Site Cleanup Work Plan
Former Carol Glover BP
Yamhill, Oregon

Prepared for:
Oregon Department of Environmental Quality
Task Order No. 71-18-29

March 8, 2023
2659-00/Task 7

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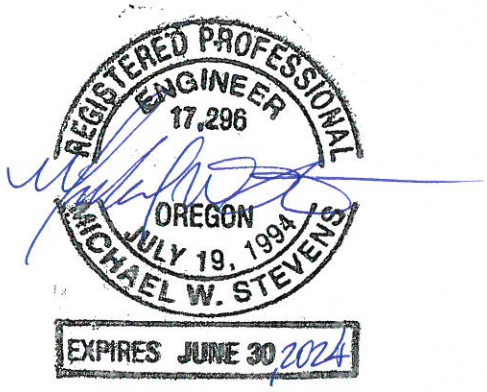
Carmen Owens, P.E.
Senior Engineer



Michael Stevens, P.E.
Principal Engineer

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1.0 Introduction

This Site Cleanup Work Plan (Work Plan) presents the scope of work for implementing the selected cleanup alternative at the Carol Glover BP Site (Site) located at 185 South Maple Street in Yamhill, Oregon (Figures 1 and 2). In 2022, a Site Investigation and Analysis of Brownfield Cleanup Alternatives (SI/ABCA) was prepared for the Site (Apex, 2022), and the selected cleanup alternative is the decommissioning of the facility underground storage tanks (USTs) by removal, excavation, and off-Site disposal of petroleum-impacted soil. This Work Plan presents the activities to implement this alternative. This Work Plan was prepared for the Oregon Department of Environmental Quality (DEQ) under Task 7 of Task Order 71-18-29.

1.1 Purpose

The main purpose of the Work Plan is to implement the cleanup alternative selected in the SI/ABCA Report (Apex, 2022). The selected alternative aims to reduce and/or eliminate hazardous substances in soil and groundwater and to allow future re-development of the property.

1.2 Scope of Work

To accomplish the above objectives, the scope of work that is described in this Work Plan consists of the following general tasks:

1) Remove the on-Site building and vehicle hoists;
2) Decommission and remove five USTs and associated piping in accordance with Oregon Administrative Rule (OAR) 340-150-0168;
3) Collect and analyze soil and/or groundwater samples in accordance with OAR 340-150-0168;
4) Remove petroleum-impacted soil near the fuel island and the suspected petroleum-contaminated soil coincident with the USTs and vehicle hoists and dispose of at an off-site regulated Subtitle D landfill; and
5) Prepare a report documenting implementation of the selected cleanup alternative.

These activities are discussed in further detail within this Work Plan.

2.0 Background

This section includes a description of the Site, land use, history, and geology and hydrogeology. Background information pertaining to prior site investigation activities is described in the SI/ABCA Work Plan (Apex, 2021).

2.1 Site Location and History

This section presents a description of the Site location and Site history.

2.1.1 Location

The former Carol Glover BP site (the Site) is located in downtown Yamhill, Oregon. This former service station site is small (about 0.12 acres) and situated on the northeast corner of the intersection of East 1st Street and South Maple Street (also known as Tualatin Valley Highway/Hwy 47). The Site is identified in DEQ's Leaking Underground Storage Tank (LUST) database as site number 36-93-4164.

The Site is identified as tax lot 1500 on assessor's map number 3 4 04AC. Properties to the north and east include residential properties located along South Maple and East 1st Street; to the south is Yamhill City Hall; to the west are restaurants and retail space; and to the southwest is the former Yamhill Station site (also known as known as Senz Automotive Service; LUST 36-06-2111, LUST 36-88-4062, and Environmental Cleanup Site Information [ECSI] database number 4923).

2.1.2 Land Use

Land use in the vicinity of the Site is a mix of residential and commercial. The Site is zoned as General Commercial (GC) and is currently vacant. Historical use has been commercial, although residential use is permitted. The Site has one single story building (approximately 1,200 square feet) and is currently paved with asphalt and concrete. The Site is within the downtown commercial district of the City of Yamhill in an area of mixed retail, city government, and residential use. The Yamhill Station site (LUST 36-06-2111, LUST 36-88-4062, and ECSI 4923) is located on the opposite corner of the intersection (southwest of the Site). There were significant releases of petroleum hydrocarbons and associated investigations conducted by DEQ and others at the Yamhill Station site. Groundwater monitoring from the Yamhill Station site has shown a consistent groundwater flow and relatively steep gradient to the west and southwest, away from the Site.

2.1.3 Site History

The first records of the Site indicate that by the 1890s, the property was developed as a residential property which included a house to the north of the Site along Main Street and a shed along the eastern property line. The property is also shown as a residential property in a 1902 Sanborn insurance map (Apex, 2021). By the time of the 1913 insurance map, the residential property had been subdivided, the Site had been redeveloped into the Hotel Royal, and part of the hotel had burned down. In the 1920s, the property had been converted into apartments which remained at least into the 1930s.

Aerial photos suggest the current Site building was in place by 1954, consistent with use as an automotive service station. Based on available UST records, it is assumed that service station operations began some time prior to 1964.

In 1993, soil contamination was identified during the installation of a new water line to the Site building (Pacific Northern Environmental [PNE], 1993). The 1998 city directory lists the Site as a "beauty shop" called Main Line Services. Most recently, the Site was reportedly used as a restaurant; the 2018 city directory indicates that two businesses were located within the Site, Bella Luna Patisserie and Yamhill Chocolate N Wine Gallery. In February 2018, Yamhill County foreclosed on the Site property, and it has been unoccupied since then.

2.1.4 Geology and Hydrogeology

According to the Geologic Map of Oregon (DOGAMI, 2001) and the United States Geological Survey (USGS, 2001), the Site is underlain by Pleistocene lacustrine and fluvial material consisting of unconsolidated to semi-consolidated lacustrine clay, silt, sand, and gravel. The Site is located within the North Yamhill River drainage, which is a tributary to the Yamhill River in the Northern Oregon Coast Range. The topography of the Site is relatively flat with a slight downward slope to the south and west towards the North Yamhill River. The Site is located approximately 187 feet above mean sea level (MSL).

Based on the recently conducted Site investigation activities, subsurface soils at the Site consist of silt, silty sand, and silty clay from the surface to approximately 12 feet below ground surface (bgs) and silty clay and clay from 12 to 20 feet bgs (the deepest exploration completed at the Site). Fill materials were observed from the ground surface to a depth of approximately 3 feet bgs in several locations. Groundwater was encountered in one boring at 13 feet bgs. Groundwater monitoring from an adjacent site (Yamhill Station site) has shown a consistent groundwater flow and relatively steep gradient to the west and southwest.

2.2 Site Assessment Work

According to DEQ, the first environmental assessment of the site was performed in July 1993, when gasoline and diesel contamination in soil was identified within 2 feet of a new water service line. Soil sampling confirmed gasoline and diesel contamination (33 and 118 milligrams per kilogram [mg/kg], respectively; PNE, 1993). The scope of work during this period did not include sampling or assessment of the Site tank nest or other product lines.

In 2001 and 2002, DEQ conducted an assessment to investigate the abandoned on-site tanks (DEQ, 2002). This work utilized LUST Trust funds and was limited in its scope. Contractors emptied and rinsed the USTs, removing 701 gallons of product and creating 3,120 gallons of rinsate and water which were also removed. A focused site investigation included the completion of five borings using direct push drilling techniques. Petroleum hydrocarbons (total petroleum hydrocarbons as gasoline [TPHg], total petroleum hydrocarbons as diesel [TPHd], and volatile organic compounds [VOCs]) were detected in soil samples, and petroleum VOCs

were detected in groundwater. Benzene concentrations in soil and groundwater were present at concentrations above risk based concentrations (RBCs) for residential vapor intrusion and leaching to groundwater, and TPHg was present at concentrations that exceeded soil matrix cleanup concentrations. In addition, 1,1-dicholoroethane and vinyl chloride were detected in groundwater at concentrations that were below RBCs.

In 2021, Apex conducted a limited Site investigation to fill data gaps and characterize the nature and extent of contamination in soil and groundwater at the Site. The investigation included the completion of eight soil borings via direct-push methods and collection of grab soil and groundwater samples. Soil samples were collected from all borings and a groundwater sample was collected in one boring. All analytes were below applicable RBCs with the exception of TPHg in two soil samples and lead in the groundwater sample. The results of the investigation are summarized in the SI/ABCA Report (Apex, 2022).

2.3 Historical and Database Records Review

As part of the 2021 Site investigation, Apex obtained and reviewed environmental databases and readily available historical records to characterize the obvious and apparent uses of the Site and adjacent sites of interest. No additional information about the Site was obtained from the records review. Adjacent sites of interest are listed below.

- **Yamhill Central Office – 211 1st Street, Yamhill, Oregon.** This site is located approximately 75 feet southeast of the Site. The site is listed under several names, including the GTE Yamhill Office and Frontier Communications. From review of the available records, the site has known releases to soil and groundwater from diesel storage tanks. Releases and contamination were identified during tank decommissioning. A cleanup was started in early 1998 and was reportedly completed in February 1999. According to DEQ's LUST database, the site was issued a No Further Action (NFA) determination.
- **Senz Auto Service (Yamhill Station) – 210 S Maple Street, Yamhill, Oregon.** This site is located approximately 90 feet southwest of the Site. The site is listed under several names and is also called the Yamhill Station and North Yamhill Gas Station. From review of the available records, the site has known releases to soil and groundwater from storage tanks. Releases and contamination were identified after an uncontrolled release to the city storm sewers was reported. Remediation of the site was undertaken, and regular groundwater monitoring was conducted until 2011 (Apex, 2021). The site remains listed in DEQ databases as requiring further investigation, and as of December 2020, the property was under a consent order. Sampling from this site indicates that groundwater primarily moves toward the southwest, away from the Site.

2.4 Geophysical Survey

On April 1, 2021, a geophysical survey of the Site was performed using ground-penetrating radar (GPR) and included an assessment of: (1) the number and location of USTs; (2) limitations imposed by physical obstructions (e.g., buildings or other structures, asphalt, concrete, etc.) that may hinder site investigation and UST decommissioning activities; and (3) subsurface utilities that may interfere with or prevent investigation activities and UST decommissioning activities. The geophysical survey findings confirmed that five USTs were present. As shown in Figure 2, the geophysical survey findings indicated that: the locations of the USTs were close to the Site building; public and private utilities had been installed over the USTs; and two suspected vehicle hoists were located in the building.

2.5 Hazardous Building Material Survey

A hazardous building material (HBM) survey was performed on November 2, 2021 as part of the Site investigation. No asbestos-containing materials were identified in the structure, and toxicity characteristic leaching procedure (TCLP) analysis indicated that the building materials are not considered hazardous waste. Paint samples collected from the building were identified as lead-based paint (LBP), so building demolition planning and execution will require appropriate handling of this material.

The HBM survey also included a visual inspection for the potential presence of hazardous materials such as polychlorinated biphenyls (PCBs), fluorescent light tubes, and ballasts. The following hazardous materials were identified: three fluorescent light fixtures containing six fluorescent tubes; and one in-wall air-conditioning unit. Additional HBM may be present at the Site that was not visible during the survey.

3.0 Site Cleanup Activities

The Site cleanup activities will include on-Site building demolition, UST removal and decommissioning, and impacted soil removal.

3.1 Preparatory Activities

Site Health and Safety Plan. A Site-specific health and safety plan (HASP) has been prepared for the proposed activities. Appendix A includes a copy of the HASP. The HASP was prepared in general accordance with the Occupational Safety and Health Administration (OSHA) and the OAR. A copy of the HASP will be maintained on site during the field activities. In addition, prior to performing any on-site work, Apex will prepare a Job Safety Analysis (JSA) guiding task-specific activities, risks, and safety protocols for each task. All field staff supporting the project will be required to review and follow the HASP and JSAs. Safety topics will be refreshed daily with the field crew using a daily safety tailgate meeting, to be conducted by Apex's Site Supervisor or Site Safety Officer.

Site Access. Apex will provide notification to Yamhill County and Oregon DEQ at least 48 hours in advance of the Site cleanup activities.

Subcontractor Solicitation. Apex will solicit a primary subcontractor to complete this work including demolition of the on-Site building, UST removal and decommissioning, and off-Site disposal of soil as necessary. Ancillary subcontracted services will include utility locating. Analytical laboratory services will be provided by Pace Analytical under the existing State of Oregon Price Agreement.

Underground Utility Location. Apex will arrange to have underground utilities located and marked prior to beginning the field investigation work. This will include contacting the Oregon Utility Notification Center, who will in turn notify the various utilities in the area to identify any underground installations. A private utility locator will also be used to field-mark utilities on-site prior to the demolition and UST removal activities.

Inadvertent Discovery Plan. Apex prepared an Inadvertent Discovery Plan (IDP; Appendix B) to protect cultural resources that are significant to local tribes and to develop a plan to proceed with site investigation activities while avoiding and minimizing impacts to cultural resources. The IDP is subject to Confederated Tribes of Grand Ronde (CTGR) and State Historic Preservation Office (SHPO) review and approval, and will be reviewed and implemented with Apex staff and subcontractors.

Threatened and Endangered Species. Readily available data were reviewed prior to the 2021 Site investigation to determine the listed status of the area or county with respect to the presence of threatened or endangered species listed in the Endangered Species Act (ESA). The results of the review are documented in the Site Assessment Work Plan (Apex, 2021). For the preparation of this work plan, the data sources were re-reviewed to assess if there are any additional species added to the lists since the 2021 report. No changes in the species lists for the Site were found. Given that this Site was developed as a residential area in the 1890's and has been in continuous use as a residential, retail, and commercial property, the threatened and engendered species within the county are considered incompatible with the habitats encountered in the vicinity of the Site. However, all work conducted at the Site will be assessed for potential to impact these species during the planning and implementation stages.

Utility Disconnection. Prior to demolition of the on-Site building, service utilities to the Site will be disconnected. Anticipated utilities that will need disconnection include water, electricity, and natural gas. Apex will contact the City of Yamhill, Portland General Electric, and Northwest Natural to have the services disconnected, and will verify with the City that no other utilities are present.

3.2 On-Site Building Demolition

The Site building must be demolished to allow access for tank removal. Demolition of the wood and concrete structures at the Site will be conducted in accordance with applicable federal, state, and local laws, rules, and regulations by a licensed demolition contractor.

Prior to commencing demolition, the selected contractor will apply for and obtain a demolition permit through Yamhill County. If demolition work or support activities will be conducted within the right-of-way of either South Maple Street or East 1st Street, the contractor will obtain a right-of-way permit from the City of Yamhill prior to work.

During the hazardous materials survey, LBP (paint containing lead concentrations over 5,000 parts per million) as defined by the US Environmental Protection Agency (EPA; 40 CFR 745) was identified. Handling of the LBP should be done according to OAR 333, Division 068 to 070 – Lead Requirements, which establish the requirements for the abatement of LBP-containing materials. Appropriate engineering controls detailed in OSHA Standards 1926.62(e)(1) should be used to reduce possible lead exposure during demolition activities.

During the demolition work, dust control measures (such as a light water spray) will be used to prevent fugitive dust emissions from the Site, and trucks leaving the Site will be swept clean and the loads will be tarped to prevent the loss of materials during transportation. All demolition debris will be recycled or hauled to a licensed construction/demolition landfill or a Subtitle D Landfill. The selected contractor will be responsible for any damage to adjacent properties, including the right-of-way of adjacent streets, that results from demolition activities.

3.3 Automobile Hoist Removal

Two potential automobile hoists were identified in the building during previous Site work (Figure 2). One is located under a concrete floor and the second under a raised plywood floor in the on-Site building. These hoists may contain hydraulic fluid and need to be disposed of according to applicable federal, state, and local laws, rules, and regulations during demolition. All fluids will be removed to the extent practicable before removal, and care will be taken to prevent spillage of fluids during handling and transportation of the equipment.

One soil sample will be collected from beneath each hoist. If petroleum-contaminated soil is encountered during hoist removal, may be removed based on the magnitude of the impacts and consultation with the DEQ. Additional soil samples may be collected after removal of petroleum contaminated soil. After removal, the hoists will be inspected for leaks, holes, or other indications of a release. Removed hoists will be disposed of at a licensed disposal or recycling facility.

3.4 Underground Tank Decommissioning

Five USTs (four gasoline and one waste oil) are located on the Site (Figure 2). Information about the tanks obtained from historical records and the GPR survey are provided in the table below.

Tank Identification	Tank Size (Gallons)	Tank Contents
1	3,000	Gasoline
2	2,000	Gasoline
3	2,000	Gasoline
4	6,000	Gasoline
5	500	Waste Oil

The USTs will be decommissioned by a DEQ-licensed UST service provider as described by OAR 340-160-0030 and 340-150-0156. The decommissioning and sampling activities will be conducted consistent with DEQ's *UST Program Quality Assurance Project Plan* (DEQ, 2016), *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2017), and *UST Cleanup Manual* (DEQ, 2009).

The GPR survey conducted at the Site identified water and stormwater lines that are located above the USTs. These utilities will be disconnected prior to the beginning of Site activities as described above. These pipes will be tested to verify they are not pressurized and will be removed prior to the decommissioning of the USTs. Additionally, any piping associated with the fuel distribution system (such as between the tanks and the former dispensers) will be disconnected and purged of any residual product.

A *30-Day Notice of Intent to Decommission* form must be submitted to DEQ through their Online Petroleum Release Reporting (OLPRR) system prior to tank removal activities. A copy of this notice will be submitted to the DEQ project manager (Don Hanson) and UST inspector (Dylan Eckert). Additionally, DEQ will be notified by telephone three days prior to commencing removal activities. If tank removal work will be conducted within the right-of-way of either South Maple Street or East 1st Street, a right-of-way permit will be obtained from the City of Yamhill prior to work.

The surface cover material overlying the regulated USTs (concrete, asphalt, and soil above the USTs) will be removed to facilitate access and UST removal. The removed material will be temporarily staged on-site in a location near the UST excavation to be transported off site for disposal. The UST decommissioning will be done in accordance with OAR 340-150-0168. Historical records show that the contents of the tanks were previously emptied. However, if there are any contents remaining in the USTs, the contents will be emptied and properly recycled/disposed of prior to removal. Associated piping and vents will be cut and capped, and the USTs will be cleaned and inerted using dry-ice or similar inerting method. Air within the USTs will be monitored using a lower explosive limit (LEL) meter to ensure the space is inert. The tanks will then be removed from the tank basin by excavator or similar equipment and the tank excavation will be inspected and sampled to identify potential release(s).

Sampling of the UST excavation will be completed in accordance with OAR 340-150-0180, 340-122-0340, and 340-122-0345. Sampling methods are described in the Sampling and Analysis Plan (SAP) included in Appendix C. If water is not present in the excavation, soil samples will be collected from beneath both ends

of each tank (from native soils, no more than 2 feet beneath the tank) and from additional areas as needed to ensure a minimum of one sample is collected for every 100 square feet of excavated area.

If water is encountered in the excavation, the water shall be purged from the excavation (and properly disposed of). If the water does not return within 24 hours, the soil sampling will continue as described above. If water does return within 24 hours, unsaturated soil samples will instead be collected from the sidewalls of the excavation nearest the ends of each tank, immediately above the soil-water interface at the time of the work. A sample of recovered groundwater will be collected following the excavation purging to facilitate disposal profiling.

Piping will be removed by excavation. Samples will be collected along piping runs of more than 5 feet (collected at 20-foot intervals along the piping).

Based on previous Site work, it is expected that there have been petroleum releases from the USTs. It is anticipated that nominal amounts of petroleum-contaminated soil may be encountered and will be removed as part of the UST decommissioning. Confirmation soil samples will be collected from any additional excavated area, including the sidewalls of the additional excavation, and one bottom sample will be collected for every 100 square feet of excavated area.

After removal, the tanks and piping will be inspected for leaks, holes, or other indications of a release. Removed tanks, piping, vent stacks, and utility lines will be recycled. After tank removal, a UST Checklist and Site Assessment Report will be submitted to DEQ within 30 days.

3.5 Soil Removal

Approximately 600 square feet of petroleum-contaminated soil was identified in the vicinity of the fuel island at depths up to 3 feet bgs (Figure 2) during previous Site investigations. This soil will be removed by excavation. It is also anticipated that petroleum-contaminated soil will be encountered during removal of the USTs and possibly in the vicinity of the vehicle hoists. Soil that is visibly determined to be impacted by petroleum in the immediate vicinity of the USTs and vehicle hoists will be removed by excavation. It is estimated that approximately 120 cubic yards (cy) of petroleum contaminated soil is present (including approximately 60 cy in the vicinity of the fuel island, approximately 50 cy in the vicinity of the USTs, and approximately 10 cy in the vicinity of the vehicle hoists).

Excavated soil will either be stockpiled in accordance with this plan or directly loaded into trucks. Soil to be stored on-Site will be placed in a covered and labeled roll-off box or in a lined and covered stockpile. Stockpiles will be maintained in a manner that prevents run-on, runoff, and erosion of the stockpiles. Stockpiles will be placed on plastic sheeting with a berm around the perimeter of the stockpile. The berm may be constructed by laying the bottom plastic over straw bales, Jersey Barriers, ecology blocks, or by other

equivalent methods. When not active, stockpiles will be covered with plastic and secured with sand bags or equivalent.

Based on data collected during Site Assessment and historical soil samples, impacted soil will be classified as non-hazardous solid waste. Petroleum-contaminated soil removed from the Site will be disposed of at a U.S. Resource Conservation and Recovery Act (RCRA) Subtitle D facility.

3.6 Site Restoration

Upon removal of the vehicle hoists, USTs, and petroleum-contaminated soil, the excavations will be backfilled with structural fill material (such as a commercially provided sand or crushed rock). Backfill material used will be free of debris, rock, ice, snow, organic material, or any other material which could adversely affect compaction. The backfill material will be installed in lifts of approximately 1 foot and compacted using the bucket of the excavator until there is a visibly non-yielding surface. The uppermost 12 inches of the excavation will be backfilled with commercially provided 3/4"-0 crushed gravel and compacted to a visibly non-yielding condition. The surface will be groomed to match the existing surrounding grade.

3.7 Handling of Investigation-Derived Waste

Investigation-derived waste (IDW) will consist of UST and piping surface cover material, removed fluids from the USTs, and decontamination water. The surface cover material will be included with the petroleum-impacted soil and loaded into truck(s) for offsite disposal at an approved Subtitle D landfill or other approved disposal facility. Liquid IDW will be pumped into a tank truck and transported off site for recycling at a permitted recycling facility.

Disposable items, such as sample tubing, disposable bailers, bailer line, gloves, protective overalls (e.g., Tyvek®), paper towels, etc., will be placed in plastic bags after use and deposited in trash receptacles for disposal.

4.0 Analytical Program

This section describes the analytical program for samples collected during gasoline tank removal, waste oil tank removal, and automobile hoist removal.

4.1 Soil

4.1.1 Gasoline UST

Soil samples from the gasoline UST removal activities will be analyzed for TPH identification using Northwest Method NWTPH-HCID.

If gasoline-range hydrocarbons are detected in the HCID analysis, follow-up analysis will include the following relevant constituents of interest (COIs) from Table 2.1 in DEQ's risk-based decision making (RBDM) guidance (DEQ, 2017):

- TPHg by Northwest Method NWTPH-Gx;
- VOCs by EPA Method 8260B; and
- Lead by EPA Method 6020.

If diesel-range hydrocarbons are detected in the HCID analysis, follow-up analysis will include the following relevant COIs from Table 2.1 in DEQ's RBDM guidance:

- TPHd by Northwest Method NWTPH-Dx;
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8260B; and
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C SIM.

4.1.2 Waste Oil UST

Soil samples from the waste oil UST removal activities will be analyzed for the following relevant COIs from Table 2.1 in DEQ's RBDM guidance:

- TPH identification using Northwest Method NWTPH-HCID;
- TPHd by Northwest Method NWTPH-Dx;
- VOCs by EPA Method 8260B;
- PAHs by EPA Method 8270C SIM;
- Cadmium, chromium, and lead by EPA Method 6020A; and
- PCBs by EPA Method 8082A.

4.1.3 Automobile Hoists

Soil samples from beneath the automobile hoists will be analyzed for the following constituents:

- TPHd by Northwest Method NWTPH-Dx; and
- PCBs by EPA Method 8082A.

If diesel range hydrocarbons are detected in the analysis of the automobile hoist samples, follow up analysis will include the following:

- PAHs by EPA Method 8270C SIM.

4.2 Groundwater

If groundwater is encountered during gasoline or waste oil UST removal, collected samples will be analyzed for the following relevant COIs from Table 2.1 in DEQ's RBDM guidance:

- TPH identification using Northwest Method NWTPH-HCID;
- TPHd by Northwest Method NWTPH-Dx with silica gel cleanup;
- VOCs by EPA Method 8260B;
- PAHs by EPA Method 8270C SIM;
- Cadmium, chromium, and lead by EPA Method 6020A; and
- PCBs by EPA Method 8082A.

If gasoline-range hydrocarbons are detected in the HCID analysis, follow-up analysis will include the following:

- TPHg by Northwest Method NWTPH-Gx.

5.0 Quality Assurance and Quality Control

Quality assurance/quality control (QA/QC) procedures will be used throughout this project. The SAP in Appendix C includes the QA plan for this project. This plan includes sampling and custody procedures, QA sampling analyses (such as analysis of duplicates), detection limit goals, laboratory QC, and QA reporting. Soil and groundwater sampling will be conducted and the Site QA plan was prepared in general accordance with the DEQ's *Brownfields Program Quality Assurance Project Plan*, dated November 2016 (DEQ, 2016).

6.0 Reporting

After receipt of analytical results, Apex will prepare a Site Cleanup Report that presents a summary of the building demolition, tank removal, and soil removal activities. The report will also include a summary of the analytical results and an estimate of the quantity and location of any remaining petroleum-contaminated soil.

The Site Cleanup Report will be prepared in general accordance with the following outline.

1. Introduction
    a. Purpose
    b. Scope of Work
2. Background
    a. Site Location and Description (includes Site maps)

b. Geology and Hydrogeology
c. Previous Site Work

3. Cleanup Activities
    a. Preparatory Activities
    b. Building Demolition
    c. UST Removal
    d. Soil Removal
4. Chemical Analyses and Results
    a. Analyses Performed
    b. Chemical Results
5. Conclusions
6. Appendices
    a. Backup Documentation (e.g., photographs)
    b. Analytical Laboratory Reports and Documentation (including a data quality review)

The Site Cleanup Report will initially be prepared as a draft for review by the DEQ. Upon receipt of DEQ's comments, Apex will issue the report in final form.

7.0 References

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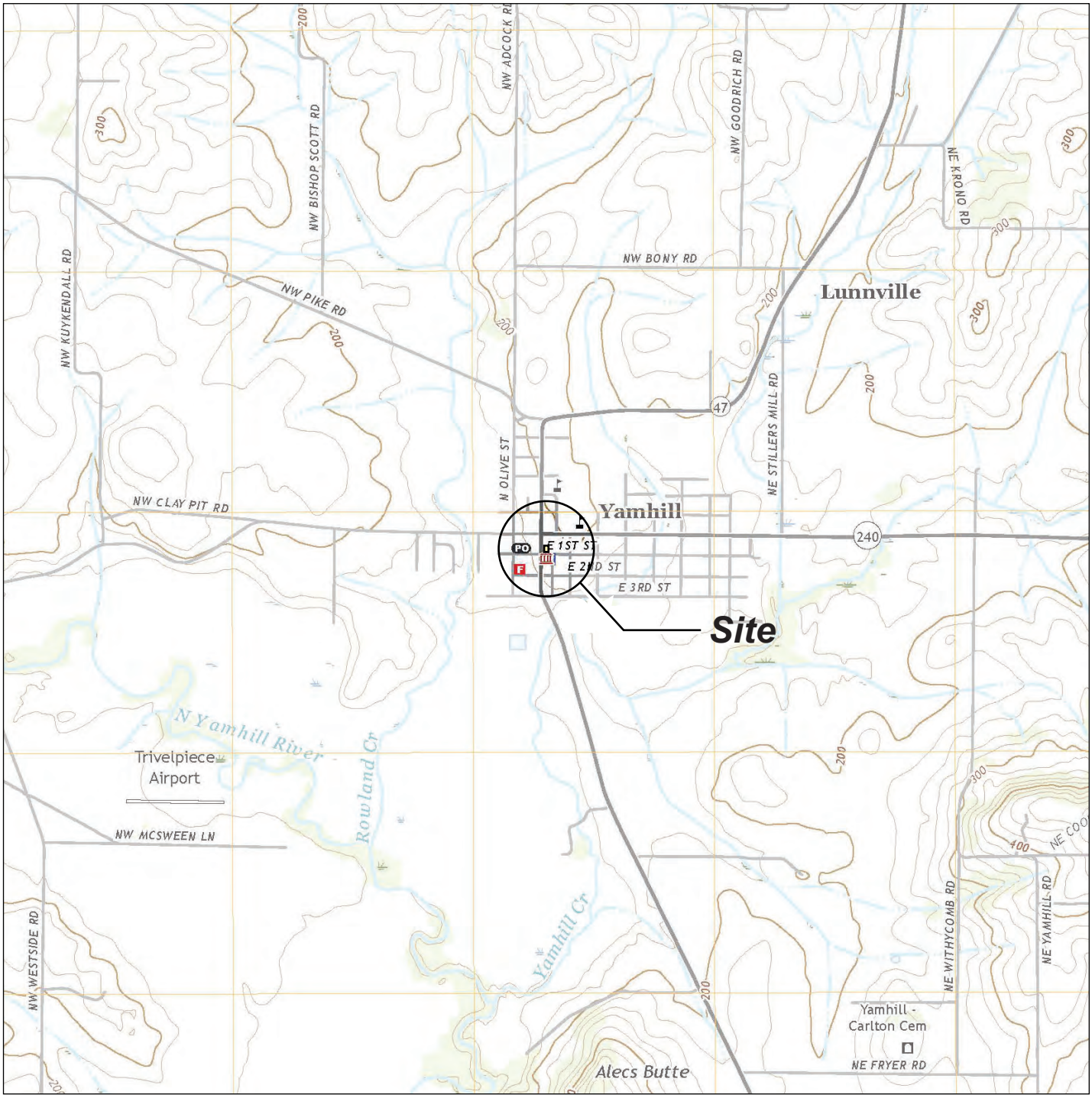


Note: Base map prepared from USGS 7.5-minute quadrangle of Carlton, OR, dated 2020 as provided by USGS.gov.

0 2,000 4,000

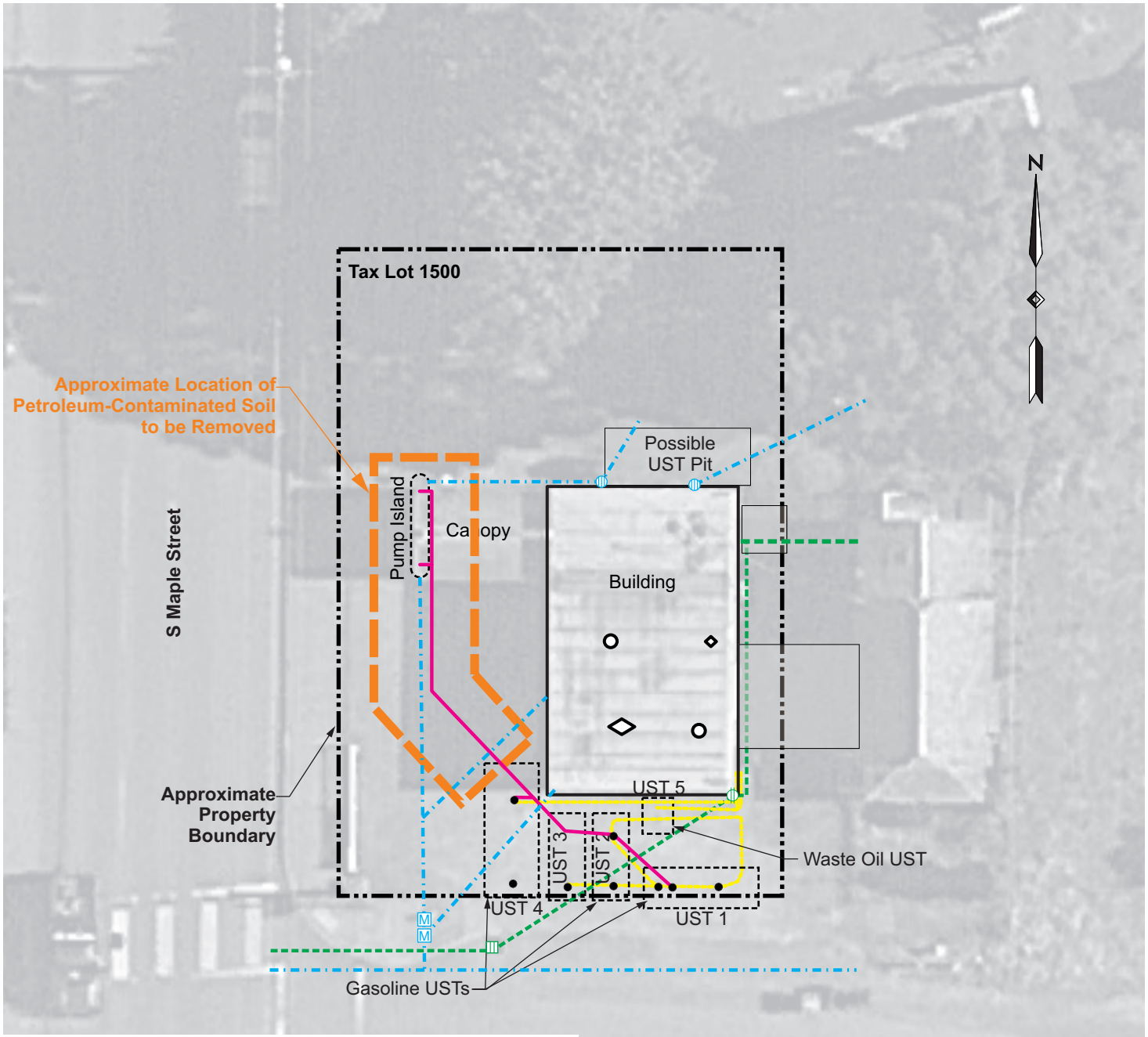
Approximate Scale in Feet

Site Location Map

Site Cleanup Work Plan
185 S. Maple Street
Yamhill, Oregon

Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 320002659-00	Drawn: JP	Approved: CO	Figure 1
	March 2023			

I:\Client\DEQ\Oregon\320002659-00 Carole Glover BP\2023 Site Cleanup WP\320002659-00 01 (Site Location).des



Legend:

- UST 1 — Underground Storage Tank Location
- Product Line
- Vent Lines
- Fill Port
- Auto Hoist
- Buried Vertical Pipe
- Water Line and Meter
- Stormwater Line Catch Basin
- Sewer Line Cleanout
- Sewer Line Catch Basin
- Backfilled Excavations

NOTE: Base map prepared from a Yamhill County assessment map (3404ac.pdf), a Figure 1 by Jim Glass (2002), an Interpretation Map by GeoPotential, and Google Earth Pro Imagery. Aerial dated June 22, 2017. All site features, locations, and dimensions are approximate.

0 20 40

Approximate Scale in Feet

Site Plan

Site Cleanup Work Plan
185 S. Maple Street
Yamhill, Oregon

Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 320002659-00	Drawn: JP	Approved: CO	Figure 2
	March 2023			

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Appendix A

Health and Safety Plan

1.0 Introduction

This health and safety plan (HASP) includes both site-specific information (including site-specific activities, health hazards, route to hospital, and toxicity information) and the General Apex Companies, LLC (Apex) Health and Safety Plan (General HASP).

1.1 Emergency Contact Summary

SITE LOCATION	185 S Maple Street in Yamhill, Oregon
NEAREST HOSPITAL	Willamette Valley Medical Center Emergency Department 2700 SE Stratus Avenue McMinnville, OR 97128 (503) 472-6131
EMERGENCY RESPONDERS	Police Department ..... 9-1-1 Fire Department ..... 9-1-1 Ambulance 9-1-1
EMERGENCY CONTACTS	Apex Companies, LLC ..... (503) 924-4704 National Response Center ..... (800) 424-8802 Oregon Accident Response System ..... (800) 452-0311 Environmental Response Team ..... (503) 283-1150 Poison Control Center ..... (800) 222-1222 Chemtrec ..... (800) 424-9300

In the event of an emergency, call for help as soon as possible. Give the following information:

- WHERE the emergency is (use cross-streets or landmarks)
- PHONE NUMBER you are calling from
- WHAT HAPPENED (type of injury)
- HOW MANY persons need help
- WHAT is being done for the victim(s)
- YOU HANG UP LAST (let the person you called hang up first)

2.0 Corporate Health and Safety Plan

The Apex General HASP, together with the included site-specific information, covers each of the 11 required plan elements as specified in Occupational Safety and Health Administration (OSHA) 1910.120, and meets all applicable regulatory requirements. The reader is advised to thoroughly review the entire plan.

3.0 Site-Specific Health and Safety Plan

3.1 Site Location and Description

LOCATION: 185 S Maple Street in Yamhill, Oregon

LAND USE OF AREA SURROUNDING FACILITY: Commercial and Residential

3.2 Site Activity Summary

SITE ACTIVITIES: Building demolition, underground storage (UST) tank removal, soil excavation, soil sampling.

PROPOSED DATE OF ACTIVITY: March 2023

POTENTIAL SITE CONTAMINANTS: Petroleum hydrocarbons (gasoline-, diesel- range) and related constituents (e.g., benzene, toluene, ethylbenzene, and total xylenes).

POTENTIAL ROUTES OF ENTRY: Skin contact with soil and groundwater, incidental ingestion of soil, and groundwater, and inhalation of gas and volatiles.

PROTECTIVE MEASURES: Engineering controls, safety glasses, safety boots, hard hat (as needed), gloves, protective clothing, and respirators (as necessary).

MONITORING EQUIPMENT: Photoionization detector (PID) with 10.2 eV lamp, olfactory indications.

3.3 Chain of Command

The chain of command for health and safety in this project involves the following individuals:

CORPORATE HEALTH AND SAFETY MANAGER ..... Jay Strauss

REGIONAL HEALTH AND SAFETY MANAGER ..... Josh House

TASK ORDER MANAGER ..... Carmen Owens, P.E.

OFFICE HEALTH AND SAFETY OFFICER ..... Lauren Bellinger

FIELD HEALTH AND SAFETY MANAGER..... Senior Onsite Apex Personnel

3.4 Hazard Analysis and Applicable Safety Procedures

The following work tasks will be accomplished:

- Building demolition;
- UST removal;

- Soil excavation;
- Soil sampling.

The associated hazards for the above activities that may be anticipated during this project are discussed in detail below.

3.4.1 Subsurface Explorations

Building demolition will be conducted with appropriate protection as discussed under Protective Measures requirements (Section 3.2). Employees are cautioned to stand clear of all equipment. Noise protection must also be available and used whenever demolition activities are in progress. In addition, exclusion zones will be established for worker protection.

Underground Utilities. Any underground activity that disturbs soil has the potential for disrupting underground utilities. Immediately stop work and evacuate the area pending further evaluation if:

- Gas or vapor venting occurs during the activity;
- The odor of natural gas is detected; or
- It is suspected a pipeline or utility service has been hit.

In addition, contact the proper authorities, as necessary, and report the incident to the Project Manager in the office.

If gas or vapor venting occurs from a soil boring, well installation, excavation, or other source, immediately position upwind from the source. If necessary, use respiratory protection. If the odor of natural gas is detected or if it suspected that a pipeline has been hit, immediately stop work, evacuate the area, and contact the proper authorities.

Never continue to work in an area, even if PID readings, LEL, and/or hydrogen sulfide tests are acceptable, if you begin to notice strange odors or symptoms of overexposure (such as dizziness, nausea, tearing of the eyes, etc.). Do not resume work until testing shows the hazard has been removed.

3.4.2 Soil Sampling

Any soil sampling will occur under the assumption that the media is contaminated, and appropriate personnel protection will be required.

3.4.3 Air Monitoring and Action Levels

Air monitoring will be conducted to determine possible hazardous conditions and to confirm the adequacy of PPE. The results of the air monitoring will be used as the basis for specifying PPE and determining the need to upgrade protective measures.

Air monitoring equipment will be calibrated prior to use (where applicable) as specified by the instrument manuals, and results will be documented in the instrument log. All equipment will be maintained as specified by the manufacturer or more frequently as required by use conditions, and repair records will be maintained with the instrument log.

PID Monitoring. Air monitoring will be conducted with a PID with 10.2 eV lamp, or equivalent, to measure organic vapor concentration during site work activities (the 10.2 eV lamp is specified to allow detection of halogenated compounds). Background PID measurements (at the work area and perimeter of the site) will be taken prior to the start of work to quantify levels associated with the ambient air space in the vicinity of the site. At least hourly, a separate PID measurement will be collected to quantify the potential for volatile organic compounds (VOCs) to be released into the breathing space. If PID measurements are elevated relative to the previously measured background levels, then detector tube readings will be collected from the breathing space. If the detector tube readings exceed the National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) concentrations, then ventilation or another engineering control will be used to attempt to bring the breathing zone back to background levels. If engineering controls are unsuccessful, then site workers will use air purifying respirators as appropriate. If detector tubes readings are below the REL concentrations, then a PID measurement will be collected from the breathing space. If PID measurements are elevated in the breathing zone above background concentrations, then site workers exposed to these levels will use air-purifying respirators as appropriate. If measured concentrations exceed Immediately Dangerous to Life or Health (IDLH) concentrations, site work will cease pending re-evaluation of the situation by the Health and Safety Manager.

Olfactory. If olfactory senses detect any unfamiliar odor or if unanticipated petroleum impacts are encountered during system installation/excavation work, work will stop until an assessment can be made to determine whether the need exists to upgrade protective measures.

3.5 Chemicals of Concern

Based on site information gathered to date, the following chemicals may be present at the site:

- Total petroleum hydrocarbons (TPH; Gasoline-Range and Diesel-Range); and
- Volatile organic compounds (VOCs).

3.5.1 Toxicity Information

Pertinent toxicological properties of these chemicals are discussed below. This information generally covers potential toxic effects which may occur from relatively significant acute and/or chronic exposures, and is not meant to indicate that such effects will occur from the planned site activities. In general, the chemicals which may be encountered at the site are not expected to be present at concentrations that could produce significant exposures. The types of planned work activities should also limit potential exposures at the site. Furthermore, appropriate protective and monitoring equipment will be used, as discussed below, to further minimize any exposures that might occur.

Standards for occupational exposures to these chemicals are included where available. Site exposures are generally expected to be of short duration and well below the level of any of these exposure limits. These standards are presented below.

PEL **P**ermissible **E**xposure **L**imit (OSHA)

REL **R**ecommended **E**xposure **L**imit (NIOSH)

IDLH **I**mmediately **D**angerous to **L**ife and **H**ealth (NIOSH)

TWA **T**ime-**W**eighted **A**verage exposure limit for any eight-hour work shift of a 40-hour work week

STEL **S**hort-**T**erm **E**xposure **L**imit expressed as a 15-minute, time-weighted average, not to be exceeded at any time during a work day

C **C**eiling exposure limit not to be exceeded at any time during a work day

The following table lists the exposure limits recommended by OSHA and NIOSH for each of the listed compounds. Respiratory protection will be required if measured concentrations in air exceed the minimum of these exposure limits.

Recommended Exposure Limits

Compound	OSHA PEL [ppm]	NIOSH REL [ppm]	IDLH [ppm]
Petroleum hydrocarbons (as petroleum distillates)	500	350	1,100
Benzene	1 (average) 5 (short-term)	0.1 (average) 1 (short-term)	500
Toluene	200 (average) 300 (short-term)	100 (average) 150 (short-term)	500
Ethylbenzene	100 (average)	100 (average) 125 (short-term)	800
Xylenes	100 (average)	100 (average) 150 (short-term)	900

Note: ppm = Parts per million.

Total Petroleum Hydrocarbons. Total Petroleum Hydrocarbons (TPH) is a term used to describe a broad family of several hundred chemical compounds that originally come from crude oil. In this sense, TPH is really a mixture of chemicals. They are called hydrocarbons because almost all of them are made entirely from hydrogen and carbon. Crude oils can vary in how much of each chemical they contain, and so can the petroleum products that are made from crude oils. Most products that contain TPH will burn. Some are clear or light-colored liquids that evaporate easily, and others are thick, dark liquids or semi-solids that do not evaporate. Many of these products have characteristic gasoline, kerosene, or oily odors. Because modern society uses so many petroleum-based products (e.g., gasoline, kerosene, fuel oil, mineral oil, and asphalt), contamination of the environment by them is potentially widespread. Contamination caused by petroleum products will contain a variety of these hydrocarbons. Because there are so many, it is not usually practical to measure each one individually. However, it is useful to measure the total amount of all hydrocarbons found together in a particular sample of soil, water, or air.

TPH can enter and leave your body when you breathe it in air; swallow it in water, food, or soil; or touch it. Most components of TPH will enter your bloodstream rapidly when you breathe them as a vapor or mist or when you swallow them. Some TPH compounds are widely distributed by the blood throughout your body and quickly break down into less harmful chemicals. Others may break down into more harmful chemicals. Other TPH compounds are slowly distributed by the blood to other parts of the body and do not readily break down. When you touch TPH compounds, they are absorbed more slowly and to a lesser extent than when you breathe or swallow them. Most TPH compounds leave your body through urine or when you exhale air containing the compounds.

The compounds in different TPH fractions affect the body in different ways. Some of the TPH compounds, particularly the smaller compounds such as benzene, toluene, and xylene (which are present in gasoline), can affect the human central nervous system. If exposures are high enough, death can occur. Breathing toluene at concentrations greater than 100 parts per million (100 ppm) for more than several hours can cause fatigue, headache, nausea, and drowsiness. When exposure is stopped, the symptoms will go away. However, if someone is exposed for a long time, permanent damage to the central nervous system can occur. One TPH compound (n-hexane) can affect the central nervous system in a different way, causing a nerve disorder called "peripheral neuropathy" characterized by numbness in the feet and legs and, in severe cases, paralysis. This has occurred in workers exposed to 500 to 2,500 ppm of n-hexane in the air. Swallowing some petroleum products, such as gasoline or kerosene, causes irritation of the throat and stomach, central nervous system depression, difficulty breathing, and pneumonia from breathing liquid into the lungs. The compounds in some TPH fractions can also affect the blood, immune system, liver, spleen, kidneys, developing fetus, and lungs. Certain TPH compounds can be irritating to the skin and eyes. Other TPH compounds, such as some mineral oils, are not very toxic and are used in foods. One TPH compound (benzene) has been shown to cause cancer (leukemia) in people. The International Agency for Research on Cancer (IARC) has determined that benzene is carcinogenic to humans (Group 1 classification). Some other TPH compounds or petroleum products, such as benzo(a)pyrene and gasoline, are considered to be

probably and possibly carcinogenic to humans (IARC Groups 2A and 2B, respectively) based on cancer studies in people and animals. Most of the other TPH compounds and products are considered not classifiable (Group 3) by IARC.

Although there are no federal regulations or guidelines for TPH in general, the government has developed regulations and guidelines for some of the TPH fractions and compounds. These are designed to protect the public from the possible harmful health effects of these chemicals. To protect workers, OSHA has set a legal limit of 500 parts of petroleum distillates per million parts of air (500 ppm) in the workplace.

The U.S. Environmental Protection Agency (EPA) regulates certain TPH fractions, products, or wastes containing TPH, as well as some individual TPH compounds. For example, there are regulations for TPH as oil; these regulations address oil pollution prevention and spill response, stormwater discharge, and underground injection control. EPA lists certain wastes containing TPH as hazardous. EPA also requires that the National Response Center be notified following a discharge or spill into the environment of 10 pounds or more of hazardous wastes containing benzene, a component in some TPH mixtures.

Nearly all states have cleanup standards for TPH or components of TPH (common cleanup standards are for gasoline, diesel fuel, and waste oil). Analytical methods are specified, many of which are considered to be TPH methods.

Benzene. Benzene, also known as benzol, is a colorless liquid with a sweet odor. Benzene evaporates into air very quickly and dissolves slightly in water. Benzene is highly flammable. Most people can begin to smell benzene in air at 1.5–4.7 parts of benzene per million parts of air (ppm) and smell benzene in water at 2 ppm. Most people can begin to taste benzene in water at 0.5 to 4.5 ppm. Benzene is found in air, water, and soil.

Benzene found in the environment is from both human activities and natural processes. Benzene was first discovered and isolated from coal tar in the 1800s. Today, benzene is made mostly from petroleum sources. Because of its wide use, benzene ranks in the top 20 in production volume for chemicals produced in the United States. Various industries use benzene to make other chemicals, such as styrene (for Styrofoam® and other plastics), cumene (for various resins), and cyclohexane (for nylon and synthetic fibers). Benzene is also used for the manufacturing of some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene, which include volcanoes and forest fires, also contribute to the presence of benzene in the environment. Benzene is also a natural part of crude oil and gasoline and cigarette smoke.

Most people are exposed to a small amount of benzene on a daily basis. You can be exposed to benzene in the outdoor environment, in the workplace, and in the home. Exposure of the general population to benzene is mainly through breathing air that contains benzene. The major sources of benzene exposure

are tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions. Vapors (or gases) from products that contain benzene, such as glues, paints, furniture wax, and detergents, can also be a source of exposure. Auto exhaust and industrial emissions account for about 20 percent of the total nationwide exposure to benzene. About 50 percent of the entire nationwide exposure to benzene results from smoking tobacco or from exposure to tobacco smoke. The average smoker (32 cigarettes per day) takes in about 1.8 milligrams (mg) of benzene per day. This is about 10 times the average daily intake of nonsmokers.

Measured levels of benzene in outdoor air have ranged from 0.02 to 34 parts of benzene per billion parts of air (ppb; 1 ppb is 1,000 times less than 1 ppm). People living in cities or industrial areas are generally exposed to higher levels of benzene in air than those living in rural areas. Benzene levels in the home are usually higher than outdoor levels. People living around hazardous waste sites, petroleum refining operations, petrochemical manufacturing sites, or gas stations may be exposed to higher levels of benzene in air.

Benzene can enter your body through your lungs when you breathe contaminated air. It can also enter through your stomach and intestines when you eat food or drink water that contains benzene. Benzene can enter your body through skin contact with benzene-containing products such as gasoline.

When you are exposed to high levels of benzene in air, about half of the benzene you breathe in leaves your body when you breathe out. The other half passes through the lining of your lungs and enters your bloodstream. Animal studies show that benzene taken in by eating or drinking contaminated foods behaves similarly in the body to benzene that enters through the lungs. A small amount will enter your body by passing through your skin and into your bloodstream during skin contact with benzene or benzene-containing products. Once in the bloodstream, benzene travels throughout your body and can be temporarily stored in the bone marrow and fat. Benzene is converted to products, called metabolites, in the liver and bone marrow. Some of the harmful effects of benzene exposure are believed to be caused by these metabolites. Most of the metabolites of benzene leave the body in the urine within 48 hours after exposure.

After exposure to benzene, several factors determine whether harmful health effects will occur, and if they do, what the type and severity of these health effects might be. These factors include the amount of benzene to which you are exposed and the length of time of the exposure. Most data involving effects of long-term exposure to benzene are from studies of workers employed in industries that make or use benzene. These workers were exposed to levels of benzene in air far greater than the levels normally encountered by the general population. Current levels of benzene in workplace air are much lower than in the past. Because of this reduction, and the availability of protective equipment such as respirators, fewer workers have symptoms of benzene poisoning.

Brief exposure (5 to 10 minutes) to very high levels of benzene in air (10,000 to 20,000 ppm) can result in death. Lower levels (700 to 3,000 ppm) can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. In most cases, people will stop feeling these effects when they stop being exposed and begin to breathe fresh air.

Eating foods or drinking liquids containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, coma, and death. The health effects that may result from eating foods or drinking liquids containing lower levels of benzene are not known. If you spill benzene on your skin, it may cause redness and sores. Benzene in your eyes may cause general irritation and damage to your cornea.

Benzene causes problems in the blood. People who breathe benzene for long periods may experience harmful effects in the tissues that form blood cells, especially the bone marrow. These effects can disrupt normal blood production and cause a decrease in important blood components. A decrease in red blood cells can lead to anemia. Reduction in other components in the blood can cause excessive bleeding. Blood production may return to normal after exposure to benzene stops. Excessive exposure to benzene can be harmful to the immune system, increasing the chance for infection and perhaps lowering the body's defense against cancer.

Benzene can cause cancer of the blood-forming organs. The Department of Health and Human Services (DHHS) has determined that benzene is a known carcinogen. The International Agency for Cancer Research (IARC) has determined that benzene is carcinogenic to humans, and the U.S. Environmental Protection Agency (EPA) has determined that benzene is a human carcinogen. Long-term exposure to relatively high levels of benzene in the air can cause cancer of the blood-forming organs. This condition is called leukemia. Exposure to benzene has been associated with development of a particular type of leukemia called acute myeloid leukemia (AML).

Exposure to benzene may be harmful to the reproductive organs. Some women workers who breathed high levels of benzene for many months had irregular menstrual periods. When examined, these women showed a decrease in the size of their ovaries. However, exact exposure levels were unknown, and the studies of these women did not prove that benzene caused these effects. It is not known what effects exposure to benzene might have on the developing fetus in pregnant women or on fertility in men. Studies with pregnant animals show that breathing benzene has harmful effects on the developing fetus. These effects include low birth weight, delayed bone formation, and bone marrow damage.

The health effects that might occur in humans following long-term exposure to food and water contaminated with benzene are not known. In animals, exposure to food or water contaminated with benzene can damage the blood and the immune system and can even cause cancer.

EPA has set the maximum permissible level of benzene in drinking water at 5 parts per billion (ppb). Because benzene can cause leukemia, EPA has set a goal of 0 ppb for benzene in drinking water and in water such as rivers and lakes. EPA estimates that 10 ppb benzene in drinking water that is consumed regularly or exposure to 0.4 ppb benzene in air over a lifetime could cause a risk of one additional cancer case for every 100,000 exposed persons. EPA recommends a maximum permissible level of benzene in water of 200 ppb for short-term exposures (10 days) for children.

EPA requires that the National Response Center be notified following a discharge or spill into the environment of 10 pounds or more of benzene.

OSHA regulates levels of benzene in the workplace. The maximum allowable amount of benzene in workroom air during an eight-hour workday, 40-hour workweek is 1 part per million (ppm). Since benzene can cause cancer, NIOSH recommends that all workers likely to be exposed to benzene wear special breathing equipment.

Toluene. Toluene is a clear, colorless liquid with a distinctive smell. It is added to gasoline along with benzene and tolueneylene. Toluene occurs naturally in crude oil and in the tolu tree. It is produced in the process of making gasoline and other fuels from crude oil, in making coke from coal, and as a by-product in the manufacture of styrene. Toluene is used in making paints, paint thinners, fingernail polish, lacquers, adhesives, and rubber, and in some printing and leather tanning processes. It is disposed of at hazardous waste sites as used solvent (a substance that can dissolve other substances) or at landfills where it is present in discarded paints, paint thinners, and fingernail polish. You can begin to smell toluene in the air at a concentration of 8 parts of toluene per million parts of air (ppm), and taste it in your water at a concentration of 0.04 to 1 ppm. (One part per million is equivalent to 1 minute in 2 years.)

Toluene can enter your body when you breathe its vapors or eat or drink contaminated food or water. When you work with toluene-containing paints or paint thinners, the toluene can also pass through your skin into your bloodstream. You are exposed to toluene when you breathe air containing toluene. When this occurs, the toluene is taken directly into your blood from your lungs. Where you live, work, and travel, and what you eat, affects your daily exposure to toluene. Factors such as your age, sex, body composition, and health status affect what happens to toluene once it is in your body. After being taken into your body, more than 75 percent of the toluene is removed within 12 hours. It may leave your body unchanged in the air you breathe out or in your urine after some of it has been chemically changed to make it more water soluble. Generally, your body turns toluene into less harmful chemicals such as hippuric acid.

A serious health concern is that toluene may have an effect on your brain. Toluene can cause headaches, confusion, and memory loss. Whether or not toluene does this to you depends on the amount you take in and how long you are exposed. Low to moderate, day-after-day exposure in your workplace can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, and loss of appetite. These

symptoms usually disappear when exposure is stopped. Researchers do not know if the low levels of toluene you breathe at work will cause any permanent effects on your brain or body after many years. You may experience some hearing loss after long-term daily exposure to toluene in the workplace.

If you are exposed to a large amount of toluene in a short time because you deliberately sniff paint or glue, you will first feel light-headed. If exposure continues, you can become dizzy, sleepy, or unconscious. You might even die. Toluene causes death by interfering with the way you breathe and the way your heart beats. When exposure is stopped, the sleepiness and dizziness will go away and you will feel normal again.

If you choose to repeatedly breathe in toluene from glue or paint thinners, you may permanently damage your brain. You may also experience problems with your speech, vision, or hearing; have loss of muscle control, loss of memory, poor balance, and decreased mental ability. Some of these changes may be permanent.

Toluene may change the way your kidneys work, but in most cases, the kidneys will return to normal after exposure stops. If you drink alcohol and are exposed to toluene, the combination can affect your liver more than either compound alone. This phenomenon is called synergism. Combinations of toluene and some common medicines like aspirin and acetaminophen may increase the effects of toluene on your hearing.

In animals, the main effect of toluene is on the nervous system. Animals exposed to moderate or high levels of toluene may also show slightly adverse effects in their liver, kidneys, and lungs.

Several studies have shown that unborn animals were harmed when high levels of toluene were breathed in by their mothers. When the mothers were fed high levels of toluene, the unborn animals did not show any structural birth defects, although some effects on behavior were noted. We do not know if toluene would harm your unborn child if you drink water or breathe air containing low levels of toluene, because studies in people are not comprehensive enough to measure this effect. However, if you deliberately breathe in large amounts of toluene during your pregnancy, your baby can have neurological problems and retarded growth and development.

Studies in workers and in animals exposed to toluene indicate that toluene does not cause cancer. The International Agency for Research on Cancer (IARC) and the Department of Health and Human Services (DHHS) have not classified toluene for carcinogenic effects. The U.S. Environmental Protection Agency (EPA) has determined that toluene is not classifiable as to its human carcinogenicity.

The federal government has developed regulatory standards and guidelines to protect you from the possible health effects of toluene in the environment. The OSHA has set a limit of 100 ppm of toluene for air in the workplace, averaged for an eight-hour exposure per day over a 40-hour work week. The American

Conference of Governmental Industrial Hygienists (ACGIH) and NIOSH have recommended that toluene in workplace air not exceed 100 ppm (as an average level over eight hours).

EPA recommends that drinking water should not contain more than 20 ppm for one day, 3 ppm for 10 days, or 1 ppm for lifetime consumption. Any release of more than 1,000 pounds of this chemical to the environment must be reported to the National Response Center.

Ethylbenzene. Ethylbenzene is a colorless liquid that smells like gasoline. You can smell ethylbenzene in the air at concentrations as low as 2 parts of ethylbenzene per million parts of air by volume (ppm). It evaporates at room temperature and burns easily. Ethylbenzene occurs naturally in coal tar and petroleum. It is also found in many products, including paints, inks, and insecticides. Gasoline contains about 2 percent (by weight) ethylbenzene. Ethylbenzene is used primarily in the production of styrene. It is also used as a solvent, a component of asphalt and naphtha, and in fuels. In the chemical industry, it is used in the manufacture of acetophenone, cellulose acetate, diethylbenzene, ethyl anthraquinone, ethylbenzene sulfonic acids, propylene oxide, and methylbenzyl alcohol. Consumer products containing ethylbenzene include pesticides, carpet glues, varnishes and paints, and tobacco products. In 1994, approximately 12 billion pounds of ethylbenzene were produced in the United States.

At certain levels, exposure to ethylbenzene can harm your health. People exposed to high levels of ethylbenzene in the air for short periods have complained of eye and throat irritation. Persons exposed to higher levels have shown signs of more severe effects such as decreased movement and dizziness. No studies have reported death in humans following exposure to ethylbenzene alone. However, evidence from animal studies suggests that it can cause death at very high concentrations in the air (about 2 million times the usual level in urban air). Whether or not long-term exposure to ethylbenzene affects human health is not known, because little information is available. Short-term exposure of laboratory animals to high concentrations of ethylbenzene in air may cause liver and kidney damage, nervous system changes, and blood changes. The link between these health effects and exposure to ethylbenzene is not clear because of conflicting results and weaknesses in many of the studies. Also, there is no clear evidence that the ability to get pregnant is affected by breathing air or drinking water containing ethylbenzene, or coming into direct contact with ethylbenzene through the skin. Two long-term studies in animals suggest that ethylbenzene may cause tumors. One study had many weaknesses, and no conclusions could be drawn about possible cancer effects in humans. The other, a recently completed study, was more convincing, and provided clear evidence that ethylbenzene causes cancer in one species after exposure in the air to concentrations greater than 740 ppm that were approximately 1 million times the levels found in urban air. At present, the federal government has not identified ethylbenzene as a chemical that may cause cancer in humans. However, this may change after consideration of the new data.

There are no reliable data on the effects in humans after eating or drinking ethylbenzene or following direct exposure to the skin. For this reason, levels of exposure that may affect your health after eating, drinking,

or getting ethylbenzene on your skin are estimated from animal studies. There are only two reports of eye or skin exposure to ethylbenzene. In these studies, liquid ethylbenzene caused eye damage and skin irritation in rabbits. More animal studies are available that describe the effects of breathing air or drinking water containing ethylbenzene.

The federal government has developed regulatory standards and guidelines to protect you from possible health effects of ethylbenzene in the environment. The U.S. Environmental Protection Agency's (EPA's) Office of Drinking Water (ODW) set 700 ppb (this equals 0.7 milligram ethylbenzene per liter of water or mg/L) as the acceptable exposure concentration of ethylbenzene in drinking water for an average-weight adult. This value is for lifetime exposure and is set at a level that is expected not to increase the chance of having (non-cancer) adverse health effects. The same EPA office (ODW) set higher acceptable levels of ethylbenzene in water for shorter periods (20 ppm or 20 mg/L for one day, 3 ppm or 3 mg/L for 10 days). EPA has determined that exposures at or below these levels are acceptable for small children. If you eat fish and drink water from a body of water, the water should contain no more than 1.4 mg/L ethylbenzene.

EPA requires that a release of 1,000 pounds or more of ethylbenzene be reported to the federal government's National Response Center in Washington, D.C.

OSHA set a legal limit of 100 ppm ethylbenzene in air. This is for exposure at work for eight hours per day.

NIOSH also recommends an exposure limit for ethylbenzene of 100 ppm. This is for exposure to ethylbenzene in air at work for up to 10 hours per day in a 40-hour work week. NIOSH also set a limit of 125 ppm for a 15-minute period.

Xylenes. There are three forms of xylene in which the methyl groups vary on the benzene ring: meta-xylene, ortho-xylene, and para-xylene (m-, o-, and p-xylene). These different forms are referred to as isomers. The term "total xylenes" refers to all three isomers of xylene (m-, o-, and p-xylene). Mixed xylene is a mixture of the three isomers and usually also contains 6 to 15 percent ethylbenzene. Xylene is also known as xylol or dimethylbenzene. Xylene is primarily a synthetic chemical. Chemical industries produce xylene from petroleum. Xylene also occurs naturally in petroleum and coal tar and is formed during forest fires. It is a colorless, flammable liquid with a sweet odor.

Xylene is one of the top 30 chemicals produced in the United States in terms of volume. It is used as a solvent (a liquid that can dissolve other substances) in the printing, rubber, and leather industries. Along with other solvents, xylene is also used as a cleaning agent, a thinner for paint, and in varnishes. It is found in small amounts in airplane fuel and gasoline. Xylene is used as a material in the chemical, plastics, and synthetic fiber industries and as an ingredient in the coating of fabrics and papers. Isomers of xylene are used in the manufacture of certain polymers (chemical compounds), such as plastics.

Xylene evaporates and burns easily. Xylene does not mix well with water; however, it does mix with alcohol and many other chemicals. Most people begin to smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53 to 1.8 ppm.

Xylene is most likely to enter your body when you breathe xylene vapors. Less often, xylene enters the body through the skin following direct contact. It is rapidly absorbed by your lungs after you breathe air containing it. Exposure to xylene may also take place if you eat or drink xylene-contaminated food or water. The amount of xylene retained ranges from 50 to 75 percent of the amount of xylene that you inhale. Physical exercise increases the amount of xylene absorbed by the lungs. Absorption of xylene after eating food or drinking water containing it is both rapid and complete. Absorption of xylene through the skin also occurs rapidly following direct contact with xylene. Absorption of xylene vapor through the skin is lower than absorption of xylene vapor by the lungs. However, it is not known how much of the xylene is absorbed through the skin. At hazardous waste sites, breathing xylene vapors, drinking well water contaminated with xylene, and direct contact of the skin with xylene are the most likely ways you can be exposed. Xylene passes into the blood soon after entering the body.

In people and laboratory animals, xylene is broken down into other chemicals, especially in the liver. This process changes most of the xylene that is breathed in or swallowed into a different form. Once xylene breaks down, the breakdown products rapidly leave the body, mainly in urine, but some unchanged xylene also leaves in the breath from the lungs. One of the breakdown products of xylene, methylbenzaldehyde, is harmful to the lungs of some animals. This chemical has not been found in people exposed to xylene. Small amounts of breakdown products of xylene have appeared in the urine of people as soon as two hours after breathing air containing xylene. Usually, most of the xylene that is taken in leaves the body within 18 hours after exposure ends. Storage of xylene in fat or muscle may prolong the time needed for xylene to leave the body.

Short-term exposure of people to high levels of xylene can cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; impaired function of the lungs; delayed response to a visual stimulus; impaired memory; stomach discomfort; and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations of xylene can also cause a number of effects on the nervous system, such as headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. People exposed to very high levels of xylene for a short period of time have died. Most of the information on long-term exposure to xylene is from studies of workers employed in industries that make or use xylene. Those workers were exposed to levels of xylene in air far greater than the levels normally encountered by the general population. Many of the effects seen after their exposure to xylene could have been caused by exposure to other chemicals that were in the air with xylene.

Results of studies of animals indicate that large amounts of xylene can cause changes in the liver and harmful effects on the kidneys, lungs, heart, and nervous system. Short-term exposure to very high

concentrations of xylene causes death in animals, as well as muscular spasms, incoordination, hearing loss, changes in behavior, changes in organ weights, and changes in enzyme activity. Long-term exposure of animals to low concentrations of xylene has not been well studied.

Information from animal studies is not adequate to determine whether or not xylene causes cancer in humans. Both the International Agency for Research on Cancer (IARC) and the U.S. Environmental Protection Agency (EPA) have found that there is insufficient information to determine whether or not xylene is carcinogenic and consider xylene not classifiable as to its human carcinogenicity.

Exposure of pregnant women to high levels of xylene may cause harmful effects to the fetus. Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, decreased weight, skeletal changes, and delayed skeletal development. In many instances, these same concentrations also cause damage to the mothers. The higher and longer the exposure to xylenes, the greater the chance of harmful health effects. Lower concentrations of xylene are not so harmful.

EPA estimates that, for an adult of average weight, exposure to 10 milligrams of xylene per liter (mg/L or ppm) of water each day for a lifetime (70 years) is unlikely to result in harmful non-cancerous health effects. For a long-term but less-than-lifetime exposure (about 7 years), 27.3 ppm is estimated to be a level unlikely to result in harmful health effects in an adult.

Exposure to 12 ppm xylene in water for one day or to 7.8 ppm of xylene in water for 10 days or longer is unlikely to present a health risk to a small child. EPA has proposed a recommended maximum level of 10 ppm xylene in drinking water.

To protect people from the potential harmful health effects of xylene, EPA regulates xylene in the environment. EPA has set a legally enforceable maximum level of 10 mg/L (equal to 10 ppm) of xylene in water that is delivered to any user of a public water system. OSHA has set an occupational exposure limit of 100 ppm of xylene in air averaged over an eight-hour workday and a 15-minute exposure limit of 150 ppm. These regulations also match recommendations (not legally enforceable) of the American Conference of Governmental Industrial Hygienists. NIOSH has recommended an exposure limit (not legally enforceable) of 100 ppm of xylene averaged over a workday up to 10 hours long in a 40-hour workweek. NIOSH has also recommended that exposure to xylene not exceed 150 ppm for longer than 15 minutes. NIOSH has classified xylene exposures of 10,000 ppm as immediately dangerous to life or health (IDLH).

EPA and the Food and Drug Administration (FDA) specify conditions under which xylene may be used as a part of herbicides, pesticides, or articles used in contact with food. The EPA has a chronic drinking water health advisory of 27.3 ppm for an adult and 7.8 ppm for a 10-kilogram child.

EPA regulations require that a spill of 1,000 pounds or more of xylene or used xylene solvents be reported to the Federal Government National Response Center.

DAILY TAILGATE MEETING FORM

Instructions: *Field completion of a tailgate meeting form is required daily prior to starting ANY field activities. All field personnel, including work-directed subs and subcontractors, involved in the day's activities must be present for the meeting or presented with the information discussed in the meeting. Keep forms with the project files.*

DATE:	**TIME:**	**PROJECT NO:**	**CLIENT:**
PROJECT SITE:		**MEETING CONDUCTED BY:**	**SIGNATURE:**

LIST ALL PROJECT TASKS IN BOXES BELOW:

1.	3.	5.
2.	4.	6.

SUPPLIES AND MATERIALS NEEDED FOR PROJECT – ADD SPECIFICS		**EQUIPMENT NEEDED FOR PROJECT – ADD SPECIFICS**	
☐ Fuel:	☐ Contech Filter:	☐ Chain saw:	☐ String trimmer
☐ Cones:	☐ Catch Basin Box:	☐ Ride-on mower:	☐ Lid/Cover puller:
☐ Barricade:	☐ Other:	☐ Stand-on mower:	☐ Other:
☐ Fall Protection:	☐ Other:	☐ Slope mower:	☒ Other:

Apex Companies COVID-19 AHA Notice

- If you are sick, you must stay home. Avoid close contact with people who are sick. If you were in contact with a confirmed or suspected COVID-19 individual, you must immediately report it to your supervisor.
- If you become ill while on the jobsite, you will immediately contact your supervisor who will then notify the project supervisor. The employee will also immediately provide any potential staff and equipment exposures to his supervisor.
- Frequently wash your hands with soap and water for at least 20 seconds. When soap and running water are unavailable, use an alcohol-based hand rub with at least 60% alcohol. Always wash hands that are visibly soiled.
- Ensure that you have, hand sanitizer, soap/water, wipes, etc, so it will available onsite where the hand washing stations are not present.
- Wear nitrile gloves when operating any equipment and wipe down equipment with sanitizing towels at the beginning and end of every shift. This includes hand tools, power tools, etc. The key is to avoid multiple use of the single hand tool by others when it hasn't been cleaned first.
- Use proper hygiene practices: keep your hands clean, do not touch your face, and if you must use your cell phone, two-way radio or other devices, please sanitize and sterilize them as frequently as possible. Avoid touching your eyes, nose, or mouth with unwashed hands.
- Personnel in job trailers will be restricted.
- JSAs and Stretch and Flex exercises will be conducted outside.
- No handshaking. Please avoid any personal contact and be aware of the 6-foot separation rule.
- Food preparation will require extra cleaning and sanitizing of surfaces and appliances.

If you need anything or have any questions, don't hesitate to reach out to me, John Strecker, at (703)-898-0825.

MANDATORY SAFETY TOPICS – ALL PROJECTS	**SWPs / PERMITS / PLANS REQUIRED**		**DAILY WEATHER CONDITIONS**
☐ Emergency Contacts & Procedures (muster points)	☐ JSA Review		☐ Current temperature: __ °F
☐ GOAL – Get Out And Look	☐ HASP Review		☐ Forecast high temperature:__ °F
☐ Stop Work Authority	☐ Site-specific PPE	☐ NA	☐ Heat Index/Feels like high:__ °F
☐ 4Sigtht 4Safety	☐ Manual lifting plan	☐ NA	☐ Relative humidity:__ %
☐ Incident Intervention Procedures (WorkCare)	☐ Housekeeping	☐ NA	☐ Forecast Precipitation/Storms: _____

☐ First Aid Kit & Eye Wash / Station Location	☐ Noise	☐ NA
☐ Heat/cold stress	☐ Utility Clearance/GDP	☐ NA
☐ Fire Extinguisher Location	☐ Fall protection plan	☐ NA
☐ Safety Data Sheets (SDSs) and chemical hazards	☐ Silica Exposure Control Plan	☐ NA
☐ Minimum PPE (safety boots, safety glasses)	☐ LOTO/machine-specific	☐ NA
☐ Medical & Training Requirements	☐ Hot Work Permit	☐ NA
	☐ Confined space entry permit	☐ NA
	☐ Excavation/trenching plan	☐ NA
	☐ Traffic control plan	☐ NA
	☐ Breathing zone monitoring plan	☐ NA

KEY REMINDERS:

- **WATER**:
  - **1 QT / employee / hr** & **increase by 1 GALLON** at **80°F**
  - Replenish when supply drops to 50%
- **SHADE**: required at **85°F** or hotter
- Review procedures & importance of rest breaks & water
  - Set alarms to take breaks & drink water
  - **NIOSH work**-rest tables
- Monitor employees for alertness, dizziness, nausea, weakness, clumsiness, unsteady walk, muscle cramps, headaches
- Record employees rest periods and water inta

STOP WORK AUTHORITY

I will **STOP** the job any time anyone is concerned or uncertain about safety.
I will **STOP** the project if anyone identifies a hazard or additional mitigation not already presented.
If it is necessary to **STOP WORK**, I will reassess the task, hazards, and mitigations, and amend documentation.

4SIGHT 4SAFETY

1. **What am I about to do?**
2. **What could go wrong?**
3. **What could be done to make it safe?**
4. **What have I done to communicate the hazard?**

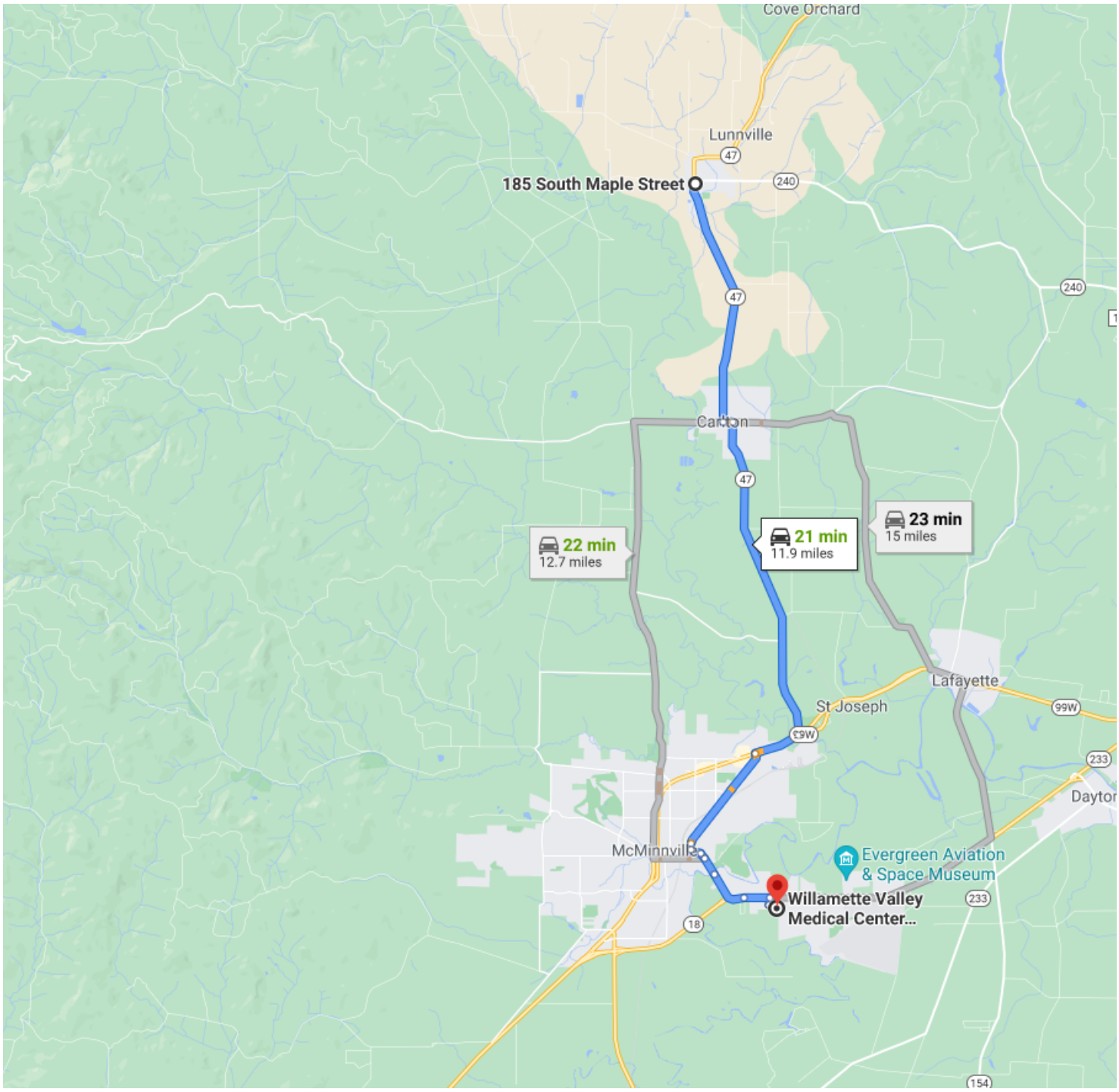
PRINT NAME / COMPANY	SIGNATURE	PRINT NAME / COMPANY	SIGNATURE

RECORD ANY ADDITIONAL NOTES IN THIS SECTION (OR ADDITIONAL PAGES IF NECESSARY)

Google Maps

185 South Maple Street, Yamhill, OR to Willamette Valley Medical Center Emergency Department

Drive 11.9 miles, 21 min



185 S Maple St

Yamhill, OR 97148

Map data ©2021 Google 1 mi

Follow OR-47 S and State Hwy 47 S to NE Lafayette Ave in McMinnville

12 min (8.6 mi)

1. Head south on OR-47 S/S Maple St toward W 1st St

Continue to follow OR-47 S

3.4 mi

2. Turn left onto State Hwy 47 S/Main St (signs for Mc Minnville)

0.1 mi

3. Turn right onto OR-47 S/State Hwy 47 S/S Pine St (signs for Mc Minnville)

Continue to follow OR-47 S/State Hwy 47 S

4.4 mi

4. Slight right onto OR-99W S/Pacific Hwy W

0.6 mi

Continue on NE Lafayette Ave to OR-18 E/NE Three Mile Ln

6 min (2.7 mi)

5. Turn left onto NE Lafayette Ave (signs for Dayton/Salem)

1.5 mi

6. Continue onto NE Johnson St

420 ft

7. Turn left onto NE 3rd St

0.2 mi

8. Continue onto NE Three Mile Ln

0.1 mi

9. Continue onto SE 3 Mile Lane, Southeast Three Mile Ln

0.2 mi

10. Continue onto NE Three Mile Ln

0.6 mi

11. Merge onto OR-18 E/NE Three Mile Ln

36 s (0.4 mi)

Continue on SE Norton Ln to your destination

1 min (0.2 mi)

12. Turn right onto SE Norton Ln

0.1 mi

13. Turn left

361 ft

14. Turn left

174 ft

15. Turn right

Destination will be on the left

115 ft

Willamette Valley Medical Center Emergency Department

2700 SE Stratus Ave, McMinnville, OR 97128

Injury and Illness Decision Tree

Employee experiences injury, illness, pain, or other health-related symptoms

Is the condition a Medical Emergency?

YES

CALL 9-1-1

NO

Employee notifies supervisor to discuss need for medical treatment

Move to next step

Does the condition require medical treatment beyond on-site first aid?

NO

1. Treat using first-aid kit
2. Complete Apex Incident Report within 24 hours of the injury
3. Report via Apex Connect H&S Page Portal
4. Replace materials used from the first-aid kit

YES

Employee, site buddy, or supervisor to immediately contact WorkCare at (888) 449-7787 to discuss medical treatment.

WorkCare will assist the employee in determining necessary treatment for the injury

Follow WorkCare Instructions, which may include self-treatment or treatment at a local occupational health clinic. Follow up with WorkCare as directed and/or needed.

Examples of Medical Emergencies

- Bleeding that cannot be controlled
- Bleeding through bandages/clothes/pressure dressing
- Loss of consciousness
- Compound fracture
- Back/neck injury
- Heat stroke

Post Injury Responsibilities

- Understand and communicate all follow-up requirements with supervisor
- IMMEDIATELY notify supervisor if any work restrictions are recommended by physician
- Work with supervisor to complete Apex Incident Report within 24 hours or sooner and submit via Apex Connect H&S Page Portal https://apexcos.sharepoint.com/sites/HS/SitePages/Home.aspx
- Add new/additional details to a revised incident report as they become available

Lost Work Time and Work Restrictions

- If lost work time and/or restrictions are imposed, supervisor discusses light duty options with employee, HSEQ Team, and Talent Team representative.
- HSEQ Team and Talent Team representatives will be actively involved in injury follow up with the focus on minimizing lost work days and returning to full-duty work.

Contact Information

WorkCare (888) 449-7787

Jay Strauss, Executive Director, Health Safety Environmental & Quality

Email: jay.strauss@apexcos.com Mobile 406-672-9357

Revision Date: Oct 13, 2020

APEX

Borings and Soil Vapor Point Installation
Job Safety Analysis (JSA)

Project Number:	**2659-00**	Project/Client Name:	**DEQ Carol Glover BP**
Project Manager:	**Carmen Owens**	Project Location:	**185 S Maple Street, Yamhill, Oregon**

Specific Task:	**Building Demolition, UST Removal, Soil Excavation**
Minimum Required PPE for Task:	☑ Hard Hat ☑ Hearing Protection ☐ Hi-Vis Shirt ☐ Coverall ☐ Face Shield ☐ Other (specify): ☑ Safety Toed Boots ☐ Long Sleeved Shirt ☑ Hi-Vis Vests Class 2 ☐ Gloves ☑ Safety Glasses ☐ Fire Resistant Clothing ☐ Hi-Vis Vests Class 3 ☑ Respirator (Have Available)

Additional Task-Step Specific PPE: (as indicated below under controls)	**NA**	**Equipment/Tools Required:**	**Demolition Equipment**
Training Required for this Task:	**40 Hr HAZWOPER**	**Permits Required for this Task: (e.g. confined space, LOTO)**	**NA**
Forms Associated with this Task:	**Daily Tailgate Meeting form, sampling sheet**		

JSA Developed/Reviewed By:			**Date and Revision Number:** 2/7/2023
Employee Name/Job Title	Employee Name/Job Title	Employee Name/Job Title	H&S Team Leader to ensure all personnel performing this task have reviewed JSA and agree to follow it. Site specific changes to this JSA have been made as warranted based on this review. H&S Team Leader Signature/Date:
Carmen Owens/Senior Engineer	**Mike Stevens/Principal Engineer**		

Task Steps	Potential Hazards and Consequences	Likelihood	Severity	Risk	Controls to Eliminated/Reduce Risks
1. Pre-Field Safety Meeting				0	All employees will attend a pre-field meeting which will include the pertinent SOPs, client-specific Job Safety Analysis, Permit(s) to Work (if required), Subsurface Investigation Procedures, potential hazards, and actual hazards present and controls for those hazards
2. Site Set up	2a. Underground Utilties	3	2	6	Call the utility notification hotline at least 48 hrs before beginning work. Use a private utility locator to mark all on site utilities.
3. Demolition and Excavation Activities	3a. Noise related injuries.	3	2	6	Wear approved safety ear plugs when working in the vicinity of the drill rig.
	3b. Physical injuries from moving parts of machinery.	3	2	6	Avoid moving parts in the machinery. Keep fingers, hands, and arms away from the rotating drill head near the top or near the bottom. Keep fingers away from pinch points when screwing pipe joints together. Wear leather gloves when handling objects and wear hard hat and steel-toed boots at all times.
	3c. Exposure to hazardous building materials	3	3	9	Maintain a safe distance from the building while demolition is in progress.
	3d. Physical hazards to personnel in the vincinity of machinery.	3	2	6	Personnel should keep away from demolition equipment unless they are required for the task. Equipment operators should beaware of people in area. Do not approach equipment without first establishing eye contact with the operator.
	3e. Physical injury from debris.	3	3	9	Ensure the contractor has established an exclusion zone and stay outside of it. Wear all required PPE.
4. Site Wide Activities	2f. Slips, trips and falls.	3	2	6	All personnel should be constantly watching for trip hazards such as uneven terrain, holes, ditches, stretched wires or ropes, or any other materials or pieces of equipment in their path

			Hazard Severity				
			1	2	3	4	5
			INSIGNIFICANT negligible or no injury could result	**MINOR** minor injury requiring only first aid	**MODERATE** injury resulting in lost time could occure	**HIGH** serious injury or death could occur	**VERY HIGH** multiple deaths could occur
Likelihood	1	VERY UNLIKELY	1	2	3	4	5
	2	UNLIKELY	2	4	6	8	10
	3	POSSIBLE	3	6	9	12	15
	4	LIKELY	4	8	12	16	20
	5	VERY LIKELY	5	10	15	20	25

APEX

Apex - Job Safety Analysis (JSA)

Media Monitoring

Project Number:	**2569-00**	**Project/Client Name:**	**Carol Glover BP / DEQ**	**Date:**	2/7/2023
Project Manager:	**Carmen Owens**	**Project Location:**	**Yamhill, OR**		

Specific Task:	**Collect Soil and Groundwater Samples**
Minimum Required PPE for Task:	High-vis shirt, steel toe boots, safety glasses, nitril gloves.
Additional Task-Step Specific PPE: (as indicated below under controls)	**NA**
Training Required for this Task:	**Hazwoper 40-hour, 8-hour Hazwoper refresher**

Permits Required for this Task: (e.g. confined space, LOTO)	**NA**

JSA Developed By:		**JSA Reviewed By (must have experience w/task):**		**H&S Team Leader to ensure all personnel performing this task have reviewed JSA and agree to follow it. Site specific changes to this JSA have been made as warranted based on this review.**	
Employee Name/Job Title	Employee Name/Job Title	Employee Name/Job Title	Employee Name/Job Title		
Carmen Owens / Senior Engineer		Mike Stevens / Principal Engineer			
				H&S Team Leader Name:	
				H&S Team Leader Signature:	

Task Steps	Potential Hazards and Consequences	Likelihood	Severity	Risk	Controls to Eliminated/Reduce Risks	Likelihood	Severity	Risk
1. Pre-Field Safety Meeting				**0**	All employees will attend a pre-field meeting which will include the pertinent SOPs, client-specific Job Safety Analysis, Permit(s) to Work (if required), potential hazards, and actual hazards present and controls for those hazards			**0**
2. Site Setup and Mobilization	2a. Personal injury - Lifting	3	2	**6**	Lift with your legs and not your back, make multiple trips and don't carry more than you can handle.	2	2	**4**
3. Sampling Activities	3a. Injury resulting from mishandling contaminated media and sample containers with preservative.	2	2	**4**	Wear nitril gloves and pay attention when handling the samples and preservative.	1	2	**2**
	3b. Slips, trips and falls.	3	3	**9**	Look at where you are stepping. Be aware of pipes, water and oil on ground, and dry cleaning equipment. Wear proper footwear.	1	3	**3**

			Hazard Severity					
			1	2	3	4	5	6
			No Injury/Illness	**Injury / Illness — First Aid Only**	**Injury / Illness — medical treatment**	**Disabling injury (restricted work or DAFW)**	**Long-term disability or major disabling injury**	**Fatality**
Likelihood	1	Very remote (1 in 1,000,000)	1	2	3	4	5	6
	2	Remote (1 in 100,000)	2	4	6	8	10	12
	3	Possible (1 in 10,000)	3	6	9	12	15	18
	4	Probable (1 in 1000)	4	8	12	16	20	24
	5	Likely (1 in 100)	5	10	15	20	25	30
	6	Almost certain (1 in 10)	6	12	19	24	30	36

Calculate the Baseline Risk Score and enter it into the appropriate column on the JSA form. The baseline risk scores are used to determine the urgency of action or implementation of hazard controls (see the risk levels below). Next, assign controls/protections for the identified hazards. Now re-calculate the score accounting for the changes the controls/protections will make. This score is the Post Prevention Risk score; enter it into the appropriate column on the JSA form. If the risk score remains above 9 as shown below, the job should be suspended until controls/protections can assist bringing the risk score down:

- 1 to 4 (Acceptable Risk) — No additional action needed.
- 5 to 8 (Low) — Review the operation/activity and take any steps necessary to reduce & control the risks.
- 9 to 16 (Medium) — Inform H&S management & seek further advice before proceeding any further with operation/activity.
- Above 16 (High) - HALT the activity immediately. Review and reduce the risks identified.

Appendix B

Inadvertent Discovery Plan

MEMORANDUM

Date: March 8, 2023

To: Don Hanson, Oregon Department of Environmental Quality

From: Carmen Owens, Apex Companies, LLC

Re: Inadvertent Discovery Plan for Site Cleanup Activities
185 S Maple Street in Yamhill, Oregon
2659-00

Apex Companies, LLC (Apex) prepared this memorandum to inform the State Historic Preservation Office (SHPO) and Confederated Tribes of the Grand Ronde Community of Oregon (CTGR) of proposed environmental cleanup activities at a location in Yamhill, Oregon (the Site; Figure 1). This memo relates to proposed environmental work for the Oregon Department of Environmental Quality (DEQ) at the former Carol Glover BP site (the Site).

The Site is located in an area that may reasonably have cultural artifacts present. In March 2021, DEQ notified the Confederated Tribes of the Grand Ronde Community of Oregon (CTGR) of an environmental site investigation that was performed at this location. The results of the site investigation were used to develop a plan to remove petroleum-contaminated soil and underground storage tanks (USTs) at the property and allow for re-development. The proposed cleanup activities are discussed within this document.

The Site has historically been entirely disturbed by construction of prior residences and a retail/commercial building dating to the 1890s. The proposed work at the Site that would be considered intrusive is building demolition and excavation of USTs. The building is located completely above ground and will not disturb soil beneath the surface during its demolition. Two vehicle hoists located within the building will be removed, including any components that are buried below the surface. It is unlikely that the hoists will be located significantly below the foundation of the building. The UST removal will be limited to the area around the tanks that has previously been disturbed and backfilled with non-native materials. Soil excavation outside of the USTs will be limited to the top 3 feet in an area that has been previously disturbed by installation of fuel dispenser islands and associated piping. These considerations suggest that the potential for encountering cultural resources is low.

The following sections provide a brief background on site history and the proposed cleanup work, a summary of ground disturbance, and a summary of characteristics based on the prior environmental assessment of the Site. This memorandum also contains a proposed Cultural Resources Inadvertent Discovery Protocol for identification and proper response in the event that cultural resources are encountered.

LOCATION

The former Carol Glover BP Site is located in downtown Yamhill, Oregon. This former service station site is small (about 0.12 acres) and situated on the northwest corner of the intersection of East 1st Street and South Maple Street (aka Tualatin Valley Highway/Hwy 47). The Site is identified in DEQ's Leaking Underground Storage Tank (LUST) database as site number 36-93-4164.

The Site is located at 185 S Maple Street, Yamhill, Yamhill County, Oregon (Figures 1 and 2), and is identified as Tax Lot 1500 on assessor's map No. 3 4 04AC. The Site is within the downtown commercial district of the City of Yamhill in an area of mixed retail, City government, and residential use. Properties to the north and east include residential properties located along South Maple and East 1st Street; to the south is Yamhill City Hall; to the west are restaurants and retail space; and to the southwest is the former Yamhill Station site (LUST 36-06-2111, LUST 36-88-4062, and ECSI 4923).

SITE HISTORY

The first records of the Site indicate that by the 1890s until at least 1902, the property was developed as a residential property which included a house to the north of the Site along South Main Street and a shed along the eastern property line. By the time of the 1913 insurance map, the residential property had been subdivided, the Site had been redeveloped into the Hotel Royal, and part of the hotel had burned down. In the 1920s, the property had been converted into apartments which remained at least into the 1930s.

Aerial photos suggest the current building was in place by 1954. Based on UST records, it is assumed that service station operations began prior to 1964. In 1993, soil contamination was identified during installation of a new water line to the Site building (Pacific Northern Environmental [PNE], 1993). The 1998 city directory lists the Site as a "beauty shop" called Main Line Services. In 2002, contractors emptied and rinsed the USTs, removing 701 gallons of product (DEQ, 2002). Most recently, the Site was reportedly used as a restaurant. The 2018 city directory indicates that two businesses were located within the Site, Bella Luna Patisserie and Yamhill Chocolate N Wine Gallery. In February 2018, Yamhill County foreclosed on the property, and it has been unoccupied since then.

CULTURAL RESOURCES INADVERTENT DISCOVERY PROGRAM

This section addresses the coordination protocol in the event of a discovery of a cultural resource during the advancement of environmental soil borings. A site plan is provided as Figure 2. Coordination is necessary in order to:

- Protect cultural resources that are significant to local tribes or may be eligible for the National Register; and
- Develop a plan to proceed with construction while avoiding and minimizing impacts to cultural resources.

When to Stop Work

In the event that construction work may uncover previously unidentified Native American artifacts, work shall cease immediately. Native American artifacts and/or features that may be encountered include, but are not limited to:

- Flaked stone tools (arrowheads, knives, scrapers etc.);
- Waste flakes that resulted from the production of flakes stone tools;
- Ground stone tools (manos, metals, mortars, and pestles);
- Layers (strata) of discolored earth resulting from fire hearths. These layers may be black, red, or mottled brown and often contain discolored cracked rocks or dark soil with charcoal;
- An accumulation of shells, burned rocks, or other food-related materials;

- Clusters of tin cans or bottles, logging equipment, or agricultural equipment that appear to be older than 50 years;
- Buried railroad tracks, decking, or other industrial materials;
- Human remains; and
- Structural remains, such as rings of rocks or round-shaped depressions in the ground surface or underground depressions seen in exposed strata.

Coordination in the Event of Inadvertent Discovery

In the event of an inadvertent discovery of possible archaeological materials, the Project Lead shall adhere to the following protocol:

1. All work will stop immediately in the vicinity of the find;
2. The area will be secured and protected within a 50-foot buffer; and
3. The Project Lead shall make notifications to the following representatives:

AGENCY	PERSONNEL	CONTACT INFORMATION
Oregon SHPO, State Archeologist	Matt Diederich	(503) 986-0577
Oregon DEQ Project Manager	Don Hanson	(541) 687-7349
Oregon DEQ Tribal Liaison	Roxy Nayar	(503) 229-6414
Confederated Tribes of Grand Ronde	Briece Edwards	(503) 879-2084

If possible human remains are encountered, the Oregon State Police and Commission on Indian Services (CIS) will also be notified.

AGENCY	PERSONNEL	CONTACT INFORMATION
Oregon State Police	Chris Allori	(503) 731-4717
CIS	Mitch Sparks	(503) 986-1067

The consulting archaeologist shall make a preliminary assessment of whether the cultural material or site is potentially significant and recommend additional steps to mitigate effects. The assessment and recommendation will be communicated to Oregon SHPO and the Tribe's concurrence will be obtained prior to resuming any ground-disturbance activities. No work at the discovery location may resume until SHPO or tribal archaeology personnel have assessed the situation and agree with the mitigation plan (if required). The discovery site will be secured and protected until the project resumes.

If human remains are encountered, the remains will be treated with dignity and respected at all times. The remains will be covered with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed. Emergency services (911) will not be contacted. Inquiries from the media or interested parties will be referred to the Project Lead. The Oregon SPHO, Oregon State Police, Oregon's legislative CIS, and appropriate tribal governments will determine an appropriate course of action. Additional archaeological excavations may be required and would be handled in coordination with the parties previously listed.

CONCLUSION

Documents reviewed herein indicate that the Site has been entirely disturbed by prior residence and retail/commercial building construction. These considerations suggest the potential for encountering cultural resources is low and the development of Cultural Resource Inadvertent Discovery Protocol is appropriate for the Site conditions.

ENCLOSED

Figure 1 – Site Location Map
Figure 2 – Site Plan

REFERENCES

Oregon Department of Environmental Quality (DEQ), 2002. *Abandoned Tanks Project Report; UST Facility ID #9769; LUST Log #26-93-4164*. March 11, 2002.

Pacific Northern Environmental (PNE), 1993. *Letter Report to Ms. Carol Glover*. July 30, 1993.

Appendix C

Sampling and Analysis Plan

1.0 Introduction

This appendix presents the field and sampling procedures and the analytical testing program that will be used to complete the field and analytical work for the site investigation activities completed at the Carol Glover BP site (the Site) located in Yamhill, Oregon. Quality assurance and quality control (QA/QC) procedures discussed in this appendix are consistent with the QA/QC requirements outlined in the Oregon Department of Environmental Quality (DEQ) Brownfields Program *Quality Assurance Project Plan* (QAPP; dated November 30, 2016).

2.0 Field and Sampling Procedures

The scope of work (SOW) for the site investigation includes decommissioning five underground storage tanks (USTs). The scope also includes the associated soil and groundwater (if present) sampling and chemical analysis. Data from these activities will be used to assess the potential for unacceptable risks posed to human health and the environment.

The field and sampling procedures include the following:

- Collection of soil and groundwater samples from UST and automobile hoist excavation;
- Sample management (e.g., containers, storage, and shipment);
- Sample location control;
- Decontamination procedures; and
- Handling of investigation-derived waste (IDW).

2.1 Preparatory Activities

Underground Utility Location. An underground utility locate request will be submitted through One-Call. A private underground utility locate will also be conducted prior to performing the subsurface work.

Property Owner Notification. The DEQ has obtained an access agreement with the owner of the Site (Yamhill County).

Health and Safety Plan. A health and safety plan (HASP) was prepared for Apex personnel involved with the project and is included in Appendix A of this work plan.

2.2 Soil and Groundwater Sampling From Excavations

Soil samples from shallow excavations (i.e., less than 24 inches in depth) will be collected using either a clean stainless-steel spoon or a hand-auger in accordance with Standard Operating Procedure (SOP) 2.2, included in this appendix. Soil samples beneath 24 inches will be similarly collected directly from soil in the excavator bucket that is not in direct contact with the bucket. A hand-tape will be used to verify the depth interval of collection. The excavator bucket will be dry-brushed to remove adhered soil prior to each sample collection within the same excavation, and soil samples will be collected from material not in direct contact with the bucket.

Groundwater samples from excavations will be collected using a disposable bailer lowered into the water or with peristaltic pump tubing lowered into the water pool (after the excavation has been purged and allowed to recover). While walking around the excavated area, the sampler may not approach the excavation sidewall within a distance equal to the distance from the top to the bottom of the excavation, so use of a bailer or tubing may require connection to a pole or the excavator bucket to collect the sample. Disturbance of the groundwater will be kept to a minimum, and if tubing is used, then care must be taken to ensure that the tubing end does not come into contact with the excavation sidewall, floor, or other solids.

2.3 Sample Management

Soil and Water Containers. Clean sample containers will be provided by the analytical laboratory ready for sample collection, including preservative if required (the container requirements are listed in Table C-1). Specific container requirements for samples that will undergo multiple analyses will be discussed with the analytical laboratory prior to sample collection. Each container will be fully filled, leaving no headspace. Lids will be equipped with Teflon® liners to reduce the loss of volatile compounds.

Labeling Requirements. A sample label will be affixed to each sample container before sample collection. Containers will be marked with the project number, sample number, date of collection, and the sampler's initials.

Sample Storage and Shipment. Soil and groundwater samples will be stored in a cooler chilled with ice or blue ice to four degrees Celsius (°C). The cooler lid will be sealed with chain-of-custody seals. If necessary, the samples will be sent via overnight courier to the analytical laboratory for chemical analysis. Otherwise, Apex will transport the containers to the laboratory. Chain of custody will be maintained and documented.

2.4 Sample Location Control

The perimeter of the UST excavations will be located using a high-accuracy, handheld global positioning system (GPS) device, and the locations of excavation sidewall and bottom samples will be determined based on hand-taped measurements relative to the excavation perimeter (while avoiding close proximity of staff to the excavation edges).

2.5 Decontamination Procedures

Personnel Decontamination. Personnel decontamination procedures depend on the level of protection specified for a given activity. The HASP (Appendix A) identifies the appropriate level of protection for the type of work and expected field conditions involved in this project. In general, clothing and other protective equipment can be removed from the investigation area. Field personnel should thoroughly wash their hands and faces at the end of each day and before taking any work breaks.

Sampling Equipment Decontamination. To prevent cross-contamination between collection of individual samples, clean, dedicated sampling equipment (e.g., groundwater sampling tubing) will be used when possible for each sampling event and will be discarded after use. Cleaning of non-disposable items will consist of the following:

- Washing in tap water and non-phosphate detergent (ex. Alconox®) solution;
- Rinsing with tap water;
- Rinsing with analyte-free deionized or distilled water (purchased distilled water and deionized water supplied by the laboratory is assumed to be analyte free);
- Air drying equipment; and
- Storing equipment in a clean container such as a new zip-lock bag or new plastic garbage bag.

Excavation Equipment and Materials. Decontamination procedures are designed to remove trace-level contaminants from excavation equipment to prevent cross-contamination between the UST locations. The excavator bucket will be decontaminated using either high-pressure washing, steam cleaning, or cleaning with detergent (as described above) before use and between locations.

2.6 Handling of Investigation-Derived Waste

Investigation-derived waste (IDW) will consist of soil, UST and piping trench cover material, soil from the UST pits, and decontamination water. UST cover material and soil will be temporarily staged on site, then loaded into a dump truck for off-site disposal. Liquid IDW (UST contents and decontamination water) will be pumped into a tank truck for off-site recycling.

Disposable items, such as sample tubing, disposable bailers, bailer line, gloves, protective overalls (e.g., Tyvek®), paper towels, etc., will be placed in plastic bags after use and deposited in trash receptacles for disposal.

3.0 Analytical Testing Program

An analytical testing program will be performed to assess the chemical quality of samples collected as part of this project. Analytical laboratory QA/QC procedures are discussed in Section 4 of this appendix.

Table C-2 lists the proposed analytical methods, detection limit goals, and the anticipated number of soil and groundwater samples. Samples will be collected and handled using methods described in Section 2 of this appendix. Specific container and storage requirements for samples will be discussed with the analytical laboratory prior to sample collection and will be in accordance with the container requirements presented in Table C-1.

The compounds of interest (COI) and respective analytical methods anticipated for this project (as defined in Table 2.1 in DEQ's risk-based decision making [RBDM] guidance; DEQ, 2017) are described below.

3.1 Soil

3.1.1 Gasoline UST

Collected soil samples from the gasoline UST removal activities will be analyzed for TPH identification using Northwest Method NWTPH-HCID.

If gasoline-range hydrocarbons are detected in the HCID analysis, follow-up analysis will include the following relevant COIs from Table 2.1 in DEQ's RBDM guidance (DEQ, 2017):

- TPHg by Northwest Method NWTPH-Gx;
- VOCs by EPA Method 8260B; and
- Lead by EPA Method 6020.

If diesel-range hydrocarbons are detected in the HCID analysis, follow-up analysis will include the following relevant COIs from Table 2.1 in DEQ's RBDM guidance:

- TPHd by Northwest Method NWTPH-Dx;
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8260B; and
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C SIM.

3.1.2 Waste Oil UST

Collected soil samples from the waste oil UST removal activities will be analyzed for the following relevant COIs from Table 2.1 in DEQ's RBDM guidance:

- TPH identification using Northwest Method NWTPH-HCID;
- TPHd by Northwest Method NWTPH-Dx;
- VOCs by EPA Method 8260B;
- PAHs by EPA Method 8270C SIM;
- Cadmium, chromium, and lead by EPA Method 6020A; and
- Polychlorinated biphenyls (PCBs) by EPA Method 8082A.

3.1.3 Automobile Hoists

Collected soil samples from beneath the automobile hoists will be analyzed for the following constituents:

- TPHd by Northwest Method NWTPH-Dx; and
- PCBs by EPA Method 8082A.

If diesel range hydrocarbons are detected in the analysis of the automobile hoist samples, follow up analysis will include the following:

- PAHs by EPA Method 8270C SIM.

3.2 Groundwater

If groundwater is encountered during UST removal, collected samples will be analyzed for the following relevant COIs from Table 2.1 in DEQ's RBDM guidance:

- TPH identification using Northwest Method NWTPH-HCID;
- TPHd by Northwest Method NWTPH-Dx with silica gel cleanup;
- VOCs by EPA Method 8260B;
- PAHs by EPA Method 8270C SIM;
- Cadmium, chromium, and lead by EPA Method 6020A; and
- PCBs by EPA Method 8082A.

If gasoline-range hydrocarbons are detected in the HCID analysis, follow-up analysis will include the following:

- TPHg by Northwest method NWTPH-Gx.

4.0 Field Quality Assurance Program

Table C-3 lists the proposed QA samples.

Field Chain of Custody. A chain-of-custody form will be used to record possession of a sample and to document analyses requested. Each time the sample bottles or samples are transferred between individuals, both the sender and receiver will sign and date the chain-of-custody form. When a sample shipment is transported to the laboratory, a copy of the chain-of-custody form will be included in the transport container (e.g., ice chest).

Field Duplicate Samples. One field duplicate soil sample will be collected during the assessment. A field duplicate will consist of two samples collected sequentially from one sample location to assess data variability. The field duplicates will be analyzed by the same analytical methods used for primary samples. Relative percent differences (RPDs) for field duplicates will be calculated to assess the data precision, accuracy, and potential variability caused by sample handling.

Trip Blank. A trip blank (i.e., transport blank) will be prepared by the analytical laboratory and will accompany the collected soil and groundwater samples during storage and shipment. The trip blank will be analyzed for TPH-Gx and VOCs.

5.0 Laboratory Quality Control

The laboratory maintains an internal quality assurance program as documented in its laboratory quality assurance manual. The laboratory uses a combination of blanks, surrogate recoveries, duplicates, matrix spike recoveries, matrix spike duplicate recoveries, blank spike recoveries, and blank spike duplicate recoveries to evaluate the analytical results. The laboratory also uses data quality goals for individual chemicals or groups of chemicals based on the long-term performance of the test methods. QA/QC requirements are outlined in the DEQ Brownfields Program *Quality Assurance Project Plan* (dated November 30, 2016).

Table C-1 – Analytical Methods – Sample Container Requirements
DEQ – Carol Glover BP
Yamhill, Oregon

Analysis	Method	Container	Preservative	Storage Temperature	Holding Time
Soil Samples					
TPH - Identification	NWTPH-HCID	4-ounce	None	4°C	14 days
TPH - Gasoline-Range	NWTPH-Gx	4-ounce	None	4°C	14 days
TPH - Diesel-Range	NWTPH-Dx	8-ounce	None	4°C	14 days
PAHs	EPA 8270M-SIM	4-ounce	None	4°C	14 days
VOCs	EPA 5035/8260B	3 x 40 mL VOA	methanol	4°C	14 days
Cadmium, Chromium, Lead	EPA 6020B	4-ounce	None	4°C	180 days
PCBs	EPA 8082A	8-ounce	None	4°C	14 days
Water Samples					
TPH - Gasoline-Range	NWTPH-Gx	3 x 40 mL VOA	HCL	4°C	14 days
TPH - Diesel-Range	NWTPH-Dx	1 L	HCL	4°C	14 days
PAHs	EPA 8270M-SIM	1L Amber	None	4°C	14 days
VOCs	EPA 5035/8260B	3 x 40 mL VOA	HCL	4°C	14 days
Cadmium, Chromium, Lead	EPA 6020B	500 mL	HNO_3, pH < 2	4°C	180 days
PCBs	EPA 8082A	1L Amber	None	4°C	7 days

Notes:

1. EPA = U.S. Environmental Protection Agency.
2. TPH = Total petroleum hydrocarbons.
3. PAHs = Polycyclic aromatic hydrocarbons.
4. VOCs = Volatile organic compounds.
5. °C = Degrees Celsius.
6. mL = Milliliter.
7. HNO_3 = Nitric preserved.

Table C-2 – Analytical Methods, Anticipated Sample Number, and Detection Limit Goals
DEQ – Carol Glover BP
Yamhill, Oregon

		Soil [mg/kg]			Water [µg/L]		
Analyte	**Method**	**Maximum Number of Samples**	**Laboratory Detection Limit**	**DEQ RBC Occupational Direct Contact**	**Maximum Number of Samples**	**Laboratory Detection Limit**	**DEQ RBC Occupational Ingestion or Inhalation of Tapwater**
Total Petroleum Hydrocarbons (TPH)							
Hydrocarbon Identification	NWTPH-HCID	15	--	--	1	31.6	--
Soil	NWTPH-Gx	15	0.8475	20,000	1	31.6	450
Diesel-Range	NWTPH-Dx	15	0.192	14,000	1	0.192	430
Volatile Organinc Compounds							
Acetone	EPA 8260B	15	0.0365	--	1	11.3	--
Acrolein	EPA 8260B	15	--	--	1	2.54	--
Benzene	EPA 8260B	15	0.000467	37	1	0.0941	2.1
Bromodichloromethane	EPA 8260B	15	0.000725	15	1	0.136	0.6
Bromoform	EPA 8260B	15	0.00117	260	1	0.129	16
Bromomethane	EPA 8260B	15	0.00197	750	1	0.605	36
Carbon Tetrachloride	EPA 8260B	15	0.000898	34	1	0.128	2.1
Chlorobenzene	EPA 8260B	15	0.00021	8,700	1	0.116	350
Chlorodibromomethane	EPA 8260B	15	0.000612	17	1	0.14	0.77
Chloroethane	EPA 8260B	15	0.0017	--	1	0.192	88000
Chloroform	EPA 8260B	15	0.00103	26	1	0.111	0.98
Chloromethane	EPA 8260B	15	0.00435	25,000	1	0.96	790
2-Chlorotoluene	EPA 8260B	15	0.000865	--	1	0.106	--
1,2-Dibromoethane	EPA 8260B	15	0.000648	0.73	1	0.126	--
1,2-Dichlorobenzene	EPA 8260B	15	0.000425	36,000	1	0.107	1400
1,3-Dichlorobenzene	EPA 8260B	15	0.0006	--	1	0.11	--
1,4-Dichlorobenzene	EPA 8260B	15	0.0007	64	1	0.12	2.1
Dichlorodifluoromethane	EPA 8260B	15	0.00161	--	1	0.374	--
1,1-Dichloroethane	EPA 8260B	15	0.000491	260	1	0.1	13
1,2-Dichloroethane	EPA 8260B	15	0.000649	16	1	0.0819	--
1,1-Dichloroethene	EPA 8260B	15	0.000606	29,000	1	0.188	1400
cis-1,2-Dichloroethene	EPA 8260B	15	0.000734	2,300	1	0.126	260
trans-1,2-Dichloroethene	EPA 8260B	15	0.00104	23,000	1	0.149	2600
1,2-Dichloropropane	EPA 8260B	15	0.00142	--	1	0.149	--
cis-1,3-Dichloropropene	EPA 8260B	15	0.000757	--	1	0.111	--
trans-1,3-Dichloropropene	EPA 8260B	15	0.00114	--	1	0.118	--
Ethylbenzene	EPA 8260B	15	0.000737	150	1	0.137	6.4
Isopropylbenzene	EPA 8260B	15	0.000425	57,000	1	0.105	2000
2-Butanone (MEK)	EPA 8260B	15	0.0635	--	1	1.19	--
Methylene Chloride	EPA 8260B	15	0.00664	76	1	0.43	--
Methyl tert-Butyl Ether	EPA 8260B	15	0.00035	1,100	1	0.101	68
Naphthalene	EPA 8260B	15	0.00488	23	1	1	0.72
Styrene	EPA 8260B	15	0.000229	130,000	1	0.118	5700
1,1,1,2-Tetrachloroethane	EPA 8260B	15	0.000948	--	1	0.147	--
1,1,2,2-Tetrachloroethane	EPA 8260B	15	0.000695	--	1	0.133	--
1,1,2-Trichlorotrifluoroethane	EPA 8260B	15	0.000754	--	1	0.18	--
Tetrachloroethene	EPA 8260B	15	0.000896	1,000	1	0.3	48
Toluene	EPA 8260B	15	0.0013	88,000	1	0.278	6,300
1,2,4-Trichlorobenzene	EPA 8260B	15	0.0044	--	1	0.481	--
1,1,1-Trichloroethane	EPA 8260B	15	0.000923	870,000	1	0.149	37,000
1,1,2-Trichloroethane	EPA 8260B	15	0.000597	26	1	0.158	1.3
Trichloroethene	EPA 8260B	15	0.000584	51	1	0.19	3.3
Trichlorofluoromethane	EPA 8260B	15	0.000827	130,000	1	0.16	5,200

Please see notes at end of table

Table C-2 – Analytical Methods, Anticipated Sample Number, and Detection Limit Goals
DEQ – Carol Glover BP
Yamhill, Oregon

		Soil [mg/kg]			Water [µg/L]		
Analyte	Method	Maximum Number of Samples	Laboratory Detection Limit	DEQ RBC Occupational Direct Contact	Maximum Number of Samples	Laboratory Detection Limit	DEQ RBC Occupational Ingestion or Inhalation of Tapwater
Volatile Organinc Compounds (Cont)							
1,2,4-Trimethylbenzene	EPA 8260B	15	0.00158	6,900	1	0.322	250
1,3,5-Trimethylbenzene	EPA 8260B	15	0.002	6,900	1	0.104	260
Vinyl Chloride	EPA 8260B	15	0.00116	4.4	1	0.234	0.49
Xylenes, Total	EPA 8260B	15	0.00088	25,000	1	0.174	830
Polycyclic Aromatic Hydrocarbons (PAHs)							
Acenaphthene	EPA 8270E SIM	15	0.005	>Csat	1	0.0329	2500
Acenaphthylene	EPA 8270E SIM	15	0.005	--	1	0.0329	--
Anthracene	EPA 8270E SIM	15	0.005	>Csat	1	0.0329	>S
Benz(a)anthracene	EPA 8270E SIM	15	0.005	2.5	1	0.0164	0.38
Benzo(a)pyrene	EPA 8270E SIM	15	0.005	0.25	1	0.0164	0.47
Benzo(b)fluoranthene	EPA 8270E SIM	15	0.005	2.5	1	0.0164	>S
Benzo(k)fluoranthene	EPA 8270E SIM	15	0.005	25	1	0.0164	>S
Benzo(g,h,i)perylene	EPA 8270E SIM	15	0.005	--	1	0.0329	--
Chrysene	EPA 8270E SIM	15	0.005	>Csat	1	0.0164	>S
Dibenzo(a,h)anthracene	EPA 8270E SIM	15	0.005	0.25	1	0.0164	0.47
Fluoranthene	EPA 8270E SIM	15	0.005	>Csat	1	0.0329	>S
Fluorene	EPA 8270E SIM	15	0.005	>Csat	1	0.0329	1300
Indeno(1,2,3-cd)pyrene	EPA 8270E SIM	15	0.005	>Csat	1	0.0164	>S
2-Methylnaphthalene	EPA 8270E SIM	15	0.005	--	1	0.0658	--
Naphthalene	EPA 8270E SIM	15	0.005	25	1	0.0658	0.72
Phenanthrene	EPA 8270E SIM	15	0.005	--	1	0.0658	--
Pyrene	EPA 8270E SIM	15	0.005	>Csat	1	0.0329	>S
Dibenzofuran	EPA 8270E SIM	15	0.005	--	1	0.0329	--
Metals							
Cadmium	EPA 6020B	15	0.5	1,100	1	0.1	160
Chromium	EPA 6020B	15	0.5	--	1	0.1	--
Lead	EPA 6020B	15	0.5	800	1	0.1	15
PCBs							
Aroclor 1016	EPA 8082A	15	0.00999	--	1	0.005	--
Aroclor 1221	EPA 8082A	15	0.00999	--	1	0.005	--
Aroclor 1232	EPA 8082A	15	0.00999	--	1	0.005	--
Aroclor 1242	EPA 8082A	15	0.00999	--	1	0.005	--
Aroclor 1248	EPA 8082A	15	0.00999	--	1	0.005	--
Aroclor 1254	EPA 8082A	15	0.00999	--	1	0.005	--
Aroclor 1260	EPA 8082A	15	0.00999	--	1	0.005	--
Aroclor 1262	EPA 8082A	15	0.00999	--	1	0.005	--
Aroclor 1268	EPA 8082A	15	0.00999	--	1	0.005	--
Total PCBs	EPA 8082A	15	--	0.59	1	--	0.028

Notes:

1. mg/Kg = Milligrams per kilogram.
2. µg/L = Micrograms per liter.
3. Number of samples includes field duplicates.
4. EPA = U.S. Environmental Protection Agency.
5. -- = Not available or not applicable.
6. >Csat = The soil RBC exceeds the solubility limit.
7. >S = The groundwater RBC exceeds the limit of three-phase equilibrium partitioning

Table C-3 – Quality Assurance Samples
DEQ – Carol Glover BP
Yamhill, Oregon

QA Sample Matrix	QA Sample Type	Analyses Requested	Anticipated Number of Samples
Soil	Field Duplicate	TPHg/TPHd/VOCs (3 x 40ml VOA; 1 x 4-ounce; 1 x 8-ounce)	1
	Field Duplicate	PAHs (8-ounce)	1

Notes:

1. VOCs = Volatile organic compounds by EPA Method 8260B.
2. TPHg = Gasoline-range petroleum hydrocarbons by Northwest Method NWTPH-Gx.
3. TPHd = Diesel-range petroleum hydrocarbons by Northwest Method NWTPH-Dx.
4. PAHs = Polycyclic aromatic hydrocarbons. by EPA Method 8270 SIM.
5. QA = Quality assurance.

Apex Standard Operating Procedures

SOP 2.1 – Standard Field Screening Procedures
SOP 2.2 – Surface Soil Sampling Procedures
SOP 2.7 – EPA 5035A Soil Sampling Procedures

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) provides instructions for standard field screening. Field screening results are used to aid in the selection of soil samples for chemical analysis. This procedure is applicable during Apex Companies, LLC (Apex) soil sampling operations.

Standard field screening techniques include the use of a photoionization detector (PID) to assess for volatile organic compounds (VOCs), for the presence of separate-phase petroleum hydrocarbons using a sheen test. These methods will not detect all potential contaminants, so selection of screening techniques shall be based on an understanding of the site history. The PID is not compound or concentration-specific, but it can provide a qualitative indication of the presence of VOCs. PID measurements are affected by other field parameters such as temperature and soil moisture. Other field screening methods, such as screening for dense non-aqueous phase liquid (DNAPL) using dye or UV light, are not considered "standard" and will be detailed in the site-specific sampling and analysis plan (SAP).

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- PID with calibration gas (record daily calibration/calibration check in field notes);
- Plastic resealable bags (for PID measurement); and
- Glass jars or stainless steel bowls (for sheen testing).

3. METHODOLOGY

Each soil sample will be field screened for VOCs using a PID and for the presence of separate-phase petroleum hydrocarbons using a sheen test. If the presence of DNAPL is suspected, then screening using dye and UV light may also to be completed. For information regarding screening using dye or UV light, refer to the site specific sampling and analysis plan.

PID lamps come in multiple sizes, typically 9.8, 10.6, and 11.7 electron volts (eV). The eV rating for the lamp must be greater than the ionization potential (in eV) of a compound in order for the PID to detect the compound. For petroleum hydrocarbons, a lamp of at least 9.8 eV should be used. For typical chlorinated alkenes (dichloroethene, trichloroethene, tetrachloroethene, or vinyl chloride.), a lamp of at least 10.6 eV should be used. The compatibility of the lamp size with the site constituents should be verified prior to the field event and will be detailed in the site-specific SAP.

PID Calibration Procedure: The PID used on-site should be calibrated daily or more frequently if needed. Calibration of the PID should be documented in field notes. Calibrations procedures should be conducted according to the manufacturer's instructions. .

<u>PID Screening Procedure:</u>

- Place a representative portion (approximately one ounce) of freshly exposed, uncompacted soil into a clean resealable plastic bag.
- Seal the bag and break up the soil to expose vapors from the soil matrix.
- Allow the bag to sit to reach ambient temperature. Note: Ambient temperature and weather conditions/humidity should be recorded in field notes. Changes in ambient temperature and weather during the field work should also be recorded, as temperature and humidity can affect PID readings.
- Carefully insert the intake port of the PID into the plastic bag.
- Record the PID measurement in the field notes or boring logs.

<u>Sheen Test Procedure:</u>

- Following the PID screen, place approximately one ounce of freshly exposed, uncompacted soil into a clean glass jar or stainless steel bowl.

- Add enough water to cover the sample.
- Observe the water surface for signs of discoloration/sheen and characterize

No Sheen (NS)	No visible sheen on the water surface
Biogenic Film (BF)	Dull, platy/blocky or foamy film.
Slight Sheen (SS)	Light sheen with irregular spread, not rapid. May have small spots of color/iridescence. Majority of water surface not covered by sheen.
Moderate Sheen (MS)	Medium to heavy coverage, some color/iridescence, spread is irregular to flowing. Sheen covering a large portion of water surface.
Heavy Sheen (HS)	Heavy sheen coverage with color/iridescence, spread is rapid, entire water surface covered with sheen. Separate-phase hydrocarbons may be evident during sheen test.

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods used for obtaining surface soil samples for physical and/or chemical analysis. For purposes of this SOP, surface soil (including shallow subsurface soil) is loosely defined as soil that is present within 3 feet of the ground surface at the time of sampling. Various types of sampling equipment are used to collect surface soil samples including spoons, scoops, trowels, shovels, and hand augers.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Spoons, scoops, trowels, shovels, and/or hand augers. Stainless steel is preferred.
- Stainless steel bowls
- Laboratory-supplied sample containers
- Field documentation materials
- Decontamination materials
- Personal protective equipment (as required by Health and Safety Plan)

3. METHODOLOGY

Project-specific requirements will generally dictate the preferred type of sampling equipment used at a particular site. The following parameters should be considered: sampling depth, soil density, soil moisture, use of analyses (e.g., chemical versus physical testing), type of analyses (e.g., volatile versus non-volatile). Analytical testing requirements will indicate sample volume requirements that also will influence the selection of the appropriate type of sampling tool. The project sampling plan should define the specific requirements for collection of surface soil samples at a particular site.

Collection of Samples

- **Volatile Analyses.** Surface soil sampling for volatile organics analysis (VOA) is different than other routine physical or chemical testing because of the potential loss of volatiles during sampling. To limit volatile loss, the soil sample must be obtained as quickly and as directly as possible. If a VOA sample is to collected as part of a multiple analyte sample, the VOA sample portion will be obtained first. The VOA sample should be obtained from a discrete portion of the entire collected sample and should not be composited or homogenized. Sample bottles should be filled to capacity, with no headspace. Specific procedures for collecting VOA samples using the EPA Method 5035 are discussed in SOP 2-7.
- **Other Analyses.** Once the targeted sample interval has been collected, the soil sample will be thoroughly homogenized in a stainless steel bowl prior to bottling. Sample homogenizing is accomplished by manually mixing the entire soil sample in the stainless steel bowl with the sampling tool or with a clean teaspoon or spatula until a uniform mixture is achieved. If packing of the samples into the bottles is necessary, a clean stainless steel teaspoon or spatula may be used.

General Sampling Procedure:

- Decontaminate sampling equipment in accordance with the Sampling and Analysis Plan (SAP) before and after each individual soil sample.
- Remove surface debris that blocks access to the actual soil surface or loosen dense surface soils, such as those encountered in heavy traffic areas. If sampling equipment is used to remove surface debris,

the equipment should be decontaminated prior to sampling to reduce the potential for sample interferences.

- When using a hand auger, push and rotate downward until the auger becomes filled with soil. Usually a 6- to 12-inch long core of soil is obtained each time the auger is inserted. Once filled, remove the auger from the ground and empty into a stainless steel bowl. If a VOA sample is required, the sample should be taken directly from the auger using a teaspoon or spatula and/or directly filling the sample container from the auger. Repeat the augering process until the desired sample interval has been augered and placed into the stainless steel bowl.

Backfilling Sample Locations:

Backfill in accordance with federal and state regulations including OAR 690-240 (e.g., bentonite requirements). The soils from the excavation will be used as backfill unless project-specific or state requirements include the use of clean backfill material.

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods used for obtaining soil samples for chemical analysis for volatile organic compounds (VOCs) by EPA Method 5035A. Samples collected using the 5035A protocols are not exposed to the atmosphere after sampling thereby reducing the potential for loss of VOCs during sample transport, handling, and analysis. This procedure assumes the use of the PowerStop Handle sampler with disposable EasyDraw Syringes or Terra Core Samplers. This procedure is applicable during Apex Companies, LLC (Apex) soil sampling activities where the 5035A protocols are employed.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Sampling equipment (PowerStop Handle, disposable EasyDraw Syringes, Terra Core Samplers)
- Laboratory-supplied sample containers (pre-weighed 40ml VOA vials including labels, preservative, stir bars, etc. [number and type as specified by the lab], two ounce jars)
    - Vials used from ACA stock must be weighed to confirm loss of reagents is less than 0.02 grams. Record vial tare weight in field notes. Discard vials with dates over 6 months old.
- Field documentation materials
- Decontamination materials
- Personal protective equipment (as required by Health and Safety Plan)

3. METHODOLOGY

The project-specific sampling and analysis plan (SAP) will define the specific requirements for 5035A methodology required for a particular site or by a regulatory agency.

Analytical Requirements

- VOCs must be analyzed within 14 days of collection.
- Field preserved samples (e.g., sodium bisulfate or methanol) must be maintained at 4° C.
- Sample collected without preservative (e.g., reagent water) must frozen or analyzed within 48 hours.

Collection of Samples

- When using the PowerStop Handle, clip the syringe into the handle in one of the three 5 gram positions. Use the heavy position for dense clay, the light position for dry sandy soil, and the medium position for all others.
- Using the handle, push the sampler into the soil to collect the sample. Continue pushing until the soil column has forced the plunger in the syringe to the stopping point or filled the sampler.
- Wipe all debris from the outside of the sampler. The soil plug should be flush with the mouth of the sampler. Remove any excess soil that extends beyond the mouth of the sampler.
- Extrude the 5 gram sample into vial and cap vial immediately. Hold vial at an angle when extruding to minimize splashing. Gently swirl vial for 10 seconds to break up soil particles (do not shake).
- When capping the vial, be sure to remove any soil or debris from the threads of the vial.
- Repeat process for each additional vial.
- Fill a two ounce container (to capacity) for percent total solids determination.

Additional Considerations

- Methanol contamination can occur from adjacent activities (e.g., exhaust from running equipment or vehicles, hot tar roofing, facility operations, etc). Collection and analysis of methanol field blank (e.g., additional methanol vial left open during period of sampling) is recommended.
- Acidification of carbonaceous soils with sodium bisulfate can cause effervescence and loss of VOCs.
- Certain volatile compounds such as 2-chloroethylvinyl ether may be lost by acidification.
- Acidification of certain soils with sodium bisulfate may cause the formation of acetone through oxidation of soil waxes and humic material (e.g., organic materials such as roots).