NATIONAL ENERGY TECHNOLOGY LABORATORY - ALBANY

PHASE I INVESTIGATION WORK PLAN, SAMPLING, AND ANALYSIS PLAN

Prepared for:
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1.0 INTRODUCTION

This Phase I Investigation Work Plan, Sampling, and Analysis Plan (Work Plan) was prepared for the U.S. Department of Energy (DOE) National Energy Technology Laboratory – Albany (NETL – Albany), located at 1450 Queen Avenue SW, City of Albany, Linn County, Oregon 97321 (Site).

This Work Plan includes an investigation of the surface water, groundwater and soil gas conditions. The on-site investigative tasks include duplication of prior soil gas sampling conducted in the suspected primary source areas of a groundwater plume of chlorinated solvents, as well as the northern and western boundary of the Site. The off-site investigation of groundwater contamination focuses on areas immediately north and west of the Site.

This Work Plan was prepared in accordance with Oregon Department of Environmental Quality (ODEQ) guidance. This Work Plan provides the framework for the data collection required in support of the Phase I Investigation Report and includes:

- A description of current conditions, including site description, operations, waste management units, and the geologic setting – **Section 2.0, 2.1, and 2.2**
- Information pertaining to the plume – **Section 2.0**
- Investigative objectives and rationale – **Section 3.0**
- Field sampling locations and methods, including decontamination – **Section 4.0 and 8.0**
- Sample handling, documentation, and transport – **Section 5.0**
- Health and Safety Plan – **Section 7.0**
- Project Management Plan – **Section 9.0**
- Schedule of activities and deliverables – **Section 10.0**

The purpose of the Work Plan is to further evaluate and delineate the nature and extent of the contamination located at the Site. If the investigation tasks described in this Work Plan do not define the full extent of contamination, additional investigation will be necessary.

The anticipated activities to implement this Work Plan include:

- Obtain off-site access to implement the investigative tasks described in this Work Plan
    - Communicate with local units of government to obtain permits for off-site investigation needs.
    - Communicate with all utility companies to confirm locations of underground utilities in the area of the proposed temporary monitoring well locations.
    - Communicate with the City of Albany to obtain a right-of-way (ROW) permit to conduct activities.
- Utilize a private utility locator to define locations of underground utilities in the area of the proposed temporary monitoring well and soil gas well locations.
- Install and sample soil gas wells to evaluate potential vapor intrusion (VI) risk to the northern and western portions of the Site, as well as potential migration off-Site.

- Install and sample groundwater monitoring wells to horizontally delineate the groundwater contamination off-site to the north and west.
- Follow procedures consistent with the 2015 ODEQ Cleanup Quality Assurance Project Plan (QAPP) and the 2017 ODEQ Risk-Based Decision Making for the Remediation of Contaminated Sites (RBDM) guidance documents.
- Complete a "desktop assessment," including data gap analysis of delineation based on prior sampling events, for each of the following tasks:
    - Review and assess historical contaminants of interests (COI) compared to prior sampling events
    - Assess the historical data of drinking water and vapor intrusion for the eastern adjoining schools and other facilities within Locality of Facility
    - Assess the potential risks to applicable drinking water wells using the ODEQ Beneficial Water Use Determination (BWUD) process
    - Note: The desktop assessment tasks will not include additional sampling of any 'gap' areas identified, those would be included in the next phases of work.
- Complete and submit a Phase I Investigation Report to ODEQ, upon completion of the activities described in this Work Plan
    - Based on the outcome of this Phase I Investigation, any additional sampling that may be identified as necessary based on the desktop assessment will be incorporated into the next phases of work

2.0 SITE BACKGROUND AND DESCRIPTION OF CURRENT CONDITIONS AT/NEAR THE SITE

The U.S. Department of Energy (DOE) National Energy Technology Laboratory– Albany (NETL-Albany) is located at 1450 Queen Avenue SW, City of Albany, Linn County, Oregon 97321 (Site). The Site is south of Queen Avenue, west of SW Broadway Street, and east of SW Liberty Street. The Site is located at latitude N 44° 37' 21" and longitude W 123° 07' 13" and is shown in **Figure 1**.

This Site is situated within a mixed land use area consisting of mixed commercial and residential uses. Current uses of the adjoining properties are described in the table below:

Direction from Site	Description
North	Fueling station/convenience store (NW of the Site) Residential properties
East	West Albany High School Liberty Elementary School Residential properties
South	Albany Tennis Club Residential properties
West	Residential properties

2.1 Current Operations

The Site currently has approximately 135 federal and contractor employees. The campus includes 40 buildings situated on approximately 33 acres, with an additional 10 acres of vacant land adjoining the south end of the campus. The 40 buildings have an aggregate total area of approximately 225,000 square feet (ft2), with twelve (12) major buildings consisting of approximately 150,000 ft2. There are 14 smaller buildings that total approximately 25,000 ft^2 and are used or occupied by employees. There are also nine small storage/special purpose structures and three unused buildings that total approximately 50,000 ft^2.

The U.S. Department of the Interior (DOI) Bureau of Mines owned and operated the Site beginning in 1942. In April 1996, DOI transferred the Site to DOE as the Albany Research Center (ARC). In November 2005, the ARC was incorporated into the in-house research of NETL, with additional locations in Pittsburgh, PA, and Morgantown, WV. NETL-Albany has a substantial amount of equipment used in researching the properties of materials and the melting, casting and fabrication of metals. Much of this equipment requires large amounts of space and demands significant amounts of electrical power and cooling water. Current and previous research at NETL-Albany involves potentially hazardous activities, including work for other Federal agencies [U.S. Environmental Protection Agency (EPA), Atomic Energy Commission (AEC), and DOI], and private industries.

2.2 Previous Sampling

Extensive sampling has taken place on-site and on adjoining properties to the east and south of the Site to evaluate groundwater, soil, and soil vapor conditions. This workplan focuses on the areas to the north and west of the Site, where there is a potential risk from groundwater migration and vapor intrusion into the structures. A 'desktop assessment' will also be completed as part of this Work Plan to further assess and review any potential data gaps from prior sampling, including sampling and other data regarding Albany public schools east of NETL and other applicable onsite data. A review of historical COIs compared to prior sampling events will also be conducted.

2.3 Geological and Hydrological Setting

The soils in the area of the Site are identified in the United States Department of Agriculture (UDSA) Web Soil Survey as generally consisting of silt loams. According to the Albany Site Groundwater Monitoring Report Event 47 – August 2023 prepared by WE2, submitted to DOE NETL on October 13, 2023, soils on-site have been characterized during the course of past soil and groundwater investigations. The following sections describe the geologic and hydrogeologic characteristics of the distinct geologic units identified at the site as summarized by WE2 in the October 2023 Event 47 Report.

2.3.1 Upper Silt Unit

The Upper Silt Unit is present from the ground surface to a depth of approximately 15 feet bgs and is predominantly silt and silty sand with laterally discontinuous clay lenses and thin water-

bearing sands. It contacts the underlying Upper Clay Unit across most of the site. The Upper Silt Unit is subject to non-uniform surface water infiltration that can become locally perched on discontinuous clay lenses and saturate discontinuous sand lenses. These conditions contribute to a non-uniform saturation and heterogeneous groundwater elevations and groundwater flow throughout the unit referred to as the Perched Aquifer.

2.3.2 Upper Clay Unit

The Upper Clay Unit is a laterally discontinuous, dense, dry clay with a maximum thickness of approximately 10 feet. The Upper Clay Unit, when encountered, is located between the Upper Silt Unit and the underlying Gravel Aquifer at a depth of approximately 12 to 18 feet bgs. The current understanding of the lateral extent of the clay shows it as an inverted "T" shaped structure; however, it is important to note that the western extent of the clay has not been evaluated. In some areas, the clay grades into soft, brown, moist, silty clay for about 10 feet from the mapped edge of the dense, hard, dry clay. The soft brown clay may represent some relatively narrow transitional facies at the edge of the Upper Clay Unit. The Upper Clay Unit is a localized aquitard and groundwater perches on it in some portions of the Site. The approximate extents of the Perched Aquifer were determined by ICF, refined by AECOM/USSE2, and are shown in Figure 3 of the October 2023 Event 47 Report. Some borings that have penetrated the Upper Clay Unit have encountered an approximately 5-foot-thick zone of dry sediments composed of the underlying Gravel Aquifer, suggesting the Upper Clay Unit (where present) prevents vertical movement of water through the clay and into the Gravel Aquifer. Flow of the perched groundwater (where present) appears to be controlled in part by the surface topography of the clay. With water infiltration being significantly less during the dry season, there are variable flow patterns in the Perched Aquifer, with flow generally somewhat radial due to local mounding around well MW-10. Groundwater flow in the southern part of the Site appears to consistently be to the south/southwest regardless of season.

2.3.3 Gravel Aquifer

The Gravel Aquifer is present from a depth of approximately 15 feet bgs to approximately 35 feet bgs and consists of gravelly sands and clayey/silty gravels which are saturated in most portions of the Site. Investigations indicate a change in lithology of the Gravel Aquifer in the northeast portion of the Site. The typical lithology of the Gravel Aquifer transitions to a predominant dark gray, poorly graded sand with little or no gravel or fines in the northeast portion of the Site. This same unit was observed in several borings in the northwestern part of Liberty Elementary School near the ball fields. Groundwater elevation data and geologic data obtained during site assessments suggest that stratigraphic variations in the overlying Upper Silt Unit may cause local confining conditions in the Gravel Aquifer; therefore, the Gravel Aquifer is considered to be semi-confined. Where the Upper Clay is absent, the Upper Silt Unit directly overlies the Gravel Aquifer and forms a continuous semi-confined aquifer. Locally, the upper portion of the Gravel Aquifer immediately below the Upper Clay has been found to be only partially saturated. Groundwater flow in the Gravel Aquifer is variable across the Site. The gradient in the central portion of the Site is very flat, and groundwater elevations decrease to the north and south, indicating a flow direction away from the center portion of the Site with a slight

east-southeast trend below Liberty Elementary School. In the southern part of the Site the groundwater gradient is generally to the southwest, and in the northern part of the Site the gradient is toward the northwest or northeast depending on the season. Water levels in wells screened across both the Upper Silt Unit and Gravel Aquifer (MW-1, MW-3, MW-5, MW-6, and MW-14) are consistent with water levels in the Gravel Aquifer. The majority of the seventeen wells installed on site since February 2005, and the four off-site wells installed in September 2006 were constructed such that the screened interval only penetrates the deep Gravel Aquifer and does not intercept the Upper Silt Unit. This was later confirmed based on contaminants of potential concerns identified in the earlier sampling events of the site's original wells.

2.3.4 Lower Silt/Clay Unit

Th Lower Silt/Clay Unit includes two stratigraphic units (Siltstone and Blue Clay) that underlie the Gravel Aquifer. In general, the Blue Clay underlies the Siltstone Unit; however, in portions of the Site, the Siltstone Unit is not present, and the Gravel Aquifer directly overlies the Blue Clay. The Lower Silt/Clay Unit is an aquitard that restricts the vertical movement of water. The surface of the Lower Silt/Clay Unit in the southwestern portion of the Site dips steeply to the southwest. The surface of the Lower Silt/Clay Unit in the eastern portion of the Site and at Liberty Elementary School dips to the east/northeast. In the northwest part of the Site the Lower Silt Clay dips to the northwest.

3.0 INVESTIGATION OBJECTIVES AND RATIONALE

The objectives of this Work Plan include:

- Evaluate the risk for vapor intrusion of chlorinated volatile organic compounds (Cl-VOCs)[1] on the northern and western portion of the Site, as well as evaluating in the vicinity of monitoring wells (MW-18 and MW-28)
- Complete a "desktop assessment," including data gap analysis of delineation based on prior sampling events, for each of the following tasks:
    - Review and assess historical contaminants of interests (COI) compared to prior sampling events
    - Assess the historical data of drinking water and vapor intrusion for the eastern adjoining schools and other facilities within Locality of Facility
    - Assess the potential risks to applicable drinking water wells using the ODEQ Beneficial Water Use Determination (BWUD) process
    - Note: The desktop assessment tasks will not include additional sampling of any 'gap' areas identified, those would be included in the next phases of work.
- Begin assessment of the potential risks to applicable drinking water wells using the ODEQ Beneficial Water Use Determination (BWUD) process per the ODEQ Guidance

[1] Cl-VOCs analytes include: 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Carbon Tetrachloride, Chloroform, Chloromethane, Methylene Chloride, Tetrachloroethene, Trichloroethene, and Vinyl Chloride.

for Conducting Beneficial Water Use Determinations at Environmental Cleanup Sites[2] published 1998 (updated 2017). Note: the BWUD is anticipated to be fully conducted during the next phase of investigation, not necessarily at the completion of Phase I of the workplan.

- Delineate the presence of Cl-VOCs in groundwater off-site to the north and west of the Site
- Evaluate the presence of Cl-VOCs in surface water within a residential neighborhood to the west of the Site.

The following sections below details the objective and rationales of each investigation. **Table 1** provides a summary of the investigative activities.

The purpose of the installation and sampling of soil gas wells on site, the installation and sampling of temporary monitoring wells off-site to the north and west, as well as sampling surface water off-site to the west is to delineate the groundwater plume of chlorinated solvents (Cl-VOCs) and to evaluate the risk that the plume poses to groundwater and soil vapor conditions on and off-site.

3.1 Soil Gas Investigation

Six permanent soil gas wells (SGWs) will be installed on-site for the purposes of investigating soil vapor conditions on-site and evaluating the potential vapor intrusion risk to nearby and adjoining properties. One of these soil gas wells will be installed in the vicinity of MW-24. Permanent soil gas wells will also be installed within the vicinity of MW-18 and MW-20 for comparison to the 2009 soil gas sampling event. To evaluate the interval measured to have the highest concentrations of CI-VOCs during the 2009 event, these SGWs will be screened at 5.0 feet bgs as well as the highest photoionization detector (PID) (Minirae 3000, 10.6 eV) reading near the groundwater source[3] (anticipated depth to be around 8-12 feet bgs). The remaining three permanent SGWs will be installed along the northern western NETL-Albany property boundary.

These SGWs installed along the western property boundary will be installed at a depth of 5.0 feet bgs and field screened during the installation using a PID for the presence of volatile organic compounds (VOCs). The proposed location of these soil gas wells is displayed on **Figure 3**. Refer to **Section 4.2** below for further discussion of installation and sampling.

The determination of applicable soil gas screening levels is defined under ODEQ, guidance for Assessing and Remediating Vapor Intrusion in Buildings, March 2010, updated June 2023[4]. The

[2] ODEQ Guidance for Conducting Beneficial Water Use Determinations at Environmental Cleanup Sites[2] published 1998 (updated 2017) is located here: https://www.oregon.gov/deq/FilterDocs/GuidanceBeneficialWaterUse.pdf
[3] If field screening and/or PID readings are zero or inconclusive to make a screen depth determination, the soil gas sampling screen will be installed 1.5 feet above observed saturated soils.
[4] June 2023 updates addresses concerns screening methods and risk-based concentrations (RBCs) are not adequately protective, particularly for chlorinated solvents, https://www.oregon.gov/deq/hazards-and-cleanup/env-cleanup/pages/vapor-intrusion.aspx

soil gas samples will be compared to ODEQ's RBDM occupational and residential risk-based concentrations[5][6] (RBCs).

3.2 Groundwater Investigation

After receiving all applicable permits, DOE will install five temporary groundwater monitoring wells off-Site for the purpose of delineating potential off-site migration of groundwater contamination. According to the October 2023 Event 47 Groundwater Monitoring Report, the extent of the groundwater plume has not been defined northwest of the Site. The temporary monitoring wells will be installed northwest of the site within the public ROWs on Queen Avenue SW, 16th Avenue SW, Broadway Avenue SW, and Park Terrace SW. The locations of these temporary monitoring wells are shown in **Figure 3**. Of the two aquifers that have been identified at the Site (shallow, perched aquifer and gravel aquifer), prior groundwater investigations have demonstrated that groundwater contamination has already been defined within the shallow, perched unit of groundwater to the north and west of the Site. Therefore, the temporary monitoring wells proposed in this Work Plan will be screened within the gravel aquifer, where the extents of groundwater contamination have not yet been defined, as identified during installation. Refer to **Section 4.3** below for further discussion of installation and sampling.

DOE will analyze groundwater samples using EPA methods 8260D[7]. Based on COCs identified in previous Reports for the Site, groundwater samples will be analyzed for 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Carbon Tetrachloride, Chloroform, Chloromethane, Methylene Chloride, Tetrachloroethene, Trichloroethene, and Vinyl Chloride.

If the temporary monitoring wells indicate delineation of the groundwater plume, DOE may later install permanent monitoring wells, to allow for periodic monitoring. Soil samples are not anticipated to be collected as part of this workplan.

3.3 Surface Water Investigation

A swale is located within one of the residential neighborhoods approximately 560 feet to the west of the Site, which is observed to be consistently saturated at a shallow depth. The swale is utilized for surface water and stormwater runoff from the south-east portions of the Site as well as the area surrounding the swale. If water is present, DOE will collect and analyze a grab sample of the surface water within this swale to evaluate the potential risk of Cl-VOCs migration to this area. Refer to **Section 4.4** below for further discussion of swale sampling.

DOE will analyze surface water samples using EPA methods 8260D. Based on COCs identified in previous analytical data for the site, this surface water sample will be analyzed for 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Carbon Tetrachloride,

[5] ODEQ's RBCs are located within the RBDM, Appendix A, Developed September 2017, revised September 2023
[6] If an ODEQ RBC is not available, EPA regional screening levels (SLs) will be utilized.
[7] This method was formerly referred to as 8260B.

Chloroform, Chloromethane, Methylene Chloride, Tetrachloroethene, Trichloroethene, and Vinyl Chloride.

4.0 FIELD METHODS, SAMPLING, AND ANALYSIS PLAN

4.1 General

This section will address the following investigation activities:

- On-site soil gas well (SGW) installation and sampling
    - Investigative activities will focus on the northwestern portion of the NETL-Albany Property, to duplicate prior soil gas sampling at two locations as well as to evaluate the vapor intrusion potential at the property boundary.
- Off-site temporary monitoring well installation and sampling
    - Investigative activities will focus on off-site locations to the north and west of the NETL-Albany Property.
- Surface water sampling of swale

Table 1 of this workplan provides a summary of the investigative program.

4.2 Soil Gas Investigative Activities

Based on discussions with ODEQ, a total of six permanent soil gas wells will be installed on-site. The location of two of these soil gas wells will be installed adjacent to monitoring wells that have presented measured contamination exceeding ODEQ's RBCs (MW-18, MW-20, MW-24). The remaining four soil gas wells will be installed on the northern and western boundary as well as the central portion of the northern boundary. The proposed locations of these soil gas wells are displayed on **Figure 3.**

4.2.1 Soil Gas Well (SGW) Installation Methods and Field Screening

All proposed SGW locations will be screened using ground penetrating radar (GPR) prior to drilling to prevent damage to buried structures. All underground utilities located within the vicinity of a proposed SGW location will be contacted and marked prior to drilling. The SGWs will be installed with hand auger and, if necessary, direct push (e.g. geoprobe) methods to a maximum depth of 16 feet bgs.

The soil gas monitoring wells will be installed with a 6" x ¼" diameter stainless-steel implant for soil gas and capped with a 7" x 3" diameter cast aluminum single bolt monument cover, installed in accordance with the manufacturer's recommended procedure. The SGWs located in the vicinity of MW-18, MW-20, and MW-24 will be screened at two different depths. To accomplish this, each of the screened depths will be installed and sampled as individual borings (i.e. side-by-side locations, each with one screen interval). The initial boring will be advanced to the top of the groundwater table to assess and determine the correct depth for the deeper SGW screen. Once the

deeper implant is installed in the initial boring, a second boring will be conducted approximately 1 to 2 feet away and the second implant will be installed at the 5.0 feet interval. These select SGWs will be screened at approximately 5.0 feet bgs as well as the highest PID reading based on field observations, historic soil gas data, and with respect to the water table depth (anticipated depth to be around 8-12 feet bgs). However, if field screening and/or PID readings are zero or inconclusive to make a screen depth determination, the soil gas sampling screen will be installed 1.5 feet above observed saturated soils[8]. ODEQ will be notified to confirm screen depths prior to installation. The remaining soil gas wells along the Property boundaries will be screened around 5.0 feet bgs.

Each soil core generated will be screened along its entire length using a PID for the presence of VOCs. The PID will be calibrated per manufacturer's specifications. The PID readings will be recorded on the boring log for each half-foot soil interval. The field screening results will assist the field personnel in identifying the interval of potential contamination.

As stated in the Section 3.2.1 of the ODEQ Guidance for Assessing and Remediating Vapor Intrusion in Buildings, March 2010, the soil gas implants will be attached to new inert, impermeable tubing (e.g. Teflon®, Nylaflow® PEEK™ or stainless steel), which will be cut to four inches below grade. The borings will both be backfilled with clean sand to one-foot above the implant, followed by bentonite chips to one-foot bgs and six-inches of clean sand and capped with a soil gas well manhole 4" in diameter set into concrete. A boring log will be developed for each of the soil gas wells installed, copies of which will be included in the Investigation Report. Following permanent installation, the SGWs will be allowed to equilibrate for at least 48 hours prior to sampling. Soil cuttings during SGWs installation will be contained within a 55-gallon drum and staged on the Site for proper disposal. Refer to **Section 7.0** of this Work Plan for further information regarding the decontamination process.

4.2.2 Soil Gas Sampling

Soil gas samples will be collected following procedures outlined in USEPA Method TO-15 (Summa Cannister) and in accordance with recommendations cited in the Section 3.2.1 of the March 2010 ODEQ Guidance for Assessing and Remediating Vapor Intrusion in Buildings Document. Prior to collecting the sample, a minimum of two volumes of the soil gas well will be purged using a graduated syringe and a 3-way valve to ensure that samples are representative of subsurface vapors. The sampling points will be tested for leaks, by covering the sampling point and filling an enclosure with a tracer gas (i.e., helium) and testing the tubing where the Summa canister will be placed for the tracer gas. Soil gas samples will be collected into a Summa canister container with a flow controller to a certified National Environmental Laboratory Accreditation Program (ORELAP) laboratory for analysis. Refer to **Section 8.0** for further discussion of sampling handling and documentation.

[8] The 1.5 feet above the observed water table should allow for collection of soil gas during future summer, fall and possibly winter events. During spring, the deeper soil gas point is likely to be below the water table.

4.2.3 Soil Gas Analysis

Soil gas samples will be submitted to a certified ORELAP laboratory for TO-15 analysis and will follow and will follow the methods described in EPA/625/R-96/010b (USEPA 1999), as updated. The soil gas samples will be reported as ug/m^3 for USEPA SLs and ODEQ SLs comparison. Based on the identified -Cl-VOCs in previous Reports for the site, soil gas samples will be analyzed for 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Carbon Tetrachloride, Chloroform, Chloromethane, Methylene Chloride, Tetrachloroethene, Trichloroethene, and Vinyl Chloride. The screening levels for soil gas sample analysis are provided in **Table 2** of this Work Plan.

4.3 Groundwater Investigative Activities

Five temporary groundwater monitoring wells (MWs) will be installed off-Site for the purpose of delineating the groundwater plume to the northwest of the Site. The MWs will be installed to the northwest of the site on the public ROWs on Queen Avenue SW, 16th Avenue SW, Broadway Avenue SW, and Park Terrace SW. The locations of these temporary monitoring wells are shown in **Figure 3**.

4.3.1 Temporary Monitoring Well (MW) Installation

All proposed MW locations will be screened using GPR prior to drilling to prevent damage to buried structures. All underground utilities located within the vicinity of a proposed MW location will be contacted and marked prior to drilling. Direct-push (e.g. Geoprobe) and/or hollow-stem auger (HSA) methods will be used to advance the soil borings as is appropriate for site conditions. Each soil core generated will be screened along its entire length using a photoionization detector (PID) (Minirae 3000, 10.6 eV) for the presence of volatile organic compounds (VOCs). The PID readings will be recorded on the boring log for each half-foot soil interval. A soil boring log will be developed for each of the temporary monitoring wells installed and copies of the soil boring logs will be provided in the Investigation Report.

Total depth at each boring will be defined by a confined layer (i.e. clay or bedrock). Upon reaching total depth of the borehole, the driller will install a temporary MW consisting of a 2-inch diameter, 10-foot well screen, with a 0.010 slot Schedule 40 PVC well screen. Soil cuttings and purged groundwater during the temporary MWs installation will be contained within a 55-gallon drum. Refer to **Section 8.0** of this Work Plan for further information regarding the decontamination process. If the groundwater samples collected from the temporary monitoring wells indicate that delineation of the groundwater plume has been achieved, a follow-up event will be conducted to install permanent monitoring wells at those locations. No soil samples are planned to be collected from these borings.

4.3.2 Temporary Monitoring Well (MW) Abandonment

All temporary installed MWs will be abandoned in accordance with Oregon Administrative Rules (OAR) 690-240. Oregon regulations allows for temporary MWs to remain in the ground

for up to 72-hours before abandonment. Abandonment work will be performed by an Oregon-licensed driller. The MW will be permanently abandoned according to OAR 690-220-0030 and shall be filled in such a manner that vertical movement of water within the borehole, including vertical movement of water within the annular space surrounding the well casing, is effectively and permanently prevented.

4.3.3 Groundwater Sampling

Groundwater samples will be collected utilizing either a peristaltic pump or a submersible pump with a flow control box for low flow purge and sample methods. New, clean polyethylene tubing and masterflex tubing will be utilized. The temporary MWs will be developed using low flow methods until sediment-free water is produced or at least three casing volumes are purged from the well (purge rate shall not exceed 500mL/minute during purging).

Prior to low-flow activities, all field meters will be calibrated according to factory instructions. As applicable, water levels of all temporary MWs will be allowed to equilibrate prior to measurements. All temporary MWs will have measured depth to water (DTW), using an electronic water level meter. Decontamination will be completed between each MW measured to minimize the risk of cross-contamination between MWs.

While purging, the water will be routed through a flow cell (i.e., YSI) in which temperature, pH, conductivity, oxygen-reduction potential, and dissolved oxygen will be monitored every 3 to 5 minutes. PID monitoring will also be conducted while purging and sampling. Once the specified parameters have stabilized over three consecutive measurements and at least three times the volume of the well casing has been purged, a sample will be collected. Additionally, turbidity will be measured utilizing a TBM after three YSI readings are collected. Turbidity will be considered stable if measured at ≤10 nephelometric turbidity units (NTUs). If turbidity measures >10 NTUs, the TBM will be utilized to measure the turbidity every three YSI readings until the measurement reaches ≤10 NTUs, is ±10%. If stabilization of the parameters does not occur within 45 minutes and a total of at least three well volumes have been purged from the well, a sample will be collected. Water level readings and turbidity will be measured after three YSI readings. If not stabilized, turbidity will be measured every three YSI readings until it has stabilized.

The parameters should stabilize as follows:

Specific Conductance	±3%
pH	±0.1 unit
Oxygen-Reduction (Redox)	±10 millivolts
Dissolved Oxygen	±>10% mg/L
Turbidity	≤10 nephelometric turbidity units (NTUs) or ±10% if >10 NTUs

In the event that the temporary wells dry up, groundwater samples will be collected from those temporary monitoring wells upon the well recharging. Groundwater samples will be collected following procedures outlined in USEPA Operating Procedure SESDPROC-301-R4. Samples

will be placed into an iced cooler after collection. Refer to **Section 5.0** for further discussion of sampling handling and documentation.

The submersible pump and any other equipment utilized for the sampling of multiple wells will be decontaminated between well sampling using Liquinox.

Purge water generated during the course of sampling will be collected in a 55-gallon drum and disposal will be coordinated by NETL – Albany Environmental Safety and Health (ES&H) Support. Refer to **Section 8.0** of this Work Plan for further information regarding the decontamination process.

4.3.4 Groundwater Analysis

Groundwater samples will be analyzed under laboratory EPA methods 8260D for Cl-VOCs. Samples will be analyzed for 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Carbon Tetrachloride, Chloroform, Chloromethane, Methylene Chloride, Tetrachloroethene, Trichloroethene, and Vinyl Chloride. The screening levels for groundwater sample analysis are provided in **Table 3** of this Work Plan.

4.4 Surface Water Sampling and Analysis

4.4.1 Surface Water Sampling

A proposed grab sample from the swale is proposed to determine if there is a potential risk of migration to that area. The location of the grab sample is presented on **Figure 3**. The grab sample will be collected in accordance with Oregon's regulations.

If there is standing water observed at the time of the field event, a grab surface water will be collected and preserved in VOAs containing HCL. However, if standing water is not observed at the time of the field event, a soil sample will be collected directly underneath the swale. The soil sample will be collected using hand auger methods, and soil samples will be preserved within a methanol VOA vial and a 4oz glass jar. Refer to **Section 5.0** for further discussion of sampling handling and documentation.

4.4.2 Surface Water Analysis

Surface water samples will be analyzed under laboratory EPA methods 8260D for Cl-VOCs. Samples will be analyzed for 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Carbon Tetrachloride, Chloroform, Chloromethane, Methylene Chloride, Tetrachloroethene, Trichloroethene, and Vinyl Chloride. The screening levels for surface water sample analysis are provided in **Table 4** of this Work Plan.

5.0 SAMPLE HANDLING, DOCUMENTATION, AND TRANSPORT

5.1 Field Logbook and Forms

All field activities and observations will be noted in a field logbook or applicable field forms. This is to ensure that the field logbook and field data forms are completed and accurate. Field logbook entries will be written clearly with enough detail so that participants can reconstruct events later, if necessary. Field logbooks will be bound, with consecutively numbered pages, and removal of any pages is prohibited. Unbiased, accurate language will be used and entries will be made while activities are in progress or as soon afterward as possible. When field activities are complete, the field logbook will be retained in the project file at Fed95's office. Copies of the field logbook will be provided to NETL – Albany.

Field data forms (e.g., soil boring log, groundwater sampling form) will be completed for activities that are not described in the field logbook and kept in the project file at Fed95's office. Copies of the field data forms will be provided to NETL – Albany upon their completion. Depending on the activity, the type of field data form and the information recorded on it may vary. Sample field forms are provided in **Appendix A** of this Work Plan.

5.2 Equipment and Supplies

Equipment and supplies will include sampling equipment, decontamination supplies, sample containers, coolers, field logbooks and forms, personal protective equipment (PPE), and personal gear. Protective wear (e.g., hard hats, gloves), as required for the health and safety of field personnel.

5.3 Sample Containers, Preservation, and Holding Times

Soil gas, groundwater and surface water samples will be placed directly in the appropriate sample containers. Sample containers and preservatives, as well as coolers and packing material, will be supplied by the appropriate certified ORELAP laboratory. Commercially available pre-cleaned jars will be used and the laboratory will maintain a record of certification from the suppliers. Sample containers will be labeled clearly at the time of sampling. Labels will include the project name, sample ID, sampler's initials, analysis to be performed, date, and time.

5.4 Sample Identification and Labeling

During sample collection, a unique code will be assigned to each sample as part of the data record. The ID code will indicate the sample type, sampling location, and level of duplication. The first component of the sample ID will contain an abbreviation for the sample type followed by the temporary monitoring well number, with leading zeros used for stations for ease of data management and correct sorting. The following abbreviations for sample types are listed below.

- SGW = soil gas well sample

- TMW = temporary monitoring well groundwater sample
- SW = surface water sample

For field duplicate samples, the original sample ID will contain "DUP" a the end of the sample ID. The sample type code (e.g., TBS or TMW) will correspond to the sample type for which the field duplicate sample or equipment rinsate blank was collected.

Examples of sample IDs are offered below:

- **SGW-01 (4.0')** indicates the soil gas sample was collected from the 4.0-foot interval of soil gas well -01
- **TMW-05** indicates a groundwater sample collected from temporary monitoring well 05.

5.5 Chain-of-Custody Procedures

Samples are in custody if they are in the custodian's view, stored in a secure place with restricted access, or placed in a container secured with custody seals. A chain-of-custody record will be signed by each person who has custody of the samples and will accompany the samples at all times. Copies of the chain-of-custody will be included in contract laboratory reports. The original chain-of-custody form will be transported with the samples to the selected contract laboratories. Upon receipt, the laboratory sample custodian will inventory the samples by comparing sample labels to those on the chain-of-custody document. The custodian will enter the sample number into a laboratory tracking system by project code and sample designation. The custodian will assign a unique laboratory number to each sample and will be responsible for distributing the samples to the appropriate analyst or for storing samples in an appropriate secure area. The contract laboratories will maintain chain-of-custody procedures internally and when samples are shipped to subcontracted laboratories or during shipment between laboratories.

5.6 Sample Packaging and Shipping

The contract laboratory will supply sample coolers and packing materials for each sampling event. Upon completion of the final sample inventory, samples will be packed in a cooler. Glass jars will be packed to prevent breakage and separated in the shipping container by bubble wrap or other shock absorbent material. Ice in sealed plastic bags will be placed in the cooler to maintain a temperature of approximately 4 degrees Celsius (ºC). Alternatively, dry ice may be used to expedite cooling if recommended by the laboratory. When the cooler is full, the COC form will be placed into a re-sealable bag and taped onto the inside lid of the cooler. A temperature blank will be added to each cooler. Coolers will be transported to the contract laboratory by lab courier or overnight shipping service. These packaging and shipping procedures are in accordance with DOT regulations as specified in 49 CFR 173.6 and 49 CFR 173.24.

6.0 QUALITY ASSURANCE PLAN

6.1 General

This Quality Assurance Plan has been developed to ensure that ODEQ data-quality standards are maintained during sampling and analysis performed during the course of this investigation. The following sections describe the data-quality objectives for precision, accuracy, and completeness, including description and frequency of field and laboratory quality assurance and quality control (QA/QC) samples to be collected/analyzed, to assess data quality; data-quality assessment procedures; and data-quality reporting. This QA/QC procedures will be consistent with:

- ODEQ Quality Assurance Policy for the Environmental Cleanup Programs, July 2015
- ODEQ Risk-Based Decision Making for Remediation of Contaminated Sites, October 2017, revised September 2023

6.2 Field QA/QC

6.2.1 Standard Field QA/QC

Standard field procedures to ensure the quality of all data collected and analyzed for this investigation will include the following:

- The use of pre-cleaned equipment to perform all sampling
- Following sampling procedures specified in ODEQ or EPA guidance or otherwise approved by ODEQ.
- Collect samples in pre-cleaned bottles; label, store, and transport the samples according to ODEQ or EPA guidelines.
- Maintain strict chain-of-custody from sample collection until the samples are received by the analytical laboratory.
- Use field notes and photographs to document all sampling activities and any deviations from the original sampling plan.

6.2.2 Soil Gas Field QA/QC

A duplicate sample will be collected during the soil gas sampling event from the soil gas well located within the contamination source area within the central portion of the property (near MW-18).

6.2.3 Groundwater QA/QC

Duplicates are two identical samples collected at the same time from the same source but placed in separate sample containers. The purpose of collecting a duplicate is to assess laboratory

performance by comparing what should be identical results. A duplicate sample will be collected during the groundwater sampling event from the temporary monitoring well located nearest to known contamination.

Equipment blanks are designed to evaluate field sampling and decontamination procedures. These blanks are prepared by passing organic-free (for organics) or deionized water (for inorganics) through decontaminated sampling equipment before filling the sample bottles. Equipment blanks will be taken for sampling equipment that is decontaminated and reused in the field (i.e., pump and water level take) each day of the groundwater sampling event.

Trip or travel blanks evaluate potential sample contamination from volatile organic compounds (VOCs) that may be present in the air on-site or in sample shipping containers. A trip blank consists of laboratory distilled, deionized water in a closed container. One trip blank will be prepared by the laboratory per field event and returned to the lab for analyses unopened, to be analyzed with the actual Site samples.

All of the QA/QC samples will be analyzed for the same constituents as the other groundwater samples collected during the investigation.

6.2.4 Surface Water QA/QC

A duplicate sample will be collected from the swale during the surface water sampling event.

One trip blank will be prepared by the laboratory and returned to the lab for analyses unopened, to be analyzed with the actual Site samples.

6.3 Laboratory QA/QC

A laboratory quality control (QC) sample will be collected and analyzed once per week of sampling per matrix during the investigation. Extra volume of a sample with sufficient material to duplicate its analyses or conduct matrix spike analyses will be taken at a location where there is known or suspected contamination. Bottle labels, traffic reports, and chain-of-custody records for these samples will identify them as laboratory QC samples. A copy of the certified ORELAP laboratory will be provided with the Phase I Investigative Report[9].

7.0 PERSONAL HEALTH AND SAFETY PLAN (HASP)

A requirement for health and safety training for all workers at hazardous waste sites was promulgated by the Occupational Safety and Health Administration (OSHA) in the Federal Register: March 6, 1989 (29 CFR Part 1910, 54 FR 9294). As a U.S. DOE Site, NETL-Albany has a safety program through its Integrated Safety Management System (ISMS). In addition, NETL-Albany is independently certified to the ISO 14001 and 45001 standards. All

[9] ORELAP certification will be provided once an analytical laboratory has been contracted for this investigation.

requirements associated with these systems and standards will be followed in actions and procedures.

The Fed95 HASP for this project is provided in **Appendix C** of this Work Plan.

8.0 DECONTAMINATION ACTIVITIES

A decontamination area will be designated at the Site and will accommodate the decontamination of field equipment from the drill rig and any other equipment that comes into contact with the potential COCs.

Drilling equipment (e.g. dill rod, samplers) will be decontaminated (e.g. steam-cleaned or pressured wash) prior to use on-site, between each boring location, and before departing the Site. Decontamination fluids generated during cleaning of the drill rig and drilling equipment will be contained within a labeled 55-gallon drum and temporarily stored in NETL-Albany's hazardous waste storage area prior to off-site disposal. All soil cuttings and/or purged groundwater developed during investigative activities will be segregated and contained in 55-gallon drum, stored in NETL-Albany's hazardous waste storage area prior to off-site disposal.

9.0 SCHEDULE OF ACTIVITIES AND SUBMITTAL OF DELIVERABLES

The proposed scheduled of activities and deliverable submittal will be provided upon the approval of this Work Plan.

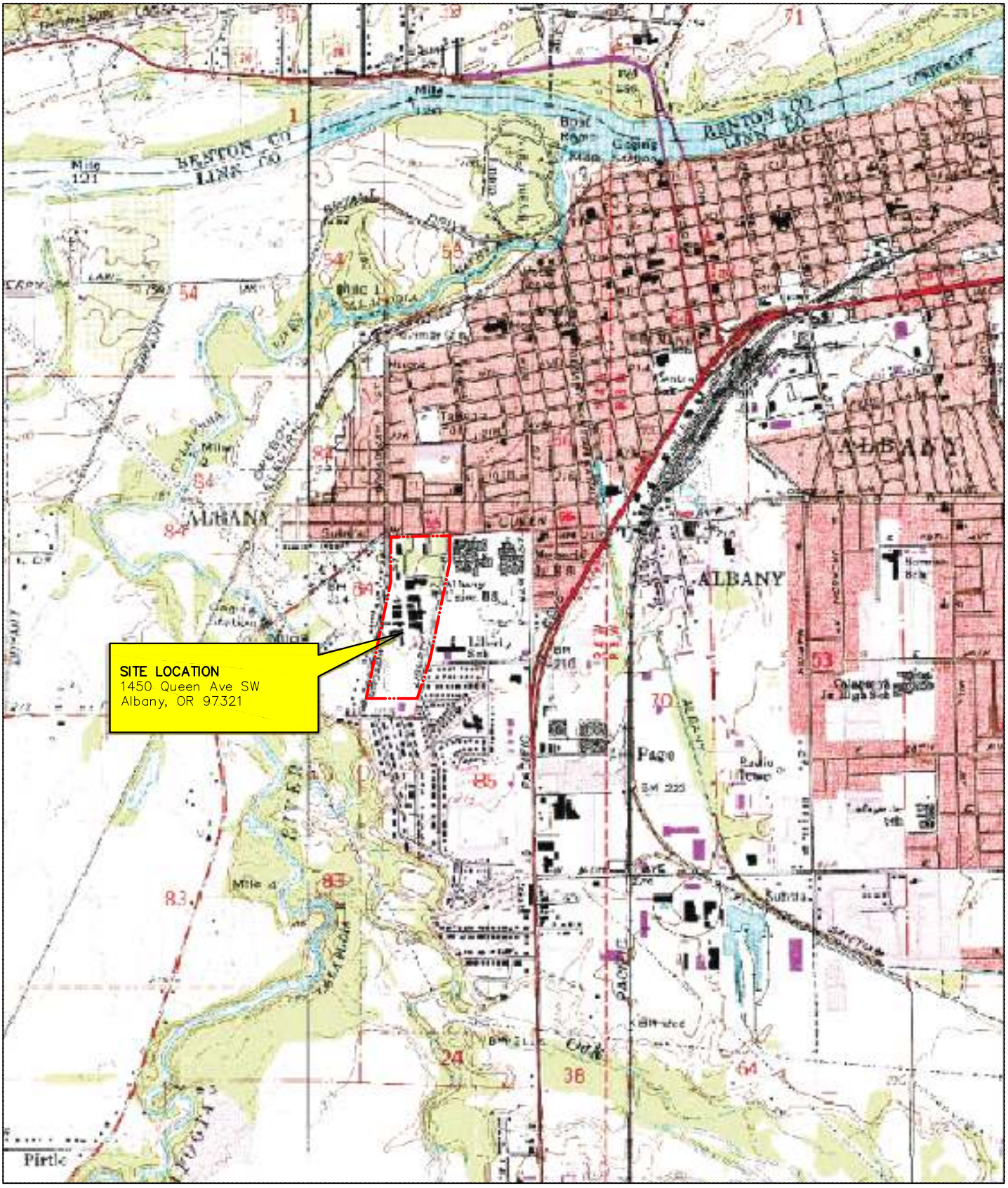
10.0 REFERENCES

- National Environmental Laboratory Accreditation Conference (NELAC) Standards – 2009
- The National Resource Conservation Service Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/)
- USEPA Publication SW-846, "Test Methods for Evaluating Solid Waste" – Updated October 2013
- USEPA, National Functional Guidelines for Superfund Organic Methods Data Review, November 2020
- U.S. Environmental Protection Agency regions 3, 6, and 9, Regional Screening Levels for Chemical Contaminants at Superfund Sites. Tables updated May 2018 (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm)
- Oregon Department of Environmental Quality, Guidance for Assessing and Remediating Vapor Intrusion in Buildings, March 2010
- Oregon Department of Environmental Quality, Guide to Tables of Vapor Intrusion RBCs Based on EPA VISL Calculations, June 2023

- Oregon Department of Environmental Quality, Expanded Preliminary Assessment Sampling Plan Guidance (https://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/Expanded-Guidance-aspx.aspx), Accessed February 2024
- Oregon Department of Environmental Quality, Numerical Groundwater Quality Reference Levels, Interim Standards for Maximum Measurable Levels of Contaminants in Groundwater, and Permanent Standards for Maximum Measurable Levels of Contaminants in Groundwater, as delineated by Oregon Administrative Rules 340-40020 and 090: November 14, 1997
- Oregon Department of Environmental Quality, Pre-Calculated Hot Spot Look-Up Tables, as delineated by Oregon Administrative Rules 340-122-010 through 115: October 20, 1998. Tables updated June 7, 2012 (http://www.deq.state.or.us/lq/pubs/docs/RBDMHotSpotTable.pdf)
- Oregon Department of Environmental Quality, Risk-Based Decision Making for the Remediation of Contaminated Sites, as delineated by Oregon Administrative Rules 340-122-0205 through 0360; Electronic spreadsheets updated June 7, 2012 (http://www.deq.state.or.us/lq/rbdm.htm)
- Albany Site Groundwater Monitoring Report Event 45, National Energy Technology Laboratory, prepared by WE2 Support Services JV, LLC, dated: August 2022
- Albany Site Groundwater Monitoring Report Event 46, National Energy Technology Laboratory, prepared by WE2 Support Services JV, LLC, dated: March 2023
- Albany Site Groundwater Monitoring Report Event 47, National Energy Technology Laboratory, prepared by WE2 Support Services JV, LLC, dated: August 2023
- NETL-Albany Indoor Air Monitoring Results/RBCs Comparisons, U.S. Department of Energy National Energy Technology Laboratory, prepared by Goldbelt Eagle, dated: December 2014
- Results of Ambient Air Sampling, Albany Research Center, dated: April 2005
- Conceptual Site Model Report Volume 2: Figures and Plates, National Energy Technology Laboratory – Albany, prepared by USSE2 O&M Services, dated July 2019
- USSE2, Groundwater Monitoring Plan for the National Energy Technology Laboratory-Albany, Revision 14, Albany, Oregon. January 2020.
- USSE2, Technical Memorandum: Conceptual Site Model Report for the National Energy Technology Laboratory (Formerly Albany Research Center), U.S. Department of Energy-Albany, Oregon. July 2019

FIGURES

FED95 LLC



VS

LEGEND

PROPERTY BOUNDARY

0 2,000 4,000

APPROXIMATE SCALE IN FEET

NOT A LEGAL SURVEY

FIGURE 1

SITE LOCATION MAP

NETL – Albany, OR
Albany, Oregon

February 2024

235743

FED95 LLC



VS

LEGEND

PROPERTY BOUNDARY

0 440 880

APPROXIMATE SCALE IN FEET

NOT A LEGAL SURVEY

FIGURE 2

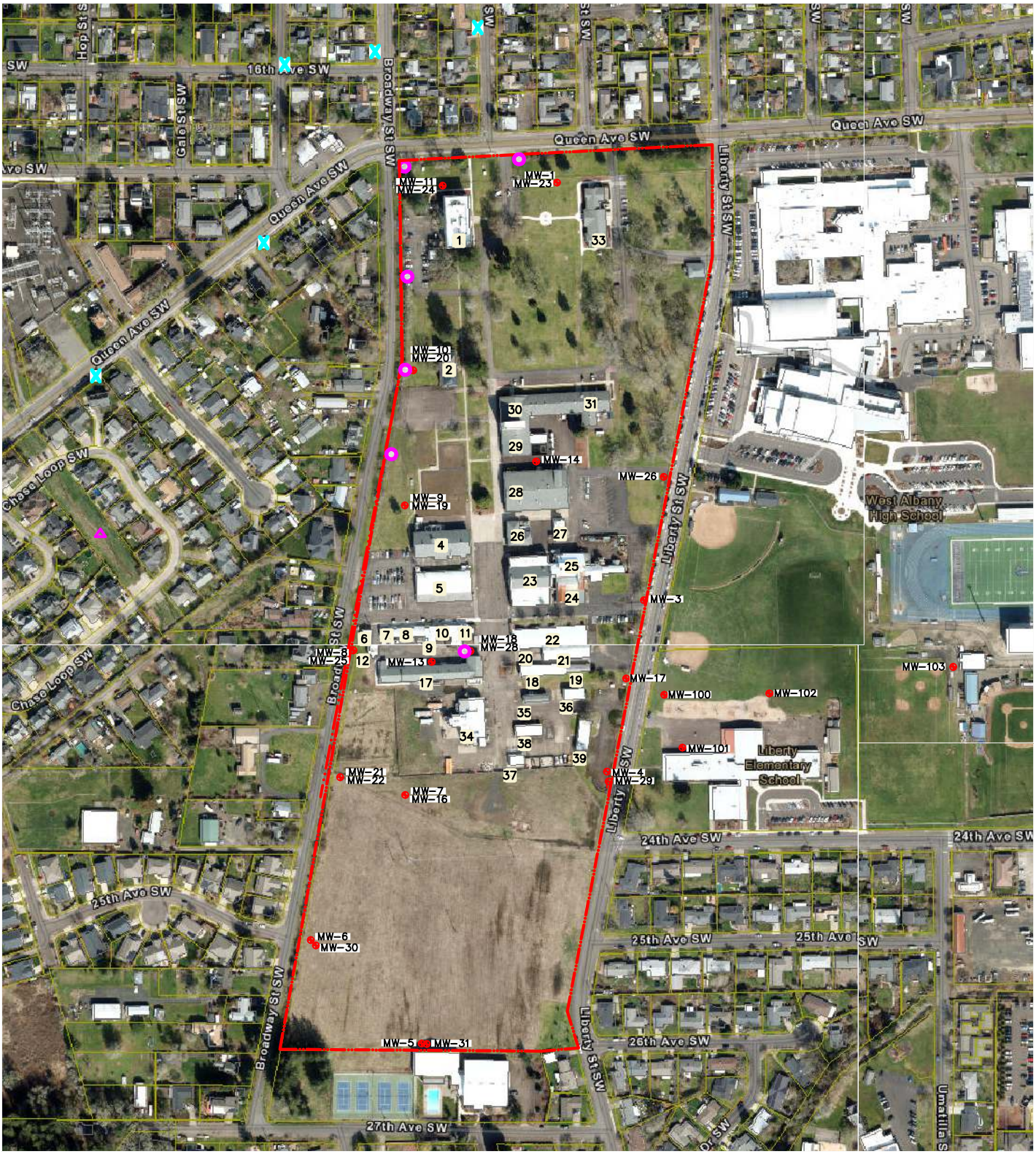
SITE VICINITY MAP

NETL – Albany, OR
Albany, Oregon

February 2024

235743

FED95 LLC



LEGEND

- APPROX. LOCATION OF EXISTING MONITORING WELL
- 1 BUILDING IDENTIFIER
- PROPOSED TEMPORARY GROUNDWATER MONITORING WELL AND PHASE II SOIL GAS WELL LOCATIONS (IF ADDITIONAL SOIL GAS WELLS ARE NECESSARY BASED ON PHASE I SOIL GAS SAMPLING RESULTS)
- PROPOSED PHASE I SOIL GAS WELL LOCATION
- PROPOSED SWALE GRAB SAMPLE LOCATION
- PROPERTY BOUNDARY

0 380 740

APPROXIMATE SCALE IN FEET

NOT A LEGAL SURVEY

VS

FIGURE 3

PROPOSED MONITORING WELL & SOIL GAS WELL LOCATION MAP

NETL – Albany, OR
Albany, Oregon

February 2024

235743

TABLES

Summary of the Phase I Sampling and Analysis Plan - Scope of Investigation
National Energy Technology Laboratories (NETL) – Albany, 1450 Queen Avenue SW, Albany, Oregon

On-Site Investigative Areas			
Area	**Matrix**	**Analytical Method Reference Number***	**Discussion****
Along the northwest corner of the NETL-Albany Property parcel boundary	Soil Gas	EPA TO-15	Three permanent soil gas wells on northern and western boundaries in northwestern portion of Site • These soil gas wells will be screened at the following depth: o 5.0 feet bgs

MW-11/MW-24 location	Soil Gas	EPA TO-15	One permanent soil gas well location to be installed within the vicinity of MW-11/MW-24 cluster.
			• Two boreholes will be conducted, each borehole installed with one soil gas well implant at its applicable screened depth.
			  o The initial boring will be advanced to the top of the groundwater table to assess and determine the correct depth for the deeper SGW screen. Once the deeper implant is installed in the initial boring, a second boring will be conducted approximately 1 to 2 feet away and the second implant will be installed at the 5.0 feet depth interval.
			• The soil gas well will be screened at the following depths:
			  o 5 feet bgs;
			  o At the highest PID reading near the groundwater source (anticipated depth to be around 8 to 12 feet bgs)
			  ▪ However, if field screening and/or PID readings are zero or inconclusive to make a screen depth determination, the soil gas sampling screen will be installed 1.5 feet above observed saturated soils[1]. ODEQ will be notified to confirm screen depths prior to installation.

MW-18/MW-28 location	Soil Gas	EPA TO-15	One permanent soil gas well location to be installed within the vicinity of MW-18/MW-28 cluster (approximate location of source area). • Two boreholes will be conducted, each borehole installed with one soil gas well implant at its applicable screened depth. o The initial boring will be advanced to the top of the groundwater table to assess and determine the correct depth for the deeper SGW screen. Once the deeper implant is installed in the initial boring, a second boring will be conducted approximately 1 to 2 feet away and the second implant will be installed at the 5.0 feet depth interval.

[1] The 1.5 feet above the observed water table should allow for collection of soil gas during future summer, fall and possibly winter events. During spring, the deeper soil gas point is likely to be below the water table.

Summary of the Phase I Sampling and Analysis Plan - Scope of Investigation
National Energy Technology Laboratories (NETL) – Albany, 1450 Queen Avenue SW, Albany, Oregon

On-Site Investigative Areas			
Area	**Matrix**	**Analytical Method Reference Number***	**Discussion****
MW-18/MW-28 location	Soil Gas	EPA TO-15	• The soil gas well will be screened at the following depths: o 5 feet bgs; o At the highest PID reading near the groundwater source (anticipated depth to be around 8 to 12 feet bgs) ▪ However, if field screening and/or PID readings are zero or inconclusive to make a screen depth determination, the soil gas sampling screen will be installed 1.5 feet above observed saturated soils[2]. ODEQ will be notified to confirm screen depths prior to installation.
MW-10/MW-20 location	Soil Gas	EPA TO-15	One permanent soil gas well location to be installed within the vicinity of MW-10/MW-20 cluster (approximate location of documented migration) • Two boreholes will be conducted, each borehole installed with one soil gas well implant at its applicable screened depth. o The initial boring will be advanced to the top of the groundwater table to assess and determine the correct depth for the deeper SGW screen. Once the deeper implant is installed in the initial boring, a second boring will be conducted approximately 1 to 2 feet away and the second implant will be installed at the 5.0 feet depth interval. • The soil gas well will be screened at the following depths: o 5 feet bgs; o At the highest PID reading near the groundwater source (anticipated depth to be around 8 to 12 feet bgs) ▪ However, if field screening and/or PID readings are zero or inconclusive to make a screen depth determination, the soil gas sampling screen will be installed 1.5 feet above observed saturated soils[2]. ODEQ will be notified to confirm screen depths prior to installation.

Direct-push (e.g. Geoprobe) and/or hollow-stem auger drilling methods will be utilized
*All samples of all matrices will be analyzed for the following constituents for this Phase I Work Plan: 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Carbon Tetrachloride, Chloroform, Chloromethane, Methylene Chloride, Tetrachloroethene, Trichloroethene, and Vinyl Chloride.
**The determination of applicable soil gas screening levels is defined under ODEQ, guidance for Assessing and Remediating Vapor Intrusion in Buildings, March 2010, Updated June 2023.
**Soil gas samples will be compared to ODEQ's RBDM occupation and residential RBCs.

[2] The 1.5 feet above the observed water table should allow for collection of soil gas during future summer, fall and possibly winter events. During spring, the deeper soil gas point is likely to be below the water table.

Summary of the Phase I Sampling and Analysis Plan - Scope of Investigation
National Energy Technology Laboratories (NETL) – Albany, 1450 Queen Avenue SW, Albany, Oregon

Off-Site Investigative Areas			
Area	**Matrix**	**Analytical Method Reference Number***	**Discussion****
Off-site to the northwest of the NETL-Albany Property parcel boundary	Groundwater	EPA5030C/ EPA 8260D	Five temporary monitoring wells to be installed, five groundwater samples will be collected: • Upon reaching the total depth of the borehole, a 10-foot well screen (0.010 slot scheduled 40 PVC) will be installed within the gravel aquifer • A collection of a groundwater sample within the gravel aquifer
Off-site to the west, swale located within NETL-Albany easement	Surface Water	EPA5030C/EPA 8260D	One surface water grab sample to be collected from swale to the west of the Site if standing water is present. • If standing water is not present, a soil sample directly beneath the swale will be collected.

Direct-push (e.g. Geoprobe) and/or hollow-stem auger drilling methods will be utilized

*All samples of all matrices will be analyzed for the following constituents for this Phase I Work Plan: 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Carbon Tetrachloride, Chloroform, Chloromethane, Methylene Chloride, Tetrachloroethene, Trichloroethene, and Vinyl Chloride

**Soil samples are not anticipated to be collected during this Phase I Work Plan.

Table 2

ODEQ and EPA's Regional Screening Criteria - Soil Gas

National Energy Technology Laboratory - Albany for Soil Gas

	RSL (TR = 1E-06; THQ=0.1) May 2023				ODEQ Vapor Intrusion RBCs June 2023[1]	
	USEPA Residential Ambient Air		Composite Worker (Industrial) Air		RBCsv	
	Carcinogenic SL TR = 1E-06	Noncarcinogenic SL THI = 0.1	Carcinogenic SL TR = 1E-06	Noncarcinogenic SL THI = 0.1	Residential	Commercial
CHLORINATED VOLATILE ORGANIC COMPOUNDS						
CONSTITUENT (ug/kg)	**SCREENING LEVEL VALUE (ug/m^3)**		**SCREENING LEVEL VALUE (ug/m^3)**		**SCREENING LEVEL VALUE (ug/m^3)**	
Carbon Tetrachloride	0.47	10	2	44	16	68
Chloroform	0.12	10	0.53	43	4.1	18
1,1-Dichloroethene	---	21	---	88	7,000	29,000
cis-1,2-Dichloroethene	---	4.2	---	18	1,400	5,800
Methyl Chloride; Chloromethane	---	9.4	---	39	3,400	41,000
Tetrachloroethylene; Tetrachloroethene	11	4.2	47	18	360	1,600
Trichloroethylene; Trichloroethene	0.48	0.2	3.0	0.88	16	100
Vinyl Chloride	0.17	10	2.8	44	5.6	93

[1] Oregon Department of Environmental Quality (ODEQ) risk-based concentrations for chronic soil vapor exposure (RBCsv) are based on the US EPA vapor intrusion screening level calculator.

TR = Target Risk

HI = Hazard Index

--- = No RSL developed

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Table 3
ODEQ and EPA's Regional Screening Criteria - Groundwater
National Energy Technology Laboratory - Albany

	USEPA Screening Levels (RSL)			ODEQ Groundwater Screening Levels			
	Primary Drinking Water MCLs[1]	Secondary Drinking Water MCLs[1]	Regional Screening Levels[2]	Groundwater MMLs[3]	Oregon - Hot Spot Tables[4]	Residential ODEQ RBCs[5]	Occupational ODEQ RBCs[5]
CHLORINATED VOLATILE ORGANIC COMPOUNDS							
CONSTITUENT	**SCREENING LEVEL VALUE (ug/L)**			**SCREENING LEVEL VALUE (ug/L)**			
Carbon Tetrachloride	5.0	---	0.46	5.0	5.0	0.46	2.1
Chloroform	80 (total THM)	---	0.22	100 (total THM)	80 (total THM)	0.22	0.98
1,1-Dichloroethene	7.0	---	2.8	7.0	7.0	2.8	13
cis-1,2-Dichloroethene	70	---	---	---	70	36	260
Methyl Chloride; Chloromethane	5.0	---	---	---	5.0	190	790
Tetrachloroethylene; Tetrachloroethene	5.0	---	11	---	5.0	12	48
Trichloroethylene; Trichloroethene	5.0	---	0.49	5.0	5.0	0.49	3.3
Vinyl Chloride	2.0	---	0.019	2.0	2.0	0.027	0.49

'--- = No RSL developed

[1] The EPA Primary and Secondary Maximum Contaminant Levels (MCLs) are provided by the U.S. Environmental Protection Agency, last updated on November 2023 [see https://semspub.epa.gov/work/HQ/404354.pdf].

[2] The EPA Regional Risk-Based Screening Values for Region 3, 6 and 9, provided by the U.S. Environmental Protection Agency, last updated on November 2023 [see https://semspub.epa.gov/work/HQ/404394.pdf]. Screening levels used are via the pathway of exposure to tapwater for Carcinogenic Target Risk (TR)

[3] The Oregon Groundwater Maximum Measurement Levels (MMLs) are provided in Oregon Administrative Rules (OAR) 340-40-0090, last updated on November 14, 1997. [https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=1457]

[4] The Oregon Hot Spot Tables are provided by the Oregon DEQ under Environmental Cleanup Guidance, [see http://www.deq.state.or.us/pubs/reports.htm]. Values used are revised to reflect Oregon DEQ hierarchy (MCL/MML, RBC, then EPA Regional Screening Levels for Regions 3, 6 and 9). Hot Spot values were modified in 2015 to reflect updates to EPA Regional Screening Levels and subsequently revised Oregon RBDM values.

[5] Oregon ingestion and inhalation from Tapwater Risk-based concentrations for individual chemicals [https://www.oregon.gov/deq/filterdocs/rbdmtable.pdf], Revised August 2023

Table 4
ODEQ and EPA's Regional Screening Criteria - Surface Water
National Energy Technology Laboratory - Albany

	USEPA Screening Levels			ODEQ Screening Levels	
	Primary Drinking Water MCLs[1]	**Human Health for the consumption of Water + Organism[2]**	**Human Health for the consumption of Organism Only[2]**	**Human Health for the consumption of Water + Organism[3]**	**Human Health for the consumption of Organism Only[3]**
CHLORINATED VOLATILE ORGANIC COMPOUNDS					
CONSTITUENT	**SCREENING LEVEL VALUE (ug/L)**			**SCREENING LEVEL VALUE (ug/L)**	
Carbon Tetrachloride (P)	5.0	0.4	5.0	0.10	0.16
Chloroform (P)	80 (total THM)	60	2000	260	1,100
1,1-Dichloroethene (P)	7.0	300	20,000	230	710
cis-1,2-Dichloroethene	70	---	---	---	---
Methyl Chloride; Chloromethane (P)	5.0	20	1,000	4.3	59
Tetrachloroethylene; Tetrachloroethene (P)	5.0	10	29	0.24	0.33
Trichloroethylene; Trichloroethene (P)	5.0	0.6	7.0	1.4	3.0
Vinyl Chloride (P)	2.0	0.022	1.6	0.023	0.23

'--- = No RSL developed

P = USEPA Priority Pollutant

[1] The EPA Primary Maximum Contaminant Levels (MCLs) are provided by the U.S. Environmental Protection Agency, updated on November 2023 [see https://semspub.epa.gov/work/HQ/404354.pdf].

[2] The EPA National Recommended Water Quality Criteria - Human Health Criteria are provided by the U.S. Envionmental Protection Agency, updated on October 2023 [see https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table]

[3] The Oregon Human Health Toxics Criteria are provided in Oregon Administrative Rules (OAR) 340-041-0033, last updated on June 16, 2011 [https://www.oregon.gov/deq/wq/Pages/WQ-Standards-Toxics.aspx]

APPENDIX A

Sample Field Forms

FED95 LLC

Groundwater Sampling Form
Project Number:
Project Name:

Sample ID:	Sample Date:	Sample Time:
Sample Crew:	Current Weather:	Current Temp:

Total Well Depth (ft):	Circle All that Apply:
Static Water Level (ft):	**Purge Method: Bailer Peristaltic Pump Submersible Pump**
Amount of Water in Well (ft):	**Sample Method: Grab Low Flow**
Casing Volume*(gal):	**Well Dried Up : YES NO**
Calculated Min. to be Purged (3x casing vol.) (gal):	
Total Vol. Purged (gal):	**Casing Size: 1 inch 2 inch 4 inch Other:_____**

Time (check every 3 to 5 min)	Flow Rate (L/Min)	Temperature (Degrees C)	Specific Conductance (mmhos) (±3%)	pH (Standard Units) (±0.1)	Redox (mv) (±10mv)	Dissolved Oxygen (mg/L) (±0.3mg/L)	Turbidity (NTUs) (≤10NTUs or ±10%)	PID Reading (ppm)	Water Level (feet)	Observations (color, odor, sheen)

Notes:
Collect first turbidity reading on 3rd YSI reading. If≤10NTUs, parameter is considered stable.
If >10NTUs, collect turbidity readings every 3rd YSI reading until reaches stabilization (≤10NTUs or or ±10%).
*1 Inch Well:
Casing Volume (Gallons) = Amount of Water in Well (ft) x 0.0408
*2 Inch Well:
Casing Volume (Gallons) = Amount of Water in Well (ft) x 0.163
*4 Inch Well:
Casing Volume (Gallons) = Amount of Water in Well (ft) x 0.653

FED95 LLC	Boring ID:	Project # :
		Address :
Boring Method:		Driller :

BLDI Staff:	PID Scan	Depth	USDA ID	Material Description & Notes
Date:				
Groundwater and Well Data		1		
Depth to GW:				
Boring Caved @:		2		
Pipe Type:				
Pipe Length:		3		
Above Ground:				
Well Cap Type:		4		
Screen Type:				
Screen Size:		5		
Screen Slot:				
Screen Depth:		6		
Sand Pack:				
Ben-Seal:		7		
Grout Type:				
Casing Type:		8		
Decon Type:				
		9		
Development:				
		10		
Abandoned w/:				
		11		
Weather:				
Ambient PID:		12		
PID used: MiniRAE 3000				
Soil Sample (depth (ft. bgs) @ time):		13		
Bold sample submitted for analysis				
		14		
		15		
		16		
Drilling Notes:				
		17		
HSA = Hollow-stem Auger				
HA = Hand Auger		18		
DP = Direct Push				
Soil Sample =		19		
Well Screen =				
SAA = Description same as above		20		
EOB = End of Boring				

bgs = below ground surface	Recovery	USDA Codes:		
PID = Photoionization Detector		**S** =Sand	**LS** =Loamy Sand	**SI** =Silt
▼ = Depth to water during drilling		**SL** =Sandy Loam	**SCL** =Sandy Clay Loam	**SC** =Sandy Clay
—— = Different primary soil above/below		**SIL** =Silty Loam	**SICL** =Silty Clay Loam	**SIC** =Silty Clay
- - - = Same primary soil above/below		**L** =Loam	**CL** =Clay Loam	**C** =Clay

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TO-15 Soil Gas Sampling Form

General Site Information			
Site Name/ Project Number		Sample ID	
Address		Bottle Vac ID	
Date		Regulator ID	
Sampling Crew		Project Manager	

Weather Conditions			
Current Weather		Bar. Pressure	
Current Temp		Last Rain Event (within last 4 days, >4 days if none)	

Volume Calculations				
Note: Convert in. to ft. first (Depth of Sampling Point)+(Total Testing Apparatus Length)=Total length in feet (Total length in ft)*(tubing volume in L/ft)=Total volume in liters Total volume in liters convert to mL (L*1,000)=Estimated Volume		Calculations (syringe is 60ml)	Flooring	
			Depth of Sampling Point (length of vapor pin or depth of soil gas well)	
			Total Testing Apparatus Length (length of regulator + entire helium chamber tubing)	
Tubing Size	Liters/Foot		Diameter of Tubing	
3/16”	0.005		Estimated Volume	
¼”	0.01		Purge Method	
½”	0.039	Note: Purge Volume needs to be at least 3 times the Estimated Volume	Purge Volume	

Instrument Readings (need to wait 45 minutes after readings before sampling)			
PID (ppm)		CO^2 (%)	
O^2 (%)		Methane (CH_4) (% LEL)	
Differential Pressure		Time	

Miscellaneous			
Vac Test Completed	☐ Yes ☐ No	Starting Time	
Tracer Gas Utilized Before Tracer Gas Utilized After	☐ Yes ☐ No ☐ Yes ☐ No If yes list kind:	Initial BottleVac Pressure	
Suspected COCs	☐ Petroleum ☐ Solvent	Ending Time	
Moisture Identified	☐ Yes ☐ No	Ending BottleVac Pressure	
Initial/Last Lab BottleVac Pressure (read off tag)		BottleVac Pressure (upon receipt by lab) (request pressure on COC, then circle applicable)	See attached bottle vac tags

I certify that all field task listed on this form have been completed to the best of my ability.

Signed:		Signed:	

APPENDIX B

Sample Scope of Work Document

Scope of Work – <u>Groundwater/Soil Gas Investigation Event</u>
1450 SW Queen Avenue, Albany, OR 97321

Site:	
Date of field work:	
Fed 95 Staff: • **Fed95 Onsite Time (15-30mins before contractors):** • **Lead Staff:**	
Contractor(s): • **Contractor onsite time:**	
Utility Clearence:	
OUNC Ticket:	
Rental Equipment Pickup:	
Rental Equipment Drop-off:	
Vehicle:	
Hotel:	

Utility Clearence Checklist				
Utility	**Approx Depth on field Map**	**Onsite Markings?**		**Approx. depth in field (GPR)**
Telephone/Fiberoptic			Orange	
Natural Gas			Yellow	
Electric			Red	
Water			Blue	
Storm Sewer			Green	
Sanitary Sewer			Green	
Petroleum Pipeline (i.e. buckeye, wolverine)			Yellow	
UST piping			No flag markings	
Sprinkler system				
Private Water Well				
Septic System				

Scope of Work – <u>Groundwater/Soil Gas Investigation Event</u>
1450 SW Queen Avenue, Albany, OR 97321

Fed95 Internal SOW Overview

Scope of Work Detail

- **Startup**
  - Greet Site Contact to discuss work
  - Check OUNC ticket is completed (complete prior to Site)
  - Mark out boring locations with chalk/spray paint
  - GPR to clear locations
  - Take site photos

- **Temporary Monitoring Well Installation/ Soil Gas sampling**
  - *Onsite*
    - 6 soil gas wells
  - *Offsite*
    - 5 temporary monitoring well locations
    - 1 swale sample grab
- **Site Cleanup**
  - Ensure site is restored and safe for use.
  - Decontaminate all equipment before leaving site.

Fed 95Internal SOW/Field Guidance

Use the checkboxes and check off items as you complete them. DO NOT leave the Site until all check boxes in the Field Event section have been checked.

Before Field Event:

_____☐ Meet with PM to go over SOW, get field book
_____☐ Print off paperwork, bring some right-in-rain paper just in case
_____☐ Bring a copy of the previous Site investigation figures and tables
_____☐ Pack truck – see attached packing list
_____☐ Coordinate sample pickup with lab and rental equipment drop-off
_____☐ OUNC Status

Field Event:

_____☐ Find safe place to park
_____☐ Document initial site conditions – field book

Scope of Work – <u>Groundwater/Soil Gas Investigation Event</u>
1450 SW Queen Avenue, Albany, OR 97321

_____☐ Take pictures (includes general pictures of the site layout, pictures showing utility locations, etc.)
_____☐ Record utility markings in field book and on figure – verify all are marked and make sense per the Site's conditions
_____☐ Go over safety plan
_____☐ Note: all field notes should match (at least include all the components of) the sample notes. If you sign at the bottom of the sheet, you are certifying that you have taken notes correctly. Important parts to remember:
- Each day has a separate page, use both sides of the page in the field book
- List all wells on first day in numerical order and record water levels. Include sample times ONLY for those wells recorded the first day.
- If a well is sampled a second day, the sample time should go on the page for the second day
- List weather, date, personnel on each day
- Any pertinent notes should be recorded (i.e. if well dried up, if you could not locate, any repairs needed, etc.)

<u>Temporary Monitoring Well Installation Methodology:</u>

_____☐ Note: all field notes should match the example notes for soil borings/monitoring well installation and surveying
_____☐ Clear with hand auger to 5' bgs, as applicable
_____☐ Conduct borings to maximum depth as indicated by SOW
_____☐ Take photographs of each sleeve – can also be done at the end of a boring with all sleeves of boring together
_____☐ Scan each sleeve with PID immediately upon opening
_____☐ Collect VOC (i.e. methanol-preserved) sample first, then rest of sample
_____☐ Record geology on soil boring logs – use USDA or USCS classification (use field key) – this can wait until the end of the boring, if you're falling behind the driller.
_____☐ Backfill borings with native soil cuttings and bentonite chips. Extra soil cuttings can be spread on-site if there is a good spot.
_____☐ Collect groundwater samples as indicated by SOW above.
_____☐ Abandon well per ODEQ standards
_____☐ Repair ground surface (i.e. asphalt, concrete)
_____☐ Measure/GPS in boring/monitoring well locations and record on figure – see email with instructions (Go off of tops of buildings if possible)
_____☐ Take overview pictures of each boring/monitoring well location using the white board to identify the location.
_____☐ Take coordinates of each location if sunny

_____☐ Decon/pack equipment

<u>Groundwater Monitoring Well Methodology Overview:</u>

_____☐ Locate and open all wells

_____☐ Take water level elevations at all wells. Measure on the north side of the casing. Record in field book in numerical order (you don't have to measure them in order, just record in order). This needs to be done before sampling.

_____☐ Set up at well (Start at least contaminated well first). Place tubing down well. Connect to YSI (unless well is super nasty, then purge for a bit first before connecting to YSI). Place water level tape down well to record water levels while sampling. Turn on YSI. Turn on pump. Start sampling.

_____☐ Record readings on low-flow logs as specified. Also record water levels with each reading. A minimum of six readings should be taken.

_____☐ When well has stabilized – meet the specifications of each parameter on the low-flow logs for three consecutive readings, collect the sample.

_____☐ If well dries up, note it on the field book and low-flow log (even if well is dry, fill out a low-flow log, just mark it as dry). Turn off pump and disconnect from YSI. Wait 5-10 minutes, then turn pump back on and collect sample.

_____☐ Collect groundwater sample (as applicable for event)

- Unleaded gasoline (3x VOAs)
- PNAs (250ml amber jars or 1L amber (if required))
- MI-10 metals (HNO_3) plastic jars
    - Bring metal filter (must be replaced each well).

_____☐ Place samples in cooler with ice, decon equipment, close and bolt well, move to next well

_____☐ Discard tubing.

_____☐ If using a submersible pump, needs to be decon in soap water bucket for 5-10 mins, followed by a rinse bucket for 5-10 mins.

_____☐ Collect a duplicate sample from one of the contaminated wells (may be discussed with PM ahead of time which well to collect it from)

<u>Conduct Soil Gas Well Installation:</u>

_____☐ Clear with hand auger to 5' bgs, using PID and classifying soil as normal

_____☐ Record geology on soil boring logs – use USDA/USCS classification (use field key)

_____☐ Placing the SGW well point

- Attach masterflex to the top of the screen and then attach poly tubing to the top of the masterflex

- Place screen (implant) from work plan intervals
- Fill with sand 1' above the implant
- Fill with bentonite until 1' bgs, then top off with sand
- Wet bentonite a little water
- Cut the poly tubing 4" below grade
- Tap well cover (i.e., monument) into the ground and fill any remaining spaces around the cover with concrete

_____☐ Repair ground surface (i.e. asphalt, concrete)
_____☐ Measure/GPS in boring/monitoring well locations and record on figure – see email with instructions (Go off of tops of buildings if possible)
_____☐ Take overview pictures of each boring/monitoring well location using the white board to identify the location.
_____☐ Take coordinates of each location if sunny
_____☐ Decon/pack equipment

<u>Initial Instrument Readings</u>

_____☐ Use Dwyer Gauge to measure differential pressure
_____☐ Use the 4-Gas Meter to take initial readings of Soil Gas wells

a. Record PID, O_2, CO^2, Methane (CH_4)
b. Wait 45 mins after readings before sampling
c. Calculate volume for Helium Testing and fill out sampling form

- After reading and before sampling (within the 45 mins), Conduct helium test

<u>Helium Test Vapor Pins Methodology:</u>

_____☐ Test pins with 4-gas meter (includes PID) and Dwyer Pressure gauge
_____☐ Remove tape from end of regulator tubing, place tubing on vapor pin
_____☐ Connect regulator to the vapor pin port on the helium chamber
_____☐ Assemble regulator on helium tank, connect tank with tubing to helium port on helium chamber
_____☐ Start helium detector, allow to zero
_____☐ Start helium, ensure valve on regulator is turned on (0.1-0.2), allow helium to run for 10-15 seconds, check with detector at base of dome – if helium is detected, shut off helium
_____☐ Use syringe to pull air through the sampling apparatus (draw from the vapor pin port), three times or until three times volume is purged. After the third time, use helium detector to check the air pushed from the syringe.

- If the helium detector doesn't register more than one or two red dots, you are ready to sample. If it does, double check the result by collecting another volume of air and testing it a little further away from the helium chamber. If it still doesn't pass, pull out the vapor pin, clean the hole of dirt, reinstall, and test again.

_____☐ Wait at least 45 minutes before sampling the vapor pins

<u>Sample Vapor Pins Methodology:</u>

_____☐ Connect bottle vac to regulator
_____☐ Note starting time and pressure on field book, sampling form, and bottle vac tag in pen
_____☐ Allow to run until pressure is between 3 and 5 (approximately 5-7 minutes)
_____☐ Remove bottle vac from regulator
_____☐ Note ending time and pressure on field book and bottle vac tag in pen
_____☐ Fill out remainder of sample label in pen
_____☐ Replace sealing cap and cover
_____☐ Completely fill out sampling sheets

<u>Before Departing Site:</u>

_____☐ Decon and pack all equipment
_____☐ Take 'after' pictures
_____☐ Double check field book and figure – everything recorded? **-Utilities**
_____☐ Mobilize equipment

Instructions for field checklist:

At the end of the field event both field technicians must initial and check off each box to ensure that everything was completed prior to leaving the site. If the SOW cannot be completed, you must call the project manager to discuss at which point you will indicate on this list that the PM was contacted and approved the change. Field form must be given to PM upon return to office. Upon completion please sign below.

I certify that all field task listed on this form have been completed to the best of my ability.

Signed:	
Signed:	

Scope of Work – <u>Groundwater/Soil Gas Investigation Event</u>
1450 SW Queen Avenue, Albany, OR 97321

<u>After Field Event:</u>

_____☐ Provide chain of custody to APM/PM/SPM for review prior to lab pick up
_____☐ Unpack truck, return equipment to proper locations
_____☐ Develop field expense sheet AND travel expense sheet (if applicable) – provide to APM/PM/SPM for review
_____☐ Complete post-field checklist (FES excel sheet will have a tab for PFC)
_____☐ Scan field notes/forms/figures and save to file
_____☐ Upload receipts to "SmartReceipts" App
_____☐ Bill time to to Costpoint/Deltek

<u>Sampling Parameters (as applicable)</u>

_____☐ Cl-VOCs (refer to Work Plan for specific parameters)

Scope of Work – <u>Groundwater/Soil Gas Investigation Event</u>
1450 SW Queen Avenue, Albany, OR 97321

Packing List

(include only what is necessary for event)

Soil Sampling Supplies

Need	Have	
☐	☐	5035 Kits (50)
☐	☐	Soil Jars (50)
☐	☐	Scale
☐	☐	Hand Augers
☐	☐	Di Water
☐	☐	PID + Cal. Kit + Filters
☐	☐	Spray Bottles
☐	☐	Stainless Steel Spoon
☐	☐	Sampling Table or use Scott's
☐	☐	5-gallon bucket
☐	☐	Drum Labels

Vapor Pin Install Supplies

Need	Have	
☐	☐	Hammer Drill and Drill Bits
☐	☐	Rotary-hefty Drill
☐	☐	Vapor Pin Kit
☐	☐	Shop Vac
☐	☐	Mallet
☐	☐	Broom + dust pan

Safety Equipment

Need	Have	
☐	☐	Traffic Cones
☐	☐	Steel-toe boots
☐	☐	Safety Vest
☐	☐	Hard Hat
☐	☐	Safety Glasses
☐	☐	Safety Goggles

File Information and Paperwork

Need	Have	
☐	☐	Field Note Book
☐	☐	Sample Labels
☐	☐	Chain of Custody
☐	☐	Project File Information
☐	☐	Soil Boring Logs

Soil Gas Sampling Supplies

Need	Have	
☐	☐	Vapor Pin Kit
☐	☐	MasterFlex Tubing
☐	☐	Bottle Vac. + Regulators
☐	☐	Helium Tank + Equipment
☐	☐	Helium dome + Leak detector
☐	☐	Syringe + milk crate
☐	☐	Pressure gauge (in milk crate)
☐	☐	4-gas meter
☐	☐	NIOSH sampling kit

GPR

Need	Have	
☐	☐	GPR
☐	☐	Tablet
☐	☐	All chargers and batteries

Tools

Need	Have	
☐	☐	Shovel
☐	☐	Man Hole Hook
☐	☐	Broom/dust pan
☐	☐	Cement/Asphalt Tools
☐	☐	Tile Probe
☐	☐	Tool kit (wrench set, screwdriver, knife, 25' tape, hammer)
☐	☐	Ruler
☐	☐	Tubing cutters

Miscellaneous Supplies

Need	Have	
☐	☐	Gloves
☐	☐	Baggies
☐	☐	Trash Bags
☐	☐	Measuring Tape
☐	☐	Paper Towels

Scope of Work – <u>Groundwater/Soil Gas Investigation Event</u>
1450 SW Queen Avenue, Albany, OR 97321

☐	☐	Liquinox
☐	☐	Cooler with Ice
☐	☐	Well Key
☐	☐	Water Level Tape
☐	☐	Decon Water (Blue Jug)
☐	☐	Shop Vac
☐	☐	Metal Detector
☐	☐	Pin Flags
☐	☐	Spray Paint
☐	☐	Scissors
☐	☐	Camera
☐	☐	Flash Light
☐	☐	Survey Equipment
☐	☐	Extension Cords
☐	☐	J-Plugs
☐	☐	Well covers
☐	☐	Sorbent Pads

Ground Water Sampling Supplies

Need	Have	
☐	☐	VOCs: VOAs
☐	☐	Metals: White Plastic Containers
☐	☐	PNAs: Amber 250ml jars
☐	☐	Peristaltic Pump (shallow wells)
☐	☐	Submersible Pump (deep wells)
☐	☐	Water Level Tape
☐	☐	YSI Flow Cell
☐	☐	Tubing
☐	☐	Master Flex Tubing
☐	☐	Red Groundwater Kit/ Flow
☐	☐	Regulators for pump
☐	☐	2 Wash/Rinse Buckets
☐	☐	1 Purge Water Bucket
☐	☐	Spray Bottles
☐	☐	Decon Water (Blue Jug)
☐	☐	Blank Water
☐	☐	Free Product Probe
☐	☐	Battery (2)
☐	☐	Bailers and Bailer Rope
☐	☐	Dry Erase Whiteboard
☐	☐	Tote and bag

LNAPL Recovery Supplies

Need	Have	
☐	☐	Drum
☐	☐	Bailers (5)
☐	☐	Bailer string roll
☐	☐	Drum wrench (check truck)
☐	☐	LNAPL transfer bucket w/ lid
☐	☐	Funnel
☐	☐	Interface Probe (2)
☐	☐	Long gloves
☐	☐	Sorbent pads (5 per bailed well)
☐	☐	Spare J-plug
☐	☐	spare well cover bolts
☐	☐	Turkey baster

APPENDIX C

Health and Safety Plan

NETL-ALBANY
HEALTH AND SAFETY PLAN

Prepared for:

U.S. Department of Energy
National Energy Technology Laboratories (NETL-Albany)
1450 Queen Avenue SW
Albany, Oregon 97321



Submitted to:

Oregon Department of Environmental Quality
Western Region
700 NE Multnomah Street
Portland, Oregon 97232

Submittal Date: February 2024

Project Number: 235743

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APPENDICES

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LIST OF ACRONYMS AND ABBREVIATIONS

ACGIH	Association Advancing Occupational and Environmental Health
ANSI	American National Standards Institute
CFR	Code of Federal Regulations
Cl-VOCs	Chlorinated volatile organic compounds
DOE	U.S. Department of Energy
Fed95	Fed95 LLC
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High-Efficiency Particulate Absorber
NETL-Albany	National Energy Technology Laboratories – Albany, Oregon
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise reduction rating
OSHA	Occupational Safety and Health Administration
OUNC	Oregon 811 Utility Notification Center
PEL	Permissible exposure limit
PID	Photoionization Detector
PPE	Personal protective equipment
RH	Relative humidity
SCP	Site Control Plan
SDS	Safety data sheets
Site	U.S. Department of Energy, National Energy Technology Laboratories (NETL-Albany), 1450 Queen Avenue SW, Albany, Oregon 97321
STEL	Short-term exposure limit
Workers	Employees of Fed95 LLC and subcontractors
VOCs	Volatile organic Compounds

1.0 OVERVIEW

This site-specific Health and Safety Plan (HASP) was developed in accordance with the provisions of Title 29 Code of Federal Regulations (CFR) Part 1910.120(b)(4) for employees of Fed95 LLC (Fed95) and subcontractors (workers) who are required to be present at any time during investigative activities at the NETL-Albany and off-site properties (Site) in Albany, Oregon. Intrusive site activities to which this plan applies includes soil and groundwater removal, soil boring investigations, monitoring well installations, soil sampling, soil gas sampling, groundwater sampling, air monitoring, and excavations.

Note that this HASP will be modified as appropriate if additional work tasks are authorized. This HASP consists of several sections which address the typical hazards and corresponding controls associated with the described Site activities, along with site-specific chemical and physical hazards unique to the Site.

2.0 SITE SAFETY PRACTICES

The following measures are designed to augment the specific health and safety guidelines provided in this HASP.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in the immediate work area and in the decontamination zone.

- Smoking is prohibited in all work areas. Matches and lighters are not allowed within 75 feet of these areas.

- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activities.

- Beards or other facial hair that interfere with respirator fit, when applicable, are prohibited.

- The use of alcohol or illicit drugs is prohibited during the conduct of field operations.

- All equipment must be decontaminated or properly discarded in contractor bags before leaving the Site. No trash shall be discarded anywhere other than the premises of Fed95 unless given permission to do so.

- Restroom activities of workers shall be kept to indoor facilities only. If on-site restrooms are unavailable, special provisions will be made by the Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader.

- Parking and pedestrian areas will be established via markers and communicated to all workers.

2.1 Contractor Safety

Contractors hired by Fed95 are responsible for:

- Reading the HASP in its entirety prior to the start of work;
- Attending the required pre-entry briefing (i.e., tailgate safety meeting) prior to each day of work and any subsequent safety meetings during the work performance;
- Ensuring, via daily inspections, that their equipment is in good working order;
- Operating their equipment in a safe manner;
- Informing Fed95 of all hazardous materials brought to the Site and, upon asking, provide copies of safety data sheets (SDS)
- Providing all of the required personal protective equipment (PPE), respiratory equipment, and safety supplies to their employees.

If at any point during the project a Fed95 staff member feels as though the subcontractor is not abiding to the policies presented in this HASP or subjecting themselves and/or surrounding personnel to unnecessary risks, Fed95 has the authority to halt operations.

3.0 SAFETY AND HEALTH RISK ANALYSIS

Areas of the Site where intrusive activities take place may contain vehicle traffic, explosion risks, and/or soil and ground water contamination. Potential health hazards may arise from exposure to organic chemicals and physical agents which may be encountered, unearthed, or released during work. Hazards not associated with project activities that may occur at the Site include violent weather, chemical releases, vehicle traffic associated with customers and deliveries to the Site, and/or normal Site activities.

3.1 Chemical Exposure and Control

Scientists are constantly testing various chemicals to determine if they are toxic and to see what the long-term effects continuous exposure may have. Toxic chemicals are defined as those gases, liquids, or solids which, through their chemical properties, can produce injurious or lethal effects upon contact with the body.

The toxicity of a chemical is not synonymous with its quality for being a health hazard. Toxicity is the capacity of a material to produce injury or harm. Hazard is the possibility that exposure to a material will cause injury when a specific quantity is used under certain conditions.

Toxic chemicals can enter the body from being swallowed, such as handling food after being in direct contact with a toxic material, inhaled (poor ventilation, or the lack of proper respiratory protection), absorbed through the skin (lack of proper PPE such as, eye protection, gloves, aprons, etc.), or injection (needle stick, puncturing of the skin, etc.).

The effects of toxic chemical exposure to a substance is dependent on dose, rate, physical state of the substance, temperature, site absorption, diet, and general state of health of the individual. Some of the immediate symptoms may include:

- Eye irritation
- Mucus membrane irritation
- Dermatitis
- Nausea
- Headache
- Choking or coughing
- Dizziness

The cumulative effects of many toxic chemicals may not be known for years to come. We do know that many serious diseases and cancers are directly related to toxic exposure.

Not all effects of toxic chemicals are known, however, we do know enough to realize their potential hazard.

3.2 Chemical Hazards

The likelihood of mechanisms for chemical exposure is:

- Contact with soil/groundwater
- Inhalation of vapors from exposed materials

Potential chemical contaminants identified during previous investigative work at the Site include petroleum related chemicals. In order to pose a health hazard to workers, contaminants must enter through one or more of four routes of exposure.

3.2.1 Inhalation

Inhalation as a route of exposure concerns dusts, mists, fumes, vapors, and gases. The first three represent particulate contaminants, while vapors and gases refer to liquid and gas phase contaminants. Coarse dusts and mists are typically trapped in the nasal passages and upper respiratory tract, while smaller particles usually are caught in the mucous coated walls of the airway tubes and are carried to the throat. Very small particles may not be trapped by the mucous membranes and may penetrate into the lungs. Water soluble vapors and gases may dissolve in the wet mucous coating of the upper airway surfaces, resulting in irritation to the eyes, nose, and throat. The gases and vapors which are less water soluble are more likely to reach the lungs.

3.2.2 Skin Absorption

Skin absorption concerns both entry of the contaminant through the skin, as well as damage caused to the skin itself. Organic solvents, such as toluene, may permeate the oily skin surface and diffuse into the blood stream. Organic solvents can also damage the skin itself by drying out the naturally existing, protective oils. Excessive skin contact with organic solvents can often lead to a dermatitis condition.

3.2.3 Ingestion

Ingestion of contaminants can provide a pathway for contaminants to enter directly into the bloodstream through the digestive system. Common pathways for ingestion of contaminants occur when a person consumes contaminated food, smokes contaminated cigarettes, or through other hand to mouth transfer of contaminants.

3.2.4 Injection

Chemical injection refers not only to injection by hypodermic needles but also whenever the skin has been breached (cut or puncture) and there is a direct pathway into the bloodstream for the chemical contaminant. Depending upon the contaminant's solubility in water, the contaminant can enter the bloodstream directly through a skin breach or puncture.

3.3 Chemical Concerns

Contaminants at the Site may cause concerns related to health and safety. These concerns include explosion and fire, oxygen deficiency, and biological hazards.

3.3.1 Explosion and Fire

There are many potential causes of explosions and fires at hazardous waste sites:

- Chemical reactions that produce explosion, fire, or heat
- Ignition of explosive or flammable materials
- Ignition of materials due to oxygen enrichment
- Agitation of shock or friction-sensitive compounds
- Sudden release of materials under pressure

In any situation where there is an increased risk of an explosion or fire, special safety precautions must be implemented to ensure the health and safety of all workers.

3.3.2 Oxygen Deficiency

The oxygen content of normal air at sea level is approximately 21 percent. Physiological effects of oxygen deficiency in humans are readily apparent when the oxygen concentration is decreased, causing increased breathing and heartrate. Oxygen concentrations lower than 16 percent can result in nausea and vomiting, brain damage, unconsciousness, and even death. Studies have shown that concentrations of 19.5 percent oxygen by volume or lower are considered to be indicative of oxygen deficiency.

Oxygen deficiency may result from the displacement of oxygen by another gas or the consumption of oxygen by a chemical reaction. Confined spaces or low-lying areas are particularly vulnerable to oxygen deficiency and should always be monitored prior to entry. Qualified field personnel should always monitor oxygen levels and use atmosphere supplying respiratory equipment when oxygen concentrations drop below 19.5 percent by volume.

3.3.3 Biological Hazards

Sources of biological hazards may include bacteria, viruses, insects, plants, birds, animals, and/or humans. Biological hazards can be encountered anywhere in the environment. Exposure to biological hazards in the workplace may result in a significant amount of occupationally associated diseases, although the biological hazards are not always recognized in the work setting.

Examples of different types of biological hazards:

- Insect stings/bites
- Allergic reactions (e.g., peanuts, pollen, bee stings, etc.)
- Poisonous plants/animals (e.g., poison ivy, cobras, belladonna, etc.)

The most common items of PPE to protect from biological hazards include:

- Latex gloves
- A proper mask for biohazards
- Eye protection
- Bug repellant

3.4 Chemical Properties

The following list shows the properties of chemicals that workers may be exposed to during field activities at the Site. The chemical properties can be found on OSHA's SDS and technical guidelines website.

- 1,1-Dichloroethene
- cis-1,2-Dichloroethene
- trans-1,2-Dichloroethene
- Carbon Tetrachloride
- Chloroform
- Chloromethane
- Methylene Chloride
- Vinyl Chloride

3.5 Published Exposure Limits

The following chemical list shows that workers may be exposed to during field activities at the Site. The published exposure limits of chemicals can be OSHA's Permissible Exposure Limits – Annotated Tables[1].

- 1,1-Dichloroethene
- cis-1,2-Dichloroethene
- trans-1,2-Dichloroethene
- Carbon Tetrachloride
- Chloroform
- Chloromethane
- Methylene Chloride
- Vinyl Chloride

Fed95 will follow the published exposure limits for permissible exposure limit (PEL), short-term exposure limit (STEL), threshold limit value (TVL), time weighted average (8-hour, TWA), Recommended Exposure Limit (REL) per each time limit as noted on these tables.

[1] https://www.osha.gov/annotated-pels

3.6 Physical Hazards

3.6.1 Safety Hazards

Hazardous waste sites may contain numerous safety hazards such as:

- Holes or ditches
- Precariously positioned objects (e.g., drums, boards, etc. that may fall)
- Sharp objects (e.g., nails, metal shards, broken glass, etc.)
- Slippery surfaces
- Steep grades
- Uneven terrain
- Unstable surfaces (e.g., walls that may cave in, flooring that may give way, etc.)

Some safety hazards are a function of the work itself. For example, heavy equipment creates an additional hazard for workers in the vicinity of the operating equipment. Protective equipment can impair a worker's agility, hearing, and/or vision, which can result in an increased risk of an accident.

Accidents involving physical hazards can directly injure workers and can create additional hazards; for example, increased chemical exposure due to damaged protective equipment or danger of explosion caused by the mixing of chemicals. Workers should constantly look out for potential safety hazards and should immediately inform their supervisor(s) of any new hazards so that mitigating action can be taken.

3.6.2 Electrical Hazards

Overhead power lines, downed electrical wires, and buried cables all pose a danger of shock or electrocution if workers contact or sever them. Electrical equipment used at the Site may also pose a hazard to workers. To help minimize this hazard, low-voltage equipment with ground-fault interrupters and water-tight, corrosion-resistant, connecting cables should be used. In addition, lightning is a hazard during outdoor operations, particularly for workers handling metal containers or equipment. To eliminate this hazard, weather conditions should be monitored, and work should be suspended during electrical storms. An additional electrical hazard involves capacitors that may retain a charge. All such items should be properly grounded before handling.

3.6.3 Heat Exposure

The Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader will evaluate environmental conditions before and during field activities to determine temperature and relative humidity (RH) (or predicted temperature and RH). If the ambient air temperature exceeds 85°F with 80% RH, the following will be implemented:

- Short work/long rest cycles will be established. This will be determined based on anticipated work tasks, required PPE, personal physical condition, ambient temperature, and environmental conditions.

- Cool rest areas will be designated for rest and recovery
- Labor intensive work operations will be distributed among workers if more than two workers are assigned
- Workers will be encouraged to drink plenty of chilled fluids (with electrolytes if possible)
- Workers will be encouraged to report symptoms of heat related illness

Workers will be expected to dress appropriately for the anticipated weather conditions.

3.6.4 Cold Exposure

The Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader will evaluate environmental conditions before and during field activities to determine temperature and wind chill factors (or predicted temperature and wind chill factors). Skin exposure to ambient air temperatures below 0°F and/or wind chill temperatures of -10°F are not permitted. If conditions warrant, the following measures will be implemented to control the length of time and temperatures to which workers are exposed to the weather during cold conditions:

- Short work/long rest cycles will be established. This will be determined based on anticipated work tasks, required PPE, personal physical condition, ambient temperature, and environmental conditions.
- Heated rest areas will be designated for breaks (i.e., inside heated vehicles)
- Workers will be encouraged to drink plenty of warm fluids

Workers will be expected to dress appropriately for the anticipated weather conditions.

3.6.5 Slips, Trips, and Falls

It is possible that the ground may be uneven at any given work area. Employees should walk around, not over or on top of, debris or trash piles. When carrying equipment, identify a path that is clear of any obstructions. It might be necessary to remove obstacles to create a smooth, unobstructed access point to the work area(s). In some cases, it may be necessary to work in two-person teams when moving equipment or other objects.

During the winter months, snow shovels and salt crystals (i.e., calcium chloride) should be kept at the Site to keep work areas free of accumulated snow and ice. Furthermore, sand or other aggregate material should be utilized to help keep work surfaces from being slippery, especially where salt/calcium chloride cannot be used. In addition, make sure work boots have soles that provide good traction. When walking on ice is necessary, Yaktrax® or crampons should be used.

Maintaining a work environment that is free from accumulated debris is the key to preventing most slip, trip, and fall hazards. Essential elements of good housekeeping include:

- Orderly placement of materials, tools, and equipment
- Placing trash receptacles at appropriate locations for the disposal of rubbish
- Prompt removal and secure storage of items that are not needed to perform the immediate task at hand
- Awareness on the part of all workers to walk around, not over or on, equipment that might have been stored in the work area.

In addition, common sense rules provide the best means to avoid uneven walking surface-related injuries:

- Do not run while at the Site, unless required to do so to escape an emergency situation
- If it is necessary to run, pay extra attention to the surface you are running over
- Do not walk backwards
- Practice and implement the technique of including the vertical peripheral view into your movements (most people remember to look left and right – you must also look down before taking steps)
- Try to look several feet ahead when traversing
- Use good housekeeping procedures to minimize the accumulation of trip hazards

3.6.6 Noise Exposure

The use of drilling equipment can expose workers to noise levels that exceed the OSHA PEL of 90 dB for an eight-hour day. Exposure to noise may result in the following:

- Temporary hearing losses where normal hearing returns after a rest period
- Interference with speech communication and the perception of auditory signals
- Interference with the performance of complicated tasks
- Permanent hearing loss due to repeated exposure resulting in nerve destruction in the hearing organ

Since personal noise monitoring will not be conducted during the proposed activities, employees must follow this general rule of thumb: if the noise levels are such that you must shout at someone approximately five feet from you, you need to be wearing hearing protection. Employees can wear either disposable earplugs or earmuffs, but all hearing protection must have a minimum noise reduction rating (NRR) of 27 dB.

3.6.7 Drilling/Direct Push & Utility Hazards

Use of a drill rig (e.g., Geoprobe, Hollow Stem auger, etc.) to advance soil borings and install monitoring wells will require all workers in the vicinity of the operating rig to wear safety-toed boots, hard hats, and hearing protection. Workers shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities.

Additionally, the following safety requirements must be adhered to:

- All drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. All workers must be aware of the location of this stop device. This stop device must be tested prior to job initiation and periodically thereafter. The drillers shall not simultaneously handle augers unless there is a standby worker to activate the emergency stop.

- The driller must never leave the controls while the tools are rotating unless all workers are kept clear of rotating equipment

- A long-handled shovel or equivalent must be used to clear drill cuttings away from the hole and from rotating tools. Hands and/or feet are not to be used for this purpose.

- A remote sampling device must be used to sample drill cuttings if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. If workers must work near any tools which could rotate, the driller must shut down the rig prior to initiating such work.

- Workers must secure all loose clothing, long hair, and/or jewelry when in the vicinity of drilling operations

- Only equipment that has been approved by the manufacturer may be used in conjunction with drilling equipment. Pins that protrude excessively from augers shall not be allowed.

- No person shall climb the drill mast while tools are rotating

- No person shall climb beyond six feet above ground surface on the drill mast without the use of American National Standards Institute (ANSI) approved fall protection (i.e., belts, lanyards, fall protection slide rail, etc.) or portable ladder that meets OSHA standards

3.6.8 Underground Utilities

The Oregon 811 Utility Notification Center (OUNC) will be contacted at least 5 business days but no more than ten business days in advance of each round of subsurface investigations at the Site. The colors typically associated with utilities are:

Red	Electric power lines, cables, conduit, and/or lighting cables
Orange	Telecommunication, alarm or signal lines, cables, and/or conduit
Yellow	Natural gas, oil, steam, petroleum, and/or other gaseous or flammable material
Green	Sewers and/or drain lines
Blue	Water lines

OUNC contact information:

- Phone: 811 or 1-800-332-2344 (2DIG)
- Website: https://digsafelyoregon.com/about-ounc/
- Positive response: https://or.itic.occinc.com/ via Locator Ticket Portal

3.6.9 Lifting/Back Safety

Using the proper techniques to lift and/or move heavy pieces of equipment is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects:

- Use mechanical devices to move objects that are too heavy to be moved manually
- If mechanical devices are not available, ask another person to assist you
- Bend at the knees, not the waist. Let your legs do the lifting.
- Do not twist while lifting
- Bring the load as close to you as possible before lifting
- Be sure the path you are taking while carrying a heavy object is free of obstructions

4.0 EMPLOYEE TRAINING ASSIGNMENTS

According to paragraph (e) of the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation: "All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph."

4.1 Intrusive Activities

Workers engaged in intrusive activities (including ground water sampling) in areas with known or suspected chemical contamination must obtain, or be working to obtain, a 40-hour HAZWOPER certificate, including the eight-hour HAZWOPER refresher when applicable. Employees involved in intrusive activities must attend a safety meeting (prior to commencing work). Safety meetings must be documented and address anticipated hazards and corresponding controls. The frequency of these meetings is at the discretion of the Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader, but at a minimum must be held prior to engaging in any new intrusive activities.

4.2 Visitors

As required by the Site Control Plan (SCP) (**Section 8.0**), all visitors are required to notify the Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader of their presence when they arrive at the Site. Visitors must comply with all posted and verbal rules as required by the Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader. Any visitor required to be present in the exclusion zone during intrusive activities must have their 40-hour HAZWOPER certification or be accompanied by a 40-hour HAZWOPER-trained worker and must comply with the directions of the Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader while in the exclusion zone.

5.0 PERSONAL PROTECTIVE EQUIPMENT POLICY

It is well recognized that routine and non-routine work operations involve a risk of occupational exposures to hazards. While Fed95 makes every effort to implement engineering and administrative exposure controls to reduce this risk, it is often necessary to supplement these controls by providing workers with PPE.

The minimum level of protection required for workers at the Site will be Level D. Level D represents the least protective level of PPE that can be worn. It offers no respiratory protection and is worn when chemical exposure is not anticipated. The following equipment will be used for Level D work:

- Work clothing as determined by the weather
- Safety-toe work boots
- Chemical protective gloves, such as nitrile (when working with material subject to sampling)
- Hard hat

Modified Level D may be required to prevent skin contact when working in potentially contaminated areas. Chemical protective gloves, booties, and disposable cloth coveralls may be required.

Level C protective equipment may be required if unsafe levels of organic vapors are present in the breathing zone (greater than 25ppm). Only medically cleared, properly trained, and fit-tested workers may wear a respirator. Organic cartridges with High-Efficiency Particulate Absorber (HEPA) filters are required for Level C.

5.1 Levels of Protection

When response activities are conducted where atmospheric contamination is known or suspected to exist, PPE must be worn. PPE is designed to prevent/reduce skin and eye contact as well as inhalation or ingestion of the chemical substance. Protective equipment to protect the body against contact with known or anticipated chemical hazards has been divided into four categories.

5.1.1 Level A

Level A protection should be worn when the highest level of respiratory, skin, eye, and mucous membrane protection is needed.

Required PPE:

- Positive pressure (pressure demand), self-contained breathing apparatus
- Fully encapsulating chemical resistant suit
- Gloves – inner, chemical resistant
- Gloves – outer, chemical resistant
- Boots – chemical resistant, safety-toe and shank (depending on suit boot construction, worn over or under suit boot)
- Two-way radio communications (intrinsically safe/non-sparking)

Optional PPE (dependent on specific situation):

- Underwear – cotton, long-john type
- Hard-hat (under suit)
- Coveralls (under suit)

5.1.2 Level B

Level B protection should be selected when the highest level of respiratory protection, but a lesser level of skin and eye protection, is needed. Level B protection is the minimum level recommended on initial site entries until the hazards have been further identified and defined by monitoring, sampling, and other reliable methods of analysis, and equipment corresponding with those findings utilized.

Required PPE:

- Positive-pressure (pressure-demand), self-contained breathing apparatus
- Chemical resistant clothing (i.e., overalls and long-sleeved jacket, coveralls, hooded two-piece chemical splash suit, disposable chemical resistant coveralls)
- Gloves – inner, chemical resistant
- Gloves – outer, chemical resistant
- Boots – outer, chemical resistant, safety-toe and shank
- Two-way radio communications (intrinsically safe)

Optional PPE (dependent on specific situation):

- Coveralls (under splash suit)
- Boots – outer, chemical resistant
- Hard hat

5.1.3 Level C

Level C protection should be selected when the type of airborne substance is known, concentration measured, criteria for using air-purifying respirators met, and skin and eye exposure is unlikely. Periodic monitoring of the air must be performed.

Required PPE:

- Full-face, air-purifying, respirator
- Chemical resistant clothing (i.e., one-piece coverall, hooded two-piece chemical splash suit, chemical resistant hood and apron, disposable chemical resistant coveralls)
- Gloves – inner, chemical resistant
- Gloves – outer, chemical resistant
- Boots – chemical resistant, safety-toe and shank
- Two-way radio communications (intrinsically safe)

Optional PPE (dependent on specific situation):

- Boots – outer, chemical resistant
- Cloth coveralls (inside chemical protective clothing)
- Hard hat
- Escape mask

5.1.4 Level D

Level D is primarily a work uniform. It should not be worn where respiratory or skin hazards exist. The specific details of Level D PPE are described above in Section 5.0.

6.0 MEDICAL SURVEILLANCE

Employees working in known or suspected contamination must be enrolled in a medical surveillance program.

6.1 Medical Examinations

The following medical examinations and consultations must be made available to each Fed95 staff member conducting activities at the Site:

- Initially (prior to potential exposure)

- At least once every twelve months for each applicable worker unless the attending physician believes a longer interval (not greater than biennially) is appropriate

- At termination of employment or reassignment to an area where the Fed95 staff member would not be covered if the Fed95 staff member has not had an examination within the last six months

- As soon as possible upon notification by a Fed95 staff member that they have developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the Fed95 staff member has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency

- At more frequent intervals if the examining physician determines that an increased frequency of examination is medically necessary

All medical examinations and procedures must be performed by or under the supervision of a licensed physician and must be provided without cost to the Fed95 staff member, without loss of pay, and at a reasonable time and place. Fed95 must provide one copy of the HAZWOPER standard and its appendices to the attending physician and the following to each Fed95 staff member:

- A description of the Fed95 staff member's duties as they relate to their exposures
- The Fed95 staff member's exposure levels or anticipated exposure levels
- A description of any PPE used or to be used
- Information from the Fed95 staff member's previous medical examinations which is not readily available to the examining physician
- Information required by OSHA Standard 1910.134 (Respiratory Protection)

Fed95 must obtain and furnish the Fed95 staff member with a copy of a written opinion from the examining physician containing the following:

- The physician's opinion as to whether the Fed95 staff member has any detected medical conditions which would place them at increased risk of material impairment of their health from work in hazardous waste operations or emergency response, or from respirator use

- The physician's recommended limitations upon the Fed95 staff member's assigned work

- The results of the medical examination and tests if requested by the Fed95 staff member

- A statement that the Fed95 staff member has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment

An accurate record of the medical surveillance required performed must be retained. This record must be retained for the period specified and meet the criteria of 29 CFR 1910.20. The record must include at least the following information:

- The name and social security number of the Fed95 staff member
- Physicians' written opinions, recommended limitations, and results of examinations and tests
- Any Fed95 staff member medical complaints related to exposure to hazardous substances
- A copy of the information provided to the examining physician by Fed95, except for the standard and its appendices

7.0 AIR MONITORING

Fed95 recognizes that the use of air monitoring instruments for the detection of unknown hazards is a necessary tool for mitigating exposure risks. OSHA requires that air monitoring shall be used to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed 1910.120(h)(1)(ii). The following table represents instances when air monitoring is necessary and establishes action limits based upon NIOSH and ACGIH recommended exposure limits.

Task	Instrument	Action Limit	Action
All drilling events involving potential exposure to contaminated soils and/or groundwater	Photoionization Detector (PID)	>25 ppm	Exercise caution, take breaks, don PPE as discussed in Section 5.0
Confined space or any task where exposure to 4-gas is of concern as assessed by Project Manager	4-Gas meter	O2 = <19.5% or >23.5% H2S = 10 ppm CO = 35 ppm LEL = >10%	Evacuate area upon exceedance of action limit(s)
Exposure to excessive dust or particulates	Casella MicroDust Pro	>15 µg/m^3	Respiratory protection required

8.0 SITE CONTROL PROGRAM

The SCP includes the Tailgate Safety Meeting HASP. At a minimum, the SCP includes:

- Site Layout Map
- Work zones
- Site communication procedures, including alerting means for emergencies
- Standard operating procedures or safe work practices
- Identification of the nearest medical assistance

A Site Layout Map is included as **Appendix A**. As Site activities progress, the layout of the Site will also change. Contaminated sites often have multiple areas of soil and/or groundwater contamination. Areas between and often around these contaminated areas may not pose any particular hazards. When intrusive work is performed in a contaminated area, chemical contamination in the form of solid, liquid, or vaporous chemicals may be released. The Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader is required to designate an exclusion zone where the potential for chemical and/or physical hazard exposure exists. This area should be marked by flagging or the equivalent, or at least denoted by the Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader during frequent safety meetings.

The surrounding areas where chemical and/or physical hazard exposures are negligible are referred to as the support zone. Individuals may work in these areas with minimal PPE and may move freely about the areas.

Individuals and equipment exiting an exclusion zone must not be allowed to carry potential chemical contamination with them into the support zone. The Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader will establish a contamination reduction zone through which potentially contaminated individuals and equipment must pass during decontamination (see **Section 9.0**). Workers that must work alone must remain in line-of-sight of other workers. Workers must never engage in intrusive activities at the Site when they are completely alone. Communication at the Site will include verbal (including utilizing cell phones) and non-verbal (while drill rig is being utilized). The primary method of alerting emergency personnel is by dialing 911. **Appendix B** contains a blank Tailgate Safety Meeting HASP that includes a daily safety meeting and a map with driving directions to the nearest hospital. However, in the event that a worker becomes injured or requires immediate medical attention, the worker must be transported by an ambulance. Injured workers often worsen during travel and may require immediate medical attention.

9.0 DECONTAMINATION

9.1 Personal Decontamination

Proper decontamination is required of all personnel before leaving the Site. Decontamination will occur within the contamination reduction zone. Many items are disposable and will only require sufficient decontamination to off-suit without exposure.

Regardless of the type of decontamination system required, a container of portable water and liquid soap (i.e., Liquinox) will be made available so workers can wash their hands and face before leaving the Site for lunch or for the day.

9.2 PPE Decontamination

Disposable PPE (e.g., Tyvek® coveralls, gloves, etc.) will be removed from the decontamination reduction zone and placed in contractor bags. Final disposal of contaminated PPE will be done in accordance with the approved workplan.

If worn, respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning. Respirators will be thoroughly cleaned using disinfectant material within one week following any respirator use (refer to the cleaning instructions provided with the respirator or specified by Appendix B-2 to the OSHA regulations at 29 CFR 1910.134).

9.3 Equipment Decontamination

It is important that equipment be contaminated at the Site or work area prior to being moved to other locations or removed from the Site. Decontamination procedures include both the physical and chemical steps taken to remove any chemical or material contamination. Besides the health and safety aspect, decontamination also serves to help prevent cross-contamination between samples. All equipment that comes into contact with sampled material (e.g., soil and groundwater) should be free of any material that could contaminate the true nature of the sampled material.

Additionally, any container or equipment used for field sub-sampling should be free of contamination. The decontamination procedure at the Site will include:

- Liquinox wash with heavy bristle brush
- Initial rinse using tap/well water
- Final rinse using distilled water

10.0 EMERGENCY RESPONSE PLAN

The following sections detail the emergency response plans to be implemented at the Site in case of an emergency.

10.1 Delta Fuels Emergency

In the event of a Site evacuation emergency, an alarm will sound. All personnel and workers on the premises are required to immediately exit through the front gate or other designated exit point.

10.2 Chemical Release

The risk of a chemical release from existing contamination is minimal. A chemical release from gasoline or diesel-powered equipment can occur. Heavy equipment operators are required to maintain appropriate spill response materials, including:

- Pigs and/or other absorbent materials
- Recovery drums
- Shovels
- PPE

If a chemical release threatens off-site persons or property, the Fed95 Project Manager, Quality Assurance Manager & Data Manager, or Field Team Leader should contact authorities using 911.

10.3 Violent Weather

Violent weather (e.g., thunderstorm, tornado, high winds, etc.) can occur with minimal notice based on local weather conditions. In the event that lightning is observed in the vicinity of the Site, workers are to avoid water, high ground, open spaces, solitary tall trees, and metal objects. If shelter is not available, you should:

- Crouch down with both feet together. Do not lie down or place your hands on the ground.
- Do not stand near other people. Keep a minimum distance of 15 feet apart.
- If you are outside and feel your hair stand on end, this is an indication that lightning is about to strike. You should bend forward, putting your hands on your knees.

- Persons injured by lightning do not carry an electrical charge and can be handled safely. Administer first aid/cardiopulmonary resuscitation to a lightning victim if you are qualified to do so. Send for help immediately. If heavy winds occur, seek shelter immediately if possible. Remember that loose material can become airborne.

Inside of a shelter, stay away from doors, windows and avoid water. Electrical appliances (e.g. computers, power tools) should be turned off and unplugged. If appliances cannot be unplugged (e.g. telephones), stay away from them.

10.4 Fire

In the event of an incipient stage fire, workers should notify adjacent individuals of this situation and exit the area. Only workers trained in the use of fire extinguishers should attempt to use an extinguisher. In the event of an out-of-control fire, workers are to exit the area as quickly as possible and assemble at the designated location (discussed at the Tailgate Safety Meeting) with other workers for a head count.

10.5 Medical Emergency

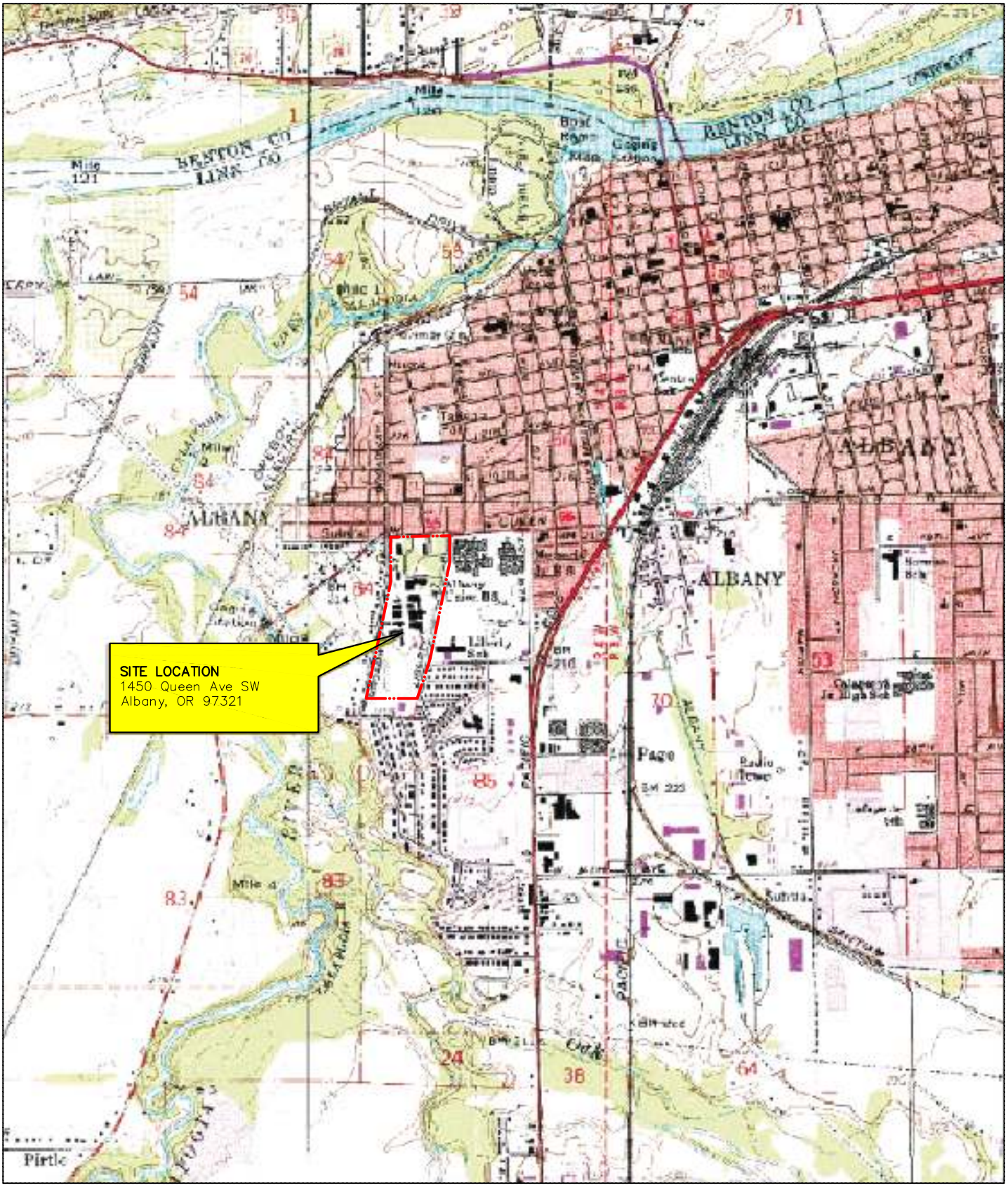
If a worker observes an individual being injured or exhibiting signs/symptoms of illness, they should immediately notify as many individuals as necessary (including the Fed95 Project Manager, Quality Assurance Manager & Data Manager, and Field Team Leader) of the situation.

Emergency Contact	Phone Number
Police	911
Fire Station	911
Ambulance	911
Leslie DeBoer – Fed95 Project Manager	616-490-1405
Vivian Spencer – Fed95 Quality Assurance Manager & Data Manager	616-278-5338
Fed95 Main Office	616-459-3737

APPENDIX A

Figures

FED95 LLC



VS

LEGEND

PROPERTY BOUNDARY

0 2,000 4,000

APPROXIMATE SCALE IN FEET

NOT A LEGAL SURVEY

FIGURE 1

SITE LOCATION MAP

NETL – Albany, OR
Albany, Oregon

February 2024

235743

FED95 LLC



VS

LEGEND

PROPERTY BOUNDARY

0 440 880

APPROXIMATE SCALE IN FEET

NOT A LEGAL SURVEY

FIGURE 2

SITE VICINITY MAP

NETL – Albany, OR
Albany, Oregon

February 2024

235743

APPENDIX B

Tailgate Safety Meeting, Health and Safety Plan

Utility Clearence Checklist				
Utility	**Approx Depth on field Map**	**Onsite Markings?**		**Approx. depth in field (GPR)**
Telephone/Fiberoptic			Orange	
Natural Gas			Yellow	
Electric			Red	
Water			Blue	
Storm Sewer			Green	
Sanitary Sewer			Green	
Petroleum Pipeline			Yellow	
UST piping			No flag markings	
Sprinkler system				
Private Water Well				
Septic System				

Tailgate Health and Safety Plan					
Site Location: NETL-Albany **Date:** **Description of Work:**					
Hazards Identification Considerations					
Hazard Possibilities		**Considerations**		**Comments**	
	Travel to and from Site		- Load Secured - Vehicle in good working condition		
	Travel over Sensitive Areas		Minimize Unnecessary Impacts		
	Site Traffic		Reflective and/or Bright Colored Clothing		
	Adverse Weather Conditions		Proper Clothing Available		
	Slips, Trips, and Falls		Hazard Areas Acknowledged		
	Pinch Points		Hand Protection		
	Power/Hand Tools		- Inspected and in Good Working Condition - Operator Familiar with Proper Use		
	Presence of Drilling/Heavy Equipment		Communication/Eye Contact with Operator		
	Vibration		Anti-vibration Gloves		
	Noise		Hearing Protection		
	Electrical		- GFCI/Power Shut-Off Switch or Breaker - (LOCKOUT/TAGOUT)		

	Below Ground Utilities		Utility Location Complete		
	Overhead Hazards		Power Lines, Loose Items, Pipelines, etc.		
	Flammable/Explosive Materials		Correct Storage/Secure if Transporting		
	Hazardous Materials		- Spill Prevention Measures in Place - MSDS Readily Available		
	Hazardous Atmospheres		Atmospheric Monitoring Devices (i.e. PID)		
	Wildlife Interaction		Right-of-way to Wildlife/Avoid Interaction		
	Confined Space				
	Hot Work				
PPE (As Necessary to Reduce or Eliminate Hazards)					
	Hard Hats		Overboots		H2S Monitor, PID, Multi-Gas Meter
	Safety Glasses		Nitrile (Surgical Style)		Respirators or Dust Guard
	Hearing Protection		Nitrile (Gauntlet Style)		Fall Protection
	Fire Resistant Clothing		Flotation Devices		Face Shield
	Steel-Toe Boots (Always Required)		Tyvek		Chemical Resistant Apron
	Traffic Vest				
Other Considerations					
	Spill Kit		Viable Means of Communication Available		Safe Site Access/Egress
	Fire Extinguisher		Ensure Necessary Permits are in Place		Proper Waste Disposal
	First Aid Kit		Confined Space/Trenching Hazards (See Attached Information)		
Work Tasks					
Task		**Task**		**Comments**	
	Surface Soil Sampling		Surveying		
	HSA Soil Boring/Sampling		LNAPL Check		
	Hand Auger Soil Boring/Sampling		Amending Groundwater		
	Groundwater Sampling		Operate/Maintain Treatment System		
	Drum Removal		Remediation System Design		
	Direct Push Soil Boring/Sampling		Vapor Pin Installation		
Air Monitoring Equipment					
Meter Type		**Where monitored**		**Frequency**	
	Photoionization Detector (PID)		Breathing Zone	Every 15 Minutes	
	Multimeter (LEL, O_2, H_2S, CO)		Ambient Atmosphere/Confined Space	Continuously	

Calibrate all meters daily according to manufacturer's instructions and document calibration data in the appropriate log book.
Remember to correct response factor in meters if necessary.

Air Monitoring Action Levels and Responses
Breathing Zone Limit: 5 ppm on PID
≥ 5 ppm on PID in the Breathing Zone – Evacuate Area, Ventilate Area
< 10% LEL – Continue Monitoring
Limit of ≥ 10% LEL – Eliminate Ignition Sources, Evacuate Area, Ventilate Area
< 19.5% on O_2 - Evacuate Area, Ventilate Area
> 23.5% on O_2 - Eliminate Ignition Sources, Evacuate Area, Ventilate Area
Limit of 10 ppm (TWA) on H_2S – Evacuate Area, Ventilate Area
Limit of 25 ppm (TWA); 200 ppm (Ceiling) on CO – Evacuate Area, Ventilate Area

Potential Chemicals of Concern					
	Gasoline Constituents		Volatile Organic Compounds		Metals
	Diesel Fuel Constituents		Chlorinated Solvents		Hexavalent Chromium
	Hydrogen Peroxide		Other Petroleum: Kerosene		Fuel Oil

Level of Protection					
	Level D		Level C		Level B

Decontamination Procedures					
	Hand Wipes		Standard Three-Step		
	Soap and Water Wash		High Pressure Hot Water/Steam		

Medical/Emergency Contacts		
Police: 911	Ambulance: 911	Fire: 911

- **Emergency Gathering Area:** Front gate of Site
- **Nearest Medical Facility:** Samaritan Medical Clinic – North Albany, 400 NW Hickory Street, Suite 300, Albany, OR 97321
- **Nearest hospital:** Samaritan Albany General Hospital – 1046 ,6th Avenue SW, Albany, OR 97321
-

I understand the Health & Safety hazards of this job and agree to work safe and work smart.

Print Name/Company	Signature

Samaritan Albany General Hospital
1046 6th Avenue SW, Albany, OR 97321

3 min (1.0 mile)

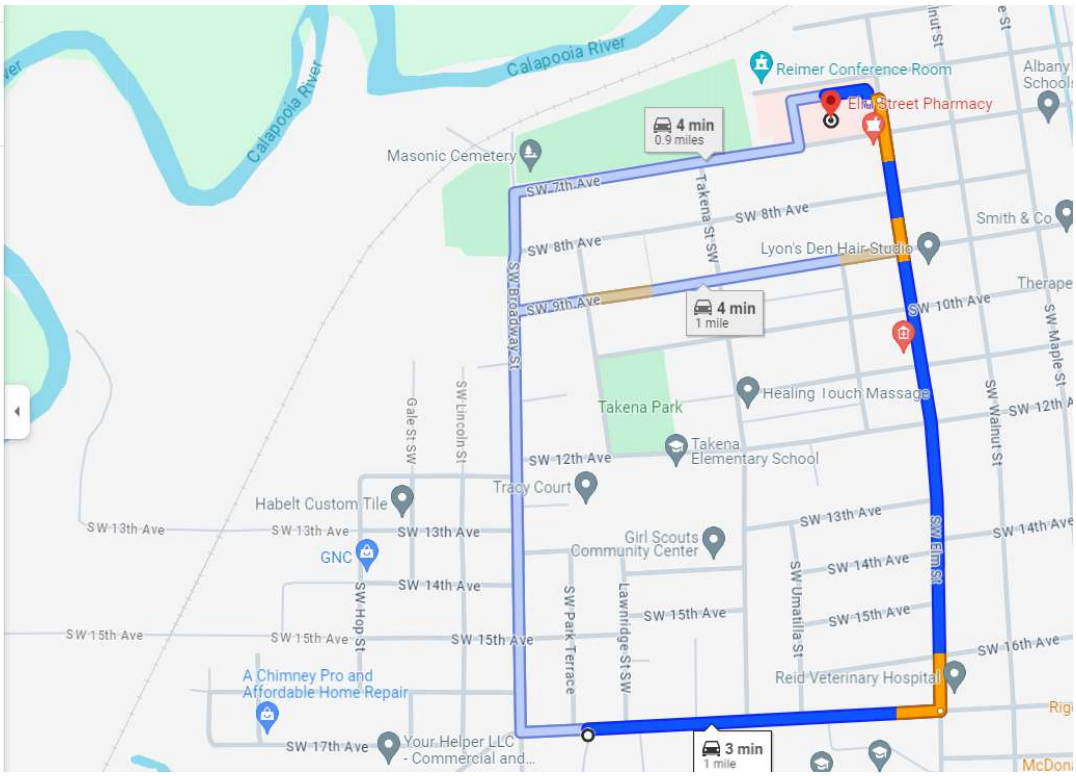
via SW Queen Ave and SW Elm St

Fastest route now due to traffic conditions

U.S. Department Of Energy, NETL Albany Research Center
1450 SW Queen Ave, Albany, OR 97321

- Head east on SW Queen Ave toward Lawnridge St SW — 0.3 mi
- Turn left onto SW Elm St — 0.6 mi
- Turn left — 52 ft
- Turn right — Destination will be on the left — 259 ft

Samaritan Albany General Hospital
1046 6th Ave SW, Albany, OR 97321



Guidance for PID Exposure & Response

This guidance document is intended to reduce the exposure risks to volatile organic compounds (VOCs) and risks to human health and safety. PID responses are measured within the breathing zone.

PID response between 0-25 ppm

Required PPE

- Level D Protection

Action Items

- Conduct Site investigation and sampling

PID response between 25-50 ppm

Required PPE

- Level D Protection (minimum)

Action Items

- Take precautions to minimize inhalation exposure
    - Work upwind from source of vapors, as applicable
    - Stop work and vacate area until concentrations attenuate below 25ppm.
- Implement respiratory protection measures
    - Respirators may be utilized by properly trained and certified individuals

PID response between 51-100 ppm

Required PPE

- Level C Protection

Action Items

- Take precautions to minimize inhalation exposure
    - Work upwind from source of vapors, as applicable
    - Stop work and vacate area until concentrations attenuate below 25ppm.
- Implement respiratory protection measures
    - Respirators shall be utilized by properly trained and certified individuals

PID response exceeding 101 ppm

Required PPE

- Level B Protection

Action Items

- Take precautions to minimize inhalation exposure
    - Work upwind from source of vapors, as applicable
    - Stop work and vacate area until concentrations attenuate below 25ppm.
- Implement respiratory protection measures
    - Supplied air respirators shall be utilized by properly trained and certified individuals