

**CORRECTIVE ACTION PLAN
(COST PROPOSAL NO. 17)**

**PURUSHOTAM, INC.
DADEVILLE TRUCK STOP
17223 HIGHWAY 280
DADEVILLE, ALABAMA**

**FACILITY I.D. NO. 25065-123-011214
INCIDENT NO. UST21-06-03**

PPM PROJECT NO. 432401-CAPD

MAY 1, 2026



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(COST PROPOSAL NO. 17)**

FOR

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DADEVILLE TRUCK STOP
17223 HIGHWAY 280
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**FACILITY I.D. NO. 25065-123-011214
INCIDENT NO. UST21-06-03**

PREPARED FOR:

**PRANAV PATEL
PURUSHOTAM, INC.
3074 ARBOR BEND
HOOVER, ALABAMA 35244**

PPM PROJECT NO. 432401-CAPD

MAY 1, 2026

PREPARED BY:



**CHUCK GOODEN
PROJECT MANAGER**

REVIEWED BY:



**MATTHEW J. EBBERT, P.G.
SENIOR GEOLOGIST**

**PPM CONSULTANTS, INC.
5555 BANKHEAD HIGHWAY
BIRMINGHAM, ALABAMA 35210
(205) 836-5650**

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CERTIFICATION PAGE

I certify under penalty of law that this Corrective Action Plan for the Dadeville Truck Stop facility located at 3075 Alabama Highway 280 in Dadeville, Franklin County, Alabama, and the plans, specifications, and technical data submitted within were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiring of the person or persons who directly gathered the enclosed information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information.



Matthew J. Ebbert, P.G.
AL No. 1131

05/01/26

Date

UST RELEASE FACT SHEET

GENERAL INFORMATION:

SITE NAME: Dadeville Truck Stop

ADDRESS: 17223 Highway 280, Dadeville, Alabama

FACILITY I.D. NO.: 25065-123-011214

INCIDENT NO.: UST21-06-03

RESULTS OF EXPOSURE ASSESSMENT:

How many private drinking water wells are located within 1,000 ft. of site?	0
How many public water supply wells are located within 1 mile of the site?	0
Have any drinking water supply wells been impacted by contamination from this release?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Is there an imminent threat of contamination to any drinking water wells?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Have vapors or contaminated groundwater posed a threat to the public?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are any underground utilities impacted or imminently threatened by the release?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Have surface waters been impacted by the release?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Is there an imminent threat of contamination to surface waters?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
What is the type of surrounding population?	Commercial/Residential

CONTAMINATION DESCRIPTION:

Type of contamination at site: Gasoline, Diesel, Waste Oil Kerosene, Other ___

Free product present in wells? Yes No

Maximum BTEX or PAH concentration measured in soil:	0.016 mg/kg benzene (SB-4-28-29) 12.6 mg/kg ethylbenzene (SB-4-28-29) 62.5 mg/kg xylenes (SB-4-28-29) 0.051 mg/kg MTBE (SB-5-28-29) 8.40 mg/kg naphthalene (SB-4-28-29)
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Maximum COC concentrations measured in groundwater: (4/18/25)	2.760 mg/L benzene (MW-5) 28.946 mg/L BTEX (MW-4) 0.604 mg/L MTBE (MW-5) 0.828 mg/L naphthalene (MW-4)
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ADEM GROUNDWATER BRANCH UST SITE CLASSIFICATION SYSTEM CHECKLIST

Please read all of the following statements and mark either yes or no if the statement applies to your site. If you have conducted a Preliminary or Secondary Investigation, all questions should be answered. Closure site assessment reports may not provide you with all the necessary information, but answer the statements with the knowledge obtained during the closure site assessment.

SITE NAME: Dadeville Truck Stop
 SITE ADDRESS: 17223 Highway 280, Dadeville, Alabama

FACILITY I.D. NO.: 25065-123-011214
 INCIDENT NO.: UST21-06-03

OWNER NAME: Purushotam, Inc.
 OWNER ADDRESS: 3074 Arbor Bend, Hoover, AL 35244

NAME & ADDRESS OF PERSON COMPLETING THIS FORM: Chuck Gooden, PPM Consultants, Inc.
5555 Bankhead Highway, Birmingham, Alabama 35210

<i>CLASSIFICATION</i>	<i>DESCRIPTION</i>	<i>YES</i>	<i>NO</i>
CLASS A	IMMEDIATE THREAT TO HUMAN HEALTH, HUMAN SAFETY OR SENSITIVE ENVIRONMENTAL RECEPTOR		
A.1	Vapor concentrations at or approaching explosive levels that could cause health effects, are present in a residence or building.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
A.2	Vapor concentrations at or approaching explosive levels are present in subsurface utility system(s), but no buildings or residences are impacted.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS B	IMMEDIATE THREAT TO HUMAN HEALTH, HUMAN SAFETY OR SENSITIVE ENVIRONMENTAL RECEPTOR		
B.1	An active public water supply well, public water supply line, or public surface water intake is impacted or immediately threatened.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B.2	An active domestic water supply well, domestic water supply line or domestic surface water intake is impacted or immediately threatened.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B.3	The release is located within a designated Wellhead Protection Area I.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS C	IMMEDIATE THREAT TO HUMAN HEALTH, HUMAN SAFETY OR SENSITIVE ENVIRONMENTAL RECEPTOR		
C.1	Ambient vapor/particulate concentrations exceed concentrations of concern from an acute exposure, or safety viewpoint.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
C.2	Free product is present on the groundwater, at ground surface, on surface water bodies, in utilities other than water supply lines, or in surface water runoff.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS D	SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS		
D.1	There is a potential for explosive levels, or concentrations of vapors that could cause acute effects, to accumulate in a residence or other building.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
D.2	A non-potable water supply well is impacted or immediately threatened.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**ADEM GROUNDWATER BRANCH
UST SITE CLASSIFICATION SYSTEM
CHECKLIST (continued)**

<i>CLASSIFICATION</i>	<i>DESCRIPTION</i>	<i>YES</i>	<i>NO</i>
D.3	Shallow contaminated surface soils are open to public access, and dwellings, parks, playgrounds, day care centers, schools or similar use facilities are within 500 feet of those soils.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS E	SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS		
E.1	A sensitive habitat or sensitive resources (sport fish, economically important species, threatened and endangered species, etc.) are impacted and affected.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS F	SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS		
F.1	Groundwater is impacted and a public well is located within 1 mile of the site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
F.2	Groundwater is impacted and a domestic well is located within 1,000 feet of the site.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
F.3	Contaminated soils and/or groundwater are located within designated Wellhead Protection Areas (Areas II or III).	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS G	SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS		
G.1	Contaminated soils and/or groundwater are located within areas vulnerable to contamination from surface sources.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CLASS H	SHORT TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS		
H.1	Impacted surface water, stormwater, or groundwater discharges within 500 feet of a surface water body used for human drinking water, whole body water-contact sports, or habitat to a protected or listed endangered plant and animal species.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CLASS I	LONG TERM THREAT TO HUMAN HEALTH, SAFETY, OR SENSITIVE ENVIRONMENTAL RECEPTORS		
I.1.	Site has contaminated soils and/or groundwater but does not meet any of the above-mentioned criteria.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

ADDITIONAL COMMENTS:

According to the USGS Water Information System, three former water wells owned by the City of Dadeville were once located within one mile of the site. The closest well was approximately 3,500 feet southeast of the site. Currently, the City of Dadeville purchases its water supply from Alexander City, and has not obtained drinking water from local wells since approximately 1980. No private wells were found within 1,000 feet of the site in a door-to-door survey around the site.

Complete the classification evaluation questions listed above. Upon completion, determine the highest rank of the site (A.1 is the highest rank) based on the statements answered with a yes.

Enter the determined classification ranking:	G.1
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ADEM GROUNDWATER BRANCH
SITE CLASSIFICATION CHECKLIST
(5/8/95)

1.0 INTRODUCTION

PPM Consultants, Inc. (PPM) was retained by Purushotam, Inc. to prepare a Corrective Action Plan (CAP) for the Dadeville Truck Stop facility located at 17223 Highway 280 in Dadeville, Tallapoosa County, Alabama. The CAP is in response to Alabama Department of Environmental Management (ADEM) approval of Cost Proposal No. 17 via letter dated November 3, 2025.

The investigative and corrective actions at the site are in response to an accidental release of petroleum hydrocarbons from an underground storage tank (UST) system. The objective of the CAP is to select an appropriate remedial approach to effectively and efficiently decrease constituents of concern (COC) concentrations in soil and groundwater to below Site-Specific Corrective Action Levels (SSCALs) previously established by an Alabama Risk-Based Corrective Action (ARBCA) Evaluation. The COCs for the site include benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary butyl ether (MTBE), and naphthalene.

This CAP provides site background information, a summary of pertinent environmental activities conducted to date, information regarding subsurface conditions, and a detailed description of the selected method of site remediation. A schedule and cost estimates are included for the implementation of this CAP and associated effectiveness monitoring.

2.0 BACKGROUND

2.1 SITE LOCATION

Dadeville Truck Stop is a retail petroleum station located in a commercial and residential area of Dadeville, Alabama. Geographically, the site is located in the southwest ¼ of the southeast ¼ of Section 32, Township 22 North, Range 32 East, on the Dadeville, Alabama Quadrangle. More specifically the site is located at 32° 50' 33" North latitude and 85° 46' 28" West longitude. The site location is shown in **Figure 1, Site Location Map** in **Figures**.

2.2 ADJACENT PROPERTIES

The site property is located on the north corner of the intersection of U.S. Highway 280 at Clanton Street, in Dadeville, Alabama. The north adjoining properties are residential lots. The bus shop owned by the Tallapoosa County Board of Education adjoins the site to the

east. A boat sales and service facility is located to the southeast across Clanton Street. Cleared but vacant lots are located across Highway 280 to the south and southwest. Residential lots are located west across Highway 280. A cleared and graveled parking area associated with the Dadeville Truck Stop adjoins the northwest side of the site. The surrounding properties are depicted on **Figure 2, Area Map**.

2.3 SITE DESCRIPTION

The Dadeville Truck Stop is a retail petroleum station. The facility is situated near the top of a ridge that slopes from the dispenser area in front of the store to the west and to the southeast. An embankment with a steep southwestern slope is located near the northeastern property boundary. Surface water from the site is directed into a shallow ditch along the northeast side of Highway 280, which then flows southeast, eventually discharging into Buck Creek at a point approximately 2,100 feet southwest of the property.

One building is present at the property, which includes a convenience store on its southeastern end and a vacant garage on its northwestern end. A canopy is located in front (southwest) of the building that covers all of the fuel dispensers except one kerosene dispenser, which is located near the south corner of the building.

Five USTs are present at the site although only three are currently in service. One temporarily abandoned kerosene UST with a capacity of 3,000 gallons is located approximately 40 feet southeast of the store building. Two 8,000-gallon USTs containing diesel and regular-grade gasoline are located in a tank pit located near the north corner of the canopy. Two 6,000-gallon USTs including an off-road diesel tank and a temporarily abandoned premium gasoline tank, are located in a separate tank pit approximately 50 feet northwest of the canopy.

Underground utilities known to exist in the vicinity of the site include a water line and a septic tank. The water meter is located near the southeast property boundary and likely traverses northwesterly to the store building. A septic tank is located near the eastern corner of the store building. The location of the field lines is not known but is suspected to be northeast of the store building. Overhead power lines traverse along the Highway 280 right-of-way (ROW) and along the Clanton Street ROW Site features and are shown on **Figure 3, Site Map**.

2.4 SITE HISTORY

The following provides a brief summary of pertinent events conducted at the site:

Phase I Environmental Site Assessment (ESA): A Phase I ESA was conducted in May 2021 by PPM for the lending institution involved with a proposed renovation of the facility. Research examined during the assessment indicated the site was a petroleum station since at least 1960. A truck and automotive repair shop known as L and L Automotive operated on site from approximately 2000 to 2015. The current USTs were installed in 1976. The 3,000-gallon kerosene UST and 6,000-gallon premium gasoline UST were temporarily abandoned in 2011.

Phase II ESA and Release Reporting: A Phase II ESA was performed on June 3, 2021, by PPM. Two soil borings (SB-1 and SB-2) were advanced on either side of the canopy to approximately 50 feet below ground surface (BGS). Two borings (SB-3 and SB-4) were advanced behind the garage to approximately 20 feet BGS. The borings were advanced using direct-push tools (DPT) and/or solid-stem augers (SSA). Initial saturation was encountered in the deeper borings at approximately 45 to 46 feet BGS and temporary monitoring wells TMW-1 and TMW-2 were installed in the borings. The static water level in the temporary monitoring wells was measured at approximately 28 feet BGS.

One soil sample was collected from each boring except SB-2 for analysis of volatile organic compounds (VOCs) per Environmental Protection Agency (EPA) Method 8260. Two soil samples were collected for analysis of VOCs from SB-2. Although some petroleum compounds were detected in the soil samples (e.g., naphthalene), none exceeded either a Regional Screening Level (RSL) established by the EPA or an Initial Screening Level (ISL) established by ADEM for UST sites.

Groundwater samples were collected from the temporary monitoring wells and analyzed for VOCs per EPA Method 8260. Benzene and MTBE were detected above an ISL in the TMW-1 sample [0.710 and 1.310 milligrams per liter (mg/L), respectively]. In the TMW-2 sample, the following COCs were detected above an ISL: benzene (2.770 mg/L), toluene (23.900 mg/L), ethylbenzene (5.960 mg/L), xylenes (28.000 mg/L), and naphthalene (0.931 mg/L). A release was reported to ADEM on June 18, 2021, when the laboratory report was received.

Preliminary Investigation: After reviewing the results of the release report, ADEM issued a letter to Pranav Patel on September 7, 2021, requiring that a Preliminary Investigation (PI) be performed on the property to assess the extent of impacts to soil and groundwater and to determine appropriate corrective actions. Incident No. UST21-06-03 was assigned to the release. Cost Proposal No. 1 was pre-approved by ADEM on August 30, 2021, to cover the costs of installing four monitoring wells during a Preliminary Investigation. Addendum No. 1 to Cost Proposal No. 1 was approved on March 7, 2022, to cover the costs of one additional monitoring well and the associated additional analytical costs.

The PI was completed in December 2021 when five soil borings (SB-1 through SB-5) were advanced and 2-inch inside diameter (I.D.) monitoring wells (MW-1 through MW-5) were installed in each boring. A PI Report was submitted to ADEM on February 1, 2022. The lithology at the site consisted of 4 to 7 feet of clayey or gravelly silt, which was underlain by weathered schist. Bedrock consisting of amphibolite and schist was encountered at approximately 36 to 37 BGS. Soil samples were analyzed for BTEX and MTBE per EPA Method 8260 and polynuclear aromatic hydrocarbons (PAHs) per EPA Method 8270. Soil samples from SB-4 and SB-5 contained COC concentrations that exceeded ISLs established by ADEM. Groundwater was encountered between 27 to 30 feet BGS in each boring. Groundwater flow direction was determined to be flowing somewhat radially from the area around the fuel dispensers. Groundwater samples were analyzed for BTEX and MTBE per EPA Method 8260 and PAHs per EPA Method 8270. The concentrations of one or more of the COCs exceeded the ISLs in four of the five samples (all but MW-2). PPM recommended additional delineation following completion of the planned renovations at the facility. PPM also recommended quarterly groundwater monitoring at the facility.

Groundwater Monitoring: Cost Proposal Nos. 2 through 5 for quarterly groundwater monitoring were approved on June 1, 2022. The events were conducted through August 2023.

Secondary Investigation: ADEM approved PPM's Workplan for a Secondary Investigation (SI), dated, September 30, 2022, in correspondence dated November 4, 2022. Cost Proposal No. 6 for the SI work was approved on November 4, 2022. Once PPM secured off-site property access to the highway ROW from the Alabama Department of Transportation (ALDOT), the field activities were conducted in May and June of 2023. The scope included installing five soil borings and installing three Type II monitoring wells (MW-6, MW-8, and MW-9). One boring (SB-10) intended for a Type II monitoring well installation encountered auger refusal prior to observing sufficient groundwater and

was abandoned. Another boring (SB-7) was advanced with the intention of installing a Type III monitoring well. However, after encountering refusal at 47 feet BGS and installing an outer casing, the hole could not be advanced through the base of the casing and into bedrock with the available roller bit. The casing was left in place and temporarily capped in case a decision was made to extend a well into the bedrock at a later time. Slug tests were also performed during the investigation. The extent of the plume in both soil and groundwater is horizontally delineated to relatively low concentrations that are likely to be less than risk-based standards. The vertical extent has not yet been defined.

Because the groundwater monitoring event under Cost Proposal No. 5 was conducted after the installation of the new wells, it included eight Type II monitoring wells: MW-1 through MW-6, MW-8, and MW-9.

Continued Groundwater Monitoring: Cost Proposal Nos. 7 and 8 for quarterly groundwater monitoring were approved on September 11, 2023. Sampling under Cost Proposal No. 7 was conducted on November 27, 2023. The dissolved benzene concentration at MW-5 (1.580 mg/L) exceeded the SSCAL of 0.3740 mg/L.

Groundwater monitoring for Cost Proposal No. 8 was conducted on March 5, 2024. The dissolved benzene concentrations at MW-3 (0.638 mg/L), MW-4 (0.840 mg/L), and MW-5 (1.700 mg/L) exceeded the SSCAL of 0.3740 mg/L.

Groundwater monitoring approved under Cost Proposal 10 was conducted on May 13, 2024. The dissolved benzene concentrations at MW-3 (0.470 mg/L), MW-4 (1.340 mg/L), and MW-5 (1.800 mg/L) exceed the SSCAL of 0.3740 mg/L.

Groundwater monitoring for Cost Proposal No. 12 was conducted on August 12, 2024. The dissolved benzene concentrations at MW-5 (2.400 mg/L) exceeded the SSCAL of 0.3740 mg/L. The benzene concentrations in MW-3 and MW-4 dropped below the SSCALs since the previous sampling event on May 13, 2024, event after exceeding SSCALs for two consecutive sampling periods.

ARBCA Evaluation: On September 11, 2023, ADEM approved Cost Proposal No. 9 for an ARBCA evaluation. The evaluation report was completed and submitted to ADEM on January 17, 2024. The proposed SSCALs calculated in the evaluation were approved by ADEM in their letter of January 24, 2024.

CAP Evaluation: On March 7, 2024, ADEM approved Cost Proposal No. 11 for a CAP Evaluation. The CAP Evaluation was completed and submitted to ADEM on August 22, 2024. PPM recommended performing PetroFix[®] injections as the preferred remedial method. In correspondence dated August 26, 2024, ADEM approved the CAP Evaluation and requested preparation of Cost Proposal Number 15 to implement a Pilot Test at the site utilizing the recommended technology.

PetroFix[®] Pilot Study: On November 20, 2024, ADEM approved Cost Proposal No. 15 for a Pilot Study utilizing PetroFix[®] injections. Tasks completed for the Pilot Study included procurement of a Class V Underground Injection Control (UIC) permit from ADEM, a ground penetrating radar (GPR) survey of the injection area, advancement of injection points for injection of PetroFix[®] and Pilot Test Report presenting data and conclusions. The UIC permit was issued by ADEM on May 12, 2025. Upon receipt of the UIC permit the GPR survey and injection point drilling were scheduled. The GPR survey was conducted on June 23, 2025, along with initiation of the injection point installation. An injection point (IP) grid of seven locations was marked in the vicinity of MW-5, located on the southeast portion of the subject property. At each IP, a hollow, steel probe with horizontal jet nozzles at the tip was attempted to be advanced to a total depth of 35 feet BGS. The Regenesis design included injecting a total of 800 pounds of PetroFix[®] and 40 pounds of Electron Acceptor (EA) blend mixed with tap water. Shallow refusal was experienced in IP-1, IP-2, IP-5, and IP-7. Tap water was injected in IP-3 and IP-6 to confirm if daylighting would occur. Tap water did daylight and it was decided that IP-3 and IP-6 were not good candidates for PetroFix[®] injection. In IP-4 the bit would not open and no PetroFix[®] was able to be injected. Due to shallow probe refusal and the subsurface lithology, the Petrofix material could not be injected into the subsurface.

2.5 SITE CONDITIONS

2.5.1 Soil

Subsurface soils were identified from visual inspection of samples recovered from installation of soil borings during the PI and SI. The upper 3 to 5 feet of soil at the site were comprised of reddish brown and gray clayey silt or gravelly silt except for boring SB-8, which encountered road bed gravel in the upper 4 feet. Underlying the silt or gravel was a weathered schist containing abundant mica and veins of weathered quartz. Auger refusal was encountered in boring SB-10 at 28 feet BGS and SB-7 at 47 feet BGS on apparent bedrock.

Sectional views of the site stratigraphy are presented in **Figure 4A, Geologic Cross-Section A-A'** and **Figure 4B, Geologic Cross-Section B-B'**. Soil borings and monitoring well construction logs from prior site investigations are provided in **Appendix A, Soil Boring/Monitoring Well Construction Logs**.

2.5.2 COC in Soil

Free product was not encountered in any of the soil borings advanced. Analytical results from the soil samples collected during the PI and SI indicate all adsorbed COC concentrations are reported below the SSCALs.

A summary of this data is presented in **Table 1, Soil Analytical Summary, Tables**. In addition, **Figure 5, COC Concentrations in Soil** illustrates COC concentrations measured across the site.

2.5.3 Groundwater

On April 18, 2025, groundwater levels ranged from 24.99 feet below top of casing (BTOC) at monitoring well MW-8 to 28.28 feet BTOC at MW-1. Groundwater flow direction is generally to the west from the dispensers and tank pits. The hydraulic gradient between MW-5 and MW-9 was calculated to be approximately 0.015 feet/foot (ft/ft) on that date. **Figure 6, Groundwater Elevation Map (April 18, 2025)** depicts the groundwater surface and estimated flow direction. Groundwater elevation data are shown in **Table 2, Groundwater Elevation Survey Data**.

2.5.4 COCs in Groundwater

Free product was not observed during groundwater sampling activities conducted on April 18, 2025. The dissolved benzene concentration was reported above the SSCAL in monitoring well MW-5 (2.760 mg/L) and MW-4 (0.476 mg/L). COC concentrations reported for the remaining sampled monitoring wells were either BDL or were below the SSCALs.

Groundwater analytical results are summarized in **Table 3, Groundwater Analytical Summary**. The analytical results for dissolved benzene, MTBE, and naphthalene are provided in **Figure 7, Dissolved Benzene Isoconcentration Map (April 18, 2025)**; **Figure 8, Dissolved MTBE Isoconcentration Map (April 18, 2025)**; and **Figure 9, Dissolved Naphthalene Isoconcentration Map (April 18, 2025)**.

3.0 REMEDIAL APPROACH

Based on recent data collected, a remediation by natural attenuation (RNA) approach, augmented by monthly mobile enhanced multi-phase extraction (MEME) events, should be implemented at the site. These corrective actions are intended to reduce COC concentrations in groundwater at MW-4 and MW-5 to below SSCALs.

The following provides a description of the RNA/MEME approach.

3.1 RECOVERY WELL INSTALLATION

Prior to performing MEME events, PPM recommends overdrilling monitoring wells MW-4 and MW-5 and converting them to 4-inch I.D. recovery wells (MW-4R and MW-5R). The locations are depicted on **Figure 10, Proposed Recovery Well Locations**.

Existing monitoring wells MW-4 and MW-5 will be over-drilled to approximately 37 feet BGS. Following removal of the well casing and screen, grout, bentonite, and sand pack, the borings will be reamed with 6.25-inch I.D. augers. Soil cuttings generated during boring advancement will be transported to GFL Environmental Landfill in Tallassee, Alabama. A new waste profile will need to be obtained prior to drilling activities associated with these proposed field activities as the previously obtained profile has expired.

The wells will be constructed with 25-foot lengths of 4-inch I.D., 0.01-inch slotted polyvinyl chloride (PVC) screen, and appropriate length of riser pipe. Sand will be placed in the boring annulus from the bottom of the boring to approximately 2 feet above the screen. A bentonite seal approximately 2 feet thick will be constructed above the sand pack and the remaining annular space will be cemented to within approximately 1 foot BGS. The site will be subsequently surveyed for horizontal and vertical control. Locations will be referenced to existing monitoring wells at the site.

3.2 MOBILE ENHANCED MULTI-PHASE EXTRACTION

MEME is a remedial technique that utilizes high vacuum pressures and flow rates to extract vapor and liquid from the subsurface via recovery/monitoring wells by means of a truck or trailer-mounted mobile vacuum unit. Recovered fluids are temporarily contained in holding tanks on site and subsequently transported off site for proper disposal. The use of high vacuum/airflows can result in higher fluid recovery rates in comparison to

traditional pump and treat methods. MEME also aids in removing COCs adsorbed to the soil matrix.

MEME events will be conducted to reduce COC concentrations in MW-4R and MW-5R by applying vacuum to them during the extraction events. Vacuum gauges and flow gauges are connected to the extraction wells to record the removal rate from each well. Influent and effluent flow rates and vapor concentrations are measured at the thermal oxidizer to estimate the mass of hydrocarbons recovered and treated prior to discharge to the atmosphere. Recovered liquids are transported off site to a permitted facility for disposal or recycling.

3.3 REMEDIATION BY NATURAL ATTENUATION

Natural attenuation is a term applied to the processes that help reduce contaminant concentrations and, in some cases, reduce the potential for contaminant migration. There are multiple components that comprise natural attenuation including: biodegradation; sorption; dispersion and dilution; and volatilization. Biodegradation is often considered the most important component of RNA as it results in chemical changes to the contaminant often rendering it less harmful to the environment.

RNA is typically not considered for sites with elevated contaminant concentrations or free product, as it will generally not achieve site objectives within a reasonable time frame. However, RNA is often selected for sites with low to moderate impact that show indications that it may be effective. In addition, RNA may be used in conjunction with other remedial methods that address contaminant source control.

Based on prior analytical data, dissolved benzene concentrations exceed the SSCALs in monitoring wells MW-4 and MW-5. RNA monitoring will be performed to evaluate the reduction in the COC concentrations in over-drilled locations MW-4R and MW-5R.

4.0 FIELDWORK METHODOLOGY

The following provides a detailed description of the investigative methodology to be employed during the completion of the proposed RNA and MEME scope of work.

4.1 GROUNDWATER ELEVATION SURVEY

Site depth to groundwater and groundwater flow direction will be estimated through a quarterly groundwater elevation survey completed prior to each groundwater sampling event. Depth to groundwater measurements will be accomplished with an oil/water interface probe capable of measuring the water depth to within +/- 0.01 feet. The interface probe will be cleaned prior to use at each well location by means of a phosphate free soap rinse, an isopropyl rinse, and a rinse of distilled water. Rinse fluids will be discharged to the land surface in areas that do not drain back to the respective well locations.

Groundwater depths will be measured in each accessible well from a point on the north side of the top of casing using the interface probe. The well casing elevations and groundwater depths will be used to calculate groundwater elevations and flow direction. In addition, groundwater depths will be used to calculate well-casing volumes prior to well purging activities.

4.2 GROUNDWATER SAMPLING

Groundwater monitoring events will be conducted once per quarter and will include each available monitoring well and recovery well (MW-1 through MW-6, MW-8, and MW-9). Monitoring wells will be sampled in general accordance with PPM's internal Quality Assurance/Quality Control (QA/QC) Plan for sampling at UST sites. Prior to sampling, each well will be purged of approximately three well-casing volumes (or to near dryness) in an effort to obtain samples representative of subsurface conditions. Single use, disposable PVC bailers, and nylon rope will be used to purge each well and to facilitate sample collection.

During the groundwater sampling event, purge water from the monitoring wells will be contained on site in 55-gallon drums. The purge water contained in the drums will be removed during the subsequent MEME event.

Each sample will be transferred from the bailer into 40-milliliter (mL) glass vials containing hydrochloric acid (HCl) as a preservative. Each container will be filled with the sample, promptly capped, and appropriately labeled to indicate the sample origin. Containers will be subsequently placed in an iced cooler for preservation during shipment to the laboratory. A duplicate sample will be collected from one monitoring well in accordance with QA/QC protocol.

Disposable nitrile gloves will be worn during each well purge and sample collection in an effort to reduce the potential for cross-contamination. Gloves will be changed and discarded between each sample acquisition.

4.3 SAMPLE PRESERVATION AND DISPATCH

Each sample retained for laboratory analyses will be promptly placed on ice and preserved at approximately 4 degrees Celsius (°C). The samples will be labeled to document the appropriate project information. Samples will be sealed within insulated coolers and transported under chain-of-custody protocol to an independent laboratory for analysis.

4.4 LABORATORY ANALYSES

Groundwater samples will be analyzed by Sutherland Environmental Company, Inc. in Birmingham, Alabama for BTEX, MTBE, and naphthalene per EPA Method 8260.

4.5 MEME EVENTS

Two 8-hour MEME events will be performed each quarter. This will result in a total of eight MEME events over the course of the first year of RNA effectiveness monitoring. However, PPM will closely monitor vapor recovery rates and dissolved concentrations during the MEME events. If concentrations start to decline after the first two quarters of monitoring, PPM will recommend decreasing the number of MEME events performed during each quarterly monitoring period.

PPM will perform the 8-hour MEME events utilizing a vacuum truck equipped with a vacuum pump. A thermal oxidizer will be used to treat off-gases prior to release to the atmosphere. The ADEM Air Division will be notified prior to initiating MEME events at the site.

Groundwater levels will be measured at select monitoring wells prior to initiating each MEME event to establish static conditions for comparison to conditions observed during the event. Vacuum gauges will be installed in the flexible 2-inch hose that connects the wellhead to the vacuum pump. A gate valve will control the applied vacuum to the extraction point. Airflow rates, VOC concentrations, and applied vacuum will be measured periodically throughout the event. Field measurements will be used to evaluate the site response to treatment and estimate the pounds of hydrocarbons removed throughout the operating period.

PPM will utilize recovery well MW-4R and MW-5R during the MEME events but may change the extraction wells based on the results of the groundwater sampling events. PPM may extract from multiple wells simultaneously during the MEME events. Additionally, the duration/frequency of the MEME events can be modified with ADEM approval, based on results of subsequent groundwater monitoring activities.

5.0 REPORTING

Quarterly RNA/MEME effectiveness monitoring reports will be prepared and submitted within approximately 45 days of the final MEME event each quarter. Reports will include a detailed description of the fieldwork performed and a summary of the associated findings.

Current and historical groundwater elevation and analytical data will be presented in summary tables. In addition, figures will be provided indicating the apparent direction of groundwater flow and estimated extent of COC impact. The report will be reviewed by an engineer or geologist experienced in conducting subsurface environmental investigations and corrective actions. A copy of the MEME reports will be included.

6.0 SITE HEALTH AND SAFETY

A site-specific Health and Safety Plan (HASP) for proposed corrective action activities at the facility is included in **Appendix B, Site Health and Safety Plan**. The HASP was specifically designed to address the proposed activities at the site. All project personnel will be familiar with the HASP, and the HASP will be kept on site throughout the duration of the corrective action activities.

7.0 PROJECT SCHEDULE

PPM proposes to conduct RNA effectiveness monitoring on a quarterly basis for at least one year. Following the first two quarters of events, PPM will evaluate if the MEME events should be reduced to quarterly. If at any time during these activities it is deemed necessary to modify corrective action efforts, PPM will contact ADEM for discussion.

8.0 COST ESTIMATE

The work elements for CAP implementation are eligible for reimbursement from the Alabama Tank Trust Fund (ATTF). Cost proposals for implementation of the CAP were submitted separately through the Alabama Environmental Permitting and Compliance System (AEPACS) and include:

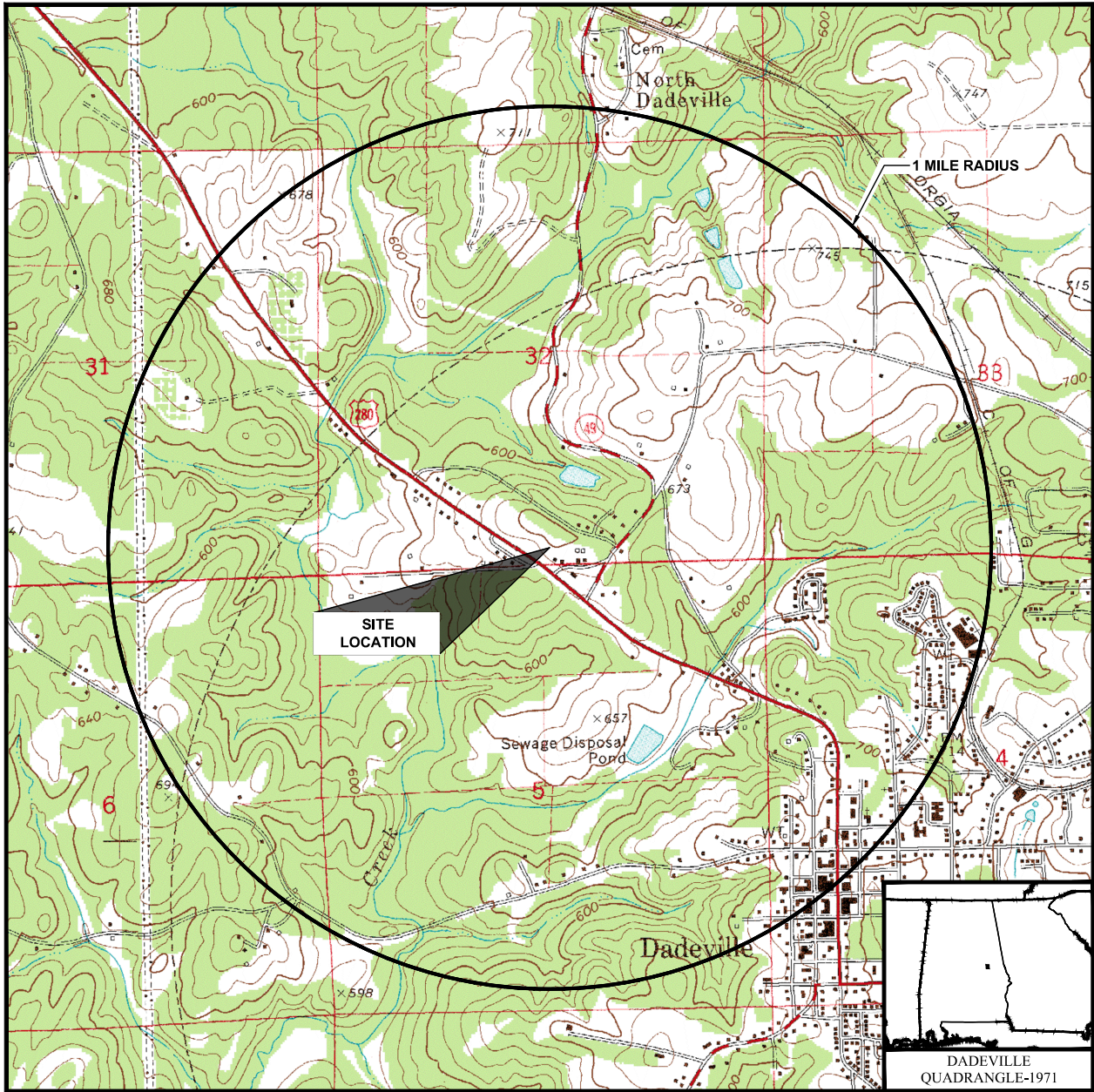
Cost Proposal No. 19 – First Quarter RNA Effectiveness Monitoring

Cost Proposal No. 20 – Second Quarter RNA Effectiveness Monitoring

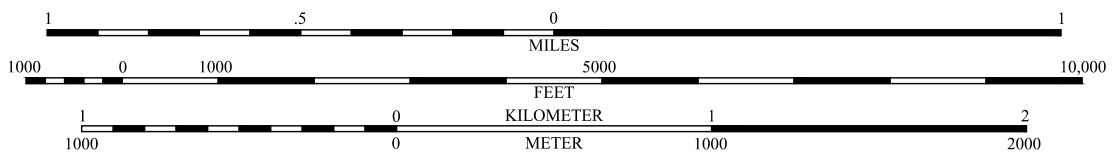
Cost Proposal No. 21 – Third Quarter RNA Effectiveness Monitoring


Cost Proposal No. 22 – Fourth Quarter RNA Effectiveness Monitoring.

FIGURES



SCALE: 1 : 24,000



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PURUSHOTAM, INC.
DADEVILLE TRUCK STOP
 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

SITE LOCATION MAP

FIGURE NUMBER

1



I.D.	DESCRIPTION
1	RESIDENTIAL
2	TALLAPOOSA COUNTY BUS SHOP
3	FOSHEE BOAT DOC
4	ANIMAL CARE CENTER
5	HORSESHOE BEND BAPTIST CHURCH AND DAYCARE
6	HARRIS PERFORMANCE
7	BLUE CREEK IRONWORKS
8	DIRT QUARRY

SOURCE: GOOGLE EARTH

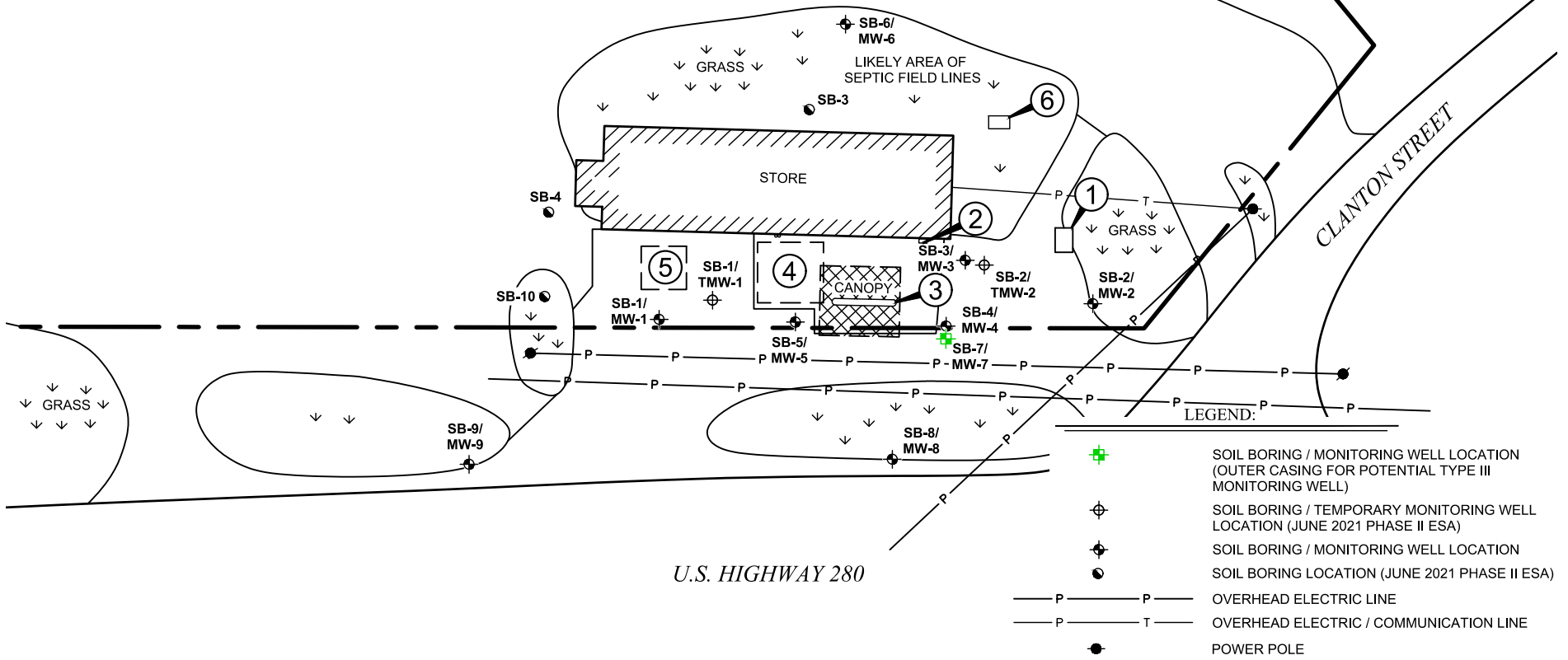
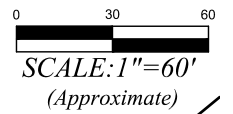
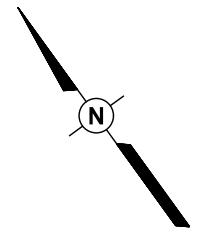
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MRS	12/15/25
PROJECT NUMBER:	PHASE:
432401	CAPD

PURUSHOTAM, INC.
DADEVILLE TRUCK STOP
 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

AREA MAP

FIGURE NUMBER
2

I.D.	DESCRIPTION
1	KEROSENE UST
2	KEROSENE DISPENSER
3	DIESEL AND GASOLINE DISPENSERS
4	REGULAR GASOLINE USTs
5	OFF-ROAD DIESEL AND PREMIUM GASOLINE USTs
6	SEPTIC TANK




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 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

SITE MAP

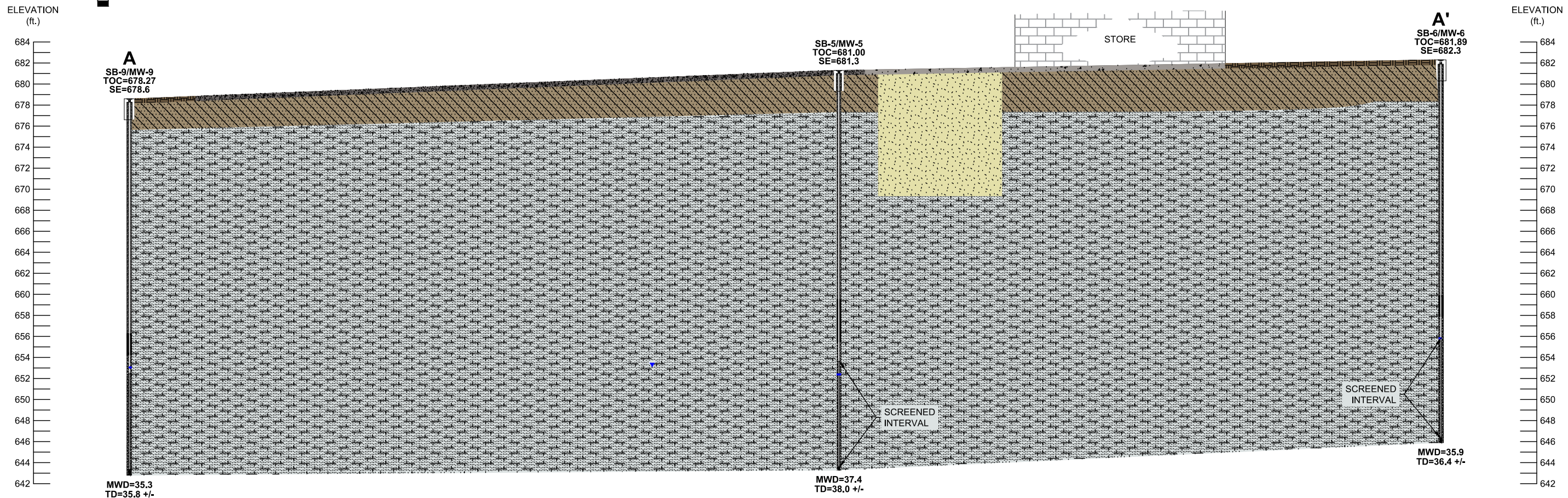
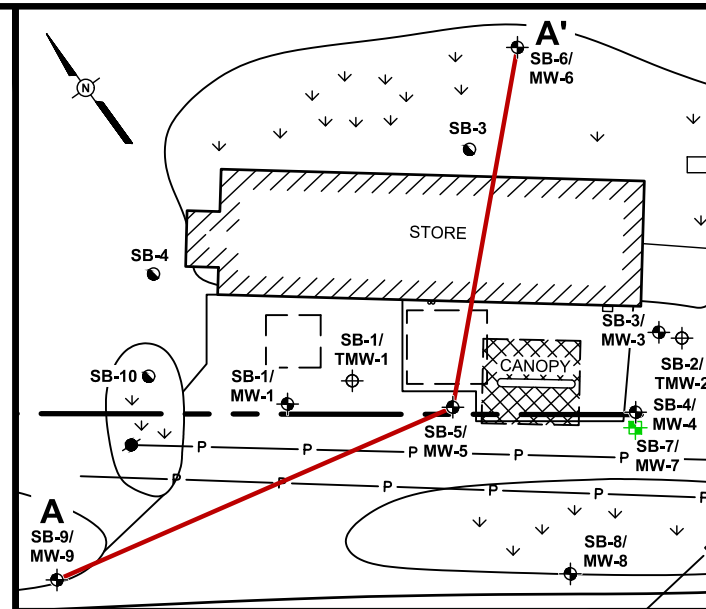
FIGURE
NUMBER
3

LEGEND:





-  CLAYEY SILT
-  WEATHERED SCHIST
-  TANK PIT BACKFILL
-  ASPHALT
-  CONCRETE
-  TOP SOIL

- TOC=681.00 TOP OF CASING (ft.)
- SE=681.3 SURFACE ELEVATION (ft.)
- TD=38.0 +/- TOTAL DEPTH OF BORING (ft.)
- MWD=36.9 MEASURED WELL DEPTH (ft.)
-  SCREENED INTERVAL W/SUMP

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=10'



LEGEND:

-  CLAYEY SILT
-  WEATHERED SCHIST
-  TANK PIT BACKFILL
-  ASPHALT
-  CONCRETE
-  TOP SOIL

TOC=681.51 TOP OF CASING (ft.)

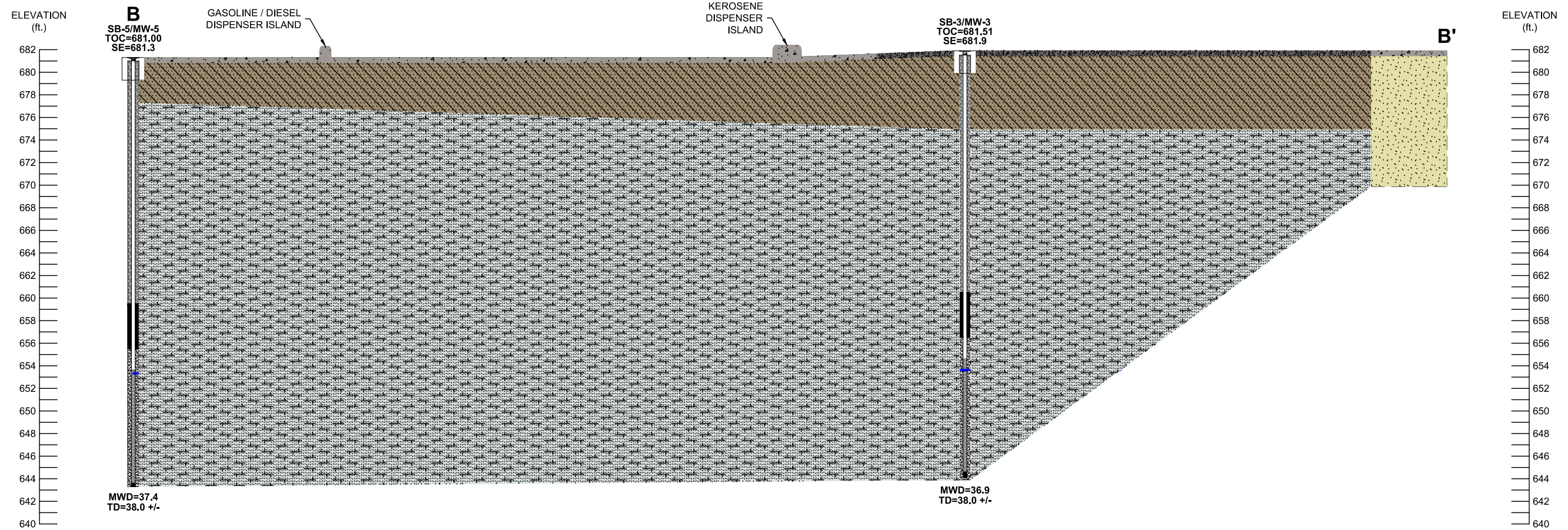
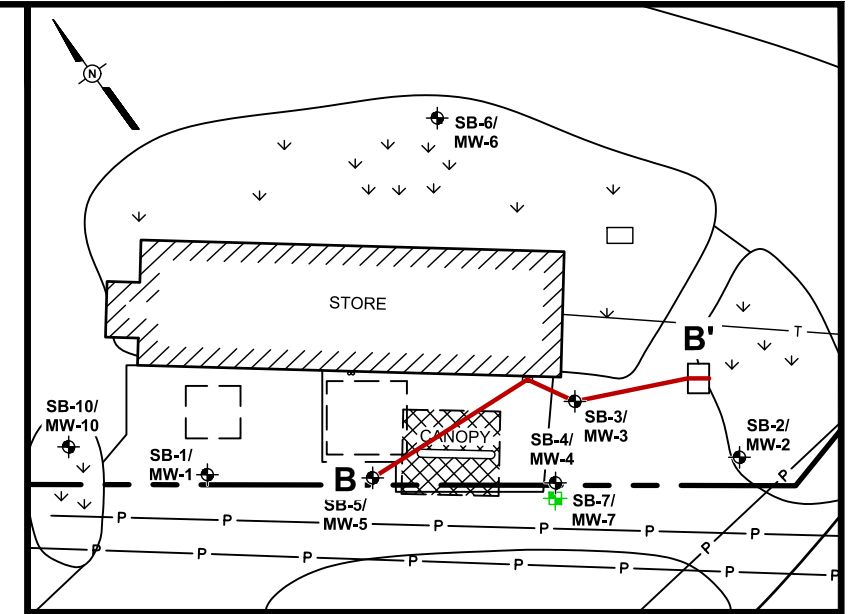
SE=681.9 SURFACE ELEVATION (ft.)

TD=38.0 +/- TOTAL DEPTH OF BORING (ft.)

MWD=36.9 MEASURED WELL DEPTH (ft.)

 SCREENED INTERVAL W/SUMP

HORIZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'



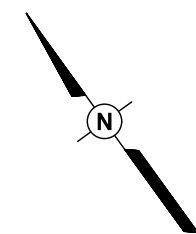
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DADEVILLE TRUCK STOP
17223 U.S. HIGHWAY 280
DADEVILLE, ALABAMA

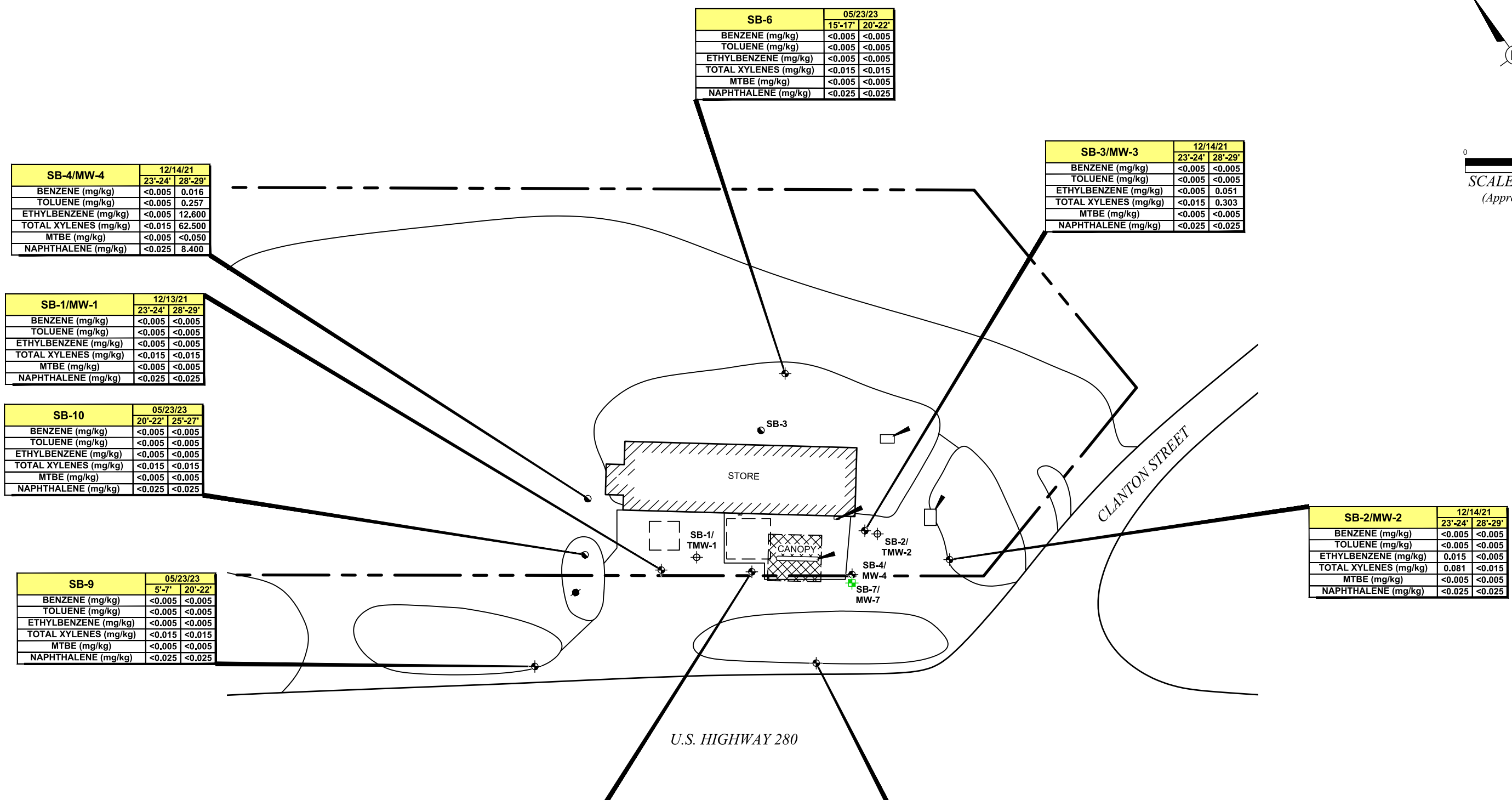
GEOLOGIC CROSS-SECTION
B-B'

FIGURE NUMBER

4B



0 30 60
SCALE: 1"=60'
(Approximate)



SB-4/MW-4	12/14/21	
	23'-24'	28'-29'
BENZENE (mg/kg)	<0.005	0.016
TOLUENE (mg/kg)	<0.005	0.257
ETHYLBENZENE (mg/kg)	<0.005	12.600
TOTAL XYLENES (mg/kg)	<0.015	62.500
MTBE (mg/kg)	<0.005	<0.050
NAPHTHALENE (mg/kg)	<0.025	8.400

SB-1/MW-1	12/13/21	
	23'-24'	28'-29'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	<0.005
ETHYLBENZENE (mg/kg)	<0.005	<0.005
TOTAL XYLENES (mg/kg)	<0.015	<0.015
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<0.025	<0.025

SB-10	05/23/23	
	20'-22'	25'-27'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	<0.005
ETHYLBENZENE (mg/kg)	<0.005	<0.005
TOTAL XYLENES (mg/kg)	<0.015	<0.015
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<0.025	<0.025

SB-9	05/23/23	
	5'-7'	20'-22'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	<0.005
ETHYLBENZENE (mg/kg)	<0.005	<0.005
TOTAL XYLENES (mg/kg)	<0.015	<0.015
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<0.025	<0.025

SB-6	05/23/23	
	15'-17'	20'-22'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	<0.005
ETHYLBENZENE (mg/kg)	<0.005	<0.005
TOTAL XYLENES (mg/kg)	<0.015	<0.015
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<0.025	<0.025

SB-3/MW-3	12/14/21	
	23'-24'	28'-29'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	<0.005
ETHYLBENZENE (mg/kg)	<0.005	0.051
TOTAL XYLENES (mg/kg)	<0.015	0.303
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<0.025	<0.025

SB-2/MW-2	12/14/21	
	23'-24'	28'-29'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	<0.005
ETHYLBENZENE (mg/kg)	0.015	<0.005
TOTAL XYLENES (mg/kg)	0.081	<0.015
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<0.025	<0.025

SB-5/MW-5	12/15/21	
	23'-24'	28'-29'
BENZENE (mg/kg)	0.012	0.012
TOLUENE (mg/kg)	0.031	0.018
ETHYLBENZENE (mg/kg)	<0.005	<0.005
TOTAL XYLENES (mg/kg)	0.027	0.016
MTBE (mg/kg)	0.025	0.051
NAPHTHALENE (mg/kg)	<0.025	<0.025

SB-8	05/23/23	
	15'-17'	20'-22'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	0.010
ETHYLBENZENE (mg/kg)	<0.005	0.058
TOTAL XYLENES (mg/kg)	<0.015	0.357
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<0.025	<0.025

LEGEND:
 SOIL BORING / MONITORING WELL LOCATION (OUTER CASING FOR POTENTIAL TYPE III MONITORING WELL)
 SOIL BORING / MONITORING WELL LOCATION
 (mg/kg) MILLIGRAMS PER KILOGRAM

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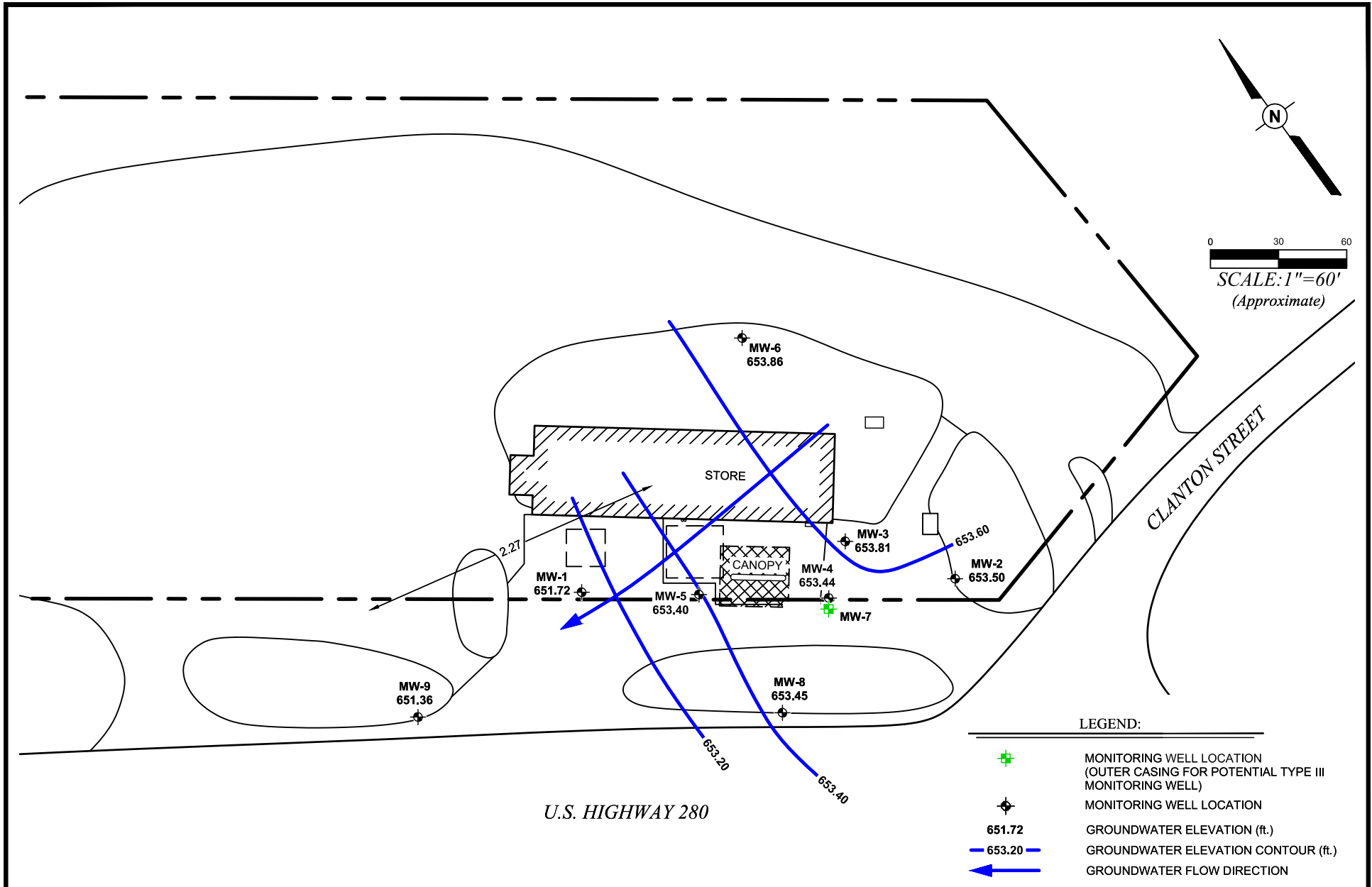
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DRAWN DATE: 12/15/25

PROJECT NUMBER: 432401
PHASE: CAPD

PURUSHOTAM, INC.
DADEVILLE TRUCK STOP
 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

COC CONCENTRATIONS IN SOIL

FIGURE NUMBER
5

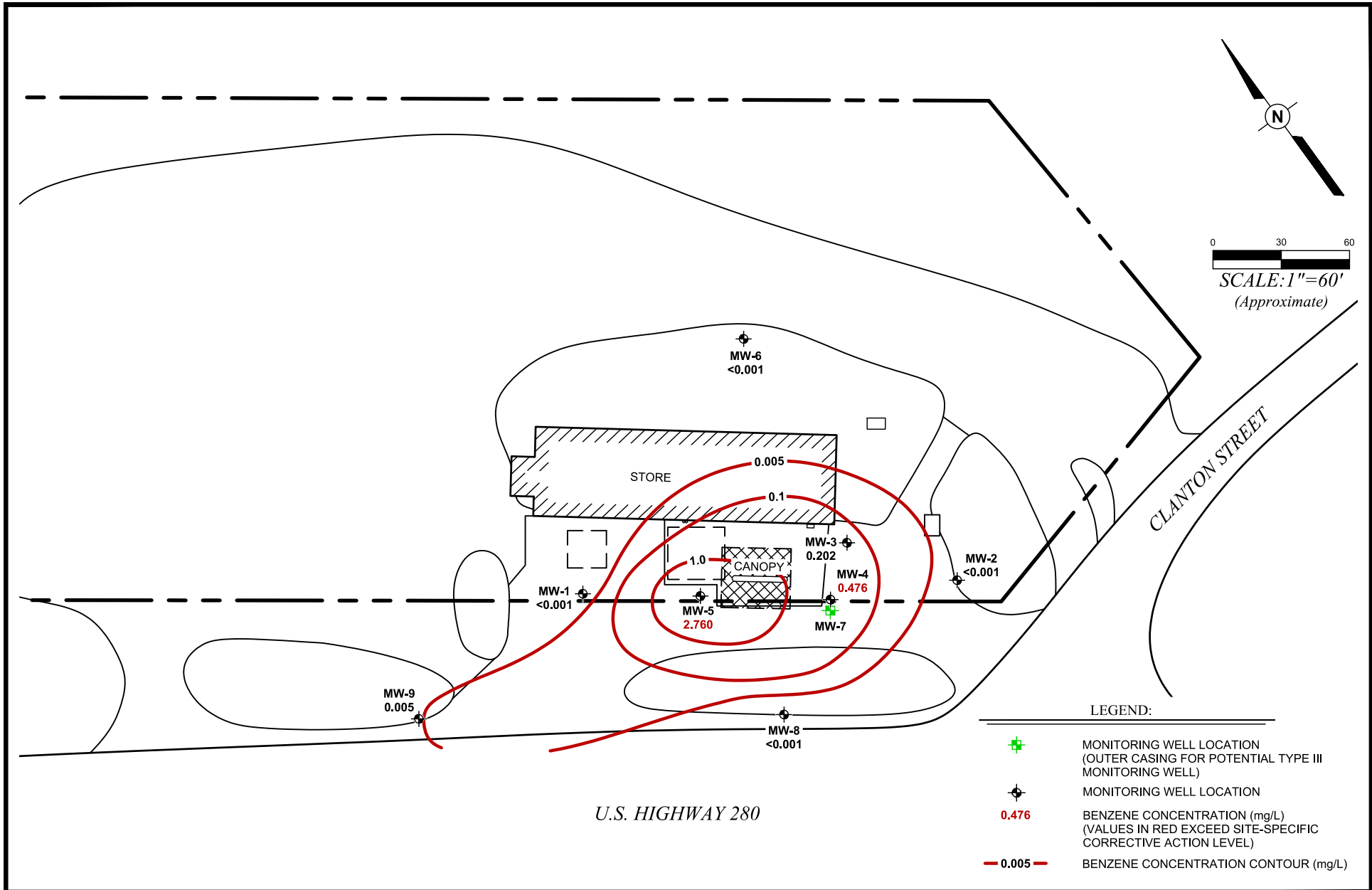


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DADEVILLE TRUCK STOP
 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

GROUNDWATER ELEVATION MAP
 (APRIL 18, 2025)

FIGURE NUMBER
6

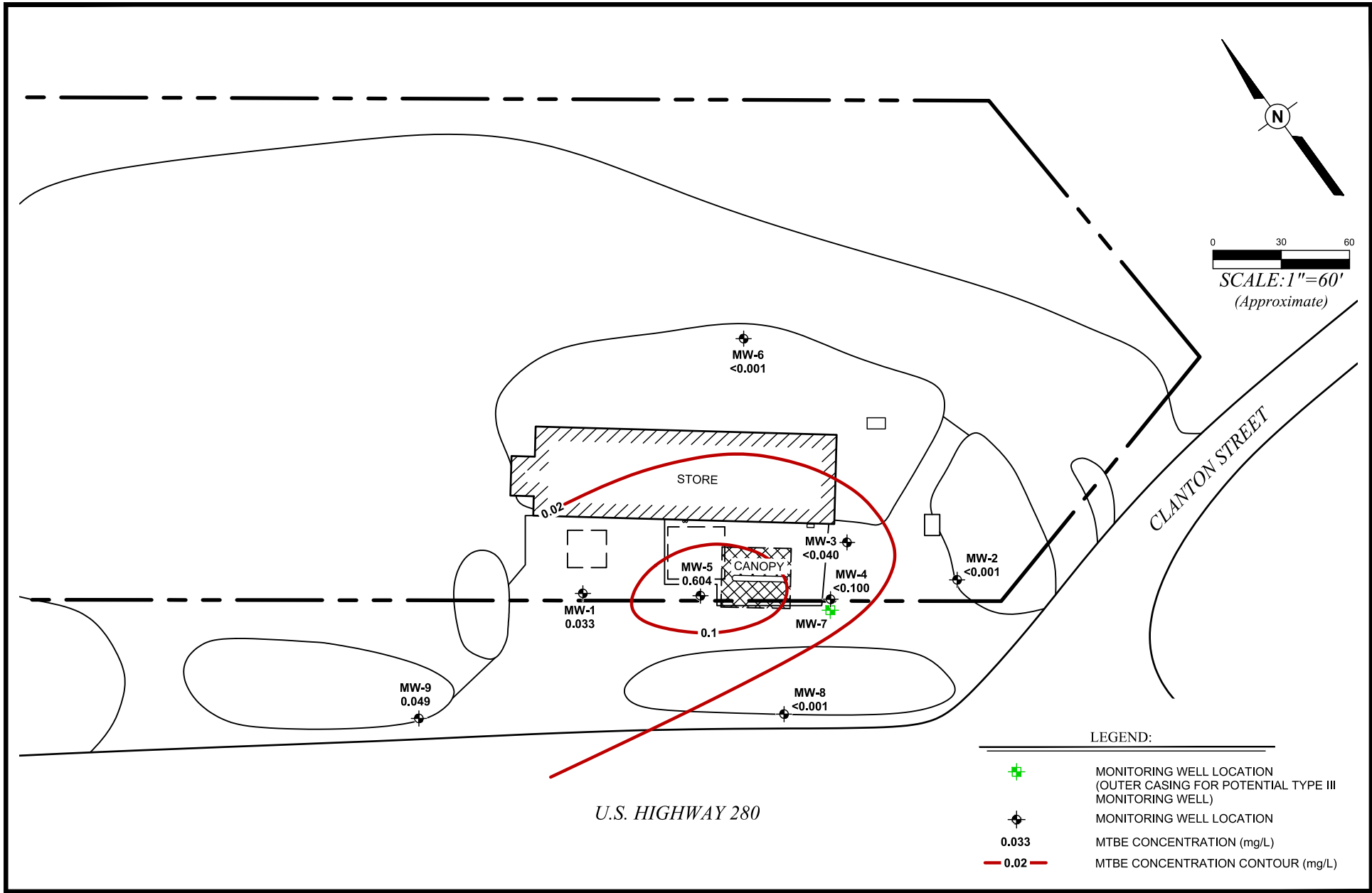


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DADEVILLE TRUCK STOP
 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

DISSOLVED BENZENE
ISOCONCENTRATION MAP
 (APRIL 18, 2025)

FIGURE NUMBER
7

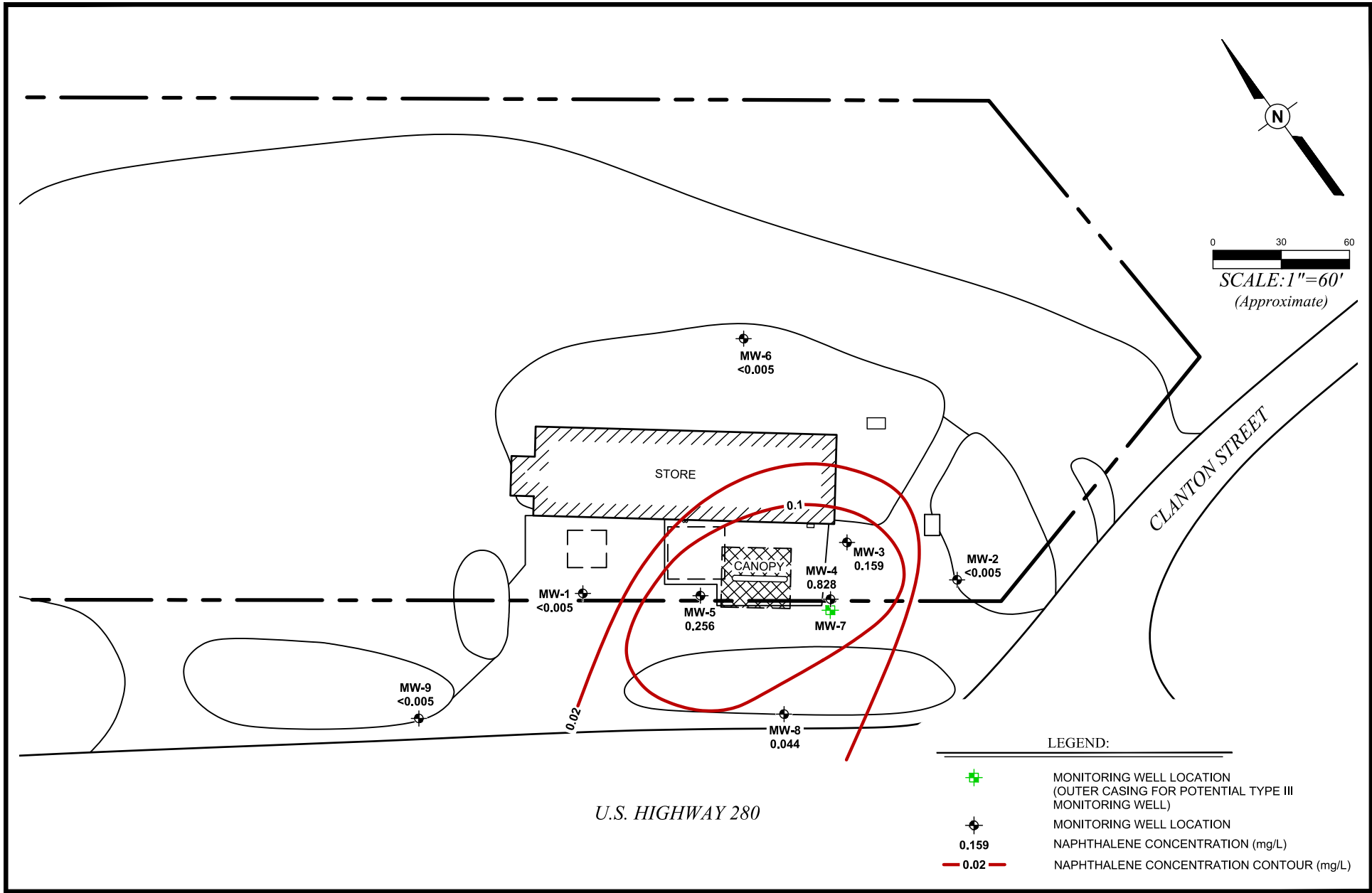


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PROJECT NUMBER: 432401	PHASE: CAPD

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DADEVILLE TRUCK STOP
 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

DISSOLVED MTBE
ISOCONCENTRATION MAP
 (APRIL 18, 2025)

FIGURE NUMBER
8



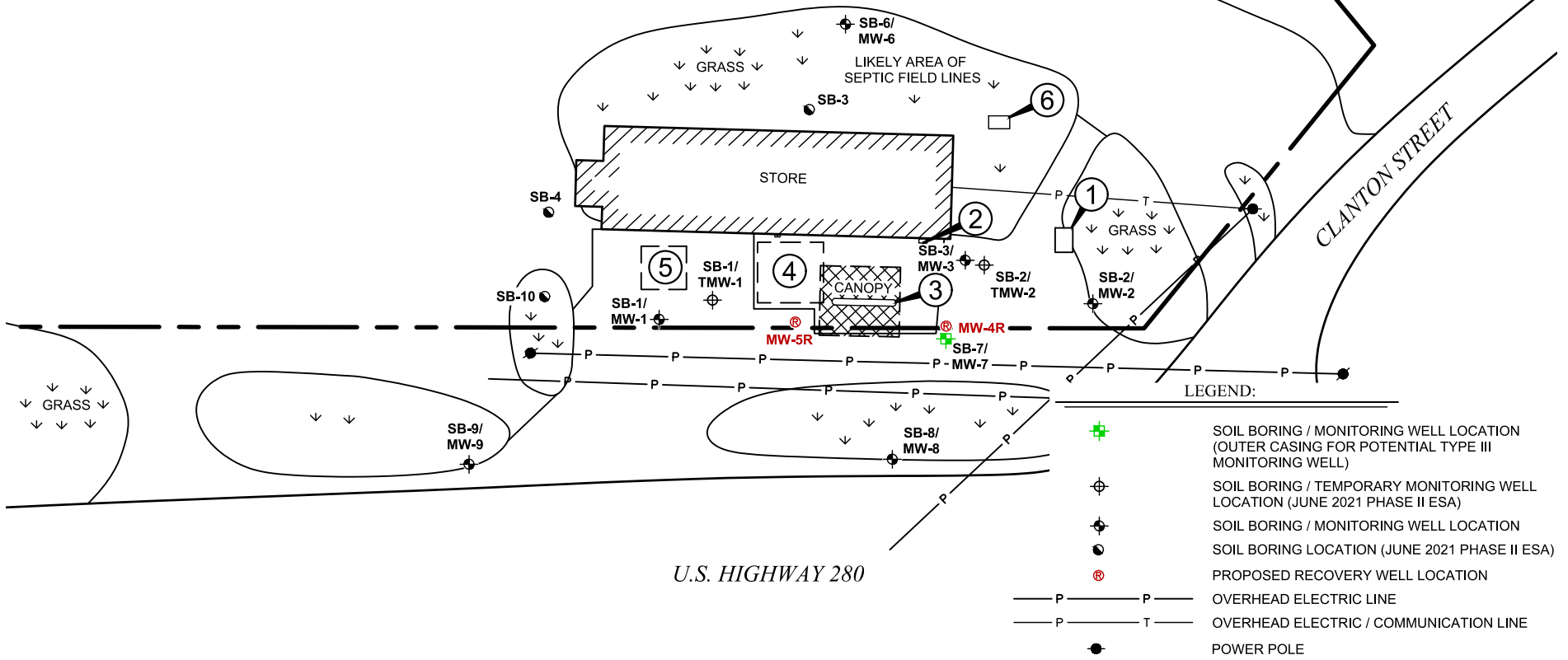
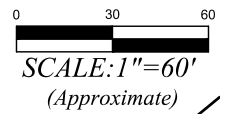
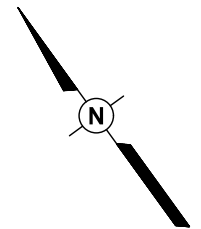
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PROJECT NUMBER: 432401	PHASE: CAPD

PURUSHOTAM, INC.
DADEVILLE TRUCK STOP
 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

DISSOLVED NAPHTHALENE
ISOCONCENTRATION MAP
 (APRIL 18, 2025)

FIGURE
NUMBER
9

I.D.	DESCRIPTION
1	KEROSENE UST
2	KEROSENE DISPENSER
3	DIESEL AND GASOLINE DISPENSERS
4	REGULAR GASOLINE USTs
5	OFF-ROAD DIESEL AND PREMIUM GASOLINE USTs
6	SEPTIC TANK



LEGEND:

	SOIL BORING / MONITORING WELL LOCATION (OUTER CASING FOR POTENTIAL TYPE III MONITORING WELL)
	SOIL BORING / TEMPORARY MONITORING WELL LOCATION (JUNE 2021 PHASE II ESA)
	SOIL BORING / MONITORING WELL LOCATION
	SOIL BORING LOCATION (JUNE 2021 PHASE II ESA)
	PROPOSED RECOVERY WELL LOCATION
	OVERHEAD ELECTRIC LINE
	OVERHEAD ELECTRIC / COMMUNICATION LINE
	POWER POLE

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PURUSHOTAM, INC.
DADEVILLE TRUCK STOP
 17223 U.S. HIGHWAY 280
 DADEVILLE, ALABAMA

PROPOSED RECOVERY WELL LOACTIONS

FIGURE NUMBER
10

TABLES

TABLE 1
SOIL ANALYTICAL SUMMARY
DADEVILLE TRUCK STOP
17223 HIGHWAY 280
DADEVILLE, ALABAMA

SAMPLE I.D.	SAMPLE DEPTH (ft BGS)	SAMPLE DATE	HEADSPACE (ppmv)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL-BENZENE (mg/kg)	XYLENES (mg/kg)	TOTAL BTEX (mg/kg)	MTBE (mg/kg)	NAPHTHALENE BY 8260 (mg/kg)	NAPHTHALENE BY 8270 (mg/kg)
SB-1-23-24	23 - 24	12/13/21	60	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	<0.050
SB-1-28-29	28 - 29	12/13/21	100	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	<0.050
SB-2-23-24	23 - 24	12/14/21	0	<0.005	<0.005	0.015	0.081	0.096	<0.005	<0.025	<0.050
SB-2-28-29	28 - 29	12/14/21	0	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	<0.050
SB-3-23-24	23 - 24	12/14/21	50	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	<0.050
SB-3-28-29	28 - 29	12/14/21	65	<0.005	<0.005	0.051	0.303	0.354	<0.005	<0.025	<0.050
SB-4-23-24	23 - 24	12/14/21	280	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	<0.050
SB-4-28-29	28 - 29	12/14/21	840	0.016	0.257	12.600	62.500	75.373	<0.050	8.400	1.670
SB-5-23-24	23 - 24	12/15/21	65	0.012	0.031	<0.005	0.027	0.070	0.025	<0.025	<0.050
SB-5-28-29	28 - 29	12/15/21	55	0.012	0.018	<0.005	0.016	0.046	0.051	<0.025	<0.050
SB-6-15-17	15 - 17	05/23/23	75	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	NA
SB-6-20-22	20 - 22	05/23/23	35	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	NA
SB-8-15-17	15 - 17	05/23/23	25	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	NA
SB-8-20-22	20 - 22	05/23/23	50	<0.005	0.010	0.058	0.357	0.425	<0.005	<0.025	NA
SB-9-5-7	5 - 7	05/23/23	0	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	NA
SB-9-20-22	20 - 22	05/23/23	0	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	NA
SB-10-20-22	20 - 22	05/23/23	45	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	NA
SB-10-25-27	25 - 27	05/23/23	90	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.025	NA
SSCAL - Indoor Inhalation			--	818.1	3,519	1,628	2,048	--	38,412	38,412	1,705
SSCAL - GRP Source (SB-3, SB-4, and SB-5)			--	1.420	615.5	620.5	2,048	--	1.473	101.2	101.2

Notes: BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes per EPA Method 8260/5035
MTBE - Methyl tertiary butyl ether per EPA Method 8260/5035
Naphthalene per EPA Method 8260/5035 and 8270
ft BGS - feet below ground surface
mg/kg - milligrams per kilogram
BDL - Below Detection Limit
ppmv - parts per million by volume (headspace measured with RKI Eagle Model gas indicator)
SSCAL - Site-Specific Corrective Action Level
NA - Not analyzed

Source: PPM Consultants, Inc.
PPM Project No. 432401-CAPD

TABLE 2
GROUNDWATER ELEVATION SURVEY DATA
DADEVILLE TRUCK STOP
17223 HIGHWAY 280
DADEVILLE, ALABAMA

WELL I.D.	DATE	SURFACE ELEVATION (ft)	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft BTOC)	SCREENED INTERVAL (ft BTOC)	DEPTH TO WATER (ft BTOC)	GROUND-WATER ELEVATION (ft)
MW-1	12/29/21	680.4	680.00	36.5	26.5 - 35.9	28.45	651.55
	08/22/22			36.5		29.02	650.98
	11/28/22			36.9		30.16	649.84
	02/22/23			36.6		27.49	652.51
	06/09/23			36.2		27.21	652.79
	08/04/23			36.1		28.13	651.87
	11/27/23			36.2		29.37	650.63
	03/05/24			36.5		27.06	652.94
	05/13/24			36.4		25.79	654.21
	08/12/24			36.5		28.51	651.49
	12/09/24			36.5		30.24	649.76
	04/18/25			36.5		28.28	651.72
MW-2	12/29/21	681.4	680.75	36.2	26.2 - 35.6	27.41	653.34
	08/22/22			36.2		27.79	652.96
	11/28/22			36.6		28.93	651.82
	02/22/23			36.3		26.88	653.87
	06/09/23			36.0		26.11	654.64
	08/04/23			36.6		26.97	653.78
	11/27/23			36.4		28.28	652.47
	03/05/24			36.1		26.76	653.99
	05/13/24			36.2		25.84	654.91
	08/12/24			36.1		27.29	653.46
	12/09/24			36.2		28.84	651.91
	04/18/25			36.1		27.25	653.50
MW-3	12/29/21	681.9	681.51	36.9	26.6 - 36.1	27.88	653.63
	08/22/22			36.9		28.17	653.34
	11/28/22			37.4		29.51	652.00
	02/22/23			37.0		27.23	654.28
	06/09/23			36.9		26.29	655.22
	08/04/23			36.8		27.15	654.36
	11/27/23			37.3		28.77	652.74
	03/05/24			36.8		26.82	654.69
	05/13/24			36.9		25.90	655.61
	08/12/24			37.0		27.46	654.05
	12/09/24			36.9		29.36	652.15
	04/18/25			36.9		27.70	653.81
MW-4	12/29/21	681.4	681.13	37.0	27.0 - 36.4	27.50	653.63
	08/22/22			37.0		27.84	653.29
	11/28/22			37.3		29.28	651.85
	02/22/23			37.2		26.88	654.25
	06/09/23			37.0		25.85	655.28
	08/04/23			36.7		26.52	654.61
	11/27/23			36.8		28.41	652.72
	03/05/24			36.8		26.60	654.53
	05/13/24			37.1		25.69	655.44
	08/12/24			37.0		27.08	654.05
	12/09/24			36.9		29.20	651.93
	04/18/25			37.0		27.69	653.44

TABLE 2
GROUNDWATER ELEVATION SURVEY DATA
DADEVILLE TRUCK STOP
17223 HIGHWAY 280
DADEVILLE, ALABAMA

WELL I.D.	DATE	SURFACE ELEVATION (ft)	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft BTOC)	SCREENED INTERVAL (ft BTOC)	DEPTH TO WATER (ft BTOC)	GROUND-WATER ELEVATION (ft)
MW-5	12/29/21	681.3	681.00	37.2	27.2 - 36.6	27.67	653.33
	08/22/22			37.3		28.28	652.72
	11/28/22			37.9		29.76	651.24
	02/22/23			37.7		26.76	654.24
	06/09/23			37.1		25.89	655.11
	08/04/23			35.1		27.09	653.91
	11/27/23			37.4		28.86	652.14
	03/05/24			37.3		26.34	654.66
	05/13/24			37.5		25.14	655.86
	08/12/24			37.4		27.44	653.56
	12/09/24			37.4		29.71	651.29
	04/18/25			37.4		27.60	653.40
MW-6	06/09/23	682.3	681.89	35.4	26.0 - 35.5	26.07	655.82
	08/04/23			35.6		27.35	654.54
	11/27/23			35.8		28.92	652.97
	03/05/24			35.9		26.78	655.11
	05/13/24			NL		NL	NL
	08/12/24			NL		NL	NL
	12/09/24			35.9		29.96	651.93
	04/18/25			35.7		28.03	653.86
MW-8	06/09/23	679.0	678.44	35.0	26.0 - 35.6	23.41	655.03
	08/04/23			34.7		24.66	653.78
	11/27/23			34.9		26.31	652.13
	03/05/24			34.9		24.05	654.39
	05/13/24			35.0		22.92	655.52
	08/12/24			34.8		25.02	653.42
	12/09/24			35.0		27.03	651.41
	04/18/25			34.7		24.99	653.45
MW-9	06/09/23	678.6	678.27	34.3	25.3 - 34.9	25.22	653.05
	08/04/23			35.4		27.09	651.18
	11/27/23			35.4		28.26	650.01
	03/05/24			35.3		25.60	652.67
	05/13/24			35.3		24.09	654.18
	08/12/24			35.1		27.37	650.90
	12/09/24			35.3		29.17	649.10
	04/18/25			35.3		26.91	651.36

Notes: Elevation data referenced to assumed benchmark of 680 feet above mean sea level at the top of casing of MW-1 (from USGS 7.5-minute Dadeville topographic quadrangle)
ft BTOC - feet below top of casing
NL - Not Located

Source: PPM Consultants, Inc.
PPM Project No. 432401-GWM10

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
DADEVILLE TRUCK STOP
17223 HIGHWAY 280
DADEVILLE, ALABAMA

WELL I.D.	DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	TOTAL XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTHALENE (mg/L)
MW-1	12/29/21	<0.001	<0.001	<0.001	<0.003	BDL	0.111	<0.005
	08/22/22	<0.001	<0.001	<0.001	<0.003	BDL	0.125	<0.005
	11/28/22	<0.001	<0.001	<0.001	<0.003	BDL	0.050	<0.005
	02/22/23	<0.001	<0.001	<0.001	<0.003	BDL	0.036	<0.005
	06/09/23	<0.001	<0.001	<0.001	<0.003	BDL	0.090	<0.005
	08/04/23	<0.001	<0.001	<0.001	<0.003	BDL	0.022	<0.005
	11/27/23	<0.001	<0.001	<0.001	<0.003	BDL	0.104	<0.005
	03/05/24	<0.001	<0.001	<0.001	<0.003	BDL	0.050	<0.005
	05/13/24	<0.001	<0.001	<0.001	<0.003	BDL	0.040	<0.005
	08/12/24	<0.001	<0.001	<0.001	<0.003	BDL	0.161	<0.005
12/09/24	<0.001	<0.001	<0.001	<0.003	BDL	0.123	<0.005	
04/18/25	<0.001	<0.001	<0.001	<0.003	BDL	0.033	<0.005	
SSCAL - POC		0.3351	67.01	46.91	175	--	1.340	1.340
MW-2	12/29/21	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	08/22/22	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	11/28/22	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	02/22/23	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	06/09/23	0.013	<0.001	<0.001	0.016	0.029	<0.001	0.006
	08/04/23	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	11/27/23	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	03/05/24	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	05/13/24	0.005	<0.001	<0.001	0.003	0.008	<0.001	<0.005
	08/12/24	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
12/09/24	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005	
04/18/25	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005	
SSCAL - POC		0.1179	35.57	24.90	175	--	0.7115	0.7115
MW-3	12/29/21	0.047	0.997	0.171	1.150	2.365	<0.010	0.031
	08/22/22	0.141	0.658	0.654	2.620	4.073	<0.020	0.118
	11/28/22	0.409	6.730	1.920	9.260	18.319	<0.100	0.085
	02/22/23	0.620	4.380	1.960	10.600	17.560	<0.050	0.325
	06/09/23	0.400	1.680	1.150	4.190	7.420	<0.040	0.176
	08/04/23	0.068	0.107	0.253	0.930	1.358	<0.001	0.035
	11/27/23	0.174	0.572	0.906	3.460	5.112	<0.020	0.176
	03/05/24	0.638	1.140	1.710	5.830	9.318	<0.020	0.262
	05/13/24	0.470	0.914	1.010	3.480	5.874	<0.02	0.200
	08/12/24	0.072	0.057	0.271	0.672	1.072	<0.005	0.049
12/09/24	0.288	0.920	1.200	4.480	6.888	<0.001	0.150	
04/18/25	0.202	0.576	0.948	3.160	4.886	<0.040	0.159	
SSCAL - Source		0.3740	74.81	52.36	175	--	1.496	1.496
MW-4	12/29/21	0.143	2.980	0.752	6.970	10.845	<0.040	0.119
	08/22/22	0.009	1.300	6.280	29.800	37.389	<0.001	1.330
	11/28/22	0.184	3.290	3.430	24.300	31.204	<0.100	0.591
	02/22/23	0.188	3.140	3.270	24.500	31.098	<0.050	0.429
	06/09/23	0.091	1.550	5.500	26.100	33.241	<0.050	1.320
	08/04/23	0.152	2.210	4.610	24.600	31.572	<0.050	1.050
	11/27/23	0.005	0.860	3.360	18.700	22.925	<0.040	1.300
	03/05/24	0.840	6.420	3.670	22.300	33.230	<0.100	0.550
	05/13/24	1.340	6.740	4.980	26.900	39.960	<0.100	2.310
	08/12/24	0.279	3.860	6.100	34.000	44.239	<0.100	1.670
12/09/24	0.185	2.170	5.150	23.800	31.305	<0.100	2.070	
04/18/25	0.476	4.700	3.170	20.600	28.946	<0.100	0.828	
SSCAL - Source		0.3740	74.81	52.36	175	--	1.496	1.496

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
DADEVILLE TRUCK STOP
17223 HIGHWAY 280
DADEVILLE, ALABAMA

WELL I.D.	DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	TOTAL XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTHALENE (mg/L)
MW-5	12/29/21	0.140	0.323	0.041	0.229	0.733	0.070	0.011
	08/22/22	1.620	4.700	1.170	5.490	12.980	0.900	0.250
	11/28/22	1.590	4.510	1.110	5.530	12.740	0.770	0.147
	02/22/23	1.650	4.850	1.200	6.950	14.650	0.870	0.234
	06/09/23	1.810	3.360	0.910	5.550	11.630	1.120	0.198
	08/04/23	1.260	2.740	0.600	4.280	8.880	0.463	0.112
	11/27/23	1.580	2.280	0.812	4.440	9.112	0.700	0.644
	03/05/24	1.700	2.100	0.704	4.700	9.204	0.580	0.103
	05/13/24	1.800	1.940	0.650	3.860	8.250	0.305	0.369
	08/12/24	2.400	4.820	1.020	5.570	13.810	0.680	0.250
12/09/24	2.690	2.200	1.000	4.820	10.710	0.540	0.305	
04/18/25	2.760	1.990	0.900	5.560	11.210	0.604	0.256	
SSCAL - Source		0.3740	74.81	52.36	175	--	1.496	1.496
MW-6	06/09/23	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	08/04/23	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	11/27/23	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	03/05/24	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	05/13/24	NL	NL	NL	NL	NL	NL	NL
	08/12/24	NL	NL	NL	NL	NL	NL	NL
	12/09/24	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
04/18/25	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005	
SSCAL - Indoor Comm.		394.2	526	169	175	--	48,000	31
MW-8	06/09/23	0.048	0.044	0.248	2.520	2.860	<0.020	0.086
	08/04/23	0.001	0.049	0.188	1.230	1.468	<0.001	0.034
	11/27/23	<0.001	0.003	0.009	0.249	0.261	<0.001	0.022
	03/05/24	0.012	0.003	0.136	0.866	1.017	<0.001	0.135
	05/13/24	0.057	0.006	0.065	1.320	1.448	<0.001	0.105
	08/12/24	0.005	0.025	0.128	1.040	1.198	<0.002	0.131
	12/09/24	0.037	0.011	0.007	1.590	1.645	<0.001	0.290
04/18/25	<0.001	<0.001	0.003	0.144	0.147	<0.001	0.044	
SSCAL - POC		0.2362	47.24	33.07	175	--	0.9448	0.9448
MW-9	06/09/23	<0.001	<0.001	<0.001	<0.003	BDL	0.002	<0.005
	08/04/23	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	11/27/23	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	03/05/24	<0.001	<0.001	<0.001	<0.003	BDL	0.019	<0.005
	05/13/24	<0.001	<0.001	<0.001	<0.003	BDL	0.003	<0.005
	08/12/24	<0.001	<0.001	<0.001	<0.003	BDL	0.002	<0.005
	12/09/24	<0.001	<0.001	<0.001	<0.003	BDL	0.001	<0.005
04/18/25	0.005	<0.001	<0.001	<0.003	0.005	0.049	<0.005	
SSCAL - POC		0.0781	15.63	10.94	156.3	--	0.3125	0.3125

**TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
DADEVILLE TRUCK STOP
17223 HIGHWAY 280
DADEVILLE, ALABAMA**

WELL I.D.	DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	TOTAL XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTHALENE (mg/L)
DUPLICATE RESULTS								
DUP (MW-1)	12/29/21	<0.001	<0.001	<0.001	<0.003	BDL	0.117	<0.005
DUP (MW-1)	08/22/22	<0.001	<0.001	<0.001	<0.003	BDL	0.126	<0.005
DUP (MW-1)	11/28/22	<0.001	<0.001	<0.001	<0.003	BDL	0.052	<0.005
DUP (MW-1)	02/22/23	<0.001	<0.001	<0.001	<0.003	BDL	0.036	<0.005
DUP (MW-1)	06/09/23	<0.001	<0.001	<0.001	<0.003	BDL	0.086	<0.005
DUP (MW-3)	08/04/23	0.065	0.097	0.244	0.902	1.308	<0.010	<i>0.036</i>
DUP (MW-3)	11/27/23	0.165	0.526	0.840	3.240	4.771	<0.020	0.182
DUP (MW-3)	03/05/24	0.630	1.200	1.750	5.860	9.440	<0.020	0.264
DUP (MW-3)	05/13/24	0.444	0.990	0.940	3.260	5.634	<0.020	0.222
DUP (MW-3)	08/12/24	0.067	0.055	0.289	0.700	1.111	<0.005	0.053
DUP (MW-3)	12/09/24	0.282	0.880	1.150	4.460	6.772	<0.001	0.132
DUP (MW-3)	04/18/25	0.187	0.528	0.856	2.880	4.451	<0.040	<i>0.130</i>

Notes: mg/L - milligrams per liter
 MTBE - Methyl tertiary butyl ether
 BTEX, MTBE, and naphthalene analysis per EPA Method 8260
 SSCAL - Site-Specific Corrective Action Level
 POC - Point of Compliance
 BDL - Below detection limit
Bold values exceed SSCAL
Italics - Result is above the method detection limit and below the reporting limit
 NL-Not Located

Source: PPM Consultants, Inc.
 PPM Project No. 432401-GWM10

APPENDICES

APPENDIX A – SOIL BORING/MONITORING WELL CONSTRUCTION LOGS



LOG OF BORING: SB-1 / MW-1

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-PI
 Project Type: Preliminary Investigation

Boring Information:

Date / Time: 12-13-21 / 12:40
 Logged By: WH
 Drilling Company / Driller: Walker-Hill Env.
 Drilling Method: Sonic
 Total Boring Depth: 38.0 ft BGS
 Initial Saturation (ft)/Date: NA
 Static GW level (ft)/Date: 28.40 ft BTOC / 12-16-21
 Surface Elevation (ft): 680.4 ft
 Sampling Interval: Continuous

Well Information:

Well Type: Type II
 Well Purpose: Monitoring
 Well Construction Date: 12-13-21
 Total Well Depth: 37.0 ft
 Screened Interval: 26.5 ft - 35.9 ft
 Screen Slot Size: 0.01-in.
 Development Method: Manual Bailing
 Gallons Purged: 10 gal

Depth in Feet	Surf. Elev. 680.4	Water Level	USCS	GRAPHIC	Water Levels		Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet	Well Schematic: MW-1
					▼ Static GW level	▽ Initial Saturation						
DESCRIPTION												
0	680			ML	CLAYEY SILT, no plasticity, well graded, very fine, loose, angular, dry, red/brown to gray, no odor		1	N/A	0	100%	0	
5	675			WEATHERED SCHIST, no plasticity, firm, moist, brown/red, mottled, quartz		2	N/A	0	100%	5		
10	670			WEATHERED SCHIST, no plasticity, firm, moist, red/tan, mottled yellow, no odor, quartz		3	N/A	55	100%	10		
15	665			WEATHERED SCHIST, no plasticity, firm, homogeneous, dark red/brown, no odor, micaceous, quartz		4	N/A	0	100%	15		
20	660			WEATHERED SCHIST, no plasticity, hard, homogeneous, moist, dark red/brown, no odor, micaceous, quartz		5	N/A	60*	100%	20		
25	655			WEATHERED SCHIST, very hard, moist, dark red/brown to gray, no odor		6	N/A	100*	100%	25		
30	650	▼		WEATHERED SCHIST, very hard, homogeneous, moist, gray/dark brown, no odor, lenses of amphibolite up to 8" thick		7	N/A	0	100%	30		
35	645									35		
40	640				(Boring terminated @ 38.0 ft BGS)					40		
45										45		

NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.



LOG OF BORING: SB-2 / MW-2

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-PI
 Project Type: Preliminary Investigation

Boring Information:

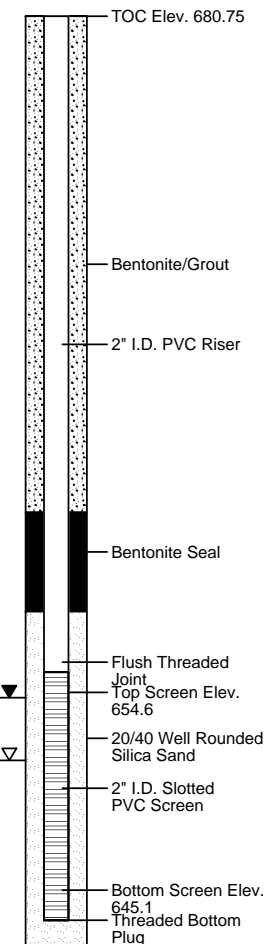
Date / Time: 12-14-21 / 08:45
 Logged By: AP
 Drilling Company / Driller: Walker-Hill Env.
 Drilling Method: Sonic
 Total Boring Depth: 40.0 ft BGS
 Initial Saturation (ft)/Date: 30.0 ft BGS
 Static GW level (ft)/Date: 27.47 ft BTOC / 12-16-21
 Surface Elevation (ft): 681.4 ft
 Sampling Interval: Continuous

Well Information:

Well Type: Type II
 Well Purpose: Monitoring
 Well Construction Date: 12-15-21
 Total Well Depth: 36.5 ft
 Screened Interval: 26.2 ft - 36.6 ft
 Screen Slot Size: 0.01-in.
 Development Method: Manual Bailing
 Gallons Purged: 20 gal

Depth in Feet	Surf. Elev. 681.4	Water Level	USCS	GRAPHIC	Water Levels		DESCRIPTION	Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet
					▼ Static GW level	▽ Initial Saturation						
0	681						CLAYEY SILT, no plasticity, firm, homogeneous, moist, red, no odor	1	N/A	0	100%	0
5	676		ML				CLAYEY SILT, no plasticity, hard, homogeneous, moist, red with mica, no odor	2	N/A	0	100%	5
10	671						WEATHERED SCHIST, homogeneous, moist, red/tan with mica, no odor WEATHERED SCHIST, homogeneous, tan/brown with mica, no odor, quartz veins	3	N/A	0	100%	10
15	666						WEATHERED SCHIST, homogeneous, moist, tan/brown with mica, no odor, quartz veins	4	N/A	0	100%	15
20	661						WEATHERED SCHIST, homogeneous, moist, tan/brown with mica, no odor, quartz veins	5	N/A	0*	100%	20
25	656						WEATHERED SCHIST, homogeneous, moist, tan/brown with mica, no odor, quartz veins	6	N/A	0*	100%	25
30	651	▼					WEATHERED SCHIST, homogeneous, saturated, dark brown, with mica, no odor	7	N/A	0	100%	30
35	646	▽					HARD SCHIST, saturated, bedrock					35
40	641						(Boring terminated @ 40.0 ft BGS)					40
45												45

Well Schematic: MW-2



NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.



LOG OF BORING: SB-3 / MW-3

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-PI
 Project Type: Preliminary Investigation

Boring Information:

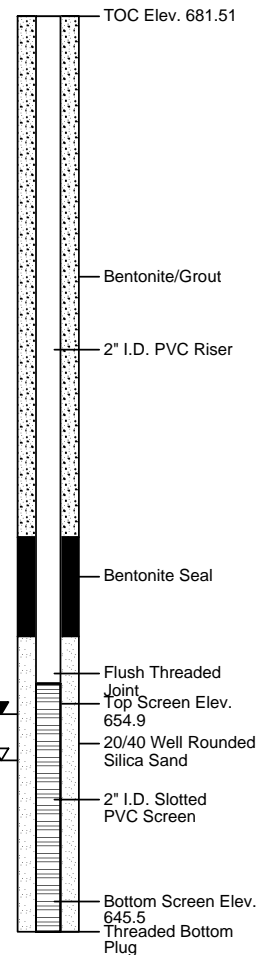
Date / Time: 12-14-21 / 12:30
 Logged By: AP
 Drilling Company / Driller: Walker-Hill Env.
 Drilling Method: Sonic
 Total Boring Depth: 38.0 ft BGS
 Initial Saturation (ft)/Date: 30.0 ft BGS
 Static GW level (ft)/Date: 28.14 ft BTOC / 12-16-21
 Surface Elevation (ft): 681.9 ft
 Sampling Interval: Continuous

Well Information:

Well Type: Type II
 Well Purpose: Monitoring
 Well Construction Date: 12-15-21
 Total Well Depth: 36.9 ft
 Screened Interval: 26.6 ft - 36.1 ft
 Screen Slot Size: 0.01-in.
 Development Method: Manual Bailing
 Gallons Purged: 20 gal

Depth in Feet	Surf. Elev. 681.9	Water Level	USCS	GRAPHIC	Water Levels		DESCRIPTION	Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet
					▼ Static GW level	▽ Initial Saturation						
0	681						CLAYEY SILT, no plasticity, hard, homogeneous, moist, red, no odor	1	N/A	0	--	0
5	676		ML				WEATHERED SCHIST, homogeneous, moist, red/dark brown, no odor, interbedded quartz	2	N/A	0	100%	5
10	671						WEATHERED SCHIST, homogeneous, moist, tan/brown, no odor, interbedded quartz	3	N/A	0	100%	10
15	666						WEATHERED SCHIST, homogeneous, moist, tan/brown, no odor, interbedded quartz	4	N/A	10	100%	15
20	661						WEATHERED SCHIST, homogeneous, moist, tan/brown, no odor, interbedded quartz	5	N/A	50*	100%	20
25	656						WEATHERED SCHIST, homogeneous, moist, tan/brown, no odor, interbedded quartz	6	N/A	65*	100%	25
30	651	▼					WEATHERED SCHIST, homogeneous, saturated, dark brown, no odor, interbedded quartz					30
35	646	▽										35
40	641						(Boring terminated @ 38.0 ft BGS)					40
45												45

Well Schematic: MW-3



NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-PI
 Project Type: Preliminary Investigation

Boring Information:

Date / Time: 12-14-21 / 14:30
 Logged By: AP
 Drilling Company / Driller: Walker-Hill Env.
 Drilling Method: Sonic
 Total Boring Depth: 38.0 ft BGS
 Initial Saturation (ft)/Date: 27.0 ft BGS
 Static GW level (ft)/Date: 29.66 ft BTOC / 12-16-21
 Surface Elevation (ft): 681.4 ft
 Sampling Interval: Continuous

Well Information:

Well Type: Type II
 Well Purpose: Monitoring
 Well Construction Date: 12-15-21 35.9 ft
 Total Well Depth: 27.0 ft - 36.4 ft
 Screened Interval: 0.01-in.
 Screen Slot Size: Manual Bailing
 Development Method: 20 gal
 Gallons Purged:

Depth in Feet	Surf. Elev. 681.4	Water Level	USCS	GRAPHIC	Water Levels		Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet	Well Schematic: MW-4
					▼ Static GW level	▽ Initial Saturation						
DESCRIPTION												
0	681			ML	CLAYEY SILT, no plasticity, firm, homogeneous, moist, red/brown, no odor		1	N/A	0	--	0	TOC Elev. 681.13
5	676				WEATHERED SCHIST, no plasticity, homogeneous, moist, red/brown, no odor, quartz veins		2	N/A	0	100%	5	
10	671				WEATHERED SCHIST, no plasticity, homogeneous, moist, red/brown, no odor, quartz veins		3	N/A	25	100%	10	Bentonite/Grout
15	666				WEATHERED SCHIST, no plasticity, homogeneous, moist, dark brown/tan, petroleum-like odor, quartz veins		4	N/A	65	100%	15	2" I.D. PVC Riser
20	661				WEATHERED SCHIST, no plasticity, homogeneous, wet, gray/brown, petroleum-like odor, quartz veins		5	N/A	280*	100%	20	Bentonite Seal
25	656	▽			WEATHERED SCHIST, no plasticity, homogeneous, wet, gray/brown, petroleum-like odor, quartz veins		6	N/A	840*	100%	25	Flush Threaded Joint
30	651	▼			WEATHERED SCHIST, no plasticity, homogeneous, gray/brown, petroleum-like odor						30	Top Screen Elev. 654.2
35	646										35	20/40 Well Rounded Silica Sand
40	641										40	2" I.D. Slotted PVC Screen
45					(Boring terminated @ 38.0 ft BGS)						45	Bottom Screen Elev. 644.7
												Threaded Bottom Plug

NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.



LOG OF BORING: SB-5 / MW-5

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-PI
 Project Type: Preliminary Investigation

Boring Information:

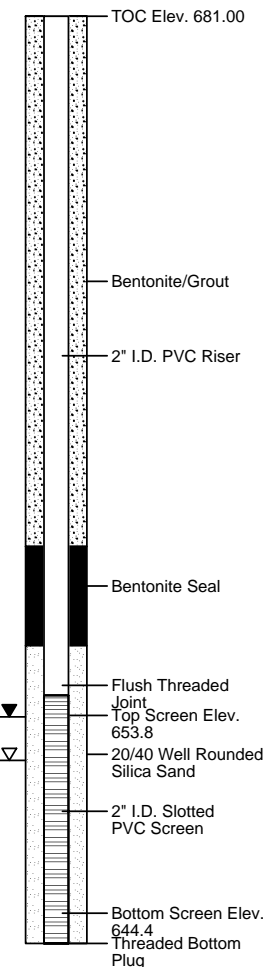
Date / Time: 12-15-21 / 08:48
 Logged By: AP
 Drilling Company / Driller: Walker-Hill Env.
 Drilling Method: Sonic
 Total Boring Depth: 38.0 ft BGS
 Initial Saturation (ft)/Date: 30.0 ft BGS
 Static GW level (ft)/Date: 28.25 ft BTOC / 12-16-21
 Surface Elevation (ft): 681.3 ft
 Sampling Interval: Continuous

Well Information:

Well Type: Type II
 Well Purpose: Monitoring
 Well Construction Date: 12-15-21
 Total Well Depth: 37.4 ft
 Screened Interval: 27.2 ft - 36.6 ft
 Screen Slot Size: 0.01-in.
 Development Method: Manual Bailing
 Gallons Purged: 20 gal

Depth in Feet	Surf. Elev. 681.3	Water Level	USCS	GRAPHIC	Water Levels		DESCRIPTION	Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet
					▼ Static GW level	▽ Initial Saturation						
0	681						GRAVELLY SILT, no plasticity, homogeneous, moist, red/tan/gray, no odor, gravel is fine to coarse, angular to subangular, quartz	1	N/A	0	--	0
5	676						WEATHERED SCHIST, homogeneous, moist, red/tan, no odor, quartz veins	2	N/A	0	100%	5
10	671						WEATHERED SCHIST, homogeneous, moist, red/gray, no odor, quartz veins	3	N/A	0	100%	10
15	666						WEATHERED SCHIST, homogeneous, moist, dark brown, no odor, quartz veins	4	N/A	5	100%	15
20	661						WEATHERED SCHIST, homogeneous, wet, dark brown, no odor, quartz veins	5	N/A	65*	100%	20
25	656							6	N/A	55*	100%	25
30	651	▼										30
35	646											35
40	641						(Boring terminated @ 38.0 ft BGS)					40
45												45

Well Schematic: MW-5



NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-SI
 Project Type: Secondary Investigation

Boring Information:

Date / Time: 05-23-23 / 08:45
 Logged By: AP
 Drilling Company / Driller: Singley Drilling
 Drilling Method: HSA
 Total Boring Depth: 36.4 ft BGS
 Initial Saturation (ft)/Date: 25.3 ft BGS
 Static GW level (ft)/Date: 25.94 ft BTOC / 05-26-23
 Surface Elevation (ft): 682.3 ft
 Sampling Interval: 5 ft centers

Well Information:

Well Type: Type II
 Well Purpose: Sampling
 Well Construction Date: 05-25-23
 Total Well Depth: 35.9 ft
 Screened Interval: 26.0 ft - 35.5 ft
 Screen Slot Size: 0.01-in.
 Development Method: Submersible pump
 Gallons Purged: 5 gal

Depth in Feet	Surf. Elev. 682.3	Water Level	USCS	GRAPHIC	Water Levels		Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet	Well Schematic: MW-6
					▼ Static GW level	▽ Initial Saturation						
DESCRIPTION												
0	682										0	
5	677			WEATHERED SCHIST, homogeneous, moist, red/tan, no odor, mica	1	N/A	0	50%	5			
10	672			WEATHERED SCHIST, homogeneous, moist, red/tan, no odor	2	N/A	0	50%	10			
15	667			WEATHERED SCHIST, homogeneous, moist, red/tan, no odor, quartz and mica	3	N/A	75*	50%	15			
20	662			WEATHERED SCHIST, homogeneous, moist, red/brown, no odor, quartz and mica	4	N/A	35*	50%	20			
25	657	▼		WEATHERED SCHIST, homogeneous, wet, dark red/brown, no odor, quartz and mica	5	N/A	0	50%	25			
30	652			WEATHERED SCHIST, homogeneous, wet, dark brown, no odor, mica	6	N/A	0	20%	30			
35	647			(Boring terminated @ 36.4 ft BGS)								35
40	642										40	
45											45	

NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.



LOG OF BORING: SB-7 / MW-7

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-SI
 Project Type: Secondary Investigation

Boring Information:

Date / Time: 05-24-23 / 08:15
 Logged By: AP
 Drilling Company / Driller: Singley Drilling
 Drilling Method: HSA
 Total Boring Depth: 47.0 ft BGS
 Initial Saturation (ft)/Date: NA
 Static GW level (ft)/Date: NA
 Surface Elevation (ft): 681.3 ft
 Sampling Interval: Continuous

Well Information:

Well Type: Surface casing only
 Well Purpose: Potential future Type II MW
 Construction Date: 05-26-23
 Total Casing Depth: 36.9 ft
 Screened Interval: NA
 Screen Slot Size: NA
 Development Method: NA
 Gallons Purged: NA

Depth in Feet	681.3 Surf. Elev.	Water Level	USCS	GRAPHIC	Water Levels		Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet	Well Schematic: MW-7
					▼ Static GW level	▽ Initial Saturation						
DESCRIPTION												
0					Not logged to 46 ft BGS. See descriptions from SB-4/MW-4						0	<p>Grout</p> <p>6" I.D. PVC Riser</p>
5											5	
10											10	
15											15	
20											20	
25											25	
30											30	
35											35	
40											40	
45											45	
50					(Auger refusal @ 47.0 ft BGS)						50	

NOTES:

-Could not drill through base of casing with mud rotary.
 Secured casing at surface for possible future completion as Type II well.

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-SI
 Project Type: Secondary Investigation

Boring Information:

Date / Time: 05-25-23 / 12:30
 Logged By: AP
 Drilling Company / Driller: Singley Drilling
 Drilling Method: HSA
 Total Boring Depth: 36.2 ft BGS
 Initial Saturation (ft)/Date: 25.0 ft BGS
 Static GW level (ft)/Date: 23.64 ft BTOC / 05-26-23
 Surface Elevation (ft): 679.0 ft
 Sampling Interval: 5 ft centers

Well Information:

Well Type: Type II
 Well Purpose: Sampling
 Well Construction Date: 05-25-23
 Total Well Depth: 36.0 ft
 Screened Interval: 26.0 ft - 35.6 ft
 Screen Slot Size: 0.01-in.
 Development Method: Submersible pump
 Gallons Purged: 15 gal

Depth in Feet	Surf. Elev. 679.0	Water Level	USCS	GRAPHIC	Water Levels		Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet	Well Schematic: MW-8	
					▼ Static GW level	▽ Initial Saturation							
DESCRIPTION													
0	679		CG		Road Bed - rounded gravel						0		
5	674				WEATHERED SCHIST, homogeneous, dry, red/brown/tan, no odor, mica No recovery	1	N/A	0	50%	5			
10	669				WEATHERED SCHIST, homogeneous, moist, red/brown, no odor, quartz and mica	2	N/A	0	50%	10			
15	664				WEATHERED SCHIST, homogeneous, moist, red/tan/orange, no odor	3	N/A	25*	75%	15			
20	659				WEATHERED SCHIST, homogeneous, brown/tan/orange, no odor, quartz and mica	4	N/A	50*	50%	20			
25	654	▼			No recovery					25			
30	649				WEATHERED SCHIST, homogeneous, saturated, dark brown/dark red, no odor, mica	5	N/A	15	20%	30			
35	644				(Boring terminated @ 36.2 ft BGS)							35	
40	639										40		
45											45		

NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.

CONSULTANTS

Client / Site Information:

Client: Purushotam, Inc.
 Site: Dadeville Truck Stop
 Location: Dadeville, AL
 Agency Interest No.: UST21-06-03
 PPM Project No.: 432401-SI
 Project Type: Secondary Investigation

Boring Information:

Date / Time: 05-25-23 / 08:30
 Logged By: AP
 Drilling Company / Driller: Singley Drilling
 Drilling Method: HSA
 Total Boring Depth: 35.8 ft BGS
 Initial Saturation (ft)/Date: NA
 Static GW level (ft)/Date: 25.37 ft BTOC / 05-26-23
 Surface Elevation (ft): 678.6 ft
 Sampling Interval: 5 ft centers

Well Information:

Well Type: Type II
 Well Purpose: Sampling
 Well Construction Date: 05-25-23
 Total Well Depth: 35.3 ft
 Screened Interval: 25.3 ft - 34.9 ft
 Screen Slot Size: 0.01-in.
 Development Method: Submersible pump
 Gallons Purged: 9 gal

Depth in Feet	Surf. Elev. 678.6	Water Level	USCS	GRAPHIC	Water Levels		Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet	Well Schematic: MW-9
					▼ Static GW level	▽ Initial Saturation						
DESCRIPTION												
0	678		ML		CLAYEY SILT, no plasticity, soft, homogeneous, moist, red/brown, no odor						0	
5	673				WEATHERED SCHIST, homogeneous, moist, red/brown/tan, no odor, mica WEATHERED SCHIST, homogeneous, moist, red/brown/tan, no odor, mica	1	N/A	0*	50%	5		
10	668				WEATHERED SCHIST, homogeneous, moist, red/orange/tan, no odor, mica	2	N/A	0	25%	10		
15	663				WEATHERED SCHIST, homogeneous, moist, red/brown/tan, no odor, mica	3	N/A	0	25%	15		
20	658				WEATHERED SCHIST, homogeneous, moist, red/brown/orange, no odor, quartz and mica	4	N/A	0*	50%	20		
25	653	▼			No recovery						25	
30	648				WEATHERED SCHIST, homogeneous, dry, light brown/tan, no odor, mica	5	N/A	0	20%	30		
35	643				(Boring terminated @ 35.8 ft BGS)						35	
40	638										40	
45											45	

NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.



LOG OF BORING: SB-10

CONSULTANTS

<p>Client / Site Information:</p> <p>Client: Purushotam, Inc. Site: Dadeville Truck Stop Location: Dadeville, AL Agency Interest No.: UST21-06-03 PPM Project No.: 432401-SI Project Type: Secondary Investigation</p>	<p>Boring Information:</p> <p>Date / Time: 05-23-23 / 12:50 Logged By: AP Drilling Company / Driller: Singley Drilling Drilling Method: HSA Total Boring Depth: 28.0 ft BGS Initial Saturation (ft)/Date: NA Static GW level (ft)/Date: NA Surface Elevation (ft): 680.5 ft Sampling Interval: 5 ft centers</p>	<p>Well Information:</p> <p>Well Type: NA Well Purpose: NA Well Construction Date: NA Total Well Depth: NA Screened Interval: NA Screen Slot Size: NA Development Method: NA Gallons Purged: NA</p>
--	--	---

Depth in Feet	Surf. Elev. 680.5	Water Level	USCS	GRAPHIC	Water Levels	Sample	Blow Count	Headspace Concentration (ppmv)	Percent Recovery	Depth in Feet	Well Schematic: NA
					▼ Static GW level ▽ Initial Saturation						
0	680			ML						0	
5	675			[Pattern]		1	N/A	0	20%	5	
10	670			[Pattern]		2	N/A	0	0%	10	
15	665				No recovery	3	N/A	30	0%	15	
20	660			[Pattern]		4	N/A	45*	25%	20	
25	655			[Pattern]		5	N/A	90*	50%	25	
30	650				(Boring refusal @ 28.0 ft BGS)					30	
35	645									35	
40	640									40	
45										45	

NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- *Sample submitted for laboratory analysis

- Soil descriptions generally based on visual inspection/professional judgment as described in ASTM D2488-09a: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Laboratory testing not conducted, and the data should not be used for engineering purposes.

APPENDIX B – SITE HEALTH AND SAFETY PLAN

HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

HEALTH AND SAFETY PLAN

**PURUSHOTAM, INC.
DADEVILLE TRUCK STOP
17223 HIGHWAY 28
DADEVILLE, ALABAMA
TALLAPOOSA COUNTY**

PPM PROJECT NO. 432401-CAP

APRIL 30, 2026



PREPARED UNDER THE DIRECTION OF:
JERI F. THRASHER, CSP | MBA / HEALTH AND SAFETY DIRECTOR
1600 LAMY LANE, MONROE, LOUISIANA 71201
(P) 318.812.3454 / (C) 318.884.8188



HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

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HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

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PROJECT CHECKLIST – HASP AND JSA

Project/Task and Corresponding Job Safety Analysis:

- | | |
|---|---|
| <input type="checkbox"/> Chemical Injection
<input type="checkbox"/> DPVE/SVE/AS System Install/Decommission
<input checked="" type="checkbox"/> Drilling/Probing [Hand Auger/Heavy Equipment – specify]
<input checked="" type="checkbox"/> Mobile Vacuum Event [Emergency Response]
<input type="checkbox"/> Ozone System Install/Decommission
<input type="checkbox"/> Remediation System Modification
<input type="checkbox"/> Other [specify below and contact HSD with details] | <input type="checkbox"/> Spill Bucket Replacement/Closure
<input type="checkbox"/> Trenching/Excavation
<input type="checkbox"/> UST Closure [PPM as General Contractor]
<input type="checkbox"/> UST Closure/Raze & Rebuilds [Client Contractor, PPM Sample Only]
<input type="checkbox"/> Well Plugging and Abandonment [GIP/Overdrill – specify] |
|---|---|

Notes: [Specify type of system and whether install/decommission; identify chemical being injected and notify HSD in advance for new chemical(s); if trenching or excavating; specify whether P&A is GIP or overdrill; specify what system modification is to be conducted.]

INSTALLATION OF DPVE SYSTEM

Hazard Assessment:

Chemical Hazards	Physical/Biological Hazards	Protective Equipment:
<input type="checkbox"/> Acids <input type="checkbox"/> Activated Carbon <input type="checkbox"/> Alconox®/Liquinox®/Isopropanol <input type="checkbox"/> Asbestos <input type="checkbox"/> Bases/Alkali <input type="checkbox"/> Calibration Gas [Meth/Hex/Hydro/Iso] <input type="checkbox"/> Carbon Dioxide [Dry Ice] <input type="checkbox"/> Chlorinated Solvents [Dry Cleaners] <input type="checkbox"/> Descaling Agents [Analytix AN-754GH] <input type="checkbox"/> Diesel/PAHs <input checked="" type="checkbox"/> Dust [Nuisance/Concrete] <input type="checkbox"/> Dust [Granular Carbon/Aluminum Oxide] <input type="checkbox"/> Fuel Gases [Meth/Hex/Butane/Prop] <input checked="" type="checkbox"/> Gasoline [BTEX] <input type="checkbox"/> Hydrogen Sulfide [H ₂ S] <input type="checkbox"/> Kerosene <input type="checkbox"/> Metals [specify metal(s) above] <input checked="" type="checkbox"/> Methyl-Tertiary Butyl Ether [MTBE] <input type="checkbox"/> Oil [hydraulic/lubricating] <input type="checkbox"/> Oxidizer [specify chemical above] <input type="checkbox"/> Ozone <input type="checkbox"/> Pesticides [Industrial/Agricultural] <input type="checkbox"/> Polychlorinated Biphenyls [PCB] <input type="checkbox"/> Other* [contact HSD] <input type="checkbox"/> Unknown(s)* [contact HSD]	<input checked="" type="checkbox"/> Biological [specify above] <input type="checkbox"/> Combustion/Flammability <input type="checkbox"/> Compressed Gas [cylinders] <input checked="" type="checkbox"/> Concrete [coring/cutting] <input checked="" type="checkbox"/> Crane [subcontractor] <input checked="" type="checkbox"/> Cuts/Lacerations <input checked="" type="checkbox"/> Driving <input type="checkbox"/> Drowning <input checked="" type="checkbox"/> Electrical <input type="checkbox"/> Falls [elevated heights] <input type="checkbox"/> Forklift <input checked="" type="checkbox"/> Hand/Power Tools <input checked="" type="checkbox"/> Heat/Cold Stress <input type="checkbox"/> Illumination <input type="checkbox"/> Ladder Safety <input checked="" type="checkbox"/> Material Handling [back safety] <input checked="" type="checkbox"/> Mobile Equipment <input checked="" type="checkbox"/> Noise <input checked="" type="checkbox"/> Repetitive Motion <input checked="" type="checkbox"/> Slips/Trips/Falls <input checked="" type="checkbox"/> Traffic or Secluded Sites <input checked="" type="checkbox"/> Uneven Working Surfaces <input type="checkbox"/> Unstable Soils/Cave-Ins <input type="checkbox"/> Other* [contact HSD] <input type="checkbox"/> Unknown(s)* [contact HSD]	<input type="checkbox"/> Apron and Goggles <input type="checkbox"/> Booties/Foot Covers <input checked="" type="checkbox"/> Ear Plugs/Canal Caps <input type="checkbox"/> Face Shield <input type="checkbox"/> Flame-Retardant Clothing <input type="checkbox"/> Hand – Cotton Gloves <input type="checkbox"/> Hand – Kevlar Gloves <input type="checkbox"/> Hand – Leather Gloves <input checked="" type="checkbox"/> Hand – Nitrile Gloves <input type="checkbox"/> Hand – Other* <input checked="" type="checkbox"/> Hard Hat [Class E] <input type="checkbox"/> Harness and Lanyard <input checked="" type="checkbox"/> High Visibility Shirt/Vest <input type="checkbox"/> Personal Flotation Device <input type="checkbox"/> Protective Suits [tyvek]* <input checked="" type="checkbox"/> Reflective Shirt/Vest <input type="checkbox"/> Respirator [air-purifying]* <input type="checkbox"/> Respirator [supplied air]* <input type="checkbox"/> Rubber boots <input checked="" type="checkbox"/> Safety Glasses <input checked="" type="checkbox"/> Steel-Toed Boots <input type="checkbox"/> Other* [contact HSD]

Documentation Required:

- Ambient Air Monitoring
 - Forklift Safety Inspection
 - HASP Acknowledgement Form
 - Incident Report/Log [as applicable]
 - Occupational Noise Monitoring
 - Subsurface Clearance Checklist
 - Tailgate Safety Meeting Log
 - Trench/Excavation Inspection
- Subcontractor-Required (must obtain copy):
- Crane Inspection
 - Forklift Inspection
 - Heavy Equipment Inspection [specify above]
 - One Call
 - Other* [specify above]

Return Pages in the Following Order:

- HASP Cover Page
- Project Checklist
- Emergency Summary Information and Maps
- Personnel Roles and Responsibilities, p.3
- Site Map with boring, well, trench/excavation locations
- One Call (if electronic copy)
- Subsurface Clearance Checklist
- Ambient Air Monitoring Report
- Occupational Noise Monitoring Report
- Crane Inspection (if applicable)
- Forklift Inspection (if applicable)
- Trench/Excavation Checklist
- Incident Report and Log (if applicable)
- HASP Acknowledgement
- Tailgate Safety Meeting Log

HASP Generated By [Print Name]:

Andrew Paradis

Date Generated:

11/17/2025



HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

EMERGENCY SUMMARY INFORMATION

Medical Facility:

In cases of incidents or near-misses, the Health and Safety Director (HSD) must be verbally contacted immediately once any spills/releases have been contained and appropriately isolated. Incidents resulting in injury or illness must be reported immediately to the HSD for further instruction and injury case management. 911 should be called for life-threatening cases or cases requiring immediate attention. Be prepared to administer CPR and first aid care only if you have been trained to do so, acquire consent from injured worker (unless unconscious in which consent is implied), and training is up-to-date.

Name of Hospital: DCH Regional Medical Center Phone: 205-759-7111
 Address: 809 University Blvd East City, State: Tuscaloosa, AL Zip: 35401
 Directions and Map: See attached (next page) Distance: 13.3 miles Time: 22 min

Company and Emergency Contact Information:

Agency/Emergency Responder	Telephone	Website
Fire Department / Police Department / Ambulance	911	--
Center for Disease Control and Prevention	800-232-4636	www.cdc.gov
CDC – Public Health Preparedness and Response	404-639-7405	cdcinfo@cdc.gov
CDC – Bioterrorism Preparedness and Response	404-639-0385	cdcinfo@cdc.gov
CDC – Toxic Substances and Disease Registry	770-488-7100	cdcinfo@cdc.gov
Chemtrec [24-Hour Emergency Chemical Spill]	800-262-8200	chemtrec@chemtrec.com
EPA RCRA Superfund Hotline	800-424-9346	--
Poison Control Center	800-222-1222	www.aapcc.org

PPM Contact Information	Representative	Office	Cell
Principal [Primary Regional Safety PIC]	Shawn Ivey	318-812-3463	318-237-0677
Principal [Alternate Regional Safety PIC]	Zane Hood	205-836-5650	205-240-9883
Health and Safety Director	Jeri Thrasher	318-812-3454	318-884-8188
Safety Supervisor [Baton Rouge]	Jason Beauvais	225-293-7270	337-247-6994
Safety Supervisor [Birmingham]	Andrew Paradis	205-836-5650	251-622-8607
Safety Supervisor [Jackson]	Lori Lea	601-956-8233	601-955-5920
Safety Supervisor [Mobile/Pensacola]	Kay Williams	251-990-9000	251-753-4455
Safety Supervisor [Monroe]	Sarah Scott	318-323-7270	225-241-6751
Safety Supervisor [Orlando]	Brian Richards	407-240-1127	352-409-1606

Note: District and Project Managers can be contacted by using the office phone numbers provided for each location. During periods of transition or in the absence of a designated Safety Supervisor, the Health and Safety Director will assume responsibilities.

Designated Break and Evacuation Locations:

Personal protective equipment is required at all times within the work zone and can only be removed when in the site's designated break area. Smoking will be permitted within the break area pending the site's ambient contaminant concentrations. In the event of an emergency, workers must report to the designated evacuation area for a headcount. This site's designated break and evacuations areas are outlined as follows:

Break Area: _____ Evacuation Area: _____
 Break Area: _____ Evacuation Area: _____
 Break Area: _____ Evacuation Area: _____

1.0 INTRODUCTION

1.1 COMPANY COMMITMENT

PPM is committed to the safety and wellbeing of its employees and subcontractors. Our mission to simplify the complex is done under the provision that worker health, safety and security is not compromised in the process. In addition, the company strives to ensure that the environment and its natural resources are preserved and not otherwise negatively impacted as the result of company-related processes. This commitment to our workers and our environment is outlined within our written health, safety, security and environmental (HSSE) program, which establishes the company's expectations through its policies and procedures.

1.2 HASP PURPOSE

The purpose of this health and safety plan (HASP) is to mitigate those hazards associated with routine company-related tasks that could not otherwise be substituted or eliminated. This document outlines the control measures, protective equipment and emergency response procedures necessary to ensure worker safety and wellbeing are maintained. This HASP has been prepared in accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120 standard for typical conditions encountered during routine business practices.

1.3 APPLICABILITY AND EXCEPTIONS

All field-related projects and/or tasks require a HASP, unless otherwise exempted by the safety department. The provisions outlined within this plan are applicable to all personnel assigned to the project and subcontracted workers hired by the company to complete the project. PPM will not be responsible for the safety of contracted workers hired directly by the client or partnering companies unless otherwise specified by these entities to do so and expressly agreed to, in writing, by all applicable parties. Accountability for the health, safety and security of contractors under these circumstances must be pre-established and explicitly outlined within the proposed scope of work and must additionally be approved by a Principal of the company.

This plan has been prepared specifically for common chemicals and tasks associated with routine business practices. Review and completion of this plan is separated into two categories:

- 1) *Routine and repetitive tasks that do not require field monitoring.* Some examples include: groundwater monitoring, mobile ozone or vacuum events (non-emergency release), system operation and maintenance, environmental assessments/audits, compliance audits, lead/asbestos inspections, and/or other similar non-intrusive tasks. These projects require review of applicable sections of the HASP and requires no field documentation other than HASP acknowledgement.
- 2) *Routine and repetitive tasks that require field monitoring.* Some examples include: drilling, geoprobing, excavating, trenching, chemical injection, remediation system installations or demobilizations, emergency mobile vacuum events (due to chemical releases), and/or other forms of similar sampling and analysis or subsurface disturbances. These projects require a HASP request form be submitted to the Safety Supervisor for preparation and document tracking. They also require review of applicable sections of the HASP and requires field documentation that must be returned to the safety department for recordkeeping.

Any project involving chemical(s), field-related task(s), and/or protective clothing and equipment not otherwise specified within this plan is considered non-routine and requires a site-specific plan be developed by the Health and Safety Director (HSD). When possible, please allow five days for preparation.

- **Health and Safety Director.** The HSD is responsible for proposing and generating HSSE policies/procedures under the advisement of the Authorizing Principals and in accordance with evolving local, state and federal regulations; communicating HSSE requirements to all affected personnel within the organization; and ensuring uniform implementation of these provisions throughout the PPM organization. The HSD also ensures contractual HSSE obligations are fulfilled and sustained.
- **District Manager.** Each branch office has a designated District Manager (DM) who is responsible for ensuring that HSSE policies and procedures are implemented by the workers assigned to his/her office. The DM is directly accountable to the Principals for the safety performance of his/her office.
- **Safety Supervisor.** Each branch office has a designated Safety Supervisor (SS) assigned by the DM. The SS is responsible for ensuring HSSE compliance by all within his/her office through consistent toolbox training, unscheduled site safety inspections and any other tasks delegated by the HSD. The SS is directly accountable to the HSD for his/her supervisory role and is also accountable to his/her DM regarding the office's safety performance.
- **Project Manager.** Each project has a designated Project Manager (PM) who is responsible for the safety and wellbeing of the workers assigned to his/her jobsite(s). The PM establishes the overall scope-of-work for the project and must consider the appropriate safety provisions (i.e., engineering design, protective equipment, etc.) during the planning phase. The PM is directly accountable to their DM for job-related HSSE issues that arise throughout any phase of the project.
- **Site Safety Officer.** A site safety officer (SSO) is assigned to each field project. An alternate SSO is also assigned to any field project with more than one PPM employee onsite. The SSO is responsible for jobsite safety, which includes, but is not limited to, the following:
 - Designate break and evacuation areas based on current site conditions;
 - Review the provisions outlined within the HASP and JSA (as applicable) with all affected personnel, subcontractors, client, and regulatory officials;
 - Ensure site security and prevent unauthorized entry to the work zone;
 - Ensure subsurface utilities have been marked and appropriate Principal approval has been obtained for critical zone disturbances;
 - Locate emergency shut-off devices to pumps and heavy equipment;
 - Establish communication system with equipment operators;
 - Ensure all workers and contractors wear required protective equipment;
 - Prohibit onsite smoking, except when permitted within designated areas;
 - Complete required field documentation outlined within the HASP for worker exposure monitoring and other site safety inspections; and
 - Report to management any incident or near-miss event.

The alternate SSO is responsible for jobsite safety in the absence of the SSO or when under the direction of the SSO.



HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

HEALTH AND SAFETY PLAN

The following personnel are assigned to this project:

Name	Title/Position
Michael Ellison	District Manager
Chuck Gooden	Project Manager
Jeri F. Thrasher, CSP	Health and Safety Director
Andrew Paradis	Safety Supervisor (SS)
Connor Gaston	Site Safety Officer (SSO)
Forest Stroud	Alternate SSO
Complete Environmental	Subcontractor

2.3 SHORT-SERVICE EMPLOYEES

Short-service employees are defined as any worker employed by PPM for less than six months or workers who have not yet completed required training and certification. Short-service employees are assigned a mentor and supervised at all times when in the field - (exception: establishing offices that do not have a mentor may require that short-service employees perform field duties unsupervised; however, exemption is required by an Authorizing Principal).

2.4 TRAINING AND MEDICAL MONITORING

PPM field personnel associated with this project have received company HSSE policy and procedural training as part of their safety orientation. Personnel have additionally received initial 40-Hour HAZWOPER certification, which is updated annually through an 8-Hour refresher. This training course meets the requirements of OSHA 29 CFR 1910.120(e). Short-service employees not otherwise HAZWOPER-certified will be provided training after 90-day probationary period.

In accordance with the medical monitoring requirements outlined within 29 CFR 1910.120(f), workers who are or may potentially be exposed to hazardous materials are provided a medical evaluation paid for by the company. Only those employees who have been medically cleared for duty by a physician are permitted to perform field duties.

3.0 HAZARD ASSESSMENT AND CONTROL MEASURES

3.1 CHEMICAL HAZARDS AND CONTROLS

PPM is an environmental consulting firm that specializes in environmental spill response, remediation and general regulatory compliance providing services to the energy, commercial, industrial, and private sectors. As part of these functions, workers will likely be exposed to chemical hazards through the following routes: site contamination, chemicals used as part of the remediation process, chemicals used for equipment maintenance and calibrations, and chemicals used/stored at client facilities.

3.1.1 Gases and Fumes

3.1.1.1 Acids

Acids have a pH <7, change litmus paper to red, taste sour (most citrus fruits are acidic), are corrosive to metals, and are commonly found in car/forklift batteries, used as sample preservatives and used to prevent algae, calcium and other similar buildups in piping systems. Common acids encountered through company-related processes include but are not limited to: hydrochloric (muriatic), nitric, phosphoric and sulfuric acid. Acids can cause moderate to severe skin and eye burns, and breathing the fumes created by these materials can cause extreme

burning of the respiratory system. Materials with a pH <2 must be disposed as a hazardous waste; however, acids can be neutralized with a base/alkali.

Control Measures: Never pour water into acid! Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Thoroughly wash exposed skin and hands upon completion of handling to avoid skin/eye irritations, itching and burning and prevent accidental ingestion. Prevent contact with metals.

3.1.1.2 Bases/Alkali

Commonly referred to as caustics, bases have a pH >7, change litmus paper to blue, have a bitter taste, feel slippery and are commonly used to make soap and textiles, found in common household detergents, cleaners (i.e., Drano, oven cleaners and ammonia products), milk of magnesia and antacids. Common bases encountered through company-related processes include but are not limited to: sodium hydroxide, potassium hydroxide, calcium hydroxide, ammonia, and sodium carbonate. Bases can cause moderate to severe skin and eye burns, and breathing the fumes created by these materials can cause extreme burning of the respiratory system and pulmonary edema. Materials with a pH >12.5 must be disposed as a hazardous waste. While bases react violently with acids, they can also be neutralized by acids.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Thoroughly wash exposed skin and hands upon completion of handling to avoid skin/eye irritations, itching and burning and prevent accidental ingestion.

3.1.1.3 Calibration and Fuel Gases

Calibration gases are used to calibrate air monitoring equipment. Common calibration gases used for equipment calibration include: hexane, hydrogen, isobutylene and methane. Calibration gases are used in small quantities, are highly flammable, and must be stored and handled safely. Gases such as hexane, methane, butane, and propane are used as fuel sources and may be encountered in larger quantities at oil and gas facilities. Workers may also come across methane gas through work in landfills, swamps, and agricultural land associated with raising livestock.

Control Measures: Keep containers upright, lids secured and store in climate-controlled environment away from heat sources. Calibration gases are asphyxiants (displace oxygen) so calibrate equipment in well-ventilated areas. When these gases are anticipated in larger quantities, workers must air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment.

3.1.1.4 Carbon Dioxide (Dry Ice)

Dry ice is carbon dioxide in a solid form. It may be used as a refrigerant and/or to displace vapors and has been used on some PPM jobsites for such purposes. Some hazards associated with the use of dry ice include, but are not limited to: frostbite through direct skin contact, asphyxiation due to displacement of oxygen in the atmosphere, and explosion from release of pressure exerted by the conversion of carbon dioxide solid to gas which could produce projectiles of the dry ice.

Control Measures: Avoid direct contact with solid dry ice to prevent frostbite. Avoid storing in areas with limited air flow (ventilation) such as buildings, vehicles, or other confined areas where gases can accumulate and be inhaled. Store inside a paper bag within a refrigerator, freezer, or cooler with a tight seal.

3.1.1.5 Hydrogen Sulfide

Hydrogen sulfide (H₂S) is a colorless gas known for its pungent odor (often referred to as a “rotten egg” odor) at low concentrations. It is a highly flammable and toxic substance associated with oil and gas refining, mining, tanning, pulp and paper processing, and rayon manufacturing. It can also occur naturally in sewers, well water, oil and gas wells, manure pits, and volcanoes. Hydrogen sulfide is heavier than air so it settles in low-lying enclosed areas such as manholes, sewers, and underground telephone vaults. Another characteristic of hydrogen sulfide is that it fatigues a worker’s sense of smell so it cannot be relied upon in determining the continuous presence of H₂S gas. Health effects depend upon the exposure concentration and include, but are not limited to: irritation of eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (tears), photophobia (intolerance to light), corneal vesiculation; dizziness, headache, weakness, exhaustion, irritability, insomnia; gastrointestinal disturbance; as a liquid: frostbite.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Wear personal monitoring badges for H₂S within the breathing zone. Where applicable, rely upon stationary monitoring devices and when alarms are triggered, evacuate the area upwind immediately. Use escape only respiratory protection when issued by PPM and/or the client facility.

3.1.2 Oxidizers

3.1.2.1 Hydrogen Peroxide (30-50%)

Hydrogen peroxide is a colorless liquid with a slightly sharp odor. It is a powerful oxidizer injected into subsurface soils, in conjunction with ozone, for the treatment of contaminants such as MTBE, BTEX, hydrocarbons – aliphatic and polyaromatic, diesel fuel, chlorinated solvents, VOCs, and pesticides. It is generally noncombustible, but upon contact with a combustible material, may result in spontaneous combustion. Direct contact may result in severe skin and eye damage. Symptoms of exposure include: irritation of eyes, nose, and throat; corneal ulcer; burning and redness of skin; and bleaching of hair.

Control Measures: Because hydrogen peroxide is injected into subsurface soils, worker exposures will likely result from a release at the monitoring wellhead, sparge point or other similar avenues that will lead the substance to ground surface. Therefore, workers must routinely air monitor around sparge points and monitoring wells for evidence of leakage. Collections must occur at the wellhead (source) as well as within the breathing zone of the worker. Hydrogen peroxide is injected into the subsurface via tubing from storage containers of liquid hydrogen peroxide so workers may have direct contact with these storage containers during initial setup and when replacing empty containers with new containers. Wear face shields, elbow-length gloves, and aprons as necessary to prevent direct contact with substance, and workers must keep face away from the source while collecting ambient air samples to avoid potential inhalation exposures and splash hazards.

3.1.2.2 Oxygen Release Compound® (ORC) and ORC Advanced®

ORC® and ORC Advanced® are forms of enhanced aerobic bioremediation which supplies oxygen to accelerate the biodegradation of soil and groundwater contaminants. Both materials are a white powder that gets mixed with water and injected in subsurface soils. Once mixed, these

materials have a pH of 10 [ORC] and 11-13 [ORC Advanced], making them a significant skin and eye irritant. Symptoms of exposure include: cough, sore throat, nose bleeds (extended exposures), eye watering and redness, eye lesions (extended exposures), nausea and vomiting if ingested and skin irritation.

Control Measures: When in powder form, this material is to be treated as a nuisance dust. Avoid creating dusty environments during the mixing process. When dealing with unknown dust concentrations, wear air-purifying respirator with P-100 HEPA filter until product becomes slurry mixture. Wear nitrile, neoprene or rubber gloves for hand protection and safety glasses or goggles for eye protection. Avoid storing oxidizers near combustible materials, other strong oxidizers, strong acids or other strong chemical agents. etc. (see safety data sheet for complete list of incompatibles).

3.1.2.3 Ozone

Ozone is a pale, blue gas with a distinctive odor similar to that of chlorine bleach and can be smelled at relatively low concentrations. It is a powerful oxidizer injected into subsurface soils for the treatment of contaminants such as MTBE, BTEX, hydrocarbons – aliphatic and polyaromatic, diesel fuel, chlorinated solvents, VOCs, and pesticides. Symptoms of exposure include: dryness of mouth, coughing, irritation to nose, throat and chest; difficult breathing, headache, and fatigue; eye irritation causing pain, lacrimation (tears) and inflammation.

Control Measures: Because ozone is injected into subsurface soils, worker exposures will likely result from a release at the monitoring wellhead, sparge point or other similar avenues that will lead the substance to ground surface. Workers must consistently air monitor sparge points and monitoring wells for evidence of ozone leakage. Collections must occur at the wellhead (source) as well as within the breathing zone of the worker. Ozone rapidly converts into O₂, CO₂ and other less toxic molecules but exposure limits can be triggered at the wellhead so workers must keep face away from the source while collecting the sample until it can be confirmed that the sample is acceptable for worker exposure.

Although this system has built-in safety features which shut down the system if a leak is detected, sometimes ozone concentrations can build up inside the mobile ozone trailer. Workers should use caution when opening door and should keep door open while in use to allow for ventilation.

3.1.2.4 RegenOx A and B™

RegenOx™ is an oxidizing compound comprised of two parts (A and B) that is injected into subsurface soils as part of in-situ remediation. Part A is a white, odorless powder with a pH of 10.5 and is the oxidizer/catalyst component of this mixture. Part B is a blue/green, odorless liquid with a pH of 11 and is the activator complex. Both parts are mixed together prior to subsurface injection. The mixing of these materials is a relatively safe process but exposures can result in skin, eye, respiratory and gastrointestinal irritations. Symptoms include: coughing, shortness of breath, irritation to mucous membranes, nose and throat; skin and eye itching/redness; vomiting and diarrhea associated with ingestion [Part A] and irritation to mouth, esophagus and stomach [Part B].

Control Measures: When mixing materials, wear protective clothing such as neoprene, rubber or PVC gloves for hand protection and goggles or face-shield for eye protection. Avoid storing oxidizers near combustible materials, other strong oxidizers, acids, bases, salts of heavy metals, reducing agents, etc. (see safety data sheet for complete list of incompatibles).

3.1.3 Particulates and Fibers

Particulates are commonly referred as particulate matter and consist of pieces of solid matter suspended in a gas or liquid. Particulate matter can occur naturally or be man-made. Fibers consist of continuous filaments or elongated pieces like those similar to thread. Fibers are used to produce various materials such as paper, rope, and clothing. The common types of particulates and fibers encountered by personnel are outlined in the following sections.

3.1.3.1 Aluminum Oxide

Aluminum oxide is a byproduct generated by ozone remediation systems. Condensation forms on aluminum metal parts which when combined with oxygen creates a white, odorless, crystalline powder scale which can build up on metal parts of the system and presents a potential contact, inhalation, and/or ingestion exposure to workers. Aluminum oxide is a noncombustible solid, is not considered carcinogenic, and may include symptoms such as irritation of eyes, skin, and respiratory system.

Control Measures: To eliminate contact exposures, workers must wear chemical-resistant gloves and aprons to remove powder scale buildup from aluminum piping during routine system maintenance. Workers should avoid creating dust buildup of this substance, and when this cannot otherwise be avoided, workers must upgrade to respiratory equipment with P-100 filter to prevent inhalation of this material.

3.1.3.2 Asbestos

Asbestos is a naturally-occurring fibrous material used in many products due to its attractive features. Asbestos has tensile strength, can easily be woven, and is heat and chemical resistant. It is most commonly found in roofing shingles, floor and ceiling tiles, textiles, coatings, paper and cement products, piping insulation and friction products such as automobile clutch, brake and transmission parts. The three most common forms of asbestos include:

- **Amosite (brown asbestos).** Amphibole fiber formation (straight, needle-like fibers). Originated in Africa and used industrially as a fire retardant in thermal insulation, used in cement sheeting and is also found in ceiling tiles.
- **Chrysotile (white asbestos).** Serpentine fiber formation (curled fibers). Is less friable (less-likely to be inhaled) than other types of asbestos and therefore viewed by many to be the safest type of the asbestos, which is why it is the most common form of asbestos used in the U.S. mostly in the form of building materials.
- **Crocidolite (blue asbestos).** Amphibole fiber formation (straight, needle-like fibers). Originated in South Africa and Australia and used for thermal and chemical insulation as well as construction piping and water casings. Is considered to be the most dangerous type of asbestos.

When asbestos is disturbed through repairs, remodeling or demolition, airborne fibers can be inhaled by workers causing respiratory diseases such as lung cancer, asbestosis and mesothelioma – all of which have a latency period between exposure and onset of symptoms. These respiratory diseases are chronic in nature and generally irreversible. Smokers are more susceptible to the damaging health effects of asbestos exposures. Symptoms of asbestos exposure include: shortness of breath, difficult breathing or swallowing, persistent coughing that progressively worsens, wheezing and hoarseness, coughing up blood, pain or tightening in the chest, swelling of face or neck, loss of appetite, weight loss, fatigue or anemia.

Control Measures: Asbestos-containing areas must be identified by signs, which will likely be found when working at larger industrial and commercial facilities. In these cases, workers must avoid these areas and take all necessary precautions to prevent disturbing any materials within these areas. In most cases, potential asbestos exposures will be in the form of sample collection as part of environmental site assessments performed on commercial properties. Personnel must be certified asbestos inspectors to perform these collections. In some cases, demolition of structures potentially containing asbestos materials may be supervised. At a minimum, the designated PPM-representative must be asbestos certified; however, the demolition and air monitoring requirements will be subcontracted to an appropriately state-certified contractor.

Because the sample collection process disturbs asbestos-containing materials (ACM) or potential asbestos-containing materials (PACM), workers must wear air-purifying respiratory protection in the form of half-mask respirator with P-100 high efficiency particulate air (HEPA) filters and must also wet the sample area with a soap-water mixture to reduce the dispersion of fibers. *Note: asbestos-containing materials will be presumed until otherwise verified through laboratory analysis. Buildings constructed prior to the 1980s have a greater likelihood of containing asbestos. PACMs must be treated as if they contain asbestos, and the greatest level of control should be used when collecting samples.*

3.1.3.3 Heavy Metals

Numerous heavy metals bind naturally to soils; therefore, dusty environments can introduce these hazards to workers. Heavy metals are poisonous to humans and can cause severe health effects due to their proven or suspected carcinogenic characteristics. Common heavy metals encountered through company-related processes include:

- **Aluminum.** A silvery-white, malleable, ductile, and odorless solid (metal); combustible as a solid (although takes effort), but easily ignitable when in fine dust form which can cause explosions; can cause damage to the eyes, skin and respiratory system; symptoms include: skin, eye and respiratory irritation.
- **Arsenic.** A silver-gray or tin-white metal commonly associated with under-ground storage tanks; noncombustible in solid form but presents slight explosion hazard in dust form when exposed to flame; is considered potential lung and lymphatic system carcinogen and can also affect liver, kidneys and skin through inhalation, skin absorption, skin/eye contact and ingestion exposures; symptoms include: respiratory irritations such as ulceration of nasal septum, dermatitis, gastrointestinal disturbances, hyperpigmentation (darkening) of the skin, and peripheral neuropathy (problem with nerves that carry information to and from the brain and spinal cord which can result in pain, loss of sensation and inability to control muscles).
- **Barium.** A silvery-white metal that exists naturally in the environment; because it is very reactive in its natural state, it is often combined with other elements such as oxygen, carbon and sulfur; it has many uses, but one likely exposure source is that it is used by the oil and gas industry to make drilling mud, which lubricates the drill and simplifies the process when drilling through rock; barium in its natural state is highly flammable and reacts violently with water; may cause irritation of skin, eye, nose, throat and upper respiratory tract, allergic reactions, and central nervous system damage; symptoms include: corneal damage including blindness, poisoning, dermatitis, and skin, eye and throat burns.
- **Cadmium.** A soft, bluish-white metal commonly associated with underground storage tanks; noncombustible in solid form but will burn in powder form; is considered potential prostate and lung carcinogen and can also affect respiratory system, kidneys and blood through inhalation and ingestion exposures; symptoms include: pulmonary

edema (fluid in air sacs of lungs) which causes difficult breathing, cough, chest tightness, substernal pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, loss of smell, emphysema, proteinuria (protein in urine), and mild anemia.

- **Chromium.** A hard, steel-gray metal commonly associated with underground storage tanks; noncombustible in solid form but finely dispersed dust particles will rapidly burn when exposed to a flame; chromium is not considered a likely carcinogen, but does affect skin, eyes and respiratory system through inhalation, ingestion and contact exposures; symptoms include: skin and eye irritation and lung fibrosis (scarring of the lungs).
- **Copper.** A soft, malleable reddish-orange metal commonly associated with underground storage tanks; noncombustible in solid form but may ignite when in powder form; copper is not considered a likely carcinogen, but does affect skin, eyes, respiratory system, liver and kidneys through inhalation, ingestion and contact exposures; symptoms include: skin, eye and pharynx irritation, nasal septum perforation, metallic taste, and dermatitis.
- **Iron.** A lustrous metal with a grayish tinge commonly used in industry in the construction of machinery, tools, automobiles, ships and building components; it is the most commonly used of all metals and can also be found in numerous dietary sources; elevated iron in the blood can react with peroxides to produce free radicals that can damage DNA, proteins, lipids and other cellular components; upon exposure, iron can cause skin, eye, mucous and respiratory irritations; it is also flammable as a fine dust.
- **Lead.** A soft, gray metal commonly associated with underground storage tanks, paints and coatings; noncombustible in solid form; lead is not considered a likely carcinogen, but does affect eyes, gastrointestinal tract, central nervous system, kidneys, blood and gingival tissue (soft tissue of the mouth surrounding the teeth) through inhalation, ingestion and contact exposures; symptoms include: eye irritation, weakness, exhaustion, insomnia, facial pallor (paleness), weight loss/anorexia, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis of wrist and ankles, encephalopathy (various brain disorders), kidney disease, and hypertension.
- **Magnesium.** A strong, silvery-white, light-weight metal that exists naturally in the environment; because it is very reactive in its natural state, it is often combined with other elements to form magnesium oxide, various salts, and other industrially-important compounds; magnesium is the third most commonly used metal; because it is light-weight, it is widely used in manufacturing numerous electronics; upon exposure, magnesium can cause skin and eye irritations; it is also flammable as a fine dust.
- **Mercury.** A silver-white, liquid metal associated with underground storage tanks, batteries, fluorescent bulbs, thermometers and thermostats; noncombustible liquid; mercury is not considered a likely carcinogen but does affect skin, eyes, respiratory system, central nervous system and kidneys through inhalation, skin absorption, ingestion and contact exposures; symptoms include: skin and eye irritation, cough, chest pain, difficult breathing, bronchitis, pneumonia (lung inflammation), tremor, insomnia, irritability, indecision, headache, weakness, exhaustion, stomatitis (inflammation of lining within the mouth), salivation, gastrointestinal disturbance, weight loss/anorexia, and proteinuria (protein in urine).
- **Selenium.** Crystalline, red to gray solid that is considered to be combustible when in fine dust form; elemental selenium is rare – it is most commonly produced as a byproduct of refining copper or producing sulfuric acid; selenium can cause damage to the skin, eyes, respiratory system, liver, kidneys, blood and spleen; symptoms include:

skin, eye, nose, and throat irritations, visual disturbance, headache, chills, fever, difficulty breathing, bronchitis, metallic taste, garlic breath, gastrointestinal disturbance, dermatitis, and skin and eye burns.

- **Silver.** A white, lustrous metal that is noncombustible in solid form but can become flammable when in dust form. Silver can cause damage to the nasal septum, skin and eyes. Symptoms include: blue-gray eyes, nasal septum, throat and skin, ulceration of skin, and gastrointestinal disturbance.
- **Zinc.** A bluish-white metal commonly associated with underground storage tanks and used as an anti-corrosion agent; zinc is commonly found in common cold lozenges and over-the-counter cold remedies, as a dietary supplement and also within common foods such as beans, nuts, whole grains and pumpkin/sunflower seeds; zinc is commonly considered non-toxic but in abundance can result in gastrointestinal irritation through ingestion exposures; symptoms include: loss of appetite, nausea, vomiting, stomach cramps, diarrhea and headaches.

Control Measures: Soils should be wet and kept damp to reduce the amount of airborne dust concentrations generated. Providing sufficient ventilation, wearing safety glasses with side-shield protection and wearing dust masks or respiratory equipment with P100 filter are other alternatives for working in dusty environments. Most PPM jobsites can be mitigated using wet methods only. Workers should use additional precautions when using both wet methods and power tools or corded equipment to avoid electrical shock. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion.

3.1.3.4 Nuisance and Concrete Dust

Dust generation is a common occurrence when working with contaminated soils and when mixing or dismantling concrete. In most cases, activities that result in dust accumulation are subcontracted making them more susceptible to these respiratory hazards than PPM personnel. Generally, dust accumulation is minimal, but the SSO must ensure that subcontractors are using effective controls to minimize dust accumulation, and that they are also equipped and wearing the appropriate protective equipment when performing these tasks. Contaminants associated with common job-related dusty environments include:

- **Total and respirable dust.** Dust found in the air that can cause breathing difficulties if inhaled. OSHA has established permissible exposure limits (PELs) for both total and respirable dusts to regulate worker exposures. Respirable dust is defined as dust particles less than 10 micrometers in diameter, which is too small to be visible. Symptoms of exposure can include coughing, wheezing and breathing difficulties.
- **Concrete dust.** Commonly generated through core drilling and jack-hammering through concrete. Also, small areas of concrete can be replaced by workers who may generate dusts from bags of cement as part of the mixing process. Trace amounts of crystalline silica, alkaline compounds and hexavalent chromium are found within cement. OSHA has established PELs for Portland cement to regulate worker exposures. Symptoms of exposure can include coughing, wheezing, eye irritations and in severe cases silicosis.

Control Measures: Soils should be wet and kept damp to reduce the amount of airborne dust concentrations generated. Providing sufficient ventilation, wearing safety glasses with side-shield protection and wearing dust masks or respiratory equipment with P100 filter are other alternatives for working in dusty environments. Most PPM jobsites can be mitigated using wet methods only. Workers should use additional precautions when using both wet methods and

power tools or corded equipment to avoid electrical shock. Wet cement can also cause skin burns so workers should wear goggles, aprons or long-sleeved clothing, and hand protection when mixing cement. Wash skin immediately and thoroughly if exposed to wet cement.

3.1.4 Volatile and Semi-Volatile Organic Compounds

Volatile organic compounds (VOCs) are a broad group of materials that have the ability to vaporize (change from a solid or liquid into a gas) with an increase in ambient temperature. Some example VOCs include: paints and lacquers, paint thinners, pesticides, solvents and degreasers, glues/adhesives and petroleum fuels. Semi-volatile organic compounds (SVOCs) include phenols and polycyclic aromatic hydrocarbons (PAHs), which have a higher boiling point than water and may vaporize with an increase in ambient temperature. VOC/SVOCs are not known for acute toxicity but have significant chronic health effects because concentrations are often low and symptoms are slow to develop, which is why several VOC/SVOCs are suspected or known carcinogens. Common VOC/SVOCs are outlined in the following sections.

3.1.4.1 Chlorinated Compounds

A chlorinated solvent is a type of organochlorine, which is an organic compound (contains carbon) that also contains chlorine. They are found in a variety of products and used as part of the dry cleaning process due to its ability to dissolve materials such as fats and greases. Workers are most likely to be exposed to these chemicals as part of soil and groundwater assessment and remediation associated with dry cleaning contaminants. Chlorinated solvents can be environmentally persistent and tend to evaporate easily making inhalation the primary route of worker exposure. However, workers may additionally be exposed to chlorinated solvents through ingestion, absorption and skin/eye contact. Common chlorinated solvents encountered through company-related processes include:

- **Carbon tetrachloride.** A noncombustible, colorless liquid with ether-like odor; considered a potential carcinogen with damaging effects to the central nervous system, eyes, lungs, liver, kidneys, and skin; symptoms include: skin and eye irritation, central nervous system depression, nausea, vomiting, drowsiness, dizziness, and incoordination.
- **Chloroform.** A noncombustible, colorless liquid with pleasant odor; considered a potential carcinogen with damaging effects to the liver, kidneys, heart, eyes, skin, and central nervous system; symptoms include: skin and eye irritation, dizziness, mental dullness, nausea, confusion, headache, weakness, exhaustion, anesthesia, and enlarged liver.
- **Methylene chloride.** A combustible, colorless liquid with chloroform-like odor; considered a potential carcinogen with damaging effects to the eyes, skin, cardiovascular system, and central nervous system; symptoms include: skin and eye irritation, weakness, exhaustion, drowsiness, dizziness, numb and tingling limbs, and nausea.
- **Perchloroethylene (Tetrachloroethylene).** A noncombustible, colorless liquid with mild chloroform-like odor; when in a fire, it decomposes to hydrogen chloride and phosgene; considered a potential carcinogen with damaging effects to the eyes, skin, respiratory system, liver, kidneys and central nervous system; symptoms include: skin, eye, nose, throat and respiratory irritation, nausea, flushed face and neck, dizziness, incoordination, headache, drowsiness, skin redness, and liver damage.

- **Trichloroethylene.** A combustible, colorless liquid with chloroform-like odor; will burn when exposed to flame, but is difficult to burn; considered a potential carcinogen with damaging effects to the eyes, skin, respiratory system, heart, liver, kidneys, and central nervous system; symptoms include: skin and eye irritation, headache, visual disturbance, weakness, exhaustion, dizziness, tremor, drowsiness, nausea, vomiting, dermatitis, cardiac arrhythmias, parasthesia (tingling or numbness of the skin), and liver injury.
- **Vinyl chloride.** A combustible, colorless gas or liquid (below 7^o F) with pleasant odor at high concentrations; considered a potential carcinogen with damaging effects to the liver, central nervous system, blood, respiratory system, and lymphatic system; symptoms include: weakness, exhaustion, abdominal pain, gastrointestinal bleeding, enlarged liver, pallor or cyanosis of extremities, and frostbite (as a liquid).

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

3.1.4.2 Isopropyl Alcohol

After bailers and reusable sampling equipment is decontaminated withalconox[®] solution, it is then sprayed with isopropyl alcohol. Also referred to as isopropanol, isopropyl alcohol is a colorless, flammable liquid commonly known as rubbing alcohol. It is considered a skin, eye and respiratory system irritant that causes damage through inhalation, ingestion and skin/eye contact exposures. Symptoms of overexposure include: irritation of eyes, nose and throat, drowsiness, dizziness, headache and dry, cracking skin.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Increase frequency of air monitoring if action limits are triggered and remove or isolate all ignition sources if flammability limits are triggered. Thoroughly wash exposed skin and hands upon completion of handling to avoid skin/eye irritations.

3.1.4.3 Methyl-Tertiary Butyl Ether (MTBE)

MTBE is a colorless, flammable liquid with an ether-like odor used as a fuel additive to reduce emission gases such as ozone and carbon monoxide. At one point gasoline could consist of as much as 10-15% MTBE but has since been replaced with ethanol and other additions less harmful to humans and the environment. MTBE poses a concern because it is considered a potential human carcinogen, can easily travel through soils, and is very soluble in water creating larger contaminant plumes than other gasoline constituents. It is also more resistant to biodegradation making it more environmentally persistent. MTBE is considered a skin, eye, respiratory and central nervous system irritant with symptoms that include: skin, eye and mucous membrane irritation, dizziness, nausea, headache, intoxication, loss of balance and coordination, unconsciousness, coma, respiratory failure and death.

Control Measures: Avoid prolonged exposures to oil mist, liquid or vapor. Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective

equipment. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

3.1.4.4 Organic Hydrocarbons

Total petroleum hydrocarbon (TPH) is a broadly used term referring to a large family of compounds that originate from crude oil. Crude oil is a naturally-occurring, flammable liquid comprised of a complex mixture of various hydrocarbons. It is recovered through oil drilling, but can be refined and separated into other substances such as gasoline, kerosene, diesel and lubricating oils. TPH is generally comprised of hydrogen and carbon; hence the term “hydrocarbon”. Because there are so many different mixtures, TPH is divided into groups or fractions, and each fraction consists of hydrocarbons that exhibit similar soil and groundwater traits. Fractioning TPH is beneficial in the risk assessment process because certain fractions may be eliminated as contaminants of concern. Common petroleum-based chemicals encountered through company-related processes include:

- **Gasoline.** Gasoline is extracted from crude oil through a distillation process. It is comprised primarily of aliphatic hydrocarbons, but also includes some aromatic hydrocarbons such as benzene and toluene to increase octane ratings. Additional additives such as tetraethyl lead and methyl-tertiary butyl ether (MTBE) were added to gasoline to enhance performance and reduce harmful carbon monoxide exhaust emissions and reduce smog. Due its harmful effects to human health and the environment, neither additive is currently used and has been replaced instead with alcohols such as ethanol or methanol.

Gasoline is used primarily as a fuel source but can also be used as a solvent. Components of gasoline are considered to be carcinogenic, and because gasoline is highly volatile, inhalation of vapors is always a concern for workers. Gasoline is also a skin and eye irritant, its vapors are highly flammable, and it is a major source of pollution gas (i.e., 1 U.S. gallon of gasoline produces 19.4 pounds of carbon dioxide, a greenhouse gas). Gasoline is comprised of the following four constituents:

- Benzene – a colorless, flammable liquid with a sweet odor; makes up on average 0.62% to 1% of gasoline; is considered a known carcinogen with damaging effects to skin, eyes, respiratory system, blood, central nervous system and bone marrow, which can result in anemia (decreased red blood cell count making one weak and tired), decreased white blood cell count (difficult to fight off infections), and low blood platelet count (excessive bleeding); benzene causes damage through inhalation, skin absorption, ingestion and contact exposures; symptoms include: drowsiness, dizziness, headaches, confusion, tremors, skin/eye irritations, redness and blistering of the skin, vomiting, stomach irritation, convulsions, rapid heart rate, unconsciousness, leukemia (long-term) and death (large doses).
- Toluene – a colorless, flammable liquid with benzene-like odor (smells like paint thinner); can produce damaging effects to skin, eyes, respiratory and central nervous systems, liver and kidneys; toluene causes damage through inhalation, skin absorption, ingestion, and contact exposures; symptoms include: eye and nose irritation, weakness, exhaustion, confusion, euphoria, dizziness, headaches, dilated pupils, lacrimation (tears), anxiety, muscle fatigue, insomnia, parathesia (tingling or numbness of the skin), dermatitis, and liver/kidney damage.

- **Ethylbenzene** – a colorless, flammable liquid with aromatic odor (smells like gasoline); is considered a potential human carcinogen that can produce damaging effects to skin, eyes, respiratory and central nervous systems; ethylbenzene causes damage through inhalation, skin/eye contact and ingestion exposures; symptoms include: irritation of the eyes, skin and mucuous membranes, headaches, dizziness, dermatitis, narcosis (unconsciousness) and coma.
- **Xylene** – colorless, flammable liquid with sweet, balsam-like odor; is a mixture of ortho-, meta- and para-xylene isomers that releases carbon monoxide gas when burned; can produce damaging effects to skin, eyes, respiratory and central nervous systems, gastrointestinal tract, blood, liver and kidneys; xylene causes damage through inhalation, skin absorption, ingestion and skin/eye contact exposures; symptoms include: irritation of skin, eyes, nose and throat, dizziness, excitement, drowsiness, incoordination, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain and dermatitis.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Increase frequency of air monitoring once action limits are triggered to ensure that all ignition sources are removed or isolated when flammability limits are triggered. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

- **Kerosene.** Kerosene is a source of fuel refined from crude oil that is heavier than gasoline but lighter than diesel. It is a colorless to yellowish oily liquid used in households as a lamp oil and used industrially as jet fuel for aircraft and rocket engines. Kerosene has a strong odor, is highly flammable, and causes damage to the eyes, skin, respiratory system, and central nervous system. Workers may be exposed to liquid kerosene and its vapors through inhalation, ingestion, skin and/or eye contact. Symptoms include: irritation of eyes, skin, nose and throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; and chemical pneumonitis (aspiration liquid). Kerosene is commonly referred to as paraffin in other countries.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Increase frequency of air monitoring once action limits are triggered to ensure that all ignition sources are removed or isolated when flammability limits are triggered. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

- **Diesel/polycyclic aromatic hydrocarbons (PAHs).** Diesel is a source of fuel refined from crude oil and used in diesel trucks, boats, school and city buses, trains, cranes, farming equipment, emergency response vehicles and power generators. Diesel is an attractive fuel source because it is less volatile and emits smaller amounts of greenhouse gases (CO and CO₂); however, during combustion it does release large amounts of soot which can lead to acid rain, smog and poor health conditions. PAHs are found in crude oil and

soot and are also a by-product of petroleum processing or combustion, specifically the incomplete burning of oil and gas. Common PAH constituents include: acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)-fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. The regulated PAH constituents are outlined below:

- Coal tar pitch volatiles - PAH components anthracene, benzo(a)pyrene, chrysene, phenanthrene, and pyrene, all of which have the same chemical description, target organs, and regulatory threshold limits are not addressed by NIOSH as individual components. Instead, they are classified and regulated as coal tar pitch volatiles. Coal tar pitch volatiles may vary slightly but are described as combustible, black or brown amorphous residues and are considered a potential human carcinogen with damaging effects to respiratory system, skin, bladder, and kidneys. Symptoms include: dermatitis and bronchitis.
- Naphthalene – Naphthalene is a combustible, colorless to brown solid with an odor or mothballs that causes damaging effects to eyes, skin, blood, liver, kidneys, and central nervous system. Symptoms include: eye irritation, headache, confusion, excitement, discomfort, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, jaundice, blood in urine, renal failure, dermatitis, optic and cornea damage.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Increase frequency of air monitoring once action limits are triggered to ensure that all ignition sources are removed or isolated when flammability limits are triggered. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

- **Hydraulic and lubrication oils.** Oils used for internal combustion engines to lubricate moving parts, prevent corrosion and to cool the engine. Lubricating oils are made from crude oil but also include additives to improve certain properties. Lubricating oils can be highly flammable and can cause irritation of nose, throat and lungs, headaches, dizziness, nausea, vomiting and diarrhea.

Control Measures: Avoid prolonged exposures to oil mist, liquid or vapor. Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

3.1.4.5 Pesticides

A pesticide is another type of organochlorine commonly used for crop dusting agricultural farmland not only to kill insects, rodents and germs, but is also used for weed and mildew control. The term “pesticide” includes a broad category of chemicals that can be further broken down into insecticides, rodenticides and fungicides. Some older and more recently banned pesticides (such as DDT) tend to be environmentally persistent. Workers are potentially exposed to

pesticides as part of the assessment or remediation of impacted farmland as well as commercial pesticide manufacturing and/or storage facilities. Similarly to chlorinated solvents, pesticides can be volatile making inhalation the primary route of worker exposures. However, workers may additionally be exposed to pesticides through ingestion, absorption and skin/eye contact. There are numerous pesticides tested as part of assessment and remediation of impacted sites; however, the following pesticides are OSHA-regulated materials that pose a potential health risk to workers:

- **Aldrin.** A noncombustible, colorless to dark-brown crystalline solid with mild chemical odor; may dissolve in flammable liquids; formerly used as an insecticide and is considered a potential carcinogen with damaging effects to the central nervous system, kidneys, liver, and skin; symptoms include: headache, dizziness, nausea, vomiting, vague feeling of discomfort, jerking of limbs, convulsions, coma, hematuria (blood in urine), and azotemia (blood containing high levels of urea, creatinine and other nitrogen-rich compounds).
- **Dichlorodiphenyltrichloroethane (DDT).** A combustible, colorless crystals or off-white powder with a slight aromatic odor; considered a potential carcinogen with damaging effects to the eyes, skin, central nervous system, liver, kidneys, and peripheral nervous system; symptoms include: skin and eye irritation, tingling and numbness of tongue, lips and face, tremor, anxiety, dizziness, confusion, vague feeling of discomfort, headache, weakness, exhaustion, convulsions, partial loss or impaired movement of hands, and vomiting.
- **Dieldrin.** A noncombustible, colorless to light-tan crystals with a mild chemical odor; used as an insecticide and is considered a potential carcinogen with damaging effects to the central nervous system, liver, kidneys, and skin; symptoms include: headache, dizziness, nausea, vomiting, vague feeling of discomfort, sweating, jerking of limbs, convulsions, and coma.
- **Endrin.** A noncombustible, colorless to tan, crystalline solid with a mild chemical odor; may dissolve in flammable liquids; used as an insecticide with damaging effects to the central nervous system and liver; symptoms include: epileptic-like convulsions, stupor, headache, dizziness, abdominal discomfort, nausea, vomiting, anorexia, insomnia, aggressiveness, confusion, drowsiness, weakness, and exhaustion.
- **Heptachlor.** A noncombustible, white to light-tan crystals with a camphor-like odor; may dissolve in flammable liquids; used as an insecticide and is considered a potential carcinogen with damaging effects to the central nervous system and liver; symptoms provided for animals only and include: tremor, convulsions, and liver damage.
- **Lindane.** A noncombustible, white to yellow crystalline powder with slight, musty odor; may dissolve in flammable liquids; causes damaging effects to skin, eyes, respiratory system, central nervous system, blood, liver, and kidneys; symptoms include: skin, eye, nose and throat irritation, headache, nausea, convulsions, respiratory difficulty, cyanosis, aplastic anemia, and muscle spasm.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

3.1.4.6 Polychlorinated Biphenyls (PCB)

Polychlorinated biphenyls (PCBs) are a mixture of numerous chlorinated compounds and are commercially sold under the trade name Aroclor® 1242 (contains 42% Cl⁻) and Aroclor® 1254 (contains 54% Cl⁻). It is a colorless to light-yellow, oily solid or liquid with no known taste or smell and can volatilize to a vapor with a slight increase in temperature. PCBs were used as coolants and lubricants in transformers, capacitors and electrical equipment because they do not burn easily and are good insulators. Production in the U.S. was discontinued in 1977 due to its environmental persistence and damaging health effects. PCBs do not easily break down, bind strongly to soil, accumulate in fish and marine life, and can travel far distances in air.

Workers are likely to be exposed to PCBs through damaged or burning transformers, known/suspected site contamination, or ingestion of contaminated fish. PCBs can also be found in pre-1977 fluorescent light fixtures, electrical devices (TVs and appliances), and hydraulic oils. Worker exposures are likely to occur through inhalation, absorption, ingestion and contact causing damaging effects to the skin, eyes, liver and reproductive system. Symptoms include: eye irritation, chloracne (acne-like skin condition in adults), liver damage, and reproductive effects.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Wear hand protection when handling contaminated soils/groundwater and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

3.1.5 Other/Unknown Chemicals

3.1.5.1 Activated Carbon

Also referred to as activated charcoal, this material comes in various forms but is most often purchased by PPM in granular form (occasionally purchased in pellet form). Activated carbon is a porous material that is effective in the adsorption of gases/vapors and is commonly used as part of the groundwater treatment process. This material is non-toxic but can be irritating to the skin and eyes. Loose granules can also present a slip hazard and dusts can accumulate when replacing spent carbon with unspent carbon.

Control Measures: Keep granules inside storage bag or carbon vessel and immediately remove spilled granules from the work area to prevent slipping. Wear appropriate protective clothing such as gloves and safety glasses when working with/near this material to prevent skin and eye contact. Keep dust generation to a minimum using a porta vac and be prepared to wear a dust mask or half mask with P-100 HEPA cartridge when dusts cannot otherwise be mitigated.

3.1.5.2 Alconox®/Liquinox®

Alconox® (powder) and Liquinox® (liquid) are detergents used to decontaminate bailers and equipment to prevent cross-contamination of samples. Detergents generally can be skin or eye irritants that can cause itching, pain, redness or burning.

Control Measures: Keep face away from solution when mixing and wear safety glasses with side-shield protection or goggles depending upon the degree of splashing. Wear hand protection when handling this product and wash hands prior to eating, drinking or other forms of hand-to-mouth contact to prevent accidental ingestion and contact irritations of skin/eye.

3.1.5.3 Descaling Agents (Analytix AN-754GH)

Various chemicals may be used to prevent the accumulations of scaling along monitoring well walls. These descalers may vary by office location; however, most of these chemicals exhibit similar characteristics. They are typically acidic in nature and may be extremely corrosive to skin, eyes, and respiratory system.

Control Measures: Keep face away from solution when handling and wear safety glasses with side-shield protection or goggles depending upon the degree of splashing. Use safe precautions when handling material and make every effort to avoid direct contact with this material through the use of protective clothing and equipment such as chemical-resistant gloves, goggles and aprons. Avoid inhaling any fumes that may arise from these chemicals.

3.1.5.4 GoJo® Natural Orange™ Pumice Hand Cleaner

GoJo® Natural Orange™ is a nonhazardous sanitizer used to clean hands, face, and exposed skin from dust, sludge, or other residues that may be encountered through the inspection process. This cleaning agent is not likely to produce adverse effects for most workers; however, some may be sensitive to this substance and reactions can consist of skin and eye irritations that can cause itching, pain, redness or burning.

Control Measures: Keep cleaning agents away from eyes and avoid continued use if you experience adverse skin reactions. If reactions persist after the substance is discontinued and cleaned from the affected area, seek prompt medical attention.

3.1.5.5 Magnaflux Soundclear® Gr. 60

Magnaflux Soundclear® Gr. 60 is an ultrasonic couplant (a bonding gel) that is applied to the transducer of the ultrasonic thickness meter, which when applied to the exterior wall of storage tanks, can establish the thickness of the tank wall.

Control Measures: Keep gel away from eyes and skin, and avoid continued use if you experience adverse eye/skin reactions. If reactions persist after the substance is discontinued and cleaned from the affected area, seek prompt medical attention. Use appropriate sanitation precautions to avoid accidental ingestion. Inhalation is not anticipated; however, respiratory irritations may occur if not handled properly.

3.1.5.6 Unknown Chemicals and/or Concentrations

Workers do not often come into contact with unknown chemicals and/or chemical concentrations. Although rare, workers may potentially encounter unknowns during drum characterizations as requested by a particular client. When the client cannot identify the material(s) inside a drum or other container, this material(s) is to be treated as an extremely hazardous substance using the highest level of safety precautions including, but not limited to, personal protective clothing/equipment. When working with known chemicals at unknown concentrations, the same level of safety precautions must be implemented to preserve worker safety and wellbeing. These situations are considered an immediately dangerous to life and/or health (IDLH) environment.

Control Measures: When this type of work is proposed by a client, it must be presented and approved by Authorizing Principals, Shawn Ivey or Zane Hood. Due to the increase in safety precautions, a site-specific HASP must be generated by the HSD, which may require additional time to prepare. Never open a drum/container that does not belong to PPM if the contents or concentrations are unknown.

3.1.6 Chemical/Physical Properties

The following table outlines the chemical and physical properties associated with the most common volatile or semi-volatile constituents encountered by PPM.

Chemical Name	VP ¹	VD ²	SG ³	Sol ⁴	FP ⁵	LEL ⁶	UEL ⁷
Diesel	0.009 psia	>1	0.83-0.88	Negligible	125	0.6	7.5
Gasoline	38-300	3-4	0.72-0.76	Insoluble	45	1.4	7.6
Benzene	75	2.8	0.88	<1	12	1.2	7.8
Toluene	21	4	0.87	<1	40	1.1	7.1
Ethylbenzene	7	4	0.87	<1	55	0.8	6.7
Xylene	9	4	0.86	<1	81	1.1	7.0
MTBE	245-256	3.1	0.74	4.8	-17	1.6	8.4
Ozone	>1 atm	1.7	2.14	<1	N/A	N/A	N/A

1 – Vapor Pressure (mmHg) – the higher the VP, the more likely it is to change from a liquid to a vapor with an increase in temperature.

2 – Vapor Density – how heavy the material is in air; anything >1 will sink into worker breathing zone; anything <1 will rise.

3 – Specific Gravity – how heavy the material is in water; anything >1 will sink in water; anything <1 will float on water.

4 – Solubility (%) – how likely the material is to be dissolved in water.

5 – Flash Point (°F) – lowest temp that material vapors will ignite/burn.

6 – Lower Explosive Limit (%) – lowest concentration in which vapors will ignite.

7 – Upper Explosive Limit (%) – highest concentration in which vapors will ignite.

3.2 PHYSICAL HAZARDS AND CONTROLS

3.2.1 Combustion/Flammability

The three elements needed to produce a fire are: combustible material, oxygen, and ignition source (heat). As part of most projects, the presence of gasoline (flammable contaminant) within an outdoor environment (sufficient oxygen content) when combined with the use of heavy equipment (electrical source) provides all three elements necessary to produce a flammable setting. Fires can also be the result of overloading circuitry and improper chemical storage.

Control Measures: Monitor ambient site concentrations to ensure flammable action limits are not triggered. Oxidizers are capable of releasing oxygen and generating heat so store them away from combustible materials. Do not overload power outlets. Remove foot heaters or other electrical devices if they trip ground fault circuit interrupters (GFCI) or produce burnt smell and/or smoke. Use ABC-rated fire extinguisher to extinguish fire or follow company evacuation procedures when warranted.

3.2.2 Compressed Gas

Compressed gases such as acetylene and oxygen may be used to operate cutting torches. Cylinders can become projectiles if they are not secured and/or stored properly. Improper handling of cylinders can also result in muscular sprains/strains, falls, bruising, or broken bones. Other hazards may include chemical burns, explosion fire, poisoning, and cold burns due to container mishandling. In addition, utility gas lines are often buried onsite nearby areas where drilling, trenching or other similar surface disturbances are likely to occur. Contact with a subsurface gas line could result in an explosion, fire, and other significant physical bodily injury.

Control Measures: Only qualified workers appropriately trained in compressed gas safety are permitted to work with compressed gases. Keep compressed gas cylinders upright and secured when in storage, transit or use. The valve protection cap must remain in place when not in use and during storage and should only be removed when the cylinder is secured and/or ready for use. Never drag or slide a compressed gas cylinder, drop a cylinder, or subject cylinders to strikes from other objects as this may cause damage to the valves. Store in a climate-controlled environment away from heat sources, heavily traveled paths, and emergency exits and store

other combustible materials in a separate location away from compressed gas cylinders. Smoking is prohibited near compressed gases. Keep empty and full cylinders segregated and replace empty cylinders promptly. Restrict unauthorized access to compressed gases and visually inspect containers weekly.

3.2.3 Concrete Coring and Cutting

The use of jackhammers and coring equipment is necessary to cut through concrete when conducting subsurface work. The use of this equipment is extremely loud, creates dusty environments and can create projectiles out of broken pieces of concrete.

Control Measures: Wet affected areas of concrete to reduce amount of dust generated; however, avoid creating large puddles of water as some equipment being used is corded and can create electrical hazards. If dust continues to be a problem, workers must wear air-purifying respirator with P-100 HEPA filter. Use vacuum-based core drills or secure the base of the core drill to concrete when working on uneven surfaces. Know where the manual shut-off switch is located and if not within reaching distance of worker, someone must be present at electrical outlet to unplug equipment should it be necessary. Operator and any worker required to be within 10 feet of coring/cutting process must wear face shield over safety glasses with side-shield protection to protect against flying particles.

3.2.4 Contaminated Water/Splash Hazards

Beware of splash hazards posed by purging and/or development of groundwater monitoring wells. Chemical splash hazards may also be encountered during drum sampling of known contaminants. Contaminants are likely to vary; therefore, the chemical hazards section of this plan should be referenced to address the hazards posed by the contaminant.

Control Measures: Workers must wear safety glasses with side-shield protection. Goggles may be necessary depending upon the degree of splashing. Goggles are required when moving containers of or working with severe eye irritants, acids or caustics.

3.2.5 Cuts and Lacerations

Acetate liners used for soil collections must be cut to collect the sample. Also, tubing materials used when groundwater sampling or used for air monitoring must be cut in various lengths. Shears or tube cutters are alternatives to using knives or other blades; however, there may be instances in which the use of knives or blades cannot be avoided.

Control Measures: Always use sharpened blades as dull blades can require more applied force. Wear leather or Kevlar® gloves to protect hands. Secure the object being cut keeping free hand out of the way and always cut away from the body. If cut must be made towards the body, cut the object at an angle away from the body. Utility knives must have a self-retracting blade and should not be stored in pockets of clothing.

When collecting soil samples, workers should rely upon the subcontractor to cut the sample liners whenever possible. When workers must cut the liners, the following specific instructions are required:

- Secure the liner to a stable structure (i.e., the truck tailgate or portable table).



- Use the proper cutting tool for the job (see photo); subcontractors often have this tool.
- Cut the liner perpendicular to the body – avoid cutting towards the body.

3.2.6 Driving Safety

Most company-related field activities occur offsite and require personnel to drive from the office to the jobsite. Collision with another vehicle or into a structure can result in property damage, worker injury or even a fatality.

Control Measures: Drivers must have valid state license to drive and must be classified appropriate to the type of vehicle he/she will be required to operate (i.e., vehicles with gross vehicle weight rating [GVWR] >10,000 lbs or any vehicle/trailer combination GVWR >10,000 lbs requires a commercial driver's license). Additional safety precautions for driver safety include, but are not limited to, the following:

- Obey all federal and state traffic laws (i.e., speed limits, yielding, etc.)
- Plan route to site in advance to avoid traffic congestion, construction, road closures, inclement weather or other similar forms of delay
- Perform pre-use inspection to ensure vehicle is fueled and in good working order
- Ensure all materials are secured
- Avoid distractions such as changing radio stations, reading texts or emails, eating, drinking, or other similar functions
- Pull over to take or make a phone call even when using hands-free devices
- Texting while driving is strictly prohibited by PPM and is a law in several states
- Drive defensively - yield to aggressive drivers, slow down when driving through adverse weather conditions or when driving through school zones

3.2.7 Drowning

Water bodies where the potential for drowning exists includes: oceans, rivers, lakes, seas, gulfs, bays, ponds, wetlands, bayous, streams or other similar water sources. Work over or near these types of water bodies is rarely encountered, and routine company job tasks do not usually result in the use of a boat. However, when they arise, jobs of this nature do pose a risk of drowning. When sample collections are anticipated to occur from within a boat, this will likely take place in various locations of the water body with varying or unknown depths, currents, floating and subsurface debris, and/or other similar hazards.

Control Measures: Tasks requiring work over or near water where the potential for drowning could occur requires a minimum of two workers. Use a boat with a flat, stable surface to reduce the potential for rollover. In addition, workers must wear a U.S. Coast Guard-approved life preserver at all times when inside the boat or when otherwise performing a task where the potential for drowning still exists. Once over water, movement within the boat should be minimized, and workers must use caution when collecting the sample. Workers must be equipped with buoys or other similar means to extract any individual that should fall into the water.

3.2.8 Electrical

3.2.8.1 Subsurface and Overhead Utilities

Typical jobsites will pose both subsurface and overhead utility hazards. Also, remediation systems are electrically operated and pose similar electrical hazards. Contact with power lines or exposed electrical wires can result in electric shock, severe skin burns and electrocution. Electrical wires are generally insulated as a first line of defense; however, tears or damage to the insulated material can directly expose workers to the wire. Other utility lines may be present at common jobsites and include water, sewer, natural gas, telephone and fiber optic. A punctured

natural gas line can spontaneously combust and cause a massive explosion. In addition, active retail gas stations contain subsurface product lines running from the tank pit to the dispenser islands and the layout of these lines can often be difficult to determine. Damage to some utilities may not necessarily pose a safety risk but damage to these structures can disrupt normal business functions and be very costly.

Control Measures: Treat all electrical lines and wires as active and avoid contact. Keep all equipment at least 10 feet away from all overhead power lines unless they have been isolated or shielded by the local energy company. Add an additional 0.4 inches to this distance for every 1 kV in excess of 50 kV. Follow all clearance procedures outlined within the company’s written Subsurface Clearance program, which includes but is not limited to the following measures:

Pre-Work Clearance (Offsite and Onsite Preparations)

- Request as-built drawings and/or obtain specialized knowledge of subsurface utility/structural locations from the client or property owner.
- Pre-plan borehole locations and visually review with client or property owner.
- Contact state one-call 48-72 hours (state-specific time requirements vary) to mark utility locations prior to field work; make secondary notices if site not marked.
- Contact additional local utility providers that do not subscribe to one-call to mark utility locations prior to field work; make secondary notices if site not marked.
- Hire private utility locators to identify presence of subsurface structures in addition to or in the absence of other clearance methods.
- Perform visual site observations for indicators of subsurface utilities/structures.
- Locate all emergency shut-off devices and isolate the work area.
- Identify and avoid critical zones (*any area within 10 feet of UST system*) or obtain principal approval when there are no other alternatives to avoidance.
- Follow clearance procedures for critical and non-critical zones.

Subsurface Clearance Procedures

- Clear all boreholes horizontally to 110% of the diameter of the widest digging instrument intended for use starting in all four cardinal directions (NSEW) then fully covering the entire circumference of the area.
- Clear all boreholes vertically to minimum 4-foot depth BGS unless greater depths are specified by the Office Manager/Principal.
- Use company-approved clearance methods (for drilling/probing) in order of preference outlined as follows:
 - 1) Blunt-tip push probe
 - 2) Tiered approach – use push probe for vertical clearance, then use digging tools (i.e., hand auger or post-hole diggers) to clear horizontally to same depth previously cleared vertically; then use push probe to further advance vertically; continue until depth-requirement is achieved
 - 3) Hand auger and/or post-hole digger – used only when push probe cannot otherwise be advanced vertically due to soil type(s)
- Use flat-edge shovel to clear for trenches/excavations when in areas of marked or suspected subsurface utilities/structures; clear area until utility/structure is located; if not located within depth-requirement, proceed with trenching/excavating.

3.2.8.2 Electrical Tools and Power Cords

Assorted power tools may be required for certain tasks. Power tools can be battery operated or otherwise have an electrical power cord, which can be plugged into an electrical outlet. Due to this factor, energy can be controlled by plugging or unplugging the cord and does not require energy isolation. The electrical wires are typically insulated; however, kinks or cuts made to the

power cord jacket can expose workers to these electrical wires resulting in electric shock or electrocution.

Control Measures: Perform an initial inspection to ensure tools and cords are in good working order and immediately discard or label damaged tools/cords to prevent use until repairs or replacements can be made. Additional safety precautions for electrical protection include, but are not limited to, the following:

- Only use electrical outlets and matching cords with grounding wire (3-prong).
- Never remove grounding prong to accommodate a 2-prong electrical outlet.
- Electrical cords should be rated for hard or extra hard use.
- Insulated jackets should show no evidence of kinks, cuts or tears; any sign of wear (frayed insulation or exposed wires) requires immediate labeling of the cord as “damaged” and must be immediately removed from the work area.
- Avoid placing electrical cords or tools in pools of water or other wet areas.
- All portable or temporary wiring must be protected by GFCI.
- Avoid using tools or cords that trip the GFCI.
- Do not run over cords or place them through doors, windows or other pinch points.

3.2.8.3 Lockout/Tagout

Remediation systems are electrically-operated systems that may require energy isolation as part of operation, maintenance or repairs. According to 29 CFR 1910.147(a)(2)(ii), energy must be isolated when 1) a worker must remove or by-pass safety guards or devices; or 2) a worker must place a body part at the point of operation or where a danger zone exists in the operating cycle. These requirements do not apply to corded equipment as this power source can be isolated by unplugging the equipment. It also does not apply to other pressurized systems for gas or steam if it can be proven that continuity of service is essential or that shut down of the system is impractical.

Routine operations and maintenance procedures typically do not trigger the requirements for energy isolation. However, it should be noted that during certain system or component repairs, these criteria may be triggered and the locking and tagging of the system and/or its components is necessary to prevent the unintentional startup of the system.

Control Measures: Locking and tagging of the system must be conducted in accordance with company requirements outlined within its written Lockout/Tagout program. An itemized procedure list for system deactivation and reactivation are posted at all remediation systems.

3.2.9 Hand and Power Tools

The electrical hazards posed by the use of power tools have previously been addressed. However, other hazards are posed by the use of hand or power tools. Removing or by-passing safety guards can expose a worker to the piercing, cutting, crushing or rotating hazards of mechanical equipment. Improper posture or repetition of hand tools can lead to musculoskeletal disorders as outlined within the previous section.

Control Measures: Use equipment in accordance with manufacturer guidelines and according to its intended purpose. Always select the appropriate tool for the job and refrain from making adjustments. Never remove or bypass safety guards. Perform an initial inspection to ensure tools are in good working order and immediately discard or label damaged tools to prevent use until repairs or replacements can be made. Keep tools stored appropriately to prevent rust or other signs of weathering. Wear appropriate head, eye, hand, and foot protection at all times. Avoid wearing jewelry or loose-fitting protective gloves/clothing that could become entangled in moving parts of the tool.

3.2.10 Illumination

Most company-related tasks will be conducted during normal, daylight hours; however, some tasks may be required to be conducted at night. When these instances occur, visibility will be decreased making the jobsite and the task more dangerous. In addition, the overall visibility of workers to drivers, equipment operators, etc. may be decreased.

Control Measures: The National Cooperative Highway Research Program (NCHRP) Report 498: Illumination Guidelines for Nighttime Highway Work outlines a set of guidelines for adequate lighting when working at night. Workers should adhere to these requirements to ensure appropriate visibility during all phases of the project. The three categories outlined by the NCHRP include the following:

- Level I illuminance is necessary in areas where the work crew is in motion, moving from spot to spot. Required for low accuracy tasks that may involve the use of slow-moving equipment, and where large objects must be visible.
- Level II illuminance is necessary in areas on or around construction equipment. A higher degree of lighting in this area will provide a safer environment for equipment operators allowing them to perform tasks that require a moderate level of accuracy.
- Level III illuminance is necessary for tasks that require a higher level of visual acuity or difficulty.

Sample tasks and the illumination requirements for those tasks are outlined below:

Sample Tasks (Not All-Inclusive)	Illumination Levels	Average Minimum Maintained Illuminance
All work operation areas; setup of lane or road closures, lane closure tapes, and flagging stations	Level I	54 lux (5 foot-candles)
Areas on or around construction equipment; asphalt paving, milling and concrete placement and/or removal	Level II	108 lux (10 foot-candles)
Pavement or structural crack/ pothole filling; joint repair, pavement patching/repairs; installation of signal/electrical/ mechanical equipment	Level III	215 lux (20 foot-candles)

Note: A foot-candle (fc) is defined as a unit of illumination that is equal to one lumen per square foot, or 10.764 lux.

Increased lighting can be provided using portable light plant towers, balloon lighting, roadway luminaires mounted on temporary poles, and factory-installed lights on equipment. Workers should select a light source and position it in a manner that reduces the amount of glare. When conducting night tasks on or near road system right-of-ways, workers must additionally adhere to appropriate state DOT roadway and traffic control requirements. Reflective clothing/vests are required when working at night or decreased illumination.

3.2.11 Ladder Safety

3.2.11.1 Portable Ladder Safety

Portable ladders are commonly used when replacing spent carbon with inactivated granular carbon or to access stationary aboveground storage tanks for inspections and/or maintenance. Carbon vessels consist of 55-gallon drums or other vessels that commonly range from 8-30 feet in height. It should be noted that carbon vessels can exceed 30 feet but these vessels are not common to current company processes. As part of this change-out process, workers must climb

portable ladders at heights greater than 4 feet and they must do so carrying 50-lb sacks of granular carbon or other materials.

Control Measures: Falls from ladder use are exempted from the fall protection standards (29 CFR 1926.500-503). Instead falls from ladders are outlined within 29 CFR 1910.23, which does not require the use of personal fall arrest system when working at elevations in excess of 4 feet (general industry). Use buddy system when able or check in periodically with the office to relay status. Use a portable A-frame ladder and ensure that it is locked in place. Place ladder on level, compact ground surfaces and avoid wet areas. Never place ladder near entrance/exit or other pathway that could interfere with ladder usage. Use ladder for its intended purpose and in accordance with manufacturer's guidelines. Use two hands when ascending or descending.

3.2.11.2 Fixed Ladder Safety

Fixed ladders may be used at client facilities to access rooftops or other similar elevated walking/working surface. This is often necessary with asbestos and/or lead sample collections, vacuum events, aboveground tank inspections and industrial compliance.

Control Measures: Falls from ladder use are exempted from the fall protection standards (29 CFR 1926.500-503). Instead falls from ladders are outlined within 29 CFR 1910.23, which does not require the use of personal fall arrest system when working at elevations in excess of 4 feet (general industry). According to OSHA requirements, fixed ladders must have cages, wells, ladder safety devices, or self-retracting lifelines when the climb is less than 24 feet but the top of the ladder is greater than 24 feet above lower levels. When a fixed ladder is greater than 24 feet, it must be equipped with one of the following: ladder safety devices or self-retracting lifelines with rest platforms at intervals not to exceed 150 feet. When able and it does not otherwise introduce additional safety hazards, personnel may be required to use personal fall arrest system. This will be determined on a case-by-case basis.

3.2.12 Material Handling and Back Safety

It is common for workers to transport materials such as hand or power tools, bailers, sampling containers and monitoring equipment from the office to various site locations. Workers are also likely to relocate drums or other chemical storage containers. Materials may be heavy putting strain on the back, or they may be large or bulky and obstruct vision during transport.

Control Measures: When lifting or relocating heavy or large items, mechanical devices should be used as a first line of defense. When mechanical means are not available, workers should use the buddy system to lift and transport loads in excess of 50 lbs or load that obstruct view of travel. When lifting an object, workers should bend at the knees and lift with the legs – avoid applied pressure to the back as muscle strain will likely occur. Keep loads close to the body and avoid twisting while carrying loads. Ensure travel paths are free of obstructions prior to lift and relocating materials.

3.2.13 Mobile Equipment

3.2.13.1 Heavy Equipment and Machinery

Various types of heavy equipment are necessary to perform routine tasks such as drilling, geoprobing (direct push), mobile vacuum, trenching, excavating, remediation system installations and removals, underground storage tank removals, and other similar tasks. The use of this type of equipment is mostly subcontracted, and PPM requires its subcontractors be adequately trained to safely operate these types of heavy machinery. Other forms of heavy equipment such as forklifts, skid steers, and core drills can be operated by company personnel. PPM requires that operators of these types of equipment be deemed competent by the company through safety, instructional and observational training and/or operator experience. Also,

equipment must be inspected by a competent prior to use, documented and returned to the safety department for recordkeeping. Hazards associated with the use of heavy equipment include, but are not limited to, the following:

- Pinching, rolling, crushing, rotating hazards from equipment, hoses and connections
- Contact with overhead or underground utilities gas lines, power lines, etc.)
- Falling loads
- Hydraulic or pressurized equipment parts
- Swing radius of equipment
- Operator blind spots
- Hot equipment parts



Control Measures: Use equipment in accordance with its intended purpose. Machinery must be grounded prior to use and equipped with emergency stop devices. Workers must locate and test these devices prior to using the equipment. When the equipment is in use, one worker must be readily available to engage emergency stop devices unless other workers remain away from the equipment while in operation. Equipment must remain at least 10 feet away from any overhead utility line unless the line has been otherwise isolated or shielded from accidental contact. Derricks/masts of mobile equipment must be lowered prior to relocating equipment from one location to another while onsite. Personnel who work with or near rotating or other moving parts are prohibited from wearing jewelry, loose clothing or other similar means that could become entangled within the equipment. Long hair should be tied back and protective clothing should fit securely. Workers should not collect samples or otherwise place hands in or near augers when it is rotating, and workers must also avoid climbing mast of equipment when it is in operation. Wheels should be chocked and hand brakes set to secure equipment when at rest.

Contact with hot parts must be avoided and it should be noted that metal parts become extremely hot with sun exposure, which can cause significant skin burns. Workers are prohibited from working beneath elevated loads and must avoid any area impacted by the swing radius of operating equipment unless a spotter is used. Additionally, workers must be aware of operator blind spots which may also require the use of a spotter.

3.2.13.2 Aerial and Scissor Lifts

Use of aerial and/or scissor lifts is a rare occurrence. Workers anticipated to use such equipment will require additional training beyond what is provided through policy/procedural safety orientation(s) and annual refresher. Aerial and scissor lifts are not synonymous and are covered under two separate OSHA regulations. Regulatory requirements for aerial lifts can be found in §1926.453, while requirements for scissor lifts (defined by OSHA as a mobile scaffolding system) can be found in §1926.452(w). This equipment can reach elevations in excess of 4 feet triggering fall protection. It should be noted that per OSHA guidelines, aerial lifts require the use of personal fall arrest systems in conjunction with the use of a guardrail system, while scissor lifts require the use of personal fall arrest systems only in the absence of a guardrail system.

Control Measures: Use of aerial and scissor lifts is strictly prohibited unless approved in advance by the safety department. Additional regulatory training and competency assessment(s) will be required in making this determination.

3.2.14 Noise

OSHA regulates worker exposures to noise. The established action limit for an 8-hour workday is 85 decibels (dB), a time-weighted average (TWA). Levels at or in excess of this limit can cause hearing loss, which depending upon exposure can be a temporary or permanent loss. Noisy

environments can also interfere with worker communication and comprehension, which poses additional safety risks.

Noise exposures can be measured using sound level meters or noise dosimeters. Certain work-related processes considered to be noisy include but are not limited to the following:

- Remediation systems – systems vary, but noise levels have been measured ≥ 90 dB
- Heavy equipment operation (including vac trucks) – have been measured ≥ 120 dB
- Use of power tools – sound levels vary (electric drill – 95 dB, power saw 110 dB, power drill – 130 dB, pneumatic drill – 120 dB)
- Work conducted nearby high traffic roadways – typical freeway traffic is 70 dB; however, large 18-wheelers have been measured ≥ 90 dB
- Coring and cutting of concrete – use of jackhammers or coring equipment have been measured ≥ 130 dB

Control Measures: Download NIOSH Sound Level Meter or similar app on any smart phone to assess noise levels. Sound level meters may also be used to assess noise levels. Document noise levels using PPM's Occupational Noise Monitoring Report and return to the HSD upon completion of the project. In the absence of monitoring equipment, workers who must shout at a co-worker 5 feet away are likely triggering regulatory threshold limits for noise exposures. Those environments ≥ 85 dB require the use of administrative controls or protective equipment. Administrative measures such as limiting work hours within noisy environments should be the first line of defense used to control worker exposures to noise levels in excess of 85 dB. When this cannot be achieved use hearing protectors such as earplugs, canal caps or ear muffs to protect worker hearing.

3.2.15 Repetitive Motion

Some tasks require a degree of repetition that may put strain on muscles and joints of the body. Poor posture can also put a similar degree of strain on the body. Typical symptoms of repetitive motion strain do not necessarily occur immediately (i.e., they can appear at rest during sleep) and include but are not limited to the following:

- Tingling, swelling or numbness of wrists, knees, elbow or other joints
- Sharp, piercing pain
- Loss of flexibility or muscle strength

Control Measures: Avoid performing repetitive tasks that target specific parts of the body for extended periods of time. Recognize symptoms promptly and vary job task for a while. Stretching and flexibility exercises can strengthen muscles over time. Report any signs or symptoms of repetitive motion strain to the HSD immediately. These injuries progressively worsen so prevention is imperative.

3.2.16 Scaffolding

Use of scaffolding systems, which includes walking, working, assembling, disassembling, and/or other similar uses, is a rare occurrence. Workers anticipated to work on or near scaffolding systems will require additional training beyond what is provided through policy/procedural safety orientation(s) and annual refresher. Scaffolding systems will most commonly be encountered at a client facility and should be avoided.

Control Measures: Use of scaffolding systems is strictly prohibited. Work requiring the use of a scaffolding system will be subcontracted to appropriately qualified contractors.

3.2.17 Slips, Trips, and Falls

Open boreholes generated through drilling or direct push as well as improper materials storage can pose tripping hazards. In addition, typical groundwater monitoring activities can result in open monitoring wells producing the same results. Trenching and excavating jobs can result in large, open earth depressions of varied depths and widths in which workers, tools or equipment could potentially fall. Activated carbon replacements, asbestos/lead sampling, aboveground storage tank inspections and/or maintenance, and use of catwalks may require work at elevations ≥ 4 feet, which may require additional safety measures such as the use of fall protective equipment (i.e. full-body harness and lanyard). *Note: Only personnel who have received additional fall protection training are considered competent for performing these tasks – all other workers are prohibited from working at elevations ≥ 4 feet without additional training and certification.*

Areas surrounding tank systems are likely to contain aboveground piping, pumps, loading platforms, retaining walls/berms, and other similar features which may require the worker to walk on and/or over in order to gain access to certain areas of the tank for inspection. Walking on or around surfaces associated with drainage structures (i.e., sumps, canal ditches, etc.) may also create slip, trip and fall hazards.

Control Measures: Store all materials away from work areas until ready for use and keep all travel paths unobstructed. Walk around materials – never walk over them. Use secured, steel sheet plates or wood to cover open boreholes. Use company truck and cones to isolate traffic from open monitoring wells. Heavy equipment, barricades and caution tape must be used to isolate open excavations from vehicular traffic and unauthorized personnel. Use full-body harness and lanyard to tie-off to stable structure when working on walking/working surfaces at elevations ≥ 4 feet (refer to Section 3.2.19). Refer to Section 3.2.11 for fall hazards associated with the use of ladders.

3.2.18 Traffic and Secluded Areas

Most petroleum remediation activities occur at active retail gasoline facilities, which expose workers to vehicular traffic. In some cases, work may be required within roadway right-of-ways or workers may be required to cross highways to perform work on an adjoining property or within a median. Secluded areas are not typical of most field-related projects; however, they do exist on occasion. Workers required to perform tasks at remote locations should be aware that these locations may be unlawfully inhabited and/or have the potential for illegal activities.

Control Measures: Use buddy system when working in high traffic areas as first line of defense, especially on spill bucket closures, groundwater sampling, or other similar tasks that require workers to bend, kneel or sit at or slightly above ground level which greatly decreases worker visibility. When these conditions are triggered, the buddy system will require one worker to stand nearby the other worker to create a unit whereby the observer has the primary responsibility of ensuring the safety of the worker with decreased visibility. When working upright, the buddy system will permit workers to separate only to distances that are clearly visible to both workers in a manner that ensures both can continuously monitor the other during all phases of the task. For example, during the sample collection, workers must fill vials or other containers at the vehicle so that they remain in an upright position during collection. Collections at the well are prohibited unless workers are together as a unit because when workers are separated, this process generally requires the worker to bend or kneel, which decreases the visibility of that individual. In addition, the worker is no longer in a position to observe his/her co-worker voiding the effectiveness of the buddy system. If operating as a unit, one worker may observe while the other collects the sample at the well.

When the buddy system cannot be implemented, use the company vehicle and cones to clearly define and block traffic from your work area. Relocate vehicle and cones when work area changes. Workers must wear high visibility safety shirts or ANSI Class II vests to increase visibility even when using additional safety precautions. Reflective clothing/vests are required when working at night or decreased illumination. Additional illumination requirements for night work can be found in Section 3.2.10. When conducting night tasks on or near road system right-of-ways, workers must additionally adhere to appropriate state DOT roadway and traffic control requirements. When working in secluded or unsafe areas, the following measures are required:

- Schedule work during daylight hours.
- Contact local police department and inquire about security.
- Never go to site alone; use buddy system.
- Notify manager or co-worker regarding your location, estimated time to perform duties and anticipated time of return; make intermittent calls throughout the day.
- Have cell phone readily available and pre-set to 911.
- Carry whistle and pepper spray as alternate methods of defense.
- Wear work clothes and protective equipment to identify you are there in a professional capacity.
- Park vehicle nearby and never exit the vehicle if anyone or anything appears suspicious.

Note: The use of the buddy system as outlined above applies to traffic hazards only and should not be incorporated universally without additional discussion and management approval. For instance, the use of the buddy system as required when conducting emergency response is clearly specified by OSHA §1910.120 in a manner that opposes the previously outlined requirements. In the absence of regulatory direction, PPM will adhere to this definition of the buddy system.

3.2.19 Walking/Working Surfaces

3.2.19.1 Elevated Walking/Working Surfaces

Activated carbon replacements, asbestos/lead sampling, and aboveground storage tank inspections and/or maintenance may require work at elevations ≥ 4 feet. In addition, use of catwalks may exist at heights ≥ 4 feet. According to §1910.21, a catwalk is considered a runway which is defined as a passageway for persons, elevated above the surrounding floor or ground level, such as a footwalk along shafting or a walkway between buildings. When working on multilevel surfaces, any floor deteriorations or openings must be obstructed to prevent inadvertent falls from an elevated surface. Also, when working on multilevel structures, such as the roof of a tank, openings within the walking/working surface can cause collapse and/or extreme falls. Working at elevated heights can create fall hazards that can result in a fatality or serious physical impairment. Due to these risks, tasks such as these may require additional safety measures such as the use of fall protective equipment (i.e. full-body harness and lanyard). Falling objects from a catwalk to a lower level is another hazard commonly associated with elevated walking/working surfaces. *Note: Only personnel who have received additional fall protection training are considered competent for performing these tasks - all other workers are prohibited from working at elevations ≥ 4 feet without additional training and certification.*

Control Measures: Walking/working surfaces located greater than 4 feet (general industry) above ground surface requires fall protection in the form of a guardrail system to protect against inadvertent falls from elevated heights. Use barriers to isolate floor openings to prevent inadvertent trips and/or falls through such openings. Holes and openings must always be covered when not otherwise needed to perform a task. To protect workers from falling objects, runways must include toeboards, screens, guardrail system, debris nets, catch platforms, canopy structures, or barricades. Workers on lower levels must also wear hard hats at all times. Runways should consist of a nonskid surface material or grating, handrail supports for 200 pounds of force,

and means of egress that is permanent and stationary (ex. fixed ladders or stairs). Workers should wear laced footwear with rubber soles to give better foot and ankle support and to reduce the likelihood of slips.

3.2.19.2 Uneven Walking/Working Surfaces

Uneven walking and/or working surfaces are not uncommon. Sites with minimal grounds-keeping can disguise potholes, which could result in trips/falls or foot injuries. Dense vegetation can also disguise dips and potholes. Using limbs, branches, or other similar debris to cross over streams creates an unstable ground surface that can become structurally unsafe after repeated use. Aboveground storage tank lids may be domed and unlevel posing additional hazards in the inspection process.

Control Measures: When work is to be performed at an inactive facility, bring weed eaters and sprayer to address overgrown vegetation. When grounds keeping is the responsibility of the client, the Project Manager should call in advance and request site maintenance be performed prior to PPM's arrival onsite. Workers should also wear laced, steel-toed boots which gives better ankle support than slip-on safety footwear. When working in highly vegetative areas that must be accessed, workers should use mechanical equipment to clear cut access paths or use other hand tools. Avoid walking over vegetation or other debris that may become unstable after repeated use.

3.2.19.3 Unstable Soils and Cave-Ins

Soil is an extremely heavy material, and may weigh more than 100 pounds per cubic foot. A cubic yard of soil may weigh more than 2,700 pounds. That is nearly one and a half tons, the equivalent weight of a car. Furthermore, wet soil or rocky soil is usually heavier. The human body cannot support such heavy loads without being injured. The primary hazard associated with a trench or excavation is a cave-in. Common excavations consist of an average depth of 10-15 feet, and when soils cave-in on or around a worker, it will generally result in death.

Control Measures: Any trench or excavation ≥ 4 feet in depth must have the following protective measures implemented:

- Perform visual inspections prior to start of work daily and conduct additional inspections warranted by changes in site conditions.
- Provide onsite competent person with the knowledge and authority to correct any noted hazards derived from daily visual inspections.
- Keep all tools, materials, equipment and workers at least 2 feet away from edge of trench/excavation.
- Ladder or other means of egress in accordance with 29 CFR 1926.651(c)(2) must be provided by the subcontractor and be present onsite at all times – PPM requires a ladder be present onsite under these conditions regardless of whether a worker enters the trench/excavation.
- When controls are used and workers are required to enter a trench/excavation, ladders must be placed so that workers are not required to travel lateral distances greater than 25 feet.

OSHA requires that any trench/excavation with a depth ≥ 4 feet use engineering controls to prevent cave-ins. In addition, OSHA also requires that any trench/excavation with a depth ≥ 20 feet use a qualified engineer to determine the appropriate engineering control. *Note: Under no circumstances must any individual enter a trench/excavation with a depth of 4 feet or greater without the use of engineering controls. In addition, no equipment requiring an individual to be placed on or inside the equipment during its operation is permitted inside the trenched/excavated area. Soil packing and obtaining samples must be conducted through alternative methods.*

3.2.20 Weather

3.2.20.1 Heat Stress

Heat is a common concern for states in the southern U.S. and the use of personal protective clothing only adds to this stress. Heat stress can occur in as little as 15 minutes. Symptoms are generally progressive but some exceptions do apply. Some symptoms of heat stress may not arise, may go unnoticed or may occur simultaneously depending on the degree of progression and the awareness level of the worker. The following symptoms are associated with heat stress:

- Heat rash – skin rash caused by plugged sweat ducts due to perspiration
- Fainting – blood is not circulated properly to the brain and typically results from extended periods of standing in conjunction with immobility
- Dehydration – extreme water loss; workers will experience thirst
- Heat cramps – leg or stomach muscle cramps due to loss of sodium and potassium through perspiration
- Heat exhaustion – profuse sweating and clammy skin
- Heat stroke – core body temperature rises to life-threatening condition (104°F)

Control Measures: Heat stress can occur very rapidly; therefore, workers must be alert to the signs and symptoms and should be additionally aware of sluggishness or behavioral changes in their co-workers. Workers should be acclimated to their environment and breaks should be taken as necessary to replenish fluids and cool down core body temperature. Alternate workers as necessary to keep work going. Remove excess protective clothing and break in a shaded, cool area. Any worker exhibiting symptoms of heat stress will be prohibited from performing additional duties for the remainder of the day.

3.2.20.2 Cold Stress

The degree of coldness depends upon temperature, wind and wetness. When exposed to colder climates, the body loses heat faster than it can be generated. Prolonged exposures can rapidly use up the body's stored energy resulting in the following:

- Trench foot – injury to feet when immersed in water for prolonged periods resulting in reddening of skin, numbness, leg cramps, swelling, tingling pain, blisters or ulcers, bleeding under skin, and gangrene
- Chilblain – damage to capillary blood vessels in skin resulting in redness and itching mostly on cheeks, ears, fingers and toes; possible blistering, inflammation and ulceration in extreme cases
- Frostbite – injury caused by freezing of the skin, reduced blood flow to hands/feet, numbness, tingling or stinging, aching, bluish or pale, waxy skin which may lead to amputation
- Hypothermia – body loses heat faster than it can generate it resulting in (early symptoms) shivering, fatigue, loss of coordination, confusion and disorientation; (late symptoms) no shivering, blue skin, dilated pupils, slowed pulse and breathing and loss of consciousness

Control Measures: Workers should be acclimated to their environment, wear multiple layers of clothing, remove wet or damp clothing promptly and breaks should be taken as necessary to drink warm fluids and warm core body temperature. Alternate workers as necessary to keep work going. Any worker exhibiting symptoms of cold stress will be prohibited from performing additional duties for the remainder of the day.

3.2.20.3 Adverse Weather Conditions

Adverse weather conditions can include heavy rainfall, thunderstorm, lightning, hail, snow, tornado watch/warning, tropical storm or hurricane advisory to name a few. These types of weather conditions interfere with travel and field work. Workers who attempt to drive under these conditions put themselves at risk.

Control Measures: Follow local weather advisories and postpone work as necessary. Weather conditions can change rapidly while onsite. Carry NOAA weather radios when in the field to monitor changes in weather. Be prepared to use stop-work authority as necessary to address changes in weather. Plan your escape route in advance and be prepared to move to higher ground and/or evacuate. Never drive through flooded roads.

3.3 BIOLOGICAL HAZARDS AND CONTROLS

3.3.1 Insects and Mosquitoes

Insects and mosquitoes are prominent in just about any work location. Large ant beds as well as other insect nests such as hornets, wasps, yellow jackets and bees can be found as early as spring. They can reside in trees, high vegetative areas, holes within the ground or within piles of trash and debris.

Mosquitoes can carry infectious diseases such as West Nile virus and Zika virus, which can cause long-term debilitating illnesses, birth defects, or fatality. They are most active at dusk or dawn. Symptoms vary and can appear between 3-14 days after a bite.

- West Nile: (mild symptoms) – fever, headache, body aches, nausea, vomiting, and swollen lymph glands or skin rash on chest, stomach and back; symptoms may last for several days to a few weeks; occurs in up to 20% of people infected; (severe symptoms) – high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis; symptoms may last for several weeks and neurological symptoms may be permanent; occurs in 1 out of 250 people infected.
- Zika: mild fever, skin rashes, muscle and joint pain, and conjunctivitis (pink eye) that usually last between 2-7 days; can cause severe birth defects in offspring of pregnant women.

Control Measures: PPM contracts a professional spraying company to spray for insect nests; however, workers should carry pest-control materials as necessary and keep extra cans of wasp, hornet, bee and ant spray as a secondary precaution. Workers required to carry allergy treatments such as an epinephrine injection (epipen) must keep this nearby at all times, and co-workers must know the location of this treatment should it be needed. To prevent mosquito bites, use insect repellent containing DEET, wear long-sleeved shirts and long pants and remove any standing water from buckets or barrels where mosquitoes can lay their eggs.

3.3.2 Ticks and Spiders

Spiders can be found in highly vegetative areas, in and around remediation systems and in other similar areas. Black widow spiders are commonly found inside well vaults, beneath a system in dark crevices and other similar dark spaces.



Ticks can be encountered in highly vegetative areas with limited grounds keeping. Ticks are external parasites and there are more than 800 different species. Deer ticks carry Lyme disease, but <5% of all tick bites result in Lyme infection. Symptoms of Lyme infection include: flu-like illness with red skin rash that occurs within 3 weeks of bite. Rash should be circular and can increase daily. Symptoms of exposure should be reported immediately to the safety department and medical attention should be sought as necessary.

Control Measures: PPM contracts a professional spraying company to spray for spiders when also spraying for insects. Avoid placing hands and arms in dark spaces that cannot be seen. Use caution when opening well vaults or when working in other dark places. Do post-job body inspection and remove ticks immediately.

3.3.3 Rodents, Reptiles and Roaming Animals

The southeast U.S. is home to various species of venomous snakes. Venomous snakes will likely be found beneath piles of debris, near bodies of water or in high or heavily vegetative areas. They generally have a triangular-shaped head, elliptical pupils, and some have rattlers. A few common species of venomous snakes are identified below.



Southern Copperhead



Water Moccasin



E. Diamondback Rattler



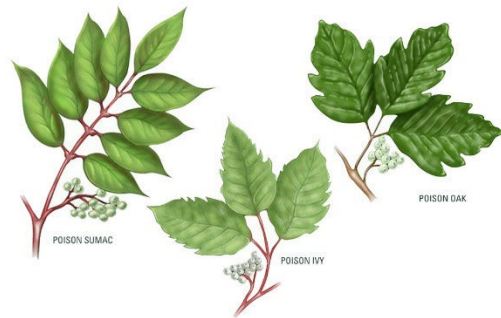
Coral Snake

Facilities located near lakes, rivers, bayous, streams or that otherwise have ponds may have alligators present. Alligators will come out of the water and onto land surface to build nests for their eggs or to sunbathe. They are also known to lie beneath the water’s surface in wait when they are preparing to attack and they may not be visible to workers. Highly vegetative areas and areas with trash or debris can be home to rodents such as rats or mice. Remediation systems provide warmth in colder climates and it is not uncommon to find rodents and other animals within or around the unit. Sites located in populated areas may have wandering animals. Pets may be trained to attack when approached, may have mange (parasitic skin diseases) or may carry other diseases.

Control Measures: When working in or around bodies of water, be aware of any indicators of alligator presence, which require immediate evacuation of the area. General awareness and caution must be used when working in highly vegetative areas. Never place hands or other parts of body in an area that is not clearly visible. Snake guards/chaps should be worn when working in suspected snake-infested areas. Workers must avoid wandering animals – they may appear to be a pet; however, they can carry diseases and they may bite or scratch.

3.3.4 Poison Plants

Heavily vegetative areas may have poisonous plants such as poison ivy, oak or sumac, which produce a poisonous sap called urushiol. Typically the first exposure to these plants may not result in any symptoms as this is classified as a “sensitization period”. Future exposures to these plants will then produce bumps often mistaken for mosquito bites until they begin to ooze. This is spread by scratching affected areas and touching other unaffected areas.



Control Measures: First line of defense is to be able to identify and avoid these plants. Weed killers should be used to minimize mowing and to eliminate exposure to poison ivy, oak or sumac. It should be noted that poisonous plants still thrive throughout the winter and they are more difficult to locate without their leaves. Workers should wear long-sleeved shirts and long pants tucked into boots when working in highly vegetative areas. Pre-medicated towelettes or lotions form a barrier on the skin and prevent adverse reactions. Rubbing alcohol can remove the oil resin up to 30 minutes after exposure, and antihistamines (non-drowsy) can also be taken post-exposure to minimize the reaction.

3.3.5 Bloodborne Pathogens

Sharps hazards come in various forms and may include hypodermic needles, cutting tools or equipment/machinery with sharp edges like box cutters, scissors, machinery blades, etc. Hypodermic needles are occasionally encountered at some jobsites. Needles may be used for insulin injections or drug use. Other sharps may become contaminated upon contact with infected sources. Life-threatening illnesses such as hepatitis or human immunodeficiency virus [HIV] (also referred to as bloodborne pathogens) may be transmitted via contaminated sharps so workers should be extremely cautious at all field locations. Also, bloodborne pathogens can be transmitted from an infected individual to another when providing first aid. All individuals and sharps must be treated as other potentially infectious materials (OPIM).

Control Measures: Never reach beneath the remediation system or stick hands in areas not clearly visible. Do a visual inspection before reaching for any component or item. Never recap a needle! Remove needles carefully using puncture-resistant gloves. Place them in plastic containers with a closed lid. Duct tape the lid before discarding. Drop off at community drop sites (where available). This type of waste is considered biohazardous waste; however, only healthcare facilities and medical waste industries are regulated. Be aware that the state of Florida requires disposal of this waste at established drop off locations, but all other states in which PPM has an office only recommend using these locations where available. Avoid contact with sharp edges of equipment/machinery, use cutting tools in accordance with manufacturer’s guidelines, and always cut away from or perpendicular to the body. Use the concept of universal precautions for infection control. This concept is to treat all human blood and certain human body fluids as if known to be infectious for HIV, hepatitis B, and other bloodborne pathogens.

3.3.6 Infectious Illnesses

Infectious illnesses caused by viral, bacterial, fungal and parasitic agents are often transmitted by infected biological sources such as mosquitoes, humans, birds, pigs, ticks, etc. Such illnesses as influenza, swine and avian flu, coronavirus (COVID-19), HIV, Zika and West Nile virus, tuberculosis, and hepatitis, to name a few, can be acquired through occupational exposures.

Control Measures: Workers will be immunized, where appropriate and available, and personal protective equipment will be provided to eliminate or reduce potential contact with contaminated sources. Illnesses transmitted person-to-person that may result as an epidemic or pandemic event will be addressed through social distancing, telecommuting, and other recommendations or requirements outlined by state and federal agencies. The preventive measures warranted will be dictated by the illness type and mode of transmission; therefore, each situation will be evaluated on a case-by-case basis.

The current illness prevention measures in place to prevent or minimize the spread of COVID-19 include, but are not limited to, the following:

- Get vaccinated;
- Ensure worker temperature is $\leq 100.4^{\circ}\text{F}$;
- Maintain social distances of 6 feet or greater;
- Wear facemask in public settings and when social distancing cannot be maintained;
- Clean and disinfect hands frequently and after contact with commonly-touched sources;
- Clean and disinfect common areas such as restrooms, kitchen, and break areas;
- Clean and disinfect commonly shared vehicles, instruments, tools, or other similar materials; and
- Immediate isolation from others once potential COVID-19 symptoms develop, and management reporting to prevent contact with and spread of infection to others.

Note: Additional safety precautions for SARS-CoV-2 are outlined within PPM’s Exposure Control and Response Plan for Coronavirus Disease 2019 (COVID-19) and must be implemented in accordance with the plan.

4.0 EXPOSURE MONITORING

As part of company-related processes, employees will or have the potential to be exposed to various chemical hazards. Chemicals that pose an inhalation hazard may not be considered a threat to worker health until a regulatory limit or more stringent company-imposed action limit is triggered. In addition, some chemicals can become flammable at certain limits. To ensure workers are not working within hazardous or flammable atmospheres, ambient air monitoring will be performed for any work-related process in which chemicals pose an inhalation hazard and have assigned regulatory limits for permissible worker exposures or are otherwise considered a potential fire hazard. Air monitoring will not be required when working with or near materials considered to be non-hazardous in nature or do not otherwise pose an inhalation or fire hazard to workers.

4.1 TERMINOLOGY/DEFINITIONS

In order to determine existing or potential worker overexposures to hazardous or flammable substances, workers must first understand common exposure terminology. Some commonly used exposure terms are defined in the following table:

Term	Definition
Action Limit	Company-assigned exposure limit assigned to a chemical that is more stringent than the regulatory or recommended exposure limit.
Ceiling Limit	Maximum concentration of a chemical a worker can be exposed to at any point during a work shift. This is an instantaneous reading.
Flammability/Explosive Range	The concentration range (LEL-UEL) of a combustible or flammable material (gas/vapor) that will burn or explode when introduced to an ignition source.

Term	Definition
Immediately Dangerous to Life and/or Health (IDLH)	Concentration of a chemical beyond which a worker will be capable of escaping death or permanent injury without help in less than 30 minutes.
Lower Flammability/ Explosive Limit (LFL/LEL)	The lowest concentration of a gas/vapor needed to produce a fire or explosion when exposed to an ignition source.
Permissible Exposure Limit (PEL)/Threshold Limit Value (TLV)	OSHA's regulatory exposure limit is the PEL, whereas the TLV is used to represent other published recommended exposure limits (NIOSH or ACGIH).
Short-Term Exposure Limit (STEL)	Maximum concentration of a chemical a worker can be exposed to without adverse effects over a 15-minute period (unless otherwise noted) not to exceed 4 times per work shift with 1-hr rest intervals between exposures.
Time-Weighted Average (TWA)	Maximum concentration of a chemical a worker can be exposed to without any adverse effect. Based on an 8-hr day/40-hr week.
Upper Flammability/ Explosive Limit (UFL/UEL)	The highest concentration of a gas/vapor needed to produce a fire or explosion when exposed to an ignition source.

4.2 ESTABLISHING EXPOSURE AND FLAMMABILITY LIMITS

4.2.1 Exposure Limits

For any material that has an established regulatory or recommended exposure limit, PPM has established a more conservative action limit. It is the company's intention to take some form of action before a worker is exposed at regulatory or recommended levels. The exception to this concept applies only to contaminants with very low exposure limits and also to the detection capabilities of air monitoring equipment.

Action limits are established on a case-by-case basis and in accordance with general industry practice. When ambient air concentrations trigger action limits, engineering, administrative or work practice controls should be incorporated to eliminate the exposure or reduce worker exposures to an acceptable limit. When this cannot be achieved, workers will be required to upgrade personal protective equipment.

4.2.2 Flammability Limits

PPM has adopted general industry practice by setting its flammability action limits to be 10% of the regulatory limit. Since lower and upper explosive limits are provided as a percentage, PPM has additionally converted the flammability ranges of commonly encountered combustible and flammable materials into parts per million (ppm). Regardless of the volatile monitoring equipment used, workers will be able to determine when a given work environment is or becomes a flammable environment. Workers must also recognize that when working in environments in which chemical concentrations >UEL, as effective control measures are introduced the chemical concentration will again fall back into the flammability range and ignition sources must be eliminated until concentrations once again fall below the material's assigned LEL.

4.3 REGULATORY EXPOSURE LIMITS

Whenever an action, regulatory or recommended exposure limit is triggered, workers must be prepared to immediately report site conditions to management, to develop and implement alternative control measures, to evacuate the site when warranted and/or be prepared to upgrade personal protective equipment (i.e., wear respiratory protection). In order to wear respiratory protection, workers must first be medically cleared by a physician, be fit-tested to a

specific respirator and have received training in accordance with the procedures outlined within the company's Respiratory Protection program. To ascertain eligibility, workers must receive authorization from the safety department prior to using a respirator.

Action, regulatory, and/or recommended exposure limits assigned to routine chemicals commonly encountered by workers are outlined within the following table:

Constituent	Toxicity					Fire
	Action	PEL/TLV	STEL	Ceiling	IDLH	LEL-UEL
Activated carbon	--	--	--	--	--	--
Alconox® [nuisance dust]	5	5	--	--	--	--
Aldrin[pesticide]	0.25	0.25	--	--	25	--
Aluminum[metal]	5	5	--	--	--	--
Aluminum oxide[nuisance dust]	5	5	--	--	--	--
Ammonia[base]	50	50	35 [†]	--	300	15,000-28,000
Arsenic[metal]	0.01	0.01	--	--	5	--
Analytix AN-754GH	--	--	--	--	--	--
Asbestos	0.1	0.1	1	--	--	--
Barium[metal]	0.5	0.5	--	--	--	--
Benzene	1	1	5	--	500	1,200-7,800
n-Butane	400	800	--	--	--	1,600-8,400
Cadmium[metal]	0.005	0.005	--	--	9	--
Calcium hydroxide[base]	5	5	--	--	--	--
Carbon dioxide[dry ice]	2,500	5,000 [†]	30,000	--	40,000	--
Carbon tetrachloride	2	2 [†]	--	25	200	--
Chloroform	2	2 [†]	2 [60-min]	50	500	--
Chromium[metal]	0.5	0.5	--	--	250	--
Coal tar pitch volatiles[PAH]	0.2	0.2	--	--	80	--
Copper[metal]	1	1	--	--	100	--
DDT[pesticide]	1	1	--	--	500	--
Dieldrin[pesticide]	0.25	0.25	--	--	50	--
Diesel	100[skin]	100[skin]	--	--	--	600-7,500
Dust [Total]	15	15	--	--	--	--
Dust [Respirable]	5	5	--	--	--	--
Dust [Portland Cement]	50	50	--	--	--	--
Endrin[pesticide]	0.1	0.1	--	--	2	--
Ethylbenzene	100	100 [†]	125 [†]	--	800	800-6,700
Gasoline	100	300 [†]	500 [†]	--	--	1,400-7,600
Heptachlor[pesticide]	0.5	0.5	--	--	35	--
Hexane	50	50 [†]	--	--	1,100	1,100-7,500
Hydrochloric acid[HCl]	--	--	--	5	50	--
Hydrogen peroxide[30-50%]	1	1	--	--	75	--
Hydrogen Sulfide[H ₂ S]	1	1	--	10	100	4,000-44,000
Iron[metal]	--	--	--	--	--	--
Isobutylene	--	--	--	--	--	1,800-9,600
Isopropyl alcohol	200	400 [†]	500 [†]	--	2,000	2,000-12,700
Kerosene	50	100	--	--	--	700-5,000
Klozur[sodium persulfate]	5	5	--	--	--	--
Lead[metal]	0.05	0.05	--	--	100	--
Lindane[pesticide]	0.5	0.5	--	--	50	--
Liquinox®	--	--	--	--	--	--

Constituent	Toxicity					Fire
	Action	PEL/TLV	STEL	Ceiling	IDLH	LEL-UEL
Lubricating oils[motor oil]	--	--	--	--	--	--
Magnesium[metal]	--	--	--	--	--	--
Mercury[metal/vapor]	0.1[skin]	0.1 [†] [skin]	--	0.1 [†] [skin]	10[skin]	--
Methane	--	--	--	--	--	5,000-15,000
Methylene chloride	25	25	125	--	2,300	13,000-23,000
MTBE	50	50	--	--	--	1,000-8,000
Muriatic acid[HCl]	--	--	--	5	50	--
Naphthalene[PAH]	10	10 [†]	15 [†]	--	250	900-5,900
Nitric acid	2	2 [†]	4 [†]	--	25	--
NXT[Klozur – sodium persulfate]	5	5	--	--	--	--
Oil[crude]	0.2[mg/m ³]	0.2[mg/m ³]	--	--	--	1,000-8,000
ORC [®] /ORC Advanced [®]	5	5	--	--	--	--
Ozone	0.05	0.1 [†]	0.3 [†]	0.1	5	--
PCB	0.5[skin]	0.5[skin]	--	--	5	--
Perchloroethylene[PERC]	25	25 [†]	--	150[cap]	150	--
Phosphoric acid[H ₃ PO ₄]	1	1 [†]	3 [†]	--	1,000	--
Potassium hydroxide[base]	2	2 [†]	--	2	--	--
Propane	500	1,000	--	--	2,100	2,100-9,500
RegenOx A or B [™]	--	--	--	--	--	--
Selenium[metal]	0.2	0.2	--	--	1	--
Silver[metal]	0.01	0.01	--	--	10	--
Sodium carbonate[base]	--	--	--	--	--	--
Sodium hydroxide[base]	2	2	--	2 [†]	10	--
Sulfuric acid[H ₂ SO ₄]	1	1	15 [†]	--	15	--
Tetrachloroethylene[PERC]	25	25 [†]	100	150[cap]	150	--
Toluene	100	100 [†]	150 [†]	300	500	1,100-7,100
Trichloroethylene	50	50 [†]	200 [†]	200	1,000	8,000-10,500*
Vinyl chloride	1	1	--	5[15-min]	--	3,600-33,000
Xylene	100	100 [†]	150 [†]	--	900	1,100-7,000
Zinc[metal]	--	--	--	--	--	--

NOTES:

[†] - More protective OSHA PELs vacated by the 11th Circuit Court of Appeals in July 1992; however, OSHA can enforce under the General Duty Clause. PPM will adhere to these exposure limits to ensure worker health and wellbeing is maintained.

Diesel, dusts, heavy metals, bases/alkalis, Trap & Treat BOS-200, and PCBs are all measured as mg/m³ – not ppm!

Asbestos is measured as number of fibers per unit air (f/cc); Portland cement is measured as million parts per cubic feet (mppcf).

Action limit and PEL are time-weighted averages over 8-hour work period. STEL is TWA over 4 15-min periods, with the exception of asbestos, which has a 30-minute excursion limit. Others are instantaneous readings.

PAHs - coal tar pitch volatile components of TPH-D include anthracene, benzo(a)pyrene, chrysene, phenanthrene and pyrene, all of which have the same permissible exposure and IDLH limits; therefore, all components lumped into one group. The only other regulated component of PAH is naphthalene which is a component of crude or refined oil and is listed separately from other PAHs.

Only the regulated pesticide components of EPA SWA-846 Methods 8080/8081 are included above.

Perchloroethylene (PCE) has a ceiling limit of 200 ppm for 5 minutes within any 3-hr period not to exceed 300 ppm but this has been capped at 150 ppm to match IDLH concentrations for this material. Trichloroethylene's flammability range is effective ≥77°F.

Flammability ranges (LEL-UEL) are set at 10%.

Any constituent not otherwise specified above that is anticipated as part of company-related processes in which workers have the potential to be exposed must be immediately reported to the safety department and will require a site-specific HASP. This HASP will be generated and issued by the safety department and requires a 1-week advanced notice.

4.4 MONITORING EQUIPMENT AND CALIBRATION

Because PPM works with a variety of chemicals, not all constituents can be detected with one universal monitoring device. Some monitoring equipment can provide instantaneous readings, while others require laboratory analysis (wet method analysis). In addition, each monitoring device has its advantages and disadvantages. Some commonly used monitoring devices used by PPM include the following:

- **Organic vapor analyzers (OVA).** This monitoring device is used to detect volatile and semi-volatile substances. Some OVAs used by the company include MiniRAE 2000 PGM 7600, GasTech®, RKI Eagle® photoionization detector (PID), and Micro FID® flame ionization detector (FID). The advantage of this monitoring device is that it is a direct-read instrument and provides instantaneous readings. Some disadvantages of this equipment are that it generally does not provide readings less than 1 ppm, it does not give percent LEL or provide oxygen content. OVAs generally detect a group of chemicals and do not indicate which compound is being detected.
- **Ozone meters.** This monitoring device is used to detect ozone gas and is also a direct-read instrument. The ozone meter used by some offices within the company is the EcoSensor Ozone Sensor A-21ZX. It is chemical-specific but has some interference from other oxidizing gases.
- **PortaSens II gas detector.** The monitoring device is a portable, direct-read gas leak detector that has the ability to measure a variety of different gases by simply inserting a gas-specific sensor. This instrument is lightweight and can measure gases such as acetylene, ammonia, carbon monoxide, fluorine, formaldehyde, hydrogen, hydrogen chloride, hydrogen cyanide, hydrogen peroxide, hydrogen sulfide, oxygen, ozone, phosgene, and sulfur dioxide. For a composite list of gases, refer to the manufacturer's website.
- **Portable air monitoring pumps.** These monitoring devices are used to assess continuous personnel and background exposures and are commonly used for sampling heavy metals, asbestos, silica or nuisance/respirable dusts. A common portable air monitoring pump used by the company is the SKC AirChek52®. Pumps are set to a specific flow rate of air (can be low volume or high volume) and contaminants are captured using a filter, which is later sent for laboratory analysis. Some advantages of this monitoring equipment are that these pumps are small, light-weight and portable. Some disadvantages of this monitoring equipment are that they do not provide instantaneous readings; exposures are unknown until laboratory results are received.
- **Personal monitoring badges.** These monitoring devices are used to assess continuous personnel exposures. They are light-weight, easy to use and can target specific constituents as opposed to a group of compounds. Badges must be sent to lab for analysis so they do not provide instantaneous readings. In addition, other constituents with similar chemical make-up can cause interference giving inaccurate exposures so samplers must be able to identify potential cross-interference prior to sampling.
- **Colorimetric indicator tubes.** These monitoring devices are used to assess continuous personnel exposures. Passive diffusion tubes are used when determining longer term exposures and workers need only break off the tip of the tube to initiate sampling. Pumps can also be used to draw in air and generally give a short-term exposure assessment during the period of time the air is extracted. Tubes are contaminant-specific and change color when in contact with the constituent giving an instantaneous reading.

Colorimetric tubes have a $\pm 25\%$ degree of error and chemicals with similar make-up can cause interference giving inaccurate exposures so samplers must be able to identify potential cross-interference prior to sampling.

To ensure it is in good working order, air monitoring equipment must be calibrated in accordance with manufacturer recommendations for each monitoring device. Workers must be aware that each office utilizes different monitoring equipment; therefore, readings from instruments calibrated with methane may not be the same as readings from instruments calibrated with hexane. Be sure to use the instrument's conversion tables as provided by the manufacturer when warranted. In addition, some metals can produce toxic gases when burned or exposed to open flames; therefore, the safety data sheet should be referenced when working with metal-contaminated soils.

4.5 SAMPLE COLLECTION

To appropriately determine exposures, samples must be collected within the breathing zone (shoulder level) of the worker, subcontractor or other affected pedestrian when relevant to site concentrations and location of these concentrations in relation to the general public. It should be noted that there may be times in which samples must be collected at the source (i.e., inside manhole) for technical purposes. These concentrations must be identified and reported as separate readings not indicative of worker exposures. Additional precautions must be taken to prevent impact to worker breathing zone during the sample collection when at or near the contaminant source. Depending on the concentrations in this given area or when impact to worker breathing zone cannot otherwise be avoided, respiratory protection may be required.

4.6 MONITORING FREQUENCY AND DOCUMENTATION

Ambient air monitoring is required prior to field work to establish a baseline and intermittently throughout the course of a project to compensate for changes in site conditions. Samples must be collected every two hours so long as concentrations are well below established action limits. Areas selected for monitoring must compensate for worker/subcontractor exposures, general public exposures, residential areas, potential nearby business exposures, etc. and may warrant numerous collection locations.

When there is a noted increase in ambient site concentrations, the sampling frequency must be increased to every 30 minutes until site conditions indicate a decreasing trend. If site concentrations are elevating at a rapid pace, continuous air monitoring must be conducted to ensure no threshold limits are triggered. This may require temporary postponement of site activities until concentrations can be reduced to an acceptable limit. Whenever any threshold limit is triggered, site activities must be halted and the safety department notified.

All monitoring areas, concentrations, sample collection times and/or notations (i.e., change in site conditions, contaminant source readings, etc.) must be documented using the company's Ambient Air Monitoring Report form. Forms must be completed fully and returned to the safety department for review upon completion of the project.

5.0 PERSONAL PROTECTIVE EQUIPMENT

5.1 PROJECT-SPECIFIC PPE REQUIREMENTS

Depending on the degree of the hazard(s) posed by field tasks, various levels of protective clothing and equipment may be required. Protective clothing and/or equipment required by routine tasks covered by this HASP are outlined further in the table below. Protective clothing and/or equipment not otherwise covered by this plan will require a site-specific HASP. Contact the HSD for further instructions.

Field Task	Protective Clothing/Equipment										
	Steel-Toed Shoes ¹	Safety Glasses ²	High Visibility Shirt/Vest ³	Gloves ⁴	Hearing Protector ⁵	Hard Hat (Class E) ⁶	Goggles/Face Shield ⁷	Respirator (APR) ⁸	Harness/Lanyard	Flotation Devices/Buoys ⁹	Fire Retardant Clothing ¹⁰
Activated carbon replacement	X		X	X	X	X	X	X	X		
Asbestos inspections or sampling	X	X	X	X				X			
Chemical injection	X	X	X	X	X	X					
▪ Working with dry powder	X		X	X	X	X	X	X			
▪ Working with liquid/mixing w/H ₂ O	X		X	X	X	X	X				
Compliance audits/visual inspections[Phase 1]	X	X	X								
DPT - drilling, geoprobing[Hand Auger]	X	X	X	X							
DPT - drilling, geoprobing[Heavy Equipment]	X	X	X	X	X	X					
Groundwater sampling	X	X	X	X							
Mobile vacuum event	X	X	X	X	X						
Mobile ozone	X	X	X	X	X						
Monitoring well plugging and abandonment	X	X	X	X	X	X					
Operation and maintenance of system	X	X	X	X	X						
Remediation system install/demobilization	X	X	X	X	X	X					
Spill bucket replacement/closure	X	X	X	X	X	X					
Trenching and excavating	X	X	X	X	X	X					
UST pull/closure	X	X	X	X	X	X					
Any work over or near water body		X		X			X			X	
Any work performed at oil and gas facility, terminals, or other similar property	X	X		X	X	X					X

1 – Steel-toed boots/shoes or equivalent ANSI-approved composite-toe footwear; rubber boots may be used when working within a boat or near a water body
2 – Safety glasses must be ANSI-approved and equipped with side-shield protection; prescription lenses are permitted if equipped with side-shield protection
3 – DOT Class II or III high visibility clothing or safety vests with exposure to traffic and/or mobile equipment
4 – Nitrile gloves for petroleum contamination; Kevlar®/leather gloves for cutting hazards; other chemical-resistant gloves needed for more stringent chemical hazards
5 – Ear plugs, canal caps or ear muffs when noise levels ≥85 dB
6 – Class E hard hats required for protection against electrical hazards
7 – Safety glasses must be upgraded to goggles or face shield when working with/mixing powders or when working with liquids that present splash hazard
8 – Air-purifying respirator (half-mask or full-face) required for all asbestos sample collections and when chemical threshold limits are triggered and control measures are ineffective
9 – Personal flotation devices (life jacket) must be U.S. Coast Guard-approved.
10 – Fire-retardant clothing is a client-specific requirement; clients within the oil/gas industry generally require fire-retardant clothing

5.2 REDUCTION OF PROTECTIVE CLOTHING AND EQUIPMENT

The use of protective clothing and equipment is mandatory at all times during the course of a project except when inside a designated break area. A break area will be assigned by the Site Safety Officer during the pre-entry safety briefing. The break area must be:

- Located a minimum of 50 feet away from the work zone
- Located where ambient concentrations are not > chemical detection limit
- Located out of the way of vehicular traffic and must not hinder any functions of other businesses

The break area must be clearly designated by posting cones, barricades, or caution tape. Affected personnel and subcontractors must be informed of the break area during the pre-work safety briefing. Only when inside the break area may protective clothing and/or equipment be

removed. If the conditions noted above cannot be met, the safety department must be contacted. Variances may be granted based on certain site conditions.

5.3 OTHER PROTECTIVE AIDS

Protective equipment can be used in a number of ways to draw attention to the worker or work area, to isolate the work area from unauthorized persons and/or traffic, or to identify the hazard(s) posed by the activity. Common examples of protective equipment used by PPM include, but are not limited to the following:

- Signs, posters, labels
- Cones, barricades, caution tape
- Heavy equipment/machinery or company vehicles
- Steel plate covers or wood for monitoring wells and/or holes
- First aid kit
- Flashing lights
- Flag extensions on cones for greater visibility
- Portable 10 or 20-lb ABC fire extinguishers
- Lockout/tagout devices
- Handheld eyewash bottles

6.0 SITE ACCESS, CONTROL, AND DECONTAMINATION

6.1 SITE ACCESS

Typical PPM jobsites occur in areas open and accessible to the general public. However, when working at unguarded gated facilities, workers must secure appropriate means of site access from the client. This can include a coordinated effort to meet the client at a designated date and time, or acquiring keys to the facility from the client. *Note: Personnel and/or subcontractors are prohibited from climbing over or crawling beneath site fencing to secure site access.*

6.2 DESIGNATED WORK ZONES

6.2.1 Non-Emergency Response Sites

Most offsite activities occur at jobsites either open to the public (i.e., retail gasoline stations) or controlled access to private facilities. In either case, routine business practices, especially those involved in the remediation process, occur after releases have been controlled. Under these conditions, the immediate work area will be defined using caution tape, cones, barricades, vehicles, equipment, or other similar means in order to prevent unauthorized entry of others into the work zone; create a barrier between hazards associated with the task(s) and the public, and eliminate the migration of potentially hazardous substances into clean areas of the property.

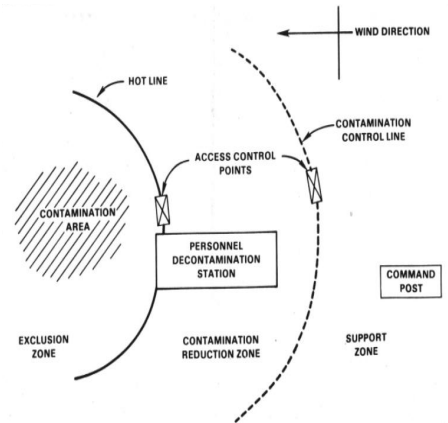
6.2.2 Emergency Response Sites

On occasion, PPM may be required to respond to an active chemical release. Jobsites with the following conditions meet OSHA's definition for a hazardous waste site:

- Uncontrolled releases of hazardous substances;
- Cleanup of RCRA sites;
- Hazardous waste operations at treatment, storage and disposal (TSD) facilities; and
- Emergency response operations for release, or potential threat of release, of hazardous substances.

Work performed at any jobsite that meets the definition of a hazardous waste site requires designated work areas to isolate hazardous work areas from unprotected persons, to prevent the migration of contamination, and to prevent the transfer of contamination through impacted protective clothing as well as monitoring and sampling equipment. Designated work areas include the following:

- Exclusion zone – the area denoting site contamination where heavy equipment operation and sample collection is likely to occur
- Contamination reduction zone – the area surrounding the exclusion zone where clothing and equipment is decontaminated to prevent the transfer of contaminants
- Support zone – any area not otherwise considered the exclusion or contamination reduction zone



6.3 AUTHORIZED PERSONNEL

Only authorized personnel are permitted within the work zone (non-emergency response) and/or exclusion or decontamination reduction zones (emergency response). An authorized person is considered to be any individual who has a relevant role or function in relation to the project, participates in onsite safety briefings, and signs the HASP acknowledgement form. Facility managers, client, agency representatives, and law enforcement or regulatory officials may refuse to participate in planned safety meetings or HASP review. As this situation arises, all equipment and job tasks should be temporarily halted to allow for onsite inspection and monitoring by these individuals. When unauthorized persons exit the defined work zone(s), all site activities may resume.

6.4 STOP-WORK AUTHORITY

The SSO has full stop-work authority and should use this authority under the following conditions:

- When a hazardous condition, unsafe behavior or other safety concern is noted
- When a near-miss or incident is reported
- When an unauthorized individual enters the designated work zone
- When lightning or other signs of inclement weather is noted within the area
- When a contaminant action limit is triggered
- When unexpected conditions arise that could warrant changes to safety procedures and/or scope of work

6.5 GENERAL SITE CONTROL AND SAFETY PRECAUTIONS

The following denotes simple procedures for maintaining site control and worker safety:

- Designated parking and pedestrian walkways in areas a reasonable distance away from active investigation
- Use buddy system whenever feasible
- Perform pre-job inspection to establish appropriate baselines and to visually inspect for obstacles, clearances, etc.
- Avoid smoking on the jobsite unless within authorized areas (i.e., break areas when deemed appropriate by the SSO for smoking)
- Use appropriate safety devices (i.e., cones, barricades, etc.) to clearly identify work zones and break areas
- Prevent unauthorized entry and use stop-work authority as necessary

- Perform post-job inspection to ensure all materials have been removed from the site; pay close attention to the vehicles to ensure animals or person(s) are not located beneath the vehicle and that all cab and toolbox doors have been secured

6.6 DECONTAMINATION PROCEDURES

In order to prevent the spread of contamination from impacted work zones, monitoring equipment, sampling equipment, and/or workers, decontamination must take place. Decontamination is defined as the removal or reduction of contaminants. Decontamination procedures vary based on the degree of site contamination as well as the contaminant(s) involved, and this process must take place within the contamination reduction zone. As impacted workers and equipment exit the exclusion zone, they must be decontaminated using appropriate detergent solutions. Disposal protective clothing must be discarded in garbage bags or lined containers for proper disposal.

Typical company functions require a low level of decontamination which involves the cleaning of bailers, purge materials and/or other similar equipment as samples are collected in various areas of a jobsite. Most chemicals in which workers are exposed are classified as skin and eye irritants; therefore, it is important for workers to remove contaminated clothing as soon as possible, flush eyes for a minimum of 20 minutes and usealconox®/liquinox® solution to wash impacted skin.

7.0 EMERGENCY RESPONSE

7.1 ALARMS AND ONSITE NOTIFICATIONS

To compensate for unexpected conditions and/or changes in existing site conditions, each jobsite must have an effective communication system in place. Workers are notified of emergencies through various forms of effective communication consisting of the following:

- Verbal communication – is generally the most effective form of communication for the majority of all job-related tasks associated with a project
- Hand communication – hand signals are used in place of verbal communication under the following conditions:
 - When noise levels become elevated due to heavy equipment operation or other similar measures that prevent workers from hearing verbal communications
 - When equipment operator’s line of vision is obstructed
 - Under any situation deemed necessary by the SSO
- Continuous horn blast of vehicle or air horn – used in lieu of verbal and hand communications due to:
 - Large, dispersed work zones or multiple work areas that prevent overall effectiveness of other forms of communication
 - Multiple site distractions that inhibit immediate worker attention
 - Elevated noise levels that inhibit immediate worker attention

One continuous blast is to be used so as not to confuse workers with other equipment sounds.

7.2 PERSONNEL ASSESSMENT AND EVACUATION

Once an alarm has been triggered, workers must be evacuate the work zone and meet in the designated area assigned during the pre-entry safety briefing. This location is determined by the SSO based on distance from existing hazards and verification that it is upwind of any chemical hazard source. Site evacuation is warranted under the following conditions:

- When ambient air concentrations meet or exceed an established action limit assigned for a constituent
- When new hazards not otherwise addressed within this safety plan are encountered
- When subcontractor, field personnel, clients, or regulatory officials violate the safety provisions outlined within this plan
- Upon client or regulatory agency request
- Under any condition the SSO deems unsafe

When evacuation is warranted, all field personnel and subcontractors will meet at the designated area for a preliminary head count, which is conducted by the SSO. Further provisions will be discussed at that time.

7.3 INCIDENT, NEAR-MISS, AND HAZARD RECOGNITION REPORTING

Incidents, near-misses or other noted hazards must be reported promptly to the safety department so that each case can be further investigated to determine the root-cause of the event in order to prevent future recurrences. An incident is defined as an occurrence that results in worker injury or property damage. Examples of an incident include, but are not limited to, the following:

- Underground storage tank (UST) puncture
- Auto-related accident regardless of fault
- Contact with overhead or subsurface utilities (i.e., water, sewer, telephone, fiber optic, power, transfer product lines, etc.)
- Chemical spill or release
- Slips, trips, or falls

A near miss is defined as an unplanned event that did not result in injury, illness or damage but had the potential to do so. Unexpected hazards may arise from unsafe acts or conditions or changes in site conditions. Incidents, near-misses and hazards must be reported to the safety department immediately once the site has been secured. The site is considered secured once all leaks have been properly contained, and the area has been evacuated and further isolated to prevent unauthorized entry. All reports must be made to the District Manager or can be made to the safety department directly. In addition, all reports must be documented using the Incident, Near-Miss and Hazard Recognition Report.

7.4 INJURY REPORTING AND CASE MANAGEMENT

Any incident that results in injury must be reported immediately to the HSD. Reported injuries or illnesses that warrant medical care must be managed by the safety department. In order to achieve this, all cases are evaluated for medical necessity. Whenever possible, workers are sent to the company's pre-established occupational medicine clinics that specialize in work-related injury care. Workers are permitted to seek medical attention (911) without prior company consent only when the injury appears to be life-threatening or when the injury requires immediate medical attention and contact with designated company officials cannot be achieved.

Workers who seek medical attention without company consent will be required to pay for their own medical care out-of-pocket. This provision also applies to follow up care when an injury/illness does not get better. Workers must additionally report changes in medical condition to the HSD, and additional medical evaluations must be coordinated by the company.

7.5 GENERAL MEDICAL CARE AND FIRST AID

It is company policy that all field workers be trained in adult CPR and first aid. Workers who have received this level of training should be prepared to administer care for minor injuries. Certified workers may additionally be called upon to provide care to more seriously injured persons while waiting for additional medical attention. If the victim is conscious, workers must indicate that they are certified and they must additionally obtain consent prior to administering care. Consent is implied when the victim is unconscious.

Some general emergency care provisions are outlined below (not all-inclusive):

Hazard Category	Hazard	Response
Chemical	Inhalation	Move worker to fresh air. If vomiting, dizzy or groggy, seek medical attention immediately. Administer CPR if certified.
	Dermal/Contact	Remove contaminated clothing and flush affected area with soap/water for ~20 minutes. Seek medical care if pain persists.
	Ingestion	Seek immediate medical attention. Do not give fluids to an unconscious person. Do not induce vomiting.
	Eye	Flush with copious amounts of water for ~20 minutes. Seek medical attention if pain persists.
Physical	Heat stress	Apply warm, damp heat and pressure to reduce pain in legs/abdomen. Give electrolyte drinks by mouth, if conscious. Remove excess clothing and attempt to cool core body temperature promptly using cold water. Medical attention is warranted for extreme heat stress.
	Cold stress	Remove any wet clothing immediately and bundle in extra clothing and/or blankets. Drink warm fluids, if conscious. Attempt to warm core body temperature using heater or other methods. Medical attention is warranted for extreme cold stress.
	Sprain/strain	Use combination heat/cold therapies to reduce swelling and apply pain relief. Take an over-the-counter naproxen sodium (Aleve) or ibuprofen (Advil) for pain and inflammation. Seek medical attention if pain persists for more than a few days.
	Tingling/numbness	Generally an indication of swelling but can lead to permanent nerve damage. Take an over-the-counter naproxen sodium (Aleve) or ibuprofen (Advil) for pain and inflammation. Seek medical attention if symptoms persist.
	Cuts/lacerations	Apply pressure to wound for blood to clot and use bandages to cover wound. Antibiotic creams can prevent infection. Seek medical attention for deep cuts that require stitches.
	ringing in ears	Symptom of hearing loss, which will require medical testing to determine if this is a temporary or permanent hearing loss.
Biological	Needle stick	Immediately remove needle. Squeeze the area to extract blood from the wound. Seek immediate medical care and carry the needle with you to the medical clinic.
	Insect/spider/tick/animal bite	Immediately remove insect or tick and pay close attention over the next few days for symptoms of delayed illness. Seek medical attention if noted. Seek medical attention for black/brown widow and brown recluse spider bites as well as animal bites.
	Poison plants	Pay attention for evidence of allergic reaction (itching, redness and irritation) and seek medical attention if over-the-counter remedies prove ineffective or if affected area spreads.

Hazard Category	Hazard	Response
Biological	Infectious Illness [COVID-19]	If potential COVID-related symptoms present while onsite, isolate yourself from other workers and maintain distances in much greater excess than 6 feet. Inform workers onsite (call them if necessary) to inform them of your current condition. Report your symptoms to management immediately. Minimize the amount of contact you have with commonly shared materials such as the vehicle, field paperwork, tools, etc. Self-quarantine until tested negative or upon management permission to return to work as based on CDC recommendations for symptoms approach.

Caution: Individuals with heart problems, on a "low sodium" diet, or who otherwise have blood pressure issues and work in hot environments should consult a physician for proper alternative care when working under these conditions.

7.6 HAZARDOUS SUBSTANCE RELEASE

In the event that hazardous substances migrate from the work zone and potentially endanger unprotected personnel or the community, the area will be isolated and the spill contained and cleaned by authorized personnel. On-site activities will cease until the release is brought under control and the site is returned to its previous condition or otherwise poses no additional harm to site personnel. All hazardous materials must be containerized and labeled until it can be profiled and disposed in accordance with regulatory requirements at an approved landfill. Workers should reference the SDS for additional information.

7.7 REGULATORY, CLIENT, OR OTHER AGENCY NOTIFICATIONS

In the event of an emergency, all reporting must be made to your direct project or office manager and/or safety department. Other required client, regulatory or other agency notifications will be made by management within appropriate reporting deadlines.

8.0 WASTE MANAGEMENT

Under normal conditions associated with the remediation process, groundwater monitoring wells are purged of impacted groundwater and as part of the investigation process, impacted soils are stored within containers until these wastes can be profiled and disposed at an approved landfill. Other chemicals may be ordered for maintenance or to otherwise facilitate the remediation process. It is the company's objective to ensure all containers are in good condition and labeled appropriately so as to prevent any release of contaminated materials from these containers until it can be appropriately disposed.

8.1 CONTAINER LABELING

All containers used by the company must be appropriately labeled – even when a waste is in accumulation or a material is still in use. Containers are defined by the company as any bucket, bottle, barrel, drum, jar, tote, can, box, crate, tank, or other similar means used to contain, store, and/or transport materials. Containers may be movable or stationary and can vary in weight and dimension; however, common containers used by the company include drums, totes, buckets, soil bags or super sacks.

8.1.1 Hazardous Material/Waste Labeling

Any hazardous material or waste container(s) must be labeled in accordance with 29 CFR 1910.1200 using a globally harmonized system (GHS) for chemical classification and labeling. Tags using the same GHS-format should be used for soil bags and super sacks. Each label must contain six required elements, which include the following:

- Product identifier – should match the product name on the safety data sheet
- Signal word – “danger” (severe) or “warning” (less severe)
- Hazard statements – phrase assigned to a hazard class used to describe the nature of the product’s hazards
- Precautionary statements – a measure to minimize or prevent adverse effects that results from exposure
- Supplier identification – name, address, and telephone number of the supplier or manufacturer*
- Pictograms – graphical symbols used to convey specific hazard information visually

**PETROLEUM-IMPACTED
GROUNDWATER [Gasoline]**

UN No. 1203
CAS No. 86290-81-5

DANGER

Extremely flammable liquid and vapor. Causes skin irritation. May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. May cause drowsiness or dizziness. May cause damage to organs (blood, liver, kidney) through prolonged or repeated exposure. May be fatal if swallowed and enters airways. Toxic to aquatic life with long lasting effects.



See SDS for further information.

Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep container(s) tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe gas/fumes/vapors/spray. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye and face protection. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Seek medical attention as warranted. If inhaled, remove person to fresh air and keep comfortable for breathing. If swallowed, immediately call poison control doctor. Do NOT induce vomiting. If on skin or hair, take off immediately all contaminated clothing. Rinse skin with water/shower. If skin irritation occurs, seek medical attention. In case of fire, use alcohol-resistant foam, carbon dioxide, dry powder or water fog for extinction. Collect spillage. Store in well-ventilated, cool place and keep container tightly closed.

This material collected as part of remediation. For emergencies, contact:
PPM Consultants, Inc. | 1600 Lamy Lane, Monroe, LA 71201 | 800-945-4834

**Note: Hazardous materials ordered by PPM must have the manufacturer or supplier information posted on the containers; however, materials generated as part of the remediation process must identify PPM as the emergency contact.*

8.1.2 Nonhazardous Material/Waste Labeling

Containers of nonhazardous materials and/or wastes must also be labeled. They will be labeled using the same labeling system as addressed within the previous section; however, workers should expect these labels to be less detailed since these materials are not likely to pose hazards. Continued use of this labeling system will permit workers to identify the contents of any container used by the company.

Once materials have been deemed as a waste, then non-hazardous waste labels must additionally be affixed to the container(s) so long as the material is truly considered to be a nonhazardous substance. Verbiage for this label template has been modified to meet the needs of the company, and workers are required to complete the label in accordance with the following requirements:

NON-HAZARDOUS WASTE

GENERATOR INFORMATION (Optional)

SHIPPER _____

ADDRESS _____

CITY, STATE, ZIP _____

CONTENTS _____

NON-HAZARDOUS WASTE

- Generator – PPM must never be identified as the generator; wastes are generated on behalf of the client and therefore, must have the client’s name.
- Contact – PPM will be considered the contact; this will enable clients with multiple subcontractors to identify which of their contractors is generating the waste.
- Phone – Provide PPM’s phone number in case of emergency (800-945-4834).
- Contents – Identify the material being stored within the container.
- Start date – Indicate the date that the material is first placed inside the container; if the container will be accumulating, worker must still provide a date and must also indicate that it is in accumulation.

8.2 CONTAINER STORAGE AND DISPOSAL

In accordance with company policy, all wastes must be stored within fenced remediation systems, behind buildings or in other inconspicuous areas so as not to be disturbed by unauthorized individuals. Wastes must also be profiled and disposed within 90 days of task completion. Drums that are in accumulation may reside onsite for a period no greater than 365

days. Materials in accumulation must be profiled and disposed at least once per calendar year to ensure container integrity. Variances to this policy must be approved by the District Manager or safety department in advance.

8.3 CONTAINER INSPECTIONS

Containers stored at sites with a remediation system undergo routine visual inspections. Inspections occur on a quarterly basis to ensure that container integrity is maintained and that there is no evidence of leakage, excessive rusting, bulging or other forms of container damage that could result in a release. Inspections are documented and retained by the safety department. Evidence of container damage is promptly addressed.

9.0 PERSONNEL/CONTRACTOR SAFETY REVIEW

This HASP and any corresponding JSA(s) must be outlined during a safety briefing that is to be held by the SSO. This safety briefing shall occur prior to the start of the project and consists of an entire review of all relevant sections of this safety plan as it relates to all phases of the project. Affected company personnel, subcontractors, clients, and/or regulators assigned to the project must participate in the safety briefing to gain access to the work zone. Changes or additions in site personnel will require an additional safety briefing be conducted with all affected person(s) to permit site access. Participants of the safety briefing will be required to sign a form to acknowledge they have received safety instructions and agree to abide by the provisions outlined within the HASP and JSA.

Additional tailgate meetings shall occur on a daily basis prior to the initiation of work activities. All authorized persons must attend the tailgate meeting held by the SSO to discuss the safety provisions affected by the task(s) to be performed for that day. Each participant will be required to sign the tailgate meeting log to acknowledge they have received safety instructions and agree to abide by those provisions reviewed during the tailgate meeting. ***No one should be permitted to participate in the tailgate meetings until a complete review of the HASP and corresponding JSA(s) has been completed!***

10.0 CONTRACTOR RESPONSIBILITY AND SUPERVISION

Subcontractors must abide by all safety procedures outlined within this plan, or they will be required to leave the premises until these procedures are implemented. Subcontractors will be permitted to operate under a separate safety plan as long as it meets the minimum requirements established by this HASP, has been reviewed and approved by the HSD in advance of the project's start date, and does not otherwise conflict with the provisions of this HASP.

Subcontractors may not initiate work without the authorization of PPM, and all subcontracted work must be performed under the supervision of a PPM representative. Managers and field workers must coordinate schedules with the subcontractor(s) in advance of the project. All field processes must be shut down when a PPM representative leaves the jobsite unless otherwise approved by the District Manager; however, notations must be made within the HASP when this exception is granted.

Subcontractors must provide advanced notification when bringing additional chemicals not otherwise covered by this safety plan onto the jobsite. A safety data sheet must be provided to the HSD for review/approval before any chemical will be permitted onsite. If approved, any additional hazards, preventive measures, and emergency response procedures associated with the introduction of these substances must be incorporated into this HASP prior to the start of the project.

11.0 CONFINED SPACE

Confined space is defined by OSHA as any space that is “large enough and so configured that an employee can bodily enter and perform assigned work, has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy.” In accordance with this definition, PPM will not be conducting any field-related task that can be defined as confined space entry. PPM personnel have not been adequately trained for confined space entry; therefore, in the event site conditions warrant this type of work, a qualified contractor will be hired for this task.

12.0 LIST OF ABBREVIATIONS

ACM	asbestos-containing material	MTBE	methyl-tertiary butyl ether
ANSI	American National Standards Institute	NCHRP	National Cooperative Highway Research Program
BGS	below ground surface	NIOSH	National Institute for Occupational Safety and Health
BTEX	benzene, toluene, ethylbenzene, and xylene	NOAA	National Oceanic and Atmospheric Administration
CFR	Code of Federal Regulations	O ₂ /O ₃	oxygen/ozone
CHMM	Certified Hazardous Materials Manager	ORC	oxygen release compound
CO/CO ₂	carbon monoxide/dioxide	OSHA	Occupational Safety and Health Administration
CSP	Certified Safety Professional	OVA	organic vapor analyzer
dB	decibel	PACM	presumed asbestos-containing material
DEET	N,N-diethyl-meta-toluamide	PAH	polycyclic aromatic hydrocarbon
DOT	Department of Transportation	PCB	polychlorinated biphenyl
fc	foot-candle	P.E.	Professional Engineer
FID	flame ionization detector	PEL	permissible exposure limit
GFCI	ground fault circuit interrupter	P.G.	Professional Geologist
GHS	Globally Harmonized System of Chemical Classification and Labeling	PIC	Principal-in-Charge
GVWR	gross vehicle weight rating	PID	photo-ionization detector
HASP	health and safety plan	PPM	PPM Consultants, Inc.
HEPA	high efficiency particulate air	ppm	parts per million
HIV	human immunodeficiency virus	SDS	safety data sheet
HMIS	hazardous materials information system	SS	Safety Supervisor
HSD	Health and Safety Director	SSO	Site Safety Officer
HSSE	health, safety, security and environmental	STEL	short-term exposure limit
IDLH	immediately dangerous to life and/or health	SVOC	semi-volatile organic compound
JSA	job safety analysis	TPH	total petroleum hydrocarbon
kV	kilo volt	TLV	threshold limit value
LEL	lower explosive limit	TWA	time-weighted average
LFL	lower flammability limit	UEL	upper explosive limit
		UFL	upper flammability limit
		VOC	volatile organic compound
		UST	underground storage tank

**SAFETY DATA SHEETS
AND
FIELD FORMS**

Note: Safety data sheets and field forms are separate documents that can also be found on the PPM Server via the ipad. Locate the appropriate forms as dictated by the task and/or the Safety Supervisor, complete and return to the Safety Department for recordkeeping.