. Disconnect the flow controller from the canister and re-attach the ¼-inch laboratory-supplied cap on the passivated canister inlet. Check that the passivated canister sample tag has been fully labeled, including sample identification number, passivated canister and flow controller serial numbers, vacuum readings, sampling start and end time, and sampling start and end date.
13. After the sample is collected, an additional soil vapor sample may be collected in a Tedlar bag and monitored for total VOCs, oxygen, carbon dioxide, and methane, with field measurements recorded.
14. Fill out the COC with project name, file number, sample identification, passivated canister and flow controller serial numbers, the date and time that the samples were collected, analysis requirements, and other fields as instructed. Retain one copy of the COC. Place passivated canisters and flow controllers back into their original boxes and ship to the laboratory for analysis.
15. Complete the Soil Vapor Probe Sampling Record.

Probe Abandonment

Soil vapor probes shall be abandoned in general accordance with local agency permit requirements. Data should be validated and reported to the client and agencies (if applicable) prior to abandonment.

ATTACHMENT A

Soil Vapor Sampling Equipment and Supply List

Version Date: July 2018

Soil Vapor Sampling Equipment and Supply List

Forms

1. *Soil Vapor Probe Construction Form*
2. *Soil Vapor Purge Calculations*
3. *Soil Vapor Probe Sampling Record*
4. *Chain of Custody*

Laboratory

1. Summa canisters
2. Flow controllers
3. Compression fittings (nut and ferrules)
4. Pressure gauge
5. Chain of custody

Supplies

7. ¼-inch (O.D) x 3/16-inch (I.D.) Teflon® tubing (rigid for sampling)
8. ¼-inch (O.D) x 3/16-inch (I.D.) Tygon® tubing (soft for connections)
9. ¼-inch PVDF barbed T-fitting
10. ¼-inch polycarbonate stopcock
11. Tedlar® bags
12. Nitrile gloves

Compressed Air Supply

1. Helium tank (~60 cubic foot)
2. Cylinder stand

Tools

7. 9/16-inch fixed wrench
8. >8-inch adjustable wrench
9. Tubing cutter
10. Needle-nose pliers
11. Low-flow inert gas regulator
12. Helium shroud or tent

Rental Instruments/Equipment

6. Dielectric MGD-2002 Helium Detector
7. RAE Systems ppbRAE Photoionization Detector with calibration kit
8. Landtec GEM 2000 Multi-gas Meter with calibration kit
9. Vacuum Box (a.k.a. “Lung Box”)
10. Vacuum Pump
    a. Sensydine GilAir 5 Personal Air Sampling Pump with Low-Flow Modulator (200 mL/min)
    b. Equipco Portavac2 (7 L/min)

Suppliers

Cole Parmer	http://www.coleparmer.com/
Equipco	http://www.equipcoservices.com/
Airgas	http://airgas.com/
Environmental Service Products	https://www.envservprod.com/store/

Version Date: July 2018

ATTACHMENT B

Soil Vapor Probe Construction Form

Version Date: July 2018

SOIL VAPOR PROBE CONSTRUCTION

HALEY ALDRICH

Probe ID		Site Location	
Project Name			
Project Number		Field Personnel	

Installation Date		Borehole Diameter	
Drilling Method		Drilling Contractor	
		Driller	

Materials Used

Tubing: [X] 0.25 Diameter (inches)

Probe Completion Time _____

Construction
- [X] Teflon
- [ ] Nylon
- [ ] Other

Screen: 1.5 Length (inches); 0.38 Diameter (inches); _____ Slot Size

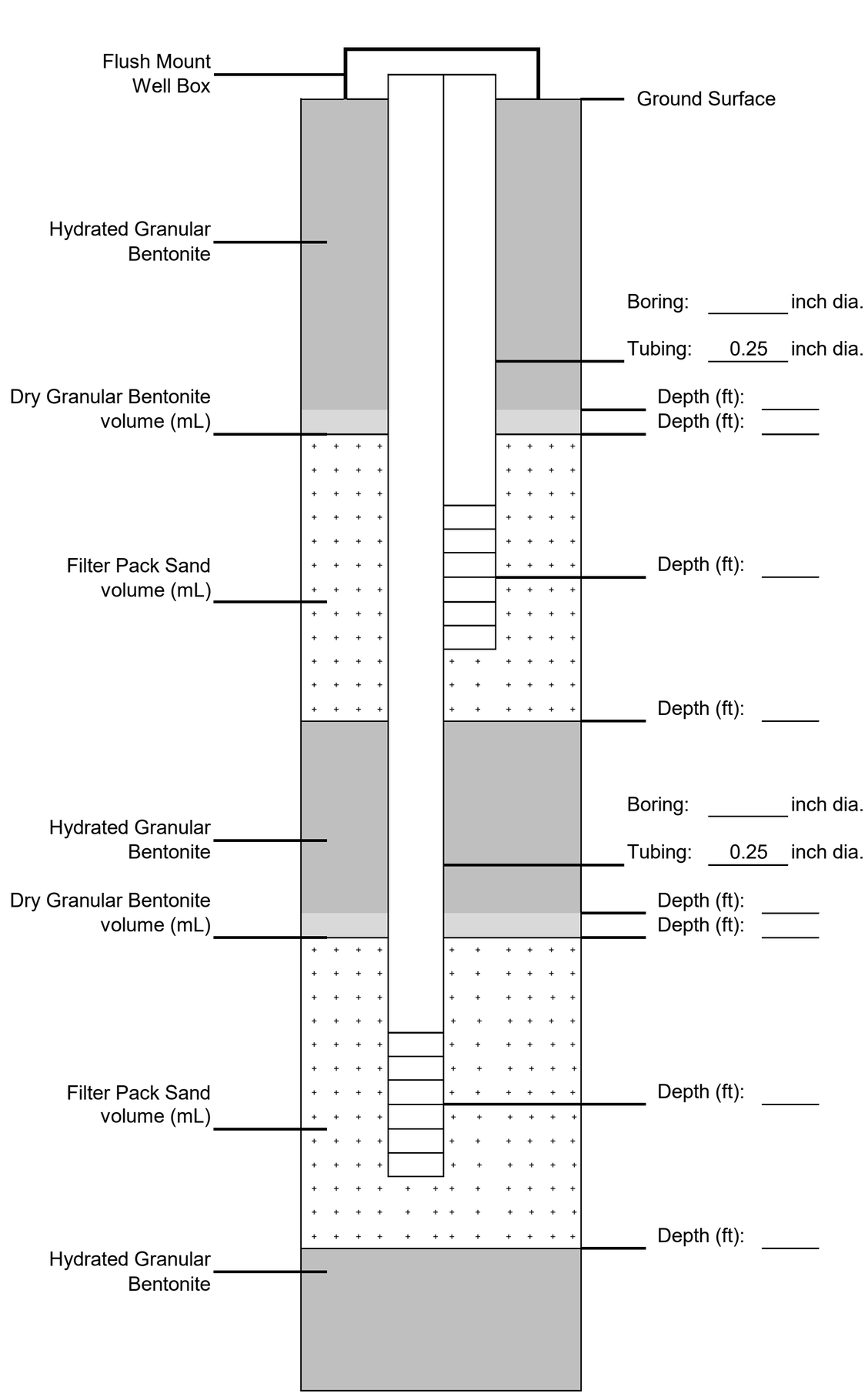
Construction
- [ ] PVC
- [ ] Stainless Steel
- [X] Other acrylic

Valve:
- [ ] Brass
- [X] Polycarbonate
- [X] 2-Way
- [ ] 3-Way
- [ ] Other

Vault:
- [ ] Flush Mount
- [ ] Above Ground

_____ Length (inches)
_____ Stickup (inches)

Cover Material
- [ ] PVC: temporary 4-inch slip cap
- [ ] Well Box
- [ ] Other _____



NOT TO SCALE

ATTACHMENT C

Example Soil Vapor Purge Calculations

Version Date: July 2018

SV-01 - EXAMPLE

	Item	Spreadsheet User Directions	Value	Units	Explanation
Air in Tubing within Well & Soil Gas Sample Tubing	Length of soil gas probe tubing below ground	ENTER THIS INFORMATION	6.75	feet	
	Diameter of probe tubing	ENTER THIS INFORMATION	0.18	inch	Below grade is 1/4 in SS OD tubing/casing, 0.18 in ID
	Volume of soil gas probe tubing below ground	*DO NOT MODIFY FORMULA*	34	mL	Volume of cylinder = π * tubingDiameter^2 / 4 * LengthBelowGround(ft) * 12in_per_ft * 16.3871mL_per_in3
	Soil gas sampling tubing diameter	ENTER THIS INFORMATION	0.1875	inch	1/4" OD, 3/16" ID Teflon tubing
	Soil gas sampling tubing length	ENTER THIS INFORMATION	2	feet	Feet of tubing above ground: approx. 2 feet
	Soil gas sampling tubing volume above ground	*DO NOT MODIFY FORMULA*	11	mL	Volume of cylinder = π * tubingDiameter^2 / 4 * LengthAboveGround(ft) * 12in_per_ft * 16.3871mL_per_in3
Air in Sand Pack	Well casing diameter	ENTER THIS INFORMATION	7.5	inch	Well construction: 7.5 in borehole (multiprobe hole)
	Sand pack height	ENTER THIS INFORMATION	1.5	feet	Well construction: 1 foot sand, 0.5 feet unhydrated bentonite
	Sand pack porosity	ENTER THIS INFORMATION	0.35	--	Well construction: 0.35
	Well casing volume	*DO NOT MODIFY FORMULA*	13,031	mL	Volume of cylinder = π * casingDiameter^2 / 4 * HeightOfSandPack(ft) * 12in_per_ft * 16.3871mL_per_in3
	Diameter of probe tubing	ENTER THIS INFORMATION	0.18	inch	Below grade is 1/4 in SS OD tubing/casing, 0.18 in ID
	Volume of probe tubing within sand pack	*DO NOT MODIFY FORMULA*	8	mL	Volume of cylinder = π * tubingDiameter^2 / 4 * HeightOfSandPack(ft) * 12in_per_ft * 16.3871mL_per_in3
	Sand volume	*DO NOT MODIFY FORMULA*	13,024	mL	Volume of sand = WellCasingVolume - CMTChannelVolume
	Air within sand pack	*DO NOT MODIFY FORMULA*	4,558	mL	Volume of air in sand pack = Porosity * SandVolume
ONE PURGE VOLUME (std)			4.6030	L	Volume of sand pack + probe tube + sampling tube (converted to liters: 1 L = 1,000 mL)
ONE PURGE VOLUME (no sand pack)			0.045	L	Tubing only (DTSC guidance App D)
THREE PURGE VOLUMES (std)			13.8	L	Cumulative volume to purge prior to collecting Summa canister sample
THREE PURGE VOLUMES (no sand pac			0.134	L	Tubing only (DTSC guidance App D)

ATTACHMENT D

Soil Vapor Probe Sampling Record

Version Date: July 2018

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: _____ Project Number: _____ Probe ID: _____ Soil vapor probe Sub-slab probe

Site Location: _____ PID Model and ID#: _____

Date: _____ Weather: _____ Landfill Gas Meter and ID#: _____

Site Personnel: _____ Helium Detector Model and ID#: _____

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt ____ Other (specify): _____

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe _____ (L) Sub-Slab Probe _____ (L)

Purge Measurements								Helium Tracer Gas Measurements		
Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)	Shroud (%)		Purge Sample Concentration (ppm)
				CH_4	CO_2	O_2	VOCs	Min	Max	

Shut-in test completed prior to purging and sampling? Yes No

Vac. Pressure while purging is less than -7 in. Hg? Yes No

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? Yes No

Sample Collection						
Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID

Comments:

Weather Readings

Temperature: _____ °F

Humidity: _____ %

Barometric Pressure: _____ in. Hg

Wind: _____ mph Direction: _____

ATTACHMENT B
Field Data Sheets

DAILY FIELD REPORT

PROJECT	TASS 2	**H&A FILE NO.**	0209772-004
LOCATION	10505 N. Portland Rd, Portland	**PROJECT MGR.**	Colby Hunt
CLIENT	City of Portland BES	**REPORT NO.**	1
CONTRACTOR	NA	**DATE**	6/6/2024
WEATHER	clear & calm	**TEMPERATURE**	70s

0930 - Arrive onsite and don PPE. Site is secured to vehicular traffic and there are no personnel onsite. Access site by walking around gate. Move to north portion of West Property and begin measuring CH4, H2S, and CO2 concentrations with a calibrated Optimax hand-held multigas analyzer.

1015 - Begin measuring concentrations of above gases at the ground surface (locations shown on attached site plan):

Location	CH4 (%)	H2S (ppm)	CO2 (ppm)
1	0	0	0.02
2	0	0	0.03
3	0	0	0.02
4	0	0	0.02
5	0	0	0.02
6	0	0	0.03
7	0.07*	0	0.02
8	0.08*	0	0.02
9	0	0	0.02
10	0	0	0.02
11	0	0	0.02
12	0	0	0.02
13	0	0	0.02

* initial methane concentration reading. Methane concentration rapidly decreased to 0% at this location and does not appear representative of actual methane concentration at the ground surface at this location.

A representative of Landis & Landis Construction arrives onsite and access a fenced enclosure near the west boundary of TASS 2. The fenced enclosure contains two Conex-box type mobile offices, three storage boxes, two mobile restrooms, and heavy equipment. One of the two Conex-box type mobilie offices is unlocked (the remaining mobile office and storage boxes are locked. Access unlocked mobile office and measure CH4, H2S, and CO2 concentrations in three separate office spaces, also inside one of the portable restrooms:

Location	CH4 (%)	H2S (ppm)	CO2 (ppm)
Office 1	0	0	0.06
Office 2	0	0	0.04
Office 3	0	0	0.04
Restroom	0	0	0.04

Continue with ground-surface monitoring: (Page 2)

Field Representative(s)

Colby Hunt

Distribution:

City of Portland BES

Project File

Haley & Aldrich, Inc.

DAILY FIELD REPORT

PROJECT	TASS 2	**H&A FILE NO.**	0209772-004
LOCATION	10505 N. Portland Rd, Portland	**PROJECT MGR.**	Colby Hunt
CLIENT	City of Portland BES	**REPORT NO.**	1
CONTRACTOR	NA	**DATE**	6/6/2024
WEATHER	clear & calm	**TEMPERATURE**	70s

Location	CH4 (%)	H2S (ppm)	CO2 (ppm)
14	0	0	0.03
15	0	0	0.04
16	0	0	0.04
17	0	0	0.03
18	0	0	0.04

Obtain measurements from three septic treatment tanks installed in an open excavation near the northeast corner of TASS 2:

Location	CH4 (%)	H2S (ppm)	CO2 (ppm)
Treatment #1	0	0	0.03
Treatment #2	0	0	0.03
Treatment #3	0	0	0.04

Observe 8 septic tanks in an open excavation near the northeast corner of TASS 2. Because no one else is onsite, determine it may not be safe to access these septic tanks. Obtain measurements from the open excavation:

Location	CH4 (%)	H2S (ppm)	CO2 (ppm)
Excavation	0	0	0.03

Representatives of the City of Portland arrive onsite (Brian Marcum, John O'Donovan, Taryn Meyer, and Michelle Ladd). Taryn observes an apparent safe area to access septic tank excavation, and I obtain measurements from each septic tank:

Location	CH4 (%)	H2S (ppm)	CO2 (ppm)
Septic #1	0	0	0.03
Septic #2	0	0	0.04
Septic #3	0	0	0.05
Septic #4	0	0	0.06
Septic #5	0	0	0.07
Septic #6	0	0	0.08
Septic #7	0	0	0.09
Septic #8	0	0	0.10

Field Representative(s)

Colby Hunt

Distribution:

City of Portland BES

Project file

Haley & Aldrich, Inc.

DAILY FIELD REPORT

PROJECT	TASS 2	**H&A FILE NO.**	0209772-004
LOCATION	10505 N. Portland Rd, Portland	**PROJECT MGR.**	Colby Hunt
CLIENT	City of Portland BES	**REPORT NO.**	1
CONTRACTOR	NA	**DATE**	6/6/2024
WEATHER	clear & calm	**TEMPERATURE**	70s

Measure methane concentrations in a standpipe connected to subsurface piping associated with future restroom facilities near the northeast corner of TASS 2:

Location	CH4 (%)	H2S (ppm)	CO2 (ppm)
Standpipe	0	0	0.04

1230 - Leave site.

Field Representative(s)

Colby Hunt

Distribution:

City of Portland BES

Project file

Haley & Aldrich, Inc.

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-1 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.24.2024 Weather: Cloudy + 60's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt __X__ Other (specify): Gravel

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe 0.15 (L) Sub-Slab Probe _____ (L)

Purge Measurements								Helium Tracer Gas Measurements		
Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)	Shroud (%)		Purge Sample Concentration (ppm)
				CH_4	CO_2	O_2	VOCs	Min	Max	
PRE	--	0.1	0.1	--	--	--	1.12 ppm	31	35	--
PRE	--	0.1	0.2	41	6.25	19	1.12 ppm	31	35	4%
PRE	--	0.1	0.3	--	--	--	--	31	35	8%
PRE	--	0.3	0.6	--	--	--	--	31	35	10%
PRE	--	0.2	0.8	--	--	--	--	31	35	--
SAMPLE	--	--	--	--	--	--	--	31	36.7	--
POST		--	--	50.05	8.13	0.1	0.486 ppm	--	--	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? Yes **No**

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
1235	1240	23172	1L4708	-27	-5	SV-1-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
1302	1304	238867	Syringe	50ml/min	200	SV-1-TO-17

Comments: '-- = not measured
- insufficient purge volume to collect all parameters from tedlar bag
- High methane level interferring with Helium detection
- POST sample readings collected directly from probe

Weather Readings

Temperature: 57.5 °F

Humidity: 59.3 %

Barometric Pressure: 30.1 in. Hg

Wind: 2.7 mph Direction: SW

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-2 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.24.2024 Weather: Overcast + 70's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt X Other (specify): Gravel

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe 0.15 (L) Sub-Slab Probe _____ (L)

Purge Measurements								Helium Tracer Gas Measurements		
Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)	Shroud (%)		Purge Sample Concentration (ppm)
				CH_4	CO_2	O_2	VOCs	Min	Max	
PRE	--	0.3	0.3	--	--	--	--	32	36	7.90%
SAMPLE	--	--	--	--	--	--	--	32	36	--
POST	--	--	--	39.29	6.78	19.5	0.683 ppm	32	36	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? Yes **No**

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
1440	1446	23661	1L3593	-29	-5	SV-2-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
1448	1502	876290	Syringe	50ml/min	200	SV-2-TO-17

Comments:
-- = not measured
- insufficient purge volume to collect all parameters from tedlar bag
- High methane level interferring with Helium detection
- POST sample readings collected directly from probe

Weather Readings

Temperature: 72.8 °F

Humidity: 48.3 %

Barometric Pressure: 30.07 in. Hg

Wind: 1.9 mph Direction: SW

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-3 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.25.2024 Weather: Cloudy/Rainy + 50's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone ____ Asphalt X Other (specify): Gravel

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):
Soil Vapor Probe 0.4 (L) Sub-Slab Probe _____ (L)

Purge Measurements

Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)
				CH_4	CO_2	O_2	VOCs
PRE	--	0.8	0.8	18.18	5.01	1.02	3.070 ppm
SAMPLE	--	--	--	--	--	--	--
POST	--	--	--	18.92	5.25	0.36	2.833 ppm

Helium Tracer Gas Measurements

Shroud (%)		Purge Sample Concentration (ppm)
Min	Max	
--	--	--
--	--	--
--	--	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? NA

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
1456	1502	24234	1L2264	-28	-5	SV-3-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
1509	1516	876283	Syringe	50ml/min	300	SV-3-TO-17

Comments: '-- = not measured
- 2-propanol used for leak detection due to PRT tooling sticking too far out of surface for helium shroud
- POST sample readings collected directly from probe

Weather Readings

Temperature: 57.2 °F

Humidity: 95.4 %

Barometric Pressure: 29.84 in. Hg

Wind: 10.8 mph Direction: SE

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-4 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.24.2024 Weather: Cloudy + 60's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt X Other (specify): Gravel

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe 0.15 (L) Sub-Slab Probe _____ (L)

Purge Measurements

Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)
				CH_4	CO_2	O_2	VOCs
PRE	--	0.3	0.3	--	--	--	--
SAMPLE	--	--	--	--	--	--	--
POST	--	--	--	42	4.6	3.62	1.10 ppm

Helium Tracer Gas Measurements

Shroud (%)		Purge Sample Concentration (ppm)
Min	Max	
32	36	8.80%
32	36	--
32	36	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? Yes **No**

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
1554	1559	23999	1L4371	-26	-5	SV-4-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
1611	1616	876286	Syringe	50ml/min	200	SV-4-TO-17

Comments: '-- = not measured
- insufficient purge volume to collect all parameters from tedlar bag
- High methane level interferring with Helium detection
- POST sample readings collected directly from probe

Weather Readings

Temperature: 69.4 °F

Humidity: 53.1 %

Barometric Pressure: 30.06 in. Hg

Wind: 1.1 mph Direction: SW

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-5 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.24.2024 Weather: Cloudy + 60's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt X Other (specify): Gravel

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe 0.15 (L) Sub-Slab Probe _____ (L)

Purge Measurements								Helium Tracer Gas Measurements		
Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)	Shroud (%)		Purge Sample Concentration (ppm)
				CH_4	CO_2	O_2	VOCs	Min	Max	
PRE	--	0.3	0.3	--	--	--	--	32	36	5.50%
SAMPLE	--	--	--	--	--	--	--	32	35	--
POST	--	--	--	31.5	4.62	0.08	0.888 ppm	32	36	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? Yes **No**

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
1658	1703	23334	1L4623	-26	-5	SV-5-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
1713	1719	869351	Syringe	50ml/min	200	SV-5-TO-17

Comments: '-- = not measured
- insufficient purge volume to collect all parameters from tedlar bag
- High methane level interferring with Helium detection
- POST sample readings collected directly from probe

Weather Readings

Temperature: 66.9 °F

Humidity: 56 %

Barometric Pressure: 30.03 in. Hg

Wind: 1.9 mph Direction: SW

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-6 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.25.2024 Weather: Overcast / Rainy + 50's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt X Other (specify): Gravel

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe 0.15 (L) Sub-Slab Probe _____ (L)

Purge Measurements								Helium Tracer Gas Measurements		
Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)	Shroud (%)		Purge Sample Concentration (ppm)
				CH_4	CO_2	O_2	VOCs	Min	Max	
PRE	--	0.3	0.3	--	--	--	--	32	36	5.20%
SAMPLE	--	--	--	--	--	--	--	32	36	--
POST	--	--	--	24.86	0.26	3.95	2.013 ppm	32	36	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? Yes **No**

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
900	907	23461	40875	-27	-5	SV-6-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
923	930	876284	Syringe	50ml/min	300	SV-6-TO-17

Comments: '-- = not measured
- insufficient purge volume to collect all parameters from tedlar bag
- High methane level interferring with Helium detection
- POST sample readings collected directly from probe

Weather Readings

Temperature: 55.2 °F

Humidity: 100 %

Barometric Pressure: 29.9 in. Hg

Wind: 1.7 mph Direction: SE

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-8 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.25.2024 Weather: Cloudy/Rainy + 50's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt X Other (specify): Gravel

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe 0.15 (L) Sub-Slab Probe _____ (L)

Purge Measurements								Helium Tracer Gas Measurements		
Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)	Shroud (%)		Purge Sample Concentration (ppm)
				CH_4	CO_2	O_2	VOCs	Min	Max	
PRE	--	0.3	0.3	--	--	--	--	32	36	5.70%
SAMPLE	--	--	--	--	--	--	--	32	36	--
POST	--	--	--	32.98	2.67	0.08	35.86 ppm	32	36	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? Yes **No**

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
1350	1356	24106	1L4346	-27	-5	SV-8-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
1409	1416	238885	Syringe	50ml/min	300	SV-8-TO-17

Comments: '-- = not measured
- insufficient purge volume to collect all parameters from tedlar bag
- High methane level interferring with Helium detection
- POST sample readings collected directly from probe

Weather Readings

Temperature: 56.7 °F

Humidity: 92.1 %

Barometric Pressure: 29.86 in. Hg

Wind: 2.8 mph Direction: S/SW

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-9 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.25.2024 Weather: Cloudy/Rainy + 60's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: ____ Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt X Other (specify): Gravel

Surface Thickness (in inches): _____ (or) ____ Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe 0.15 (L) Sub-Slab Probe _____ (L)

Purge Measurements								Helium Tracer Gas Measurements		
Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)	Shroud (%)		Purge Sample Concentration (ppm)
				CH_4	CO_2	O_2	VOCs	Min	Max	
PRE	--	0.3	0.3	--	--	--	--	32	36	0
SAMPLE	--	--	--	--	--	--	--	32	36	--
POST	--	--	--	3.88	5.29	0.14	--	32	36	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? **Yes** No

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
1237	1243	23667	1L2709	-28	-5	SV-9-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
1255	1301	233398	Syringe	50ml/min	300	SV-9-TO-17

Comments: '-- = not measured
- insufficient purge volume to collect all parameters from tedlar bag
- High methane level interferring with Helium detection
- POST sample readings collected directly from probe

Weather Readings

Temperature: 55.5 °F

Humidity: 89.4 %

Barometric Pressure: 29.88 in. Hg

Wind: 2.1 mph Direction: SE

SOIL VAPOR PROBE SAMPLING RECORD

HALEY ALDRICH

Project: TASS 2 SVI Project Number: 209772 Probe ID: SV-10 **Soil vapor probe** Sub-slab probe

Site Location: 10505 N Portland Road PID Model and ID#: RAE-PPB 3000 10.6ev / U62797X

Date: 4.25.2024 Weather: Overcast/Raining + 50's Landfill Gas Meter and ID#: MRU-OPTIMAX - U120520X

Site Personnel: Max Elias, Michael Oakes Helium Detector Model and ID#: Dialetric MGD - 2002 /U79887X

Surface Type: X Concrete ____ Grass ____ Soil ____ Paving Stone

____ Asphalt ____ Other (specify): _____

Surface Thickness (in inches): _____ (or) X Unknown
(If asphalt or concrete)

Calculated Casing Volume (one volume):

Soil Vapor Probe 0.15 (L) Sub-Slab Probe _____ (L)

Purge Measurements

Pre- or Post-Sample?	Vac. Pressure (in. Hg)	Purge Volume (L)	Cumulative Volume (L)	Landfill Gas Meter (%)			PID (ppb)
				CH_4	CO_2	O_2	VOCs
PRE	--	0.3	0.3	--	--	--	--
SAMPLE	--	--	--	--	--	--	--
POST	--	--	--	0.01	4.76	10.1	178.4 ppm

Helium Tracer Gas Measurements

Shroud (%)		Purge Sample Concentration (ppm)
Min	Max	
32	36	0
32	36	--
32	36	--

Shut-in test completed prior to purging and sampling? **Yes (Pass)** No

Vac. Pressure while purging is less than -7 in. Hg? **Vacuum pressure not measured**

Helium concentration in field-screened samples is less than 10% of minimum concentration in the shroud? **Yes** No

Sample Collection (TO-15)

Start Time	End Time	Flow Controller	Canister ID	Initial Vacuum (in. Hg)	Final Vacuum (in. Hg)	Sample ID
1132	1138	23291	1L2443	-27	-5	SV-10-TO-15

Sample Collection (TO-17)

Start Time	End Time	Tube ID	Sample Method	Flow Rate	Sample Volume	Sample ID
1154	1202	238545	Syringe	50ml/min	300	SV-10-TO-17
1205	1211	876289	Syringe	50ml/min	300	SV-10-TO-17-DUP

Comments: '-- = not measured
- insufficient purge volume to collect all parameters from tedlar bag
- High methane level interferring with Helium detection
- POST sample readings collected directly from probe
- Sheen observed in water adjacent to sample probe

Weather Readings

Temperature: 58.3 °F

Humidity: 90.5 %

Barometric Pressure: 29.89 in. Hg

Wind: 0.9 mph Direction: SE

ATTACHMENT C
Analytical Laboratory Reports

eurofins | Air Toxics

5/18/2024
Mr. Andy Klopfenstein
Haley & Aldrich, Inc.
6420 SW MacAdam Ave
Ste 100
Portland OR 97239

Project Name: COP TASS 2
Project #:
Workorder #: 2405186A

Dear Mr. Andy Klopfenstein

The following report includes the data for the above referenced project for sample(s) received on 5/6/2024 at Eurofins Air Toxics LLC.

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 LLC. 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: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Monica Tran

Project Manager

eurofins | Air Toxics

WORK ORDER #: 2405186A

Work Order Summary

CLIENT:	Mr. Andy Klopfenstein Haley & Aldrich, Inc. 6420 SW MacAdam Ave Ste 100 Portland, OR 97239	**BILL TO:**	Accounts Payable Haley & Aldrich 70 Blanchard Road Suite 430 Burlington, MA 02129-1400
PHONE:	503-620-7284	**P.O. #**	0209772-004
FAX:	503-620-6918	**PROJECT #**	COP TASS 2
DATE RECEIVED:	05/06/2024	**CONTACT:**	Monica Tran
DATE COMPLETED:	05/18/2024		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-1-TO-15	Modified TO-15	6.3 "Hg	10 psi
02A	SV-2-TO-15	Modified TO-15	4.5 "Hg	10 psi
03A	SV-3-TO-15	Modified TO-15	4.9 "Hg	10.1 psi
04A	SV-4-TO-15	Modified TO-15	5.7 "Hg	9.9 psi
05A	SV-5-TO-15	Modified TO-15	5.5 "Hg	10 psi
06A	SV-6-TO-15	Modified TO-15	6.1 "Hg	9.8 psi
07A	SV-8-TO-15	Modified TO-15	4.3 "Hg	9.8 psi
08A	SV-9-TO-15	Modified TO-15	4.5 "Hg	10 psi
09A	SV-10-TO-15	Modified TO-15	5.7 "Hg	10 psi
10A	Lab Blank	Modified TO-15	NA	NA
10B	Lab Blank	Modified TO-15	NA	NA
11A	CCV	Modified TO-15	NA	NA
11B	CCV	Modified TO-15	NA	NA
12A	LCS	Modified TO-15	NA	NA
12AA	LCSD	Modified TO-15	NA	NA
12B	LCS	Modified TO-15	NA	NA
12BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 05/18/24

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP – 209222, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP – T104704434-22-18, UT NELAP – CA009332022-14, VA NELAP - 12240, WA ELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program) CA300005-017
Eurofins Environment Testing Northern California, LLC certifies that the test results contained in this report meet all requirements of the 2016 TNI Standard.

LABORATORY NARRATIVE
Modified TO-15
Haley & Aldrich, Inc.
Workorder# 2405186A

Nine 1 Liter Summa Canister (100% Certified) samples were received on May 06, 2024. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode.

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

Requirement	***TO-15***	***ATL Modifications***
Initial Calibration	</=30% RSD with 2 compounds allowed out to < 40% RSD	</=30% RSD with 4 compounds allowed out to < 40% RSD
Blank and standards	Zero Air	UHP Nitrogen provides a higher purity gas matrix than zero air

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per client project requirements, the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Dilution was performed on samples SV-1-TO-15, SV-2-TO-15, SV-3-TO-15, SV-4-TO-15, SV-5-TO-15, SV-6-TO-15 and SV-8-TO-15 due to the presence of high level target species.

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.

E - Exceeds instrument calibration range.

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.

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

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-1-TO-15		
Lab ID:	2405186A-01A	**Date/Time Analyzed:**	5/17/24 08:22 PM
Date/Time Collected:	4/24/24 12:40 PM	**Dilution Factor:**	21.3
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051717

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	14	52	58	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	25	66	73	Not Detected
1,1,2-Trichloroethane	79-00-5	19	52	58	Not Detected
1,1-Dichloroethane	75-34-3	9.4	39	43	22 J
1,1-Dichloroethene	75-35-4	22	38	42	Not Detected
1,2,4-Trichlorobenzene	120-82-1	58	240	320	Not Detected
1,2,4-Trimethylbenzene	95-63-6	14	47	52	Not Detected
1,2-Dibromoethane (EDB)	106-93-4	27	74	82	Not Detected
1,2-Dichlorobenzene	95-50-1	17	58	64	Not Detected
1,2-Dichloroethane	107-06-2	15	39	43	Not Detected
1,2-Dichloropropane	78-87-5	13	44	49	Not Detected
1,3,5-Trimethylbenzene	108-67-8	14	47	52	Not Detected
1,3-Butadiene	106-99-0	14	21	24	Not Detected
1,3-Dichlorobenzene	541-73-1	15	58	64	Not Detected
1,4-Dichlorobenzene	106-46-7	22	58	64	Not Detected
1,4-Dioxane	123-91-1	35	120	150	Not Detected
2,2,4-Trimethylpentane	540-84-1	20	45	50	620
2-Butanone (Methyl Ethyl Ketone)	78-93-3	21	94	120	120 J
2-Hexanone	591-78-6	49	130	170	Not Detected
2-Propanol	67-63-0	36	78	100	82 J
3-Chloropropene	107-05-1	34	100	130	Not Detected
4-Ethyltoluene	622-96-8	12	47	52	Not Detected
4-Methyl-2-pentanone	108-10-1	17	39	44	Not Detected
Acetone	67-64-1	70	200	250	610

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-1-TO-15		
Lab ID:	2405186A-01A	**Date/Time Analyzed:**	5/17/24 08:22 PM
Date/Time Collected:	4/24/24 12:40 PM	**Dilution Factor:**	21.3
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051717

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	18	50	55	Not Detected
Benzene	71-43-2	8.0	31	34	340
Bromodichloromethane	75-27-4	22	64	71	Not Detected
Bromoform	75-25-2	43	99	110	Not Detected
Bromomethane	74-83-9	74	120	410	Not Detected
Carbon Disulfide	75-15-0	25	99	130	Not Detected
Carbon Tetrachloride	56-23-5	21	60	67	Not Detected
Chlorobenzene	108-90-7	10	44	49	Not Detected
Chloroethane	75-00-3	39	84	110	Not Detected
Chloroform	67-66-3	12	47	52	Not Detected
Chloromethane	74-87-3	37	66	220	Not Detected
cis-1,2-Dichloroethene	156-59-2	9.2	38	42	180
cis-1,3-Dichloropropene	10061-01-5	12	44	48	Not Detected
Cumene	98-82-8	11	47	52	Not Detected
Cyclohexane	110-82-7	13	33	37	590
Dibromochloromethane	124-48-1	27	82	91	Not Detected
Ethanol	64-17-5	99	160	200	Not Detected
Ethyl Benzene	100-41-4	11	42	46	23 J
Freon 11	75-69-4	19	54	60	Not Detected
Freon 113	76-13-1	18	73	82	Not Detected
Freon 114	76-14-2	21	67	74	61 J
Freon 12	75-71-8	25	47	53	Not Detected
Heptane	142-82-5	15	39	44	290
Hexachlorobutadiene	87-68-3	130	340	450	Not Detected

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-1-TO-15		
Lab ID:	2405186A-01A	**Date/Time Analyzed:**	5/17/24 08:22 PM
Date/Time Collected:	4/24/24 12:40 PM	**Dilution Factor:**	21.3
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051717

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	12	34	38	670
m,p-Xylene	108-38-3	6.6	42	92	31 J
Methyl tert-butyl ether	1634-04-4	28	120	150	Not Detected
Methylene Chloride	75-09-2	31	110	370	Not Detected
Naphthalene	91-20-3	8.8	22	110	Not Detected
o-Xylene	95-47-6	11	42	46	23 J
Propylbenzene	103-65-1	12	47	52	Not Detected
Styrene	100-42-5	8.0	41	45	Not Detected
Tetrachloroethene	127-18-4	18	65	72	Not Detected
Tetrahydrofuran	109-99-9	20	28	31	Not Detected
Toluene	108-88-3	10	36	80	35 J
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	4400	94000
trans-1,2-Dichloroethene	156-60-5	19	38	42	Not Detected
trans-1,3-Dichloropropene	10061-02-6	7.4	44	48	Not Detected
Trichloroethene	79-01-6	17	52	57	36 J
Vinyl Chloride	75-01-4	23	24	27	85

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	80
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	102

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-2-TO-15		
Lab ID:	2405186A-02A	**Date/Time Analyzed:**	5/17/24 05:33 PM
Date/Time Collected:	4/24/24 02:46 PM	**Dilution Factor:**	11.3
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051712

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	7.5	28	31	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	13	35	39	Not Detected
1,1,2-Trichloroethane	79-00-5	10	28	31	Not Detected
1,1-Dichloroethane	75-34-3	5.0	20	23	33
1,1-Dichloroethene	75-35-4	12	20	22	Not Detected
1,2,4-Trichlorobenzene	120-82-1	31	120	170	Not Detected
1,2,4-Trimethylbenzene	95-63-6	7.5	25	28	Not Detected
1,2-Dibromoethane (EDB)	106-93-4	14	39	43	Not Detected
1,2-Dichlorobenzene	95-50-1	9.1	30	34	Not Detected
1,2-Dichloroethane	107-06-2	7.9	20	23	Not Detected
1,2-Dichloropropane	78-87-5	7.1	23	26	Not Detected
1,3,5-Trimethylbenzene	108-67-8	7.4	25	28	Not Detected
1,3-Butadiene	106-99-0	7.3	11	12	Not Detected
1,3-Dichlorobenzene	541-73-1	7.9	30	34	Not Detected
1,4-Dichlorobenzene	106-46-7	11	30	34	Not Detected
1,4-Dioxane	123-91-1	19	61	81	Not Detected
2,2,4-Trimethylpentane	540-84-1	10	24	26	280
2-Butanone (Methyl Ethyl Ketone)	78-93-3	11	50	67	45 J
2-Hexanone	591-78-6	26	69	92	Not Detected
2-Propanol	67-63-0	19	42	56	Not Detected
3-Chloropropene	107-05-1	18	53	71	Not Detected
4-Ethyltoluene	622-96-8	6.2	25	28	Not Detected
4-Methyl-2-pentanone	108-10-1	8.9	21	23	Not Detected
Acetone	67-64-1	37	110	130	220

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-2-TO-15		
Lab ID:	2405186A-02A	**Date/Time Analyzed:**	5/17/24 05:33 PM
Date/Time Collected:	4/24/24 02:46 PM	**Dilution Factor:**	11.3
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051712

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	9.4	26	29	Not Detected
Benzene	71-43-2	4.3	16	18	29
Bromodichloromethane	75-27-4	12	34	38	Not Detected
Bromoform	75-25-2	23	52	58	Not Detected
Bromomethane	74-83-9	39	66	220	Not Detected
Carbon Disulfide	75-15-0	13	53	70	Not Detected
Carbon Tetrachloride	56-23-5	11	32	36	Not Detected
Chlorobenzene	108-90-7	5.5	23	26	Not Detected
Chloroethane	75-00-3	21	45	60	Not Detected
Chloroform	67-66-3	6.3	25	28	Not Detected
Chloromethane	74-87-3	20	35	120	Not Detected
cis-1,2-Dichloroethene	156-59-2	4.9	20	22	50
cis-1,3-Dichloropropene	10061-01-5	6.3	23	26	Not Detected
Cumene	98-82-8	6.1	25	28	Not Detected
Cyclohexane	110-82-7	7.2	18	19	450
Dibromochloromethane	124-48-1	14	43	48	Not Detected
Ethanol	64-17-5	53	85	110	Not Detected
Ethyl Benzene	100-41-4	5.8	22	24	Not Detected
Freon 11	75-69-4	10	28	32	Not Detected
Freon 113	76-13-1	9.4	39	43	Not Detected
Freon 114	76-14-2	11	36	39	Not Detected
Freon 12	75-71-8	13	25	28	25 J
Heptane	142-82-5	7.9	21	23	150
Hexachlorobutadiene	87-68-3	68	180	240	Not Detected

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-2-TO-15		
Lab ID:	2405186A-02A	**Date/Time Analyzed:**	5/17/24 05:33 PM
Date/Time Collected:	4/24/24 02:46 PM	**Dilution Factor:**	11.3
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051712

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	6.2	18	20	860
m,p-Xylene	108-38-3	3.5	22	49	11 J
Methyl tert-butyl ether	1634-04-4	15	61	81	Not Detected
Methylene Chloride	75-09-2	16	59	200	Not Detected
Naphthalene	91-20-3	4.7	12	59	Not Detected
o-Xylene	95-47-6	5.9	22	24	6.9 J
Propylbenzene	103-65-1	6.2	25	28	Not Detected
Styrene	100-42-5	4.2	22	24	Not Detected
Tetrachloroethene	127-18-4	9.9	34	38	Not Detected
Tetrahydrofuran	109-99-9	11	15	17	Not Detected
Toluene	108-88-3	5.3	19	42	8.2 J
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	2300	70000
trans-1,2-Dichloroethene	156-60-5	10	20	22	Not Detected
trans-1,3-Dichloropropene	10061-02-6	3.9	23	26	Not Detected
Trichloroethene	79-01-6	9.1	27	30	11 J
Vinyl Chloride	75-01-4	12	13	14	72

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	83
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	101

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-3-TO-15		
Lab ID:	2405186A-03A	**Date/Time Analyzed:**	5/17/24 05:58 PM
Date/Time Collected:	4/25/24 03:02 PM	**Dilution Factor:**	6.72
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051712

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	0.71	2.9	3.7	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	1.2	3.7	4.6	Not Detected
1,1,2-Trichloroethane	79-00-5	1.1	2.9	3.7	Not Detected
1,1-Dichloroethane	75-34-3	0.58	2.2	2.7	Not Detected
1,1-Dichloroethene	75-35-4	0.66	2.1	2.7	Not Detected
1,2,4-Trichlorobenzene	120-82-1	14	24	25	Not Detected
1,2,4-Trimethylbenzene	95-63-6	0.89	2.6	3.3	1.6 J
1,2-Dibromoethane (EDB)	106-93-4	1.3	4.1	5.2	Not Detected
1,2-Dichlorobenzene	95-50-1	0.80	3.2	4.0	Not Detected
1,2-Dichloroethane	107-06-2	0.66	2.2	2.7	Not Detected
1,2-Dichloropropane	78-87-5	0.98	2.5	3.1	Not Detected
1,3,5-Trimethylbenzene	108-67-8	0.81	2.6	3.3	Not Detected
1,3-Butadiene	106-99-0	0.63	1.2	1.5	Not Detected
1,3-Dichlorobenzene	541-73-1	0.89	3.2	4.0	Not Detected
1,4-Dichlorobenzene	106-46-7	0.66	3.2	4.0	Not Detected
1,4-Dioxane	123-91-1	0.71	1.9	12	Not Detected
2,2,4-Trimethylpentane	540-84-1	4.7	15	16	100
2-Butanone (Methyl Ethyl Ketone)	78-93-3	1.0	9.5	40	11 J
2-Hexanone	591-78-6	3.1	13	14	Not Detected
2-Propanol	67-63-0	2.5	7.9	33	6.4 J
3-Chloropropene	107-05-1	2.9	10	10	Not Detected
4-Ethyltoluene	622-96-8	0.93	2.6	3.3	Not Detected
4-Methyl-2-pentanone	108-10-1	0.54	2.2	2.8	Not Detected
Acetone	67-64-1	7.2	7.7	32	50

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-3-TO-15		
Lab ID:	2405186A-03A	**Date/Time Analyzed:**	5/17/24 05:58 PM
Date/Time Collected:	4/25/24 03:02 PM	**Dilution Factor:**	6.72
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051712

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	0.79	2.8	3.5	Not Detected
Benzene	71-43-2	0.32	1.7	2.1	2.7
Bromodichloromethane	75-27-4	0.96	3.6	4.5	Not Detected
Bromoform	75-25-2	1.3	5.6	6.9	Not Detected
Bromomethane	74-83-9	7.5	12	130	Not Detected
Carbon Disulfide	75-15-0	9.9	10	100	18 J
Carbon Tetrachloride	56-23-5	0.88	3.4	4.2	Not Detected
Chlorobenzene	108-90-7	0.87	2.5	3.1	Not Detected
Chloroethane	75-00-3	2.4	8.5	8.9	Not Detected
Chloroform	67-66-3	0.71	2.6	3.3	7.3
Chloromethane	74-87-3	2.2	6.7	6.9	Not Detected
cis-1,2-Dichloroethene	156-59-2	1.4	2.1	2.7	Not Detected
cis-1,3-Dichloropropene	10061-01-5	0.54	2.4	3.0	Not Detected
Cumene	98-82-8	1.2	2.6	3.3	Not Detected
Cyclohexane	110-82-7	2.2	11	12	50
Dibromochloromethane	124-48-1	0.92	4.6	5.7	Not Detected
Ethanol	64-17-5	2.7	6.1	25	13 J
Ethyl Benzene	100-41-4	0.67	2.3	2.9	0.95 J
Freon 11	75-69-4	0.59	3.0	3.8	Not Detected
Freon 113	76-13-1	0.98	4.1	5.2	Not Detected
Freon 114	76-14-2	1.1	3.8	4.7	5.3
Freon 12	75-71-8	2.3	16	17	Not Detected
Heptane	142-82-5	2.1	13	14	Not Detected
Hexachlorobutadiene	87-68-3	8.3	34	36	Not Detected

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

Client ID:	SV-3-TO-15		
Lab ID:	2405186A-03A	**Date/Time Analyzed:**	5/17/24 05:58 PM
Date/Time Collected:	4/25/24 03:02 PM	**Dilution Factor:**	6.72
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051712

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	2.8	11	12	87
m,p-Xylene	108-38-3	1.2	2.3	2.9	1.4 J
Methyl tert-butyl ether	1634-04-4	0.73	1.9	2.4	Not Detected
Methylene Chloride	75-09-2	1.0	1.9	12	5.6 J
Naphthalene	91-20-3	2.1	4.2	7.0	Not Detected
o-Xylene	95-47-6	0.90	2.3	2.9	Not Detected
Propylbenzene	103-65-1	0.99	2.6	3.3	Not Detected
Styrene	100-42-5	0.78	2.3	2.9	Not Detected
Tetrachloroethene	127-18-4	1.1	3.6	4.6	Not Detected
Tetrahydrofuran	109-99-9	9.4	9.5	9.9	Not Detected
Toluene	108-88-3	0.44	2.0	25	4.1 J
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	270	30000
trans-1,2-Dichloroethene	156-60-5	0.99	2.1	2.7	Not Detected
trans-1,3-Dichloropropene	10061-02-6	0.90	2.4	3.0	Not Detected
Trichloroethene	79-01-6	0.42	2.9	3.6	Not Detected
Vinyl Chloride	75-01-4	0.41	1.4	1.7	Not Detected

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	108
4-Bromofluorobenzene	460-00-4	70-130	91
Toluene-d8	2037-26-5	70-130	100

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-4-TO-15		
Lab ID:	2405186A-04A	**Date/Time Analyzed:**	5/17/24 06:07 PM
Date/Time Collected:	4/24/24 03:59 PM	**Dilution Factor:**	11.8
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051713

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	7.8	29	32	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	14	36	40	Not Detected
1,1,2-Trichloroethane	79-00-5	11	29	32	Not Detected
1,1-Dichloroethane	75-34-3	5.2	21	24	6.2 J
1,1-Dichloroethene	75-35-4	12	21	23	Not Detected
1,2,4-Trichlorobenzene	120-82-1	32	130	180	Not Detected
1,2,4-Trimethylbenzene	95-63-6	7.8	26	29	Not Detected
1,2-Dibromoethane (EDB)	106-93-4	15	41	45	Not Detected
1,2-Dichlorobenzene	95-50-1	9.5	32	35	Not Detected
1,2-Dichloroethane	107-06-2	8.2	21	24	Not Detected
1,2-Dichloropropane	78-87-5	7.4	24	27	Not Detected
1,3,5-Trimethylbenzene	108-67-8	7.8	26	29	Not Detected
1,3-Butadiene	106-99-0	7.7	12	13	Not Detected
1,3-Dichlorobenzene	541-73-1	8.3	32	35	Not Detected
1,4-Dichlorobenzene	106-46-7	12	32	35	Not Detected
1,4-Dioxane	123-91-1	20	64	85	Not Detected
2,2,4-Trimethylpentane	540-84-1	11	25	28	160
2-Butanone (Methyl Ethyl Ketone)	78-93-3	12	52	70	39 J
2-Hexanone	591-78-6	27	72	97	Not Detected
2-Propanol	67-63-0	20	44	58	24 J
3-Chloropropene	107-05-1	19	55	74	Not Detected
4-Ethyltoluene	622-96-8	6.4	26	29	Not Detected
4-Methyl-2-pentanone	108-10-1	9.3	22	24	Not Detected
Acetone	67-64-1	39	110	140	170

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-4-TO-15		
Lab ID:	2405186A-04A	**Date/Time Analyzed:**	5/17/24 06:07 PM
Date/Time Collected:	4/24/24 03:59 PM	**Dilution Factor:**	11.8
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051713

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	9.8	27	30	Not Detected
Benzene	71-43-2	4.4	17	19	54
Bromodichloromethane	75-27-4	12	36	40	Not Detected
Bromoform	75-25-2	24	55	61	Not Detected
Bromomethane	74-83-9	41	69	230	Not Detected
Carbon Disulfide	75-15-0	14	55	73	Not Detected
Carbon Tetrachloride	56-23-5	12	33	37	Not Detected
Chlorobenzene	108-90-7	5.7	24	27	Not Detected
Chloroethane	75-00-3	22	47	62	Not Detected
Chloroform	67-66-3	6.6	26	29	Not Detected
Chloromethane	74-87-3	21	36	120	Not Detected
cis-1,2-Dichloroethene	156-59-2	5.1	21	23	350
cis-1,3-Dichloropropene	10061-01-5	6.5	24	27	Not Detected
Cumene	98-82-8	6.3	26	29	Not Detected
Cyclohexane	110-82-7	7.5	18	20	130
Dibromochloromethane	124-48-1	15	45	50	Not Detected
Ethanol	64-17-5	55	89	110	170
Ethyl Benzene	100-41-4	6.1	23	26	Not Detected
Freon 11	75-69-4	11	30	33	Not Detected
Freon 113	76-13-1	9.8	41	45	Not Detected
Freon 114	76-14-2	11	37	41	Not Detected
Freon 12	75-71-8	14	26	29	26 J
Heptane	142-82-5	8.2	22	24	50
Hexachlorobutadiene	87-68-3	72	190	250	Not Detected

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-4-TO-15		
Lab ID:	2405186A-04A	**Date/Time Analyzed:**	5/17/24 06:07 PM
Date/Time Collected:	4/24/24 03:59 PM	**Dilution Factor:**	11.8
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051713

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	6.5	19	21	200
m,p-Xylene	108-38-3	3.7	23	51	19 J
Methyl tert-butyl ether	1634-04-4	16	64	85	Not Detected
Methylene Chloride	75-09-2	17	61	200	Not Detected
Naphthalene	91-20-3	4.9	12	62	Not Detected
o-Xylene	95-47-6	6.1	23	26	Not Detected
Propylbenzene	103-65-1	6.5	26	29	Not Detected
Styrene	100-42-5	4.4	23	25	Not Detected
Tetrachloroethene	127-18-4	10	36	40	38 J
Tetrahydrofuran	109-99-9	11	16	17	Not Detected
Toluene	108-88-3	5.6	20	44	53
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	2400	49000
trans-1,2-Dichloroethene	156-60-5	11	21	23	85
trans-1,3-Dichloropropene	10061-02-6	4.1	24	27	Not Detected
Trichloroethene	79-01-6	9.5	28	32	69
Vinyl Chloride	75-01-4	13	14	15	780

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	80
4-Bromofluorobenzene	460-00-4	70-130	95
Toluene-d8	2037-26-5	70-130	101

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-5-TO-15		
Lab ID:	2405186A-05A	**Date/Time Analyzed:**	5/17/24 06:41 PM
Date/Time Collected:	4/24/24 05:03 PM	**Dilution Factor:**	11.8
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051714

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	7.8	29	32	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	14	36	40	Not Detected
1,1,2-Trichloroethane	79-00-5	11	29	32	Not Detected
1,1-Dichloroethane	75-34-3	5.2	21	24	Not Detected
1,1-Dichloroethene	75-35-4	12	21	23	Not Detected
1,2,4-Trichlorobenzene	120-82-1	32	130	180	Not Detected
1,2,4-Trimethylbenzene	95-63-6	7.8	26	29	Not Detected
1,2-Dibromoethane (EDB)	106-93-4	15	41	45	Not Detected
1,2-Dichlorobenzene	95-50-1	9.5	32	35	Not Detected
1,2-Dichloroethane	107-06-2	8.2	21	24	Not Detected
1,2-Dichloropropane	78-87-5	7.4	24	27	Not Detected
1,3,5-Trimethylbenzene	108-67-8	7.8	26	29	Not Detected
1,3-Butadiene	106-99-0	7.7	12	13	Not Detected
1,3-Dichlorobenzene	541-73-1	8.3	32	35	Not Detected
1,4-Dichlorobenzene	106-46-7	12	32	35	Not Detected
1,4-Dioxane	123-91-1	20	64	85	Not Detected
2,2,4-Trimethylpentane	540-84-1	11	25	28	24 J
2-Butanone (Methyl Ethyl Ketone)	78-93-3	12	52	70	22 J
2-Hexanone	591-78-6	27	72	97	Not Detected
2-Propanol	67-63-0	20	44	58	Not Detected
3-Chloropropene	107-05-1	19	55	74	Not Detected
4-Ethyltoluene	622-96-8	6.4	26	29	Not Detected
4-Methyl-2-pentanone	108-10-1	9.3	22	24	Not Detected
Acetone	67-64-1	39	110	140	110 J

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-5-TO-15		
Lab ID:	2405186A-05A	**Date/Time Analyzed:**	5/17/24 06:41 PM
Date/Time Collected:	4/24/24 05:03 PM	**Dilution Factor:**	11.8
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051714

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	9.8	27	30	Not Detected
Benzene	71-43-2	4.4	17	19	Not Detected
Bromodichloromethane	75-27-4	12	36	40	Not Detected
Bromoform	75-25-2	24	55	61	Not Detected
Bromomethane	74-83-9	41	69	230	Not Detected
Carbon Disulfide	75-15-0	14	55	73	Not Detected
Carbon Tetrachloride	56-23-5	12	33	37	Not Detected
Chlorobenzene	108-90-7	5.7	24	27	Not Detected
Chloroethane	75-00-3	22	47	62	Not Detected
Chloroform	67-66-3	6.6	26	29	Not Detected
Chloromethane	74-87-3	21	36	120	Not Detected
cis-1,2-Dichloroethene	156-59-2	5.1	21	23	Not Detected
cis-1,3-Dichloropropene	10061-01-5	6.5	24	27	Not Detected
Cumene	98-82-8	6.3	26	29	Not Detected
Cyclohexane	110-82-7	7.5	18	20	41
Dibromochloromethane	124-48-1	15	45	50	Not Detected
Ethanol	64-17-5	55	89	110	Not Detected
Ethyl Benzene	100-41-4	6.1	23	26	Not Detected
Freon 11	75-69-4	11	30	33	Not Detected
Freon 113	76-13-1	9.8	41	45	Not Detected
Freon 114	76-14-2	11	37	41	Not Detected
Freon 12	75-71-8	14	26	29	Not Detected
Heptane	142-82-5	8.2	22	24	14 J
Hexachlorobutadiene	87-68-3	72	190	250	Not Detected

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-5-TO-15		
Lab ID:	2405186A-05A	**Date/Time Analyzed:**	5/17/24 06:41 PM
Date/Time Collected:	4/24/24 05:03 PM	**Dilution Factor:**	11.8
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051714

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	6.5	19	21	130
m,p-Xylene	108-38-3	3.7	23	51	Not Detected
Methyl tert-butyl ether	1634-04-4	16	64	85	Not Detected
Methylene Chloride	75-09-2	17	61	200	Not Detected
Naphthalene	91-20-3	4.9	12	62	Not Detected
o-Xylene	95-47-6	6.1	23	26	Not Detected
Propylbenzene	103-65-1	6.5	26	29	Not Detected
Styrene	100-42-5	4.4	23	25	Not Detected
Tetrachloroethene	127-18-4	10	36	40	Not Detected
Tetrahydrofuran	109-99-9	11	16	17	Not Detected
Toluene	108-88-3	5.6	20	44	8.8 J
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	2400	49000
trans-1,2-Dichloroethene	156-60-5	11	21	23	Not Detected
trans-1,3-Dichloropropene	10061-02-6	4.1	24	27	Not Detected
Trichloroethene	79-01-6	9.5	28	32	Not Detected
Vinyl Chloride	75-01-4	13	14	15	Not Detected

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	78
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	104

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-6-TO-15		
Lab ID:	2405186A-06A	**Date/Time Analyzed:**	5/17/24 07:15 PM
Date/Time Collected:	4/25/24 09:07 AM	**Dilution Factor:**	12.0
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051715

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	8.0	29	33	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	14	37	41	Not Detected
1,1,2-Trichloroethane	79-00-5	11	29	33	Not Detected
1,1-Dichloroethane	75-34-3	5.3	22	24	Not Detected
1,1-Dichloroethene	75-35-4	12	21	24	Not Detected
1,2,4-Trichlorobenzene	120-82-1	33	130	180	Not Detected
1,2,4-Trimethylbenzene	95-63-6	8.0	26	29	Not Detected
1,2-Dibromoethane (EDB)	106-93-4	15	41	46	Not Detected
1,2-Dichlorobenzene	95-50-1	9.7	32	36	Not Detected
1,2-Dichloroethane	107-06-2	8.4	22	24	Not Detected
1,2-Dichloropropane	78-87-5	7.6	25	28	Not Detected
1,3,5-Trimethylbenzene	108-67-8	7.9	26	29	Not Detected
1,3-Butadiene	106-99-0	7.8	12	13	Not Detected
1,3-Dichlorobenzene	541-73-1	8.4	32	36	Not Detected
1,4-Dichlorobenzene	106-46-7	12	32	36	Not Detected
1,4-Dioxane	123-91-1	20	65	86	Not Detected
2,2,4-Trimethylpentane	540-84-1	11	25	28	93
2-Butanone (Methyl Ethyl Ketone)	78-93-3	12	53	71	14 J
2-Hexanone	591-78-6	28	74	98	Not Detected
2-Propanol	67-63-0	20	44	59	Not Detected
3-Chloropropene	107-05-1	19	56	75	Not Detected
4-Ethyltoluene	622-96-8	6.5	26	29	Not Detected
4-Methyl-2-pentanone	108-10-1	9.5	22	24	Not Detected
Acetone	67-64-1	40	110	140	160

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-6-TO-15		
Lab ID:	2405186A-06A	**Date/Time Analyzed:**	5/17/24 07:15 PM
Date/Time Collected:	4/25/24 09:07 AM	**Dilution Factor:**	12.0
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051715

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	10	28	31	Not Detected
Benzene	71-43-2	4.5	17	19	46
Bromodichloromethane	75-27-4	12	36	40	Not Detected
Bromoform	75-25-2	24	56	62	Not Detected
Bromomethane	74-83-9	41	70	230	Not Detected
Carbon Disulfide	75-15-0	14	56	75	36 J
Carbon Tetrachloride	56-23-5	12	34	38	Not Detected
Chlorobenzene	108-90-7	5.8	25	28	Not Detected
Chloroethane	75-00-3	22	47	63	Not Detected
Chloroform	67-66-3	6.7	26	29	Not Detected
Chloromethane	74-87-3	21	37	120	Not Detected
cis-1,2-Dichloroethene	156-59-2	5.2	21	24	Not Detected
cis-1,3-Dichloropropene	10061-01-5	6.6	24	27	Not Detected
Cumene	98-82-8	6.4	26	29	Not Detected
Cyclohexane	110-82-7	7.6	18	21	69
Dibromochloromethane	124-48-1	15	46	51	Not Detected
Ethanol	64-17-5	56	90	110	Not Detected
Ethyl Benzene	100-41-4	6.2	23	26	Not Detected
Freon 11	75-69-4	11	30	34	Not Detected
Freon 113	76-13-1	10	41	46	Not Detected
Freon 114	76-14-2	12	38	42	Not Detected
Freon 12	75-71-8	14	27	30	Not Detected
Heptane	142-82-5	8.4	22	24	160
Hexachlorobutadiene	87-68-3	73	190	260	Not Detected

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-6-TO-15		
Lab ID:	2405186A-06A	**Date/Time Analyzed:**	5/17/24 07:15 PM
Date/Time Collected:	4/25/24 09:07 AM	**Dilution Factor:**	12.0
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051715

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	6.6	19	21	610
m,p-Xylene	108-38-3	3.7	23	52	4.0 J
Methyl tert-butyl ether	1634-04-4	16	65	86	Not Detected
Methylene Chloride	75-09-2	17	62	210	Not Detected
Naphthalene	91-20-3	5.0	12	63	Not Detected
o-Xylene	95-47-6	6.2	23	26	Not Detected
Propylbenzene	103-65-1	6.6	26	29	Not Detected
Styrene	100-42-5	4.5	23	26	Not Detected
Tetrachloroethene	127-18-4	10	37	41	Not Detected
Tetrahydrofuran	109-99-9	11	16	18	Not Detected
Toluene	108-88-3	5.6	20	45	26 J
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	2400	57000
trans-1,2-Dichloroethene	156-60-5	11	21	24	Not Detected
trans-1,3-Dichloropropene	10061-02-6	4.2	24	27	Not Detected
Trichloroethene	79-01-6	9.6	29	32	Not Detected
Vinyl Chloride	75-01-4	13	14	15	360

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	80
4-Bromofluorobenzene	460-00-4	70-130	95
Toluene-d8	2037-26-5	70-130	102

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-8-TO-15		
Lab ID:	2405186A-07A	**Date/Time Analyzed:**	5/17/24 07:48 PM
Date/Time Collected:	4/25/24 01:56 PM	**Dilution Factor:**	11.1
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051716

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	7.4	27	30	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	13	34	38	Not Detected
1,1,2-Trichloroethane	79-00-5	10	27	30	Not Detected
1,1-Dichloroethane	75-34-3	4.9	20	22	Not Detected
1,1-Dichloroethene	75-35-4	11	20	22	Not Detected
1,2,4-Trichlorobenzene	120-82-1	30	120	160	Not Detected
1,2,4-Trimethylbenzene	95-63-6	7.4	24	27	Not Detected
1,2-Dibromoethane (EDB)	106-93-4	14	38	43	Not Detected
1,2-Dichlorobenzene	95-50-1	9.0	30	33	Not Detected
1,2-Dichloroethane	107-06-2	7.7	20	22	Not Detected
1,2-Dichloropropane	78-87-5	7.0	23	26	Not Detected
1,3,5-Trimethylbenzene	108-67-8	7.3	24	27	Not Detected
1,3-Butadiene	106-99-0	7.2	11	12	Not Detected
1,3-Dichlorobenzene	541-73-1	7.8	30	33	Not Detected
1,4-Dichlorobenzene	106-46-7	11	30	33	Not Detected
1,4-Dioxane	123-91-1	18	60	80	Not Detected
2,2,4-Trimethylpentane	540-84-1	10	23	26	190
2-Butanone (Methyl Ethyl Ketone)	78-93-3	11	49	65	61 J
2-Hexanone	591-78-6	26	68	91	Not Detected
2-Propanol	67-63-0	19	41	54	Not Detected
3-Chloropropene	107-05-1	18	52	69	Not Detected
4-Ethyltoluene	622-96-8	6.0	24	27	Not Detected
4-Methyl-2-pentanone	108-10-1	8.8	20	23	Not Detected
Acetone	67-64-1	37	100	130	360

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-8-TO-15		
Lab ID:	2405186A-07A	**Date/Time Analyzed:**	5/17/24 07:48 PM
Date/Time Collected:	4/25/24 01:56 PM	**Dilution Factor:**	11.1
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051716

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	9.2	26	29	Not Detected
Benzene	71-43-2	4.2	16	18	8.1 J
Bromodichloromethane	75-27-4	12	33	37	Not Detected
Bromoform	75-25-2	23	52	57	Not Detected
Bromomethane	74-83-9	38	65	220	Not Detected
Carbon Disulfide	75-15-0	13	52	69	50 J
Carbon Tetrachloride	56-23-5	11	31	35	Not Detected
Chlorobenzene	108-90-7	5.4	23	26	Not Detected
Chloroethane	75-00-3	20	44	58	Not Detected
Chloroform	67-66-3	6.2	24	27	Not Detected
Chloromethane	74-87-3	20	34	110	Not Detected
cis-1,2-Dichloroethene	156-59-2	4.8	20	22	Not Detected
cis-1,3-Dichloropropene	10061-01-5	6.2	23	25	Not Detected
Cumene	98-82-8	6.0	24	27	Not Detected
Cyclohexane	110-82-7	7.0	17	19	440
Dibromochloromethane	124-48-1	14	42	47	Not Detected
Ethanol	64-17-5	52	84	100	Not Detected
Ethyl Benzene	100-41-4	5.7	22	24	Not Detected
Freon 11	75-69-4	10	28	31	Not Detected
Freon 113	76-13-1	9.2	38	42	Not Detected
Freon 114	76-14-2	11	35	39	Not Detected
Freon 12	75-71-8	13	25	27	Not Detected
Heptane	142-82-5	7.7	20	23	140
Hexachlorobutadiene	87-68-3	67	180	240	Not Detected

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-8-TO-15		
Lab ID:	2405186A-07A	**Date/Time Analyzed:**	5/17/24 07:48 PM
Date/Time Collected:	4/25/24 01:56 PM	**Dilution Factor:**	11.1
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msda.i / a051716

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	6.1	18	20	480
m,p-Xylene	108-38-3	3.4	22	48	4.2 J
Methyl tert-butyl ether	1634-04-4	15	60	80	Not Detected
Methylene Chloride	75-09-2	16	58	190	Not Detected
Naphthalene	91-20-3	4.6	12	58	Not Detected
o-Xylene	95-47-6	5.8	22	24	Not Detected
Propylbenzene	103-65-1	6.1	24	27	Not Detected
Styrene	100-42-5	4.2	21	24	Not Detected
Tetrachloroethene	127-18-4	9.7	34	38	Not Detected
Tetrahydrofuran	109-99-9	10	15	16	Not Detected
Toluene	108-88-3	5.2	19	42	Not Detected
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	2300	45000
trans-1,2-Dichloroethene	156-60-5	10	20	22	Not Detected
trans-1,3-Dichloropropene	10061-02-6	3.9	23	25	Not Detected
Trichloroethene	79-01-6	8.9	27	30	Not Detected
Vinyl Chloride	75-01-4	12	13	14	Not Detected

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	82
4-Bromofluorobenzene	460-00-4	70-130	93
Toluene-d8	2037-26-5	70-130	101

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-9-TO-15		
Lab ID:	2405186A-08A	**Date/Time Analyzed:**	5/17/24 04:26 PM
Date/Time Collected:	4/25/24 12:43 PM	**Dilution Factor:**	1.98
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051710

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	0.21	0.86	1.1	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	0.35	1.1	1.4	Not Detected
1,1,2-Trichloroethane	79-00-5	0.34	0.86	1.1	Not Detected
1,1-Dichloroethane	75-34-3	0.17	0.64	0.80	Not Detected
1,1-Dichloroethene	75-35-4	0.19	0.63	0.78	Not Detected
1,2,4-Trichlorobenzene	120-82-1	4.0	7.0	7.3	Not Detected
1,2,4-Trimethylbenzene	95-63-6	0.26	0.78	0.97	1.3
1,2-Dibromoethane (EDB)	106-93-4	0.37	1.2	1.5	Not Detected
1,2-Dichlorobenzene	95-50-1	0.24	0.95	1.2	Not Detected
1,2-Dichloroethane	107-06-2	0.19	0.64	0.80	Not Detected
1,2-Dichloropropane	78-87-5	0.29	0.73	0.92	Not Detected
1,3,5-Trimethylbenzene	108-67-8	0.24	0.78	0.97	0.44 J
1,3-Butadiene	106-99-0	0.18	0.35	0.44	Not Detected
1,3-Dichlorobenzene	541-73-1	0.26	0.95	1.2	Not Detected
1,4-Dichlorobenzene	106-46-7	0.19	0.95	1.2	Not Detected
1,4-Dioxane	123-91-1	0.21	0.57	3.6	Not Detected
2,2,4-Trimethylpentane	540-84-1	1.4	4.4	4.6	63
2-Butanone (Methyl Ethyl Ketone)	78-93-3	0.29	2.8	12	37
2-Hexanone	591-78-6	0.91	3.9	4.0	Not Detected
2-Propanol	67-63-0	0.74	2.3	9.7	5.0 J
3-Chloropropene	107-05-1	0.85	3.0	3.1	Not Detected
4-Ethyltoluene	622-96-8	0.27	0.78	0.97	0.54 J
4-Methyl-2-pentanone	108-10-1	0.16	0.65	0.81	Not Detected
Acetone	67-64-1	2.1	2.2	9.4	120

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-9-TO-15		
Lab ID:	2405186A-08A	**Date/Time Analyzed:**	5/17/24 04:26 PM
Date/Time Collected:	4/25/24 12:43 PM	**Dilution Factor:**	1.98
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051710

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	0.23	0.82	1.0	Not Detected
Benzene	71-43-2	0.093	0.51	0.63	6.3
Bromodichloromethane	75-27-4	0.28	1.1	1.3	Not Detected
Bromoform	75-25-2	0.37	1.6	2.0	Not Detected
Bromomethane	74-83-9	2.2	3.7	38	Not Detected
Carbon Disulfide	75-15-0	2.9	3.0	31	Not Detected
Carbon Tetrachloride	56-23-5	0.26	1.0	1.2	Not Detected
Chlorobenzene	108-90-7	0.26	0.73	0.91	Not Detected
Chloroethane	75-00-3	0.72	2.5	2.6	Not Detected
Chloroform	67-66-3	0.21	0.77	0.97	Not Detected
Chloromethane	74-87-3	0.64	2.0	2.0	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.40	0.63	0.78	Not Detected
cis-1,3-Dichloropropene	10061-01-5	0.16	0.72	0.90	Not Detected
Cumene	98-82-8	0.36	0.78	0.97	1.8
Cyclohexane	110-82-7	0.66	3.3	3.4	9.1
Dibromochloromethane	124-48-1	0.27	1.3	1.7	Not Detected
Ethanol	64-17-5	0.79	1.8	7.5	18
Ethyl Benzene	100-41-4	0.20	0.69	0.86	2.3
Freon 11	75-69-4	0.17	0.89	1.1	Not Detected
Freon 113	76-13-1	0.29	1.2	1.5	Not Detected
Freon 114	76-14-2	0.32	1.1	1.4	Not Detected
Freon 12	75-71-8	0.68	4.7	4.9	2.7 J
Heptane	142-82-5	0.62	3.9	4.0	Not Detected
Hexachlorobutadiene	87-68-3	2.4	10	10	Not Detected

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

Client ID:	SV-9-TO-15		
Lab ID:	2405186A-08A	**Date/Time Analyzed:**	5/17/24 04:26 PM
Date/Time Collected:	4/25/24 12:43 PM	**Dilution Factor:**	1.98
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051710

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	0.84	3.3	3.5	21
m,p-Xylene	108-38-3	0.37	0.69	0.86	5.8
Methyl tert-butyl ether	1634-04-4	0.22	0.57	0.71	Not Detected
Methylene Chloride	75-09-2	0.31	0.55	3.4	Not Detected
Naphthalene	91-20-3	0.62	1.2	2.1	Not Detected
o-Xylene	95-47-6	0.26	0.69	0.86	2.5
Propylbenzene	103-65-1	0.29	0.78	0.97	0.57 J
Styrene	100-42-5	0.23	0.67	0.84	Not Detected
Tetrachloroethene	127-18-4	0.32	1.1	1.3	Not Detected
Tetrahydrofuran	109-99-9	2.8	2.8	2.9	Not Detected
Toluene	108-88-3	0.13	0.60	7.5	12
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	81	9800
trans-1,2-Dichloroethene	156-60-5	0.29	0.63	0.78	Not Detected
trans-1,3-Dichloropropene	10061-02-6	0.26	0.72	0.90	Not Detected
Trichloroethene	79-01-6	0.12	0.85	1.1	Not Detected
Vinyl Chloride	75-01-4	0.12	0.40	0.51	Not Detected

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	104
4-Bromofluorobenzene	460-00-4	70-130	82
Toluene-d8	2037-26-5	70-130	101

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-10-TO-15		
Lab ID:	2405186A-09A	**Date/Time Analyzed:**	5/17/24 10:39 PM
Date/Time Collected:	4/25/24 11:38 AM	**Dilution Factor:**	2.07
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051719

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	0.22	0.90	1.1	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	0.37	1.1	1.4	Not Detected
1,1,2-Trichloroethane	79-00-5	0.35	0.90	1.1	Not Detected
1,1-Dichloroethane	75-34-3	0.18	0.67	0.84	Not Detected
1,1-Dichloroethene	75-35-4	0.20	0.66	0.82	Not Detected
1,2,4-Trichlorobenzene	120-82-1	4.2	7.4	7.7	Not Detected
1,2,4-Trimethylbenzene	95-63-6	0.27	0.81	1.0	0.65 J
1,2-Dibromoethane (EDB)	106-93-4	0.39	1.3	1.6	Not Detected
1,2-Dichlorobenzene	95-50-1	0.25	1.0	1.2	Not Detected
1,2-Dichloroethane	107-06-2	0.20	0.67	0.84	Not Detected
1,2-Dichloropropane	78-87-5	0.30	0.76	0.96	Not Detected
1,3,5-Trimethylbenzene	108-67-8	0.25	0.81	1.0	0.28 J
1,3-Butadiene	106-99-0	0.19	0.37	0.46	0.25 J
1,3-Dichlorobenzene	541-73-1	0.27	1.0	1.2	Not Detected
1,4-Dichlorobenzene	106-46-7	0.20	1.0	1.2	Not Detected
1,4-Dioxane	123-91-1	0.22	0.60	3.7	Not Detected
2,2,4-Trimethylpentane	540-84-1	1.4	4.6	4.8	3.1 J
2-Butanone (Methyl Ethyl Ketone)	78-93-3	0.31	2.9	12	8.8 J
2-Hexanone	591-78-6	0.95	4.1	4.2	Not Detected
2-Propanol	67-63-0	0.78	2.4	10	2.4 J
3-Chloropropene	107-05-1	0.89	3.1	3.2	Not Detected
4-Ethyltoluene	622-96-8	0.29	0.81	1.0	0.90 J
4-Methyl-2-pentanone	108-10-1	0.17	0.68	0.85	1.2
Acetone	67-64-1	2.2	2.4	9.8	52

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-10-TO-15		
Lab ID:	2405186A-09A	**Date/Time Analyzed:**	5/17/24 10:39 PM
Date/Time Collected:	4/25/24 11:38 AM	**Dilution Factor:**	2.07
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051719

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	0.24	0.86	1.1	Not Detected
Benzene	71-43-2	0.097	0.53	0.66	5.2
Bromodichloromethane	75-27-4	0.29	1.1	1.4	Not Detected
Bromoform	75-25-2	0.39	1.7	2.1	Not Detected
Bromomethane	74-83-9	2.3	3.8	40	Not Detected
Carbon Disulfide	75-15-0	3.0	3.1	32	Not Detected
Carbon Tetrachloride	56-23-5	0.27	1.0	1.3	Not Detected
Chlorobenzene	108-90-7	0.27	0.76	0.95	Not Detected
Chloroethane	75-00-3	0.75	2.6	2.7	Not Detected
Chloroform	67-66-3	0.22	0.81	1.0	0.44 J
Chloromethane	74-87-3	0.67	2.0	2.1	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.42	0.66	0.82	Not Detected
cis-1,3-Dichloropropene	10061-01-5	0.17	0.75	0.94	Not Detected
Cumene	98-82-8	0.37	0.81	1.0	0.43 J
Cyclohexane	110-82-7	0.69	3.4	3.6	Not Detected
Dibromochloromethane	124-48-1	0.28	1.4	1.8	Not Detected
Ethanol	64-17-5	0.82	1.9	7.8	15
Ethyl Benzene	100-41-4	0.21	0.72	0.90	3.0
Freon 11	75-69-4	0.18	0.93	1.2	0.77 J
Freon 113	76-13-1	0.30	1.3	1.6	Not Detected
Freon 114	76-14-2	0.33	1.2	1.4	Not Detected
Freon 12	75-71-8	0.71	4.9	5.1	2.9 J
Heptane	142-82-5	0.65	4.1	4.2	8.8
Hexachlorobutadiene	87-68-3	2.6	10	11	Not Detected

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	SV-10-TO-15		
Lab ID:	2405186A-09A	**Date/Time Analyzed:**	5/17/24 10:39 PM
Date/Time Collected:	4/25/24 11:38 AM	**Dilution Factor:**	2.07
Media:	1 Liter Summa Canister (100% Certified)	**Instrument/Filename:**	msdv.i / v051719

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	0.88	3.5	3.6	3.2 J
m,p-Xylene	108-38-3	0.38	0.72	0.90	9.0
Methyl tert-butyl ether	1634-04-4	0.22	0.60	0.75	Not Detected
Methylene Chloride	75-09-2	0.32	0.58	3.6	Not Detected
Naphthalene	91-20-3	0.65	1.3	2.2	Not Detected
o-Xylene	95-47-6	0.28	0.72	0.90	3.2
Propylbenzene	103-65-1	0.30	0.81	1.0	Not Detected
Styrene	100-42-5	0.24	0.70	0.88	0.32 J
Tetrachloroethene	127-18-4	0.34	1.1	1.4	3.0
Tetrahydrofuran	109-99-9	2.9	2.9	3.0	Not Detected
Toluene	108-88-3	0.14	0.62	7.8	28
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	85	310
trans-1,2-Dichloroethene	156-60-5	0.30	0.66	0.82	Not Detected
trans-1,3-Dichloropropene	10061-02-6	0.28	0.75	0.94	Not Detected
Trichloroethene	79-01-6	0.13	0.89	1.1	Not Detected
Vinyl Chloride	75-01-4	0.12	0.42	0.53	Not Detected

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	108
4-Bromofluorobenzene	460-00-4	70-130	114
Toluene-d8	2037-26-5	70-130	98

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	Lab Blank		
Lab ID:	2405186A-10A	**Date/Time Analyzed:**	5/17/24 01:18 PM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051706a

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	0.11	0.44	0.54	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	0.18	0.55	0.69	Not Detected
1,1,2-Trichloroethane	79-00-5	0.17	0.44	0.54	Not Detected
1,1-Dichloroethane	75-34-3	0.086	0.32	0.40	Not Detected
1,1-Dichloroethene	75-35-4	0.098	0.32	0.40	Not Detected
1,2,4-Trichlorobenzene	120-82-1	2.0	3.6	3.7	Not Detected
1,2,4-Trimethylbenzene	95-63-6	0.13	0.39	0.49	Not Detected
1,2-Dibromoethane (EDB)	106-93-4	0.19	0.61	0.77	Not Detected
1,2-Dichlorobenzene	95-50-1	0.12	0.48	0.60	Not Detected
1,2-Dichloroethane	107-06-2	0.098	0.32	0.40	Not Detected
1,2-Dichloropropane	78-87-5	0.15	0.37	0.46	Not Detected
1,3,5-Trimethylbenzene	108-67-8	0.12	0.39	0.49	Not Detected
1,3-Butadiene	106-99-0	0.093	0.18	0.22	Not Detected
1,3-Dichlorobenzene	541-73-1	0.13	0.48	0.60	Not Detected
1,4-Dichlorobenzene	106-46-7	0.098	0.48	0.60	Not Detected
1,4-Dioxane	123-91-1	0.10	0.29	1.8	Not Detected
2,2,4-Trimethylpentane	540-84-1	0.69	2.2	2.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	78-93-3	0.15	1.4	5.9	Not Detected
2-Hexanone	591-78-6	0.46	2.0	2.0	Not Detected
2-Propanol	67-63-0	0.38	1.2	4.9	Not Detected
3-Chloropropene	107-05-1	0.43	1.5	1.6	Not Detected
4-Ethyltoluene	622-96-8	0.14	0.39	0.49	Not Detected
4-Methyl-2-pentanone	108-10-1	0.081	0.33	0.41	Not Detected
Acetone	67-64-1	1.1	1.1	4.8	Not Detected

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	Lab Blank		
Lab ID:	2405186A-10A	**Date/Time Analyzed:**	5/17/24 01:18 PM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051706a

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	0.12	0.41	0.52	0.19 J
Benzene	71-43-2	0.047	0.26	0.32	Not Detected
Bromodichloromethane	75-27-4	0.14	0.54	0.67	Not Detected
Bromoform	75-25-2	0.19	0.83	1.0	Not Detected
Bromomethane	74-83-9	1.1	1.9	19	Not Detected
Carbon Disulfide	75-15-0	1.5	1.5	16	Not Detected
Carbon Tetrachloride	56-23-5	0.13	0.50	0.63	Not Detected
Chlorobenzene	108-90-7	0.13	0.37	0.46	Not Detected
Chloroethane	75-00-3	0.36	1.3	1.3	Not Detected
Chloroform	67-66-3	0.10	0.39	0.49	Not Detected
Chloromethane	74-87-3	0.32	0.99	1.0	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.20	0.32	0.40	Not Detected
cis-1,3-Dichloropropene	10061-01-5	0.081	0.36	0.45	Not Detected
Cumene	98-82-8	0.18	0.39	0.49	Not Detected
Cyclohexane	110-82-7	0.34	1.6	1.7	Not Detected
Dibromochloromethane	124-48-1	0.14	0.68	0.85	Not Detected
Ethanol	64-17-5	0.40	0.90	3.8	Not Detected
Ethyl Benzene	100-41-4	0.10	0.35	0.43	Not Detected
Freon 11	75-69-4	0.088	0.45	0.56	Not Detected
Freon 113	76-13-1	0.15	0.61	0.77	Not Detected
Freon 114	76-14-2	0.16	0.56	0.70	Not Detected
Freon 12	75-71-8	0.34	2.4	2.5	Not Detected
Heptane	142-82-5	0.31	2.0	2.0	Not Detected
Hexachlorobutadiene	87-68-3	1.2	5.1	5.3	Not Detected

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	Lab Blank		
Lab ID:	2405186A-10A	**Date/Time Analyzed:**	5/17/24 01:18 PM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051706a

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	0.42	1.7	1.8	Not Detected
m,p-Xylene	108-38-3	0.18	0.35	0.43	Not Detected
Methyl tert-butyl ether	1634-04-4	0.11	0.29	0.36	Not Detected
Methylene Chloride	75-09-2	0.15	0.28	1.7	Not Detected
Naphthalene	91-20-3	0.31	0.63	1.0	Not Detected
o-Xylene	95-47-6	0.13	0.35	0.43	Not Detected
Propylbenzene	103-65-1	0.15	0.39	0.49	Not Detected
Styrene	100-42-5	0.12	0.34	0.42	Not Detected
Tetrachloroethene	127-18-4	0.16	0.54	0.68	Not Detected
Tetrahydrofuran	109-99-9	1.4	1.4	1.5	Not Detected
Toluene	108-88-3	0.066	0.30	3.8	Not Detected
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	41	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.15	0.32	0.40	Not Detected
trans-1,3-Dichloropropene	10061-02-6	0.13	0.36	0.45	Not Detected
Trichloroethene	79-01-6	0.063	0.43	0.54	Not Detected
Vinyl Chloride	75-01-4	0.060	0.20	0.26	Not Detected

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

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	104
4-Bromofluorobenzene	460-00-4	70-130	112
Toluene-d8	2037-26-5	70-130	100

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	Lab Blank		
Lab ID:	2405186A-10B	**Date/Time Analyzed:**	5/17/24 01:42 PM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051707e

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,1,1-Trichloroethane	71-55-6	0.66	2.4	2.7	Not Detected
1,1,2,2-Tetrachloroethane	79-34-5	1.2	3.1	3.4	Not Detected
1,1,2-Trichloroethane	79-00-5	0.90	2.4	2.7	Not Detected
1,1-Dichloroethane	75-34-3	0.44	1.8	2.0	Not Detected
1,1-Dichloroethene	75-35-4	1.0	1.8	2.0	Not Detected
1,2,4-Trichlorobenzene	120-82-1	2.7	11	15	Not Detected
1,2,4-Trimethylbenzene	95-63-6	0.66	2.2	2.4	Not Detected
1,2-Dibromoethane (EDB)	106-93-4	1.2	3.4	3.8	Not Detected
1,2-Dichlorobenzene	95-50-1	0.81	2.7	3.0	Not Detected
1,2-Dichloroethane	107-06-2	0.70	1.8	2.0	Not Detected
1,2-Dichloropropane	78-87-5	0.63	2.1	2.3	Not Detected
1,3,5-Trimethylbenzene	108-67-8	0.66	2.2	2.4	Not Detected
1,3-Butadiene	106-99-0	0.65	1.0	1.1	Not Detected
1,3-Dichlorobenzene	541-73-1	0.70	2.7	3.0	Not Detected
1,4-Dichlorobenzene	106-46-7	1.0	2.7	3.0	Not Detected
1,4-Dioxane	123-91-1	1.6	5.4	7.2	Not Detected
2,2,4-Trimethylpentane	540-84-1	0.92	2.1	2.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	78-93-3	0.99	4.4	5.9	Not Detected
2-Hexanone	591-78-6	2.3	6.1	8.2	Not Detected
2-Propanol	67-63-0	1.7	3.7	4.9	Not Detected
3-Chloropropene	107-05-1	1.6	4.7	6.3	Not Detected
4-Ethyltoluene	622-96-8	0.54	2.2	2.4	Not Detected
4-Methyl-2-pentanone	108-10-1	0.79	1.8	2.0	Not Detected
Acetone	67-64-1	3.3	9.5	12	Not Detected

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	Lab Blank		
Lab ID:	2405186A-10B	**Date/Time Analyzed:**	5/17/24 01:42 PM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051707e

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
alpha-Chlorotoluene	100-44-7	0.83	2.3	2.6	Not Detected
Benzene	71-43-2	0.38	1.4	1.6	Not Detected
Bromodichloromethane	75-27-4	1.0	3.0	3.4	Not Detected
Bromoform	75-25-2	2.0	4.6	5.2	Not Detected
Bromomethane	74-83-9	3.4	5.8	19	Not Detected
Carbon Disulfide	75-15-0	1.2	4.7	6.2	Not Detected
Carbon Tetrachloride	56-23-5	1.0	2.8	3.1	Not Detected
Chlorobenzene	108-90-7	0.48	2.1	2.3	Not Detected
Chloroethane	75-00-3	1.8	4.0	5.3	Not Detected
Chloroform	67-66-3	0.56	2.2	2.4	Not Detected
Chloromethane	74-87-3	1.8	3.1	10	Not Detected
cis-1,2-Dichloroethene	156-59-2	0.43	1.8	2.0	Not Detected
cis-1,3-Dichloropropene	10061-01-5	0.55	2.0	2.3	Not Detected
Cumene	98-82-8	0.54	2.2	2.4	Not Detected
Cyclohexane	110-82-7	0.63	1.5	1.7	Not Detected
Dibromochloromethane	124-48-1	1.3	3.8	4.2	Not Detected
Ethanol	64-17-5	4.7	7.5	9.4	Not Detected
Ethyl Benzene	100-41-4	0.52	2.0	2.2	Not Detected
Freon 11	75-69-4	0.91	2.5	2.8	Not Detected
Freon 113	76-13-1	0.83	3.4	3.8	Not Detected
Freon 114	76-14-2	0.97	3.1	3.5	Not Detected
Freon 12	75-71-8	1.2	2.2	2.5	Not Detected
Heptane	142-82-5	0.70	1.8	2.0	Not Detected
Hexachlorobutadiene	87-68-3	6.1	16	21	Not Detected

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	Lab Blank		
Lab ID:	2405186A-10B	**Date/Time Analyzed:**	5/17/24 01:42 PM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051707e

Compound	CAS#	MDL (ug/m3)	LOD (ug/m3)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	110-54-3	0.55	1.6	1.8	Not Detected
m,p-Xylene	108-38-3	0.31	2.0	4.3	Not Detected
Methyl tert-butyl ether	1634-04-4	1.3	5.4	7.2	Not Detected
Methylene Chloride	75-09-2	1.4	5.2	17	Not Detected
Naphthalene	91-20-3	0.41	1.0	5.2	Not Detected
o-Xylene	95-47-6	0.52	2.0	2.2	Not Detected
Propylbenzene	103-65-1	0.55	2.2	2.4	Not Detected
Styrene	100-42-5	0.38	1.9	2.1	Not Detected
Tetrachloroethene	127-18-4	0.87	3.0	3.4	Not Detected
Tetrahydrofuran	109-99-9	0.94	1.3	1.5	Not Detected
Toluene	108-88-3	0.47	1.7	3.8	Not Detected
TPH ref. to Gasoline (MW=100)	9999-9999-038	NA	D	200	Not Detected
trans-1,2-Dichloroethene	156-60-5	0.91	1.8	2.0	Not Detected
trans-1,3-Dichloropropene	10061-02-6	0.35	2.0	2.3	Not Detected
Trichloroethene	79-01-6	0.80	2.4	2.7	Not Detected
Vinyl Chloride	75-01-4	1.1	1.2	1.3	Not Detected

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	79
4-Bromofluorobenzene	460-00-4	70-130	95
Toluene-d8	2037-26-5	70-130	103

Client ID:	CCV		
Lab ID:	2405186A-11A	**Date/Time Analyzed:**	5/17/24 09:17 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051702

Compound	CAS#	%Recovery
1,1,1-Trichloroethane	71-55-6	105
1,1,2,2-Tetrachloroethane	79-34-5	98
1,1,2-Trichloroethane	79-00-5	104
1,1-Dichloroethane	75-34-3	107
1,1-Dichloroethene	75-35-4	105
1,2,4-Trichlorobenzene	120-82-1	93
1,2,4-Trimethylbenzene	95-63-6	103
1,2-Dibromoethane (EDB)	106-93-4	104
1,2-Dichlorobenzene	95-50-1	104
1,2-Dichloroethane	107-06-2	103
1,2-Dichloropropane	78-87-5	105
1,3,5-Trimethylbenzene	108-67-8	99
1,3-Butadiene	106-99-0	105
1,3-Dichlorobenzene	541-73-1	102
1,4-Dichlorobenzene	106-46-7	104
1,4-Dioxane	123-91-1	102
2,2,4-Trimethylpentane	540-84-1	114
2-Butanone (Methyl Ethyl Ketone)	78-93-3	107
2-Hexanone	591-78-6	100
2-Propanol	67-63-0	100
3-Chloropropene	107-05-1	105
4-Ethyltoluene	622-96-8	103
4-Methyl-2-pentanone	108-10-1	106
Acetone	67-64-1	98

Client ID:	CCV		
Lab ID:	2405186A-11A	**Date/Time Analyzed:**	5/17/24 09:17 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051702

Compound	CAS#	%Recovery
alpha-Chlorotoluene	100-44-7	105
Benzene	71-43-2	103
Bromodichloromethane	75-27-4	104
Bromoform	75-25-2	103
Bromomethane	74-83-9	105
Carbon Disulfide	75-15-0	110
Carbon Tetrachloride	56-23-5	110
Chlorobenzene	108-90-7	102
Chloroethane	75-00-3	105
Chloroform	67-66-3	105
Chloromethane	74-87-3	100
cis-1,2-Dichloroethene	156-59-2	105
cis-1,3-Dichloropropene	10061-01-5	106
Cumene	98-82-8	103
Cyclohexane	110-82-7	105
Dibromochloromethane	124-48-1	106
Ethanol	64-17-5	109
Ethyl Benzene	100-41-4	100
Freon 11	75-69-4	110
Freon 113	76-13-1	104
Freon 114	76-14-2	105
Freon 12	75-71-8	110
Heptane	142-82-5	102
Hexachlorobutadiene	87-68-3	103

Client ID:	CCV		
Lab ID:	2405186A-11A	**Date/Time Analyzed:**	5/17/24 09:17 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051702

Compound	CAS#	%Recovery
Hexane	110-54-3	107
m,p-Xylene	108-38-3	104
Methyl tert-butyl ether	1634-04-4	107
Methylene Chloride	75-09-2	104
Naphthalene	91-20-3	69
o-Xylene	95-47-6	108
Propylbenzene	103-65-1	104
Styrene	100-42-5	105
Tetrachloroethene	127-18-4	101
Tetrahydrofuran	109-99-9	102
Toluene	108-88-3	105
TPH ref. to Gasoline (MW=100)	9999-9999-038	100
trans-1,2-Dichloroethene	156-60-5	106
trans-1,3-Dichloropropene	10061-02-6	103
Trichloroethene	79-01-6	102
Vinyl Chloride	75-01-4	110

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	103
4-Bromofluorobenzene	460-00-4	70-130	96
Toluene-d8	2037-26-5	70-130	102

Client ID:	CCV		
Lab ID:	2405186A-11B	**Date/Time Analyzed:**	5/17/24 10:44 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051703

Compound	CAS#	%Recovery
1,1,1-Trichloroethane	71-55-6	87
1,1,2,2-Tetrachloroethane	79-34-5	100
1,1,2-Trichloroethane	79-00-5	103
1,1-Dichloroethane	75-34-3	96
1,1-Dichloroethene	75-35-4	102
1,2,4-Trichlorobenzene	120-82-1	87
1,2,4-Trimethylbenzene	95-63-6	98
1,2-Dibromoethane (EDB)	106-93-4	103
1,2-Dichlorobenzene	95-50-1	96
1,2-Dichloroethane	107-06-2	86
1,2-Dichloropropane	78-87-5	105
1,3,5-Trimethylbenzene	108-67-8	100
1,3-Butadiene	106-99-0	105
1,3-Dichlorobenzene	541-73-1	98
1,4-Dichlorobenzene	106-46-7	97
1,4-Dioxane	123-91-1	100
2,2,4-Trimethylpentane	540-84-1	99
2-Butanone (Methyl Ethyl Ketone)	78-93-3	95
2-Hexanone	591-78-6	105
2-Propanol	67-63-0	87
3-Chloropropene	107-05-1	97
4-Ethyltoluene	622-96-8	97
4-Methyl-2-pentanone	108-10-1	102
Acetone	67-64-1	104

Client ID:	CCV		
Lab ID:	2405186A-11B	**Date/Time Analyzed:**	5/17/24 10:44 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051703

Compound	CAS#	%Recovery
alpha-Chlorotoluene	100-44-7	100
Benzene	71-43-2	101
Bromodichloromethane	75-27-4	96
Bromoform	75-25-2	102
Bromomethane	74-83-9	108
Carbon Disulfide	75-15-0	101
Carbon Tetrachloride	56-23-5	86
Chlorobenzene	108-90-7	98
Chloroethane	75-00-3	89
Chloroform	67-66-3	88
Chloromethane	74-87-3	85
cis-1,2-Dichloroethene	156-59-2	98
cis-1,3-Dichloropropene	10061-01-5	98
Cumene	98-82-8	97
Cyclohexane	110-82-7	93
Dibromochloromethane	124-48-1	102
Ethanol	64-17-5	102
Ethyl Benzene	100-41-4	100
Freon 11	75-69-4	85
Freon 113	76-13-1	93
Freon 114	76-14-2	95
Freon 12	75-71-8	89
Heptane	142-82-5	101
Hexachlorobutadiene	87-68-3	92

Client ID:	CCV		
Lab ID:	2405186A-11B	**Date/Time Analyzed:**	5/17/24 10:44 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051703

Compound	CAS#	%Recovery
Hexane	110-54-3	99
m,p-Xylene	108-38-3	100
Methyl tert-butyl ether	1634-04-4	85
Methylene Chloride	75-09-2	96
Naphthalene	91-20-3	81
o-Xylene	95-47-6	97
Propylbenzene	103-65-1	99
Styrene	100-42-5	103
Tetrachloroethene	127-18-4	98
Tetrahydrofuran	109-99-9	91
Toluene	108-88-3	100
TPH ref. to Gasoline (MW=100)	9999-9999-038	100
trans-1,2-Dichloroethene	156-60-5	101
trans-1,3-Dichloropropene	10061-02-6	94
Trichloroethene	79-01-6	99
Vinyl Chloride	75-01-4	104

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	82
4-Bromofluorobenzene	460-00-4	70-130	100
Toluene-d8	2037-26-5	70-130	104

Client ID:	LCS		
Lab ID:	2405186A-12A	**Date/Time Analyzed:**	5/17/24 09:57 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051703

Compound	CAS#	%Recovery
1,1,1-Trichloroethane	71-55-6	100
1,1,2,2-Tetrachloroethane	79-34-5	108
1,1,2-Trichloroethane	79-00-5	108
1,1-Dichloroethane	75-34-3	101
1,1-Dichloroethene	75-35-4	95
1,2,4-Trichlorobenzene	120-82-1	95
1,2,4-Trimethylbenzene	95-63-6	110
1,2-Dibromoethane (EDB)	106-93-4	108
1,2-Dichlorobenzene	95-50-1	106
1,2-Dichloroethane	107-06-2	107
1,2-Dichloropropane	78-87-5	104
1,3,5-Trimethylbenzene	108-67-8	108
1,3-Butadiene	106-99-0	100
1,3-Dichlorobenzene	541-73-1	105
1,4-Dichlorobenzene	106-46-7	105
1,4-Dioxane	123-91-1	105
2,2,4-Trimethylpentane	540-84-1	103
2-Butanone (Methyl Ethyl Ketone)	78-93-3	101
2-Hexanone	591-78-6	107
2-Propanol	67-63-0	107
3-Chloropropene	107-05-1	102
4-Ethyltoluene	622-96-8	108
4-Methyl-2-pentanone	108-10-1	112
Acetone	67-64-1	95

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCS		
Lab ID:	2405186A-12A	**Date/Time Analyzed:**	5/17/24 09:57 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051703

Compound	CAS#	%Recovery
alpha-Chlorotoluene	100-44-7	100
Benzene	71-43-2	105
Bromodichloromethane	75-27-4	110
Bromoform	75-25-2	107
Bromomethane	74-83-9	94
Carbon Disulfide	75-15-0	107
Carbon Tetrachloride	56-23-5	103
Chlorobenzene	108-90-7	104
Chloroethane	75-00-3	97
Chloroform	67-66-3	98
Chloromethane	74-87-3	93
cis-1,2-Dichloroethene	156-59-2	99
cis-1,3-Dichloropropene	10061-01-5	109
Cumene	98-82-8	103
Cyclohexane	110-82-7	102
Dibromochloromethane	124-48-1	109
Ethanol	64-17-5	122
Ethyl Benzene	100-41-4	98
Freon 11	75-69-4	104
Freon 113	76-13-1	97
Freon 114	76-14-2	100
Freon 12	75-71-8	102
Heptane	142-82-5	100
Hexachlorobutadiene	87-68-3	105

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCS		
Lab ID:	2405186A-12A	**Date/Time Analyzed:**	5/17/24 09:57 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051703

Compound	CAS#	%Recovery
Hexane	110-54-3	99
m,p-Xylene	108-38-3	100
Methyl tert-butyl ether	1634-04-4	100
Methylene Chloride	75-09-2	96
Naphthalene	91-20-3	85
o-Xylene	95-47-6	106
Propylbenzene	103-65-1	108
Styrene	100-42-5	103
Tetrachloroethene	127-18-4	104
Tetrahydrofuran	109-99-9	104
Toluene	108-88-3	101
TPH ref. to Gasoline (MW=100)	9999-9999-038	Not Spiked
trans-1,2-Dichloroethene	156-60-5	100
trans-1,3-Dichloropropene	10061-02-6	109
Trichloroethene	79-01-6	104
Vinyl Chloride	75-01-4	103

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	96
4-Bromofluorobenzene	460-00-4	70-130	97
Toluene-d8	2037-26-5	70-130	101

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCSD		
Lab ID:	2405186A-12AA	**Date/Time Analyzed:**	5/17/24 11:02 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051704

Compound	CAS#	%Recovery
1,1,1-Trichloroethane	71-55-6	100
1,1,2,2-Tetrachloroethane	79-34-5	101
1,1,2-Trichloroethane	79-00-5	108
1,1-Dichloroethane	75-34-3	101
1,1-Dichloroethene	75-35-4	96
1,2,4-Trichlorobenzene	120-82-1	96
1,2,4-Trimethylbenzene	95-63-6	105
1,2-Dibromoethane (EDB)	106-93-4	106
1,2-Dichlorobenzene	95-50-1	104
1,2-Dichloroethane	107-06-2	106
1,2-Dichloropropane	78-87-5	104
1,3,5-Trimethylbenzene	108-67-8	104
1,3-Butadiene	106-99-0	100
1,3-Dichlorobenzene	541-73-1	102
1,4-Dichlorobenzene	106-46-7	104
1,4-Dioxane	123-91-1	105
2,2,4-Trimethylpentane	540-84-1	103
2-Butanone (Methyl Ethyl Ketone)	78-93-3	103
2-Hexanone	591-78-6	104
2-Propanol	67-63-0	105
3-Chloropropene	107-05-1	102
4-Ethyltoluene	622-96-8	103
4-Methyl-2-pentanone	108-10-1	111
Acetone	67-64-1	95

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCSD		
Lab ID:	2405186A-12AA	**Date/Time Analyzed:**	5/17/24 11:02 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051704

Compound	CAS#	%Recovery
alpha-Chlorotoluene	100-44-7	103
Benzene	71-43-2	104
Bromodichloromethane	75-27-4	108
Bromoform	75-25-2	104
Bromomethane	74-83-9	96
Carbon Disulfide	75-15-0	107
Carbon Tetrachloride	56-23-5	104
Chlorobenzene	108-90-7	103
Chloroethane	75-00-3	100
Chloroform	67-66-3	97
Chloromethane	74-87-3	104
cis-1,2-Dichloroethene	156-59-2	99
cis-1,3-Dichloropropene	10061-01-5	108
Cumene	98-82-8	102
Cyclohexane	110-82-7	100
Dibromochloromethane	124-48-1	108
Ethanol	64-17-5	123
Ethyl Benzene	100-41-4	101
Freon 11	75-69-4	105
Freon 113	76-13-1	97
Freon 114	76-14-2	101
Freon 12	75-71-8	102
Heptane	142-82-5	101
Hexachlorobutadiene	87-68-3	105

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCSD		
Lab ID:	2405186A-12AA	**Date/Time Analyzed:**	5/17/24 11:02 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msdv.i / v051704

Compound	CAS#	%Recovery
Hexane	110-54-3	99
m,p-Xylene	108-38-3	102
Methyl tert-butyl ether	1634-04-4	99
Methylene Chloride	75-09-2	99
Naphthalene	91-20-3	87
o-Xylene	95-47-6	107
Propylbenzene	103-65-1	104
Styrene	100-42-5	105
Tetrachloroethene	127-18-4	103
Tetrahydrofuran	109-99-9	105
Toluene	108-88-3	100
TPH ref. to Gasoline (MW=100)	9999-9999-038	Not Spiked
trans-1,2-Dichloroethene	156-60-5	99
trans-1,3-Dichloropropene	10061-02-6	107
Trichloroethene	79-01-6	103
Vinyl Chloride	75-01-4	101

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	97
4-Bromofluorobenzene	460-00-4	70-130	95
Toluene-d8	2037-26-5	70-130	100

* % Recovery is calculated using unrounded analytical results.

EPA METHOD TO-15 GC/MS FULL SCAN
COP TASS 2

eurofins | Air Toxics

Client ID:	LCS		
Lab ID:	2405186A-12B	**Date/Time Analyzed:**	5/17/24 11:17 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051704

Compound	CAS#	%Recovery
1,1,1-Trichloroethane	71-55-6	86
1,1,2,2-Tetrachloroethane	79-34-5	100
1,1,2-Trichloroethane	79-00-5	104
1,1-Dichloroethane	75-34-3	95
1,1-Dichloroethene	75-35-4	97
1,2,4-Trichlorobenzene	120-82-1	86
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	102
1,2-Dichlorobenzene	95-50-1	95
1,2-Dichloroethane	107-06-2	86
1,2-Dichloropropane	78-87-5	102
1,3,5-Trimethylbenzene	108-67-8	100
1,3-Butadiene	106-99-0	103
1,3-Dichlorobenzene	541-73-1	96
1,4-Dichlorobenzene	106-46-7	96
1,4-Dioxane	123-91-1	102
2,2,4-Trimethylpentane	540-84-1	99
2-Butanone (Methyl Ethyl Ketone)	78-93-3	94
2-Hexanone	591-78-6	107
2-Propanol	67-63-0	90
3-Chloropropene	107-05-1	97
4-Ethyltoluene	622-96-8	96
4-Methyl-2-pentanone	108-10-1	104
Acetone	67-64-1	104

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCS		
Lab ID:	2405186A-12B	**Date/Time Analyzed:**	5/17/24 11:17 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051704

Compound	CAS#	%Recovery
alpha-Chlorotoluene	100-44-7	100
Benzene	71-43-2	100
Bromodichloromethane	75-27-4	93
Bromoform	75-25-2	100
Bromomethane	74-83-9	105
Carbon Disulfide	75-15-0	102
Carbon Tetrachloride	56-23-5	86
Chlorobenzene	108-90-7	99
Chloroethane	75-00-3	89
Chloroform	67-66-3	87
Chloromethane	74-87-3	85
cis-1,2-Dichloroethene	156-59-2	96
cis-1,3-Dichloropropene	10061-01-5	98
Cumene	98-82-8	97
Cyclohexane	110-82-7	95
Dibromochloromethane	124-48-1	99
Ethanol	64-17-5	122
Ethyl Benzene	100-41-4	102
Freon 11	75-69-4	83
Freon 113	76-13-1	90
Freon 114	76-14-2	94
Freon 12	75-71-8	88
Heptane	142-82-5	102
Hexachlorobutadiene	87-68-3	91

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCS		
Lab ID:	2405186A-12B	**Date/Time Analyzed:**	5/17/24 11:17 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051704

Compound	CAS#	%Recovery
Hexane	110-54-3	99
m,p-Xylene	108-38-3	100
Methyl tert-butyl ether	1634-04-4	86
Methylene Chloride	75-09-2	92
Naphthalene	91-20-3	91
o-Xylene	95-47-6	98
Propylbenzene	103-65-1	97
Styrene	100-42-5	104
Tetrachloroethene	127-18-4	98
Tetrahydrofuran	109-99-9	97
Toluene	108-88-3	99
TPH ref. to Gasoline (MW=100)	9999-9999-038	Not Spiked
trans-1,2-Dichloroethene	156-60-5	98
trans-1,3-Dichloropropene	10061-02-6	93
Trichloroethene	79-01-6	98
Vinyl Chloride	75-01-4	103

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	81
4-Bromofluorobenzene	460-00-4	70-130	99
Toluene-d8	2037-26-5	70-130	103

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCSD		
Lab ID:	2405186A-12BB	**Date/Time Analyzed:**	5/17/24 11:51 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051705

Compound	CAS#	%Recovery
1,1,1-Trichloroethane	71-55-6	85
1,1,2,2-Tetrachloroethane	79-34-5	99
1,1,2-Trichloroethane	79-00-5	102
1,1-Dichloroethane	75-34-3	94
1,1-Dichloroethene	75-35-4	97
1,2,4-Trichlorobenzene	120-82-1	88
1,2,4-Trimethylbenzene	95-63-6	99
1,2-Dibromoethane (EDB)	106-93-4	101
1,2-Dichlorobenzene	95-50-1	94
1,2-Dichloroethane	107-06-2	84
1,2-Dichloropropane	78-87-5	102
1,3,5-Trimethylbenzene	108-67-8	98
1,3-Butadiene	106-99-0	102
1,3-Dichlorobenzene	541-73-1	95
1,4-Dichlorobenzene	106-46-7	96
1,4-Dioxane	123-91-1	100
2,2,4-Trimethylpentane	540-84-1	98
2-Butanone (Methyl Ethyl Ketone)	78-93-3	93
2-Hexanone	591-78-6	105
2-Propanol	67-63-0	90
3-Chloropropene	107-05-1	97
4-Ethyltoluene	622-96-8	94
4-Methyl-2-pentanone	108-10-1	102
Acetone	67-64-1	104

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCSD		
Lab ID:	2405186A-12BB	**Date/Time Analyzed:**	5/17/24 11:51 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051705

Compound	CAS#	%Recovery
alpha-Chlorotoluene	100-44-7	100
Benzene	71-43-2	99
Bromodichloromethane	75-27-4	93
Bromoform	75-25-2	99
Bromomethane	74-83-9	103
Carbon Disulfide	75-15-0	102
Carbon Tetrachloride	56-23-5	86
Chlorobenzene	108-90-7	98
Chloroethane	75-00-3	88
Chloroform	67-66-3	86
Chloromethane	74-87-3	84
cis-1,2-Dichloroethene	156-59-2	96
cis-1,3-Dichloropropene	10061-01-5	97
Cumene	98-82-8	97
Cyclohexane	110-82-7	94
Dibromochloromethane	124-48-1	98
Ethanol	64-17-5	121
Ethyl Benzene	100-41-4	102
Freon 11	75-69-4	83
Freon 113	76-13-1	90
Freon 114	76-14-2	94
Freon 12	75-71-8	87
Heptane	142-82-5	102
Hexachlorobutadiene	87-68-3	93

* % Recovery is calculated using unrounded analytical results.

Client ID:	LCSD		
Lab ID:	2405186A-12BB	**Date/Time Analyzed:**	5/17/24 11:51 AM
Date/Time Collected:	NA - Not Applicable	**Dilution Factor:**	1.00
Media:	NA - Not Applicable	**Instrument/Filename:**	msda.i / a051705

Compound	CAS#	%Recovery
Hexane	110-54-3	97
m,p-Xylene	108-38-3	99
Methyl tert-butyl ether	1634-04-4	86
Methylene Chloride	75-09-2	91
Naphthalene	91-20-3	94
o-Xylene	95-47-6	99
Propylbenzene	103-65-1	97
Styrene	100-42-5	102
Tetrachloroethene	127-18-4	98
Tetrahydrofuran	109-99-9	96
Toluene	108-88-3	98
TPH ref. to Gasoline (MW=100)	9999-9999-038	Not Spiked
trans-1,2-Dichloroethene	156-60-5	97
trans-1,3-Dichloropropene	10061-02-6	94
Trichloroethene	79-01-6	97
Vinyl Chloride	75-01-4	102

D: Analyte not within the DoD scope of accreditation.

Surrogates	CAS#	Limits	%Recovery
1,2-Dichloroethane-d4	17060-07-0	70-130	79
4-Bromofluorobenzene	460-00-4	70-130	98
Toluene-d8	2037-26-5	70-130	103

* % Recovery is calculated using unrounded analytical results.

eurofins | Air Toxics

5/17/2024
Mr. Andy Klopfenstein
Haley & Aldrich, Inc.
6420 SW MacAdam Ave
Ste 100
Portland OR 97239

Project Name: COP TASS 2
Project #:
Workorder #: 2405186B

Dear Mr. Andy Klopfenstein

The following report includes the data for the above referenced project for sample(s) received on 5/6/2024 at Eurofins Air Toxics LLC.

The data and associated QC analyzed by Modified ASTM D-1946 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 LLC. 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: Monica Tran at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Monica Tran

Project Manager

eurofins | Air Toxics

WORK ORDER #: 2405186B

Work Order Summary

CLIENT:	Mr. Andy Klopfenstein Haley & Aldrich, Inc. 6420 SW MacAdam Ave Ste 100 Portland, OR 97239	**BILL TO:**	Accounts Payable Haley & Aldrich 70 Blanchard Road Suite 430 Burlington, MA 02129-1400
PHONE:	503-620-7284	**P.O. #**	0209772-004
FAX:	503-620-6918	**PROJECT #**	COP TASS 2
DATE RECEIVED:	05/06/2024	**CONTACT:**	Monica Tran
DATE COMPLETED:	05/17/2024		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-1-TO-15	Modified ASTM D-1946	6.3 "Hg	10 psi
02A	SV-2-TO-15	Modified ASTM D-1946	4.5 "Hg	10 psi
03A	SV-3-TO-15	Modified ASTM D-1946	4.9 "Hg	10.1 psi
04A	SV-4-TO-15	Modified ASTM D-1946	5.7 "Hg	9.9 psi
05A	SV-5-TO-15	Modified ASTM D-1946	5.5 "Hg	10 psi
06A	SV-6-TO-15	Modified ASTM D-1946	6.1 "Hg	9.8 psi
07A	SV-8-TO-15	Modified ASTM D-1946	4.3 "Hg	9.8 psi
08A	SV-9-TO-15	Modified ASTM D-1946	4.5 "Hg	10 psi
09A	SV-10-TO-15	Modified ASTM D-1946	5.7 "Hg	10 psi
10A	Lab Blank	Modified ASTM D-1946	NA	NA
10B	Lab Blank	Modified ASTM D-1946	NA	NA
11A	CCV	Modified ASTM D-1946	NA	NA
12A	LCS	Modified ASTM D-1946	NA	NA
12AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 05/17/24

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP – 209222, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP – T104704434-22-18, UT NELAP – CA009332022-14, VA NELAP - 12240, WA ELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program) CA300005-017
Eurofins Environment Testing Northern California, LLC certifies that the test results contained in this report meet all requirements of the 2016 TNI Standard.

LABORATORY NARRATIVE
Modified ASTM D-1946
Haley & Aldrich, Inc.
Workorder# 2405186B

Nine 1 Liter Summa Canister (100% Certified) samples were received on May 06, 2024. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and Helium in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

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

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
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

eurofins | Air Toxics

Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SV-1-TO-15

Lab ID#: 2405186B-01A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	49

Client Sample ID: SV-2-TO-15

Lab ID#: 2405186B-02A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00020	40

Client Sample ID: SV-3-TO-15

Lab ID#: 2405186B-03A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00020	18

Client Sample ID: SV-4-TO-15

Lab ID#: 2405186B-04A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	48

Client Sample ID: SV-5-TO-15

Lab ID#: 2405186B-05A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	30

Client Sample ID: SV-6-TO-15

Lab ID#: 2405186B-06A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	25
Helium	0.10	0.19

eurofins | Air Toxics

Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SV-8-TO-15

Lab ID#: 2405186B-07A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00019	31

Client Sample ID: SV-9-TO-15

Lab ID#: 2405186B-08A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00020	3.7

Client Sample ID: SV-10-TO-15

Lab ID#: 2405186B-09A

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.10	13

eurofins | Air Toxics

Client Sample ID: SV-1-TO-15

Lab ID#: 2405186B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051516**	**Date of Collection:**	**4/24/24 12:40:00 PM**
Dil. Factor:	**2.13**	**Date of Analysis:**	**5/15/24 09:14 PM**

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	49
Helium	0.11	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: SV-2-TO-15

Lab ID#: 2405186B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051517**	**Date of Collection: 4/24/24 2:46:00 PM**	
Dil. Factor:	**1.98**	**Date of Analysis: 5/15/24 09:43 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00020	40
Helium	0.099	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: SV-3-TO-15

Lab ID#: 2405186B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051518**	**Date of Collection: 4/25/24 3:02:00 PM**	
Dil. Factor:	**2.02**	**Date of Analysis: 5/15/24 10:11 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00020	18

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: SV-4-TO-15

Lab ID#: 2405186B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051519**	**Date of Collection: 4/24/24 3:59:00 PM**	
Dil. Factor:	**2.07**	**Date of Analysis: 5/15/24 10:41 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	48
Helium	0.10	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: SV-5-TO-15

Lab ID#: 2405186B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051520**	**Date of Collection: 4/24/24 5:03:00 PM**	
Dil. Factor:	**2.06**	**Date of Analysis: 5/16/24 08:01 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	30
Helium	0.10	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: SV-6-TO-15

Lab ID#: 2405186B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051521**	**Date of Collection:**	**4/25/24 9:07:00 AM**
Dil. Factor:	**2.09**	**Date of Analysis:**	**5/16/24 08:22 AM**

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	25
Helium	0.10	0.19

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: SV-8-TO-15

Lab ID#: 2405186B-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051522**	**Date of Collection: 4/25/24 1:56:00 PM**	
Dil. Factor:	**1.94**	**Date of Analysis: 5/16/24 08:45 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00019	31
Helium	0.097	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: SV-9-TO-15

Lab ID#: 2405186B-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051523**	**Date of Collection:**	**4/25/24 12:43:00 PM**
Dil. Factor:	**1.98**	**Date of Analysis:**	**5/16/24 09:06 AM**

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00020	3.7
Helium	0.099	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: SV-10-TO-15

Lab ID#: 2405186B-09A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051524**	**Date of Collection:**	**4/25/24 11:38:00 AM**
Dil. Factor:	**2.08**	**Date of Analysis:**	**5/16/24 09:42 AM**

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00021	Not Detected
Helium	0.10	13

Container Type: 1 Liter Summa Canister (100% Certified)

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2405186B-10A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/15/24 02:09 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Methane	0.00010	Not Detected

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 2405186B-10B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051504c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/15/24 03:15 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 2405186B-11A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051501**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 5/15/24 01:18 PM**

Compound	%Recovery
Methane	97
Helium	98

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 2405186B-12A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/15/24 01:43 PM**	

Compound	%Recovery	Method Limits
Methane	94	85-115
Helium	98	85-115

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 2405186B-12AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10051526**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/16/24 10:42 AM**	

Compound	%Recovery	Method Limits
Methane	93	85-115
Helium	99	85-115

Container Type: NA - Not Applicable

ATTACHMENT D
Draft Site-Specific RBC Memorandum

Memorandum

To: **Sarah Greenfield**

From: **Mike Poulsen**

Date: **April 26, 2024**

Subject: **DRAFT Development of Site-Specific Soil Vapor to Outdoor Air Risk-Based Concentrations North Larsen TASS 2 Site**

State of Oregon Department of Environmental Quality

Vapor to Outdoor Air

Federal and state concerns about vapors from soil and groundwater have mainly focused on vapor intrusion into buildings. In 1999, DEQ developed risk-based concentrations (RBCs) for exposure scenarios that included volatilization from soil to indoor and outdoor air, and from groundwater to indoor and outdoor air. Later, DEQ added RBCs for soil vapor to indoor and outdoor air. In June 2023, in an effort to be consistent with current science, DEQ substantially revised the approach for volatilization from groundwater and soil vapor to indoor air, and removed RBCs for volatilization from soil because they were not considered sufficiently reliable. Default RBCs for volatilization from soil vapor to outdoor air (RBC_{svo}) have not been developed by DEQ or other state and federal regulatory agencies. Only RBCs for soil vapor migration to indoor air are currently available.

For this project, soil vapor sampling is being performed to evaluate potential risks to people living in RVs and temporary structures that will elevated a minimum 5 inches above ground surface. For this scenario, DEQ developed potential RBC_{svo} screening values for soil vapor to outdoor air. We considered methods used to develop RBC_{so} (soil to outdoor air) values (*Risk-Based Decision Making for the Remediation of Contaminated Sites*, Oregon Department of Environmental Quality, September 22, 2003) and those suggested by others (K.W. DiBiasio and C.Y. Jeng, *Outdoor Air Risks from Subsurface Contamination by Volatile Chemicals*, Society of Toxicology poster, 2012). Because the methods depend on assumptions about the areal extent of contamination and the depth of soil vapor samples, the calculated RBCs should be viewed as protective default values. Because the estimates are conservative, if site data are below RBCs, additional refinement of RBC_{svo} will not be necessary. However, as with other RBCs, site-specific RBCs can be calculated, if appropriate.

Use of Effective Diffusion Coefficient to Calculate Flux

DEQ's RBDM guidance used a diffusion coefficient to evaluate the diffusion of vapors in soil, and converted the result to a soil concentration. Given our interest in evaluating soil vapor concentrations, chemical flux can be calculated directly from a soil vapor concentration using the following equation:

Equation 1:

$$Q_{calc} = C_v * D_{eff} / (d * CF1)$$

Where:
Q_{calc} = chemical flux ($\mu g/m^2$-s)
C_v = soil vapor concentration ($\mu g/m^3$)
D_{eff} = diffusion coefficient (cm^2/s), chemical specific
d = depth of soil vapor measurement (m) Default 5 ft = 1.5 m
CF1 = conversion factor 10,000 cm^2/m^2

Equation 2:

$$D_{eff} = (D_a * n_{-air}^{10/3})/n^2 + (D_w * n_{-water}^{10/3})/(HLC * n^2)$$

D_a = diffusivity in air (cm^2/s)
D_w = diffusivity in water (cm^2/s)
n_{-air} = soil air-filled porosity (cm^3/cm^3). Default 0.26
n_{-water} = soil water-filled porosity (cm^3/cm^3). Default 0.12
n = total soil porosity (cm^3/cm^3). Default 0.38
HLC = Henry's law constant (unitless)

This equation does not consider flux through a cap and would therefore be considered representative of baseline conditions prior to any remedial action.

Dispersion Model to Calculate Air Concentration Based on Flux

EPA developed a relationship between chemical flux and outdoor air concentrations using modeled air dispersion calculations for various U.S. cities. EPA chose to present this relationship as flux per concentration, Q/C. As a health protective estimate, EPA recommended a value of 68.81 g-m/kg-s (*Soil Screening Guidance: Technical Background Document*, U.S. Environmental Protection Agency, EPA/540/R-95/128, 1996). This value is used in DEQ's RBDM guidance and is considered protective for a site with an impacted area of 0.5 acre or less. Other values are available in EPA guidance to better represent the areal extent of impacted soil. For a 5-acre site, a more appropriate conservative value from EPA's soil screening guidance document is 45.93 g-m/kg-s, based on meteorological conditions in Los Angeles.

Using Q/C, the concentration in outdoor air can be calculated as:

Equation 3:

$$C_{oa} = Q_{calc} * CF2 / Q/C$$

Where:
C_{oa} = concentration of chemical in outdoor air ($\mu g/m^3$)
Q_{calc} = chemical flux ($\mu g/m^2$-s) from Equation 1
CF2 = conversion factor (1000 g/kg)
Q/C = air dispersion factor (g-m/kg-s). Default 45.93 g-m/kg-s

Using Q_{calc} from Equation 1, the equation can also be expressed as:

Equation 4:

$$C_{oa} = [C_v * D_{eff} / (d * CF1)] * CF2 / Q/C$$

Solving for C_v:

Equation 5:

$$C_v = C_{oa} * d * Q/C * CF1 / (D_{eff} * CF2)$$

RBC_{svo} can be obtained by setting the air concentration C_{oa} equal to the acceptable air value (RBC_{air}), and then the calculated soil vapor concentration (C_v) will be equivalent to RBC_{svo}.

Equation 6:

$$RBC_{svo} = RBC_{air} * d * Q/C * CF1 / (D_{eff} * CF2)$$

Where:
RBC_{svo} ($\mu g/m^3$) = risk based concentration, soil vapor to outdoor air
RBC_{air} ($\mu g/m^3$) = risk-based concentration, air
d = depth of soil vapor measurement (m)
Q/C = air dispersion factor (g-m/kg-s)
D_{eff} = diffusion coefficient (cm^2/s), Equation 2
CF1 = conversion factor 10,000 cm^2/m^2
CF2 = conversion factor (1000 g/kg)

EPA's Q/C approach replaced an earlier, simpler box model to calculate an air concentration assuming a wind speed through an assumed volume of air.

Results

Equations 2 and 6 were used to calculate RBC_{svo} values shown in the attached spreadsheet. RBC_{air} values are those currently used by DEQ. Chemical values were obtained from EPA's Regional Screening Level tables, most recently issued in November 2023. To be consistent with DEQ's vapor intrusion assumptions, Henry's Law Constant was adjusted to the average Oregon groundwater temperature of 12.5° C rather than the default value of 25° C.

Conclusion

DEQ Cleanup considers use of the RBC_{svo} values appropriate for screening of vapor risk at the proposed TASS 2 development on a site-specific basis. Use of the values assumes that structures will be constructed/placed over new asphalt paving or other hardscape and will be separated from the hardscape by a minimum of five inches with open air flow.

ATTACHMENT E
Methane in Soil Health and Safety Plan

Methane in Soil
Health and Safety Plan

West Property – TASS 2 Site
10505 North Portland Road
Portland, Oregon

Prepared for:
City of Portland, Bureau of Environmental Services
1120 SW 5th Avenue, Room 1000
Portland, Oregon 97204

June 2024
PBS Project 27066.030

PBS
4412 S CORBETT AVENUE
PORTLAND, OR 97239
503.248.1939 MAIN
866.727.0140 FAX
PBSUSA.COM

Emergency Contacts/Emergency Routes

This section provides contact information in case emergency conditions should occur on site during project activities. An Emergency Response Plan is presented in section 14 of this report.

EMERGENCY TELEPHONE NUMBERS

Poison Control Center:	800.222.1222
National Response Center:	800.424.8802
EPA Environmental Response Team:	206.553.1200
Utility Notification Center (Oregon):	800.332.2344
Oregon OSHA Center (Salem):	503.378.3272
Oregon Emergency Response System:	800.452.0311
Northwest Natural Gas - Emergency:	800.882.3377

PROJECT-SPECIFIC CONTACT INFORMATION

Provided in section 3.

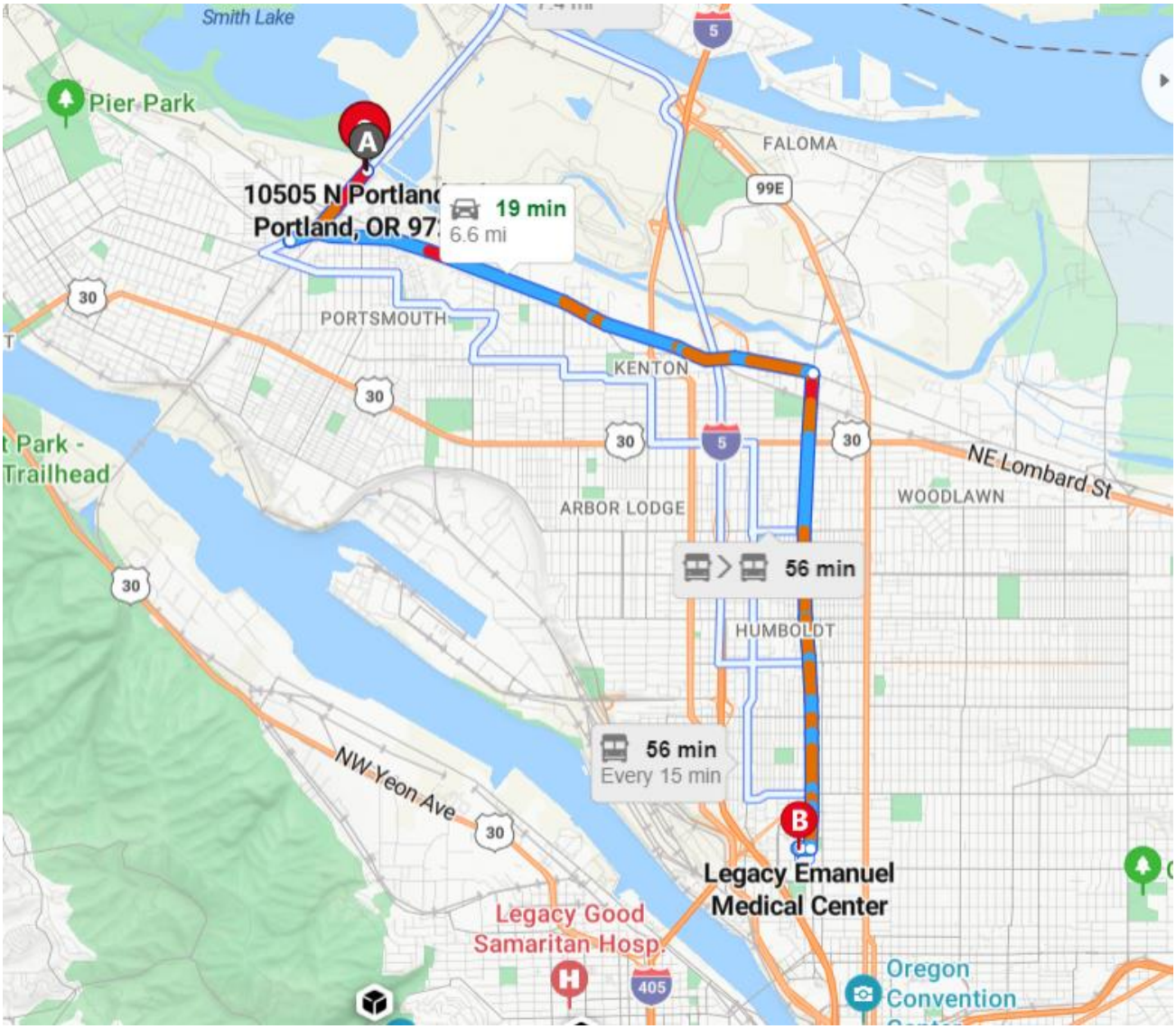
EMERGENCY ROUTE TO NEAREST HOSPITAL/EMERGENCY MEDICAL CENTER

Name:	Legacy Emanuel Medical Center
Address:	501 N Graham Street Portland, Oregon
Phone:	(503) 413-2200

Emergency Route to Hospital from Project Area:

1. Head southwest on N Portland Rd toward N Columbia Way for 0.5 miles.
2. Make a U-Turn to stay on N Columbia Way for 0.2 miles.
3. Bear right onto N Columbia Blvd and continue driving for 3 miles.
4. Turn right onto N Vancouver Ave and continue driving for 2.7 miles.
5. Turn right onto N Stanton St and continue driving for 300 ft.
6. Turn left and you will arrive at Legacy Emanuel Medical Center on the right.

See next page for the route map from the site to the hospital.



Route map from site to the Hospital

TABLE OF CONTENTS

SUPPORTING DATA

TABLES

APPENDICES

1 PROJECT LOCATION AND DESCRIPTION

1.1 Project Location

Site/Project Name:	West Property – TASS 2 Site
Site Address:	10505 North Portland Road
Site City/State/Zip Code:	Portland, Oregon 97203

The project is located along North Portland Road in Portland, Oregon and is located within Township 01 North, Range 01 East Section 5.

1.2 Project Description

The City of Portland is in the process of converting an abandoned lot located at 10505 North Portland Avenue in Portland, Oregon into an RV Shelter Park. To date, the development of this facility has included grading and installing utilities. The installation of utilities has required trenching for plumbing and electrical and the excavation of two large pits for wastewater holding tanks. Elevated methane concentrations in the soil were discovered during a recent investigation and construction operations were suspended.

Methane is common in soils with organic waste content. Bacterial decomposition of these organic wastes generates methane. In landfills, this methane is often extracted and vented or is used to generate power. Working around these soil conditions can be done safely as long as certain precautions are exercised.

1.3 Dates of Work

The work on this project, which may encounter soil gas and contaminated soil or groundwater, is anticipated to occur in 2024.

2 PURPOSE AND DESCRIPTION OF THE HAZARDOUS SUBSTANCE HEALTH AND SAFETY PLAN

2.1 Why is a Site-Specific Health and Safety Plan (HASP) Required on this Project?

Organic waste including petroleum, woody debris and other is likely buried under some portions of the project area. Decomposition of this waste is resulting in elevated methane gas in the soils on the project. Isolated minor pockets of chemical contaminated soil have also been encountered in the vicinity of the project but is not expected to adversely affect construction work on the stie. The presence of methane gas in the soil may pose a risk to human health with respect to fire hazard, explosion risk when contained and asphyxiation (oxygen displacement).

Because of this potential hazard, a health and safety plan (HASP) that meets Occupational Safety and Health Administration (OSHA) requirements (29 Code of Federal Regulation [CFR] 1910.120) and Oregon Administrative Rules (OAR) is required to address potential human health risk related to the contamination. The owner has retained PBS Engineering and Environmental Inc. (PBS) to develop this HASP to be utilized during site activities in which contaminated materials are encountered or when working in areas where these materials are present. Workers engaging in construction activities must familiarize themselves with the contents of this HASP, and sign that they have been informed as to the contents. An employee signature page is included in Appendix A.

2.2 What Is the Purpose of this HASP?

This HASP describes the specific responsibilities, training requirements, protective equipment, and operating procedures required or considered necessary for safe working conditions during construction activities. The plan primarily addresses potential worker exposure to the known soil gases and potentially contaminated soil or groundwater during planned site activities, but also is protective of the public and the environment. The

HASP will also serve if unanticipated contaminated soil or groundwater is encountered during construction activities. The staffing and monitoring requirements in this HASP are not intended for general construction activities performed in uncontaminated media.

2.3 How Is this HASP Different from the Contractor's General Safety Program?

The HASP is intended to supplement the Contractor's General Safety Program; job activities not related to work performed around or within contaminated media are not discussed in this HASP. A copy of the first page of the Contractor's General Safety Program is included in Appendix B. Site workers must comply with their employer's General Safety Program in addition to the requirements of this HASP. If workers believe the contents of the HASP and their employer's General Safety Program are in conflict, they should work with their supervisor and the contractor construction manager to resolve the conflict.

2.4 How Has this HASP Been Prepared?

During development of this HASP, consideration was given to current safety standards as defined by the Environmental Protection Agency (EPA), OSHA, Oregon OSHA (OR-OSHA) and National Institute for Occupational Safety and Health (NIOSH). Specifically, PBS uses the following reference sources in the preparation of site-specific health and safety plans:

- 29 CFR 1926.65 (Construction Standard) and 1910.120 (General Industry Standard) and 40 CFR 311
- Oregon Occupational Safety and Health Code: OAR 437, Division 2, General Occupational Safety and Health Rules
- NIOSH Pocket Guide to Chemical Hazards, DHHS (NIOSH) Publication No. 2005-149, September 2007

Work and environmental conditions at this site may change over the course of the project; as such, this HASP is dynamic and may be modified to encompass changes in work conditions or other unanticipated events and hazards.

3 KEY PERSONNEL AND RESPONSIBILITIES

The following table lists key personnel assigned to this project and their responsibilities.

Table 1. Key Personnel

Project Role	Name and Company	Contact Information
General Contractors	Lia Lopez Fulcrum Construction Michelle Ladd COP Construction PM	971 201 6843 503 823 8344
Site Safety Officer	Aaron Arnold Fulcrum Construction	971 330 0951
Environmental Consultant	Douglas Hancock PBS Engineering and Consulting	Office: 503 417 7597 Cell: 503 209 1484
City of Portland Project Environmental Oversight	Taryn Meyer City of Portland	503 823 8155

3.1 Contractor Construction Manager

The contractor Construction Manager is responsible for enforcing safe work practices and adherence to this HASP and the Contractor's General Safety Program for the duration of the project. The Construction Manager is responsible for enforcing and conducting the emergency response plan and conducting accident and near-miss investigations. The Construction Manager shall have training to identify field indicators for contaminated media.

The Construction Manager has the authority to suspend field activities if the health and safety of any person is endangered and can suspend subcontractors or individuals from field activities due to infractions of the HASP. For more information regarding specific identified chemical hazards on the site consult the project CMMP (contaminated media management plan) and the project SSSHP (site specific safety and health plan).

3.2 Site Safety Coordinator

The Site Safety Coordinator is the primary field contact for health and safety during activities involving potentially contaminated soil or groundwater. The Site Safety Coordinator will have the following responsibilities:

- Ensure that all on-site personnel have the appropriate HASP awareness training regarding the contents of the HASP and other safety requirements to be observed during construction.
- Be on site and present during work in hazardous materials zones, in areas where contaminated soil or groundwater is encountered, to provide field screening.
- Implement and monitor the HASP requirements, and work with the Environmental Consultant to modify requirements when appropriate.
- Perform air monitoring as required by the HASP, if properly trained and holding appropriate qualifications.

This Site Safety Coordinator may be employed by the contractor, or this role may be filled by the Environmental Consultant (discussed below). The Safety Coordinator should hold the following qualifications:

- Demonstrated experience providing oversight of contaminated media during excavation or dewatering activities
- Training with the Environmental Consultant on site-specific issues related to contaminated media and worker safety

3.3 Environmental Consultant

The Environmental Consultant has the following responsibilities:

- Prepare this HASP and oversee all additions and/or modifications
- Assist the contractor in identifying and evaluating potential hazards and developing appropriate procedures for addressing known or suspected conditions or activities that may pose routine occupational hazards or immediate danger to life or health
- Serve as the Site Safety Coordinator if the contractor does not have qualified personnel to fill this role

The Environmental Consultant will hold these qualifications:

- Forty-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training with current refresher certification

- Eight-hour Hazardous Waste Supervisor training or equivalency
- Two or more years of experience in hazardous substance or hazardous waste site remediation or related work
- Current first aid and AED/CPR training
- Certified Industrial Hygienist
- Certified Safety Professional

3.4 Site Workers

Site Workers completing tasks in areas associated with potentially contaminated soil or groundwater shall be responsible for the following:

- Performing work as described by the Construction Manager or designee
- Receiving the appropriate initial and ongoing training
- Reading, agreeing to, signing, and following the HASP (signature sheet in Appendix A)
- Conducting work in a safe manner
- Reporting all hazards to the Construction Manager or designee for corrective action
- Reporting faulty equipment to the Construction Manager or designee

All workers who may encounter contaminated media, or work in the vicinity of contaminated media, shall have completed HASP awareness training as outlined in section 9. This will include awareness-level training of the chemicals of concern in the contaminated media and methods for field identification of contaminated media. This training is to be provided as part of each employer's hazard communication program. This training does not satisfy requirements established in 29 CFR 1926.65 or 29 CFR 1910.120 for 24- or 40-hour HAZWOPER training.

4 KNOWN ENVIRONMENTAL CONDITIONS

4.1 Site Investigations

In generating this HASP, information from the following site documents were used:

- Soil Vapor Investigation West Property – TASS 2 Site; Haley Aldrich, 3 June 2024

The following environmental issue poses a potential risk to occupation worker, construction, and excavation workers:

- The presence of buried organic materials has resulted in the generation of methane gas. This gas is present in soils throughout the property at varying concentrations.
- Isolated concentrations of other contaminants may be present at low concentrations.

4.2 Contaminants of Concern

Contaminants of concern that may pose a risk to construction and excavation workers include methane gas primarily and other chemicals. Methane is flammable and can present fire and explosion hazards if allowed to accumulate in a pit, trench or buried enclosure. For more information regarding specific identified chemical hazards on the site consult the project CMMP (contaminated media management plan) and the project SSSHP (site specific safety and health plan).

4.3 Identified Human Health Risk

The levels of contaminants observed in the project soils pose a potential risk to contractors on this project. The potential human receptors for the site include:

- Current and future on-site workers involved in non-invasive activities
- Current and future on-site workers involved in intrusive activities include but are not limited to the following: trenching, pit excavation, utility installation, confined space entry operations, utility vault entry and inspections, etc.

5 HAZARD ANALYSIS

The evaluation of hazards is based on the conditions, previous investigations, and anticipated risks posed by specific operations. Hazards, hazardous conditions, or materials may be present or encountered within the project boundaries that are not anticipated based on available background information. This HASP is to be considered dynamic and shall be changed or updated as necessary.

This hazard analysis focuses on work tasks that may pose a hazard due to contaminated soil and groundwater. It is assumed that hazards related to regular construction activities have been assessed and formally communicated to employees in each employer's general safety program.

5.1 Work Task Descriptions

Work activities where personnel are expected to encounter methane and H2S gas include the following:

- Excavation, trenching and utility installation
- Soil excavation and grading
- Below-grade installation of structures and enclosures (confined spaces)
- Removal, relocation, stockpiling, and disposal of contaminated soils from various excavations
- Other work operations that may require workers entering confined spaces on the project where these gases may accumulate

5.2 Chemical Hazards and Controls

Methane is a colorless, odorless, and tasteless flammable gas that can ignite at a concentration of 5 percent by volume (pbv). At room temperature, methane is a gas that is less dense than air. In open and ventilated areas, methane will dissipate quickly; but in confined, non-ventilated spaces, methane can concentrate and create potential asphyxiation (by displacing oxygen) and flammable atmospheres. The action level for methane gas on this project has been set at 10% of the lower explosive limit (LEL) which is a concentration of 0.5 pbv.

It is important to mention that methane gas at sufficient concentrations can also be accompanied by other gases such as carbon dioxide (CO2) and carbon monoxide (CO). All these gases, at high concentrations, can displace oxygen, posing an asphyxiation risk.

Air monitoring action levels for worker breathing zone (which may include confined spaces) are summarized in Table 2.

Table 2. Air Monitoring Action Levels

Parameter	Action Level	Reference
Oxygen	>19.5% to <23.5%	OSHA
Carbon Dioxide (CO2)	5,000 ppm	OSHA PEL
Carbon Monoxide (CO)	50 ppm	OSHA PEL
Photoionization Detector (PID)	10 ppm	OSHA 1910.1028(f)(1)(iii)
Lower Explosivity Limit (LEL)	< 10% LEL / 0.5 pbv	OSHA
Methane	< 1,000 ppm	Oregon OSHA
Hydrogen Sulfide (H2S)	< 2 ppm	10% of PEL

This HASP provides direction for the use of protective measures to eliminate or to significantly minimize exposure to the physical and chemical hazards presented by these gases. Site workers should comply with these requirements to minimize these hazards. If an undocumented contaminant is encountered that is determined to pose a chemical hazard to personnel, work activities shall cease, and the Construction Manager notified of the situation.

5.3 Physical Hazards and Controls

The nature of construction work poses physical hazards to construction workers and visitors or trespassers to the job site. As previously noted, these hazards should be addressed in the contractor's general safety program. Table 3 summarizes typical hazards associated with contaminated media along with recommended preventive actions or controls.

Table 3. Physical Hazards

Hazard	Prevention
Site excavation and trenching	Grubbing, excavation, trenching of surface soils on the project will disturb soils that contain elevated concentrations of methane. This gas will be released into the atmosphere. Workers may notice occasional odors related to other soil gasses and odors. The natural aeration of soils containing methane gas is not likely to generate hazardous atmospheres with respect to flammability and toxicity. When odors are noticed, the safety officer shall screen the work area for both methane hydrogen sulfide volatile organic compounds and carbon monoxide. If methane is detected at concentrations exceeding 10% of LEL or if H2S gas is detected at a concentration of 10% of PEL (2 ppm) work shall stop until concentrations dissipate. If chemical odors are noticed, the safety officer shall screen the work area for petroleum using a PID. If concentrations greater than 10 ppm are sustained for more than a few minutes, work shall stop until concentrations dissipate.
Hot work and other sources of ignition	Where a combustible contaminated media, such as methane and H2S, is present, no "hot work" (use of explosives, torches, appliances, tools, or equipment producing spark, flame, or ignition) should be started until measures are taken to detect and eliminate the chance for an explosion or fire. Monitoring of the LEL is required where hot work will be performed in areas of contaminated media containing flammable gases. This monitoring should occur prior to and during the performance of hot work. Field personnel shall not work in locations where heavy equipment (e.g., backhoe) operators cannot ensure that the swing radius of their equipment shall be no closer than 20 feet to the nearest overhead line (unless lines have been booted or shut off). All electrical equipment used on the site shall be supplied with a ground fault breaker. This protection shall be tested prior to the use of the equipment. The equipment shall not be used if the ground fault breaker fails to operate properly. Workers are prohibited from smoking or having open fires in the vicinity of contaminated media. Workers are prohibited from covering excavations or other soil cavities in a way the prevents the natural ventilation of those spaces.

Hazard	Prevention
Asphyxiation and flammable atmospheres during work in excavations, pits, confined spaces, and enclosures	All unsecured or accessed confined spaces such as utility vaults, manholes, storm drains, trenches, and other buried or semi-buried enclosures on the project shall be tested daily for methane and H2S, but also normal atmospheric levels of oxygen, CO2, and CO. All sample data shall be kept in a permanent logbook. If a temporarily covered excavation or soil cavity is encountered on the project, workers shall test the cavity for H2S and methane gases prior to removing that cover. If flammable gases are found to be present in excess of 10% LEL or 10% of the PEL, the cavity shall be ventilated until these elevated concentrations have dissipated and normal atmospheric conditions are present. All workers are prohibited from entering any excavations, pits, building crawlspaces, utility vaults, confined spaces or other enclosures without prior testing to determine the concentrations of methane H2S. If flammable gases are found to be present in excess of 10% LEL or 10% of the PEL, the cavity shall be ventilated until these elevated concentrations have dissipated to normal atmospheric conditions. Continuous monitoring of methane and H2S shall be performed during all work in these spaces. If petroleum vapors are encountered, screening with a PID to confirm vapors are less than 10 ppm will occur prior to entry. If petroleum vapors are found to be present in excess of 10 ppm, the space shall be ventilated until the elevated concentrations have dissipated.

5.4 Radiological Hazards and Controls

No radiological hazards are expected to be found on this site. If a hazardous material is encountered that is determined to pose a radiological hazard to personnel, work activities shall cease, and the Construction Manager shall be notified.

5.5 Biological Hazards and Controls

No known biological hazards are expected to be encountered on the site. Should a biological hazard be identified during site activities, work shall cease, and the Construction Manager shall be notified.

6 MEDICAL SURVEILLANCE REQUIREMENTS

Except for isolated concentrations of oil-range TPH on the south side of the property, known site contaminant concentrations in affected media are not above state-established screening levels protective of construction and excavation workers. Medical surveillance is currently not warranted under 29 CFR 1926.65. The awareness training is intended to provide sufficient knowledge to site workers to help avoid unacceptable contaminant exposure.

7 ENVIRONMENTAL AIR MONITORING

Environmental air monitoring of the ambient air in the worker breathing zones shall be conducted during excavation, and removal of soil or groundwater. Air monitoring would be conducted as described in Appendix D.

Site workers may be exposed to toxic, explosive, or oxygen-deficient atmospheres. If work is done that could create these hazards (such as working in trenches and confined spaces where gases can accumulate), monitoring for these atmospheric hazards shall be performed as a prudent precautionary measure. Work shall be monitored with a suitable instrument that detects explosive vapors such as a flame ionization detector (FID) or LEL meter. A PID should be used to monitor for petroleum compounds. Should a potentially explosive condition be noted, all ignition sources shall be extinguished, and procedures enacted according to Emergency Response Procedures in section 14.

Site workers will not be allowed entry into any excavations or confined spaces unless normal atmospheric conditions below action levels are observed. If atmospheric conditions are not adequate for entry, engineering controls such as ventilation or modified PPE may be required.

8 SITE CONTROL MEASURES AND OPERATIONAL ZONES

The following section defines measures and procedures for maintaining site control, which is an essential component in the implementation of the HASP. Site control is necessary when work is being conducted in contaminated media and access to the work area needs to be controlled for the safety of the workers and the general public.

8.1 Area Boundaries and Barriers

If a task requires that the work area be controlled, area boundaries shall be established by the Construction Manager or designee. Area boundaries shall be marked in a manner that informs personnel or visitors that access to that area is limited. This may be accomplished by using signage, barricades, cones, and/or warning tape. Alternately, a worker may be stationed to direct traffic away from the restricted area. If the affected area is located where unauthorized personnel are likely to pass, temporary security fencing should be used to prevent contact with the affected area.

Area boundaries established for this project: To protect non-essential personnel and/or pedestrians, area boundaries should be established while conducting subsurface intrusive activities within the project area.

8.2 Operational Zones

The potential health hazards of the contaminated media are not expected to require the delineation of specific operational work zones; however, if field conditions indicate that these zones are required or if media with unidentified contamination is discovered during site activities, specific work zones may be established to prevent accidents and/or unauthorized entry into the affected area(s).

If it is determined that work zones are needed during the proposed scope of work, procedures for establishing and using work zone are provided in Appendix E. The work zones will include the Exclusion (Hot) Zone, Contamination Reduction (Warm) Zone, and Support (Cold) Zone. If operational zones are required as a standard protocol for the project, this HASP should be revised to reflect this change.

8.3 Buddy System

Given the current understanding of the on-site contamination, separate operational work zones are not necessary. If site conditions require identification of a Hot Zone, a buddy system protocol must be established.

In cases of confined space entry, proper confined space entry protocols with the requisite staff will be followed.

8.4 Communications

On-site communications during activities that preclude normal volume communications should follow the contractor's standard safety policies for alternative communications (i.e., hand signals, two-way portable radios, or cellular telephones).

8.5 Engineering Controls and Work Practices

To the extent feasible, engineering controls and work practices will be implemented to reduce and maintain employee exposure below the permissible exposure limit for airborne dust and other potential airborne site related hazards. Site workers will be informed at safety briefings if engineering controls and work practices are instituted.

Engineering control options that can be implemented to reduce potential employee exposure in the event of elevated dusts or vapors above permissible exposure limits include, but are not limited to, the following:

- Removal of personnel from the affected area to an upwind location
- Use of industrial ventilation fans to provide fresh air circulation in the employee work zones
- Progressive excavation and grading techniques, which may include:
    - Potholing to identify potential impacted areas in advance of excavation activities
    - Graduated excavation in impacted areas (i.e., excavating to depth in lifts and allow soil to rest to minimize potential breathing zone hazards)
    - Till or scrape soil to disturb impacted soils and allow soil to rest to let vapors dissipate below permissible exposure limits prior to resuming work in these areas

Any reasonable combination of engineering controls, work practices, and PPE shall be used to reduce and maintain employee exposures below the permissible exposure limits. The amount of personnel and equipment in contaminated areas shall be minimized yet allow for effective site operations.

9 SAFETY TRAINING

9.1 Initial HASP Awareness Training

The Construction Manager or Environmental Consultant shall conduct an initial safety briefing with site workers who will participate in work activities involving contaminated soil or groundwater. This briefing will include the following:

- How contamination at the site was identified
- What the regulatory agency or property owner requires to manage contamination and ensure worker safety
- Review of the HASP, including the following topics:
    - Site characterization
    - Site controls
    - Hazard recognition/analysis
    - Air monitoring if warranted

  - PPE, including respirator use if warranted
  - Decontamination protocols
- How to identify contaminated soil and/or groundwater (i.e., staining, odor, sheen, buried solid waste) and protocol for reporting the discovery

9.2 Ongoing Safety Briefings

The Construction Manager will conduct or coordinate ongoing safety briefings to ensure that new site workers are familiar with the contents and requirements of the HASP. It is the responsibility of the Construction Manager to determine when workers require the initial HASP awareness safety training and alert the Environmental Consultant that additional training is needed.

10 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The readily available information about site contamination indicates a low risk of exposure to hazards associated with contaminated media; therefore, Modified Level D Protection, as defined below, is the minimum level of protection when working with the known contaminated media.

10.1 Initial Exposure Assessment

Contamination at the site is well studied and its effects and properties well understood relative to human health risk; therefore, an initial site-specific exposure assessment is not warranted.

If unexpected conditions occur, such as encountering unanticipated or unknown contamination, an exposure assessment will be conducted to determine the appropriate level of PPE required. In this instance, work in the area shall stop temporarily until the assessment is complete. The protocol for this assessment will be determined based on the nature of the unexpected condition. Once the results of the assessment are available, the Construction Manager, Site Safety Coordinator, and Environmental Consultant shall determine if work activities suggest modification through engineering controls or use of additional PPE.

As an example, if an unexpected odor is observed in an area of known contamination, monitoring ambient air in the work zone using a PID, as outlined in section 7, may be appropriate. If the result is below the action level of 10 ppm above the ambient air measurement, this will be considered a negative exposure assessment, and Modified Level D PPE (summarized below) will be adequate for that work task.

10.2 PPE Protection Levels

Based on the known or suspected contamination present at the site, the use of Modified Level D PPE is appropriate for all site workers. No exchange of PPE shall be allowed except in emergency situations involving a threat to health and safety.

10.2.1 Modified Level D Personal Protection Equipment

Modified Level D PPE includes the following:

- Dedicated work clothes
- Safety boots/shoes
- Hard hat
- Gloves: nitrile or other material with appropriate protectiveness for known site contaminants (when handling or encountering contaminated media)
- Safety glasses/shield (splash protection for groundwater-related activities)

This PPE is primarily geared toward worker protection from solids (i.e., soil). If significant activities are conducted with contaminated groundwater, the required PPE should be reassessed for appropriateness.

10.2.2 Other Levels of PPE

If an initial exposure assessment or subsequent assessments determine that site conditions require PPE beyond that provided by Modified Level D, work activities will cease until conditions return to levels amenable for Modified Level D PPE. Field personnel for this project generally do not have the training required to perform activities in Modified Level C PPE, which requires respirator use.

10.3 Reassessment of Protection Program

When a significant change in site or work conditions occurs, potential hazards shall be reassessed by the Safety Supervisor. Some indicators of the need for reassessment are:

- If previously unidentified contaminated soil, groundwater, or vapors are identified
- Commencement of a new work phase and/or new activity in a contaminated area
- Change in job tasks during a work phase
- Change of season or weather
- When temperature extremes or individual medical considerations limit the effectiveness of PPE
- Contaminants other than those previously identified are encountered
- Change in ambient levels of contaminants
- Change in work scope that affects the degree of contact with contaminants

10.4 Respirators

Respirators are not anticipated to be necessary for work around contaminated media on this project. To wear a respirator at a job site, workers must be fully trained in their use, pass a fit test using their own dedicated respirator, and participate in OSHA-compliant medical surveillance. If a change in site conditions warrants the use of respirators, the Construction Manager shall ensure that a respirator program is developed that complies with OAR 437-129-045. This HASP must be revised if respirator use is required.

11 DECONTAMINATION PROCEDURES

11.1 Worker Decontamination

Given the current understanding of the on-site contamination, the decontamination procedure is limited to ensuring that residual contaminated soil is removed from work clothing and boots prior to leaving the work zone, and all personnel exposed to impacted soils thoroughly wash their hands, face, and exposed body parts prior to breaks and at the end of every work shift. If site conditions require identification of a Hot Zone, worker decontamination procedures will be reevaluated for effectiveness.

11.2 Equipment Decontamination

The Construction Manager shall ensure that equipment entering the site is properly decontaminated to prevent cross-contamination from previous sites and to ensure that personnel do not encounter unidentified and unknown hazards. Heavy equipment used by field personnel must be adequately decontaminated prior to moving between specific excavation areas. This shall consist of sweeping away loose soil and removal of significant quantities of adhered soil with hand tools. Trucks will be broom-cleaned before leaving the loading area.

Residual contaminated soil encountered during decontamination of equipment shall be captured and either placed in a truck containing similar material or stored on heavy-duty plastic for later disposal.

11.3 Disposition of Decontamination Wastes

Equipment and supplies used for the decontamination process shall be decontaminated or disposed of properly. Storage and disposal of decontamination wastes are discussed in section 16.

12 SITE STANDARD OPERATING PROCEDURES (SOPS)

Field personnel will comply with SOPs in their employer's general safety program. In addition, because of the potential for contaminated media at the site, workers, site visitors, and subcontractors shall be expected to comply with the following rules and procedures:

- Obey all warning and instructional signs posted at the site.
- Eating, drinking, chewing gum, or smoking near contaminated soil is prohibited as these practices can increase the probability of hand-to mouth transfer and ingestion of contaminated material.
- No lit cigarettes, matches, lighters, and other open flames within work areas of known or anticipated flammable or ignitable contaminated media.
- Serve as a safety backup to your partner(s) during site operations and make all site personnel aware of dangerous situations that may develop.

13 CONFINED SPACE ENTRY

A confined space is any enclosure large enough to enter, has some restricted means of egress, is not designed for continuous occupancy, and may contain one or more of the following:

- The potential to contain an oxygen-deficient or -enriched atmosphere
- A known potential hazardous atmosphere
- A material with the potential to engulf an entrant
- An internal configuration such that the entrant could be trapped or asphyxiated by inwardly converging walls or a floor that slopes downward
- Any other recognized safety or health hazard

This HASP is not intended to address confined space entry. Each employer at the site should develop their own confined space entry program. Site workers should comply with all site-specific rules related to confined space entry. It should be understood that all confined spaces on the property have a potential for the accumulation of flammable gases to the extent that they present a fire and explosion potential.

14 EMERGENCY RESPONSE PLAN

OSHA regulation 29 CFR 1910.120(l(1)) requires that site-specific HASPs include an emergency response plan. This section may be superseded by an emergency response plan that has been developed for the overall construction site.

14.1 Pre-Emergency Planning

During the initial safety briefing, site workers shall be trained in, and refreshed of, the emergency response plan. The plan shall be reviewed and revised, if necessary, on a regular basis by the Construction Manager or designee. This will ensure that the plan is adequate and consistent with prevailing site conditions.

14.2 Personnel and Lines of Authority

Emergency incidents should be anticipated and prevented by maintaining vigilance and conducting safe operations; however, should conditions change, and an emergency response is warranted, the following procedures are to be followed. The procedures below shall be outlined to all personnel as a part of the safety briefing.

- The Construction Manager or designee shall assume command unless and until relieved by police, fire, or other emergency officials. This includes taking appropriate measures to ensure the safety of site personnel. Possible actions may involve evacuation of personnel from the site area.
- All site personnel shall report to the Construction Manager or designee for a head count and for instructions.
- All personnel in an immediately dangerous to life or health (IDLH) area shall move or be removed (if injured) to an area of refuge designated by the Construction Manager or designee.
- First aid and CPR shall be applied as necessary to any injured personnel.
- The Construction Manager/Safety Supervisor shall consider if an upgrade of PPE is necessary based upon changing action levels.
- The Construction Manager or designee shall consider, as necessary, any other emergency measures, including evacuation and notification of the general public in the area, if necessary.
- The accident/incident shall be reported as soon as possible in written form on an Incident/Accident Report form found in Appendix F. Care should be taken to evaluate what may have gone wrong and why, how to prevent it in the future, and possible adjustments in the standard operating procedures.

14.3 Additional Decontamination Procedures

Decontamination procedures beyond those covered in this HASP are not expected to be required at this site. If conditions change and site conditions warrant additional decontamination procedures, this section will be modified to reflect those changes.

14.4 Safe Distances and Places of Refuge

Given that site conditions change regularly throughout construction projects, safe distances and places of refuge will be defined at ongoing safety briefings.

14.5 Emergency Recognition and Prevention

Emergency recognition and accident prevention at this construction project shall be the responsibility of all site workers. This shall be facilitated by the following procedures:

- Field personnel scheduled to work in areas with known contaminated media shall receive a safety briefing as outlined in section 9.
- Periodic health and safety briefings will be held to refresh site personnel on the emergency response plan, changes in site conditions, site controls measures, chemical and physical hazards, action levels, location of emergency equipment and phone numbers, and any other pertinent information.
- Regular safety and health inspections to determine if operations are being conducted in accordance with HASP, EPA, OSHA, and OR-OSHA requirements and regulations, and contract requirements.
- Regular evaluation of site worker personal protection levels and necessary clothing and equipment for the safety of personnel. This information shall be provided to field personnel and visitors, and appropriate compliance by these individuals shall be expected.

- Correction of any work practices or conditions that may result in injury to personnel or exposure to hazardous substances. Subcontractors shall be expected to promptly correct unsafe work practices or conditions not meeting the intent of the HASP. Failure to do so may result in temporary suspension of the field activities until corrective action is completed to the satisfaction of the Construction Manager.
- Verification that appropriate PPE is available and properly utilized by field personnel. All subcontractor personnel and site visitors shall be expected to comply with HASP procedures.
- Evaluation of weather and chemical hazard information to make any necessary modifications to work plans and personnel protection levels to maintain field personnel safety.
- Personnel should be assigned to perform specific functions during an emergency. This assignment shall be done during the safety briefing. Functions suggested are the following:
    - First-aid
    - Notify emergency services
    - Stage safety equipment
    - Regroup and take roll of site personnel
    - Notify Construction Manager

14.6 First Aid and Emergency Equipment

A general first aid kit meeting OR-OSHA guidelines shall always be kept on the site. The Construction Manager or designee shall verify that first aid kits remain fully stocked.

An eye wash station meeting ANSI Z358.1990 for Emergency Eyewash and Shower Equipment and having at least 15 minutes of flowing sterile water for purposes of flushing foreign substances from the eyes shall be located at the site.

Project vehicles shall have at least one multipurpose (Class A, B, and C) type fire extinguisher. The Construction Manager or designee shall verify that all fire extinguishers are maintained and checked regularly according to OAR 437-61: Fire Protection. All site workers shall be briefed on the locations and use of fire extinguishers.

A description of PPE required for this site was previously provided in section 10.

14.7 First Aid Protocols

This information is provided as a guide and is not considered a substitute for certified first aid/CPR training.

Skin	Remove contaminated clothing immediately, wash with soap and water.
Inhalation	Remove to fresh air. Where necessary, call emergency medical help (911) and follow medical emergency help procedures.
Eye Contact	Flush with eyewash or water at least 15 minutes. Follow emergency medical help procedures, if indicated. Contaminants may be absorbed through the eyes.
Ingestion	Obtain medical help.

Injuries	Administer first aid, if necessary. Follow emergency medical procedures in section 14.8. Medical emergencies take precedence over decontamination.

14.8 Emergency Response Protocols

In the event of an emergency, the Construction Manager will communicate that an emergency event has occurred, and that work needs to stop. Section 8.4 details the types of communication to be used at the site.

14.8.1 Emergency Procedures for an Injured Worker

- Site workers should assess the initial condition of the injured party and surrounding area. **Call 911**.
- Remove injured party from contaminated or other unsafe zone, if doing so will not result in additional injuries. If the injured party requires decontamination, rescuers should initially consult with first responders or the dispatcher.
- Apply emergency first aid to ensure breathing and reduce immediate threat to life.
- Communicate nature of emergency to the Construction Manager and document actions taken.

14.8.2 Site Evaluation and Evacuation

The Construction Manager or designee is responsible for determining if site conditions exist that require re-evaluation and/or evacuation by field personnel and should always assume worst-case conditions until proven otherwise. This includes determining if a confined space is present and entry required, and the procedures necessary to access that space. It should be noted that permit-required confined space entry is not covered by this HASP. Specific evacuation procedures, warning signs, and signals shall be covered in the safety briefings prior to beginning work and may differ depending on the site and type of operation being conducted. Visitors and subcontractors shall be expected to follow recommended actions. Three stages of evacuation have been determined for working in an area of concern:

1. Withdrawal from immediate work area on site
2. Evacuate site
3. Evacuate surrounding area

Withdrawal to a safe upwind location shall be required if any of the following occur:

- Sustained concentrations of VOCs, combustible and/or toxic gases are detected above permissible levels in the breathing zone for Modified Level D PPE.
- Occurrence of a minor accident: field operations may resume after first aid and/or decontamination procedures have been administered.
- Equipment, protective clothing, or respirator malfunctions or failure.

The site shall be evacuated in the following cases:

- Explosive levels of combustible gases, toxic gases, or VOCs are detected.
- Potentially toxic levels of organic or inorganic vapors are detected in the breathing zone that exceeds the capacity of Modified Level D PPE.
- An oxygen-deficient environment is detected.
- A major accident, fire, and/or explosion or injury occurs.

The Construction Manager or designee is responsible for determining if circumstances exist for area-wide evacuation and should always assume worst-case conditions until proven otherwise. Fire and police departments must be contacted in this case. If there is a possibility that an area-wide evacuation may be necessary, contingency plans to carry out these evacuations shall be developed in consultation with emergency services prior to the beginning of fieldwork.

14.8.3 Accident/Incident Reporting

OSHA

Accidents and/or incidents shall be reported to OSHA in the event of:

- Death. Report the death of any employee or a catastrophe (when two or more employees are fatally injured, or three or more employees admitted to a hospital or clinic as a result of the same incident) within 8 hours.
- Individual Hospitalization. Report an in-patient hospitalization, loss of an eye, and either an amputation or avulsion that results in bone loss of any employee within 24 hours.

All such accidents/incidents shall be reported to OR-OSHA: 800.922.2689.

Contractor/Ultimate Client

The Incident/Accident Report form in Appendix F must be filled out as per contractor and ultimate client requirements.

14.8.4 Critique and Incident Follow-Up

The Construction Manager or designee shall complete post-incident reports, critiques, evaluations, and medical follow-up, as needed. This may include debrief meetings with first responders and other personnel present during the emergency. The purpose of the critique and follow-up activities is to improve site-specific responses to emergencies. If improvements are needed, this HASP should be amended to reflect them.

15 NON-EMERGENCY ACCIDENTS AND INCIDENTS

15.1 Exposure/Injury/Illness

Any worker at this site who becomes injured, ill, or develops signs or symptoms due to possible overexposure involving hazardous substances, shall be required to seek medical attention within 24 hours and to notify their supervisor and the Construction Manager. A physician's written opinion may be required prior to the worker returning to normal site activities.

The incident shall be reported in written form on an Incident/Accident Report form found in Appendix F; an employer-specific incident/accident report form may be used in lieu of this form. The written report must be submitted to the Construction Manager within 24 hours of the incident.

See Appendix F for reporting requirements for accidents/incidents at a work site.

16 WASTE MANAGEMENT AND UNANTICIPATED CONTAMINATION

All employers and workers at the site must comply with regulatory requirements regarding management of solid and hazardous waste, and spill reporting obligations. In addition, they must comply with site-specific requirements established by the property owner or a regulatory agency.

This HASP is not intended to replace or supersede plans already established to deal with waste or spills, such as Pollution Control Plans or a Contaminated Media Management Plan, if prepared for the site.

16.1 Hazardous Waste

Hazardous waste must be handled according to federal and state regulations. Should any additional hazardous wastes be encountered, the Construction Manager shall be notified immediately.

16.2 Release of Reportable Quantities

Should a release of a hazardous substance occur during site activities that is greater than the reportable quantity (as defined in OAR 340-108-0010), the proper regulatory agency shall immediately be notified. Steps shall be implemented to minimize the spread of the hazardous material, which may include the construction of earthen berms, application of absorbent pads, etc. The affected area shall be cordoned off to prevent unauthorized personnel from contacting the hazardous material. An emergency response team trained in the mitigation of hazardous substance releases shall be contacted and upon their arrival, control of the affected area shall be relinquished to their authorized representative until the immediate threat of the released substance has been controlled. The Construction Manager shall be notified of the release as soon as practical.

16.3 Waste Storage and Disposal

This HASP does not prescribe specific measures for waste storage and disposal; however, a minimum level of care must be applied to all waste handling to ensure a release or other unsafe conditions do not occur.

16.4 Discovery of Unanticipated Contaminated Media

This project involves activities that may encounter unanticipated contaminated media. Should this occur, site workers shall:

- Cease operations immediately.
- Notify the Construction Manager or other appropriate key personnel immediately.
- Evacuate field personnel from the affected area until a hazard/exposure assessment is performed.
- Notify subcontractors, contractors, other site visitors, or other potentially affected personnel of the potential hazard.
- Initiate site control measures to limit access to the affected area.

16.5 Drum Handling Procedures

The use of drums is not recommended for this project. If drums are required to be used, the handling of drums shall be carried out by qualified personnel with proper equipment. Personnel shall ensure the following:

- Drums used meet the appropriate DOT, OSHA, and EPA regulations.
- Drums are inspected for integrity.

17 LIMITATIONS

PBS has prepared this plan for use by Bureau of Environmental Services with the City of Portland in Portand, Oregon. This report is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced in total or in part without the express written consent of the client and PBS. This plan is not intended to serve as the contractor safety plan and does not cover activities beyond excavation, home construction near contaminated media, and management of soil and groundwater. Health and safety procedures for general construction work at the Millpond Crossing project should be covered or referenced in the contractor safety plan and are not included.

18 SIGNATURES

PREPARER OF HEALTH AND SAFETY PLAN

Douglas Hancock CIH CSP Date
PBS Engineering and Environmental Inc.

Dennis Terzian Date
PBS Engineering and Environmental Inc.

Appendix A

Employee Signature Page

Appendix A: Employee Signature Page

The following personnel have been briefed on the contents of this HASP and understand its provisions:

Name (PRINT)	Signature	Employer	Date

Appendix A: Employee Signature Page

The following personnel have been briefed on the contents of this HASP and understand its provisions:

Name (PRINT)	Signature	Employer	Date

Appendix B

Contractor Safety and Health Policy Cover Page

Appendix C
Chemical Hazard Information

Appendix C: Chemical Hazard Information

Check the box for those chemicals that may be present at the site. If the chemical is not listed in the table, add it to the end of the table and look up the hazardous properties.

Check If Present	Material	Water Solubility[a]	Specific Gravity	Vapor Density (air=1)	Flash Point °F	Vapor Pressure	LEL UEL	PEL-TWA[g]	IDLH Level	Odor Description	Odor Threshold or Warning Concentration (ppm)	Hazard Property[j]	Acute[1] Exposure Symptoms
X	Methane	Insoluble	NA	0.52	-188C	NA	5% 17%	1,000[h] ppm	NH	Odorless	NA	B	P
X	Hydrogen Sulfide	Soluble	NA	1.19	-82C	NA	4.3% 45%	20 ppm	100 ppm	Rotten eggs	0.03 ppm	C	CDFK
X	Diesel Fuel	Insoluble	0.75-0.90	>4.5	100–134	0.4 mm	0.6%–7.5%	1,000 ppm[2]	None specified	Kerosene-like	0.08	BC	IN
X	Benzene	0.07%	0.88	2.7	12	75 mm	1.2%–7.8%	1 ppm	500 ppm	Sweet	61–97	BCG	ABCDFHIKL MNOQR
X	Toluene	0.07% (74°F)	0.87	3.2	40	21 mm	1.1%-7.1%	200 ppm	500 ppm	Sweet, pungent,	1.6	BC	DEFHIKLM NOPQ
X	Ethylbenzene	0.01%	0.87	3.7	55	7 mm	0.8%-6.7%	100 ppm	800 ppm	Aromatic	NA	BCD	ABFHIKLM NPQR
X	Xylene	Insoluble	0.87	3.7	81–90	7–9 mm	0.9%-7%	100 ppm	900 ppm	Aromatic	0.62–40	BCD	ABFHIKLM NPQ
	Benzo(a)pyrene	Insoluble	>1	8.7	NA	5.49×10^{-9} mm	NA	None	None specified	Aromatic	NA	CG	IMN
X	Naphthalene	0.003%	1.15	4.42	174	0.08 mm	0.9%-5.9%	10 ppm	250 ppm	Mothball-like	0.038	--	AEIKLNQ
X	Lead	Insoluble	11.34	NA	NA	0 mm	NA	0.050 mg/m^3	100 mg/m^3	NA	NA	C	GQ
X	PCB (generic)	Insoluble	1.38	NA	NA	0.001 mm	Non-flam	1 mg/m^{3i}	5 mg/m^3	Mild hydrocarbon	NA	CG	CHLPQ
X	Arsenic	Insoluble	5.73	--	--	--	--	10 mg/m^3	None specified	Garlic	--	B(dust)	N
X	Chromium	Insoluble	7.14	NA	NA	0 mm	NA	1 mg/m^3	250 mg/m^3	Odorless	NA	CE	ABMNQ

EXPLANATION AND FOOTNOTES

NA: Not Applicable

a Water solubility expressed as 0.2 g means 0.2 grams per 100 grams water at 20°C.

b Solubility of metals depends on the compound in which they are present.

c Several chlorinated hydrocarbons exhibit no flash point in a conventional sense, but will burn in the presence of high energy ignition source or will form explosive mixtures at temperatures above 200°F.

d Practically non-flammable under standard conditions.

e Expressed as mm mercury (Hg) under standard conditions.

f Explosive concentration of airborne dust can occur in confined areas.

g OSHA time-weighted Average (TWA) Permissible Exposure Limits (PELs) except where noted in h and i.

h Threshold Limit Value – Time-Weighted Average (TLV-TWA) adopted by the American Conference of Governmental Industrial Hygienists (ACGIH), which is lower than the OSHA Permissible Exposure Limit (PEL).

i Recommended Exposure Limit – Time-Weighted Average (REL-TWA) recommended by NIOSH. A TLV or PEL has not been adopted by ACGIH or OSHA.

A - corrosive	E - reactive
B - flammable	F - radioactive
C - toxic	G - carcinogen
D - volatile	H - infections

[1] Acute Exposure Symptoms

A - abdominal pain	G - diarrhea	M - respiratory system irritation
B - central nervous system depression	H - drowsiness	N - skin irritation
C - comatose	I - eye irritation	O - tremors
D - convulsions	J - fever	P - unconsciousness
E - confusion	K - headache	Q - vomiting
F - dizziness	L - nausea	R - weakness

[2] ACGIH-TLV

Appendix D
Air Monitoring

Appendix D: Air Monitoring

Air Monitoring Fundamentals and Instruments

Air monitoring is a means to test the air in real time for potential hazards to site workers. Typically, environmental air monitoring is conducted during excavation and removal of contaminated soil or groundwater. Air monitoring can be conducted with a PID, a meter that is able to detect VOCs in the air. Other field monitoring tools, such as Draeger gas detectors or flammable gas meters, may be used if field conditions dictate their use. Direct-reading instruments such as the PID provide information at the time of monitoring, enabling rapid decision-making. Data obtained from the real-time monitors are used to assure proper selection of personnel protective equipment, engineering controls, and work practices.

Air monitoring with a PID will typically detect VOCs but may not detect semi-volatile compounds. The PID cannot detect non-volatile contaminants such as heavy oils, semi-volatile organic compounds (SVOCs), metals, pesticides, and PCBs. The PID quantifies the concentration of total organic vapors in the air that are readable by that PID unit. It does not identify the specific type of organic vapors being measured. It also does not identify how explosive the organic vapors are being measured.

Air monitoring with an LEL meter can help identify flammable atmospheres. It should be understood that LEL meters only work properly in atmospheres with 20% oxygen. An LEL meter will give erroneous results in any atmosphere with depleted oxygen. Often a confined space monitor will include an oxygen sensor, a carbon monoxide sensor, an LEL meter and a hydrogen sulfide sensor.

The type of contamination along with the level of potential exposure by site workers provides the basis by which the appropriate air monitoring protocol is selected.

Project-Specific Air Monitoring Protocols

The contaminants of concern, methane and H2S, can be effectively monitored using a confined space meter that includes an oxygen sensor, an LEL meter and a hydrogen sulfide sensor. It is critical that the hydrogen sulfide sensor has a detection limit that is below the project specific H2S action level of 0.2 ppm. Petroleum contaminants can effectively be monitored using a PID calibrated to 100 ppm isobutylene.

Air monitoring shall occur when workers enter soil excavations or other enclosed cavities that may contain elevated concentrations of these gases. The following areas will be monitored:

- *Ambient (background):* Measurements will be taken daily to evaluate background concentrations. The sample should be taken at the perimeter of the work zone.
- *Excavation zone (pumping zone)*: Measurements will be taken in the employee breathing zone during excavation or pumping activities in areas of known or suspected contamination. Measurements will be collected inside the excavation only if it is safe for workers to enter. During excavation activities, or whenever contaminated soil or soil containing organics is disturbed, or contaminated groundwater is present, measurements will be collected from the excavation (if workers present), near earth moving equipment, and in the soil stockpile and loading zone. If hot work (e.g., welding, cutting, or grinding) is to be conducted in contaminated excavations, samples will be collected in the immediate work zone prior to and during hot work activities using a confined space meter.
- *Screening existing vaults, enclosures, temporarily covered pits and trenches:* Measurements will be taken remotely prior to removal of any temporary cover or lid associated with a soil cavity where H2S, methane, or petroleum vapors could accumulate. If levels exceed 10% LEL or 10% PEL, the soil cavity or space shall be mechanically ventilated prior to opening.

Air Monitoring Recap

- ✓ Air monitoring readings taken daily with a confined space meter.
  - Readings above 10% LEL (0.5 pbv) methane shall result in a stop work condition.
  - Readings above 10% PEL (2 ppm) for H2S shall result in a stop work condition.
- ✓ During hot work, work inside excavations, or other work in other enclosed spaces, readings will be taken prior to initiating work and continuously during work activities.
  - Readings above 10% LEL (0.5 pbv) methane: Work needs to stop immediately, and workers need to evacuate the area until vapors dissipate.
  - Readings above 10% PEL (2 ppm) H2S: Work needs to stop immediately, and workers need to evacuate the area until vapors dissipate.
  - Readings of oxygen less than 19.5% present an asphyxiation risk and concentrations greater than 23.5% oxygen present an oxygen-rich environment more prone to flammable ignition hazards. Readings outside of this range shall result in a stop work condition.

All monitoring equipment shall be calibrated weekly or immediately prior to use following the manufacturer's recommendations.

Appendix E
Operational Zone Procedures

Appendix E: Establishment of or Procedures for Operational Zones

Exclusion (Hot) Zone

The region encompassing an area of excavation, excavated soil piles or other work area presenting a risk, and a minimum of 20 feet beyond (if possible) on all sides shall be designated as the Exclusion (Hot) Zone. This zone shall be identified using caution tape, cones, or other readily identifiable barrier. For sites where public access must be restricted outside of project work hours, the Contractor shall confer with the site owner and applicable municipal/regulatory entities to determine the appropriate barrier for each location.

Only necessary site workers or authorized site visitors shall be allowed in the Hot Zone.

Note: All site workers and authorized visitors must have read the HASP and signed Appendix A prior to entering the Hot Zone. Personnel shall limit their time in the Hot Zone to necessary work and leave immediately upon completion.

All personnel entering the Hot Zone shall be outfitted in the level of protection as outlined in section 10 of this document.

The owner and the Safety Supervisor are jointly responsible for ensuring that personnel gaining access to the Hot Zone meet the above requirements. Any contaminated equipment, materials or media shall remain in the Hot Zone until properly decontaminated or other suitable disposition is arranged. A decontamination station shall be set up in the Contamination Reduction (Warm) Zone. Decontamination procedures shall be according to the Decontamination Plan outlined in section 11.

Contamination Reduction (Warm) Zone

The Contamination Reduction (Warm) Zone is the transition area between the contaminated area and the clean Support (Cold) Zone. The Warm Zone boundary shall be in a manner such that no contaminated materials or equipment shall pass beyond it to the Cold Zone. Initially, the Warm Zone is considered to be a non-contaminated area.

As applicable, workers shall remove outer layers of boot, suit, and glove coverings and proceed to the Decontamination Station (respirators would remain in-place until exiting Decontamination Station).

Support (Cold) Zone

The Support (Cold) Zone shall consist of the area of the site extending from the outer boundary of the Warm Zone to the work zone boundary. Support personnel and equipment (first aid, eyewash, etc.) shall be located in this zone. Support personnel shall be responsible for alerting the proper agency in the event of an emergency. All visitors and site personnel not currently required to be in the Hot or Warm Zones shall remain in the Cold Zone. Normal work clothes are appropriate for this zone.

Potentially contaminated personnel clothing, equipment or other materials are not permitted in this zone. Personnel entering this zone are required to remove any protective equipment worn in the Warm Zone.

Appendix F

Contractor Incident/Accident Report Form