March 11, 2022

Mr. Joe Pearson
Alabama Department of Environmental Management
UST Corrective Action Section - Groundwater Branch
1400 Coliseum Boulevard
Montgomery, Alabama 36110

**Re: Corrective Action Plan**
**(Cost Proposal No. 10)**
**Quick Shop No. 98**
**Highway 5**
**Brent, Alabama**
**Facility I.D. No. 20411-105-003683**
**Incident No. UST19-05-03**
**PPM Project No. 40101501-CAPD**

Dear Mr. Pearson:

Enclosed please find one copy of the Corrective Action Plan prepared by PPM Consultants, Inc. for the referenced site.

If you have any questions or need additional information, please contact me at (205) 836-5650.

Sincerely,
PPM Consultants, Inc.

Derek Prince, P.G.
Senior Geologist/Project Manager

c: Mr. David Collins, DC Oil Company, Inc.

# CORRECTIVE ACTION PLAN
# (COST PROPOSAL NO. 10)

## D.C. OIL COMPANY, INC.
## QUICK SHOP NO. 98
## HIGHWAY 5
## BRENT, ALABAMA

**FACILITY I.D. NO. 20411-105-003683**
**INCIDENT NO. UST19-05-03**

**PPM PROJECT NO. 40101501-CAPD**

**MARCH 11, 2022**

PPM CONSULTANTS

**CORRECTIVE ACTION PLAN**
**(COST PROPOSAL NO. 10)**

**FOR**

**QUICK SHOP NO. 98**
**HIGHWAY 5**
**BRENT, ALABAMA**

**FACILITY I.D. NO. 20411-105-003683**
**INCIDENT NO. UST19-05-03**

**PREPARED FOR:**

**D.C. OIL COMPANY, INC.**
**P.O. BOX 380394**
**BIRMINGHAM, ALABAMA 35238**

**PPM PROJECT NO. 40101501-CAPD**

**MARCH 11, 2022**


**PREPARED BY:**

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

**REVIEWED BY:**

Michael L. Ellison

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**SENIOR ENGINEER**

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**BIRMINGHAM, ALABAMA 35210**
**(205) 836-5650**

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# CERTIFICATION PAGE

*I certify under penalty of law that this Corrective Action Plan (CAP) for the Quick Shop No. 98 facility located along Highway 5 in Brent, 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.*

Michael L. Ellison, P.E.
AL No. 23757

03/11/22
Date

# UST RELEASE FACT SHEET

GENERAL INFORMATION:

SITE NAME: Quick Shop No. 98

ADDRESS: Highway 5, Brent, Alabama

FACILITY I.D. NO.: 20411-105-003683

INCIDENT NO.: UST19-05-03

RESULTS OF EXPOSURE ASSESSMENT:

| | |
|---|---|
| How many private drinking water wells are located within 1,000 ft. of site? | 1 |
| 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? | { } Yes { X } No |
| Is there an imminent threat of contamination to any drinking water wells? | { } Yes {X } No |
| Have vapors or contaminated groundwater posed a threat to the public? | { } Yes { X } No |
| Are any underground utilities impacted or imminently threatened by the release? | { } Yes { X } No |
| Have surface waters been impacted by the release? | { } Yes { X } No |
| Is there an imminent threat of contamination to surface waters? | { } Yes { X } No |
| What is the type of surrounding population? | Commercial/Residential |

CONTAMINATION DESCRIPTION:

Type of contamination at site: {X} Gasoline, { } Diesel, { } Waste Oil { } Kerosene, { } Other __

Free product present in wells? { } Yes { X } No

| | |
|---|---|
| Maximum BTEX or PAH concentration measured in soil: | Benzene – 15.100 mg/kg (B-16-6-8)<br>BTEX – 523.350 mg/kg (SB-9-1-3)<br>MTBE – 1.300 mg/kg (B-16-2-3)<br>Naphthalene – 64.800 mg/kg (B-9-1-3) |
| Current maximum COC concentrations measured in groundwater: (September 1, 2021) | Benzene 10.1 mg/L (MW-1)<br>BTEX 67.42 mg/L (MW-5)<br>MTBE 13.2 mg/L (MW-5)<br>Naph 0.846 mg/L (MW-5) |

* - A drinking water well is located on site; however, the well is artesian and screened in a lower confined aquifer.

ADEM Form 479 8/02

# 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: Quick Shop No. 98
SITE ADDRESS: Highway 5, Brent, Alabama

FACILITY I.D. NO.: 20411-105-003683
INCIDENT NO.: UST19-05-03

OWNER NAME: D.C. Oil Company, Inc.
OWNER ADDRESS: P.O. Box 380394, Birmingham, Alabama 35238

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

| ***CLASSIFICATION*** | ***DESCRIPTION*** | ***YES*** | ***NO*** |
|---|---|---|---|
| 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. | ☐ | ☒ |
| | | | |
| A.2 | Vapor concentrations at or approaching explosive levels are present in subsurface utility system(s), but no buildings or residences are impacted. | ☐ | ☒ |
| 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. | ☐ | ☒ |
| | | | |
| B.2 | An active domestic water supply well, domestic water supply line or domestic surface water intake is impacted or immediately threatened. | ☒ | ☐ |
| | | | |
| B.3 | The release is located within a designated Wellhead Protection Area I. | ☐ | ☒ |
| 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. | ☐ | ☒ |
| | | | |
| 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. | ☐ | ☒ |
| 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. | ☐ | ☒ |
| | | | |
| D.2 | A non-potable water supply well is impacted or immediately threatened. | ☐ | ☒ |

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

| *CLASSIFICATION* | *DESCRIPTION* | *YES* | *NO* |
|---|---|---|---|
| | | | |
| 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. | ☐ | ☒ |
| 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. | ☐ | ☒ |
| 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. | ☐ | ☒ |
| | | | |
| F.2 | Groundwater is impacted and a domestic well is located within 1,000 feet of the site. | ☒ | ☐ |
| | | | |
| F.3 | Contaminated soils and/or groundwater are located within designated Wellhead Protection Areas (Areas II or III). | ☐ | ☒ |
| 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. | ☒ | ☐ |
| GLASS 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. | ☐ | ☒ |
| 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. | ☐ | ☒ |

***ADDITIONAL COMMENTS:***

One domestic water well is located on the subject property, approximately 30 feet west of the USTs. However, the well is artesian and screened in a lower confined aquifer. PPM did not observe any additional domestic wells within 1,000 feet of the site. PPM contacted the City of Brent Water Department and the Perry County Water Board and they said they did not have any wells within a mile of the site and the site is not located within their wellhead protection area.

**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: | **B.2** |
|---|---|

ADEM GROUNDWATER BRANCH
SITE CLASSIFICATION CHECKLIST
(5/8/95)

# 1.0 INTRODUCTION

PPM Consultants, Inc. (PPM) was retained by D.C. Oil Company, Inc. (D.C.) to prepare a Corrective Action Plan (CAP) to address free product and adsorbed and dissolved constituents of concern (COCs) concentrations at the Quick Shop No. 98 facility located along Highway 5 in Brent, Alabama. The purpose of this CAP is to design a remediation system that will effectively remove free product and decrease COC concentrations in soil and groundwater to below Site-Specific Corrective Action Levels (SSCALs) established for the site.

The COCs for the site include benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl-tertiary-butyl-ether (MTBE), and naphthalene. The preparation of the CAP was authorized by the Alabama Department of Environmental Management (ADEM) with their approval of Cost Proposal No. 10 via correspondence dated July 23, 2021. Corrective actions are in response to an accidental release of gasoline from the former underground storage tank (UST) system at the site.

During the September 2021 quarterly groundwater monitoring event, COC concentrations exceed the SSCALs in nine of the 19 monitoring wells at the site. PPM recommends the installation of a fixed-based dual-phase vacuum extraction (DPVE) system designed to effectively and efficiently recover free product on the groundwater surface and reduced adsorbed and dissolved COC impact in a timely manner.

This CAP provides a summary of pertinent environmental activities conducted to date at the facility as well as a detailed description of the selected approach for site remediation.

# 2.0 BACKGROUND

## 2.1 SITE LOCATION

The Quick Shop No. 98 facility is a former retail petroleum station located along Highway 5 in Brent, Alabama. The site is located in the southwest ¼ of the northeast ¼ of Section 3, Township 21 North, Range 8 East of the Heiberger, Alabama, Quadrangle. More specifically, the site is located at 32° 49’ 31" north latitude and 87° 15' 29" west longitude. The site location is shown in **Figure 1**, **Site Location Map** in **Appendix A**, **Figures**.

## 2.2 ADJACENT PROPERTIES

The property is located in a rural area west of Highway 5. Large tracts of wooded properties surround the site on all sides.

## 2.3 SITE DESCRIPTION

The topography of the site is relatively flat. Structures at the site include a vacant store building in the central eastern portion of the property; a canopy cover over an inactive gasoline dispenser island to the east of the store; and an isolated diesel dispenser located south of the store. An asphalt parking lot is located between the store and Highway 5. The remainder of the site is grass/gravel covered or wooded.

The product piping to the inactive dispensers were purged and capped during an in-place UST Closure Assessment in April 2019. The closed in-place USTs are located within a single tank pit located south of the store building. The USTs include a 2,000-gallon diesel UST; a 2,000-gallon gasoline UST; a 2,000-gallon premium gasoline UST and a 3,000-gallon gasoline UST.

There were no known subsurface utilities identified at the site. Overhead electrical lines are present at the site, generally located along the perimeter of the property. Site features and approximate utility locations are shown in **Figure 2**, **Site Map**.

## 2.4 SITE HISTORY

***UST Closure Assessment:*** Curtis Service, Inc. performed the in-place closure of one 3,000-gallon and two 2,000-gallon unleaded gasoline USTs and one 2,000-gallon diesel UST at the site on April 23, 2019 and April 25, 2019.

Total petroleum hydrocarbon (TPH) concentrations in the 13 soil samples collected from the product line trench ranged from below detection limits (BDL) to 524 milligrams per kilogram (mg/kg). The TPH concentrations reported for soil samples PL-6 (350 mg/kg), PL-7 (460 mg/kg), PL-8 (326 mg/kg), PL-9 (201 mg/kg), PL-10 (524 mg/kg), and PL-12 (378 mg/kg) were above the ADEM Corrective Action Level of 100 mg/kg.

Dissolved concentrations of BTEX, MTBE, and naphthalene were detected in groundwater samples collected from temporary monitoring wells TMW-1 through TMW-4. The dissolved benzene concentrations reported for TMW-1 through TMW-4 exceeded the

ADEM Initial Screening Level (ISL) of 0.005 milligrams per liter (mg/L) and ranged from 0.013 mg/L to 0.988 mg/L. The dissolved toluene concentrations reported for TMW-1 (11.300 mg/L) and TMW-4 (3.330 mg/L) exceeded the ISL (1.0 mg/L) and the ethylbenzene concentrations reported for TMW-1 (1.140 mg/L), TMW-2 (1.240 mg/L), and TMW-4 (0.928 mg/L) also exceeded the ISL (0.70 mg/L). The dissolved MTBE concentration reported for TMW-4 (0.049 mg/L) exceeded the ISL of 0.020 mg/L. The dissolved naphthalene concentrations reported for TMW-1 through TMW-4 exceeded the ISL of 0.020 mg/L and ranged from 0.022 mg/L to 0.434 mg/L.

***Preliminary Investigation:*** Technical Drilling Services, Inc. of Knoxville, Alabama, advanced five soil borings (SB-5 through SB-9) at the site on July 16, 2019, using 4.25-inch inside diameter (I.D.) continuous flight, hollow-stem augers. Five Type II, 2-inch I.D., groundwater monitoring wells (MW-1 through MW-5) were installed in the five soil borings to depths ranging from approximately 10.0 to 10.5 feet below top of casing (BTOC) to facilitate groundwater sampling. Due to the shallow groundwater encountered at the site, only one soil sample from each boring was submitted for laboratory analysis. Analytical results indicated that all BTEX, MTBE, and naphthalene concentrations exceeded the ADEM ISLs in borings B-5, B-8, and B-9. Analytical results from the groundwater sampling event completed on July 31, 2019, indicated that dissolved benzene and naphthalene concentrations exceeded the ISLs for each monitoring well. Dissolved toluene, ethylbenzene, and MTBE concentrations exceeded the ISLs in MW-1, MW-4, and MW-5. Additionally, the dissolved xylene concentration exceeded the ISL in MW-5.

***Secondary Investigation:*** Technical Drilling Services, Inc. of Knoxville, Alabama, advanced seven soil borings (B-10 through B-16) for the installation of Type II monitoring wells (MW-6 through MW-12) and one boring B-17 for the installation of Type III monitoring well MW-13D. COC concentrations in the soil exceeded the ISLs in borings B-14 through B-17. Dissolved COC concentrations in groundwater exceeded the ISLs in monitoring wells MW-1 through MW-5 and MW-10 through MW-12. COC concentrations in groundwater were not delineated to the north and east of the site and PPM recommended additional monitoring wells that required offsite access permission.

***Additional Well Installation:*** PPM obtained access from the Alabama Department of Transportation (ALDOT) to install three monitoring wells in the right-of-way (ROW). Technical Drilling Services, Inc. of Knoxville, Alabama, advanced six borings (B-18 through B-23) for the installation Type II monitoring wells (MW-1 through MW-19). Groundwater samples were not collected during the Additional Well Installation activities.

***Groundwater Monitoring:*** PPM completed a groundwater monitoring event at the site on December 29, 2020. Groundwater samples were collected from monitoring wells MW-1 through MW-12, MW-13D, and MW-14 through MW-19 for analysis of BTEX, MTBE, and naphthalene. Laboratory analytical results indicate dissolved COC concentrations exceeded the ISLs in nine monitoring wells.

***Alabama Risk-Based Corrective Action (ARBCA) Evaluation:*** ADEM correspondence dated July 30, 2020, requested a workplan for an ARBCA Tier I/II evaluation. PPM submitted the workplan for an ARBCA evaluation and ADEM correspondence dated September 15, 2020, approved the cost proposal.

Representative concentrations of benzene, toluene, and xylenes in soil exceed the proposed Tier II Site-Specific Target Levels (SSTLs) for indoor inhalation for on-site commercial and construction workers. Representative COC concentrations in groundwater were below the proposed Tier II SSTLs. Representative concentrations of benzene, toluene, MTBE, and naphthalene exceeded the proposed Tier II groundwater resource protection (GRP) values for soil and groundwater at the source. The representative benzene concentrations in groundwater for point of compliance (POC) wells MW-10, MW-11, and MW-12 exceed the proposed Tier II GRP values. Representative concentrations of benzene, toluene and ethylbenzene exceed the proposed Tier II stream protection (SP) values for soil and groundwater at the source. The representative benzene and toluene concentrations in groundwater at MW-11 and MW-12 exceed the proposed Tier II SP values. The Tier II SSTLs, GRP values, and SP values were used to develop the SSCALs, which were approved by ADEM in correspondence dated June 14, 2021.

***CAP Evaluation:*** ADEM approved the completion of a CAP Evaluation in correspondence dated March 1, 2021. PPM evaluated multiple remedial technologies for the site. Based on the extent of impact, the amount petroleum impact in soil and groundwater, site conditions, and geology, PPM recommended that a fix-based DPVE system be installed at the site to reduce COC impact in soil and groundwater. The CAP Evaluation was submitted to ADEM on April 8, 2021, and ADEM agreed with the recommendations in correspondence dated June 14, 2021.

### 2.4.1 Soil

Subsurface soil was identified from visual inspection encountered during installation of soil borings. Soil conditions encountered at the site generally consisted of clay or silt to a depth of approximately 6 feet to 8 feet below ground surface (BGS). Sand was generally

encountered below the clay to the boring termination depth of approximately 10 to 11 feet BGS. In boring B-15, clayey sand was encountered to a depth of approximately 6 feet BGS. Sand was encountered in boring B-16 from the surface to a depth of approximately 9 feet BGS. A clay layer was encountered at approximately 15 feet BGS in boring B-17 (Type III well). This clay layer extends to at least 33 feet BGS.

Representative cross-sections of the lithology encountered at the site are presented in **Figure 3A**, **Lithologic Cross-Section A-A'** and **Figure 3B**, **Lithologic Cross-Section B-B'**. Soil boring logs and monitoring well construction logs are provided in **Appendix B**, **Soil Boring Logs/Monitoring Well Construction Logs**.

### 2.4.2 Groundwater

The initial zone of saturation was typically observed at approximately 6 feet to 8 feet BGS in most borings. An initial saturated zone was encountered in boring B-16 at approximately 1 foot BGS.

During the September 1, 2021, groundwater sampling event, depth to groundwater measured in each Type II monitoring well ranged from 2.36 feet BTOC in MW-7 to 4.03 feet BTOC in MW-4. Based on these groundwater level measurements, the groundwater flow direction was found to be generally toward the east and the east-southeast. The hydraulic gradient between MW-8 and MW-18 was estimated at approximately 0.004 feet/foot (ft/ft). Groundwater elevation data are shown in **Table 1, Groundwater Elevation Survey Data, Appendix C, Tables**. **Figure 4, Groundwater Elevation Map (September 1, 2021)** depicts the groundwater flow direction and potentiometric surface.

### 2.4.3 COCs in Soil

Free product was not encountered in any of the soil borings installed during the investigations. Results from headspace analyses from borings where monitoring wells were installed ranged from BDL to >11,000 parts per million by volume (ppmv). The highest headspace readings (>11,000 ppmv) were measured in soil borings B-8 from 4 to 6 feet BGS, B-9 from 1 to 3 feet BGS, and boring B-16 from 2 to 3 feet and 6 to 8 feet BGS. Headspace concentrations are shown in the boring logs in **Appendix B** and **Table 2, Soil Analytical Summary**.

The highest benzene concentration was observed in boring B-16 (15.100 mg/kg). A soil sample from boring SB-9 recorded the highest naphthalene concentration (64.800 mg/kg). Both of the borings are located east and southeast of the dispenser island. COC

concentrations exceeded the SSCALs at the site in the following eight borings SB-5, SB-8, SB-9, B-14, B-15, B-16, B-17, and B-23. COC concentrations are shown on **Figure 5, COC Concentrations in Soil**.

### 2.4.4 COCs in Groundwater

The analytical results from the most recent groundwater sampling event on September 1, 2021, were compared to the approved SSCALs. Laboratory analytical results indicate dissolved COC concentrations exceeded the SSCALs in nine monitoring wells.

Groundwater analytical results are summarized in **Table 3, Groundwater Analytical Summary**. The apparent horizontal extent of dissolved COC impact is shown in the following figures:

- **Figure 6, Dissolved Benzene Isoconcentration Map (September 1, 2021)**
- **Figure 7, Dissolved MTBE Isoconcentration Map (September 1, 2021)**
- **Figure 8, Dissolved Naphthalene Isoconcentration Map (September 1, 2021)**.

## 3.0 REMEDIAL APPROACH

This CAP has been prepared to achieve the following objectives:

- Reduce adsorbed and dissolved COC concentrations to below approved SSCALs
- Accomplish site objectives in a safe, timely, and cost-effective manner.

Based on the elevated and apparent extent of COC impact, a sustained remedial effort will be necessary to achieve project objectives.

## 4.0 PROPOSED CORRECTIVE ACTION

The following provides a description of the proposed corrective action efforts for the site including associated effectiveness monitoring.

### 4.1 CORRECTIVE ACTION OVERVIEW

The first phase of corrective action will consist of operation of a DPVE system and associated effectiveness monitoring. Operation of the DPVE system is intended to reduce adsorbed COC impact in soil and dissolved COC impact in groundwater impact. In

addition, these efforts should reduce the potential for further migration of dissolved COC impact by creating groundwater drawdown within the zone of influence for the recovery wells.

The second phase of corrective action may consist of remediation by natural attenuation (RNA) monitoring and would be intended to address dissolved COC concentrations that may be at or near the SSCALs but do not warrant further DPVE system efforts.

A baseline groundwater sampling event will be conducted prior to DPVE system startup under an existing approved cost proposal for quarterly groundwater monitoring. Subsequent groundwater monitoring events will be conducted throughout corrective action activities to assess the overall effectiveness of the remedial approach and to aid in selecting the future course of actions at the site.

A description of the additional corrective actions and associated effectiveness monitoring is provided in the following sections.

## 4.2 DUAL-PHASE VACUUM EXTRACTION

### 4.2.1 Overview of DPVE

DPVE is a method of extracting vapor and liquid from the subsurface by applying high vacuum to recovery wells and trenches in the region where the COCs and free product are present. These high vacuums produce both vapor and liquid phase flow from the subsurface. The flow of air through the subsurface creates a concentration gradient that causes the volatilization of some contaminants that may be present in the vadose zone while delivering oxygen, which can increase microbial activity necessary to biodegrade other contaminants. Free product floating on the groundwater can also be removed at a higher rate in comparison to traditional pump and treat techniques.

The vacuum applied by the DPVE system to a recovery well source creates a low pressure head in the well casing, resulting in a low point in the hydraulic system increasing water flow to the well more readily. The flow of water from the subsurface results in the removal of substances dissolved or suspended in the water and can help to control or reverse the migration of dissolved COC impact. Therefore, DPVE enhances the recovery of COC in the subsurface by increasing the groundwater capture zone around the recovery well and affecting more of the vadose zone by depressing the water table.

Hydrocarbons in the liquid and vapor phase are brought to the surface where they are separated in a vapor-liquid separation vessel. The extracted liquid phase may include both water and hydrocarbons. Multiple liquid phases can be separated in secondary treatment systems. The free phase hydrocarbons are collected for off-site disposal or recycling, and the water is routed for treatment prior to discharging to a permitted location. The vapor phase can be treated by means of a thermal or catalytic oxidizer, through a carbon filter, or in some cases, discharged directly to the atmosphere depending on discharge limits established by ADEM.

Additional details on the installation and utilization of the technology at this site are presented in the following sections.

### 4.2.2 Design Considerations

A pilot test was not performed at the site for this CAP at the site. Therefore, PPM utilized past experience with similar site settings to aid in remedial system design. Fourteen recovery wells are proposed to extract fluids and vapors from the ground. In addition, two shallow recovery trenches are proposed to extract vapors from shallow soil near the former dispensers. Additional information relative to the overall number of proposed recovery wells required is provided in **Section 4.3**.

The proposed DPVE system and recovery well layout are anticipated to sufficiently recover free product, soil vapors, and impacted groundwater within the target area. The depths of the recovery wells/screened intervals should produce adequate influence across shallow and lower zones of impact.

### 4.2.3 DPVE System

PPM recommends that an oil-sealed liquid-ring vacuum pump (LRVP) with an operating capacity of at least 525 actual cubic feet per minute (acfm) at 14 inches of mercury (in Hg) be used at the site. The LRVP will be driven by a 40-hp totally enclosed fan cooled (TEFC) motor. The DPVE system will be enclosed in a seabox container.

PPM submitted quotation requests to the following two equipment manufacturers: Product Recovery Management (PRM) and MK Environmental. Based on the pricing, PPM recommends utilizing PRM Filtration for the construction of the DPVE system.

The phase separation equipment will consist of a vacuum-rated knockout pot for separation of the extracted liquids (free product and groundwater) and vapor, two pressure rated

separators on the discharge side of the LRVP, an oil/water separator (OWS), and an air stripper (AS) for groundwater treatment.

The aboveground transfer capacity of the unit is rated at 40 gallons per minute (gpm) on average in the liquid phase. Other components of the DPVE system are discussed in the following sections. Information regarding system components is provided in **Appendix D, Equipment Manufacturer's Specifications and Quotations**.

### 4.2.4 Air Treatment

Vapor emissions from the LRVP will be treated by means granular activated carbon (GAC). Two 1,000-pound GAC vessels will be acquired with the purchase of the DPVE system.

### 4.2.5 Water Treatment

Recovered fluids will be transferred from the primary air/water separator to the OWS by means of a 2.0-hp transfer pump. From the OWS, groundwater will gravity flow to the air stripper.

Once groundwater enters the air stripper, the dissolved COCs will be removed by means of an air stripper that will remove up to 99 percent of benzene, per PRM. The design flow rate is 40 gpm. Once treated, the groundwater will gravity flow into a sump located within the air stripper. When the groundwater in the sump reaches a pre-set level, a 3.0-hp transfer pump will be activated and the groundwater will be pumped through the effluent discharge line and subsequently to the planned outfall located in a ditch located approximately 140 feet west of the proposed system location. PPM will submit an application for a National Pollutant Discharge Elimination System (NPDES) permit for the DPVE system effluent upon approval of the CAP.

### 4.2.6 Electrical Components

The internal DPVE electrical equipment will meet or exceed Class I, Division 2 National Electrical Code (NEC) standards for explosion-proof apparatus. Single-phase power is available at the site; therefore, a convertor will be used to supply three-phase power to the electrical motors. Power will be provided to the system by Alabama Power.

### 4.2.7 Fail-Safe and Telemetry Components

The DPVE unit will be equipped with a telemetry system to provide prompt notification of system shut down if the system cannot restart automatically. The telemetry system is programmed to automatically contact designated personnel in the event of an alarm condition. The telemetry system provides data on the cause of shutdowns and, under certain conditions, permits restart of the DPVE system from a remote location.

The telemetry system can also be accessed for remote monitoring of major system parameters. An hour meter wired to the electrical system of the LRVP will be installed which will provide the total runtime of the system over a given time period. A cellular based communication account will be established to facilitate communication with the telemetry system.

### 4.2.8 Monitoring Components

Monitoring ports will be installed at select locations for collection of vapor extraction and water discharge data. In addition, a flow totalizer meter will be installed to monitor total volume of water discharged from the system. Site glasses will be installed to visually assess the rate of liquid extraction from the subsurface and to make necessary adjustments to enhance liquid recovery rates.

## 4.3 RECOVERY WELL CONSTRUCTION

It is recommended that DPVE be applied to the subsurface by means of 14 proposed vertical recovery wells and two horizontal recovery wells. All recovery wells will be constructed of 4-inch inside diameter (I.D.) recovery wells positioned at strategic locations where COC impact exceeds SSCALs in the soil and groundwater. COC impact is present from approximately 1 to 19 feet BGS at the site. The COC impact present in the soil near the former dispenser island is less than 4 feet BGS. Therefore, two shallow horizontal wells approximately 15 feet long will be installed in shallow trenches near the canopy at a proposed depth of approximately 4 feet BGS.

Vacuum applied to the 16 recovery points should induce air flow, and capture groundwater throughout the target area. Air and groundwater flow from each recovery well will be controlled with gate valves in the manifold to be located adjacent to the DPVE unit. Existing monitoring wells will be used to monitor site response and to serve as locations for measuring induced vacuum and groundwater drawdown once the system is operational. Should the radius of influence from these extraction points be deemed insufficient to

capture the majority of COC impact, additional extraction points may be added as needed. The placement of the proposed recovery wells is provided in **Figure 9, Proposed System Layout**.

## 4.4 REMEDIATION BY NATURAL ATTENUATION

Natural attenuation is a term applied to the natural 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 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.

If dissolved COC concentrations appear to be stable and are at or just below SSCALs, an RNA monitoring program may be implemented at the site. It is anticipated that DPVE system operation will reduce free product thickness and decrease COC concentrations over time. Once this has been accomplished, an RNA monitoring program may be necessary once site conditions indicate active remediation is no longer warranted at the site.

There are multiple secondary approaches for monitoring RNA effectiveness including estimating a first order rate of attenuation and measuring select water quality parameters. PPM will use both methods to evaluate the overall effectiveness of RNA. However, the stable and/or decreasing trends of dissolved COC concentrations will be the primary gauge of RNA effectiveness.

Select water quality parameters [pH, temperature, specific conductance, oxidation reduction potential (ORP), and dissolved oxygen, etc.] will also be monitored during the potential RNA groundwater monitoring events. In addition, select wells may be sampled for nitrate, manganese, iron, and sulfate to further assess the aerobic condition of the aquifer.

## 4.5 ANTICIPATED SITE RESPONSE

### 4.5.1 Pneumatic Response

The Environmental Protection Agency (EPA) references a minimum level of 0.1 inches of water column (in. w.c.) to be indicative of induced vacuum at a given location. Three 8-hour mobile enhanced multiphase extraction (MEME) events were conducted at the site in December 2021. During each event, induced vacuum was observed above this level at numerous monitoring well in vicinity of the recovery points. PPM anticipates a much larger radius of influence during DPVE system operation as the groundwater table is lowered over time. The proposed layout of vertical recovery wells and horizontal recovery wells should produce a sufficient radius of influence during continual system operation.

PPM proposes application of DPVE to the shallow horizontal wells once the groundwater table has been lowered by means of the vertical recovery wells. Once the two shallow recovery wells are online, pneumatic response is expected to notably increase in the area of the former dispensers.

### 4.5.2 Hydraulic Response

A groundwater recovery rate of approximately 3 gpm was noted during one of the three MEME events completed in December 2021. In addition, groundwater drawdown was consistently observed in multiple monitoring wells within proximity of the recovery wells. This included over 1-foot of drawdown in some wells.

PPM anticipates that the DPVE system, utilizing 4-inch I.D. vertical recovery wells and horizontal recovery trenches, will easily recovery of 10 gpm during the initial months of system operation. The proposed layout of the recovery points should produce a notable drawdown of the groundwater table and aid in controlling migration of dissolved COC impact.

### 4.5.3 Remediation by Natural Attenuation

The final phase of effectiveness monitoring will be initiated once active remediation efforts have ceased at the site. Anticipated site response to RNA cannot be adequately predicted at this time, as it is unknown what site conditions will be upon completion of the active remediation efforts. However, efforts will be made to obtain site remedial objectives within four years of implementing corrective action activities outlined in this CAP.

## 4.6 PERMITS

The site is located in a rural area south of the City of Brent, Alabama and no building permits are required.

A NPDES permit will be required to discharge treated groundwater from the DPVE system. The system effluent outfall will discharge to open ditch located approximately 140 feet west of the proposed DPVE system location. The drainage ditch discharges to the West End Ditch which ultimately discharges to the Alabama River. Upon CAP approval by ADEM, PPM will submit a NPDES permit application and associated fees.

### 4.6.1 Effluent Water

Operation of the DPVE system produces both liquid and vapor phase discharge. It is expected that the extraction process will vacuum-strip up to 80 percent of the COC constituents from the liquid stream. The air stripper is capable of removing up to 99 percent of COC constituents. PPM will discharge the effluent water to the permitted outfall per the parameters established by the pending NPDES permit.

### 4.6.2 Effluent Air

Upon CAP approval, the ADEM Air Division will be notified of the proposed remediation system and associated method of emissions treatment. The influent vapor concentrations will be treated with GAC. After effluent vapor concentrations remain below site-specific emission thresholds (SSETs) established by ADEM and free product is no longer present, the GAC may be removed from the discharge stream (once approved by ADEM).

## 4.7 DPVE SYSTEM INSTALLATION

### 4.7.1 General

The DPVE system will be located within a fenced enclosure once the system has been installed. The proposed location of the unit is shown on **Figure 9**.

Installation dates will be based on the approval date of this CAP by ADEM, equipment availability, and subcontractor scheduling. Initial installation activities will consist of the following:

- ADEM NPDES permit application
- ADEM air discharge notice

- Completion of a Solid Waste Profile
- Installation of recovery wells
- Installation of recovery trenches
- Installation of piping from each recovery well and recovery trench to the DPVE system location
- Completion of a comprehensive baseline sampling event (under previously approved cost proposal)
- Construction of a manifold to connect the recovery wells and trenches to the LRVP
- Mobilization of the DPVE unit and GAC vessels to the site
- Installation of required electrical power supply equipment and lines
- Connection to the local power service provided by Alabama Power
- Site survey of new recovery wells and associated trenching
- Connection of telemetry through a wireless cellular based service
- Preliminary system testing and startup
- Reporting.

### 4.7.2 Recovery Well Construction

Fourteen vertical recovery wells and two horizontal recovery wells will be utilized for groundwater remediation. The proposed recovery wells are strategically located such that remedial objectives can be obtained within a reasonable timeframe.

The borings for the proposed recovery wells will be advanced to approximately 15 feet BGS, with 4.25-inch I.D. hollow-stem augers. The borings will be reamed with 6.25-inch I.D. augers. Down-hole drilling equipment will be cleaned prior to use at each location with a high-pressure steam rinse. Rinse fluids will not be contained; however, they will be discharged to an impervious surface on-site. Soil cuttings generated during boring advancement will be placed in a roll-off container for disposal.

The vertical recovery wells will be constructed with 12-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 for each of the proposed wells from the bottom of the boring to approximately 1 foot above the screen. A bentonite seal approximately 0.5 feet thick will be constructed above the sand pack and the remaining annular space will be completed in the well vault. The top of each well screen will need to be installed at approximately 3 feet BGS due to the shallow groundwater present at the site and the shallow soil impact present in several borings.

The two horizontal recovery wells will be constructed at the corner of the canopy between the former dispenser island and the UST pit area. The total depth of each trench section containing recovery piping will be approximately 4 feet BGS. An approximate 6-inch thick sand layer will be placed at the bottom of each trench. The recovery well will be comprised of a 10-foot length of 4-inch I.D. PVC well screen emplaced in the sand pack, an elbow, and an approximate 3-foot length of vertical riser to connect to the 4-inch I.D. extraction piping. Gravel will extend from the sand layer at the base of the recovery trenches to a depth of approximately 1 foot BGS. The top of the trench will be completed with approximately 6 inches of concrete.

The site will be subsequently surveyed for horizontal and vertical control. Locations will be referenced to existing monitoring wells at the site. Typical construction details of the recovery wells are presented in **Figure 10, Details and Sections for 4-inch Recovery Wells and Piping Trench**. Typical construction details for the system manifold are presented in **Figure 11, Profile/Plan View of Manifold**.

Environmental, Inc., Complete Environmental, and Walker-Hill Environmental provided quotes for the system installation. Complete Environmental was the lowest quote for the system installation and in an estimated shorter time to complete the work. A bid comparison and the subcontractor quotes are provided in **Appendix E**, **Subcontractor Specifications and Quotations**.

### 4.7.3 Utility Connections

**Electrical**

The DPVE system will be equipped with a main control panel mounted on the system enclosure. The DPVE system will be properly wired by a local electrician for safe system operation. The certified electrical subcontractor will install a temporary power pole, weather head and meter base, a fused main disconnect, and the proper wiring to the system control panel. Electrical work will be performed in general accordance with applicable state and local codes.

**Telemetry**

Remote communication to the telemetry system will be provided by a wireless cellular service provided by PRM. The connectivity will provide remote communication through a secure log in.

**Water Effluent**

A 2-inch water effluent discharge line will be installed from the DPVE system to a drainage ditch approximately 140 feet west of the system enclosure.

### 4.7.4 Recovery Well Configuration

Fourteen recovery wells (RW-1 through RW-14), two horizontal recovery wells, and six horizontal screens in the piping trenches will be utilized for soil and groundwater remediation. Each recovery point will be strategically placed to vapors and impacted groundwater.

Wellhead specifications of the recovery wells will consist of the following:

- Installation of 24-inch by 24-inch by 24-inch deep, hinged well vaults at each of 14 recovery wells that will be utilized by the DPVE system
- Installation of a 4-inch I.D. to 2-inch I.D. expandable well seal; 2-inch I.D., Schedule (SCH) 40, T-pipe connection; 1-foot piece of 2-inch I.D., SCH 40 pipe with 2-inch fernco; 2-inch by 4-inch SCH 40 PVC fitting; and 1-inch SCH 40 PVC piping
- Installation of a 2-inch I.D., SCH 40 PVC priming tube/drop tube into each recovery well.

Recovery trenches and horizontal screens will be connected directly to the recovery piping. Construction details of the recovery wells and trenching are shown in **Figure 10**.

### 4.7.5 Recovery Piping and Trenches

Vacuum will be applied to 14 independent recovery lines consisting of 4-inch I.D. SCH 40 PVC piping and 2-inch I.D. SCH 40 PVC piping within trenches extending from the system manifold to each individual recovery well. A 2-inch PVC I.D. SCH 40 drop tube will be installed in each vertical recovery well and extended through a 4-inch by 2-inch well seal installed at the top of each recovery well casing. A 2-inch PVC tee will be connected to the top of each drop tube and connected to the recovery lines by a 4-inch by 2-inch PVC bushing. Vacuum at the wellhead will be measured with pressure gauges affixed to the 1-inch piping extending from each recovery well to the system manifold within the system fencing. The piping will be installed to a depth of approximately 18 inches. Efforts will be made to ensure that the piping does not interfere with existing

underground utilities. Six sections of 10-foot long, 2-inch I.D. PVC screen will be installed at various areas of the piping trench to recover vapors from shallow soils.

Trenches will be backfilled with crusher-run gravel and completed at the surface with approximately 6 inches of concrete. Excavated soils generated during recovery well and trench installation will be transported to either the Black Warrior Solid Waste facility in Coker, Alabama or the Perry County Landfill in Uniontown, Alabama, upon approval by ADEM.

### 4.7.6 System Manifold

The DPVE recovery line manifold will be installed on the southeast side of the DPVE system. A 4-inch brass gate valve will be installed on each recovery line to allow each recovery line to operate independently for liquid recovery optimization during system operation. A section of 4-inch I.D. clear PVC pipe will be installed on each recovery line at the manifold to verify liquid recovery at each location. The manifold configuration is shown on **Figure 11**.

### 4.7.7 System Placement and Security

A gravel base will be installed above the former UST pit concrete pad to level the surface. A crane will be used to off-load and position the DPVE system on the gravel pad. The two 1,000-pound carbon vessels will be offloaded and positioned at the locations designated on **Figure 9**. The system will be set-up and leveled on concrete block footings (1/8-inch over 4 feet). The system will be enclosed in an 8-foot tall wooden privacy fence to prevent unauthorized access. Warning signs will be posted on each side of the privacy fence.

## 4.8 GROUNDWATER MONITORING

A baseline groundwater monitoring event will be conducted at the site prior to system start up. The following provides a detailed description of the fieldwork methodology for the baseline event and subsequent effectiveness monitoring events.

A groundwater elevation survey will be performed prior to sampling the wells. Depth to groundwater measurements will be accomplished at each well location to be sampled 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.

Select monitoring wells will then be sampled in general accordance with PPM's internal Quality Assurance/Quality Control (QA/QC) plan. Prior to sampling, each monitoring well will be purged of approximately three well-casing volumes (or to near dryness) utilizing single use, disposable PVC bailers and nylon rope. Purge water from monitoring wells will be transferred to the system air stripper for treatment and subsequent discharge to the permitted outfall. Grab samples will be collected from on-line recovery wells via single use, disposable bailers as groundwater is continuously removed from these locations during system operation.

Each sample for COC analysis 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. A duplicate sample from one well will be collected for QA/QC protocol. Containers will then be placed in an iced cooler for preservation during shipment to the laboratory.

PPM personnel will wear disposable nitrile gloves during well purge and sample collection activities in an effort to reduce the potential for cross-contamination and as part of personal protective equipment (PPE) for the project. Gloves will be changed and discarded between each sample acquisition.

Upon completion of sampling activities, sample coolers will be transported or shipped under standard chain-of-custody protocol to an independent testing laboratory for analyses.

## 4.9 DPVE STARTUP/INITIAL OPTIMIZATION

During the initial startup of the system, vacuum will not be applied to the recovery wells and recovery trenches in order to allow adequate time to check system operation. System components will be monitored to ensure that the system is operating properly prior to applying the vacuum to the subsurface. During the first day of operation, the vacuum will gradually be applied to the recovery wells and trenches by slowly decreasing the percentage of ambient air introduced at the LRVP intake. Data will be collected to evaluate the initial VOC concentrations in the discharge air, the average groundwater removal rate, and the average airflow rate through the subsurface. This information will

provide a comparison of the system performance during the optimization period. The initial startup period is anticipated to be completed in approximately two days.

Measurement of water table drawdown in the recovery wells will be used to evaluate the hydraulic radius of influence and will assist in estimating the capture zone. The vapor discharge rate and ambient airflow rates will be measured to assess if the system is effective in creating sufficient airflow in the subsurface. Adjustments which may optimize the air flow could include adjusting the level of applied vacuum to the recovery well in various combinations, installing passive venting wells, and cleaning of well screens due to clogging or biological fouling.

The volume of groundwater removed from the subsurface will be monitored to observe the groundwater recovery rate and volume. Modifications will be performed in the field to enhance the rate of groundwater recovery such as adjusting the level of applied vacuum to the recovery points in various combinations.

## 4.10 DPVE OPERATIONS AND MAINTENANCE

PPM will periodically visit the site to conduct operations and maintenance (O&M) and monitoring activities. These activities will be conducted by a PPM engineer, geologist, or technician experienced in DPVE O&M.

PPM anticipates visiting the site approximately two times per month. Additional visits may be required based on site-specific conditions encountered. O&M and monitoring activities to be conducted during these routine visits are discussed in the following sections.

Normal operations will include O&M of the system and continued optimization of system performance as needed. Scheduled visits will be made to maintain the system components and ensure the system is operating as intended. Minor system components will be regularly inspected and replaced or repaired as required. Pumps within the unit will be serviced on a routine basis. If a shutdown of the system occurs, PPM will attempt to provide personnel to restart/repair the system within 72 hours of receiving notification of shut down.

Typical O&M activities will include the following:

- Visual inspection of treatment system components and their condition (including pipe connections for potential leaks due to vibration)
- Inspection and testing of fluid level probes and cleaning as needed
- Monitoring of vacuum levels at designated points in the DPVE system
- Monitoring of pressure levels on the exhaust side of the LRVP
- Monitoring of service water volumes used
- Monitoring of vapor temperatures at designated points in the DPVE system
- Removal of silt and sludge buildup from the knockout pot and other system components
- Evaluation of free product separation effectiveness in the oil separator (if present)
- Removal of air stripper foulants.

## 4.11 MONITORING

The progress of corrective action activities will be monitored to evaluate if the remedial objectives are being met. Soil analytical results obtained during the previous investigations at the site will be used for comparison purposes. Results from the baseline groundwater sampling will be used to gauge the progress of groundwater remediation efforts.

### 4.11.1 DPVE System Monitoring

System monitoring will include routine measurement of operational parameters and will coincide with O&M activities. Parameters to be measured, recorded, or calculated during the monthly activities are as follows:

- Date of each site visit
- Measuring groundwater/free product elevation in select monitoring wells (minimum of once per quarter for the first year)
- Manual bailing of free product from monitoring and recovery wells (if observed)
- Hydraulic and pneumatic radius of influence and supporting calculations
- Mass of hydrocarbons removed in vapor and liquid phase and supporting calculations
- Volume of liquids removed and discharged
- Air flow readings at pump discharge
- Liquid flow totalizer readings at system effluent

- Vapor concentrations at the LRVP discharge and carbon vessels
- Effluent sampling results and permit compliance status
- Total system runtime and explanations of unscheduled shutdowns
- O&M activities and system condition.

The information will be compiled into an on-going project database designed to automatically calculate information such as mass of hydrocarbons and volume of groundwater removed. This information is automatically calculated for both the monitoring period and life of the project. An example of a monitoring form to be used by PPM personnel is included in **Appendix F**, **DPVE Monitoring Forms**.

### 4.11.2 Monthly System Sampling

Effluent water samples will be collected on a monthly basis in accordance with the pending NPDES permit for the site. PPM will provide water effluent analytical results per the NPDES requirements in the Discharge Monitoring Reports (DMRs) submitted to ADEM semi-annually. Water effluent samples will be analyzed for pH, oil and grease (EPA Method 1664A), BTEX, MTBE, and naphthalene (EPA Method 8260). Samples will be collected from a port installed on the discharge side of the air stripper and prior to entering the effluent discharge line that extends to the outfall. A field measurement of pH will be performed at the time samples are collected. The volume of water discharged, as indicated by the in-line flow meter, will also be recorded at this time.

PPM anticipates collecting effluent vapor samples from the LRVP emissions on a quarterly basis. Each sample will be analyzed for total volatile organic compounds (VOCs) per EPA Method 8260, modified for air.

### 4.11.3 Quarterly Groundwater Sampling

PPM will collect groundwater samples from each of the recovery wells and monitoring wells, at least once annually. Limited groundwater sampling events of 12 wells (MW-1, MW-2, MW-4 through MW-7, MW-10, MW-11, MW-12, MW-15, MW-17, and MW-18 is recommended during subsequent quarterly periods to monitor the effectiveness of the system at reducing dissolved COC concentrations. Sampling activities will be conducted in general accordance with PPM's **Technical Sampling and Analysis QA/QC Plan**, **Appendix G**. Groundwater samples will be analyzed for BTEX, MTBE, and naphthalene per EPA Method 8260.

# 5.0 REPORTING

PPM will submit reports in accordance with ADEM requirements. These reports will include:

1. NPDES permit submittal
   Notification will be submitted to ADEM once the NPDES permit application has been submitted.

2. System Purchase and Delivery
   A system delivery letter will be submitted to ADEM within 10 days of system delivery to the site.

3. Report of Corrective Action Implementation
   This report will include drawings of the system/layout and locations of recovery wells following installation.

4. Reporting of Corrective Action Effectiveness
   PPM proposes to submit quarterly progress reports, which summarize field activities and progress of the system toward reducing COC concentrations to below SSCALs. These reports will include an evaluation of the system effectiveness, and recommendations concerning any additional modifications or change in remedial approaches that may be necessary. ADEM Corrective Action System Effectiveness Monitoring Report (CASEMR) forms will be included with each report.

5. Site Closure Report/Monitoring Well Abandonment
   This report will describe in detail the closure of the site and removal of all remediation equipment. A separate cost proposal will be submitted for this work.

# 6.0 CLOSURE EVALUATION

The data collected during site monitoring will be evaluated on a regular basis. Criteria for considering termination of remedial activities will include reduction in COC concentrations to established cleanup levels, or determination that asymptotic levels have been reached. Analysis of the hydrocarbon mass removal data, and the latest results of quarterly groundwater sampling will be used to evaluate if site objectives have been met.

The DPVE system will be shutdown following approval from ADEM. The site will be monitored for potential increases in COC concentrations (rebound) following shutdown of the system prior to demobilization of the system and ancillary components. Recommendations will be provided to ADEM concerning further action should rebound occur.

# 7.0 SITE HEALTH AND SAFETY

A site-specific Health and Safety Plan (HASP) was developed for corrective action efforts at the facility is included in **Appendix H, Site-Specific Health and Safety Plan**. The HASP was specifically designed to address the corrective actions and monitoring activities at the site. PPM project personnel are familiar with the HASP prior to performing any work at the site. The HASP will be kept on site throughout the duration of the project.

# 8.0 PROJECT SCHEDULE

PPM will notify ADEM five days in advance of any planned trenching, system installation, or startup activities to allow department personnel the opportunity to visit the site during work activities if possible. If rescheduling is necessary, PPM will notify ADEM by telephone or electronic mail of the new date and reason for rescheduling.

## 8.1 NPDES PERMIT SUBMITTAL

Upon approval from ADEM, PPM will submit the Notice of Intent (NOI) for the ADEM NPDES permit application. PPM anticipates the permit will take approximately 30 days for review and approval by ADEM.

## 8.2 ESTIMATED SCHEDULE FOR SYSTEM INSTALLATION

The equipment manufacturer (PRM) estimates a lead time for building the system at 10 to 12 weeks. PPM estimates that site preparation/system installation activities will require approximately three weeks to complete, pending site and weather conditions encountered. System placement and connection activities will likely require two to three days to complete.

System start-up activities will require approximately two days for adequate system monitoring prior to departing from the site. Based on this anticipated schedule, PPM estimates that system installation, start up, and initial optimization efforts can be

completed within 120 days of CAP approval. A report can be submitted within 150 days of authorization.

### 8.3 ESTIMATED CLEAN UP TIME

Although the length of time required to reach the cleanup objectives cannot be predicted precisely, PPM anticipates that the DPVE unit will be operated for approximately three to four years. A more accurate prediction of cleanup time will be provided once the system has been in operation long enough to establish trends in VOC mass removal rates, groundwater extraction rates, and hydraulic and pneumatic capture zones.

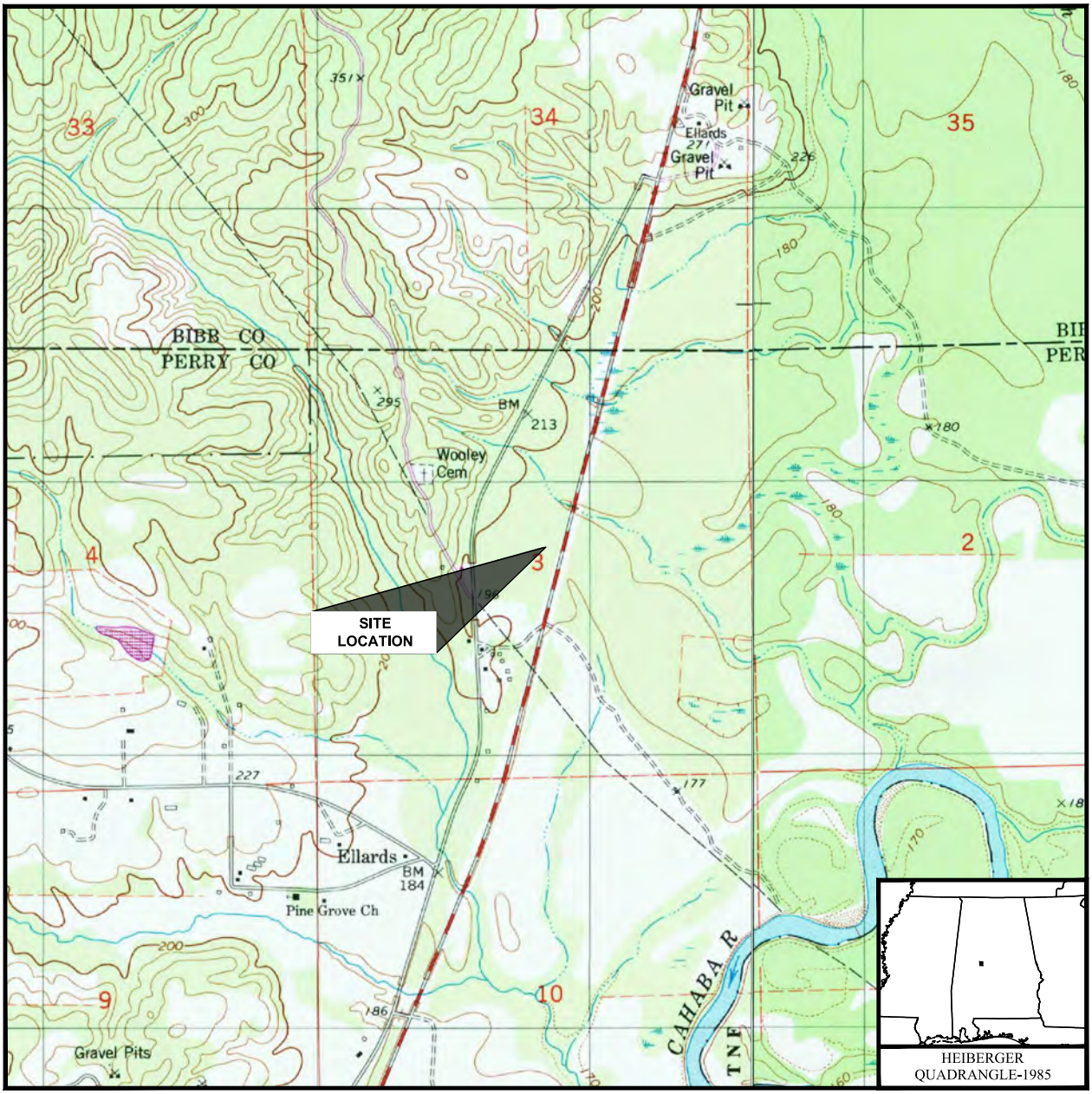
## 9.0 ESTIMATED COST

Cost proposals for completion of activities associated with implementation of the CAP and the first two quarters of O&M activities are included in the following:

- **Appendix I Cost Proposal No. 13 - Equipment Purchase**
- **Appendix J Cost Proposal No. 14 - DPVE System Installation and Startup**
- **Appendix K Cost Proposal No. 15 - First Quarter O&M and Groundwater Sampling**
- **Appendix L Cost Proposal No. 16 - Second Quarter O&M and Groundwater Sampling**.

# APPENDICES

# APPENDIX A – FIGURES

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| PPM CONSULTANTS, INC. www.ppmco.com | |
| DRAWN BY: BWH | DRAWN DATE: 01/20/22 |
| PROJECT NUMBER: 40101501 | PHASE: CAPD |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

SITE LOCATION MAP

FIGURE NUMBER
1

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SCALE: 1"=30'
(Approximate)

B-18/ MW-14

B-19/ MW-15

B-20/ MW-16

CARPORT

B-14/ MW-10

APPROXIMATE PROPERTY BOUNDARY

FORMER DISPENSER ISLAND

STORE

CANOPY

B-15/ MW-11

B-13/ MW-9

SB-9/ MW-5

B-16/ MW-12

B-21/ MW-17

HIGHWAY 5

GRAVEL

ASPHALT

STORAGE BUILDING

FORMER PRODUCT LINE

B-12/ MW-8

FORMER DIESEL DISPENSER

B-23/ MW-19

WOODED AREA

SB-5/ MW-1

3,000-GALLON GASOLINE

B-17/ MW-13D

SB-6/ MW-2

SB-8/ MW-4

WOODED AREA

WATER WELL

2,000-GALLON DIESEL

SB-7/ MW-3

2,000-GALLON GASOLINE

2,000-GALLON GASOLINE

B-22/ MW-18

B-11/ MW-7

B-10/ MW-6

LEGEND:

- SOIL BORING / TYPE II MONITORING WELL LOCATION
- SOIL BORING / TYPE III MONITORING WELL LOCATION
- P — POWER LINE
- POWER POLE

| | |
|---|---|
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| PROJECT NUMBER: 40101501 | PHASE: CAPD |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

SITE MAP

FIGURE NUMBER
2

LEGEND:

- CLAY
- SILT
- SAND
- TANK PIT BACKFILL
- ASPHALT
- CONCRETE
- TOP SOIL

**TOC=190.00** TOP OF CASING (ft.)

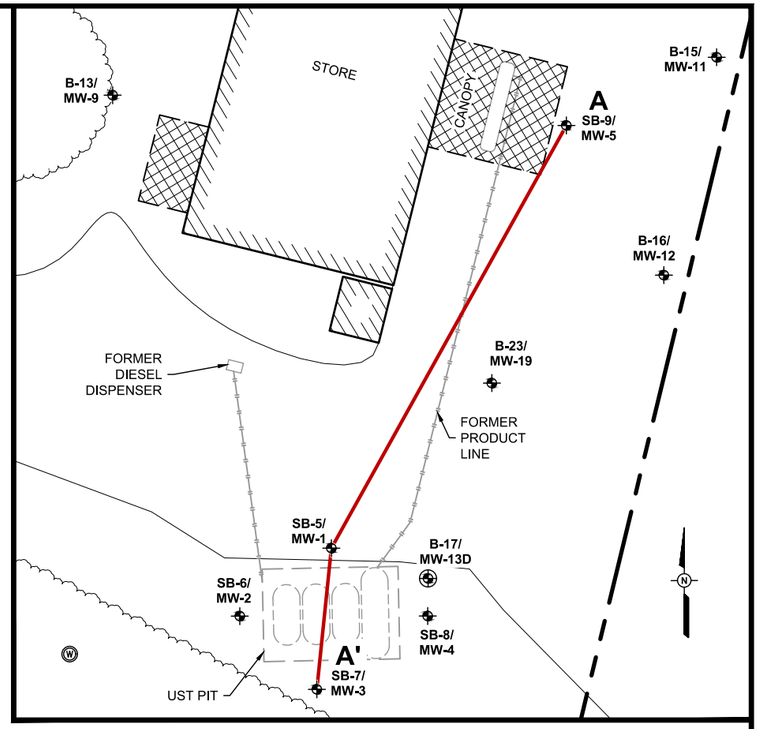
**SE=190.4** SURFACE ELEVATION (ft.)

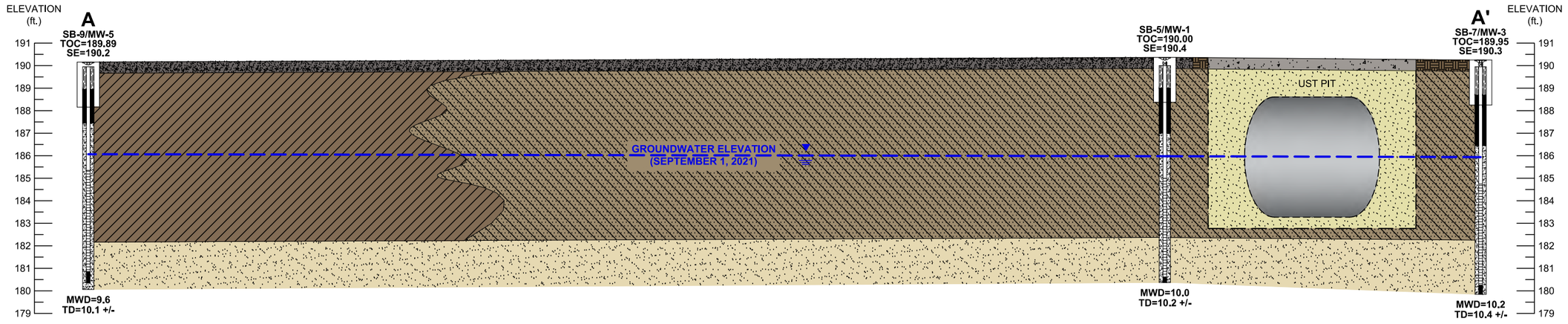
**TD=10.0 +/-** TOTAL DEPTH OF BORING (ft.)

**MWD=10.0** MEASURED WELL DEPTH (ft.)

SCREENED INTERVAL W/SUMP

*HORIZ. SCALE: 1"=10'*
*VERT. SCALE: 1"=5'*

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D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

LITHOLOGIC CROSS-SECTION
A-A'

FIGURE NUMBER
3A

LEGEND:

- CLAY
- CLAYEY SAND
- SAND
- ASPHALT
- CONCRETE
- GRAVEL
- TOP SOIL

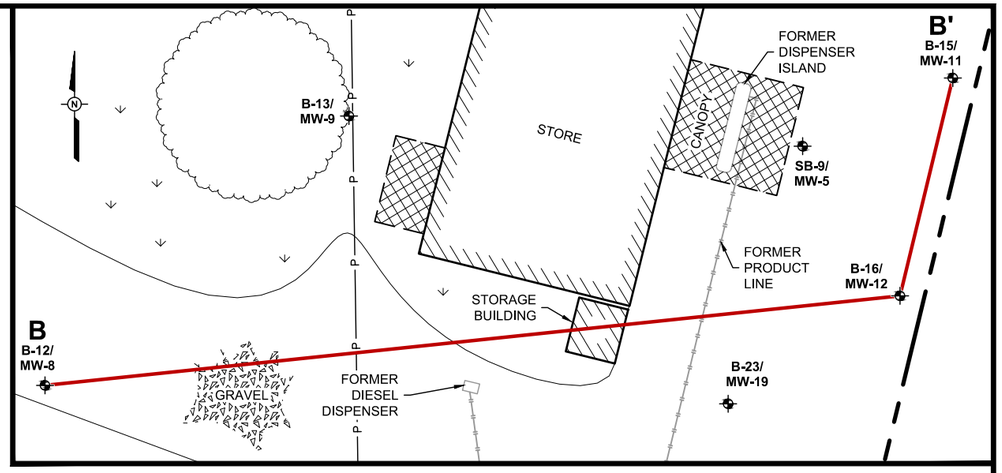
**TOC=189.56** TOP OF CASING (ft.)

**SE=190.0** SURFACE ELEVATION (ft.)

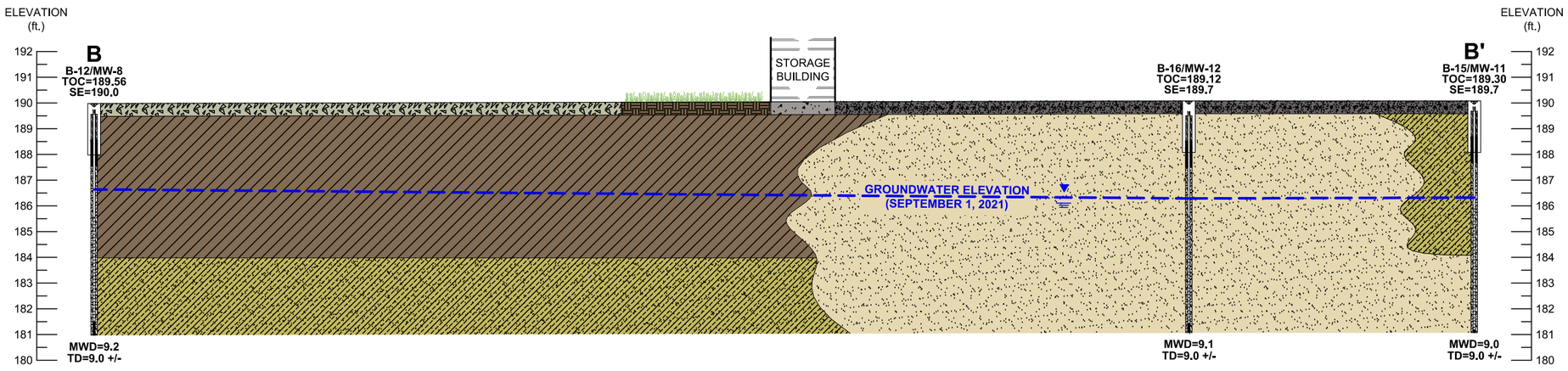
**TD=9.0 +/-** TOTAL DEPTH OF BORING (ft.)

**MWD=9.2** MEASURED WELL DEPTH (ft.)

SCREENED INTERVAL W/SUMP




*HORIZ. SCALE: 1"=20'*
*VERT. SCALE: 1"=5'*

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| PROJECT NUMBER: 40101501 | PHASE: CAPD |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

LITHOLOGIC CROSS-SECTION
B-B'

FIGURE NUMBER
3B

N

0 15 30

SCALE: 1"=30'
(Approximate)

MW-15
186.08

MW-14
186.22

MW-16
185.99

CARPORT

MW-10
186.06

MW-11
185.94

STORE

CANOPY

MW-9
186.17

MW-5
186.01

MW-17
185.88

MW-12
185.91

HIGHWAY 5

MW-8
186.64

MW-19
185.90

186.60

186.50

MW-1
185.98

MW-13D
166.50

MW-2
186.03

MW-4
185.86

186.40

WATER
WELL

MW-3
185.94

MW-18
185.63

MW-7
186.31

MW-6
185.84

186.30

186.20

186.10

186.00

185.90

185.80

185.70

**NOTE:**
MW-13D WAS NOT USED IN CONTOURING THIS MAP AS IT IS SCREENED AT A DEEPER INTERVAL.

LEGEND:

- TYPE II MONITORING WELL LOCATION
- TYPE III MONITORING WELL LOCATION
- 185.98 GROUNDWATER ELEVATION (ft.)
- 185.70 GROUNDWATER ELEVATION CONTOUR (ft.)
- GROUNDWATER FLOW DIRECTION

| | |
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D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

GROUNDWATER ELEVATION MAP
(SEPTEMBER 1, 2021)

FIGURE NUMBER
4

N

0 15 30

SCALE: 1"=30'
(Approximate)

| B-18/MW-14 | 12/14/20 |
|---|---|
| | 0'-1' |
| BENZENE (mg/kg) | <0.006 |
| TOLUENE (mg/kg) | <0.006 |
| ETHYLBENZENE (mg/kg) | <0.006 |
| TOTAL XYLENES (mg/kg) | <0.018 |
| TOTAL BTEX (mg/kg) | BDL |
| MTBE (mg/kg) | <0.006 |
| NAPHTHALENE (mg/kg) | <0.030 |

| B-15/MW-11 | 01/14/20 | |
|---|---|---|
| | 2'-3' | 6'-8' |
| BENZENE (mg/kg) | 0.049 | 3.490 |
| TOLUENE (mg/kg) | 0.407 | 82.300 |
| ETHYLBENZENE (mg/kg) | 0.029 | 20.600 |
| TOTAL XYLENES (mg/kg) | 0.184 | 108.000 |
| TOTAL BTEX (mg/kg) | 0.669 | 214.390 |
| MTBE (mg/kg) | 0.015 | <1.960 |
| NAPHTHALENE (mg/kg) | 0.060 | 7.750 |

| B-19/MW-15 | 12/14/20 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | <0.007 | <0.006 |
| TOLUENE (mg/kg) | <0.007 | <0.006 |
| ETHYLBENZENE (mg/kg) | <0.007 | <0.006 |
| TOTAL XYLENES (mg/kg) | <0.021 | <0.018 |
| TOTAL BTEX (mg/kg) | BDL | BDL |
| MTBE (mg/kg) | <0.007 | <0.006 |
| NAPHTHALENE (mg/kg) | <0.035 | <0.030 |

| B-20/MW-16 | 12/14/20 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | <0.007 | <0.009 |
| TOLUENE (mg/kg) | <0.007 | <0.009 |
| ETHYLBENZENE (mg/kg) | <0.007 | <0.009 |
| TOTAL XYLENES (mg/kg) | <0.021 | <0.027 |
| TOTAL BTEX (mg/kg) | BDL | BDL |
| MTBE (mg/kg) | <0.007 | 0.010 |
| NAPHTHALENE (mg/kg) | <0.035 | <0.045 |

CARPORT

| B-14/MW-10 | 01/14/20 | |
|---|---|---|
| | 2'-3' | 6'-8' |
| BENZENE (mg/kg) | 0.843 | 0.514 |
| TOLUENE (mg/kg) | 17.800 | 17.200 |
| ETHYLBENZENE (mg/kg) | 3.550 | 2.380 |
| TOTAL XYLENES (mg/kg) | 16.500 | 12.400 |
| TOTAL BTEX (mg/kg) | 38.693 | 32.494 |
| MTBE (mg/kg) | <0.317 | <0.214 |
| NAPHTHALENE (mg/kg) | 0.565 | 1.830 |

| B-13/MW-9 | 01/14/20 |
|---|---|
| | 2'-3' |
| BENZENE (mg/kg) | <0.005 |
| TOLUENE (mg/kg) | <0.005 |
| ETHYLBENZENE (mg/kg) | <0.005 |
| TOTAL XYLENES (mg/kg) | <0.015 |
| TOTAL BTEX (mg/kg) | BDL |
| MTBE (mg/kg) | <0.005 |
| NAPHTHALENE (mg/kg) | <0.050 |

STORE

CANOPY

| B-21/MW-17 | 12/14/20 |
|---|---|
| | 1'-3' |
| BENZENE (mg/kg) | <0.006 |
| TOLUENE (mg/kg) | <0.006 |
| ETHYLBENZENE (mg/kg) | <0.006 |
| TOTAL XYLENES (mg/kg) | <0.018 |
| TOTAL BTEX (mg/kg) | BDL |
| MTBE (mg/kg) | 0.007 |
| NAPHTHALENE (mg/kg) | <0.025 |

| SB-9/MW-5 | 07/16/19 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | 3.150 | 1.850 |
| TOLUENE (mg/kg) | 127.000 | 57.200 |
| ETHYLBENZENE (mg/kg) | 47.200 | 25.500 |
| TOTAL XYLENES (mg/kg) | 346.000 | 160.000 |
| TOTAL BTEX (mg/kg) | 523.350 | 244.550 |
| MTBE (mg/kg) | 0.624 | 0.888 |
| NAPHTHALENE (mg/kg) | 64.8000 | 17.300 |

| B-16/MW-12 | 01/14/20 | |
|---|---|---|
| | 2'-3' | 6'-8' |
| BENZENE (mg/kg) | 6.260 | 15.100 |
| TOLUENE (mg/kg) | 94.100 | 16.900 |
| ETHYLBENZENE (mg/kg) | 34.400 | 6.510 |
| TOTAL XYLENES (mg/kg) | 174.000 | 33.900 |
| TOTAL BTEX (mg/kg) | 308.760 | 72.410 |
| MTBE (mg/kg) | 1.300 | 1.090 |
| NAPHTHALENE (mg/kg) | 27.600 | 2.940 |

HIGHWAY 5

| SB-5/MW-1 | 07/16/19 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | 0.018 | 4.220 |
| TOLUENE (mg/kg) | 0.204 | 93.600 |
| ETHYLBENZENE (mg/kg) | 0.086 | 31.700 |
| TOTAL XYLENES (mg/kg) | 0.547 | 148.000 |
| TOTAL BTEX (mg/kg) | 0.855 | 277.520 |
| MTBE (mg/kg) | 0.011 | 0.130 |
| NAPHTHALENE (mg/kg) | 0.112 | 10.000 |

| B-12/MW-8 | 01/14/20 | |
|---|---|---|
| | 2'-3' | 6'-8' |
| 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 |
| TOTAL BTEX (mg/kg) | BDL | BDL |
| MTBE (mg/kg) | <0.005 | <0.005 |
| NAPHTHALENE (mg/kg) | <0.050 | <0.050 |

| SB-6/MW-2 | 07/16/19 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | <0.005 | <0.005 |
| TOLUENE (mg/kg) | 0.013 | 0.045 |
| ETHYLBENZENE (mg/kg) | <0.005 | 0.165 |
| TOTAL XYLENES (mg/kg) | <0.015 | 0.964 |
| TOTAL BTEX (mg/kg) | 0.013 | 1.174 |
| MTBE (mg/kg) | <0.005 | <0.005 |
| NAPHTHALENE (mg/kg) | <0.025 | 0.156 |

| B-23/MW-19 | 12/14/20 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | 0.606 | 8.840 |
| TOLUENE (mg/kg) | 0.938 | 51.400 |
| ETHYLBENZENE (mg/kg) | 0.117 | 17.100 |
| TOTAL XYLENES (mg/kg) | 0.416 | 68.400 |
| TOTAL BTEX (mg/kg) | 2.077 | 145.740 |
| MTBE (mg/kg) | <0.007 | 0.022 |
| NAPHTHALENE (mg/kg) | <0.035 | 2.280 |

| B-17/MW-13D | 01/13/20 | |
|---|---|---|
| | 6'-8' | 17'-19' |
| BENZENE (mg/kg) | 0.738 | 0.302 |
| TOLUENE (mg/kg) | 9.520 | 1.530 |
| ETHYLBENZENE (mg/kg) | 5.100 | 0.230 |
| TOTAL XYLENES (mg/kg) | 27.000 | 1.190 |
| TOTAL BTEX (mg/kg) | 42.358 | 3.252 |
| MTBE (mg/kg) | 0.117 | <0.005 |
| NAPHTHALENE (mg/kg) | 3.940 | <0.050 |

| B-22/MW-18 | 12/14/20 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | 0.029 | <0.006 |
| TOLUENE (mg/kg) | 0.032 | <0.006 |
| ETHYLBENZENE (mg/kg) | <0.006 | 0.007 |
| TOTAL XYLENES (mg/kg) | <0.018 | <0.018 |
| TOTAL BTEX (mg/kg) | 0.061 | 0.007 |
| MTBE (mg/kg) | <0.006 | <0.006 |
| NAPHTHALENE (mg/kg) | <0.030 | <0.030 |

| SB-7/MW-3 | 07/16/19 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | 0.014 | <0.005 |
| TOLUENE (mg/kg) | 0.050 | <0.005 |
| ETHYLBENZENE (mg/kg) | <0.005 | <0.005 |
| TOTAL XYLENES (mg/kg) | <0.015 | <0.015 |
| TOTAL BTEX (mg/kg) | 0.064 | BDL |
| MTBE (mg/kg) | <0.005 | <0.005 |
| NAPHTHALENE (mg/kg) | <0.025 | <0.025 |

WATER WELL

| SB-8/MW-4 | 07/16/19 | |
|---|---|---|
| | 1'-3' | 4'-6' |
| BENZENE (mg/kg) | <0.005 | 2.300 |
| TOLUENE (mg/kg) | 0.009 | 60.800 |
| ETHYLBENZENE (mg/kg) | <0.005 | 25.400 |
| TOTAL XYLENES (mg/kg) | <0.015 | 133.000 |
| TOTAL BTEX (mg/kg) | 0.009 | 221.500 |
| MTBE (mg/kg) | <0.005 | 0.068 |
| NAPHTHALENE (mg/kg) | <0.025 | 6.140 |

| B-11/MW-7 | 01/14/20 | |
|---|---|---|
| | 2'-3' | 6'-8' |
| BENZENE (mg/kg) | <0.005 | 0.006 |
| TOLUENE (mg/kg) | <0.005 | 0.009 |
| ETHYLBENZENE (mg/kg) | <0.005 | <0.005 |
| TOTAL XYLENES (mg/kg) | <0.015 | <0.015 |
| TOTAL BTEX (mg/kg) | BDL | 0.015 |
| MTBE (mg/kg) | <0.005 | <0.005 |
| NAPHTHALENE (mg/kg) | <0.050 | <0.050 |

| B-10/MW-6 | 01/14/20 | |
|---|---|---|
| | 2'-3' | 6'-8' |
| 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 |
| TOTAL BTEX (mg/kg) | BDL | BDL |
| MTBE (mg/kg) | <0.005 | <0.005 |
| NAPHTHALENE (mg/kg) | <0.050 | <0.050 |

LEGEND:

- SOIL BORING / TYPE II MONITORING WELL LOCATION
- SOIL BORING / TYPE III MONITORING WELL LOCATION
- 4.220 VALUES IN RED EXCEED SSCALS
- BDL BELOW DETECTION LIMIT

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| 40101501 | CAPD |

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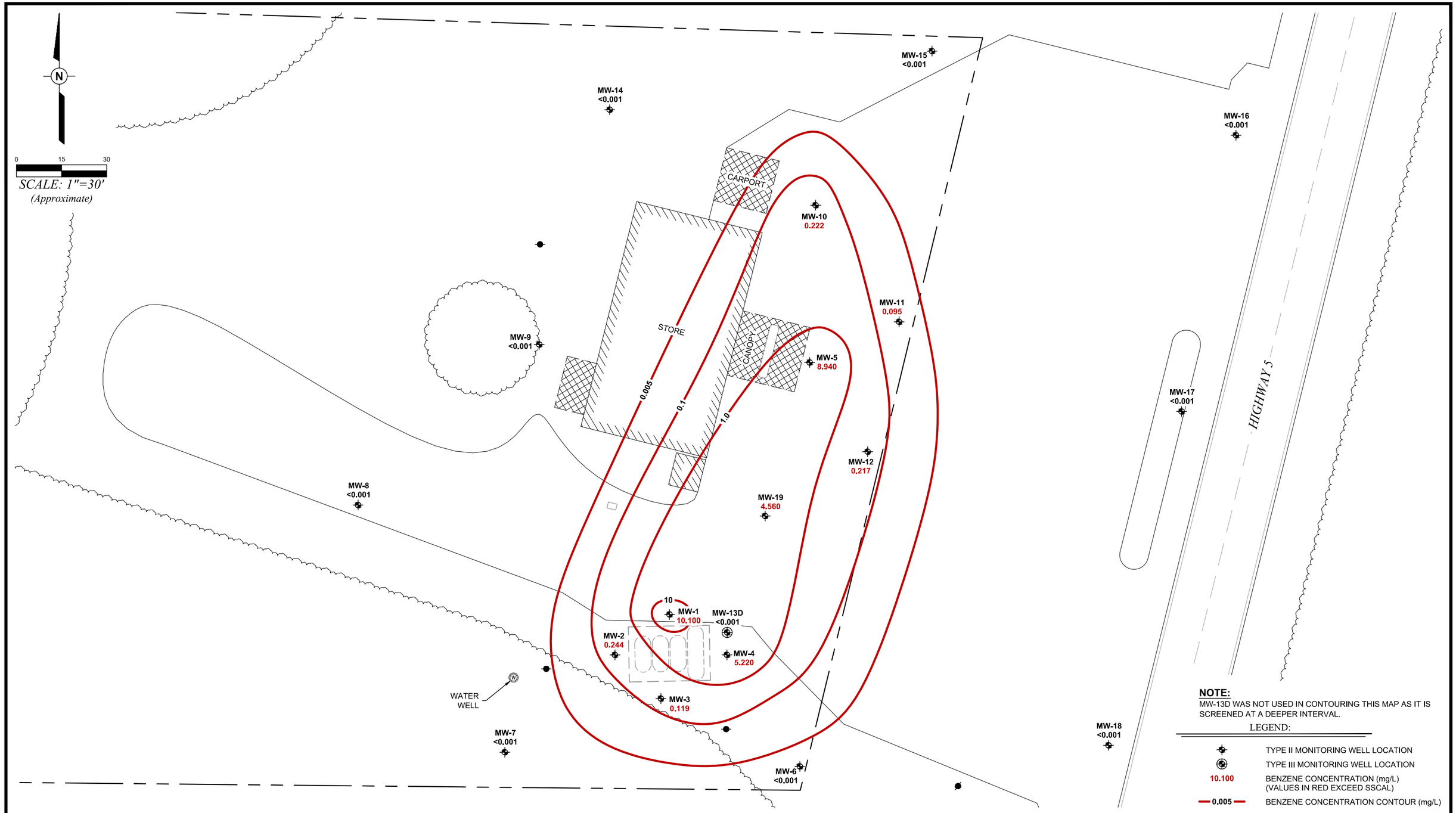
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

COC CONCENTRATIONS IN SOIL

FIGURE NUMBER
5




**NOTE:**
MW-13D WAS NOT USED IN CONTOURING THIS MAP AS IT IS SCREENED AT A DEEPER INTERVAL.

LEGEND:

- TYPE II MONITORING WELL LOCATION
- TYPE III MONITORING WELL LOCATION
- 10.100 — BENZENE CONCENTRATION (mg/L) (VALUES IN RED EXCEED SSCAL)
- 0.005 — BENZENE CONCENTRATION CONTOUR (mg/L)

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|---|---|
| BWH | 01/20/22 |
| PROJECT NUMBER: | PHASE: |
| 40101501 | CAPD |

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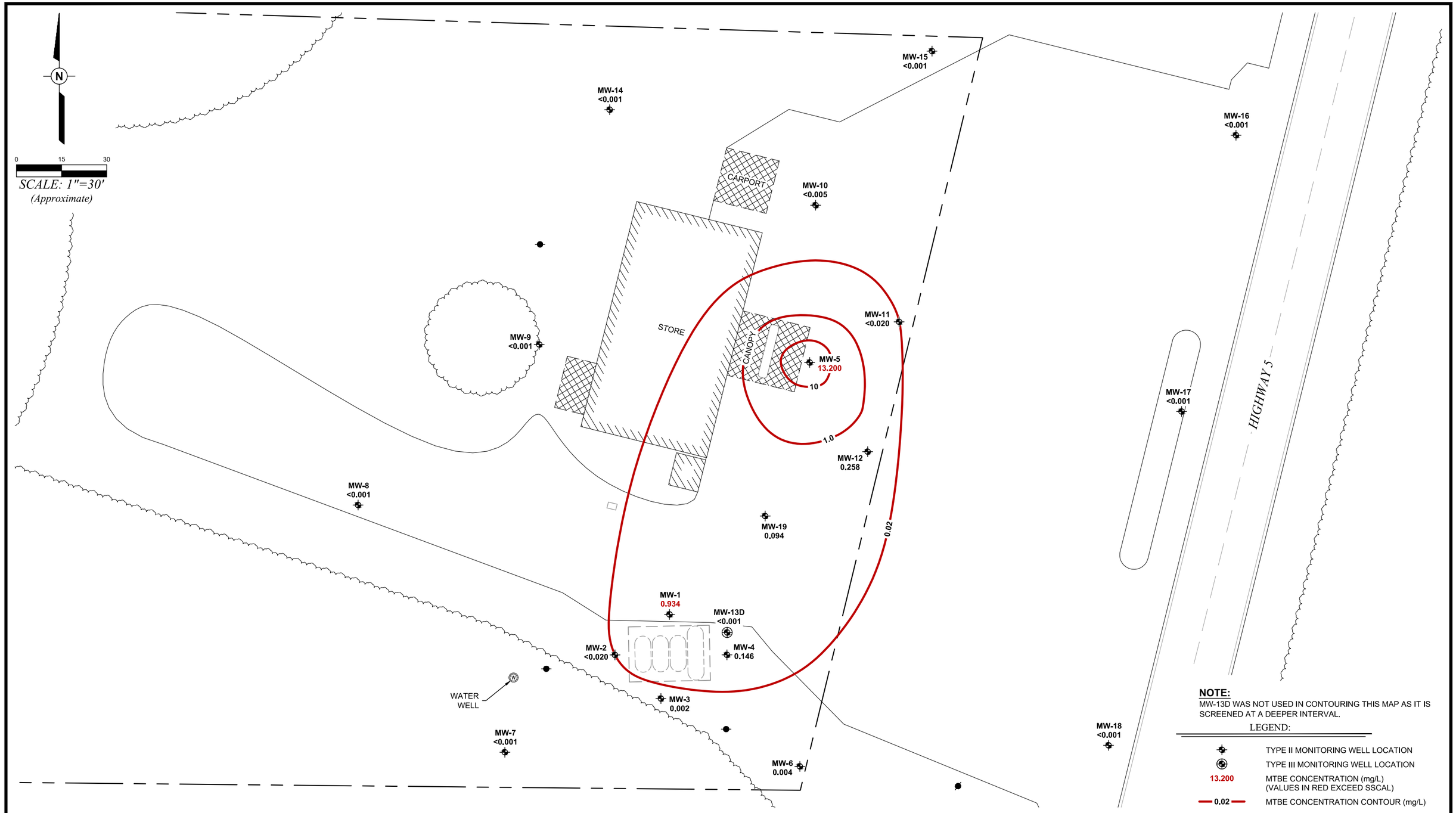
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

# DISSOLVED BENZENE ISOCONCENTRATION MAP (SEPTEMBER 1, 2021)

FIGURE NUMBER
6

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|---|---|
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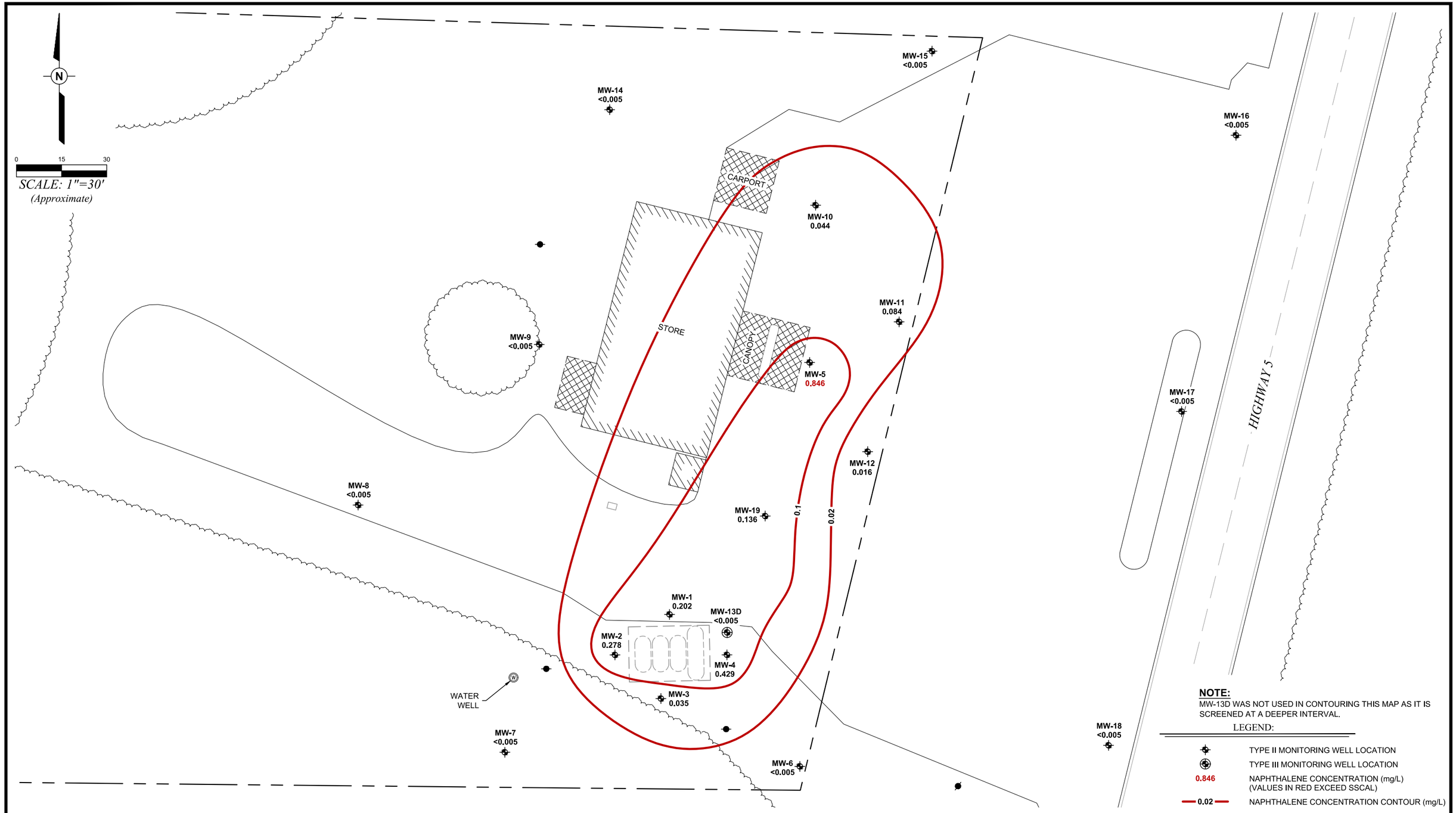
| DRAWN BY: BWH | DRAWN DATE: 01/20/22 |
| PROJECT NUMBER: 40101501 | PHASE: CAPD |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

# DISSOLVED MTBE ISOCONCENTRATION MAP
# (SEPTEMBER 1, 2021)

FIGURE NUMBER
7

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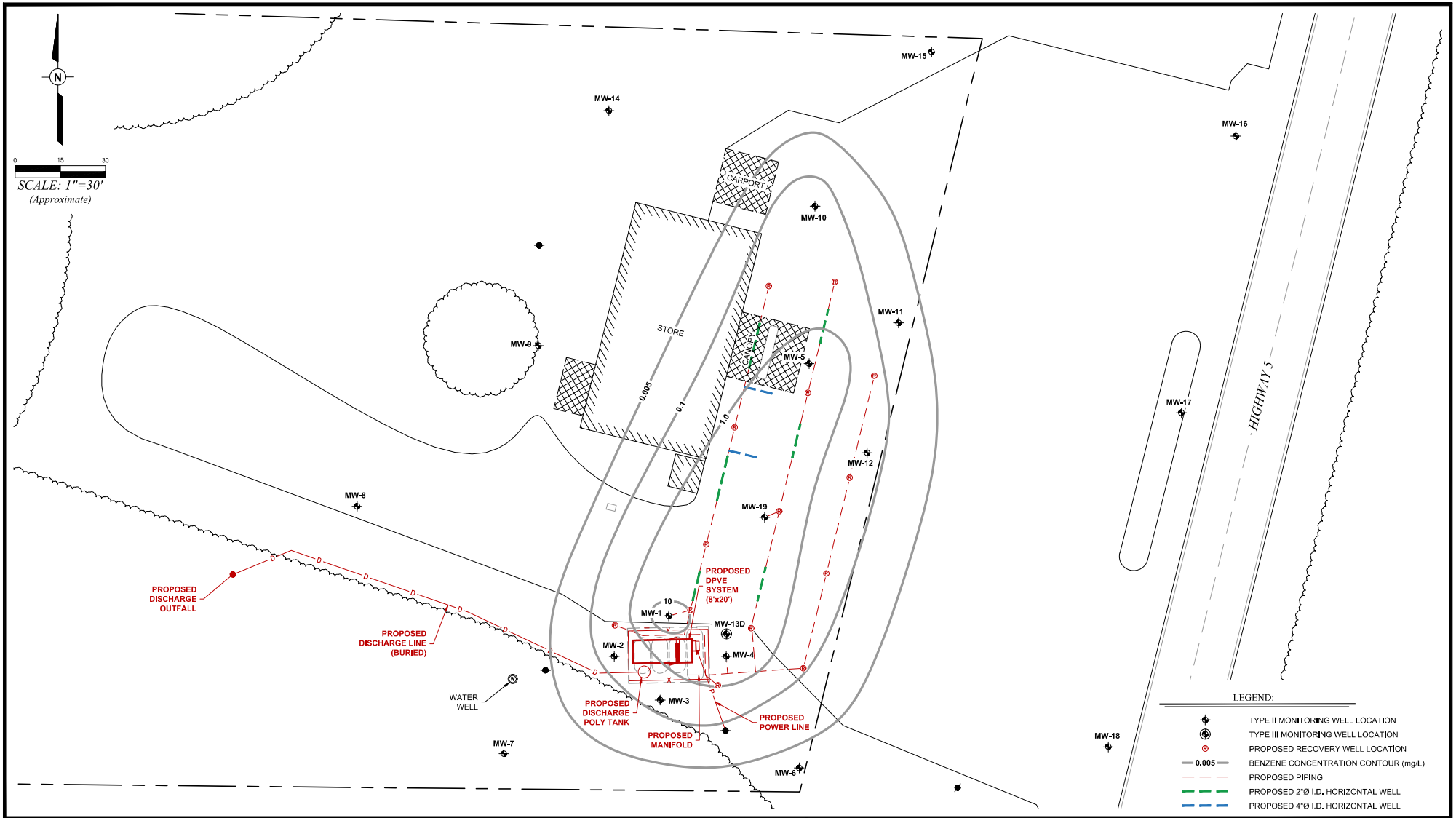
| DRAWN BY: | DRAWN DATE: |
|---|---|
| BWH | 01/20/22 |
| PROJECT NUMBER: | PHASE: |
| 40101501 | CAPD |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

# DISSOLVED NAPHTHALENE ISOCONCENTRATION MAP
# (SEPTEMBER 1, 2021)

FIGURE NUMBER
8

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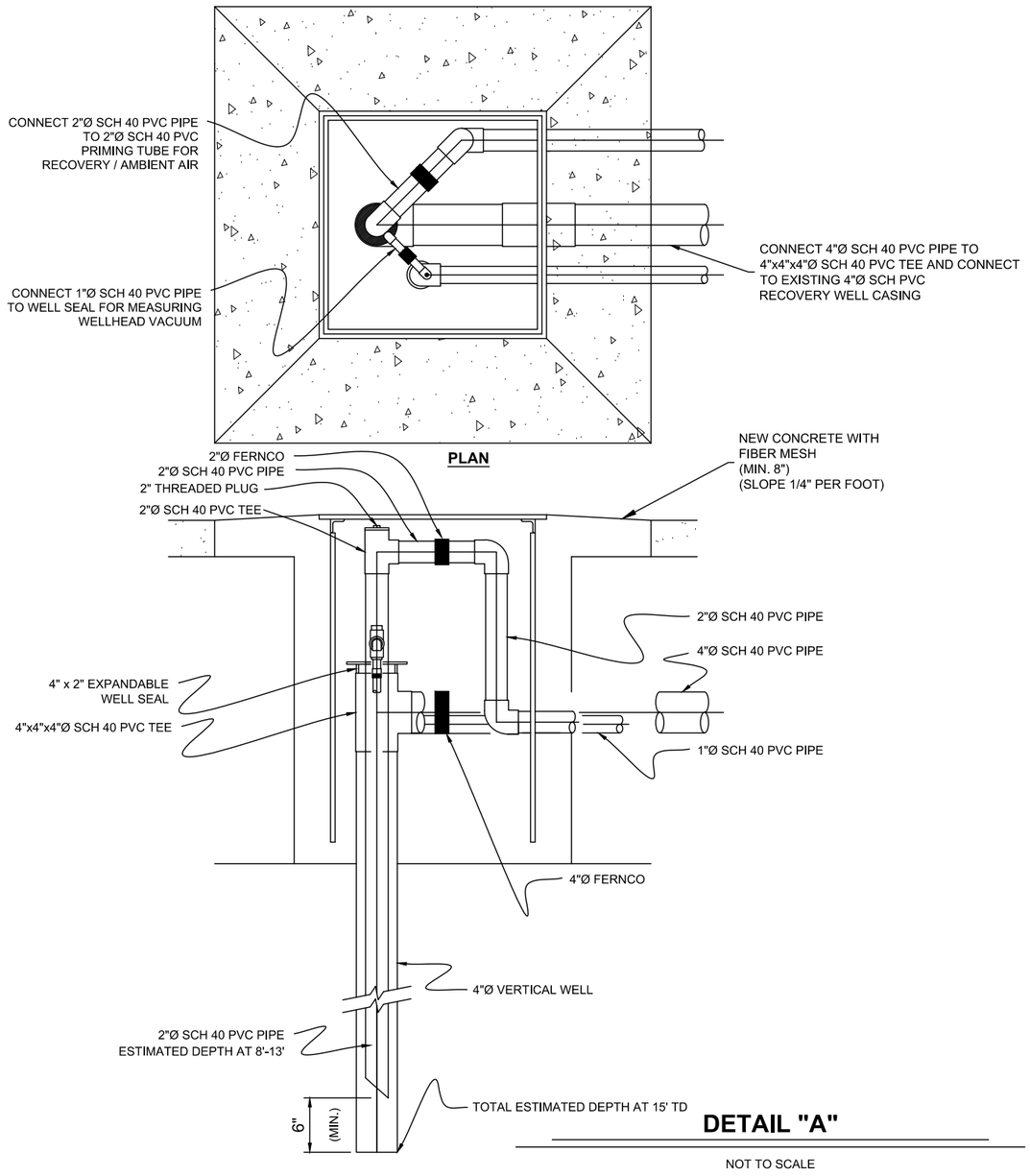
|---|---|
| BWH | 01/20/22 |
| PROJECT NUMBER: | PHASE: |
| 40101501 | CAPD |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

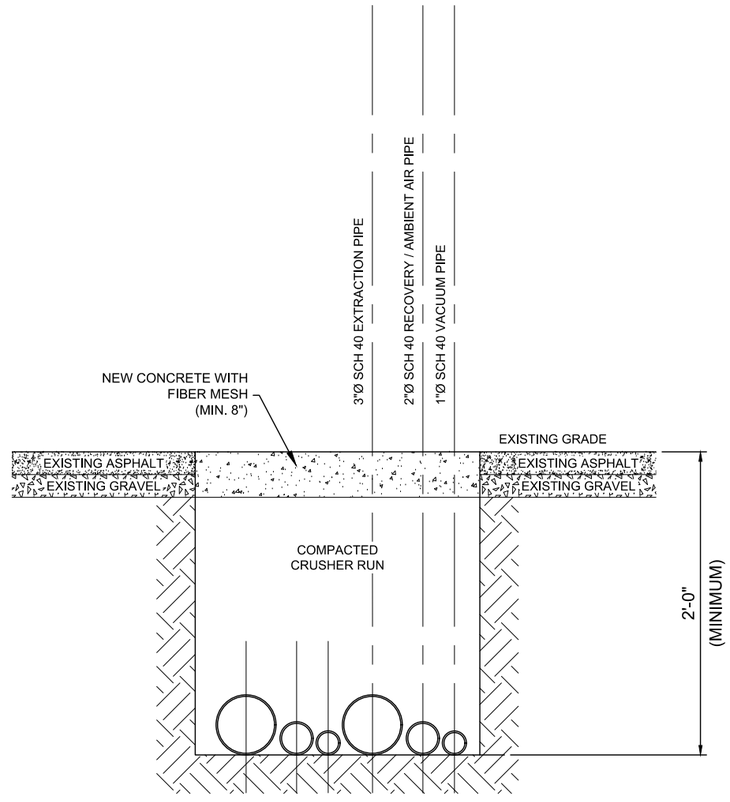
PROPOSED SYSTEM LAYOUT

FIGURE NUMBER
9




## DETAIL "A"

NOT TO SCALE




## PIPING TRENCH

(TYPICAL TRENCHING)

NOT TO SCALE

| | |
|---|---|
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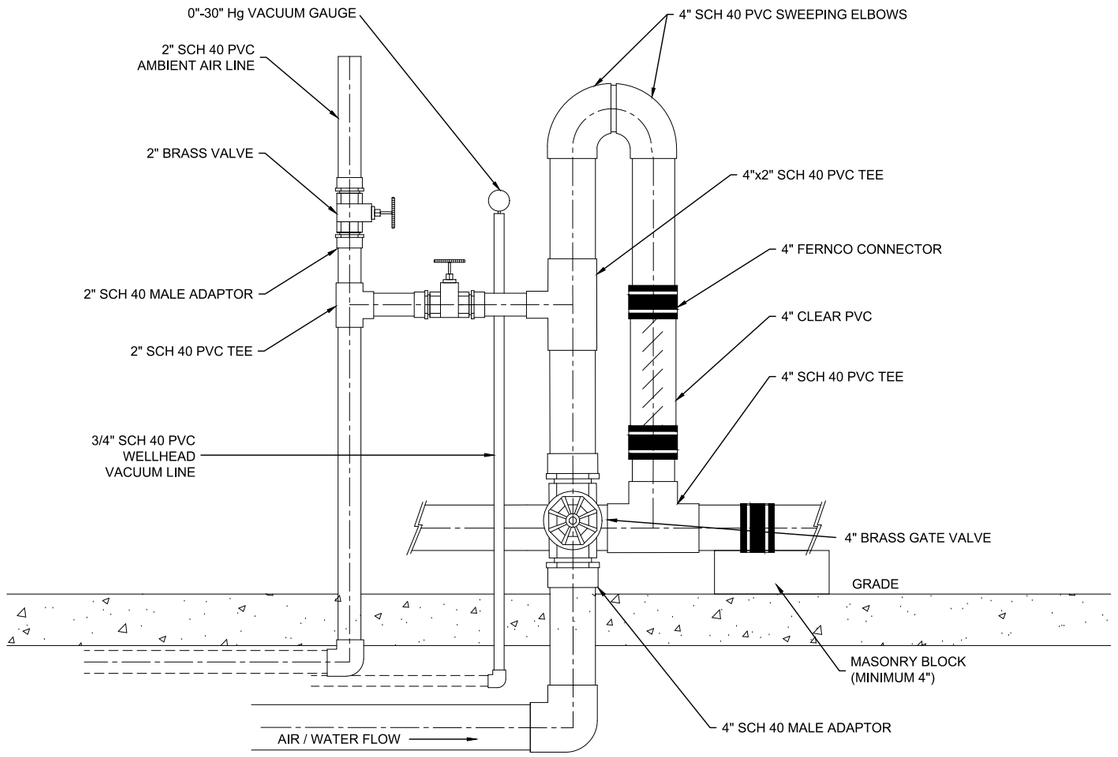
| PROJECT NUMBER: 40101501 | PHASE: CAPD |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

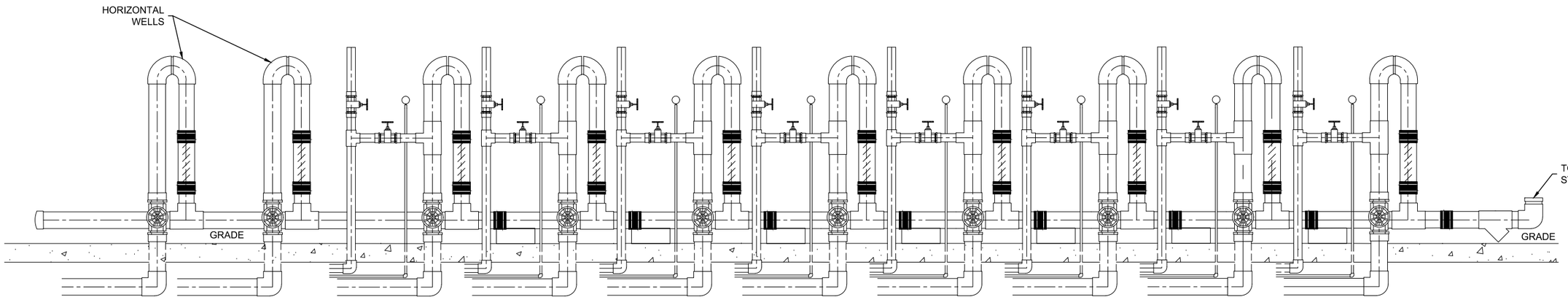
DETAILS AND SECTIONS FOR 4-INCH RECOVERY WELLS AND PIPING TRENCH

FIGURE NUMBER 10

# MANIFOLD CONNECTION FROM RECOVERY WELLS TO MANIFOLD (14 VERTICAL WELLS AND 2 HORIZONTAL WELLS)




**NOT TO SCALE**




**NOT TO SCALE**

VIEW OF 8 OF THE 14 REQUIRED ASSEMBLIES

| | |
|---|---|
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| PROJECT NUMBER: 40101501 | PHASE: CAPD |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

PROFILE / PLAN VIEW OF MANIFOLD

FIGURE NUMBER 11

# APPENDIX B – SOIL BORING LOGS/MONITORING WELL CONSTRUCTION LOGS

# LOG OF BORING: SB-5 / MW-1

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | NA |
| PPM Project No.: | 40101501-PI |
| Project Type: | Preliminary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 7-16-19 / 09:50 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling |
| Drilling Method: | DPT / HSA |
| Total Boring Depth: | 10.2 ft BGS |
| Initial Saturation (ft)/Date: | 8.0 ft BGS (7-16-19) |
| Static GW level (ft)/Date: | 6.10 ft (7-31-19) |
| Surface Elevation (ft): | 190.4 ft |
| Sampling Interval: | Continuous |

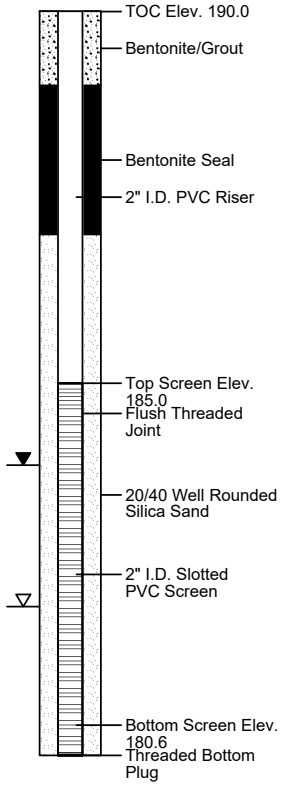
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 7-16-19 |
| Total Well Depth: | 9.96 ft |
| Screened Interval: | 5.0 ft - 9.4 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Bailer |
| Gallons Purged: | 10.0 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.4 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 190 | | | | SILT, no plasticity, soft, homogeneous, moist, gray, strong petroleum-like odor | 1 | N/A | 720* | -- |
| | | | ML | | SILT, soft, homogeneous, moist, gray, strong petroleum-like odor | | | | |
| 5 | 185 | ▼ | | | SILT, soft, homogeneous, moist, gray, strong petroleum-like odor | 2 | N/A | 4,400* | 100% |
| | | ▽ | SP | | SAND, homogeneous, poorly graded, fine, dense, angular to subangular, saturated, orange, strong petroleum-like odor | | | | |
| 10 | 180 | | | | *(Boring terminated @ 10.2 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-1**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

09-11-2019 C:\Program Files\mtech2012\Boring Log files\40101501-PI\SB-5.bor

# LOG OF BORING: SB-6 / MW-2

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | NA |
| PPM Project No.: | 40101501-PI |
| Project Type: | Preliminary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 7-16-19 / 10:50 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling |
| Drilling Method: | DPT / HSA |
| Total Boring Depth: | 10.6 ft BGS |
| Initial Saturation (ft)/Date: | 8.0 ft BGS (7-16-19) |
| Static GW level (ft)/Date: | 5.45 ft (7-31-19) |
| Surface Elevation (ft): | 189.8 ft |
| Sampling Interval: | Continuous |

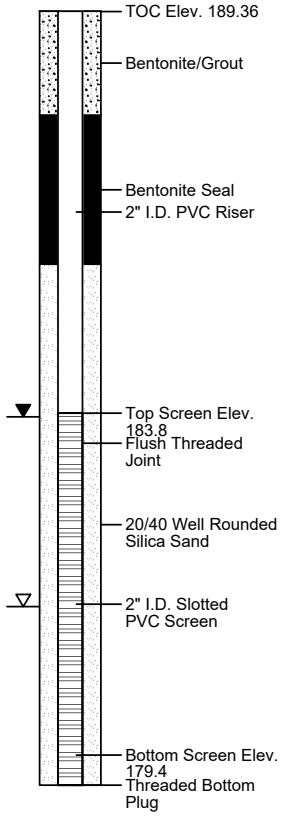
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 7-17-19 |
| Total Well Depth: | 10.5 ft |
| Screened Interval: | 5.5 ft - 10.0 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Bailer |
| Gallons Purged: | 10.0 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 189.8 | USCS | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 0 | 189 | ML | 1 | N/A | 55* | -- | SILT, soft, homogeneous, moist, gray, no odor |
| 5 | 184 | ML | 2 | N/A | 100* | 100% | SILT, soft, homogeneous, moist, gray, mild petroleum-like odor |
| 10 | 179 | SP | | | | | SAND, homogeneous, poorly graded, fine, dense, angular to subangular, saturated, tan/gray, mild petroleum-like odor |
| 15 | | | | | | | *(Boring terminated @ 10.0 ft BGS)* |

**Well Schematic: MW-2**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

09-11-2019 C:\Program Files\mtech2012\Boring Log files\40101501-PI\SB-6.bor

# LOG OF BORING: SB-7 / MW-3

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | NA |
| PPM Project No.: | 40101501-PI |
| Project Type: | Preliminary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 7-16-19 / 12:40 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling |
| Drilling Method: | DPT / HSA |
| Total Boring Depth: | 10.4 ft BGS |
| Initial Saturation (ft)/Date: | 8.0 ft BGS (7-16-19) |
| Static GW level (ft)/Date: | 6.11 ft (7-31-19) |
| Surface Elevation (ft): | 190.3 ft |
| Sampling Interval: | Continuous |

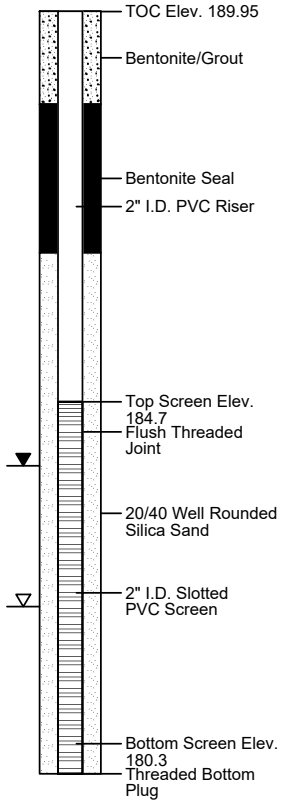
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 7-17-19 |
| Total Well Depth: | 10.2 ft |
| Screened Interval: | 5.2 ft - 9.7 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Bailer |
| Gallons Purged: | 10.0 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.3 | USCS | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 0 | 190 | | 1 | N/A | 0 | -- | SILT, homogeneous, moist, gray, no odor |
| | | ML | | | | | SILT, soft, homogeneous, moist, gray, no odor |
| 5 | 185 | | 2 | N/A | 0 | 100% | SILT |
| | | SP | | | | | SAND, homogeneous, poorly graded, fine, dense, angular to subangular, saturated, tan/gray, no odor |
| 10 | 180 | | | | | | *(Boring terminated @ 10.4 ft BGS)* |
| 15 | | | | | | | |

**Well Schematic: MW-3**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

09-11-2019 C:\Program Files\mtech2012\Boring Log files\40101501-PI\SB-7.bor

# LOG OF BORING: SB-8 / MW-4

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | NA |
| PPM Project No.: | 40101501-PI |
| Project Type: | Preliminary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 7-16-19 / 13:30 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling |
| Drilling Method: | DPT / HSA |
| Total Boring Depth: | 10.2 ft BGS |
| Initial Saturation (ft)/Date: | 8.0 ft BGS (7-16-19) |
| Static GW level (ft)/Date: | 6.10 ft (7-31-19) |
| Surface Elevation (ft): | 190.2 ft |
| Sampling Interval: | Continuous |

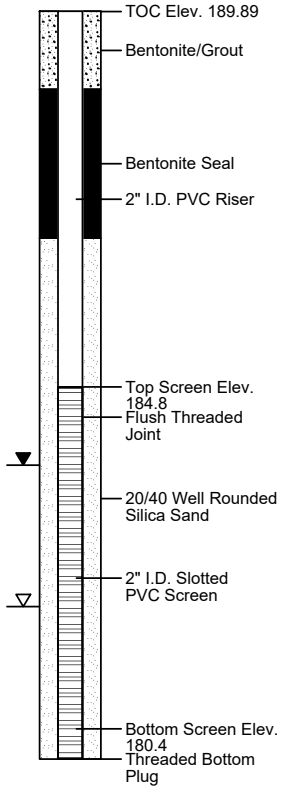
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 7-17-19 |
| Total Well Depth: | 10.04 ft |
| Screened Interval: | 5.1 ft - 9.5 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Bailer |
| Gallons Purged: | 10.0 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.2 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 190 | | | | SILT, soft, homogeneous, moist, gray, no odor | 1 | N/A | 0* | -- |
| | | | ML | | SILT, soft, homogeneous, moist, gray, strong petroleum-like odor | 2 | N/A | >11,000* | 100% |
| 5 | 185 | ▼ | | | SILT, soft, homogeneous, moist, gray, strong petroleum-like odor | | | | |
| | | ▽ | SP | | SAND, homogeneous, poorly graded, fine, dense, angular to subangular, saturated, gray/tan, strong petroleum-like odor | | | | |
| 10 | 180 | | | | *(Boring terminated @ 10.2 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-4**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

09-11-2019 C:\Program Files\mtech2012\Boring Log files\40101501-PI\SB-8.bor

# LOG OF BORING: SB-9 / MW-5

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | NA |
| PPM Project No.: | 40101501-PI |
| Project Type: | Preliminary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 7-16-19 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling |
| Drilling Method: | DPT / HSA |
| Total Boring Depth: | 10.1 ft BGS |
| Initial Saturation (ft)/Date: | 8.0 ft BGS (7-16-19) |
| Static GW level (ft)/Date: | 5.91 ft (7-31-19) |
| Surface Elevation (ft): | 190.2 ft |
| Sampling Interval: | Continuous |

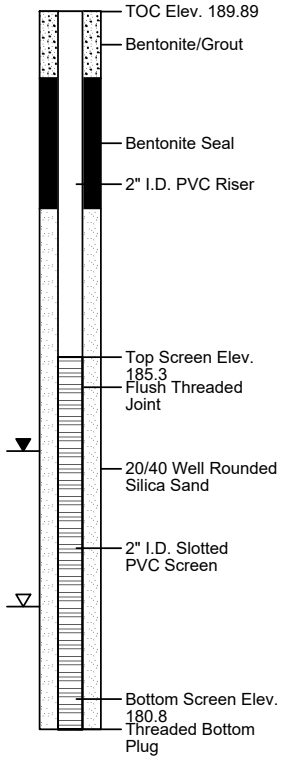
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 7-17-19 |
| Total Well Depth: | 9.58 ft |
| Screened Interval: | 4.6 ft - 9.1 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Bailer |
| Gallons Purged: | 10.0 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.2 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 190 | | | | ASPHALT | | | | |
| | | | | | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, red, very strong petroleum-like odor, gravel is fine, angular to subangular | | | | |
| | | | | | CLAY, moderate plasticity, firm, homogeneous, moist, gray, petroleum-like odor | 1 | N/A | >11,000* | -- |
| | | | CL | | CLAY, moderate plasticity, firm, homogeneous, moist, gray, petroleum-like odor | 2 | N/A | 5,000* | 100% |
| 5 | 185 | ▼ | | | CLAY, moderate plasticity, soft, homogeneous, moist, gray, petroleum-like odor | | | | |
| | | ▽ | | | | | | | |
| | | | SP | | SAND, homogeneous, poorly graded, fine, dense, angular to subangular, saturated, gray/orange, petroleum-like odor | | | | |
| 10 | 180 | | | | *(Boring terminated @ 10.1 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-5**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

09-11-2019 C:\Program Files\mtech2012\Boring Log files\40101501-PI\SB-9.bor

# LOG OF BORING: B-10 / MW-6

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-SI |
| Project Type: | Secondary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 1-14-20 / 12:36 |
| Logged By: | CG |
| Drilling Company / Driller: | GeoLab |
| Drilling Method: | HSA |
| Total Boring Depth: | 9.0 ft BGS |
| Initial Saturation (ft)/Date: | ~6.0 ft BGS |
| Static GW level (ft)/Date: | 2.84 ft BTOC (2-6-20) |
| Surface Elevation (ft): | 189.7 ft |
| Sampling Interval: | Continuous |

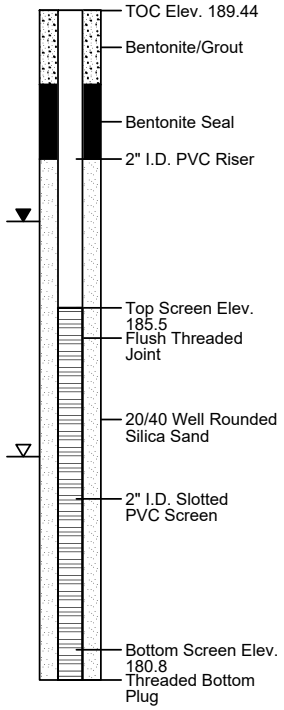
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 1-14-20 |
| Total Well Depth: | 9.10 ft |
| Screened Interval: | 3.9 ft - 8.6 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 15 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 189.7 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 189 | ▼ | CL | | CLAY, moderate plasticity, soft to firm, homogeneous, moist, gray, no odor | 1 | N/A | 70* | 100% |
| 5 | 184 | ▽ | SP | | SAND, poorly graded, medium, medium dense, subangular, moist to wet, gray/tan, slight petroleum-like odor | 2 | N/A | 0* | 100% |
| 10 | 179 | | | | *(Boring terminated @ 9.0 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-6**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

03-13-2020 \\Ppmbham\PPM_Projects_Overhead_Boring Log Drafts\40101501-SI\SB-10.bor

# LOG OF BORING: B-11 / MW-7

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-SI |
| Project Type: | Secondary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 1-14-20 / 14:45 |
| Logged By: | CG |
| Drilling Company / Driller: | GeoLab |
| Drilling Method: | HSA |
| Total Boring Depth: | 9.0 ft BGS |
| Initial Saturation (ft)/Date: | ~6.0 ft BGS |
| Static GW level (ft)/Date: | 1.92 ft BTOC (2-6-20) |
| Surface Elevation (ft): | 189.4 ft |
| Sampling Interval: | Continuous |

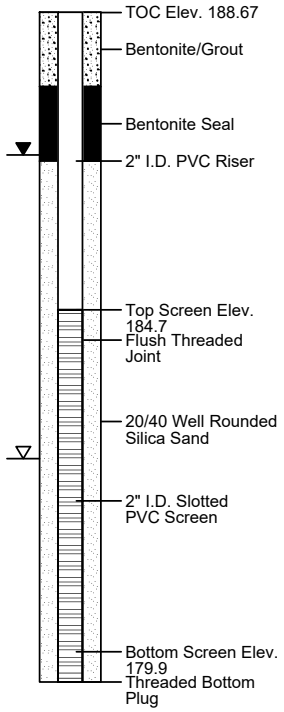
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 1-14-20 |
| Total Well Depth: | 9.2 ft |
| Screened Interval: | 4.0 ft - 8.7 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 15 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev.189.4 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 189 | ▼ | CL | | CLAY, low plasticity, firm, homogeneous, moist to wet, gray, no odor | 1 | N/A | 0* | 100% |
| 5 | 184 | ▽ | SC | | CLAYEY SAND, poorly graded, fine, dense, subangular, wet, gray, no odor | 2 | N/A | 0* | 100% |
| 10 | 179 | | | | *(Boring terminated @ 9.0 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-7**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

03-13-2020 \\Ppmbham\PPM_Projects_Overhead_Boring Log Drafts\40101501-SI\SB-11.bor

# LOG OF BORING: B-12 / MW-8

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-SI |
| Project Type: | Secondary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 1-14-20 / 12:05 |
| Logged By: | CG |
| Drilling Company / Driller: | GeoLab |
| Drilling Method: | HSA |
| Total Boring Depth: | 9.0 ft BGS |
| Initial Saturation (ft)/Date: | ~6.0 ft BGS |
| Static GW level (ft)/Date: | 2.24 ft BTOC (2-6-20) |
| Surface Elevation (ft): | 190.0 ft |
| Sampling Interval: | Continuous |

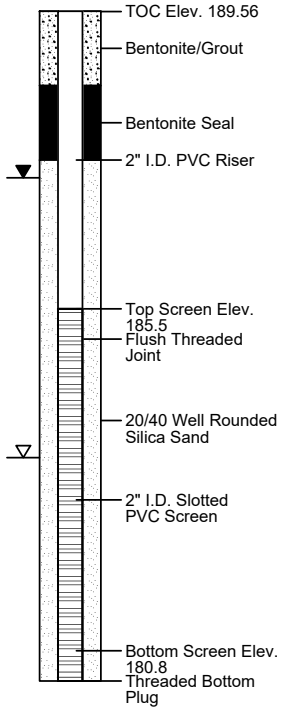
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 1-14-20 |
| Total Well Depth: | 9.2 ft |
| Screened Interval: | 4.0 ft - 9.0 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 8 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.0 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 190 | ▼ | CL | | CLAY, moderate plasticity, firm to hard, homogeneous, moist to wet, gray, no odor | 1 | N/A | 0* | 100% |
| 5 | 185 | ▽ | SC | | CLAYEY SAND, poorly graded, medium, medium dense, subangular, wet, gray, no odor | 2 | N/A | 0* | 100% |
| 10 | 180 | | | | *(Boring terminated @ 9.0 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-8**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

03-13-2020 \\Ppmbham\PPM_Projects_Overhead_Boring Log Drafts\40101501-SI\SB-12.bor

# LOG OF BORING: B-13 / MW-9

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-SI |
| Project Type: | Secondary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 1-14-20 / 11:10 |
| Logged By: | CG |
| Drilling Company / Driller: | GeoLab |
| Drilling Method: | HSA |
| Total Boring Depth: | 9.0 ft BGS |
| Initial Saturation (ft)/Date: | NA |
| Static GW level (ft)/Date: | 2.38 ft BTOC (2-6-20) |
| Surface Elevation (ft): | 190.1 ft |
| Sampling Interval: | Continuous |

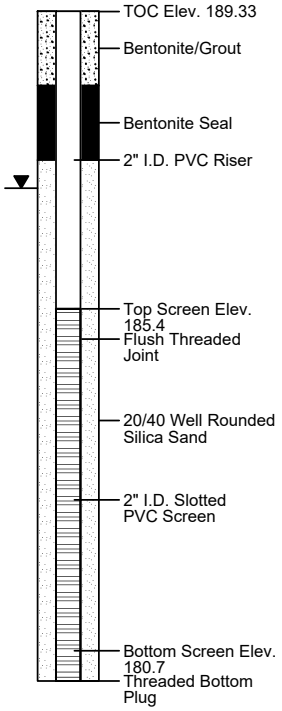
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 1-14-20 |
| Total Well Depth: | 9.1 ft |
| Screened Interval: | 3.9 ft - 8.6 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 9 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.1 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 190 | ▼ | CL | | CLAY, moderate plasticity, soft, moist, gray, no odor | 1 | N/A | 0* | 100% | 0 |
| 5 | 185 | | | | Shelby tube | | | | | 5 |
| 10 | 180 | | | | *(Boring terminated @ 9.0 ft BGS)* | | | | | 10 |
| 15 | | | | | | | | | | 15 |

**Well Schematic: MW-9**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

03-13-2020 \\Ppmbham\PPM_Projects_Overhead_Boring Log Drafts\40101501-SI\SB-13.bor

# LOG OF BORING: B-14 / MW-10

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-SI |
| Project Type: | Secondary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 1-14-20 / 10:37 |
| Logged By: | CG |
| Drilling Company / Driller: | GeoLab |
| Drilling Method: | HSA |
| Total Boring Depth: | 9.0 ft BGS |
| Initial Saturation (ft)/Date: | NA |
| Static GW level (ft)/Date: | 2.61 ft BTOC (2-6-20) |
| Surface Elevation (ft): | 190.0 ft |
| Sampling Interval: | Continuous |

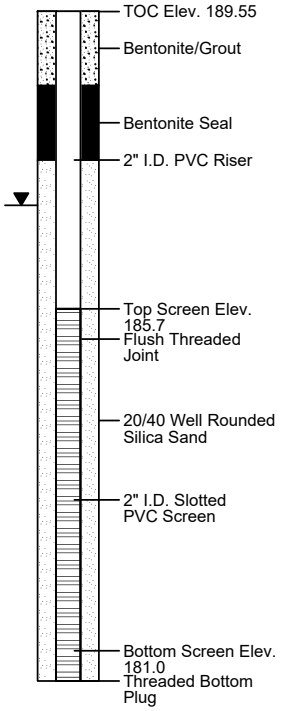
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 1-14-20 |
| Total Well Depth: | 9.0 ft |
| Screened Interval: | 3.8 ft - 8.5 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 12 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.0 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 190 | ▼ | CL | | CLAY, moderate plasticity, firm, homogeneous, moist, gray, mild petroleum-like odor | 1 | N/A | 5,050* | 100% |
| 5 | 185 | | | | SANDY CLAY, low to moderate plasticity, firm, homogeneous, brownish gray, strong petroleum-like odor | 2 | N/A | 7,200* | 100% |
| 10 | 180 | | | | *(Boring terminated @ 9.0 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-10**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

03-13-2020 \\Ppmbham\PPM_Projects_Overhead_Boring Log Drafts\40101501-SI\SB-14.bor

# LOG OF BORING: B-15 / MW-11

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-SI |
| Project Type: | Secondary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 1-14-20 / 9:00 |
| Logged By: | CG |
| Drilling Company / Driller: | GeoLab |
| Drilling Method: | HSA |
| Total Boring Depth: | 9.0 ft BGS |
| Initial Saturation (ft)/Date: | ~6.0 ft BGS |
| Static GW level (ft)/Date: | 2.44 ft BTOC (2-6-20) |
| Surface Elevation (ft): | 189.7 ft |
| Sampling Interval: | Continuous |

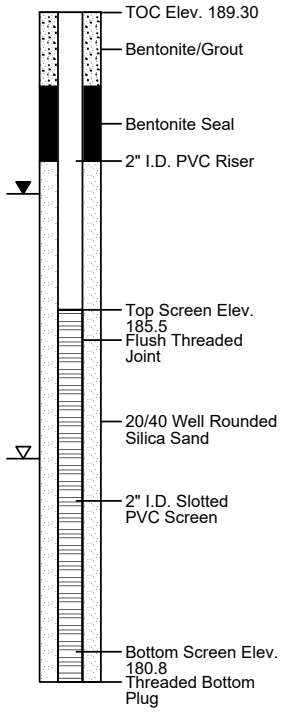
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 1-14-20 |
| Total Well Depth: | 9.0 ft |
| Screened Interval: | 3.8 ft - 8.5 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 17.5 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 189.7 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 189 | ▼ | SC | | CLAYEY SAND, well graded, fine to medium, medium dense, subangular, moist to wet, tan, mild petroleum-like odor | 1 | N/A | 510* | 100% |
| 5 | 184 | ▽ | SW | | SAND, well graded, fine to medium, medium dense, subangular, wet, gray, strong petroleum-like odor | 2 | N/A | 1,300* | 100% |
| 10 | 179 | | | | *(Boring terminated @ 9.0 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-11**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

03-13-2020 \\Ppmbham\PPM_Projects_Overhead_Boring Log Drafts\40101501-SI\SB-15.bor

# LOG OF BORING: B-16 / MW-12

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-SI |
| Project Type: | Secondary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 1-14-20 / 8:04 |
| Logged By: | CG |
| Drilling Company / Driller: | GeoLab |
| Drilling Method: | HSA |
| Total Boring Depth: | 9.0 ft BGS |
| Initial Saturation (ft)/Date: | ~1.0 ft BGS |
| Static GW level (ft)/Date: | 2.39 ft BTOC (2-6-20) |
| Surface Elevation (ft): | 189.7 ft |
| Sampling Interval: | Continuous |

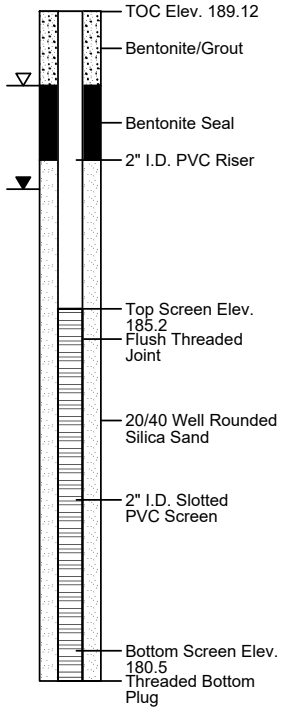
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Monitoring |
| Well Construction Date: | 1-14-20 |
| Total Well Depth: | 9.1 ft |
| Screened Interval: | 3.9 ft - 8.6 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 22 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 189.7 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 189 | ▽ ▼ | SW | | SAND, well graded, medium, medium dense, subangular, moist, brownish gray, strong petroleum-like odor | 1 | N/A | >11,000* | 100% |
| 5 | 184 | | | | SAND, well graded, medium, medium dense, subangular, moist, brownish gray, strong petroleum-like odor | 2 | N/A | >11,000* | 100% |
| 10 | 179 | | | | *(Boring terminated @ 9.0 ft BGS)* | | | | |
| 15 | | | | | | | | | |

**Well Schematic: MW-12**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

03-13-2020 \\Ppmbham\PPM_Projects_Overhead_Boring Log Drafts\40101501-SI\SB-16.bor

# LOG OF BORING: B-17 / MW-13D

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-SI |
| Project Type: | Secondary Investigation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 1-13-20 / 11:33 |
| Logged By: | CG |
| Drilling Company / Driller: | GeoLab |
| Drilling Method: | HSA |
| Total Boring Depth: | 49.3 ft BGS |
| Initial Saturation (ft)/Date: | ~6.0 ft BGS |
| Static GW level (ft)/Date: | 42.10 ft BTOC (2-6-20) |
| Surface Elevation (ft): | 190.3 ft |
| Sampling Interval: | Continuous |

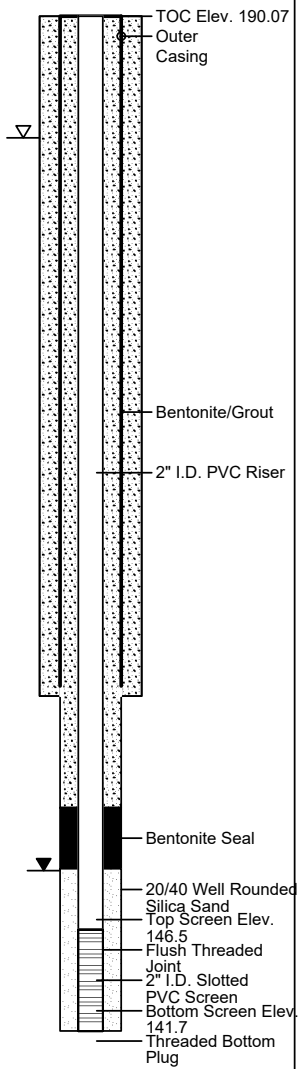
**Well Information:**

| | |
|---|---|
| Well Type: | Type III |
| Well Purpose: | Monitoring |
| Well Construction Date: | 1-16-20 |
| Total Well Depth: | 48.8 ft |
| Screened Interval: | 43.6 ft - 48.3 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 1.25 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.3 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 190 | | CL | | CLAY, moderate plasticity, soft, homogeneous, moist, gray, strong petroleum-like odor | 1 | N/A | | 100% |
| 5 | 185 | ▽ | SC | | CLAYEY SAND, poorly graded, fine to medium, dense, subangular, wet, gray, strong petroleum-like odor | 2 | N/A | 3,250* | 100% |
| 10 | 180 | | SW | | SAND, well graded, fine to medium, dense, subangular, wet, tan, mild petroleum-like odor | 3 | N/A | 170 | 100% |
| 15 | 175 | | CL | | CLAY, moderate to high plasticity, firm to hard, homogeneous, moist, purplish brown, no odor | 4 | N/A | 0* | 100% |
| 20 | 170 | | | | CLAY, wet, reddish brown, slight petroleum-like odor, not enough recovery to sample | | | | |
| 25 | 165 | | | | CLAY, moderate to high plasticity, firm to hard, moist, purplish brown, gray mottle, no odor | 5 | N/A | 0 | 100% |
| 30 | 160 | | | | CLAY, low plasticity, hard, moist, gray, reddish brown mottle, no odor | 6 | N/A | 0 | 100% |
| 35 | 155 | | | | No description.<br>No sample collection from approximately 34 ft to boring termination. | | | | |
| 40 | 150 | ▼ | | | | | | | |
| 45 | 145 | | | | No recovery | | | | |
| 50 | 140 | | | | *(Boring terminated @ 49.3 ft BGS)* | | | | |
| 55 | | | | | | | | | |

**Well Schematic: MW-13D**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

03-13-2020 \\Ppmbham\PPM_Projects_Overhead_Boring Log Drafts\40101501-SI\SB-17.bor

# LOG OF BORING: B-18 / MW-14

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-AWI |
| Project Type: | Additional Well Installation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 12-14-20 / 13:00 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling Services |
| Drilling Method: | HSA |
| Total Boring Depth: | 10.3 ft BGS |
| Initial Saturation (ft)/Date: | 1.0 ft BGS / 12-14-20 |
| Static GW level (ft)/Date: | 2.88 ft BTOC / 12-29-20 |
| Surface Elevation (ft): | 189.3 ft |
| Sampling Interval: | 5 ft |

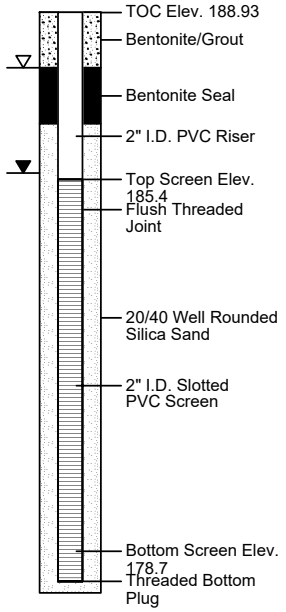
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Sampling |
| Well Construction Date: | 12-14-20 |
| Total Well Depth: | 10.4 ft |
| Screened Interval: | 3.6 ft - 10.2 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 11 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev.189.3 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 189 | ▽ ▼ | CH | | GRAVELLY CLAY, high plasticity, soft, homogeneous, saturated, light gray, no odor, gravel is coarse, rounded to sub-rounded, black staining | 1 | N/A | 0 | 100% |
| 5 | 184 | | CH | | GRAVELLY CLAY, high plasticity, firm, homogeneous, wet, light gray, no odor, gravel is fine to coarse, rounded to sub-rounded, chert | 2 | N/A | 0 | 50% |
| 10 | 179 | | SP | | SAND, no plasticity, homogeneous, poorly graded, fine to medium, dense, angular to subangular, saturated, orange, no odor | 3 | N/A | 0 | 100% |
| | | | | | *(Boring terminated @ 10.3 ft BGS)* | | | | |
| 15 | 174 | | | | | | | | |
| 20 | | | | | | | | | |

**Well Schematic: MW-14**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

01-14-2021 \\PPMBHAM03\PPM_Projects_Overhead_Boring Log Drafts\40101501-AWI\SB-18.bor

# LOG OF BORING: B-19 / MW-15

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-AWI |
| Project Type: | Additional Well Installation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 12-14-20 / 16:00 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling Services |
| Drilling Method: | HSA |
| Total Boring Depth: | 10.0 ft BGS |
| Initial Saturation (ft)/Date: | 9.0 ft BGS / 12-14-20 |
| Static GW level (ft)/Date: | 2.79 ft BTOC / 12-29-20 |
| Surface Elevation (ft): | 189.0 ft |
| Sampling Interval: | 5 ft |

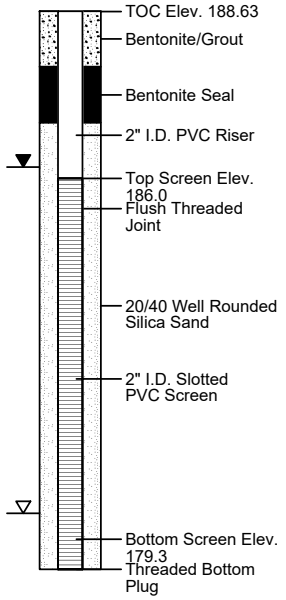
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Sampling |
| Well Construction Date: | 12-14-20 |
| Total Well Depth: | 9.5 ft |
| Screened Interval: | 2.7 ft - 9.3 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 20 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 189.0 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 189 | ▼ | | | GRAVELLY CLAY, high plasticity, soft, homogeneous, moist, light brown to gray, no odor, gravel is coarse, rounded to sub-rounded, black staining | 1 | N/A | 0 | 100% |
| 5 | 184 | | CH | | GRAVELLY CLAY, high plasticity, firm, homogeneous, moist, light brown to gray, no odor, gravel is fine to coarse, rounded to sub-rounded, chert | 2 | N/A | 0 | 100% |
| | | ▽ | SP | | SAND, no plasticity, homogeneous, poorly graded, fine to medium, dense, angular to subangular, saturated, orange, no odor | 3 | N/A | 0 | 100% |
| 10 | 179 | | | | *(Boring terminated @ 10.0 ft BGS)* | | | | |
| 15 | 174 | | | | | | | | |
| 20 | | | | | | | | | |

**Well Schematic: MW-15**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

01-20-2021 \\PPMBHAM03\PPM_Projects_Overhead_Boring Log Drafts\40101501-AWI\SB-19.bor

# LOG OF BORING: B-20 / MW-16

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-AWI |
| Project Type: | Additional Well Installation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 12-14-20 / 15:05 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling Services |
| Drilling Method: | HSA |
| Total Boring Depth: | 10.9 ft BGS |
| Initial Saturation (ft)/Date: | 9.0 ft BGS / 12-14-20 |
| Static GW level (ft)/Date: | 3.02 ft BTOC / 12-29-20 |
| Surface Elevation (ft): | 189.0 ft |
| Sampling Interval: | 5 ft |

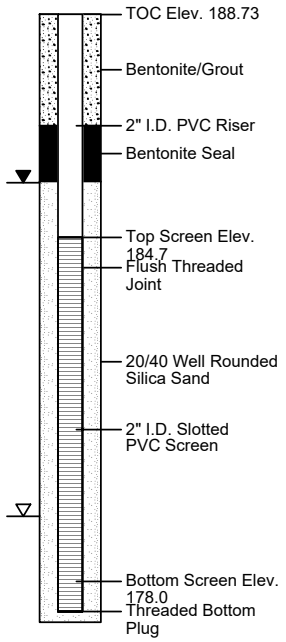
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Sampling |
| Well Construction Date: | 12-14-20 |
| Total Well Depth: | 10.9 ft |
| Screened Interval: | 4.1 ft - 10.7 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 21 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 189.0 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 189 | ▼ | | | GRAVELLY CLAY, high plasticity, soft, homogeneous, moist, light brown to gray, no odor, gravel is coarse, rounded to sub-rounded, black staining | 1 | N/A | 0 | 100% |
| 5 | 184 | | CH | | GRAVELLY CLAY, high plasticity, firm, homogeneous, moist, light brown to gray, no odor, gravel is fine to coarse, rounded to sub-rounded, chert | 2 | N/A | 0 | 100% |
| 10 | 179 | ▽ | SP | | SAND, no plasticity, homogeneous, poorly graded, fine to medium, dense, angular to subangular, saturated, orange, no odor | 3 | N/A | 0 | 50% |
| 15 | 174 | | | | *(Boring terminated @ 10.9 ft BGS)* | | | | |
| 20 | | | | | | | | | |

**Well Schematic: MW-16**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

01-14-2021 \\PPMBHAM03\PPM_Projects_Overhead_Boring Log Drafts\40101501-AWI\SB-20.bor

# LOG OF BORING: B-21 / MW-17

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-AWI |
| Project Type: | Additional Well Installation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 12-14-20 / 13:40 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling Services |
| Drilling Method: | HSA |
| Total Boring Depth: | 10.4 ft BGS |
| Initial Saturation (ft)/Date: | 4.0 ft BGS / 12-14-20 |
| Static GW level (ft)/Date: | 3.75 ft BTOC / 12-29-20 |
| Surface Elevation (ft): | 189.8 ft |
| Sampling Interval: | 5 ft |

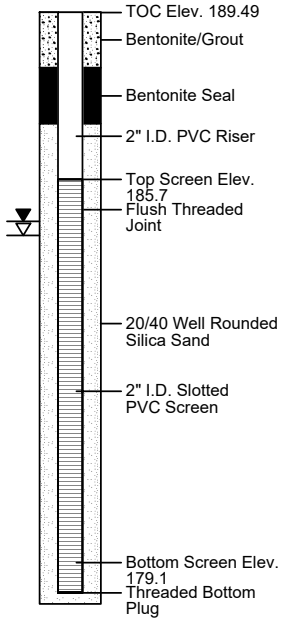
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Sampling |
| Well Construction Date: | 12-14-20 |
| Total Well Depth: | 10.6 ft |
| Screened Interval: | 3.8 ft - 10.4 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 28 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev.189.8 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 189 | ▼ ▽ | CH | | GRAVELLY CLAY, high plasticity, soft, homogeneous, moist, light brown to gray, no odor, gravel is coarse, rounded to sub-rounded, saturated | 1 | N/A | 0 | 100% |
| 5 | 184 | | CH | | GRAVELLY CLAY, high plasticity, soft, homogeneous, saturated, light gray, no odor, gravel is fine to coarse, rounded to sub-rounded, chert | 2 | N/A | 0 | 100% |
| 10 | 179 | | SP | | SAND, no plasticity, homogeneous, poorly graded, fine to medium, dense, angular to subangular, saturated, orange, no odor | 3 | N/A | 0 | 50% |
| 15 | 174 | | | | *(Boring terminated @ 10.4 ft BGS)* | | | | |
| 20 | | | | | | | | | |

**Well Schematic: MW-17**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

01-20-2021 \\PPMBHAM03\PPM_Projects_Overhead_Boring Log Drafts\40101501-AWI\SB-21.bor

# LOG OF BORING: B-22 / MW-18

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-AWI |
| Project Type: | Additional Well Installation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 12-14-20 / 12:30 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling Services |
| Drilling Method: | HSA |
| Total Boring Depth: | 10.1 ft BGS |
| Initial Saturation (ft)/Date: | 9.0 ft BGS / 12-14-20 |
| Static GW level (ft)/Date: | 2.90 ft BTOC / 12-29-20 |
| Surface Elevation (ft): | 188.9 ft |
| Sampling Interval: | 5 ft |

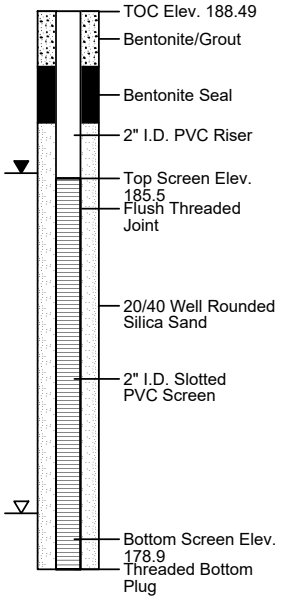
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Sampling |
| Well Construction Date: | 12-14-20 |
| Total Well Depth: | 9.8 ft |
| Screened Interval: | 3.0 ft - 9.6 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 20 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev.188.9 | Water Level | USCS | GRAPHIC | DESCRIPTION | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 188 | ▼ | | | GRAVELLY CLAY, high plasticity, soft, homogeneous, moist, light brown to gray, no odor, gravel is coarse, round to sub-rounded, black staining | 1 | N/A | 0 | 100% |
| 5 | 183 | | CH | | GRAVELLY CLAY, high plasticity, firm, homogeneous, moist, light brown to gray, no odor, gravel is fine to coarse, rounded to sub-rounded | 2 | N/A | 0 | 100% |
| 10 | 178 | ▽ | SP | | SAND, no plasticity, homogeneous, poorly graded, fine to medium, dense, angular to subangular, saturated, orange, no odor | 3 | N/A | 0 | 50% |
| 15 | 173 | | | | *(Boring terminated @ 10.1 ft BGS)* | | | | |
| 20 | | | | | | | | | |

**Well Schematic: MW-18**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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: B-23 / MW-19

PPM CONSULTANTS

**Client / Site Information:**

| | |
|---|---|
| Client: | D.C. Oil Company, Inc. |
| Site: | Quick Shop No. 98 |
| Location: | Brent, AL |
| Agency Interest No.: | UST19-05-03 |
| PPM Project No.: | 40101501-AWI |
| Project Type: | Additional Well Installation |

**Boring Information:**

| | |
|---|---|
| Date / Time: | 12-14-20 / 09:40 |
| Logged By: | AP |
| Drilling Company / Driller: | Technical Drilling Services |
| Drilling Method: | HSA |
| Total Boring Depth: | 11.0 ft BGS |
| Initial Saturation (ft)/Date: | 9.0 ft BGS / 12-14-20 |
| Static GW level (ft)/Date: | 3.92 ft BTOC / 12-29-20 |
| Surface Elevation (ft): | 190.0 ft |
| Sampling Interval: | 5 ft |

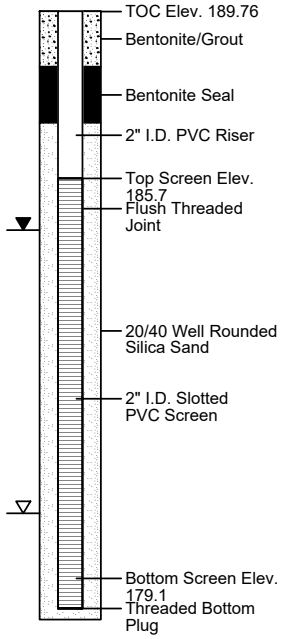
**Well Information:**

| | |
|---|---|
| Well Type: | Type II |
| Well Purpose: | Sampling |
| Well Construction Date: | 12-14-20 |
| Total Well Depth: | 10.9 ft |
| Screened Interval: | 4.1 ft - 10.7 ft |
| Screen Slot Size: | 0.01-in. |
| Development Method: | Sub pump |
| Gallons Purged: | 20 gal |

Water Levels
▼ Static GW level
▽ Initial Saturation

| Depth in Feet | Surf. Elev. 190.0 | USCS | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 0 | 190 | | | | | | |
| | | | 1 | N/A | 180 | 100% | GRAVELLY CLAY, high plasticity, soft, homogeneous, moist, light brown to gray, petroleum-like odor, gravel is coarse, rounded to sub-rounded, chert |
| 5 | 185 | CH | 2 | N/A | 350 | 100% | CLAY, high plasticity, hard, homogeneous, moist, gray, petroleum-like odor |
| 10 | 180 | SP | 3 | N/A | 75 | 50% | SAND, no plasticity, homogeneous, poorly graded, fine to medium, dense, angular to subangular, saturated, orange, petroleum-like odor |
| | | | | | | | *(Boring terminated @ 11.0 ft BGS)* |
| 15 | 175 | | | | | | |
| 20 | | | | | | | |

**Well Schematic: MW-19**




***NOTES:***

- Hand cleared to 4.0' BGS prior to drilling
-* Sample submitted for laboratory analysis
- Headspace conducted using an Eagle RKI calibrated to hexane
- 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.

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# APPENDIX C – TABLES

**TABLE 1**
**GROUNDWATER ELEVATION SURVEY DATA**
**QUICK SHOP NO. 98**
**BRENT, ALABAMA**

| WELL I.D. | DATE | SURFACE ELEVATION (ft) | TOP OF CASING ELEVATION (ft) | WELL DEPTH (ft-BTOC) | SCREENED INTERVAL (ft) | DEPTH TO WATER (ft-BTOC) | DEPTH TO PRODUCT (ft BTOC) | PRODUCT THICKNESS (ft) | GROUND-WATER ELEVATION (ft) |
|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 07/31/19 | 190.4 | 190.00 | 10.0 | 185.0-180.6 | 6.10 | -- | -- | 183.90 |
| | 02/06/20 | | | 10.0 | | 3.26 | -- | -- | 186.74 |
| | 12/29/20 | | | 11.0 | | 4.19 | -- | -- | 185.81 |
| | 03/01/21 | | | 10.0 | | 4.31 | -- | -- | 185.69 |
| | 06/01/21 | | | 10.0 | | 5.30 | -- | -- | 184.70 |
| | 09/01/21 | | | 10.0 | | 4.02 | -- | -- | 185.98 |
| MW-2 | 07/31/19 | 189.8 | 189.36 | 10.5 | 183.8-179.4 | 5.45 | -- | -- | 183.91 |
| | 02/06/20 | | | 10.6 | | 2.60 | -- | -- | 186.76 |
| | 12/29/20 | | | 10.4 | | 3.50 | -- | -- | 185.86 |
| | 03/01/21 | | | 10.4 | | 3.62 | -- | -- | 185.74 |
| | 06/01/21 | | | 10.5 | | 4.54 | -- | -- | 184.82 |
| | 09/01/21 | | | 10.6 | | 3.33 | -- | -- | 186.03 |
| MW-3 | 07/31/19 | 190.3 | 189.95 | 10.2 | 184.7-180.3 | 6.11 | -- | -- | 183.84 |
| | 02/06/20 | | | 10.4 | | 3.29 | -- | -- | 186.66 |
| | 12/29/20 | | | 10.2 | | 4.16 | -- | -- | 185.79 |
| | 03/01/21 | | | 10.2 | | 4.30 | -- | -- | 185.65 |
| | 06/01/21 | | | 10.3 | | 5.34 | -- | -- | 184.61 |
| | 09/01/21 | | | 10.2 | | 4.01 | -- | -- | 185.94 |
| MW-4 | 07/31/19 | 190.2 | 189.89 | 10.0 | 184.8-180.4 | 6.10 | -- | -- | 183.79 |
| | 02/06/20 | | | 10.1 | | 3.24 | -- | -- | 186.65 |
| | 12/29/20 | | | 10.1 | | 4.18 | -- | -- | 185.71 |
| | 03/01/21 | | | 10.1 | | 4.30 | -- | -- | 185.59 |
| | 06/01/21 | | | 10.1 | | 5.28 | -- | -- | 184.61 |
| | 09/01/21 | | | 10.1 | | 4.03 | -- | -- | 185.86 |
| MW-5 | 07/31/19 | 190.2 | 189.89 | 9.6 | 185.3-180.8 | 5.91 | -- | -- | 183.98 |
| | 02/06/20 | | | 9.7 | | 3.05 | -- | -- | 186.84 |
| | 12/29/20 | | | 9.7 | | 4.05 | -- | -- | 185.84 |
| | 03/01/21 | | | 9.6 | | 4.15 | -- | -- | 185.74 |
| | 06/01/21 | | | 9.5 | | 5.15 | -- | -- | 184.74 |
| | 09/01/21 | | | 9.6 | | 3.88 | -- | -- | 186.01 |
| MW-6 | 02/06/20 | 189.7 | 189.44 | 9.1 | 185.5-180.8 | 2.84 | -- | -- | 186.60 |
| | 12/29/20 | | | 9.1 | | 3.76 | -- | -- | 185.68 |
| | 03/01/21 | | | 9.1 | | 3.92 | -- | -- | 185.52 |
| | 06/01/21 | | | 9.0 | | 4.90 | -- | -- | 184.54 |
| | 09/01/21 | | | 9.0 | | 3.60 | -- | -- | 185.84 |
| MW-7 | 02/06/20 | 189.4 | 188.67 | 9.2 | 184.7-179.9 | 1.92 | -- | -- | 186.75 |
| | 12/29/20 | | | 9.1 | | 2.79 | -- | -- | 185.88 |
| | 03/01/21 | | | 9.1 | | 2.92 | -- | -- | 185.75 |
| | 06/01/21 | | | 9.1 | | 3.88 | -- | -- | 184.79 |
| | 09/01/21 | | | 9.1 | | 2.36 | -- | -- | 186.31 |
| MW-8 | 02/06/20 | 190.0 | 189.56 | 9.2 | 185.5-180.8 | 2.24 | -- | -- | 187.32 |
| | 12/29/20 | | | 9.1 | | 3.11 | -- | -- | 186.45 |
| | 03/01/21 | | | 9.2 | | 3.24 | -- | -- | 186.32 |
| | 06/01/21 | | | 8.9 | | 4.20 | -- | -- | 185.36 |
| | 09/01/21 | | | 9.0 | | 2.92 | -- | -- | 186.64 |
| MW-9 | 02/06/20 | 190.1 | 189.33 | 9.1 | 185.4-180.7 | 2.38 | -- | -- | 186.95 |
| | 12/29/20 | | | 9.1 | | 3.31 | -- | -- | 186.02 |
| | 03/01/21 | | | 9.1 | | 3.44 | -- | -- | 185.89 |
| | 06/01/21 | | | 9.1 | | 4.41 | -- | -- | 184.92 |
| | 09/01/21 | | | 9.1 | | 3.16 | -- | -- | 186.17 |

**TABLE 1**
**GROUNDWATER ELEVATION SURVEY DATA**
**QUICK SHOP NO. 98**
**BRENT, ALABAMA**

| WELL I.D. | DATE | SURFACE ELEVATION (ft) | TOP OF CASING ELEVATION (ft) | WELL DEPTH (ft-BTOC) | SCREENED INTERVAL (ft) | DEPTH TO WATER (ft-BTOC) | DEPTH TO PRODUCT (ft BTOC) | PRODUCT THICKNESS (ft) | GROUND-WATER ELEVATION (ft) |
|---|---|---|---|---|---|---|---|---|---|
| MW-10 | 02/06/20 | 190.0 | 189.55 | 9.0 | 185.7-181.0 | 2.61 | -- | -- | 186.94 |
| | 12/29/20 | | | 8.9 | | 3.67 | -- | -- | 185.88 |
| | 03/01/21 | | | 9.0 | | 3.77 | -- | -- | 185.78 |
| | 06/01/21 | | | 8.9 | | 4.76 | -- | -- | 184.79 |
| | 09/01/21 | | | 9.1 | | 3.49 | -- | -- | 186.06 |
| MW-11 | 02/06/20 | 189.7 | 189.30 | 9.0 | 185.5-180.8 | 2.44 | -- | -- | 186.86 |
| | 12/29/20 | | | 8.9 | | 3.45 | -- | -- | 185.85 |
| | 03/01/21 | | | 9.0 | | 3.60 | -- | -- | 185.70 |
| | 06/01/21 | | | 8.9 | | 4.58 | -- | -- | 184.72 |
| | 09/01/21 | | | 8.9 | | 3.36 | -- | -- | 185.94 |
| MW-12 | 02/06/20 | 189.7 | 189.12 | 9.1 | 185.2-180.5 | 2.39 | -- | -- | 186.73 |
| | 12/29/20 | | | 9.2 | | 3.31 | 3.30 | 0.01 | 185.82 |
| | 03/01/21 | | | 9.1 | | 3.45 | -- | -- | 185.67 |
| | 06/01/21 | | | 9.0 | | 4.46 | -- | -- | 184.66 |
| | 09/01/21 | | | 9.2 | | 3.21 | -- | -- | 185.91 |
| MW-13D | 02/06/20 | 190.3 | 190.07 | 48.8 | 146.5-141.7 | 42.10 | -- | -- | 147.97 |
| | 12/29/20 | | | 49.2 | | 6.71 | -- | -- | 183.36 |
| | 03/01/21 | | | 49.3 | | 30.18 | -- | -- | 159.89 |
| | 06/01/21 | | | 48.8 | | 25.31 | -- | -- | 164.76 |
| | 09/01/21 | | | 49.0 | | 23.57 | -- | -- | 166.50 |
| MW-14 | 12/29/20 | 189.3 | 188.93 | 10.4 | 185.4-178.7 | 2.88 | -- | -- | 186.05 |
| | 03/01/21 | | | 10.4 | | 3.06 | -- | -- | 185.87 |
| | 06/01/21 | | | 10.3 | | 3.96 | -- | -- | 184.97 |
| | 09/01/21 | | | 10.3 | | 2.71 | -- | -- | 186.22 |
| MW-15 | 12/29/20 | 189.0 | 188.63 | 9.5 | 186.0-179.3 | 2.79 | -- | -- | 185.84 |
| | 03/01/21 | | | 9.5 | | 2.98 | -- | -- | 185.65 |
| | 06/01/21 | | | 9.4 | | 3.88 | -- | -- | 184.75 |
| | 09/01/21 | | | 9.4 | | 2.55 | -- | -- | 186.08 |
| MW-16 | 12/29/20 | 189.0 | 188.73 | 10.9 | 184.7-178.0 | 3.02 | -- | -- | 185.71 |
| | 03/01/21 | | | 10.8 | | 3.17 | -- | -- | 185.56 |
| | 06/01/21 | | | 10.8 | | 4.05 | -- | -- | 184.68 |
| | 09/01/21 | | | 10.8 | | 2.74 | -- | -- | 185.99 |
| MW-17 | 12/29/20 | 189.8 | 189.49 | 10.6 | 185.7-179.1 | 3.75 | -- | -- | 185.74 |
| | 03/01/21 | | | 10.5 | | 3.89 | -- | -- | 185.60 |
| | 06/01/21 | | | 10.3 | | 4.84 | -- | -- | 184.65 |
| | 09/01/21 | | | 10.6 | | 3.61 | -- | -- | 185.88 |
| MW-18 | 12/29/20 | 188.9 | 188.49 | 9.8 | 185.5-178.9 | 2.90 | -- | -- | 185.59 |
| | 03/01/21 | | | 9.7 | | 3.00 | -- | -- | 185.49 |
| | 06/01/21 | | | 9.7 | | 4.00 | -- | -- | 184.49 |
| | 09/01/21 | | | 9.8 | | 2.86 | -- | -- | 185.63 |
| MW-19 | 12/29/20 | 190.02 | 189.76 | 10.91 | 185.7-179.1 | 3.92 | -- | -- | 185.84 |
| | 03/01/21 | | | 10.8 | | 4.07 | -- | -- | 185.69 |
| | 06/01/21 | | | 10.9 | | 5.03 | -- | -- | 184.73 |
| | 09/01/21 | | | 10.9 | | 3.86 | -- | -- | 185.90 |

*Notes:* *ft-BTOC - feet below top of casing*
*Elevations based on approximate NGVD of 190 feet above mean sea level as referenced from the Heiberger, Alabama USGS 7.5-Minute Quadrangle Topographic Map*

*Source:* *PPM Consultants, Inc.*
*40101501-CAPD*

**TABLE 2**
**SOIL ANALYTICAL SUMMARY**
**QUICK SHOP NO. 98**
**BRENT, ALABAMA**

| SAMPLE I.D. | SAMPLE DEPTH (ft BGS) | SAMPLE DATE | HEADSPACE READING (ppmv) | BENZENE (mg/kg) | TOLUENE (mg/kg) | ETHYL-BENZENE (mg/kg) | XYLENES (mg/kg) | TOTAL BTEX (mg/kg) | MTBE (mg/kg) | NAPH-THALENE (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| SB-5-1-3 | 1-3 | 07/16/19 | 720 | 0.018 | 0.204 | 0.086 | 0.547 | 0.855 | 0.011 | 0.112 |
| SB-5-4-6 | 4-6 | 07/16/19 | 4,400 | **4.220** | **93.600** | **31.700** | **148.000** | 277.520 | 0.130 | 10.000 |
| **SSCALs (GRP/SP Source Soil)** | | | | **0.0599** | **1.916** | **7.007** | **69.57** | -- | **0.2107** | **10.50** |
| SB-6-1-3 | 1-3 | 07/16/19 | 55 | <0.005 | 0.013 | <0.005 | <0.015 | 0.013 | <0.005 | <0.025 |
| SB-6-4-6 | 4-6 | 07/16/19 | 100 | <0.005 | 0.045 | 0.165 | 0.964 | 1.174 | <0.005 | *0.156* |
| **SSCALs (GRP/SP Source Soil)** | | | | **0.0599** | **1.916** | **7.007** | **69.57** | -- | **0.2107** | **10.50** |
| SB-7-1-3 | 1-3 | 07/16/19 | 0 | 0.014 | 0.050 | <0.005 | <0.015 | 0.064 | <0.005 | <0.025 |
| SB-7-4-6 | 4-6 | 07/16/19 | 0 | <0.005 | <0.005 | <0.005 | <0.015 | BDL | <0.005 | <0.025 |
| **SSCALs (GRP/SP Source Soil)** | | | | **0.0599** | **1.916** | **7.007** | **69.57** | -- | **0.2107** | **10.50** |
| SB-8-1-3 | 1-3 | 07/16/19 | 0 | <0.005 | 0.009 | <0.005 | <0.015 | 0.009 | <0.005 | <0.025 |
| SB-8-4-6 | 4-6 | 07/16/19 | >11,000 | **2.300** | **60.800** | **25.400** | **133.000** | 221.500 | 0.068 | 6.140 |
| **SSCALs (GRP/SP Source Soil)** | | | | **0.0599** | **1.916** | **7.007** | **69.57** | -- | **0.2107** | **10.50** |
| SB-9-1-3 | 1-3 | 07/16/19 | >11,000 | **3.150** | **127.000** | **47.200** | **346.000** | 523.350 | **0.624** | **64.800** |
| SB-9-4-6 | 4-6 | 07/16/19 | 5,000 | **1.850** | **57.200** | **25.500** | **160.000** | 244.550 | **0.888** | **17.300** |
| **SSCALs (GRP/SP Source Soil)** | | | | **0.0599** | **1.916** | **7.007** | **69.57** | -- | **0.2107** | **10.50** |
| B-10/MW6-2-3 | 2-3 | 01/14/20 | 70 | <0.005 | <0.005 | <0.005 | <0.015 | BDL | <0.005 | <0.050 |
| B-10/MW6-6-8 | 6-8 | 01/14/20 | 0 | <0.005 | <0.005 | <0.005 | <0.015 | BDL | <0.005 | <0.050 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-11/MW7-2-3 | 2-3 | 01/14/20 | 0 | <0.005 | <0.005 | <0.005 | <0.015 | BDL | <0.005 | <0.050 |
| B-11/MW7-6-8 | 6-8 | 01/14/20 | 0 | 0.006 | 0.009 | <0.005 | <0.015 | 0.015 | <0.005 | <0.050 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-12/MW8-2-3 | 2-3 | 01/14/20 | 0 | <0.005 | <0.005 | <0.005 | <0.015 | BDL | <0.005 | <0.050 |
| B-12/MW8-6-8 | 6-8 | 01/14/20 | 0 | <0.005 | <0.005 | <0.005 | <0.015 | BDL | <0.005 | <0.050 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-13/MW9-2-3 | 2-3 | 01/14/20 | 0 | <0.005 | <0.005 | <0.005 | <0.015 | BDL | <0.005 | <0.050 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-14/MW10-2-3 | 2-3 | 01/14/20 | 5,050 | **0.843** | 17.800 | 3.550 | 16.500 | 38.693 | <0.317 | 0.565 |
| B-14/MW10-6-8 | 6-8 | 01/14/20 | 7,200 | **0.514** | 17.200 | 2.380 | 12.400 | 32.494 | <0.214 | 1.830 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-15/MW11-2-3 | 2-3 | 01/14/20 | 510 | 0.049 | 0.407 | 0.029 | 0.184 | 0.669 | 0.015 | 0.060 |
| B-15/MW11-6-8 | 6-8 | 01/14/20 | 1,300 | **3.490** | **82.300** | 20.600 | **108.000** | 214.390 | <1.960 | 7.750 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-16/MW12-2-3 | 2-3 | 01/14/20 | >11,000 | **6.260** | **94.100** | 34.400 | **174.000** | 308.760 | 1.300 | 27.600 |
| B-16/MW12-6-8 | 6-8 | 01/14/20 | >11,000 | **15.100** | 16.900 | 6.510 | 33.900 | 72.410 | 1.090 | 2.940 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |

**TABLE 2**
**SOIL ANALYTICAL SUMMARY**
**QUICK SHOP NO. 98**
**BRENT, ALABAMA**

| SAMPLE I.D. | SAMPLE DEPTH (ft BGS) | SAMPLE DATE | HEADSPACE READING (ppmv) | BENZENE (mg/kg) | TOLUENE (mg/kg) | ETHYL-BENZENE (mg/kg) | XYLENES (mg/kg) | TOTAL BTEX (mg/kg) | MTBE (mg/kg) | NAPH-THALENE (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|---|
| B-17/MW13D-6-8 | 6-8 | 01/13/20 | 3,250 | **0.738** | **9.520** | 5.100 | 27.000 | 42.358 | 0.117 | 3.940 |
| B-17/MW13D-17-19 | 17-19 | 01/13/20 | 0 | **0.302** | 1.530 | 0.230 | 1.190 | 3.252 | <0.005 | <0.050 |
| **SSCALs (GRP/SP Source Soil)** | | | | **0.0599** | **1.916** | **7.007** | **69.57** | -- | **0.2107** | **10.50** |
| B-18/MW14-0-1 | 0-1 | 12/14/20 | 0 | <0.006 | <0.006 | <0.006 | <0.018 | BDL | <0.006 | <0.030 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-19/MW15-1-3 | 1-3 | 12/14/20 | 0 | <0.007 | <0.007 | <0.007 | <0.021 | BDL | <0.007 | <0.035 |
| B-19/MW15-4-6 | 4-6 | 12/14/20 | 0 | <0.006 | <0.006 | <0.006 | <0.018 | BDL | <0.006 | <0.030 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-20/MW16-1-3 | 1-3 | 12/14/20 | 0 | <0.007 | <0.007 | <0.007 | <0.021 | BDL | <0.007 | <0.035 |
| B-20/MW16-4-6 | 4-6 | 12/14/20 | 0 | <0.009 | <0.009 | <0.009 | <0.027 | BDL | 0.010 | <0.045 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-21/MW17-1-3 | 1-3 | 12/14/20 | 0 | <0.006 | <0.006 | <0.006 | <0.018 | BDL | 0.007 | <0.030 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-22/MW18-1-3 | 1-3 | 12/14/20 | 0 | 0.029 | 0.032 | <0.006 | <0.018 | 0.061 | <0.006 | <0.030 |
| B-22/MW18-4-6 | 4-6 | 12/14/20 | 0 | <0.006 | <0.006 | 0.007 | <0.018 | 0.007 | <0.006 | <0.030 |
| **SSCALs (On-Site) Commercial Worker** | | | | **0.2650** | **47.88** | **174.2** | **69.57** | **--** | **584.3** | **60.37** |
| B-23/MW19-1-3 | 1-3 | 12/14/20 | 180 | **0.606** | 0.938 | 0.117 | 0.416 | 2.077 | <0.007 | <0.035 |
| B-23/MW19-4-6 | 4-6 | 12/14/20 | 350 | **8.840** | **51.400** | **17.100** | 68.400 | 145.740 | *0.022* | 2.280 |
| **SSCALs (GRP/SP Source Soil)** | | | | **0.0599** | **1.916** | **7.007** | **69.57** | -- | **0.2107** | **10.50** |

*Notes:*
*ft BGS - feet below ground surface (approximate)*
*ppmv - parts per million by volume*
*mg/kg - milligrams per kilogram*
*BDL - below detection limit*
*Headspace analysis conducted with a RKI (calibrated to hexane)*
*BTEX/MTBE/Naphthalene analyses conducted per EPA Method 5035/8260*
*SSCALs - Site-Specific Corrective Action Limits*
*GRP/SP - Groundwater Resource Protection/Stream Protection*
***Bold** - indicates concentration exceeds SSCAL*

*Source:*
*PPM Consultants, Inc.*
*PPM Project No. 40101501-CAPE*

**TABLE 3**
**GROUNDWATER ANALYTICAL SUMMARY**
**QUICK SHOP NO. 98**
**BRENT, ALABAMA**

| SAMPLE I.D. | SAMPLE DATE | BENZENE (mg/L) | TOLUENE (mg/L) | ETHYL-BENZENE (mg/L) | XYLENES (mg/L) | TOTAL BTEX (mg/L) | MTBE (mg/L) | NAPH-THALENE (mg/L) |
|---|---|---|---|---|---|---|---|---|
| MW-1 | 07/31/19 | **8.240** | **19.000** | 1.190 | 6.140 | 34.570 | **0.940** | 0.200 |
| | 02/06/20 | **9.900** | **20.300** | **2.170** | 8.940 | 41.310 | **0.952** | 0.146 |
| | 12/29/20 | **6.550** | **8.350** | 1.400 | 5.190 | 21.490 | **0.720** | 0.145 |
| | 03/01/21 | **15.300** | **22.400** | **2.440** | 11.700 | 51.840 | **1.380** | *0.212* |
| | 06/01/21 | **14.900** | **25.200** | **2.980** | 12.300 | 55.380 | **2.080** | *0.278* |
| | 09/01/21 | **10.100** | **15.700** | **2.300** | 9.400 | 37.500 | **0.934** | *0.202* |
| **SSCALs (GRP/SP Source)** | | 0.0500 | 0.7950 | 2.058 | 175 | -- | 0.5721 | 0.5721 |
| MW-2 | 07/31/19 | **0.387** | 0.089 | 0.213 | 0.917 | 1.606 | 0.007 | 0.068 |
| | 02/06/20 | **0.359** | 0.340 | 0.490 | 1.150 | 2.339 | *0.004* | 0.088 |
| | 12/29/20 | **0.136** | 0.191 | 0.317 | 0.815 | 1.459 | *0.001* | 0.118 |
| | 03/01/21 | **0.121** | 0.579 | 0.539 | 1.640 | 2.879 | <0.010 | 0.163 |
| | 06/01/21 | **0.153** | 0.243 | 0.618 | 2.030 | 3.044 | *0.001* | 0.273 |
| | 09/01/21 | **0.244** | 0.730 | 0.812 | 3.190 | 4.976 | <0.020 | 0.278 |
| **SSCALs (GRP/SP Source)** | | 0.0500 | 0.7950 | 2.058 | 175 | -- | 0.5721 | 0.5721 |
| MW-3 | 07/31/19 | **0.181** | 0.023 | 0.042 | 0.047 | 0.293 | 0.005 | 0.022 |
| | 02/06/20 | 0.047 | 0.004 | 0.016 | 0.008 | 0.075 | 0.004 | 0.006 |
| | 12/29/20 | **0.056** | 0.004 | 0.030 | 0.011 | 0.101 | 0.003 | 0.021 |
| | 03/01/21 | **0.110** | 0.008 | 0.068 | 0.011 | 0.197 | *0.003* | 0.026 |
| | 06/01/21 | **0.126** | 0.014 | 0.076 | 0.036 | 0.252 | 0.004 | 0.044 |
| | 09/01/21 | **0.119** | 0.020 | 0.088 | 0.029 | 0.256 | 0.002 | 0.035 |
| **SSCALs (GRP/SP Source)** | | 0.0500 | 0.7950 | 2.058 | 175 | -- | 0.5721 | 0.5721 |
| MW-4 | 07/31/19 | **7.600** | **7.240** | 1.310 | 6.200 | 22.350 | 0.285 | *0.139* |
| | 02/06/20 | **3.560** | **4.070** | 0.575 | 3.550 | 11.755 | 0.152 | 0.099 |
| | 12/29/20 | **3.490** | **3.310** | 1.150 | 3.560 | 11.510 | 0.096 | 0.184 |
| | 03/01/21 | **5.250** | **13.600** | 1.770 | 8.000 | 28.620 | 0.105 | 0.312 |
| | 06/01/21 | **6.540** | **13.500** | **2.140** | 9.690 | 31.870 | 0.343 | **0.878** |
| | 09/01/21 | **5.220** | **11.300** | 1.910 | 9.280 | 27.710 | 0.146 | *0.429* |
| **SSCALs (GRP/SP Source)** | | 0.0500 | 0.7950 | 2.058 | 175 | -- | 0.5721 | 0.5721 |
| MW-5 | 07/31/19 | **8.730** | **29.200** | **2.610** | 14.400 | 54.940 | **14.000** | **0.684** |
| | 02/06/20 | **7.350** | **23.200** | **2.340** | 11.400 | 44.290 | **13.600** | 0.341 |
| | 12/29/20 | **9.040** | **39.400** | **3.960** | 21.000 | 73.400 | **11.700** | **0.704** |
| | 03/01/21 | **10.200** | **36.400** | **4.120** | 20.800 | 71.520 | **13.700** | **0.918** |
| | 06/01/21 | **9.800** | **40.400** | **3.020** | 17.200 | 70.420 | **27.800** | **1.260** |
| | 09/01/21 | **8.940** | **38.800** | **3.080** | 16.600 | 67.420 | **13.200** | ***0.846*** |
| **SSCALs (GRP/SP Source)** | | 0.0500 | 0.7950 | 2.058 | 175 | -- | 0.5721 | 0.5721 |
| MW-6 | 02/06/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | 0.004 | <0.001 |
| | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | 0.003 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | 0.018 | <0.005 |
| | 06/01/21 | 0.008 | <0.001 | <0.001 | <0.003 | 0.008 | 0.006 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | 0.004 | <0.005 |
| **SSCALs (GRP/SP POC)** | | 0.0445 | 0.7079 | 1.833 | 175 | -- | 0.5095 | 0.5095 |
| MW-7 | 02/06/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.001 |
| | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (GRP POC)** | | 0.1198 | 23.95 | 16.77 | 175 | -- | 0.4790 | 0.4790 |
| MW-8 | 02/06/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.001 |
| | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (Comm.)** | | 12.45 | 526 | 169 | 175 | -- | 22,870 | 31 |

**TABLE 3**
**GROUNDWATER ANALYTICAL SUMMARY**
**QUICK SHOP NO. 98**
**BRENT, ALABAMA**

| SAMPLE I.D. | SAMPLE DATE | BENZENE (mg/L) | TOLUENE (mg/L) | ETHYL-BENZENE (mg/L) | XYLENES (mg/L) | TOTAL BTEX (mg/L) | MTBE (mg/L) | NAPH-THALENE (mg/L) |
|---|---|---|---|---|---|---|---|---|
| MW-9 | 02/06/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.001 |
| | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (Comm.)** | | 12.45 | 526 | 169 | 175 | -- | 22,870 | 31 |
| MW-10 | 02/06/20 | **0.381** | 5.240 | 0.300 | 1.450 | 7.371 | <0.040 | 0.046 |
| | 12/29/20 | **0.211** | 1.720 | 0.112 | 0.556 | 2.599 | <0.005 | 0.040 |
| | 03/01/21 | **0.235** | 1.720 | 0.115 | 0.653 | 2.723 | <0.010 | *0.044* |
| | 06/01/21 | **0.172** | 0.400 | 0.057 | 0.378 | 1.007 | <0.005 | 0.055 |
| | 09/01/21 | **0.222** | 0.775 | 0.109 | 0.560 | 1.666 | <0.005 | 0.044 |
| **SSCALs (GRP POC)** | | **0.1261** | 25.22 | 17.66 | 175 | -- | 0.5045 | 0.5045 |
| MW-11 | 02/06/20 | **0.200** | **7.520** | **1.250** | 7.000 | 15.970 | <0.100 | 0.234 |
| | 12/29/20 | **0.184** | **2.460** | 0.332 | 1.610 | 4.586 | <0.040 | *0.098* |
| | 03/01/21 | **0.393** | **4.520** | 0.494 | 2.740 | 8.147 | <0.050 | *0.113* |
| | 06/01/21 | **0.221** | **1.850** | 0.238 | 1.120 | 3.429 | *0.002* | *0.063* |
| | 06/01/21 | **0.095** | **1.360** | 0.246 | 1.140 | 2.841 | <0.020 | *0.084* |
| **SSCALs (GRP/SP POC)** | | 0.0462 | 0.7344 | 1.901 | 175 | -- | 0.5285 | 0.5285 |
| MW-12 | 02/06/20 | **0.576** | **4.320** | 0.998 | 4.600 | 10.494 | 0.200 | 0.074 |
| | 12/29/20 | **0.428** | **1.160** | 0.322 | 1.440 | 3.350 | 0.212 | 0.037 |
| | 03/01/21 | **0.882** | **2.200** | 0.434 | 2.050 | 5.566 | 0.328 | *0.052* |
| | 06/01/21 | **0.602** | 0.666 | 0.164 | 0.881 | 2.313 | 0.280 | *0.035* |
| | 09/01/21 | **0.217** | 0.355 | 0.104 | 0.489 | 1.165 | 0.258 | *0.016* |
| **SSCALs (GRP/SP POC)** | | 0.0469 | 0.7466 | 1.933 | 175 | -- | 0.5373 | 0.5373 |
| MW-13D | 02/06/20 | 0.004 | 0.038 | 0.005 | 0.025 | 0.072 | <0.001 | <0.001 |
| | 12/29/20 | <0.001 | 0.002 | <0.001 | <0.003 | 0.002 | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | 0.001 | <0.001 | <0.003 | 0.001 | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (GRP/SP Source)** | | 0.0500 | 0.7950 | 2.058 | 175 | -- | 0.5721 | 0.5721 |
| MW-14 | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (Comm.)** | | 12.45 | 526 | 169 | 175 | -- | 22,870 | 31 |
| MW-15 | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (GRP POC)** | | 0.0671 | 13.42 | 9.391 | 134.2 | -- | 0.2683 | 0.2683 |
| MW-16 | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (GRP POC)** | | 0.0396 | 7.916 | 5.541 | 79.16 | -- | 0.1583 | 0.1583 |
| MW-17 | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (GRP/SP POC)** | | 0.0176 | 0.2806 | 0.7264 | 101.0 | -- | 0.2019 | 0.2019 |
| MW-18 | 12/29/20 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 03/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 06/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| | 09/01/21 | <0.001 | <0.001 | <0.001 | <0.003 | BDL | <0.001 | <0.005 |
| **SSCALs (GRP/SP POC)** | | 0.0176 | 0.2806 | 0.7264 | 101.0 | -- | 0.2019 | 0.2019 |
| MW-19 | 12/29/20 | **3.190** | **27.400** | 1.630 | 7.260 | 39.480 | 0.095 | *0.096* |
| | 03/01/21 | **5.780** | **31.200** | **4.170** | 18.300 | 59.450 | 0.119 | *0.171* |
| | 06/01/21 | **3.440** | **22.800** | **2.490** | 12.000 | 40.730 | *0.080* | *0.078* |
| | 09/01/21 | **4.560** | **36.600** | **3.880** | 19.200 | 64.240 | *0.094* | *0.136* |
| **SSCALs (GRP/SP Source)** | | 0.0500 | 0.7950 | 2.058 | 175 | -- | 0.5721 | 0.5721 |

**TABLE 3**
**GROUNDWATER ANALYTICAL SUMMARY**
**QUICK SHOP NO. 98**
**BRENT, ALABAMA**

| SAMPLE I.D. | SAMPLE DATE | BENZENE (mg/L) | TOLUENE (mg/L) | ETHYL-BENZENE (mg/L) | XYLENES (mg/L) | TOTAL BTEX (mg/L) | MTBE (mg/L) | NAPH-THALENE (mg/L) |
|---|---|---|---|---|---|---|---|---|
| **DUPLICATE RESULTS** | | | | | | | | |
| DUP (MW-5) | 07/31/19 | 8.560 | 28.300 | 2.500 | 14.300 | 53.660 | 13.800 | 13.800 |
| DUP (MW-3) | 02/06/20 | 0.041 | 0.003 | 0.017 | 0.007 | 0.068 | 0.003 | 0.003 |
| DUP (MW-3) | 12/29/20 | 0.066 | 0.005 | 0.032 | 0.011 | 0.114 | 0.003 | 0.021 |
| DUP (MW-3) | 03/01/21 | 0.106 | 0.007 | 0.064 | 0.011 | 0.188 | 0.003 | 0.025 |
| DUP (MW-3) | 06/01/21 | 0.132 | 0.015 | 0.077 | 0.036 | 0.260 | 0.004 | 0.046 |
| DUP (MW-3) | 09/01/21 | 0.119 | 0.019 | 0.082 | 0.026 | 0.246 | 0.002 | 0.035 |

*Notes:* *mg/L - milligrams per liter*
*BTEX/MTBE/Naphthalene analyses conducted per EPA Method 8260 (except naphthalene analyses on February 6, 2020 per EPA Method 8270)*
*SSCALs - Site-specific Corrective Action Limits (Proposed)*
*GRP - Groundwater Resource Protection*
*SP - Stream Protection*
*POC - Point of Compliance*
*BDL - below detection limits*
***Bold*** *values - indicates concentration exceeds Proposed SSCAL*

*Source:* *PPM Consultants, Inc.*
*40101501-CAPD*

# APPENDIX D – EQUIPMENT MANUFACTURER'S SPECIFICATIONS AND QUOTATIONS

**Request for Proposal**
**Quick Shop No. 98**
**Alabama Highway 5, Brent, Alabama**

PPM is requesting proposals for a dual-phase vacuum extraction (DPVE) system to remediate gasoline impacted soil and groundwater at the referenced facility. Bids are due, Friday, January 28, 2022 and the contract is anticipated to be awarded by June 30, 2022.

The equipment list should cover the majority of all necessary equipment but if found to be insufficient by Vendor; Vendor should identify the oversight and provide pricing to ensure functioning and capable systems.

At a minimum, for the purpose of evaluating each bidder's proposal, each cost estimate package should include the following:

- List of manufacturer and model number of all major system components
- Pump curve for all pumps and blowers
- Electrical loading table, showing all electrical equipment, horsepower (where applicable), maximum amperes, kilovolt-amps (KVA), etc.
- A description of any proposed changes as options to the cost estimate and summary cost for each line-itemed option. Any optional equipment shall not be included in the final cost of the equipment
- Diagram of the proposed equipment layouts

This specification is for delivery of an integrated, enclosed, pre-piped, pre-wired, fully equipped remediation system. The remediation system shall be capable of providing a continuous vacuum for the collection and treatment of subsurface vapors and liquids, which will contain petroleum hydrocarbons (including free-phase petroleum hydrocarbons). The system and system's components shall be fully contained within a weatherproof, enclosure. The interior of the enclosure shall contain sufficient lighting and light switches to adequately illuminate the interiors. Vendor is required to provide equipment, as specified herein, that will be fully functional and capable of continuous operation once the power and site piping connections are completed.

The enclosure and all equipment shall meet the National Electric Code (NEC) and the National Fire Protection Association (NFPA) Lighting Protection Code. **Available power supply is single-phase; therefore a convertor may be required**. The equipment shall be capable of operation within a Class 1, Division 2, Group D Hazardous Locations; and all the equipment shall be Underwriter's Laboratories (UL) or MET Laboratories listed. All motors and blowers in the hazardous areas shall be Totally Enclosed Fan-Cooled (TEFC). At a minimum, the electrical requirements are as follows:

- Include a maintained emergency stop button inside the building to shut down all motors simultaneously
- All conduit piping inside the building shall be positioned out of the main traffic areas to prevent slip/trip hazards
- All conduits entering or passing through areas that are classified as hazardous as defined by the NEC and/or NFPA shall be sealed using appropriate fittings and sealing compound as specified by code
- All wiring shall be in rigid conduit. NEC code limitations will apply to number and size of wires in conduits and junction boxes
- Provide flexible conduit from rigid conduit to all motors, solenoid valves, and devices for ease of maintenance. Flexible conduit shall not exceed 6 feet

- All switches and contacts inside building shall be UL or MET rated for Class 1, Division 2, Group D hazardous locations
- All switches inside tanks will be Class 1, Division 2, Group D hazardous locations
- Provide local disconnects as per NEC code for all motors
- At least one lighting fixture inside the building shall be 100-watt explosion-proof with a switch inside the building
- Junction boxes shall be suitable for the designated area and will comply with NEC guidelines
- Rigid conduit couplings, piping, and terminals shall be threaded
- There shall be no splices in any conduits or flex connectors. Splices are only permitted in junction or outlet boxes
- Wire nuts shall not be used for main motor or ground connections
- All wiring shall be permanently and legibly marked at each end
- Wire colors shall comply with NEC guidelines.

**The enclosure containing the system should be built on a structural steel frame and skid-mounted**. Optional enclosure can be submitted, but a skid-mounted enclosure is preferred. The unit shall have all components fully mounted, piped, wired, and equipped for transportation. The building shall consist of, but is not limited to, the following:

- Wind rated for 120 miles per hour (mph) wind load
- Professional Engineer (P.E.) stamped drawings of the building and details
- All metal frame construction. No wood load bearing members
- Structural steel base, roof frame, and vertical posts. Steel frame base to be painted for weather protection.
- Exterior shall be aluminum with outdoor rated finish
- System shall be suitable for pick up and placement with an overhead crane
- Exterior wall panels shall be track mounted and capable of being removed to allow access for servicing
- Walls, ceiling, and access doors shall be insulated with an R-10 value
- Furnish at least one lockable personnel door
- Flooring will consist of a water resistant marine grade wood, thoroughly painted with decking paint. An 18-inch center expanded metal grate will be located in the floor center to function as a drain and provide additional ventilation
- Provide 18 inches of clearance around all sides of major equipment located with the building structure for maintenance access
- The selected manufacturer shall provide a floor plan prior to approval of equipment layout.

The opening for influent piping shall be as follows:

- One 4-inch polyvinyl chloride (PVC) for air/water separator (AWS) influent

The DPVE system shall consist of an oil-sealed Liquid-Ring Vacuum Pump (LRVP) capable of delivering the specified airflow rates at the designated vacuums. Other pumps will be considered, but an oil-sealed LRVP is preferred. The vapor extraction system shall be installed and mounted in the enclosure in accordance with the manufacturer's specifications and arrive at the site pre-piped with all ancillary equipment associated with the LRVP, piping, components, valves, fittings, and appurtenances as specified below.

## 1.0 DPVE SYSTEM

### 1.1 DPVE Unit

- The remediation system will contain a LRVP capable of a flow rate of 525 actual cubic feet per minute (ACFM) @ 14.0 inches of Mercury (in Hg)
- TEFC motor, standard National Electrical Manufacturers Association (NEMA) frame designation. Minimum 1.15 service factor, for higher starting torque. Must meet NFPA Class 1, Division 2, Group D hazardous locations.
- Structural steel base frame
- Vacuum transducer integrated with telemetry system programmed to alarm at loss of vacuum or at a preset value
- Include seal oil temperature transducer, integrated with telemetry system
- Inlet piping shall be connected to the LRVP using 4-inch diameter Schedule 40 PVC
- Discharge piping shall be connected to the LRVP using 4-inch diameter Schedule 40 PVC complete with a sampling port and gauges/instruments that will accurately measure airflow, pressure, and temperature.

### 1.2 Primary Air/Water Separation Vessels (AWS-1)

- The LRVP shall have a stainless steel or aluminum vacuum-rated AWS-1 vessel
- Separation capacity of should be 15 gallons per minute (gpm) on average, with surge flow rates up to 30 gpm
- Liquid removal efficiency of 99.9 percent
- Vapor flow capacity should be greater than or equal to the associated LRVP capacity at any operating condition
- Clean out port, 6-inch diameter or larger, and designed to allow for easy opening. Flanged openings shall not be utilized
- Minimum 2-inch gate valve bottom drain/cleanout
- Stilling well installed on outside of tank and constructed of 3-inch (minimum) clear acrylic pipe for housing liquid level switches rated for Class 1, Division 1, Group D hazardous locations.
    - Level switch low (LSL) and Level switch high (LSH)
    - Level switch high high (LSHH)
    - Level probes shall be mounted on top of and protrude into the stilling well.
    - Sufficient flexible conduit and connections shall be provided to facilitate removal of the switch/connection box without disassembly
- Automatic vacuum relief valve sized for full flow
- One (1) 0-30 in. Hg vacuum gauge, easily accessible and at a visible location above knee level
- 2-inch air dilution valve with filter, complete with flow meter for measuring flow, ball valve, and silencer/filter
- Vacuum transducer integrated with telemetry system.

### 1.3 AWS-1 Transfer Pump

- The AWS-1 pump shall discharge water from the AWS-1 tank into an oil/water separator (OWS). The pump shall meet the following criteria:
- Self-priming or progressing cavity pump with Viton Stator rated for 40 gpm under 26-in. Hg vacuum
- TEFC motor with a minimum 1.15 service factor, for higher starting torque. Must meet NFPA Class 1, Division 2, Group D hazardous locations
- Pump shall handle silt, sand, and small grit without fouling or prematurely wearing out
- Pump fluid-end shall be designed with large passage to minimize seizing due to calcium or iron buildup

- Cast iron housing with bronze or stainless impeller, direct-driven
- Schedule 40 pipe and fittings
- Check valves installed both on the suction inlets and on discharge piping
- Suction pipe shall be constructed of Schedule 40 galvanized pipe cut and connected with a Fernco© for easy installation and removal
- Throttling valve, check valve, sample port and pressure gauge
- Push-button switch to activate pump, mounted inside building, within 18-inches of pump sampling port
- Hand-Off-Auto Control mounted in main electrical panel.

## 2.0 LIQUID TREATMENT

The liquid treatment system shall be constructed to receive water gravity fed from the external 2,000-gallon polyethylene tank. The system shall be composed of an OWS, bag filters, low profile air stripper, and transfer pump.

- Minimum 30-gpm capacity
- Design Air/Water Ratio must range between 100 and 200
- Use 50 percent air stripper tray efficiency, unless Vendor can provide documentation that the proposed air stripper efficiency is higher
- Base number of trays on the following influent concentrations and discharge requirements:

| Constituent | Influent Concentration (mg/L) | Discharge Limit (mg/L) |
|---|---|---|
| Benzene | 0.30 – 10 | 0.0155 |
| Toluene | 0.50 – 40 | 8.723 |
| Ethylbenzene | 0.050 – 4.0 | 1.244 |
| Xylenes | 0.050 - 21 | NA |
| MTBE | 0.010 – 28 | NA |
| Naphthalene | 0.075 – 1.2 | 0.620 |
| Oil & Grease | Not known | 15 |

### 2.1 Oil/Water Separator

Provide one (1) stainless steel or aluminum, OWS. The OWS shall be located inside the enclosure prior to the Air Stripper, and shall include the following:

- Minimum capacity shall be 30-gpm with 5 percent or higher removal efficiency
- Coalescing type with corrugated plate media designed to remove 60 micron oil droplets
- OWS shall be constructed of stainless steel or aluminum
- Lid must be sealed and gasketed to prevent vapors from entering the building and shall be suitably hinged to allow access
- Must be vented to the outside
- Top of OWS shall not be higher than 48 inches from the floor for ease of maintenance

- The OWS may gravity feed to the air stripper or utilize a sump and liquid transfer pump with LSL, LSH, and LSHH logic. Minimum 50-gallon capacity on sump. Lid must be gasketed and vented to outside.

## 2.2 Low Profile Air Stripper

Provide one (1) stainless steel or aluminum Low-Profile Air Stripper. Design shall be based on the performance criteria presented previously. The OWS shall be located inside the enclosure, and shall include the following:

- Minimum capacity of 30-gpm
- Provide sufficient quantity of trays to meet the effluent criteria (provided above)
- Air/Water flow ratio shall range between 100 and 200. Larger ratios can be used as long as Vendor can guarantee "No Blow By"
- Sieve tray air stripper designs shall not be used, no exceptions
- Effluent sump with sight glass/tube
- Include 10-inch minimum clean out port on sump and minimum 1-inch bottom mounted drain valve
- Aluminum AMCA rated spark resistant blower
- TEFC motor with a minimum 1.15 service factor, for higher starting torque. Must meet NFPA Class 1, Division 2, Group D hazardous locations
- Provide 8-inch flexible aluminum sound absorbing intake ducting
- Low air pressure switch in control panel
- Bypass switch for low air pressure alarm in control panel
- LSL, LSH, and LSHH sump level switches/probes
- Two (2) adjustable blast gate-type dampers to draw air from inside or outside the building
- Adjustable damper to control air flow set for previously specified flow rate
- Backpressure gauge
- Include minimum 8-inch single-wall galvanized discharge stack with exterior 90-degree sheet metal elbow or equivalent
- Include two 2-inch diameter inlet ports for connection of submersible pump discharge lines.

## 2.3 Air Stripper and OWS Transfer Pump

- Self-priming or progressing cavity pump with Viton Stator, or equivalent, rated for 50 gpm @ 75-ft discharge capacity
- TEFC motor with a minimum 1.15 service factor, for higher starting torque. Must meet NFPA Class 1, Division 2, Group D hazardous locations
- Pump shall handle silt, sand and small grit without fouling or prematurely wearing out Pump fluid-end shall be designed with large passages to minimize seizing due to calcium buildup
- Cast iron housing with bronze or stainless impeller, direct-driven
- Schedule 40 pipe and fittings, no exceptions
- Check valve installed both on the suction inlet and on discharge piping
- Suction pipe shall be constructed of Schedule 40 galvanized pipe cut and connected with a Fernco© for easy installation and removal
- Throttling valve, check valve, sample port and pressure gauge
- Vacuum relief valve, suitable for low pressure steam and water service
- Push-button switch to activate pump, mounted inside building, within 18-inches of pump sampling port
- Hand-Off-Auto Control mounted in main electrical panel.

### 2.4 Bag Filters

Provide two in-line bag filters constructed of stainless steel or aluminum with quick release bolts. Include ten 25-micron filter bags.

## 3.0 VAPOR TREATMENT

### 3.1 AWS-3

The vapor treatment system shall be composed of a tertiary air/water separator (AWS-3). The tertiary AWS-3 is the pre-air treatment tank that separates condensate from the soil vapors with the following features:

- Epoxy-coated carbon-steel, stainless steel, or aluminum
- Plastic tank not permitted
- 6-inch cleanout port
- One (1) 1/4-inch scavenger hose for condensate removal
- 4-inch diameter inlet and outlet
- Demister mounted to the top of AWS-3, to aid in the removal of condensate from the air stream.

### 3.2 Granular Activated Carbon Vessels

Provide two 1,000-pound granular activated carbon (GAC) vessels and new GAC designed to treat gasoline from the air stream. Each vessel should be designed to accommodate the entire airflow of the LRVP.

## 4.0 CONTROL PANEL

Vendor shall provide a single control panel for all equipment, sized for the proposed equipment, and based on electrical loading table provided by the Vendor. The remediation system control panel will be mounted on the outside of the remediation enclosure (along the front-end) at a minimum of 40 inches above the ground surface. The control panel housing will be a NEMA Type 4 enclosure with a single point connection containing all of the appropriate electrical components, disconnect, primary circuit protection, control voltage transformers, motor starters, thermal overloads, surge protection, programmable timer, 120 VAC duplex receptacle, and controls. The interior controls will be constructed to meet the NEC and applicable local electrical standards. The control panel for the system shall include, but is not limited to, the following:

- Complete control panel must be built by a UL or MET certified panel shop, UL or MET certified, and labeled accordingly
- Main fused disconnect is external to control panel
- All control circuits shall operate on 120 volt, 60 Hz current.
- Symcom brand motor saver, model no. 102, 3-Phase surge protector or equal
- NEMA 4 enclosure utilized for the main control panel and MSP style breakers
- Magnetic starters shall be utilized for all motor loads, properly sized and rated for the intended load
- Integral and adjustable thermal overloads with trip indicator for each motor load
- Power surge and lightning protection for all components
- Interior swing out sub panel for control switches, gauges, indicator lights, etc.
- Locking, blank front door panel
- Indicator lights for alarm conditions for each individual alarm
- All indicator lights must be LED type. No incandescent bulbs
- Control circuit power light
- Provide minimum of one spare N.O. auxiliary contact per contactor
- Include one 15-amp GFCI outdoor convenience outlet, with its own circuit breaker
- Padlock hasps on control panel door

- Motor circuit wiring shall conform to NEC Table 310-16, with a 0.87 wire size correction factor
- 2 ½-inch opening for electrical conduit pipe
- A system schematic shall be laminated and permanently affixed inside the electrical panel door.

### 4.1 Control Panel Switches and Gauges

The following are the minimum switches and gauges located on the front swing out panel:

- Liquid ring hour meter, non-re-settable
- Liquid ring, off/run/start
- AWS-1 pump, hand/off/auto
- Stripper pump, hand/off/auto
- OWS pump, hand/off/auto
- Stripper blower, on/off
- Low pressure alarm By-pass switch, On/Off, SPDT
- Magnehelic gauge, range 0-20 in-W.C., labeled stripper blower.

#### 4.1.1 The Dual-Phase Vacuum Extraction system requirements shall include the following:

- The motor shall be controlled by a selector switch labeled HAND-OFF-AUTO and shall have an amber status indicator light. When the selector switch is in the AUTO position, the system sensors shall control operation. When the selector switch is in the HAND position, the system shall operate regardless of system sensors. The system shall cease operation when both selector switch is in the OFF position
- The system shall be wired to automatically shut down under high water level conditions. When this fault condition occurs, a labeled alarm light will illuminate on the control panel and the LRVP motor will stop
- The system shall be wired to shut down due to loss of vacuum or a preset value. The condition must be cleared to restart the system
- The panel should clearly show the operator why the system shut down.

#### 4.1.2 The OWS system requirements shall include the following:

- The system shall be wired to automatically shut down under high water level conditions. When this fault condition occurs, a labeled alarm light will illuminate on the control panel and the LRVP motor will stop
- The system shall be wired to automatically shut down under high oil level conditions. When this fault condition occurs, a labeled alarm light will illuminate on the control panel and the LRVP motor will stop.

#### 4.1.3 The Air Stripper system requirements shall include the following:

- The blower motor shall be controlled by a separate selector switch labeled HAND-OFF-AUTO and shall have an amber status indicator light. When the selector switch is in the AUTO position, the system sensors shall control operation. When the selector switch is in the HAND position, the system shall operate regardless of system sensors. The system shall cease operation when the selector switch is in the OFF position
- The system shall be wired to automatically shut down under high water level conditions. When this fault condition occurs, a labeled alarm light will illuminate on the control panel and the LRVP motor will stop
- The LRVP systems shall be wired to shut down due to loss of blower pressure or a preset value. The condition must be cleared to restart the LRVP system.

**4.1.4 The Transfer Pumps (AWS-1, OWS, and Air Stripper Sump) requirements shall include the following:**

- The motors shall be controlled by a separate selector switch labeled HAND-OFF-AUTO and shall have an amber status indicator light.
- The transfer pumps shall be wired to continue to run under high water level conditions in the Primary Air/Water Separator and Air Stripper Sump.

### 4.2 LED Indicator Lights

The following are the minimum indicator lights located on the front swing out panel:

- LRVP running
- AWS-1 Transfer pump running
- OWS Transfer pump running (if required)
- Sump Transfer pump running
- Air Stripper Blower running.

### 4.3 Disconnect

Include a service disconnect to be installed and looped out by others. The requirements of the service disconnect are as follows:

- Sized to meet the load requirements of the proposed system
- Fused main disconnect, NEMA 4
- Meter base
- Weather head for electrical inlet installed a minimum of 12 feet above grade. Weather head shall be shipped loose. Loop out supplied by others.

## 5.0 CONTROL AND TELEMETRY SYSTEM

The DPVE unit is to be equipped with a programmable logic controller (PLC) and telecommunication alarm system to provide immediate phone and email notification should system shutdown occur. The alarm system will be programmed to automatically contact specific addresses on a designated time interval until the alarm is acknowledged. The telemetry system will provide information on the causes of shutdown and will provide the capability to restart or shutdown the systems from a remote location via a web link. A PLC shall control system operation. All control signals shall be routed through the PLC, except for the hand side of the HOA switch, which may be hardwired to the motor starter. All motor starters shall be controlled via PLC outputs and supply a "running" feedback signal to the PLC via the starter auxiliary contacts. All fault lights shall be controlled via PLC outputs. The system shall also have a system reset button wired into the PLC. The telemetry system shall show runtime statistics and counters as well as diagnostic indicators on the causes of shutdown and provides the capability to restart the remediation system from a remote location. The telemetry system must send alarms and daily reports in the form of email via wireless service.

- Minimum 24-hour battery back-up system
- UL or MET listed surge suppressor
- Internet access to telemetry should be provided through a cellular modem with an external antennae
- System must provide reports by email
- Built-in hour meters to monitor uptime, downtime and accumulated duration of each alarm
- Built-in cycle counters
- Include a copy of any software required to remotely access the system.

The system inputs shall consist of, but is not limited to, the following:

- LRVP pump state (on/off)
- AWS-1 high level
- Low air stripper blower pressure
- High level air stripper sump
- Groundwater totalizer (pulse)
- Vacuum (analog)
- Vacuum pump electric motor amperage (analog)
- Vacuum pump discharge air temperature (analog)
- Electricity on/off
- Electrical phase monitor condition
- OWS high level (unless otherwise specified)

The system outputs shall consist of, but is not limited to, the following:

- Restart for LRVP
- Shutdown for LRVP
- Automatic/Remote control option (programmed to meet design needs).

## 6.0 MISCELLANEOUS

### 6.1 Noise

The maximum noise level shall be no greater than 85 decibels inside the unit and 70 decibels 20-feet outside the unit. Any noise reducing components shall be properly ventilated and should not limit access to the mechanical or electrical components.

### 6.2 Building Heater

Furnish a building heater with the following provisions:

- Internally floor-mounted
- 3,000/3,500-watt rating, resistance type
- Suitable for Class 1, Division 2, Group D hazardous locations
- Integral XP thermostats.

### 6.3 Ventilation

Furnish a building ventilation fan(s) that is explosion-proof.

### 6.4 Water Meters

Flow totalizing water meters will be required to perform the following:

- AWS-1 discharge meter shall be minimum 1-inch, compatible with the flow rates specified. Totalizer must be mechanical and require no internal or external power source to operate. Meter body shall be of brass construction with Viton seals and be compatible with hydrocarbons. Must have inlet screen
- Air Stripper Sump discharge meter shall be minimum 1-inch, compatible with the flow rates specified. Totalizer must be mechanical and require no internal or external power source to operate. Meter must be equipped with an XP remote output for connection to the telemetry system. Include the necessary hardware/software to synchronize the readings should the two differ. Meter body

shall be of brass construction with Viton seals and be compatible with hydrocarbons. Must have inlet screen
- All meters shall be mounted to facilitate ease of removal for routine inspection and cleaning.

### 6.5 System Drawings

Within 14 days of notice to proceed, the Vendor shall submit for review and approval all of the drawings and documentations necessary for PPM to obtain a permit for the system and its contents, including, but not limited to the following items:

- Scaled shop drawings including the following: Electrical Schematic; Control Panel Layout Process and Instrumentation Diagram; System Layout; and Power Distribution
- Manufacturer's names, model/part numbers, and performance data on all major equipment components.

### 6.6 The Operations and Maintenance (O&M) Manuals

Vendor shall provide two hard copies and an electronic copy of the system Operations and Maintenance (O&M) Manual at the time of system delivery. The O&M manual shall include, at a minimum, the following: list of equipment items; shop drawings; list of description of alarm conditions; copy of all major equipment manufactures literature (major components), performance specifications, and recommended O&M; equipment warranties; startup and shutdown procedures; maintenance schedule according to the manufacturer's recommendation for major components; troubleshooting guide; and customer service and technical support contacts for major pieces of equipment.

### 6.7 Technical Support

Vendor must provide the PPM, via the telephone, technical support for troubleshooting, equipment repair and replacement consulting, programming, or any other expertise in order to maintain and successfully operate the proposed equipment as long as the equipment remains the property of the D. C. Oil Company, Inc. During the one-year warranty period, Vendor must provide free onsite trouble shooting once it has been determined that the problem cannot be solved via the telephone.

### 6.8 Start-up and Training

The equipment supplier shall provide adequate training on proper use and maintenance of the remediation system to the technical personnel on an approved startup date. PPM will provide a minimum of 14-day notice to the manufacturer to allow scheduling of an on-site start-up/technical assistance event.

### 6.9 General System Requirements

All system components shall comply with the guidelines established by the Occupational Health and Safety Administration (OSHA), National Electrical Code (NEC, 2014 Edition), and all applicable American Society of Testing and Materials (ASTM) standards. It is the sole responsibility of the equipment manufacturer to ensure substantial compliance of the system.

All system components shall be constructed of modular assembly to allow easy access for repair. System components shall be separately removable from the system through the use of unions, quick connects, flexible connectors, etc. All system components (i.e., manifolds, control panels, piping, etc.) shall be constructed to be easily disassembled, inspected, repaired, or replaced in the field.

Equipment supplier shall test each system thoroughly for proper operation. Testing shall be done at operating pressures, temperatures, and flow rates at the minimum and maximum conditions specified for the system. Testing shall be done at the supplier's facility for a minimum of eight hours. Testing shall verify all high temperature, high level, low level, loss of phase, and all related system safety devices are

functioning properly. The telemetry system shall be tested ensuring that each designated channel is properly integrated and configured to call all assigned phone numbers. Testing should reveal liquids, air, or gaseous leaks within the system and all appropriate repairs shall be conducted at the equipment manufacturer's facility prior to delivery to the site. A copy of the test results and changes made, if any, must be provided to the PPM, upon request.

Equipment supplier shall warrant all equipment against faulty design, defective or improper materials, and poor workmanship for a period of **one year** after the PPM accepts delivery of the equipment. If any defects, failures, or substandard performance occur during that period, the supplier shall make all necessary or desirable alterations, repairs, and replacements at no cost to D. C. Oil Company, Inc. nor PPM. When a problem arises, PPM will make the determination as to the cause of the problem and promptly notify the equipment supplier. Equipment supplier shall have 24 hours to respond and develop a resolution and/or submit a plan/schedule to repair the problem. Non-submittal of response shall constitute equipment supplier's acknowledgment of responsibility.

## 7.0 EXTENDED WARRANTY

PPM requests a separate line item price for an extended 3-year warranty for the system to cover parts and labor for the system and components. Details and requirements of the warranties shall be attached to the proposal. This may or may not be included with the system purchase.

# Proposal For System Purchase

## Prepared For: PPM Consultants

PRMFiltration

*Environmental Remediation & Landfill Equipment Solutions*

**Created by:**

Scott Freeman
Product Recovery Management, Inc.

**Prepared for:**

Matthew Ebbert
PPM Consultants

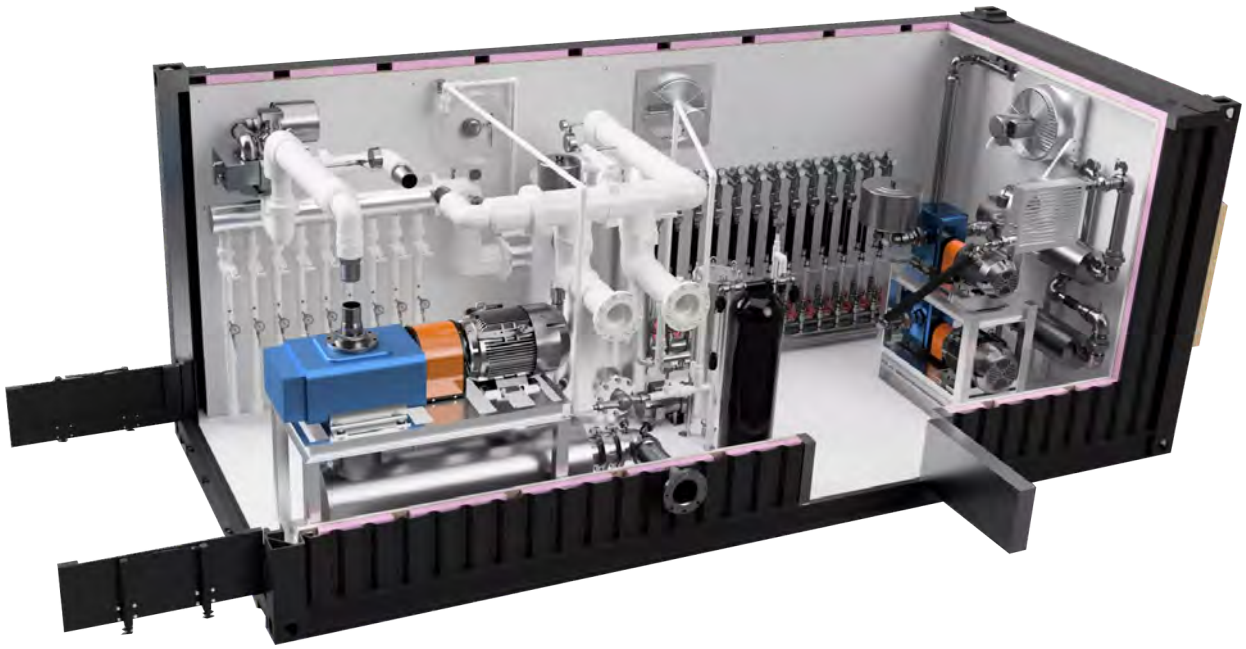
**Product Recovery Management, Inc.**
200 20th Street
Butner, NC, 27509, United States

| Quote 9187<br>Due Date: Feb 3, 2022 | Sales Rep: Scott Freeman<br>scott.freeman@prmfiltration.com \| (919) 957-8890 |
|---|---|

| Sold To | Ship To |
|---|---|
| MatthewEbbert<br>PPM Consultants<br>5555 Bankhead Highway<br>Birmingham, AL 35210 | Quick Shop No. 98<br>C/O: PPM Consultants<br>Alabama Highway 5<br>Brent, Alabama |

# Type of System:
# Dual Phase Vacuum Extraction System

# (8' x 40' Enclosed Seabox)



*(example image, actual system will differ)*

*Click for details on the PRM 3D Model developed in Fuzion*

# Proposed System

**PRM proposes to provide a fully packaged remediation system for your project in accordance with the design specifications. The equipment is itemized in the written proposal below. Upon award of the project, PRM will comission this system to be drawn by our engineering department as a 3D model in the same concept form as shown on the intro page of this proposal.**

## Enclosed Seabox Container

- Plywood treated floor, epoxy coated for slip resistance
- Double end doors and a single side door
- Framed interior with R-10 value insulation
- Wall vents throughout for proper ventilation.
- Interior to be rated and wired for Class 1 Div II in classification
- Thermostatically controlled hazardous location exhaust fan with fan guard for classified side, exterior louver, exterior finger guard, and sound hood.
- Hazardous location fluorescent lights w/ switch
- (2) 1800 W XP Heaters
- 18" Expanded metal grate in floor for drainage
- Interior walls will be covered with sound attenuation insulation to reduce decibel ratings
- Emergency push stop button on interior of enclosure
- Includes full fabrication of treatment system, including plumbing, electrical, and thorough testing as well as labeling.

## DPE System

**Liquid Ring Pump Package, includes the following:**

- Travaini liquid ring pump model TRO600V-1A
- Nominal Capacity : 525 ACFM @ 14" Hg
- Pump Speed : 1750 RPM
- Pump Materials : Cast iron housing; ductile iron impeller; 420 SS shaft
- Shaft Seals : SiC/C faced mechanical seals with Viton elastomers
- Electric Motor : 40 HP; 1750 RPM; 230/460V/3 Ph/60 Hz; TEFC, Premium Efficiency
- Rated for Class 1, Division 2 Hazardous Locations
- Monoblock assembly complete with flexible coupling and guard
- Sealing Fluid Recirculation System:
- Sealing fluid separator tank/reservoir with sight gauge, pressure gauge, high temp
- RTD & Temperature transmitter for seal oil
- High efficiency discharge separator element with oil scavenger line
- Pump discharge and inlet temperature gauge
- Inlet Check valve, vacuum gauge and sample port
- Vacuum Transmitter
- Discharge exhaust to side of enclosure

## DPE Inlet Manifold

- DPE Inlet will consist of a Single inlet leg, plumbed directly into the Moisture Separator
  - Liquid filled  vacuum gauge
  - Sample port
  - Inlet will plumb through walls for others to connect to

## Moisture Separator

- PRM model MS-200 moisture separator, aluminum construction. Designed for hi-vac application.
- Separator will include the following
  - Centrifugal design with bolt down lid and 6" clean out.
  - Solberg 245P inlet filter, filter will be integral to MS tank design
  - 1” manual drain valve
  - 2” Gate valve for dilution air mounted on MS tank. Includes inlet filter/silencer
  - 0-30” Hg Vacuum gauge
  - Dwyer 4" Pitot tube and differential pressure gauge for flow readings
  - Sight glass assembly mounted to side of tank with 3 float stem switch to control transfer pump, and high level shut off

## MS Transfer Pump

Continental Pump Model CPML67 progressive cavity transfer pump

- Coupled to a 2 HP 460V 3 phase TEFC motor
- Ball valves and unions on the inlet and discharge
- Pres gauge, check valve, ball valve, valved sample port, and PRM Pulse water meter plumbed on discharge side
- Push button local switch to activate pump manually, will be rated for XP location
- Discharge piping will plumb to OWS

## Oil Water Separator

- PRM model OWS-40 Oil Water Separator
- 2" inlet/outlet
- 2" adjustable oil skimmer, outlet on either side
- (2) 1" air vents
- 2" wide gasketed lid w/ easy turn retainers
- Poly sump for discharge water
- Three float stem mounted in the sight tube to control the transfer pump
- Product will gravity drain to exterior for others to connect to

## Transfer Pump

- Ebara Model CDU70 centrifugal transfer pump
- Coupled to a 1 HP  3 phase TEFC motor
- Rated for 40 GPM
- Ball valves and unions on the inlet and discharge
- Pres gauge, check valve, ball valve, valved sample port
- Push button local switch to activate pump manually, will be rated for XP location
- Discharge piping will plumb to Air Stripper

## Air Stripper

- PRM Model AST-243 Air Stripper, stainless steel construction, 24” wide x 48” long with 4 trays
- 7.5 Hp Pressure blower 480V, 3 Phase,  TEFC blower
- Design Flow rate of  40 GPM
- Sump pressure gauge
- Manual sump drain valve
- Three float stem mounted in the sight tube to control the transfer pump
- Pressure Gauge and Sample port will be plumbed on outlet of discharge of AST blower
- Stripper is sized to meet objectives considering that the extraction system is dualphase extraction.  the air stripper is rated for up to 65gpm hydraulic flow.

## Transfer Pump

- Ebara Model CDU120 centrifugal transfer pump
- Coupled to a 3 HP 460V 3 phase TEFC motor
- Rated for 50 GPM
- Ball valves and unions on the inlet and discharge
- Pres gauge, check valve, ball valve, valved sample port and PRM Pulse water meter plumbed on discharge side
- Push button local switch to activate pump manually, will be rated for XP location
- Discharge piping will plumb to Air Stripper

## Bag Filtration

- (2) PRM  Bag Filter housings, 8" Dia x 30" long
- 2" I/O, 100 psi rating, 100 gpm rating
- SS Strainer basket sized for #2 trade size bag
- (25) count of 25 micron bag filters included
- Ball valves on inlet and outlet
- Pressure gauges and sample ports

**Product Recovery Management, Inc.**
200 20th Street
Butner, NC, 27509, United States

## Moisture Separator

- Secondary Air Water Separator drums - 85 Gallon
- Demister elements installed in top of tanks
- 1” manual drain valve
- 1/4" Scavenger line
- Plumbing from blower discharge prior to discharge out side of enclosure to carbons

## Vapor Phase Carbon Vessels

- (2) PRM  VP-1000 Phase Carbon Vessels
- Each Filled with 1000 lbs of Granulated 4x10 Re-Activated Carbon (see options for virgin)
- 4" inlet/out connection ports
- Drain valve
- Units will ship filled, but loose for others to tie into system.  Discharge stack also responsibility of others

## Main System Industrial Control Panel

- NEMA 4 enclosure will mount on exterior of the enclosure. Panel will be 3rd party certified.
- Hand-Off-Auto switches and green running lights and red alarm lights on HMI
- Intrinsically safe relays for all switches were applicable
- Contacts and relays
- Motor starters with thermal overload and circuit protection.
- Siemens S7-1200PLC  with color HMI touch screen
    - 7” color Comfort HMI with complete HMI system control
    - Remote I/O mounted in panel board
- Includes all license fees, Smartservice for Internet based connectivity and control via secure log in.
- All reporting will be via email or text messaging through a messaging service.
- Wireless setup will be an integrated cradle point router system with Verizon 4G communications and high gain antenna. The PRM provided Telemetry allows for ease of remote login to the system.
- PRM will provide and integrate wireless service prior to system arriving
- GFCI all weather outlet located underneath control panel
- Standard lightning protection module
- CyberPower 825 UPS and surge protector
- System will restart automatically if it is safe to do so.

Note that PRM may be required to substitute the PLC system with Allen Bradley or Unitronics at our discretion based upon global supply issues.

**SINGLE PHASE TO THREE PHASE**

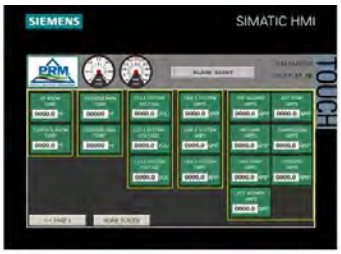
The client has advised that three phase power is not available at this site.
PRM will provide single phase to three phase conversion for all motors that are certified for the application. The conversion will be done while maintaining minimum motor horsepower requirements at proper site voltage. Since the application is single phase and reliability is in necessary for remote applications, PRM would ask the client to consider a consultation during the design phase to see if 3 phase becomes available and if not, that the design is thoroughly reviewed.

PRM has included single phase to 3phase power chokes for the 2 larger motors which may not be provided by others. PRM recommends thoroughly reviewing these details.

A Meter base has been excluded from this proposal as PRM would need to consult with POCO on suitable equipment if the system is to remain this size with 1 phase power.

## SCADA Interface

PRM uses a program interface that is accessible locally or remotely through our secure internet connection. PRM has thousands of connected SCADA interfaces in the field and the interface below is a typical representation of a typical remediation system.
PRM has the flexibility to customize per client request.



## System Load Center

- PRM has placed all circuit breakers in an adjacent 200A load center Main Breaker panel. The load center serves to minimize risk of Arc Flash or Shock hazards associated with operations and troubleshooting of the system.
- 400 Amp , 3 phase load center with main breaker mounted on trailer interior
- Individual circuit breakers for branch circuit protection of individual motors and loads
- Breaker locks will be provided for each breaker in the panel.
- Breaker panel is properly grounded and bonded and will comply with all provisions for grounding as specified in the 2011 NEC.
- Main power will enter load center and all distribution of power shall be made from here.

**Miscellaneous**

- Delivery will be via truck, unloading provision must be onsite at time of delivery
- Includes 1 year warranty
- Includes (2) O&M manuals
- Two sets of as builts one-line electrical drawings
- Includes full submittal package for approval prior to construction
- Includes two days of on-site startup and training
    - Client advises that the building Third Party Certifications are no longer necessary

Power at the above referenced facility is: 480V three phase

**Please note that a system connected to an open delta electrical system can cause warranty issues. Please see Warranty disclaimer below. Warranty issues are at the discretion of PRM.**

End of written proposal. Please see attached warranty disclaimer and security agreement. If your project payment schedule includes progress payments, then a security agreement may not be required. The written security agreement is intended to reserve PRM's right of ownership of the equipment in the event of a default of payment due to bankruptcy or some other unforeseen event. A security agreement is required in order for PRM to file for a UCC for the equipment.

We have quoted prices with terms that we feel best represent the client's needs based on review of the request. PRM can offer flexible alternative payment terms on the project based on customer request with terms up to 270 days. Note that if PRM has provided progress payment terms, these terms are structured to offer the client the best overall value as we have reduced pricing and not included any financing terms for the project. Extended payment terms do incur pricing increases due to the cost of PRM internally financing projects for customers due to the cost of carrying money for these durations. If we have quoted with terms that you prefer to change, please contact your sales agent to discuss. Note that extended terms are typically offered on State or Federally funded projects where the funding structure is such that extended terms may be required.

*********IMPORTANT*********

Upon taking receipt of equipment that has physical signs of damage, it is the responsibility of the client to document that damage on the Bill of Lading at the time of receipt of the equipment. In the event that the Bill of Lading is not properly marked and the damage is visible, PRM has no ability to make a claim against the carrier and thus the recipient would become responsible for all charges of damage repairs. The client must also notify PRM Corporate headquarters in writing within 24 hours with a written description of all damage as well as digital images of the damage. PRM selects the best carriers in the nation to do our transporting however there is always potential for damage, especially on longer journeys. Our carriers all carry freight damage insurance which we can make claims against, but only if we follow the rules and the most critical rule is that the damage must be documented on the Bill of Lading at receipt of the equipment.

**Loose Items Integrations** - PRM typically manufactures systems complete in our facility where components or subsystems may require detachment for shipping and reassembly onsite. Unless specifically quoted in our written proposal, PRM will package loose equipment separately for that shipment. It is the onsite systems contractor or other subcontractors to un-package and reinstall these components onsite. In the event the client needs or requires for PRM to install the components, there will be a required additional charge to do so. If a clients specification states that PRM is to reassemble those components, it is understood and agreed that PRM is not including pricing to do so in our base pricing unless specifically stated by PRM. PRM ships hundreds of modular systems each year and in >99% of the cases, all of our clients have the site contractors perform the components installations. It typically may not be price competitive for PRM to perform site installation work and in many cases PRM may be banned by state requirements due to contracting licenses.

**Product Recovery Management, Inc.**
200 20th Street
Butner, NC, 27509, United States

# System Pricing

| Ln # | Qty | Description | Unit Price | Subtotal |
|---|---|---|---|---|
| | 1 | REMEDIATION SYSTEM PRICING | $169,300.00 | $169,300.00 |
| | 1 | ESTIMATED SHIPPING & HANDLING<br>Unloading provisions must be onsite at time of delivery | $2,500.00 | $2,500.00 |
| | 1 | ONSITE START UP & TRAINING - 2 Days<br>System must be installed and proper power connected prior to PRM's visit to site | $3,000.00 | $3,000.00 |

**Total** **$174,800.00**

## Notes

Shipping is always estimated at the time of the quote. Due to volatile fuel costs during the past decade, PRM reserves the right to adjust shipping prices based on the national average fuel cost at the time of delivery vs. at the time of the quote. PRM dos not collect Sales and Use tax in Alabama.

Any purchase authorization must include PRM's signed/completed acceptance form (below) and a signed PRM Security Agreement as furnished by PRM.

Lead time is determined at time of order, but is typically 14-16 weeks from receipt of approved submittals.

## Payment Terms and Conditions

**Paid when Paid, not to exceed 90 Days**

| Authorized & Accepted By (Signature)<br>By signing, you agree to the below Standard Terms and Conditions | Date | PO # / Project Reference |
|---|---|---|
| | | |

**Product Recovery Management, Inc.**
200 20th Street
Butner, NC, 27509, United States

# System Options (not required)

Please select any optional items below. Options are not necessarily upgrades, they are listed as alternatives. It is up to the engineer working for you to make the ultimate decision that the option chosen is in your best interest. Options chosen may be an invalidation of strictly following a Request for Proposal or a Specification. You accept this option as an approved alternative to the specification. PRM provides the options typically to enhance the system. The system options below will be in addition to the base system quoted above.

| Option Name | Price | QTY | Subtotal |
|---|---|---|---|
| ☐ 3 Year Extended Warranty for System<br>This warranty is a parts and labor extended warranty. The warranty excludes: replacement wear items or damages caused due to lack of proper maintenance, damages caused due to irregular electrical voltage or power related issues including damage due to lightning or other natural causes. Note that PRM can provide an insurance policy on the system upon request. Actual price will be determined based on the total system price<br><br>1 year extended warranty - system total price * 3%<br>2 year extended warranty - system total price * 6%<br>3 year extended warranty - system total price * 10%<br><br>Note that the decision of the warranty purchase should be made at time of system purchase and payment must be made with the system purchase. If the client requests extended warranty periods at a later date, it will have to be evaluated by PRM and agreed upon by the client. Extended warranty requires that the system is properly serviced during the warranty period. | $0.00 | 1 | $0.00 |
| ☐ Virgin Carbon<br>PRM can provide virgin carbon in place of the re-activated carbon specified above. Price is an adder for all 2000 lbs | $2,695.00 | 1 | $2,695.00 |
| X Sound Attenuation Insulation<br>PRM will line interior framed walls and ceiling with Additional Sound Attenuation insulation to assist in reducing overall decibel rating of the system. PRM does not feel this additional layer of insulation is needed. | $2,985.00 | 1 | $2,985.00 |
| ☐ Third Party Certification<br>The system will be provided without a separate Full Certification. This certification affixes the UL/MET Certification placards to the system and ensures that the system goes through the full certification at PRMs factory. | $1,200.00 | 1 | $1,200.00 |
| ☐ Telemetry<br>Service for High Speed Telemetry is $975.00 per year and includes all networking setup and cloud services. PRM will maintain ownership of the system router if/when the telemetry service is shut down and it is to be returned to PRM, otherwise a $500 fee shall apply. Service will be prorated for the year and will auto-renew year after year unless discontinued. | $975.00 | 1 | $975.00 |
| | Subtotal | | **$0.00** |
| | Tax 1 | | **$0.00** |

**Product Recovery Management, Inc.**
200 20th Street
Butner, NC, 27509, United States

| | |
|---|---|
| **Total** | **$0.00** |

| Authorized & Accepted By (Signature)<br>By signing, you agree to the below Standard Terms and Conditions | Date | PO # / Project Reference |
|---|---|---|
| | | |

# Warranty

## WARRANTY DISCLAIMER

Product Recovery Management (PRM) will warrant all new equipment manufactured by PRM to be free of defects in materials and workmanship for a period of 1 year from the date of manufacture as established by PRM provided the following conditions are met:

1. Equipment must be operated and maintained in accordance with the guidelines established in the O&M manual(s) provided with the equipment or with the individual Equipment O&M manuals.. This includes the site specific manual as provided by PRM as well as the individual component manuals provided.
2. Warranty service shall not be applicable unless a complete logbook of routine maintenance is kept and provided to PRM upon request. For warranty coverage to be ensured,, PRM requires that O&M logs be sent to PRM staff quarterly so PRM can confirm previous maintenance, not after a warranty claim.
3. Warranty service shall not be applicable unless all outstanding invoices which are over terms are paid in full.
4. PRM will not warrant electrical equipment that is operated on an Open Delta electrical system. The only power to be used with PRM supplied equipment will be either a “Y” or a “Closed Delta”. Proper engineering design would accommodate the correct electrical provisions in the engineering specification. PRM will not be liable for any changes to the electrical supply and distribution system that are required to bring the electrical system(s) to these standards.
5. For skidded equipment, PRM is not responsible for warranty of equipment that is not provided protection from the elements such as direct sunlight, rain, hail or other weather conditions exerted by nature. It is a generally accepted practice that skids placed outdoors should be provided physical protection from the elements. An example of potential damage is direct sunlight during summer months. Motors may be designed for certain maximum operating temperatures but without physical protection, motor temperatures may exceed recommended temperatures which causes damage such as accelerated grease degradation in motor bearings. This is one of the major cause of motor failures in the elements.
6. PRM shall not be responsible for consequential damage that may occur due to direct or indirect damage caused by a failure of another piece of equipment.
7. Technicians should be duly trained and have a good understanding of electrical, and mechanical systems. Failure to have a properly trained technician work on PRM supplied equipment can result in invalidation of the warranty at the discretion of PRM.
8. PRM typically manufactures equipment/systems to client provided specifications. Failures due to a design problem by the client which can be identified as a design issue that led to the failure may be disclaimed by PRM under our standard warranty.
9. All equipment quoted as pre-wired and pre-plumbed has been done so by trained personnel. PRM has been instrumental in conformity to State and Federal Codes. If local codes vary from Federal and State Codes, it is the client's responsibility to notify PRM of particular requirements in the bid request that may necessitate changes to the proposed system.
10. Delivery must occur within 2 weeks of completion of testing by PRM or storage fees of $250.00 per week may be charged by PRM due to inconvenience of storage and location requirements. The fee may be larger for systems over $100,000.00.
11. Electrical work for this quotation is in accordance with the most current version of the National Electrical Code (NEC).
12. This bid may be for equipment only and proposed startup. This quotation does not include pricing for installation, wiring or plumbing unless explicitly stated herein.
13. This quotation is not subject to subcontractor contract. PRM shall act as an equipment vendor.
14. General warranty is for parts. In the event of a component failure that is covered under warranty, PRM will provide the repair components/parts at PRMs discretion under warranty. Shipping of replacement components is to be paid for by the client. It is understood that the client will provide the labor to replace warranted parts. It is understood that all shipping for all warrantable items are to be shipped most cost effective way unless client requests expedited shipping. If expedited shipping is requested, it is understood and agreed that PRM will invoice for all shipping charges which will be paid for by client in a timely manner.
15. PRM is typically engaged in system startups and for many clients O&M activities. PRMs general rate for service technicians is $95.00 per hour and $115.00 per hour for engineer level senior technicians. In the event a scheduled event has delays that are no fault of PRMs, PRM shall be able to invoice for overage time which may happen on startups or other service activities. Additional fees such as daily per diem and truck/mileage fees are applicable as well as parts purchased which require reimbursement plus markup. Also it is understood that PRM will be compensated in the event weather or other delaying occurrences occur that may require to procure special vehicles to perform a duty. An example would be to do a startup activity for a project in adverse weather condition where cold weather and snow may require PRM to secure a 4WD truck to do startup. It should be expected by the client that additional fees will be invoiced to cover additional expenses. It should also be considered acceptable for adverse weather to cause additional labor charges for site work as travel delays and slower sitework conditions would be expected to cause slower safe progress. It should also be understood that PRM always considers employee safety first. This means that PRM reserves the right to hold back and delays shipments.
16. For equipment being shipped into NC, FL, PA, NH, NY, VA, WA, WV and WY, the appropriate sales and use tax has been included if shown on the quote and will be paid by PRM to the state taxing authority, For equipment going to all other states, it is the customer's responsibility to pay any required sales and use taxes to their appropriate taxing authority. For bid comparisons, it is important that taxes be added to any bids from out of state to provide funds for payment of the taxes due.

**PAYMENT TERMS**

Payment terms are established on the pricing page. Service Charges of 1.5% per month will be charged on all overdue invoices. If PRM is required to bring legal action to enforce this agreement, the prevailing party shall be entitled to its reasonable attorney fees.. This agreement shall be governed by and construed in accordance with the laws of the State of North Carolina and venue shall be proper and personal jurisdiction had in state court, Durham County, North Carolina. Above payment terms are contingent upon receipt by PRM of original signed quote as well as the original signed security agreement.

**TECHNICAL SUPPORT**

In the event of a problem or failure, immediately contact PRM's corporate office and request technical assistance. Please make sure that you have the PRM Project Number available. A technician will assist in determining if the equipment is operating properly and if not, then PRM will guide the onsite technician in proper settings and adjustment. PRM technical phone support is billable at a rate of $95.00 per hour at the discretion of PRM. Purchase of a system from PRM and initiation of phone support constitutes a legal agreement that PRM can invoice for phone support.

**RETURN AUTHORIZATION**

If a component failure has occurred, PRM will ship a replacement part to the site or client office for replacement of the failed part by the Client. PRM will not be responsible for labor to replace the failed part. PRM will issue an RMA upon determination that a replacement part is necessary. PRM will invoice for the part and credit will be issued for the part only once the defective part is returned to PRM and PRM makes a determination that the part is defective at no fault of the client and within the warranty period.

**STARTUPS**

PRM recommends that all systems be ordered and that the client pay PRM to provide a day or two of startup training. In order for PRM to warranty an oxidizer system, it is a requirement that the client receive training from PRM. Only technicians that are duly trained by PRM should operate an oxidizer due to the potential risk and liability of improper operation. In no event shall PRM be liable for any consequential accidents, property damage, personal injury or death occurrences that may happen due to improper operation of an oxidizer.

**DELIVERY ACCEPTANCE & CLIENT RESPONSIBILITIES**

Buildings and systems that arrive may arrive to the project site tarped or with provisions to protect roofing and such parts. It is the client's responsibility to remove these items upon arrival. All fasteners installed to retain the materials must also be removed . If the client has a contractor doing the site installation work, PRM recommends that they ensure that the contractor handle these items.

**SECURITY AGREEMENT**

See the security agreement document on the following pages. If this project is a State or Federally funded project where the client has asked PRM to extend payment terms for the project beyond Net 45 days, PRM will require an executed security agreement. This agreement is a simple document that gives PRM ownership/entitlement to the equipment until PRM is paid for the equipment. This document protects PRM in the event a client should default on payment.

## SECURITY AGREEMENT

_____, a _____ corporation (the "Debtor"), hereby grants to PRODUCT RECOVERY MANAGEMENT, INC. (the "Secured Party") a security interest in all of Debtor's right, title and interest, now or hereafter acquired until entire debt secured by this agreement is paid in full, in the following Collateral (the "Collateral"):

1. Remediation Equipment. All remediation equipment, supplies, fittings, machinery, and other tangible personal property, in all of its forms and including fixtures, for PROJECT , located in _____ , sold to Debtor by the Secured Party together with all parts, instruments, substitutions, replacements, additions, accessories, fittings, operating manuals, plans, specifications, and tools (the "Remediation Equipment"); and
2. Proceeds and Products. All proceeds (including without limitation any rents, royalties, insurance proceeds, replacements, additions, and accessions thereto) and products of the Remediation Equipment.

THIS SECURITY AGREEMENT (the “Agreement”) SECURES: (i) the Debtor's payment to the Secured Party for the Remediation Equipment under the purchase order and/or other contracts or agreements providing for Debtor’s purchase of the Collateral (the “Contracts”); and (ii) all costs reasonably incurred by Secured Party to enforce this Agreement, and to maintain and preserve the Collateral, including without limitation all taxes, assessments, insurance, reasonable attorneys' fees, legal expenses, and expenses of sale, together with interest thereon, at a rate not greater than 18% per annum, pursuant to the following TERMS:

THE DEBTOR: bears the risk of loss; shall keep the Collateral insured for the full amount secured by this agreement at all times and at Debtor’s cost; shall repair and maintain the Collateral at Debtor’s cost and shall not use the Collateral or any part of it in a manner resulting or likely to result in waste or unreasonable deterioration of the Collateral; shall pay all taxes and assessments on the Collateral as they become due and shall keep the Collateral otherwise unencumbered; shall keep the Collateral separate and identifiable from other property owned by Debtor or located on the same premises as Collateral; shall not, without prior written consent from Secured Party, sell, lease, or otherwise dispose of any portion of the Collateral; waives the automatic stay under 11 U.S.C. Section 362; and shall promptly execute and deliver all further instruments and documents and take all action reasonably requested by Secured Party from time to time in order to perfect and protect the security interest granted in this Agreement or to enable Secured Party to exercise its rights hereunder.

THE SECURED PARTY may: file one or more financing statements, continuation statements, or amendments relative to the Collateral without the signature of the Debtor, where permitted by law; enter the premises where the Collateral is located and inspect the Collateral, either in person or by its agent, at any reasonable times and at reasonable intervals; and exercise any of the rights hereunder or pay any unpaid taxes or other obligations of the Debtor with regard to the Collateral without waiving or releasing the Debtor from any of its duties or obligations under the Contracts, provided that the Secured Party shall not be obligated to perform any of the Debtor’s obligations under the Contracts or to take any action to collect or enforce any claim for payment hereunder, and that

such failure to collect or enforce shall not be deemed a waiver of said rights, a waiver of Debtor's default, or a release of Debtor's obligations.

EVENTS OF DEFAULT. The following shall constitute events of default: Debtor's failure to pay when due any obligation secured by this Agreements under the terms of the Contracts; Debtor's breach of any affirmative covenant or other term hereunder; and/or Debtor's disposition of the Collateral in violation of this Agreement shall constitute an event of default hereunder.

REMEDIES. If an event of default shall occur, Secured Party shall have all the rights and remedies afforded a secured party by law, including all the rights and remedies of a secured party on default under the Uniform Commercial Code (the "Code") (whether or not the Code applies to the affected Collateral), and may also: (a) enter on Debtor's premises to take possession of the Collateral; (b) take immediate possession of the Collateral, wherever found, with or without legal process; (c) require Debtor to assemble the Collateral and make it available to Secured Party at a place designated by Secured Party that is reasonably convenient to both Debtor and Secured Party; and (d) apply the proceeds received from the sale or other disposition of the Collateral on default of Debtor to the payment of reasonable attorneys' fees and legal expenses incurred by Secured Party as a result of Debtor's default, in addition to those purposes provided for by law.

GENERAL PROVISIONS. Time is of the essence. Neither this Agreement nor the Debtor's obligations to the Secured Party are assignable without the prior written consent of Secured Party, although the Secured Party may assign this Agreement on written notice to the Debtor. This Agreement shall not be amended except by written instrument signed by the party to be bound, and the provisions herein are severable. Venue and jurisdiction over any disputes and parties hereto shall be proper in North Carolina. The validity, interpretation, and performance of this Agreement shall be governed by and construed under the laws of the State of North Carolina

| | |
|---|---|
| DEBTOR: _____, a _____ Corporation<br><br>By _____, its _____ | DATED: _____ |

**MK ENVIRONMENTAL INC.**

765 Springer Drive
Lombard, IL. 60148-6412
615-392-7737 (direct)

jgiltz@mkenv.com

# QUOTATION

| | |
|---|---|
| Date | 2/4/2022 |
| Quote No. | 222002 |
| Reference | Quick Shop 98 |
| Page No. | 1 of 3 |
| Freight | Included |
| Terms | per contract |
| Ship Via | FLATBED |
| F.O.B. | Factory |

Quotation valid for 30 days

| SOLD TO: | SHIP TO: |
|---|---|
| Matt Ebbert<br>PPM Consultants, Inc.<br>5555 Bankhead Highway<br>Birmingham, AL. 35210<br>205-836-5650 | Quick Shop No. 98<br>Alabama Highway 5<br>Brent, AL. |

| QUANTITY | | UNIT PRICE | AMOUNT |
|---|---|---|---|
| | 400 amp 1/60/230 volt 3 wire plus ground electrical service<br>Brought to NEMA 3R control Panel<br>Interior electrical will comply with NEC requirements for<br>Class 1, Division 2, Group D Hazardous locations<br>Motors will be TEFC construction | | |
| 1 | Dual Phase Vacuum Extraction System (DPVE) Remediation Packaged System Including: | | |
| 1 | 2 x 20 HP oil sealed Dual Extraction Systems<br>525 ACFM @ 15" Hg. Capacity total<br>20 HP TEFC motor, 3/60/230-460 volt each<br>Each OS-LRP package includes:<br>Oil Scavenge line<br>Backpressure gauge<br>Multistage filtration system allows operation over the full range of vacuums<br>Temperature gauge<br>Y strainer with clean out plug<br>High temperature switch<br>Temperature control valve<br>low and high oil level switches<br>inlet filter<br>inlet check valve<br>(1) 5-gallon seal oil bucket for top off | 199,626.00 | $199,626.00 |
| 1 | 200 gallon Air/water separator (AWS-1) with float tree level switches or equal<br>AWS-1 separator will be stainless steel or alumimum<br>10" clean out ports with vacuum rated quick release lids<br>Liquid filled vacuum gauge<br>Vacuum assist line<br>Drain valves<br>Vacuum relief valves<br>Dilution valve with filter/silencer<br>Inlet screen | | |
| 1 | 1.5 hp transfer pump, 3450 rpm, TEFC motor or equal<br>Cast Iron housing with composite impeller, anti air lock design<br>manual "Pump ON" button inside building for sampling | | |
| 1 | 2,000 gallon polyethylene tank for gross product separation<br>Two (2) inlet bulkhead fittings for piping from the (2) AWS-1 transfer pumps (by others)<br>Discharge into the poly tank shall be below the high water level to prevent mixing of LNAPL.<br>Discharge bulkhead fitting & underflow pipe approximately sized to gravity feed to OWS at 50 gpm<br>200-gallon free product storage capacity<br>LSHH poly tank switch to shut down system upon high level condition<br>Installed outdoors and piped by others | | |
| 1 | MK Model SA30 Stripperator unit or equal<br>30 GPM capacity Oil/Water Separator and air stripper treatment system<br>Coalescing separator with product skimming weir<br>Polyethylene coalescing pack with reduced spacing for efficient oil removal<br>Low profile air stripper with AMCA Type B spark resistant aluminum blower<br>Nylon tube aeration air stripper for high mass removal rates with low maintenance<br>Low, high, and high-high sump conductivity probes<br>12" clean out hatch<br>Low blower pressure alarm<br>304 stainless steel construction<br>Blower silencer | | |
| 1 | 3.0 hp transfer pump, 3450 rpm, TEFC motor or equal<br>Cast Iron housing with composite impeller, anti air lock design<br>manual "Pump ON" button inside building for sampling | | |

**MK ENVIRONMENTAL INC.**

Matt Ebbert
PPM Consultants, Inc.

Date 2/4/2022
Quote No. 222002
Reference Quick Shop 98


| QUANTITY | | UNIT PRICE | AMOUNT |
|---|---|---|---|
| 2 | Size 2 Bag Filter Housings<br>304 s.s. construction with pressure gauges<br>Includes ten (10) 25-mircon spare bags | | |
| 1 | Final discharge groundwater flow totalizer with pulse output for remote totalization | | |
| 1 | Master Control Panel System, Including:<br>NEMA 3R control panel with blank front cover<br>Swing out sub panel for gauges, control operators, and switches<br>IEC Magnetic motor starters, safety switches, H-O-A controls<br>Control transformer<br>(12) intrinsically safe relays, (12) alarm indicator LED's, (24) output channels<br>Hard wired relay logic<br>(1) exterior GFCI utility outlet<br>System run time totalizing hour meters for LRP's<br>Blower low pressure alarm<br>Anti-falsing alarm circuit to prevent nuisance tripping<br>Auto-release restart timer for remote restarts via telemetry<br>Three phase voltage and phase monitor<br>Emergency E-stop LED red indicator light located on swing out sub panel<br>Single phase variable frequency drive (VFD) for LRP's or equal<br><br><u>Liquid ring automatic shut down upon:</u><br>AWS1 high liquid level<br>Oil resevoir tank low and high level alarms x 2<br>Liquid ring High temperature alarm x 2<br>Air stripper blower low pressure<br>Air stripper sump High liquid level alarm<br>Phase fault condition<br>Interior Emergency Stop Mushroom button with twist to release detent<br>Poly tank LSHH | | |
| 1 | MK Site Optimization Software (SOS) - Wireless Monitoring Unit.<br>MK Cloud based monitoring capabilities with Email & SMS alarming notification<br>Includes: Cellular antenna, wiring diagrams, setup forms.<br>Digital Inputs, Analog inputs, and Digital Outputs for remote operation capabilities<br>Flow and Vacuum graphing and data export capabilities<br>Alarm counters for increased troublshooting efficiency<br>Wireless service will be supported and billed through MKE @ $150/mo. (subject to change)<br>Billed monthly on the first of the month following successful delivery.<br>NO more need for telephone company analog landline installation and its long distance monthly fees. | | |
| 2 | Vacuum transducer integrated into telemetry system for real time monitoring, 4-20mA | | |
| 1 | System building - Refurbished<br>8.5'W x 20' x 9.5'H aluminum/steel enclosure, fully insulated with<br>Removable sliding wall panels for ease of maintenance<br>Exterior grade plywood floor, structural steel frame<br>Includes 100 watt XP interior light, and removable center grate for ease of maintenance<br>The breaker panel and control panel will be mounted on a vertical steel bracket attached to platform end. The bracket, panels and all conduits will allow for the removal of the enclosure panels by one person.<br><br>10" structural steel base with 4" steel cross members<br>Steel corner posts and roof frame<br>Continuous sheet aluminum roof for superior protection | | |
| 1 | Equipment Electrical Installation<br>Includes XP wiring, XP seal off connectors, liquid tight flexible conduit<br>UL listed equipment. | | |
| 1 | Equipment Mechanical Installation<br>Includes mounting, piping and connectors<br>Brass fittings, sample ports, pressure gauges and sight glasses | | |
| 1 | XP heater, 12,000 BTU with XP thermostat. All components fully piped, wired and tested | | |

# MK ENVIRONMENTAL INC.

Matt Ebbert
PPM Consultants, Inc.

Date 2/4/2022
Quote No. 222002
Reference Quick Shop 9


| QUANTITY | | UNIT PRICE | AMOUNT |
|---|---|---|---|
| 2 | AWS3 knock out drum prior to oxidizer to minimize condensed liquids from entering the vapor phase carbon bed. Drum scavange connection for condensate removal. | | |
| 2 | Vapor Phase Carbon Vessels<br>VF-1000 vessels<br>1,000 lb initial load each<br>4" plain pipe fitting<br>Installed outside the system building and piped by others | | |
| 1 | Air to air heat exchanger (dual phase exhaust stream)<br>for the offgas treatment prior to the carbon vessels<br>To reduce the outlet temperature of the dual phase offgas stream to help knockout the condensate in the air stream.<br>Includes an elevated stand to mount the heat exchanger and fit over the AWS-3 knockout drum. Includes starter controls for the heat exchanger motor in the master control panel.<br>Wiring from the heat exchanger starter to the heat exchanger motor by local site electrician.<br>Located outside the system building by others. | | |
| | Notes:<br><br>1. Wireless monitoring unit will be supported and billed through MK Environmental.<br>Billed monthly on the first of the month following successful delivery at $150/month<br>Monthly service rate subject to change.<br>2. Startup and training based on 2-weeks prior notice.<br>3. 12-month standard manufacturers warranty starting the day it leaves/ships MK factory.<br>4. Single phase 400 amp disconnect and meter base provided by local electrian | | |

| | | |
|---|---|---|
| EQUIP. SUB TOTAL | | $199,626.00 |
| EQUIP. SALES TAX | | |
| START UP/TRAINING | | $2,500.00 |
| FREIGHT | | $2,500.00 |
| | | |
| NET TOTAL | | $204,626.00 |

Does not include permits, fees, etc…
Offloading & placement by others.

(1-day startup assistance)

Jerry Giltz,
MK ENVIRONMENTAL, INC.

# APPENDIX E – SUBCONTRACTOR SPECIFICATIONS AND QUOTATIONS

December 22, 2021

Mr. Kevin Ivy
Complete Environmental & Remediation Company, LLC
37 David Swan Lane
Purvis, Mississippi 39475

**Re: Quotation Request for Installation of Remediation System**
**Former Quick Shop No. 98**
**Highway 5**
**Brent, Alabama**
**Facility I.D. No. 20411-105-003683**
**UST Incident No. UST19-05-03**
**PPM Project No. 40101501-CAP**

Dear Mr. Ivy:

PPM Consultants, Inc. (PPM) is proposing to install a soil and groundwater remediation system at the referenced site and requests price quotations for the following work elements. The site is depicted on **Figure 1, Proposed System Layout, Attachment A, Figures**.

**Recovery Well and Trench System**

The remediation system will be connected to 14 new recovery wells two horizontal recovery wells. Work includes:

- The active work zone shall be barricaded by the contractor to prevent vehicles from entering the work zone. Barricades are to be installed across eastern property boundary in the paved area and approximately 230 feet of barricades will be required. Barricades shall be plastic Jersey Barriers similar to that shown below. No more than two openings for work traffic shall be open in the barricades during work hours and these openings shall be closed prior to leaving the site.

- Install two horizontal wells that will be installed in trenches that measure approximately 10 feet and 15 feet in length, 1 to 2 feet wide, and 4 feet deep. Each horizontal well will be constructed by saw cutting the asphalt (20 feet) and concrete (15 feet) pavement above the trench at a width of 3 feet down the length of the trench. The trench will be excavated with a 1-foot to 2-foot wide bucket to approximately 4 feet BGS. A 6-inch bed of sand will be placed at the base of the trench and a 10-foot length of 4-inch inside diameter (I.D.) Schedule 40 polyvinyl chloride (PVC), 0.01-inch slotted screen will be installed in the sand bed. One end of the screen will be capped with a PVC slip cap and the other end will be attached to a 4-inch PVC elbow and a 4-inch PVC riser pipe that will extend to approximately 1.5 feet BGS. The trench will be filled with either 57 stone or pea gravel from the base to approximately 0.5 feet BGS. There will be no vaults or manholes installed for the horizontal wells. Excavated soil and pavement shall be direct loaded into dump trucks (retained by contractor) and hauled to either the Black Warrior Solid Waste Landfill in Coker, Alabama or the Perry County Landfill in Uniontown, Alabama (either is acceptable and disposal to be paid by PPM).
- Traditional trenching that consists of approximately 390 feet in asphalt and 100 feet in soil (does not include trenching for horizontal wells). PPM requests that the Contractor limit the width of the pavement cuts to 3 feet and trench width to 2 feet. Trenches shall be excavated to 2 feet below the base of the pavement. Excavated soil, concrete and asphalt shall be direct loaded into dump trucks (retained by Contractor) and hauled to either the Black Warrior Solid Waste Landfill in Coker, Alabama or the Perry County Landfill in Uniontown, Alabama (either is acceptable and disposal to be paid by PPM).
- Install approximately 1,200 feet of 1-inch I.D. Sch. 40 PVC pipe; 1,600 feet of 2-inch I.D. Sch. 40 PVC pipe (includes additional 400 feet of piping to be used by PPM); and 1,425 feet of 4-inch I.D. Sch. 40 PVC from the manifold to the recovery wells and recovery trenches. The piping should be installed approximately 1.0 to 1.5 feet below the base of the pavement.
- Provide and install 14 2-foot by 2-foot by 2-foot hinged steel vaults for new recovery wells. Vaults will be constructed in 4-foot by 4-foot, 6-inch thick concrete well pads. The technical specifications for the installation of the well vaults are included in **Figure 2, Details and Sections for 4-Inch Recovery Wells and Piping Trench** and **Attachment B, Well Vault Installation**.
- Open trenches should be covered with steel plates or plywood until finished with concrete.

- Trenching and piping will be performed in accordance with the dimensions and details on the attached drawings.
    - Trenches performed in soil will be backfilled with either gravel or compacted clay brought in from an off-site source.
    - Trenches performed in asphalt and concrete will be backfilled with new pea gravel, 57 stone, or crusher run stone to a maximum height of 6 inches below the top of the surrounding asphalt and covered with a minimum of 6 inches of concrete.
    - Approximately 15 linear feet of trenching will be performed in concrete pavement beneath the canopy for the piping and recovery trench. Steel dowel pins will be drilled into the existing concrete at 3-foot linear spacing per side. Dowel pins will extend at least 3 inches into the existing concrete with at least 4 inches of reveal in the new concrete. Dowel pins are not required for asphalt pavement.
    - Concrete shall be rated for 5,000 pounds per square inch (p.s.i.) and include fiber mesh. The finished grade of concrete should match the existing grade on both sides of the trench and a light broom finish should be applied after the concrete has been allowed to slightly cure. **Note: If the concrete work does not look professional, look clean, match the existing surface, or significantly cracks within one year, the contractor may be required to remove and replace the concrete at their own costs.**
- Excavated soil, concrete, and asphalt from shall be direct loaded into dump trucks (retained by contractor) and hauled to either the Black Warrior Solid Waste Landfill in Coker, Alabama or the Perry County Landfill in Uniontown, Alabama (either is acceptable and disposal to be paid by PPM).

**System Compound**

The system compound will be located near the southern property boundary, above the closed UST pit. Work for the system compound includes:

- Construct a PVC manifold system in accordance with details shown on **Figure 3, Profile/Plan View of Manifold**.
- Install a four-sided, 8-foot tall, wooden fence around the system compound. The compound fencing measures approximately 30 feet in length by 20 feet wide. The

fence will have one double gate (minimum 8-foot total width) for equipment entry on the eastern side and one single gate (minimum 4-foot width) for personnel entry on the northern side.

- Install a pressure-treated 2 x 8 frame on the interior of the fence at the ground surface to be used to as a form for a gravel bed across the system compound.
- Place and level an approximate 6-inch pea-gravel bed inside the system compound (30 feet by 20 feet), above the concrete pad.
- Off-load and position the remediation system and two 1,000-pound carbon vessels at the locations designated on **Figure 1** including set-up and leveling (1/8-inch over 4 feet). The Dual-Phase Vacuum Extraction (DPVE) system should be placed on concrete block footings. The weight of the system is approximately 12,000 pounds and the weight of each vapor carbon vessel should be approximately 1,500 pounds. Technical specifications for remediation unit placement are included in **Attachment C, Remediation Unit Placement**.
- Off-load and position a 500-gallon polyethylene tank and connect polyethylene tank piping (one 2-inch PVC line from system to tank).
- Install a 2-inch I.D. Sch. 40 PVC (not part of piping above) discharge line from system compound to area identified as System Discharge Location on **Figure 1**, located approximately 140 feet west of system compound. Discharge pipe shall be buried a minimum of 1 foot BGS, except at discharge location. Excavated soil for the discharge line can be used to backfill the trench.
- Connect the two carbon vessels to exhaust side of the liquid-ring vacuum pump (LRVP) with 4-inch PVC piping
- PPM will retain the electrical contractor for the work.
- Restoration of site to original conditions. Specifications for site cleanup are included in **Attachment D, Cleanup, Repair, Etc**.

**The contractor shall perform work in consecutive workdays until such time that the project is complete. A schedule of implementation should be submitted one week prior to initiation of work. Work for each phase shall be performed during contiguous days and work shall commence on a Monday, prior to noon.**

**Please use the attached quote form to submit pricing (Attachment E, Quote Form). Also, please provide your estimated number of days to complete the work.** Alternate, more economical trenching and drilling methods are welcome, but must be included as a

separate quote with accompanying documentation justifying the deviations. Payment will be made based on actual measurements following completion of the work. Should the estimated quantities be exceeded, a change order should be requested prior to initiation of work. If this is not practical, at a minimum, a verbal confirmation should be requested and followed up by written correspondence (email or fax).

It is noted that all unit rates should be consistent with Alabama Tank Trust Fund (ATTF) rates, when applicable, including per diem. Receipts for overnight per diem will be required as part of the invoice.

PPM recommends, but does not require, that you visit the site prior to your submittal. **Proposals are due to PPM by noon, Friday, January 14, 2022**. If you have any questions or need additional information, please contact me at your convenience.

Sincerely,
PPM Consultants, Inc.

Matthew J. Ebbert, P.G.
Project Geologist

Attachments: Attachment A – Figures
Attachment B – Well Vault Installation
Attachment C – Remediation Unit Placement
Attachment D – Cleanup, Repair, Etc.
Attachment E – Quote Form

# ATTACHMENTS

# ATTACHMENT A

# FIGURES

N

0 15 30

SCALE: 1"=30'
(Approximate)

MW-15
MW-14
MW-16
CARPORT
MW-10
MW-11
MW-9
STORE
CANOPY
MW-5
0.005
0.1
1.0
MW-17
HIGHWAY 5
PROPOSED
(2) HORIZONTAL
WELLS (4' DEEP)
MW-12
MW-8
MW-19
PROPOSED
DPVE SYSTEM
(8'x20')
10
MW-1
MW-13D
MW-2
MW-4
PROPOSED
DISCHARGE
OUTFALL
PROPOSED
DISCHARGE LINE
(BURIED)
WATER
WELL
MW-3
PROPOSED
DISCHARGE
POLY TANK
PROPOSED
POWER LINE
PROPOSED
MANIFOLD
MW-18
MW-7
MW-6

LEGEND:

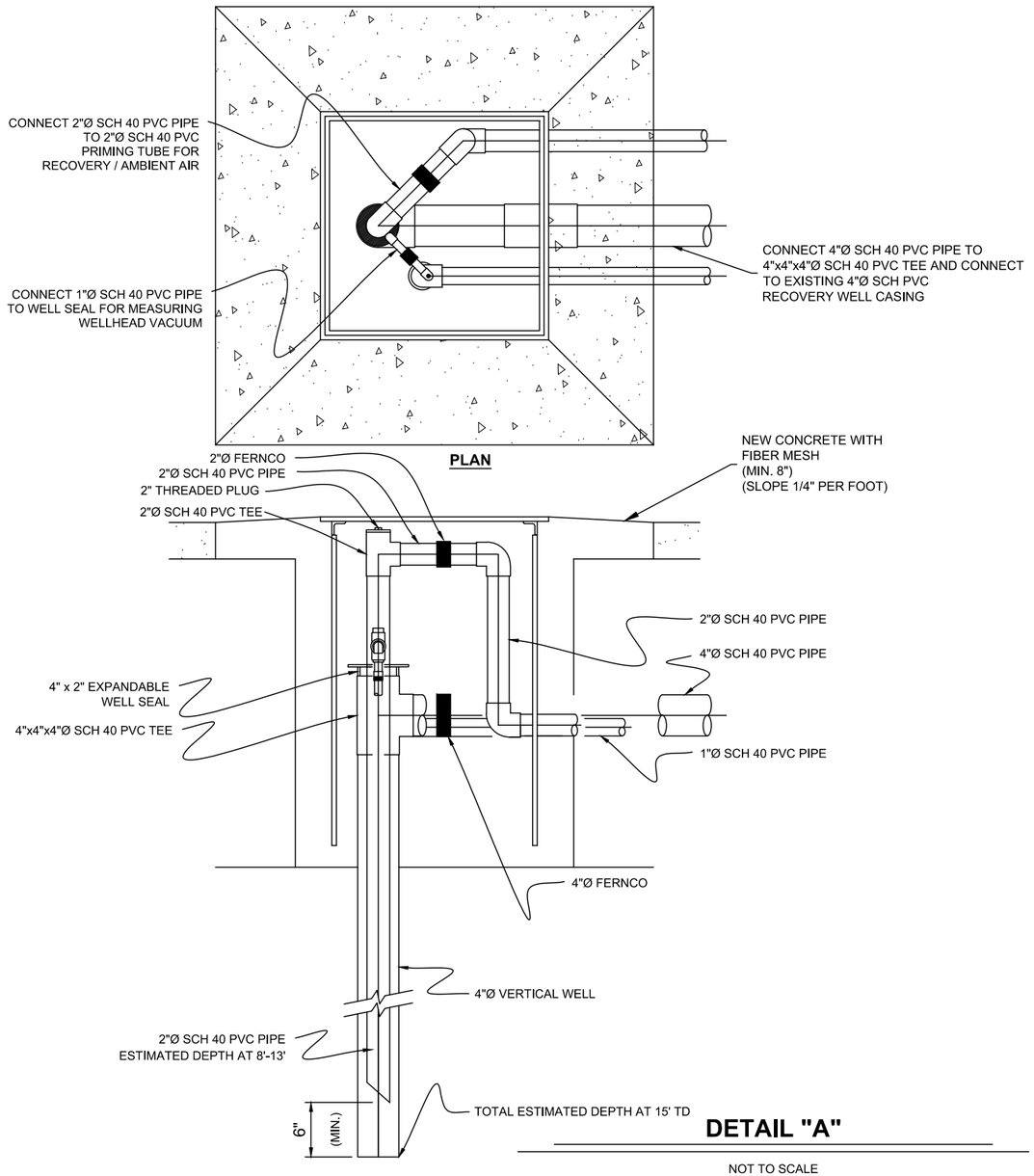
- TYPE II MONITORING WELL LOCATION
- TYPE III MONITORING WELL LOCATION
- PROPOSED RECOVERY WELL LOCATION
- 0.005 BENZENE CONCENTRATION CONTOUR (mg/L)
- PROPOSED PIPING

| | |
|---|---|
| PPM CONSULTANTS, INC. www.ppmco.com | |
| DRAWN BY: BWH | DRAWN DATE: 11/15/21 |
| PROJECT NUMBER: 40101501 | PHASE: RFP |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

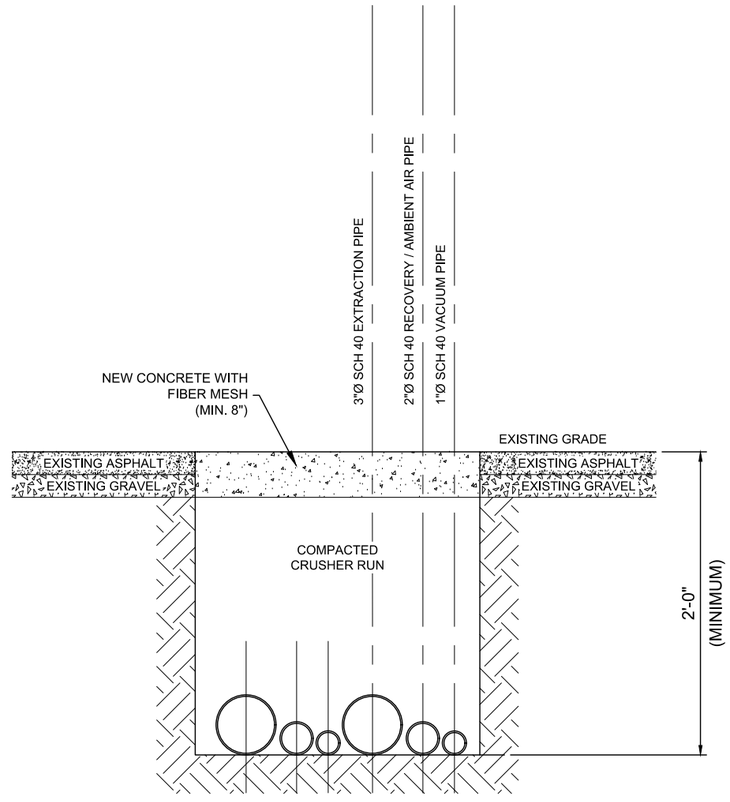
PROPOSED SYSTEM LAYOUT

FIGURE NUMBER
1




**DETAIL "A"**

NOT TO SCALE




**PIPING TRENCH**

(TYPICAL TRENCHING)

NOT TO SCALE

| | |
|---|---|
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| PROJECT NUMBER: 40101501 | PHASE: RFP |

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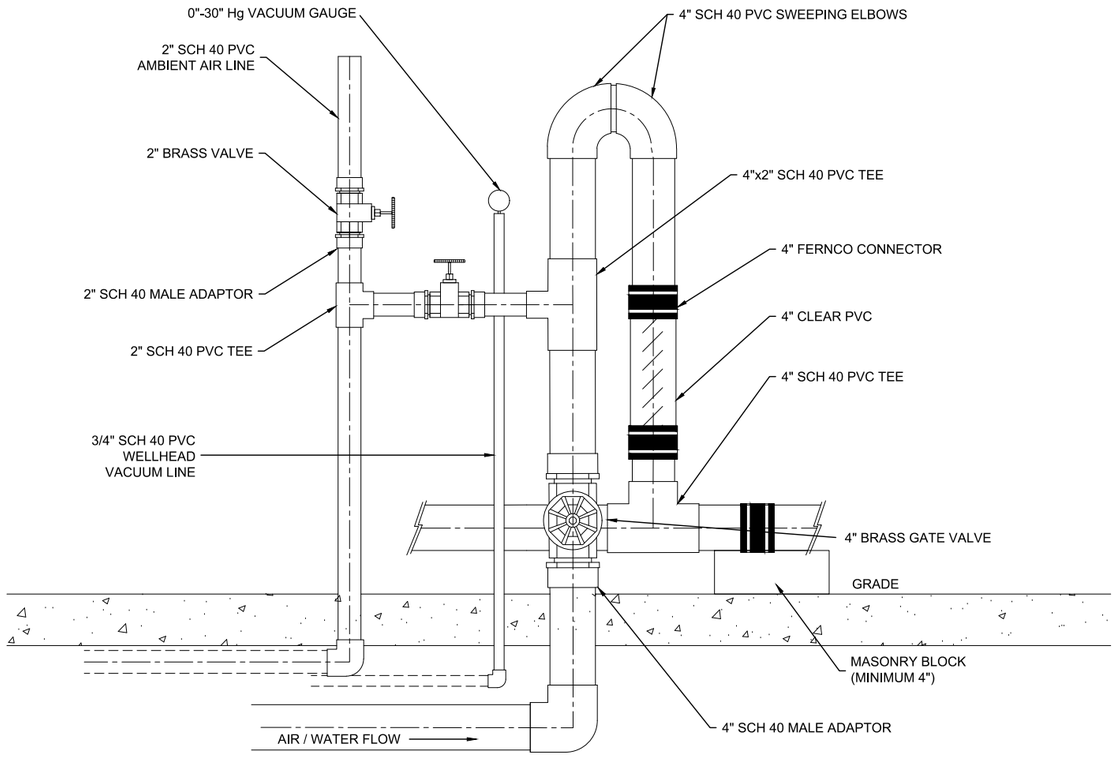
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

DETAILS AND SECTIONS FOR 4-INCH RECOVERY WELLS AND PIPING TRENCH

FIGURE NUMBER 2

## MANIFOLD CONNECTION FROM RECOVERY WELLS TO MANIFOLD (14 WELLS AND 2 HORIZONTAL WELLS)

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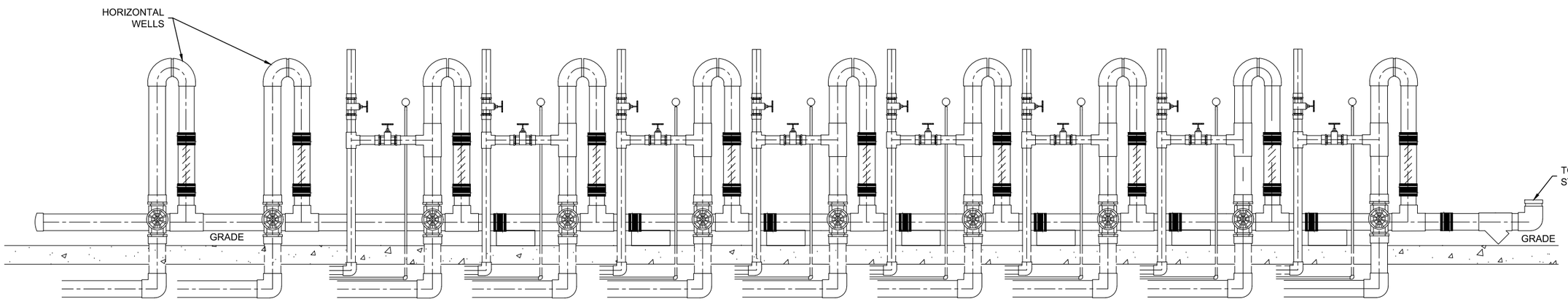


**NOT TO SCALE**

VIEW OF 8 OF THE 14 REQUIRED ASSEMBLIES

| | |
|---|---|
| PPM CONSULTANTS, INC. www.ppmco.com | |
| DRAWN BY: BWH | DRAWN DATE: 11/15/21 |
| PROJECT NUMBER: 40101501 | PHASE: RFP |

D.C. OIL COMPANY, INC.
**QUICK SHOP NO. 98**
HIGHWAY 5
BRENT, ALABAMA

PROFILE / PLAN VIEW OF MANIFOLD

FIGURE NUMBER
3

# ATTACHMENT B

# WELL VAULT INSTALLATION

PPM Consultants, Inc.
5555 Bankhead Highway
Birmingham, Alabama 35210



# 200.0 WELL VAULT INSTALLATION

| | | PAGE |
|---|---|---|
| 200.1 | GENERAL | 200-1 |
| 200.2 | MATERIALS | 200-1 |
| 200.3 | MEASUREMENT AND PAYMENT | 200-1 |

# 200.0 WELL VAULT INSTALLATION

## 200.1 GENERAL

The Contractor shall be required to install locking, spring loaded well vault(s) as specified on Drawings. At a minimum, the Contractor shall saw cut and excavate an area 4 inches larger than the dimensions of the vault on all sides (i.e., for a 30" x 30" x 30" vault, the excavated area shall be 38" x 38" x 38" minimum). The Engineer shall determine the exact placement of the vaults.

The task of this section shall include, but not necessarily be limited to the following:

- Saw cut existing asphalt
- Excavation
- Install a locking well vault
- Concrete placement
- Site restoration
- Other as may be indicated, noted, or shown on drawings, specified herein, or as reasonably implied therein

## 200.2 MATERIALS

All materials shall be new, unless specifically stated otherwise and be manufactured and approved for the intended service. All materials covered by local codes shall meet the requirements of those codes.

The Contractor will be responsible for backfilling and placing concrete in the excavated area around the well vaults to the original grade. The Contractor should complete these tasks as specified in the drawings.

## 200.3 MEASUREMENT AND PAYMENT

Measurement and payment shall be made for the following only and the cost of all other work, materials, equipment, and operations necessary for the satisfactory completion of this project, as shown on the plans and specified herein.

Complete well vault installation will be measured by the job basis for the furnishings, installation, and finishing paving area as required by the Specifications and Drawings.

# ATTACHMENT C

# REMEDIATION UNIT PLACEMENT

PPM Consultants, Inc.
5555 Bankhead Highway
Birmingham, Alabama 35210



# SECTION 300 REMEDIATION UNIT PLACEMENT


| | | PAGE |
|---|---|---|
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| **300.2** | **SKID-MOUNTED REMEDIAL UNIT** | 300-1 |
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| 300.2.1.1 | Crane Method | 300-1 |
| 300.2.1.2 | Forklift Method | 300-1 |
| 300.2.2 | Placement | 300-1 |
| 300.2.3 | Leveling | 300-2 |
| **300.3** | **TRAILER-MOUNTED REMEDIAL UNIT** | 300-2 |
| **300.4** | **DPVE ASSOCIATED FEATURES** | 300-2 |
| **300.5** | **FINAL UTILITY CONNECTIONS** | 300-2 |
| **300.6** | **TELEPHONE** | 300-3 |
| **300.7** | **METHOD OF PAYMENT** | 300-3 |

PPM Consultants, Inc.
5555 Bankhead Highway
Birmingham, Alabama 35210



# 300.0 REMEDIATION UNIT PLACEMENT

## 300.1 GENERAL

The Contractor shall be required to place remediation units as specified on drawings. Remediation unit placement shall be scheduled to take place after the installation of the subsurface extraction lines, recovery well vaults, subsurface utilities, and the electricity. It shall be the responsibility of the Engineer to schedule the delivery of the unit to the site. After the unit is in place, all subsurface utility lines and extraction lines will be piped into the unit by the Contractor according to drawing specifications and the approval of the Engineer.

## 300.2 SKID-MOUNTED REMEDIAL UNIT

### 300.2.1 Unloading and Setup

The Remediation unit shall be brought to the site on a "low-boy" or a standard trailer. The unit may be placed by either a crane or large forklift(s). The Weight of the unit is shown on the Drawings.

#### 300.2.1.1 Crane Method

If a crane is used to lift the Remediation unit, the unit shall be lifted and set in place by the four "D" rings located along the skid at each corner of the unit. The Contractor shall use four lifting chains with end hooks to allow for adjusting of the crane's hook over the unit's center-of-gravity. Also, a 9-foot spreader bar shall be used to prevent damage to the remedial unit's roof.

#### 300.2.1.2 Forklift Method

If a forklift(s) is used to lift the Remediation unit, the fork spacing should be wide enough to fit the lift pockets that are built into the skid of the unit, as specified on the Drawings. Based on the size and weight of the Remediation unit two fork trucks may be required for placement of the unit, depending on their lifting capacity.

### 300.2.2 Placement

The unit shall be supported on 3-inch solid cinder blocks placed at points around the perimeter of the unit to a minimum height of 9 inches. The location of the unit and block placement is specified on Drawings. If field conditions warrant any changes to the remediation unit placement, these changes must be made by the Engineer.

### 300.2.3 Leveling

The Contractor shall be required to level the unit once the unit is properly placed. The unit must be leveled to 1/8-inch over a 4-foot interval in all directions, measured on the air stripper tank. Solid steel or hardwood shims, provided by the Contractor, may be used for the final leveling of the Remediation unit.

## 300.3 TRAILER-MOUNTED REMEDIAL UNIT

The unit shall be placed on 3-inch blocks adequately stacked to a height so that the weight of the unit is not resting on the Trailer Axle. The Contractor shall be required to level the trailer once the unit has been set in the proper place (1/8-inch on 4-foot).

The location of the unit and block placement is specified on the Drawings. Any changes due to field conditions shall be made by the Engineer.

## 300.4 DPVE ASSOCIATED FEATURES

The Contractor shall be required to install all features associated with the vacuum extraction lines, water lines, sewer lines, electrical power, and the inline filtration system. The Drawings will specify all associated features, which may include but not limited to:

- Inline filtration system
- Muratic acid injection system
- Gate valves
- Site tubes, Fernco® couplings, specified reducers, associated piping and connections
- Extraction line manifold
- Vacuum gauges and flow meters

## 300.5 FINAL UTILITY CONNECTIONS

The final utility connections should be made after the unit has been placed. Contractor will be responsible for making the final connections as specified in the Specifications and Drawings. All exposed service water and sewer lines shall be insulated using pipe insulation having an R-2 rating.

PPM Consultants, Inc.
5555 Bankhead Highway
Birmingham, Alabama 35210



# SECTION 300 REMEDIATION UNIT PLACEMENT


| | | PAGE |
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| 300.2.1.2 | Forklift Method | 300-1 |
| 300.2.2 | Placement | 300-1 |
| 300.2.3 | Leveling | 300-2 |
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| **300.7** | **METHOD OF PAYMENT** | 300-3 |

PPM Consultants, Inc.
5555 Bankhead Highway
Birmingham, Alabama 35210



# 300.0 REMEDIATION UNIT PLACEMENT

## 300.1 GENERAL

The Contractor shall be required to place remediation units as specified on drawings. Remediation unit placement shall be scheduled to take place after the installation of the subsurface extraction lines, recovery well vaults, subsurface utilities, and the electricity. It shall be the responsibility of the Engineer to schedule the delivery of the unit to the site. After the unit is in place, all subsurface utility lines and extraction lines will be piped into the unit by the Contractor according to drawing specifications and the approval of the Engineer.

## 300.2 SKID-MOUNTED REMEDIAL UNIT

### 300.2.1 Unloading and Setup

The Remediation unit shall be brought to the site on a "low-boy" or a standard trailer. The unit may be placed by either a crane or large forklift(s). The Weight of the unit is shown on the Drawings.

#### 300.2.1.1 Crane Method

If a crane is used to lift the Remediation unit, the unit shall be lifted and set in place by the four "D" rings located along the skid at each corner of the unit. The Contractor shall use four lifting chains with end hooks to allow for adjusting of the crane's hook over the unit's center-of-gravity. Also, a 9-foot spreader bar shall be used to prevent damage to the remedial unit's roof.

#### 300.2.1.2 Forklift Method

If a forklift(s) is used to lift the Remediation unit, the fork spacing should be wide enough to fit the lift pockets that are built into the skid of the unit, as specified on the Drawings. Based on the size and weight of the Remediation unit two fork trucks may be required for placement of the unit, depending on their lifting capacity.

### 300.2.2 Placement

The unit shall be supported on 3-inch solid cinder blocks placed at points around the perimeter of the unit to a minimum height of 9 inches. The location of the unit and block placement is specified on Drawings. If field conditions warrant any changes to the remediation unit placement, these changes must be made by the Engineer.

### 300.2.3 Leveling

The Contractor shall be required to level the unit once the unit is properly placed. The unit must be leveled to 1/8-inch over a 4-foot interval in all directions, measured on the air stripper tank. Solid steel or hardwood shims, provided by the Contractor, may be used for the final leveling of the Remediation unit.

## 300.3 TRAILER-MOUNTED REMEDIAL UNIT

The unit shall be placed on 3-inch blocks adequately stacked to a height so that the weight of the unit is not resting on the Trailer Axle. The Contractor shall be required to level the trailer once the unit has been set in the proper place (1/8-inch on 4-foot).

The location of the unit and block placement is specified on the Drawings. Any changes due to field conditions shall be made by the Engineer.

## 300.4 DPVE ASSOCIATED FEATURES

The Contractor shall be required to install all features associated with the vacuum extraction lines, water lines, sewer lines, electrical power, and the inline filtration system. The Drawings will specify all associated features, which may include but not limited to:

- Inline filtration system
- Muratic acid injection system
- Gate valves
- Site tubes, Fernco® couplings, specified reducers, associated piping and connections
- Extraction line manifold
- Vacuum gauges and flow meters

## 300.5 FINAL UTILITY CONNECTIONS

The final utility connections should be made after the unit has been placed. Contractor will be responsible for making the final connections as specified in the Specifications and Drawings. All exposed service water and sewer lines shall be insulated using pipe insulation having an R-2 rating.

## 300.6 TELEPHONE

The local telephone company shall be responsible for making the appropriate telephone service connections. The Engineer shall be responsible for coordinating the installation of telephone service.

## 300.7 METHOD OF PAYMENT

Measurement and payment shall be made for the cost of all other work, materials, equipment, labor, and operations necessary for the satisfactory completion of this project, as shown on the plans and specified herein.

Complete Remediation unit installation will be measured by the job basis for furnishing, installing, connecting all piping (extraction lines, water lines, and sewer lines), electrical power, and making operational the remedial unit.

# ATTACHMENT D

# CLEANUP, REPAIR, ETC.

# SECTION 1300 CLEANUP, REPAIRS, ETC.


| | | | PAGE |
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| **1300.2** | **PROTECTION, REMOVAL, AND REPLACEMENT OF EXISTING FACILITIES** | | 1300-1 |
| **1300.3** | **PROTECTION OF PROPERTY** | | 1300-1 |
| **1300.4** | **CLEAN-UP** | | 1300-1 |
| | 1300.4.1 | Repairs to Roads, Streets, etc. | 1300-1 |
| | 1300.4.2 | Repair and Maintenance or Replacement of Fences, Lawns, Driveways, etc. | 1300-2 |
| **1300.5** | **RESPONSIBILITY OF CONTRACTOR** | | 1300-2 |
| **1300.6** | **MEASUREMENT AND PAYMENT** | | 1300-2 |

# 1300.0 CLEANUP, REPAIRS, ETC.

## 1300.1 GENERAL

The Scope of the Work required by this section includes cleaning up of all areas in which the contractor has worked; repairing all property (both public and private) which has been damaged, disturbed, altered, etc., by the Contractor's operations; and maintenance of necessary access to and across the work area.

## 1300.2 PROTECTION, REMOVAL, AND REPLACEMENT OF EXISTING FACILITIES

The Contractor shall be required to work around existing facilities, including, but not limited to, buildings, utilities, fences, roads, streets, sidewalks, etc., and will, in some cases, be required to remove and replace or reinstall such.

The Contractor shall exercise care not to damage any such property, and shall be fully responsible for any such damages, whether to the owner's property or any responsibility from such damages.

Any property removed shall be replaced such that, after replacement, it shall be similar and equal in all respects to that removed.

## 1300.3 PROTECTION OF PROPERTY

The Contractor shall be responsible for protecting all property, both private and public, and shall be responsible for any damages or blockage to streets, alley, adjacent property, etc., and shall be responsible for the stoppage or diversion of any surface waters, rainfall, etc., and does hereby indemnify the Engineer of any responsibilities from such damages.

## 1300.4 CLEAN-UP

The Contractor shall, after acceptance of the various items of work, neatly clean all his work area, including any access areas, such that after clean up, the areas will be in a neat condition and shall be in at least an equal condition as when the Contractor started his operations.

### 1300.4.1 Repairs to Roads, Streets, etc.

The Contractor shall repair any and all damages to roads, streets, etc., occurring as a result of his operations. All construction methods, materials, etc., shall be strictly in accordance with state, parish (county), or local specifications or codes as applicable and

the contractor shall replace or repair such to the satisfaction of the applicable governing body and the Engineer, or as specified elsewhere herein and/or as shown on the plans.

### 1300.4.2 Repair and Maintenance or Replacement of Fences, Lawns, Driveways, etc.

The Contractor shall repair or replace any and all damage or alterations to fences, lawns, or other property as a result of his operations. All such repair or replacement shall be performed such that the finished product shall be in a condition of at least equal to that prior to its damage or removal, all as determined by the Engineer.

The Contractor shall maintain such temporary fencing, gates, etc., as is required to protect livestock, etc., at all times during his operations and shall be fully responsible for any and all damages to such as a result of his negligence.

The Contractor shall exercise due care with respect to damage to lawns, sidewalks, driveways, entrances, etc., and shall maintain access to all property, both public and private, at all times. The Contractor shall promptly repair any such damages to the satisfaction of the Engineer.

## 1300.5 RESPONSIBILITY OF CONTRACTOR

Should the Contractor fail to repair or replace any damages as specified herein or should he fail to maintain access, or to protect any property, all as specified herein, within a reasonable time as determined by the Engineer, the Engineer hereby reserves the right to perform, or have performed for him, such work and deduct the cost thereof from any money due or which shall become due to the Contractor.

## 1300.6 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for any of the items covered in this section, and all cost thereof shall be included in the prices for the other items of work.

# ATTACHMENT E

# QUOTE FORM

# QUICK SHOP NO. 8
## SYSTEM INSTALLATION - QUOTE FORM
### ALABAMA HIGHWAY 5, BRENT, ALABAMA

| CATEGORY | | {{INSERT COMPANY NAME}} | | | |
|---|---|---|---|---|---|
| M | Mobilization (including rental equip) | 1 | L.S. | | $0.00 |
| **ZONE A - AUTOMOBILE SIDE (Gasoline Side)** | | | | | |
| A1 | Install and Construct Two Horizontal Wells | 1 | L.S. | | $0.00 |
| A2 | Trench in Soil (includes backfill with gravel or new soil) | 100 | feet | | $0.00 |
| A3 | Trench in Asphalt (includes saw cutting) | 390 | feet | | $0.00 |
| A4 | Provide and Install 1-inch Piping | 1,200 | feet | | $0.00 |
| A5 | Provide and Install 2-inch Piping | 1,600 | feet | | $0.00 |
| A6 | Provide and Install 4-inch Piping | 1,425 | feet | | $0.00 |
| A7 | Install Vaults (includes saw cutting) | 14 | well | | $0.00 |
| A8 | Backfill Piping Trenches w/ Gravel (pea; 57 stone; or crusher run) | 490 | feet | | $0.00 |
| A9 | Install and Finish Concrete | 425 | feet | | $0.00 |
| **SYSTEM COMPOUND** | | | | | |
| S1 | Construct Manifold | 1 | L.S. | | $0.00 |
| S2 | Install 8-Foot Wooden Fence | 100 | feet | | $0.00 |
| S3 | Provide and constuct 6-inch thick gravel pad at system compound | 1 | L.S. | | $0.00 |
| S3 | System and GAC Offload, Placement, and Leveling | 1 | L.S. | | $0.00 |
| S4 | Install 2-inch Discharge Line to Outfall | 1 | L.S. | | $0.00 |
| S5 | Connect System to Air Treatment and External Tank | 1 | L.S. | | $0.00 |
| **GENERAL** | | | | | |
| G1 | Transport Soil, Concrete, and Asphalt to Landfill | 125 | ton | | $0.00 |
| G2 | Site Barricade Rental and Moving | 1 | L.S. | | $0.00 |
| G4 | Site Cleanup | 1 | L.S. | | $0.00 |
| **Total** | | | | | **$0.00** |

**Field Days Anticipated to Complete Work** _____

**Name/Title** _____ **Date** _____

**Signature** _____

# QUICK SHOP NO. 98
## SYSTEM INSTALLATION - BID COMPARISON
### ALABAMA HIGHWAY 5, BRENT, ALABAMA

| CATEGORY | | | | Walker Hill | | Environmental, Inc. | | Complete Environmental | |
|---|---|---|---|---|---|---|---|---|---|
| M | Mobilization (including rental equip) | 1 | L.S. | $8,500.00 | $8,500.00 | $10,100.00 | $10,100.00 | $4,200.00 | $4,200.00 |
| **ZONE A - AUTOMOBILE SIDE (Gasoline Side)** | | | | | | | | | |
| A1 | Install and Construct Two Horizontal Wells | 1 | L.S. | $7,900.00 | $7,900.00 | $1,905.00 | $1,905.00 | $2,800.00 | $2,800.00 |
| A2 | Trench in Soil (includes backfill with gravel or new soil) | 100 | feet | $25.00 | $2,500.00 | $11.55 | $1,155.00 | $40.00 | $4,000.00 |
| A3 | Trench in Asphalt (includes saw cutting) | 390 | feet | $45.00 | $17,550.00 | $17.50 | $6,825.00 | $92.30 | $35,997.00 |
| A4 | Provide and Install 1-inch Piping | 1,200 | feet | $2.50 | $3,000.00 | $2.13 | $2,556.00 | $1.40 | $1,680.00 |
| A5 | Provide and Install 2-inch Piping | 1,600 | feet | $4.50 | $7,200.00 | $3.78 | $6,048.00 | $2.30 | $3,680.00 |
| A6 | Provide and Install 4-inch Piping | 1,425 | feet | $6.50 | $9,262.50 | $9.55 | $13,608.75 | $4.75 | $6,768.75 |
| A7 | Install Vaults (includes saw cutting) | 14 | well | $1,200.00 | $16,800.00 | $1,745.00 | $24,430.00 | $600.00 | $8,400.00 |
| A8 | Backfill Piping Trenches w/ Gravel (pea; 57 stone; or crusher run) | 490 | feet | $8.00 | $3,920.00 | $10.00 | $4,900.00 | $8.50 | $4,165.00 |
| A9 | Install and Finish Concrete | 425 | feet | $12.00 | $5,100.00 | $20.00 | $8,500.00 | $8.85 | $3,761.25 |
| **SYSTEM COMPOUND** | | | | | | | | | |
| S1 | Construct Manifold | 1 | L.S. | $10,500.00 | $10,500.00 | $23,845.00 | $23,845.00 | $10,293.00 | $10,293.00 |
| S2 | Install 8-Foot Wooden Fence | 100 | feet | $45.00 | $4,500.00 | $66.00 | $6,600.00 | $79.00 | $7,900.00 |
| S3 | Provide and construct 6-inch thick gravel pad at system compound | 1 | L.S. | $3,500.00 | $3,500.00 | $1,640.00 | $1,640.00 | $500.00 | $500.00 |
| S3 | System and GAC Offload, Placement, and Leveling | 1 | L.S. | $2,500.00 | $2,500.00 | $3,850.00 | $3,850.00 | $3,200.00 | $3,200.00 |
| S4 | Install 2-inch Discharge Line to Outfall | 1 | L.S. | $4.50 | $4.50 | $1,100.00 | $1,100.00 | $400.00 | $400.00 |
| S5 | Connect System to Air Treatment and External Tank | 1 | L.S. | $475.00 | $475.00 | $250.00 | $250.00 | $500.00 | $500.00 |
| **GENERAL** | | | | | | | | | |
| G1 | Transport Soil, Concrete, and Asphalt to Landfill | 125 | ton | $25.00 | $3,125.00 | $38.50 | $4,812.50 | $17.00 | $2,125.00 |
| G2 | Site Barricade Rental and Moving | 1 | L.S. | $1,200.00 | $1,200.00 | $8,985.00 | $8,985.00 | $7,200.00 | $7,200.00 |
| G4 | Site Cleanup | 1 | L.S. | $1,500.00 | $1,500.00 | $1,140.00 | $1,140.00 | $800.00 | $800.00 |
| **Total** | | | | | **$109,037.00** | | **$132,250.25** | | **$108,370.00** |
| | | | **Field Days Anticipated to Complete Work** | | **20** | | **15** | | **15** |

# QUICK SHOP NO. 8
## SYSTEM INSTALLATION - QUOTE FORM
### ALABAMA HIGHWAY 5, BRENT, ALABAMA

| CATEGORY | | {{INSERT COMPANY NAME}} | | | |
|---|---|---|---|---|---|
| M | Mobilization (including rental equip) | 1 | L.S. | $4,200.00 | $4,200.00 |
| **ZONE A - AUTOMOBILE SIDE (Gasoline Side)** | | | | | |
| A1 | Install and Construct Two Horizontal Wells | 1 | L.S. | $2,800.00 | $2,800.00 |
| A2 | Trench in Soil (includes backfill with gravel or new soil) | 100 | feet | $40.00 | $4,000.00 |
| A3 | Trench in Asphalt (includes saw cutting) | 390 | feet | $92.30 | $35,997.00 |
| A4 | Provide and Install 1-inch Piping | 1,200 | feet | $1.40 | $1,680.00 |
| A5 | Provide and Install 2-inch Piping | 1,600 | feet | $2.30 | $3,680.00 |
| A6 | Provide and Install 4-inch Piping | 1,425 | feet | $4.75 | $6,768.75 |
| A7 | Install Vaults (includes saw cutting) | 14 | well | $600.00 | $8,400.00 |
| A8 | Backfill Piping Trenches w/ Gravel (pea; 57 stone; or crusher run) | 490 | feet | $8.50 | $4,165.00 |
| A9 | Install and Finish Concrete | 425 | feet | $8.85 | $3,761.25 |
| **SYSTEM COMPOUND** | | | | | |
| S1 | Construct Manifold | 1 | L.S. | $10,293.00 | $10,293.00 |
| S2 | Install 8-Foot Wooden Fence | 100 | feet | $79.00 | $7,900.00 |
| S3 | Provide and constuct 6-inch thick gravel pad at system compound | 1 | L.S. | $500.00 | $500.00 |
| S3 | System and GAC Offload, Placement, and Leveling | 1 | L.S. | $3,200.00 | $3,200.00 |
| S4 | Install 2-inch Discharge Line to Outfall | 1 | L.S. | $400.00 | $400.00 |
| S5 | Connect System to Air Treatment and External Tank | 1 | L.S. | $500.00 | $500.00 |
| **GENERAL** | | | | | |
| G1 | Transport Soil, Concrete, and Asphalt to Landfill | 125 | ton | $17.00 | $2,125.00 |
| G2 | Site Barricade Rental and Moving | 1 | L.S. | $7,200.00 | $7,200.00 |
| G4 | Site Cleanup | 1 | L.S. | $800.00 | $800.00 |
| **Total** | | | | | **$108,370.00** |

**Field Days Anticipated to Complete Work** **15**

Kevin T. Ivy / Operations Manager — **1/11/2022**

**Name/Title** — **Date**

**Signature**

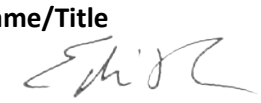
# QUICK SHOP NO. 8
## SYSTEM INSTALLATION - QUOTE FORM
### ALABAMA HIGHWAY 5, BRENT, ALABAMA

| CATEGORY | | Walker Hill Environmental, Inc. | | | |
|---|---|---|---|---|---|
| M | Mobilization (including rental equip) | 1 | L.S. | $8,500.00 | $8,500.00 |
| **ZONE A - AUTOMOBILE SIDE (Gasoline Side)** | | | | | |
| A1 | Install and Construct Two Horizontal Wells | 1 | L.S. | $7,900.00 | $7,900.00 |
| A2 | Trench in Soil (includes backfill with gravel or new soil) | 100 | feet | $25.00 | $2,500.00 |
| A3 | Trench in Asphalt (includes saw cutting) | 390 | feet | $45.00 | $17,550.00 |
| A4 | Provide and Install 1-inch Piping | 1,200 | feet | $2.50 | $3,000.00 |
| A5 | Provide and Install 2-inch Piping | 1,600 | feet | $4.50 | $7,200.00 |
| A6 | Provide and Install 4-inch Piping | 1,425 | feet | $6.50 | $9,262.50 |
| A7 | Install Vaults (includes saw cutting) | 14 | well | $1,200.00 | $16,800.00 |
| A8 | Backfill Piping Trenches w/ Gravel (pea; 57 stone; or crusher run) | 490 | feet | $8.00 | $3,920.00 |
| A9 | Install and Finish Concrete | 425 | feet | $12.00 | $5,100.00 |
| **SYSTEM COMPOUND** | | | | | |
| S1 | Construct Manifold | 1 | L.S. | $10,500.00 | $10,500.00 |
| S2 | Install 8-Foot Wooden Fence | 100 | feet | $45.00 | $4,500.00 |
| S3 | Provide and constuct 6-inch thick gravel pad at system compound | 1 | L.S. | $3,500.00 | $3,500.00 |
| S3 | System and GAC Offload, Placement, and Leveling | 1 | L.S. | $2,500.00 | $2,500.00 |
| S4 | Install 2-inch Discharge Line to Outfall | 1 | L.S. | $4.50 | $4.50 |
| S5 | Connect System to Air Treatment and External Tank | 1 | L.S. | $475.00 | $475.00 |
| **GENERAL** | | | | | |
| G1 | Transport Soil, Concrete, and Asphalt to Landfill | 125 | ton | $25.00 | $3,125.00 |
| G2 | Site Barricade Rental and Moving | 1 | L.S. | $1,200.00 | $1,200.00 |
| G4 | Site Cleanup | 1 | L.S. | $1,500.00 | $1,500.00 |
| **Total** | | | | | **$109,037.00** |

**Field Days Anticipated to Complete Work** **20**

Eric Meitzler / Vice President — **1/14/2022**

**Name/Title** — **Date**



**Signature**

# QUICK SHOP NO. 8
## SYSTEM INSTALLATION - QUOTE FORM
### ALABAMA HIGHWAY 5, BRENT, ALABAMA

| CATEGORY | | Environmental, Inc. | | | |
|---|---|---|---|---|---|
| M | Mobilization (including rental equip) | 1 | L.S. | $10,100.00 | $10,100.00 |
| ZONE A - AUTOMOBILE SIDE (Gasoline Side) | | | | | |
| A1 | Install and Construct Two Horizontal Wells | 1 | L.S. | $1,905.00 | $1,905.00 |
| A2 | Trench in Soil (includes backfill with gravel or new soil) | 100 | feet | $11.55 | $1,155.00 |
| A3 | Trench in Asphalt (includes saw cutting) | 390 | feet | $17.50 | $6,825.00 |
| A4 | Provide and Install 1-inch Piping | 1,200 | feet | $2.13 | $2,556.00 |
| A5 | Provide and Install 2-inch Piping | 1,600 | feet | $3.78 | $6,048.00 |
| A6 | Provide and Install 4-inch Piping | 1,425 | feet | $9.55 | $13,608.75 |
| A7 | Install Vaults (includes saw cutting) | 14 | well | $1,745.00 | $24,430.00 |
| A8 | Backfill Piping Trenches w/ Gravel (pea; 57 stone; or crusher run) | 490 | feet | $10.00 | $4,900.00 |
| A9 | Install and Finish Concrete | 425 | feet | $20.00 | $8,500.00 |
| SYSTEM COMPOUND | | | | | |
| S1 | Construct Manifold | 1 | L.S. | $23,845.00 | $23,845.00 |
| S2 | Install 8-Foot Wooden Fence | 100 | feet | $66.00 | $6,600.00 |
| S3 | Provide and constuct 6-inch thick gravel pad at system compound | 1 | L.S. | $1,640.00 | $1,640.00 |
| S3 | System and GAC Offload, Placement, and Leveling | 1 | L.S. | $3,850.00 | $3,850.00 |
| S4 | Install 2-inch Discharge Line to Outfall | 1 | L.S. | $1,100.00 | $1,100.00 |
| S5 | Connect System to Air Treatment and External Tank | 1 | L.S. | $250.00 | $250.00 |
| GENERAL | | | | | |
| G1 | Transport Soil, Concrete, and Asphalt to Landfill | 125 | ton | $38.50 | $4,812.50 |
| G2 | Site Barricade Rental and Moving | 1 | L.S. | $8,985.00 | $8,985.00 |
| G4 | Site Cleanup | 1 | L.S. | $1,140.00 | $1,140.00 |
| Total | | | | | $132,250.25 |

**Field Days Anticipated to Complete Work** 15

Timothy W. Walker/VP — **Name/Title**

1/14/2022 — **Date**

**Signature**

NOTE:
Prices in this quote good for 30 days due to material cost fluctuations.

# APPENDIX F – DPVE MONITORING FORMS

# DPVE FIELD MONITORING FORM

| | |
|---|---|
| **Quick Shop No. 98** | **Project Number: 40101501-** |
| **Highway 5, Brent, Alabama** | **Well Configuration:** |
| **Date:** | **Time of Arrival:** |
| **Technician:** | **Status of System:** |

***SITE RESPONSE DATA:***

| Observation Point | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **DTW** | **DTP** | **DTB** | **Purge Volume** | **Amt. Purged** | **How Purged** | **Sample Time** |
| MW-1 | | | | | | | |
| MW-2 | | | | | | | |
| MW-3 | | | | | | | |
| MW-4 | | | | | | | |
| MW-6 | | | | | | | |
| MW-7 | | | | | | | |
| MW-9 | | | | | | | |
| MW-10 | | | | | | | |
| MW-11 | | | | | | | |
| MW-12 | | | | | | | |
| MW-13D | | | | | | | |
| MW-14 | | | | | | | |
| MW-15 | | | | | | | |
| MW-16 | | | | | | | |
| MW-17 | | | | | | | |
| MW-18 | | | | | | | |
| MW-19 | | | | | | | |
| **Recovery Wells** | | | | | | | |
| RW-1 | | | | | | | |
| RW-2 | | | | | | | |
| RW-3 | | | | | | | |
| RW-4 | | | | | | | |
| RW-5 | | | | | | | |
| RW-6 | | | | | | | |
| RW-7 | | | | | | | |
| RW-8 | | | | | | | |
| RW-9 | | | | | | | |
| RW-10 | | | | | | | |
| RW-11 | | | | | | | |
| RW-12 | | | | | | | |
| RW-13 | | | | | | | |
| RW-14 | | | | | | | |

***VOC Readings ISOLATED (Y or N) :____***

| Extraction Well | Vacuum @ Wellhead | Vacuum @ Manifold | Priming Tube Open (Y/N) | VOC's | O2 |
|---|---|---|---|---|---|
| RW-1 | | | | | |
| RW-2 | | | | | |
| RW-3 | | | | | |
| RW-4 | | | | | |
| RW-5 | | | | | |
| RW-6 | | | | | |
| RW-7 | | | | | |
| RW-8 | | | | | |
| RW-9 | | | | | |
| RW-10 | | | | | |
| RW-11 | | | | | |
| RW-12 | | | | | |
| RW-13 | | | | | |
| RW-14 | | | | | |

*Water Effluent Data*

| Time | Service Water City Meter | Stripperator Discharge | OWS meter | AWS-1 Meter | Effluent sample collected (y/n) |
|---|---|---|---|---|---|
| | | | | | |
| Effluent analysis required: BTEX/MTBE/Naph., Total Lead Oil & Grease and pH | | | | pH / Temp | |

*Air Effluent Data:* *AIR SAMPLE: CIRCLE Y / N*

| LRVP Run Time | Seal Water Tank Pressure | Air Temperature | Differential Pressure | Total VOCs/LEL | %OXY |
|---|---|---|---|---|---|
| | | | | | |

*Air Effluent Striperator:*

| Actual time | Air Temperature | Differential Pressure | Total VOCs/LEL | %OXY | Lab Sample (Y or N) |
|---|---|---|---|---|---|
| | | | | | |

*Miscellaneous*

| Ambient Temperature | Vacuum AWS-1 (MS Tank) | LRVP Inlet Temp | LRVP Outlet Temp | Stripperator Pressure | KW Hours |
|---|---|---|---|---|---|
| | | | | | |

| Well Configuration @ Departure | RKI Calibration Gas | Polishing Tank Pressure (AWS-3) | Seal Pump Flow | Seal Pump Pressure |
|---|---|---|---|---|
| | | | | |

| Post Carbon | Differential Pressure | Total VOCs/LEL | %OXY | | |
|---|---|---|---|---|---|
| | | | | | |

**COMMENTS:**

# APPENDIX G – TECHNICAL SAMPLING AND ANALYSIS QA/QC PLAN

# 1.0 TECHNICAL SAMPLING AND ANALYSIS PLAN FOR GROUNDWATER MONITORING

## 1.1 PURPOSE

This Technical Sampling and Analysis (TS&A) Plan describes the methods and procedures to be followed during groundwater monitoring activities at leaking underground storage tank sites. Any modification to the sampling process will be addressed and described within in the monitoring reports.

## 1.2 LIQUID GAUGING PROCEDURES

Prior to groundwater sampling, liquid levels are measured in each well to determine the groundwater elevation and flow direction. Liquid levels inside the wells are measured with an ORS or Keck interface probe from the top of the well casing using the same reference point from which the survey elevations determined during the assessment were recorded. Groundwater elevations at the site are calculated to a common datum. Calculations for determining the water table elevations are as follows:

$$WTE = ETC - DTW$$

Where:
WTE = water table elevation
ETC = elevation to the top of the casing
DTW = depth to water

Where free product is present, the groundwater elevation is adjusted using the following formula:

$$Z_{aw} = (1-\Gamma_{ro})(Z_{ow}) + (\Gamma_{ro})(Z_{ao})$$

$\Gamma_{ro}$ = 0.755 (specific gravity)
$Z_{ow}$ = oil/water elevation
$Z_{ao}$ = air/oil elevation
$Z_{aw}$ = air/water elevation

Groundwater flow direction at the site is determined through groundwater contouring based on water table elevations calculated from the monitoring wells installed at the site.

## 1.3 GROUNDWATER SAMPLING PROCEDURES

After the depth to water is measured, each well is purged of at least five well volumes of liquid prior to sampling using a submersible pump or bailer. Purged water is contained in sealed 55 gallon drums and disposed of at an approved disposal facility. Groundwater samples are collected using disposable bailers and immediately transferred into 40 ml glass VOA vials. The vials are immediately sealed and placed on ice inside coolers. The samples are shipped with chain-of-custody forms via common courier to an independent testing laboratory for analysis. One trip blank and one duplicate sample are submitted per event for QA/QC purposes. QA/QC procedures are described in detail in the QA/QC Plan.

## 1.4 LABORATORY ANALYSES

Laboratory analyses are performed by an independent testing laboratory. The laboratory used will maintain a QA/QC program which utilizes spike and duplicate analysis. Groundwater samples will be analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), per EPA SW-846, Test Method 5030/8020, and other parameters that may be applicable to the constituents of concern. Results of the internal QA/QC program used by the laboratory are included in each report.

# 2.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN

## 2.1 PURPOSE

This Quality Assurance/Quality Control (QA/QC) Plan describes the procedures followed by personnel during the project to ensure that all data generated is accurate and representative of conditions encountered. Any modification of these procedures will be documented in the respective quarterly update.

## 2.2 GROUNDWATER SAMPLING

### 2.2.1 Well Purging

Groundwater is purged from monitoring wells prior to sampling to ensure each sample is representative of existing subsurface conditions. At a minimum, five well volumes of standing water are purged using a submersible pump or bailer. Only water inside the upper column of the well is purged. Each well is purged at a minimal rate to avoid aeration through cascading action of groundwater in the screened interval. When the bailing method is employed, the bailer is slowly lowered and retrieved from the groundwater to minimize aeration inside the well. Groundwater in wells is allowed to recover to near static water level before sampling.

### 2.2.2 Sample Collection

Groundwater samples are collected using disposable bailers. Procedures for sampling groundwater are described below:

1) The bailer is lowered into the well slowly to avoid aeration of the sample;

2) The bailer is filled from the top of the water column and retrieved; and

3) The first bailer of water is transferred from the bottom of the bailer into 40 ML, prepared, VOA vials or applicable containers specific to the analyte. The sample container is filled completely to the top and tightly sealed. Samples are placed on ice immediately following collection.

### 2.2.3 Decontamination

Disposable vinyl gloves are worn during well purging and sample collection. During well purging, the gloves are changed between each well. Gloves are also changed between each sample acquisition during the sampling process. When a pump is used, all downhole equipment is decontaminated between each use by circulating clean water and phosphate-free detergent. Disposable bailers are used for collecting samples; therefore, no additional decontamination procedures are employed.

### 2.2.4 Sample Dispatch

Groundwater samples are packed in individual plastic protective envelopes (bubble pack) inside a cooler to avoid breakage during shipment. The coolers used are insulated to maintain sample temperature near 4° C. Each cooler is sealed with tape to discourage tampering. The samples are shipped to the laboratory via common courier.

## 2.3 SAMPLE CUSTODY

A traceable link is established from the time samples are obtained until submission of analytical results. The following section describes chain-of-custody (COC) procedures which are adhered to during the project to establish that traceable link.

### 2.3.1 Documentation

Protocols for documentation are used to ensure appropriate sample identification and transfer. This documentation includes sample labels, seals, and COC forms. Labels and seals will be filled out using water-proof ink. Information to be supplied on COC forms consists of the following:

- Project number and location of the site.

- Sample identification/location.
- Sample point (depth).
- Signature of collector.
- Date and time of sample collection.
- Sample matrix (water).
- Method of preservation (HCl).
- Number of containers per sample location.
- Analytical method requested.
- Name of person(s) in possession of the COC and samples.
- Applicable remarks.

Custody seals are placed on coolers in such a manner that the container cannot be opened without breaking the seal. At least two seals are used, (one on either side of the cooler).

### 2.3.2 Custody Procedures

COC procedures implemented during the project are as follows:

- Each sample collected for the project is entered on the COC record.
- The original COC record accompanies the sample containers during transport to document their custody.
- The shipping package is sealed with strapping tape and a custody seal affixed. The seal is placed on the package in such a manner that the package cannot be opened without breaking the seal. The seal documents that the samples remained unaltered during shipment through the common parcel carrier.
- The laboratory assumes custody of the sample upon receipt and a designated sample custodian is charged with sample care and receipt.

- The laboratory retains custody of the samples in a secure area for a minimum of one month following the date of receipt. At that time, the samples are disposed of in accordance with appropriate disposal procedures.

- The sampler maintains the final copy of the COC to verify that the samples were collected and sent to the laboratory.

## 2.4 QUALITY CONTROL CHECKS

The following quality control checks are implemented during the project to verify the adherence to the QA/QC plan, and to provide measurement for method and samplers performance.

### 2.4.1 Trip Blanks

Trip blanks are used to determine the QA/QC of sample handling procedures. The trip blanks are filled with distilled water in the laboratory and will accompany the cooler to and from the project site. One trip blank is sent per cooler.

### 2.4.2 Duplicate Samples

Duplicate groundwater samples are collected to provide a check on sampling techniques as well as laboratory equipment. Duplicate samples are collected simultaneously from the same well and labeled with a different well designation number. Duplicate samples are collected at a frequency of one per 10 samples submitted for laboratory analysis.

## 3.0 TS&A AND QA/QC PLAN APPROVAL/SIGN-OFF FORMAT

I have read, understood, and agreed with the information set forth in the TS&A and QA/QC Plan.

| Name | Signature | Affiliation | Date |
|---|---|---|---|
| Name | Signature | Affiliation | Date |
| Name | Signature | Affiliation | Date |
| Name | Signature | Affiliation | Date |
| Name | Signature | Affiliation | Date |
| Name | Signature | Affiliation | Date |
| Name | Signature | Affiliation | Date |
| Name | Signature | Affiliation | Date |
| Name | Signature | Affiliation | Date |

# APPENDIX H – SITE-SPECIFIC HEALTH AND SAFETY PLAN

# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

## HEALTH AND SAFETY PLAN

**D.C. OIL COMPANY, INC.**
**QUICK SHOP NO. 98**
**HIGHWAY 5**
**HEIBERGER, ALABAMA**
**PERRY COUNTY**

**PPM PROJECT NO.** 40101501-CAPD

**JANUARY 25, 2022**


**PREPARED UNDER THE DIRECTION OF:**
JERI F. THRASHER, CSP|MBA / HEALTH AND SAFETY DIRECTOR
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# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

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# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

## PROJECT CHECKLIST – HASP AND JSA

### Project/Task and Corresponding Job Safety Analysis:

- ☐ Asbestos Inspection
- ☐ Carbon Change-Out
- ☐ Chemical Injection
- ☒ DPVE/SVE/Air Sparge Installation
- ☐ DPVE/SVE/Air Sparge Demobilization
- ☒ Drilling/Probing [Hand Auger]
- ☒ Drilling/Probing [Heavy Equipment]
- ☐ Mobile Vacuum Event [Emergency Response]
- ☐ Ozone System Installation
- ☐ Ozone System Demobilization
- ☐ Remediation System Modification* [specify below]
- ☐ Spill Bucket Replacement/Closure
- ☒ Trenching/Excavation
- ☐ UST Pull/Closure
- ☐ Well Plugging and Abandonment [Grout In Place]
- ☐ Well Plugging and Abandonment [Overdrilling]
- ☐ Other* [specify below and contact HSD with details]

### Hazard Assessment:

#### Chemical Hazards

- ☐ Acids [HCl, $HNO_3$, $H_3PO_4$, $H_2SO_4$]
- ☐ Activated Carbon
- ☒ Alconox®/Liquinox®/Isopropanol
- ☐ Asbestos
- ☐ Bases [NaOH/KOH/$CaOH_2$/$NH_3$/$Na_2CO_3$]
- ☐ Calibration Gas [Meth/Hex/Isobutyl]
- ☐ Carbon Dioxide [Dry Ice]
- ☐ Chlorinated Solvents [Dry Cleaners]
- ☐ Descaling Agents [Analytix AN-754GH]
- ☒ Diesel/PAHs
- ☒ Dust [Nuisance/Concrete]
- ☐ Dust [Granular Carbon/Aluminum Oxide]
- ☐ Fuel Gases [Meth/Hex/Butane/Prop]
- ☒ Gasoline [BTEX]
- ☐ Hydrogen Sulfide[$H_2S$]
- ☐ Kerosene
- ☐ Metals [As/Cd/Cr/Cu/Pb/Hg/Zn]
- ☒ Methyl-Tertiary Butyl Ether [MTBE]
- ☐ Oil/Lubricating Oils
- ☐ Oxidizer [NXT/ORC®/ORC Advanced®]
- ☐ Oxidizer [RegenOx A/B™]
- ☐ Ozone
- ☐ Ozone/Hydrogen Peroxide
- ☐ Pesticides [Industrial/Agricultural]
- ☐ Polychlorinated Biphenyls [PCB]

- ☐ Other C/P/B Hazard* [contact HSD]
- ☐ Unknown C/P/B Hazard* [contact HSD]

#### Physical/Biological Hazards

- ☐ Aerial Lifts
- ☒ Biological
- ☐ Combustion/Flammability
- ☐ Compressed Gas [cylinders]
- ☒ Concrete [coring/cutting]
- ☒ Cuts/Lacerations
- ☒ Driving
- ☐ Drowning
- ☐ Electrical
- ☐ Elevated Working Surfaces
- ☐ Forklift/Crane [truck-mount]
- ☒ Hand/Power Tools
- ☒ Heat/Cold Stress
- ☒ Heavy Equipment
- ☐ Illumination
- ☐ Ladder Safety
- ☒ Material Handling [back safety]
- ☒ Noise
- ☒ Repetitive Motion
- ☐ Scaffolding/Scissor Lifts
- ☒ Slips/Trips/Falls
- ☒ Traffic or Secluded Sites
- ☐ Uneven Working Surfaces
- ☐ Unstable Soils/Cave-Ins

### Protective Equipment:

- ☐ Apron and Goggles
- ☐ Booties/Foot Covers
- ☒ Ear Plugs/Canal Caps
- ☐ Face Shield
- ☐ Flame-Retardant Clothing
- ☐ Hand – Cotton Gloves
- ☐ Hand – Kevlar Gloves
- ☐ Hand – Leather Gloves
- ☒ Hand – Nitrile Gloves
- ☐ Hand – Other*
- ☒ Hard Hat [Class E]
- ☐ Harness and Lanyard
- ☒ High Visibility Shirt/Vest
- ☐ Protective Suits [tyvek]*
- ☐ Reflective Shirt/Vest
- ☐ Respirator [air-purifying]*
- ☐ Respirator [supplied air]*
- ☒ Safety Glasses
- ☒ Steel-Toed Boots
- ☐ Other PPE* [contact HSD]

### Documentation Required:

- ☒ Ambient Air Monitoring
- ☐ Crane Operator Inspection
- ☐ Forklift Safety Inspection
- ☒ HASP Acknowledgement Form
- ☐ Incident Report/Log [as applicable]
- ☒ Subsurface Clearance Checklist
- ☒ Tailgate Safety Meeting Log
- ☒ Trench/Excavation Inspection

### Return Pages in the Following Order:

- HASP Coverpage
- Project Checklist
- Emergency Summary Information and Maps
- Personnel Roles and Responsibilities, p.3
- One Call (if electronic copy)
- Subsurface Clearance Checklist
- Ambient Air
- Trench/Excavation Checklist
- HASP Acknowledgment
- Tailgate Logs

HASP Generated By [Print Name]: Brandy Hall  Date Generated: 1/25/22

# 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: Bibb Medical Center Phone: (205) 926-7063

Address: 33 BMC Dr City, State: Centreville, AL Zip: 35042

Directions and Map: See attached (next page) Distance: 15.6 mi Time: 17 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 | 318-323-7270 | 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] | David Durbin | 225-293-7270 | 225-603-8050 |
| Safety Supervisor [Birmingham] | Brandy Hall | 205-836-5650 | 205-913-5471 |
| Safety Supervisor [Jackson] | Regan Byrd | 601-956-8233 | 601-862-8693 |
| Safety Supervisor [Mobile/Pensacola] | Kay Williams | 251-990-9000 | 251-753-4455 |
| Safety Supervisor [Monroe] | Matt Colvin | 318-812-3467 | 318-355-6415 |
| Safety Supervisor [Orlando] | Amy Guilfoyle | 407-240-1127 | 941-730-5600 |

Note: District and Project Managers can be contacted by using the office phone numbers provided for each location.

### Designated Break and Evacuation Locations:

Personal protective equipment is required at all times within the work zone and can only be doffed 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: _____

bing maps

**A** Highway 5 & County Hwy-47, Marion, AL 36756

**B** Bibb Medical Center, 33 Bmc Dr, Centreville, AL 35042

**17** min , **15.6 miles**

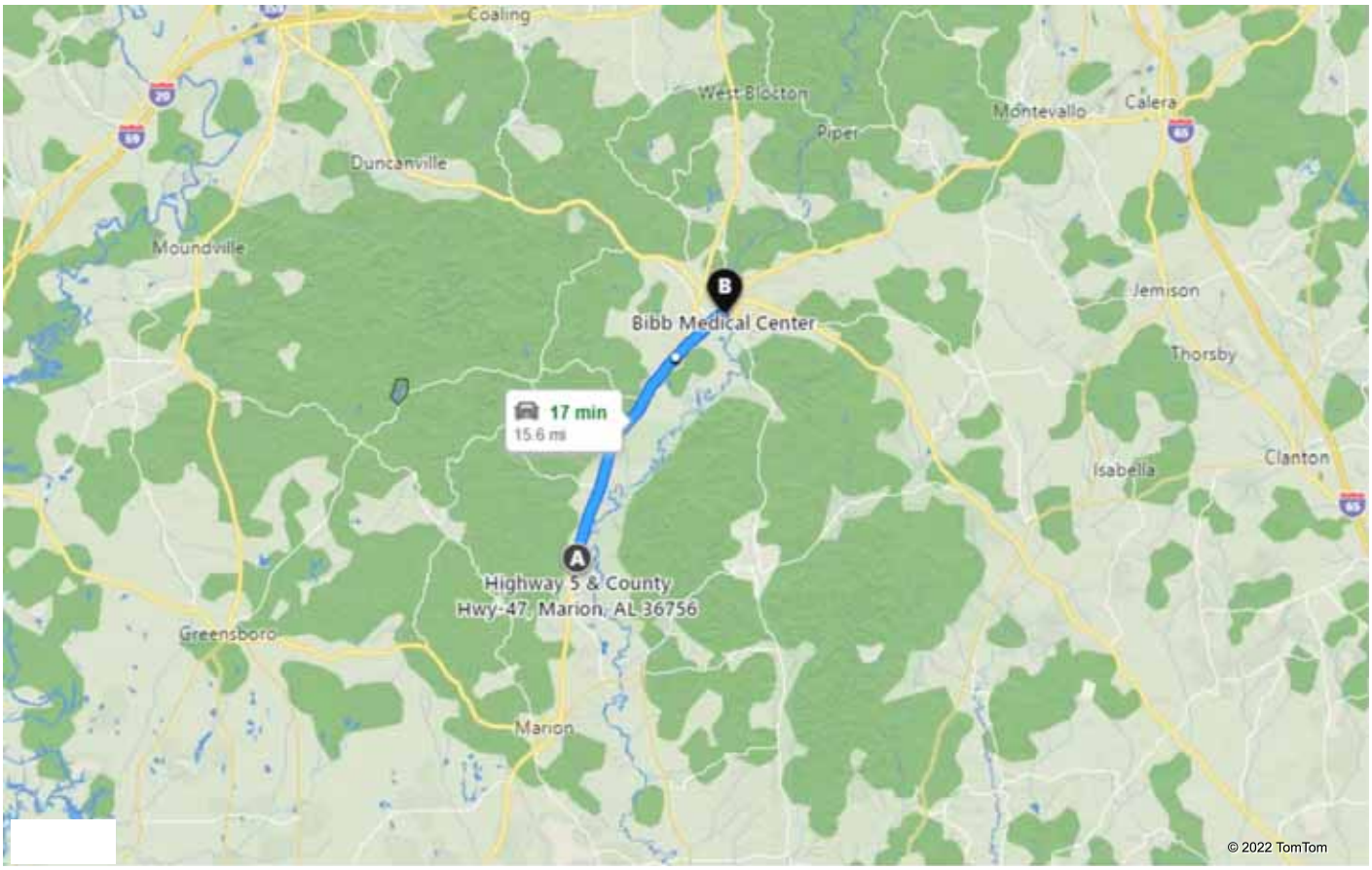
Light traffic (Leave at 5:00 PM)

Via AL-5, AL-25

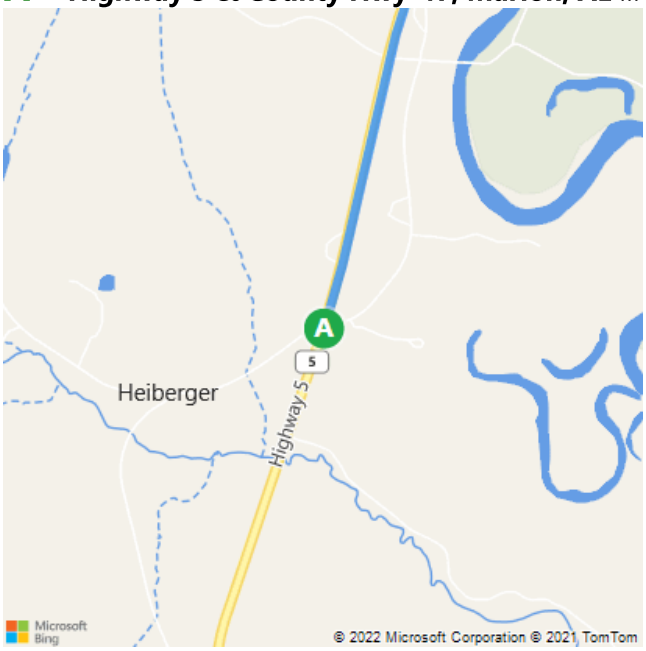
## A Highway 5 & County Hwy-47, Marion, AL 36756

| | | | |
|---|---|---|---|
| ↑ | 1. | Head **north** on **AL-5 / Highway 5** toward Onrow Tubbs Rd | 12.0 mi, 10 min |
| ↑ | 2. | Keep **right** to stay on **AL-25 / Main St** | 3.0 mi |
| ↑ | 3. | Continue on **County Road 58**<br>▲ *Minor Congestion* | 0.3 mi |
| ↰ | 4. | Turn **left** onto **Library St** | 0.2 mi |
| ↱ | 5. | Turn **right** onto **Alexander Ave** | 0.1 mi |
| | 6. | Arrive at **Alexander Ave** on the left<br>The last intersection before your destination is Library St<br>If you reach Hospital Dr, you've gone too far | |

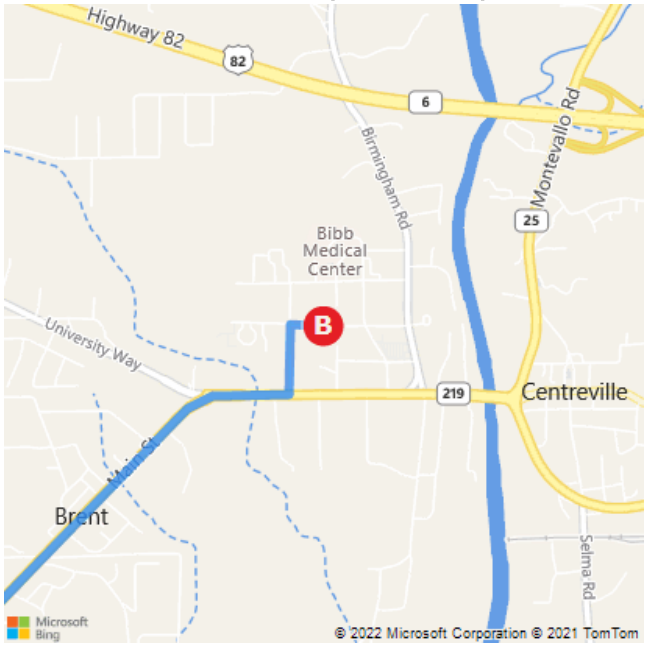
## B Bibb Medical Center




**A** **Highway 5 & County Hwy-47, Marion, AL ...**




**B** **Bibb Medical Center, 33 Bmc Dr, Centrevill...**




These directions are subject to the Microsoft® Service Agreement and are for informational purposes only. No guarantee is made regarding their completeness or accuracy. Construction projects, traffic, or other events may cause actual conditions to differ from these results. Map and traffic data © 2022 TomTom.

# 1.0 INTRODUCTION

## 1.1 COMPANY COMMITMENT

PPM is committed to the safety and wellbeing of its employees and subcontractors. Our mission to exceed client expectations 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 field activities.

## 1.3 APPLICABILITY

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. 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.

## 1.4 EXCEPTIONS

This general report template has been prepared specifically for common chemicals and tasks associated with routine company-related field processes as outlined within the Project Checklist – HASP and Job Safety Analysis (JSA) form. Any project involving a chemical or field-related task not otherwise specified within this form is considered non-routine and is not covered by the provisions of this written plan. HASP requests and proposed scope-of-work for non-routine chemicals and/or job-related tasks must be sent directly to the Health and Safety Director (HSD) so that a site-specific HASP can be prepared. When possible, please allow five days for preparation.

Common, repetitive field tasks such as groundwater monitoring, operation and maintenance of remediation systems, environmental site assessments, mobile vacuum events and other similar tasks that do not require exposure monitoring will be addressed within a separate HASP prepared specifically for these activities.

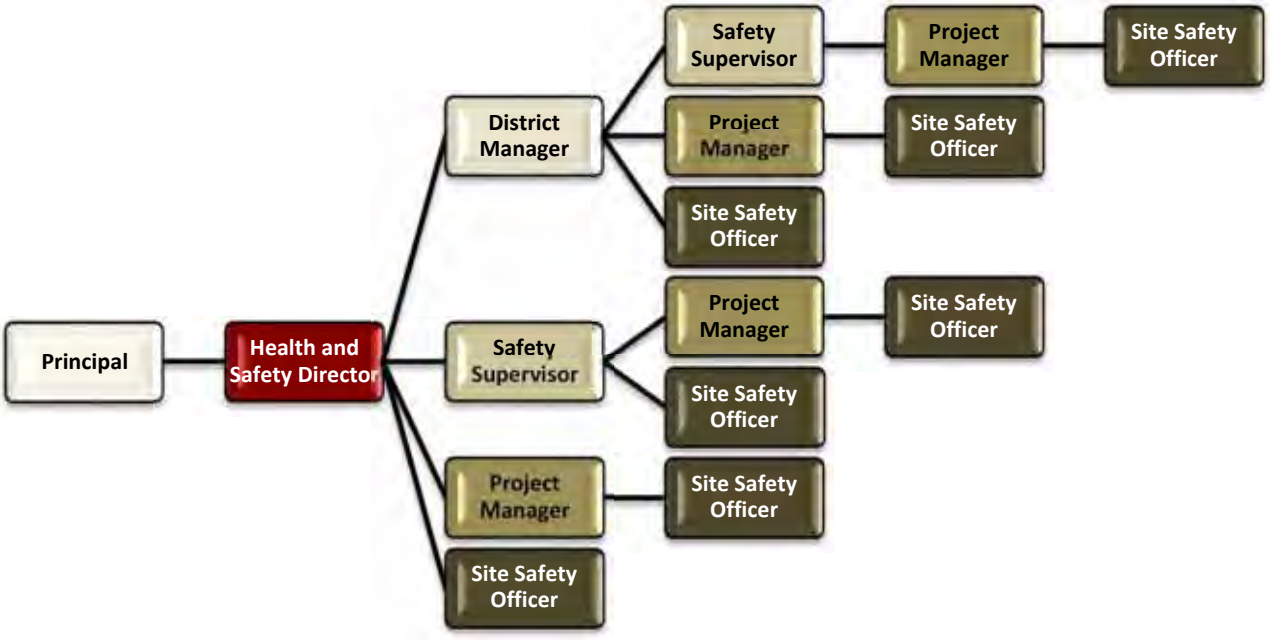
## 1.5 MANAGEMENT OF CHANGE

Should any unexpected conditions arise that introduces new hazards or eliminates existing hazards, work will cease immediately and this HASP will be amended to accommodate changes in site conditions. Additions or changes to this HASP will be communicated to all affected personnel and subcontractors.

# 2.0 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

## 2.1 CHAIN-OF-COMMAND

The hierarchy of command creates a system for accountability and is extremely beneficial to the reporting process. As indicated by the graphic below, PPM has built-in redundancies within its command chain to ensure that all affected parties are notified and accountable as well as to compensate for designated personnel when they are inaccessible. There are various ways in which to notify management; however, when it involves worker safety and health, the HSD and Principal must be notified and cannot be by-passed.




## 2.2 PERSONNEL ROLES AND RESPONSIBILITIES

Safety is the responsibility of every worker within the company, regardless of position. Workers are accountable for their own personal safety as well as the safety of the co-workers around them. Also, key personnel within the company have additional safety obligations due to their designated leadership roles within the organization. PPM expects its managers to set the tone for safety through their exemplary leadership thereby creating the foundation for a strong safety culture. Positions requiring additional safety responsibilities include the following:

- **Principal**. Principals are assigned responsibility for different departments within the company. The primary Safety Principal-in-Charge (PIC) is Shawn Ivey [Monroe], and the alternate Safety PIC is Zane Hood [Birmingham]. Each is responsible for authorizing HSSE policies and procedures set forth by the safety department and establishing the final provisions when discrepancies are noted.
- **Health and Safety Director**. The HSD is responsible for proposing and generating HSSE policy/procedures under the advisement of the Safety PIC, communicating these provisions to all affected workers within the organization, and ensuring uniform implementation of these provisions throughout all branch offices.

- **District Manager**. Each branch office has a designated District Manager who is responsible for ensuring that HSSE policies and procedures are implemented by the workers assigned to his or her office. The District Manager 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 District Manager. 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 task delegated by the HSD. The SS is directly accountable to the HSD for his/her supervisory role and is also accountable to his/her District Manager regarding the office's safety performance.
- **Project Manager**. Project Managers are responsible for all aspects of their assigned projects, including the safety and wellbeing of the workers assigned to their jobsite. Project Managers establish 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. Project Managers are directly accountable to their District Managers for the job-related safety aspects.
- **Site Safety Officer**. A site safety officer (SSO) is assigned to each field project. An alternate SSO is 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 with all affected personnel, subcontractors, client, and regulatory officials
  → Ensure site security and preventing unauthorized entry to the work zone
  → Ensure subsurface utilities have been marked and appropriate Principal approval has been obtained for exclusion 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
  → Report to management any incident or near-miss involving worker injury/illness, property damage, contact with overhead or subsurface utilities, chemical/product releases or auto accident

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

The following personnel are assigned to this project:

| NAME | TITLE/POSITION |
|---|---|
| Michael Ellison | District Manager |
| Derek Prince | Project Manager |
| Jeri F. Thrasher, CSP | Health and Safety Director |
| Brandy Hall | Safety Supervisor (SS) |
| Andrew Paradis/Connor Gaston | Site Safety Officer (SSO) |
| Stephanie Evans/Jeb Burttram | 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, Principal exemption is required).

### 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 the OSHA 29 CFR 1910.120 standard. 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, 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

A hazard is defined as a "situation that poses a level of threat to life, health, property or environment." For purposes of this written plan, hazards have been categorized in four ways – chemical, physical, biological and environmental. Hazards further outlined within the following sections are those that could not otherwise be eliminated or substituted as part of the risk assessment process. The control measures discussed throughout the following sections are required to mitigate the hazards posed to workers in order to ensure that worker safety and health is maintained.

### 3.1 CHEMICAL HAZARDS AND CONTROLS

PPM is an environmental consulting firm that specializes in environmental spill response, remediation and general regulatory compliance. 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 bases/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, 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 ($H_2S$) 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 $H_2S$ 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 $H_2S$ 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 Nano Xothermal Technology (NXT)

NXT is process used to treat chemical contamination. It is a system comprised of two compounds: Klozur® (sodium persulfate) and dry caustic potash (potassium hydroxide). This material can either be injected into the subsurface or can be placed inside open excavations as part of in-situ remediation. This material is a white solid with a pH range that is undetermined but anticipated to be on the caustic side. Symptoms of exposure include: skin, eye and respiratory irritation, itching, redness and burning; can cause permanent eye damage.

*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 (including ozone), acids, heavy metals, etc. (see safety data sheet for complete list of incompatibles).

#### 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 coverts into $O_2$, $CO_2$ 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).

3.1.2.5 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.

### 3.1.3 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**. Also called 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**. Also called 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**. Also called 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, pnuemonitis (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 moist 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.

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. Wet cement can also cause skin burns so workers should wear goggles and aprons or long-sleeved clothing when mixing cement.

*Control Measures:* Soils should be wet and kept moist 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.

### 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 7º 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.

3.1.4.2 Isopropyl Alcohol

After bailers and reusable sampling equipment is decontaminated with alconox® 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. Thoroughly wash exposed skin and hands upon completion of handling to avoid skin/eye irritations.

#### 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, incoord-ination, 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.

- **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.

- **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 $CO_2$); 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.

- **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. Thoroughly wash exposed skin and hands upon completion of handling to avoid skin/eye irritations.

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.

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.

### 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.

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 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 Shawn Ivey or Zane Hood, Regional Principals. Due to the increase in safety precautions, a site-specific HASP must be generated by the Health and Safety Director, which may require additional time to prepare. Never open a site 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 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.

### 3.2.3 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.

### 3.2.4 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.

### 3.2.5 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 drivers 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 exclusion zones (*any area within 10-foot circumference of UST pit)* or obtain principal approval when there are no other alternatives to avoidance
- Follow clearance procedures for exclusion zones, critical zones (*any area within 10 feet of furthest edge of any fuel dispenser, product distribution lines, or aboveground electrical utility; entire area between UST pit and dispenser islands; and/or any area within 10 feet of suspected subsurface utilities/structures*), and non-exclusion zones (*any area not otherwise defined as exclusion or critical*).

*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 Subpart M). Instead falls from ladders are outlined within Subpart X of 29 CFR 1926.1053, which does not require the use of personal fall arrest system when working at elevations in excess of 4 feet. 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. **Note: PPM purposely chooses to reference the most stringent safety measures under construction industry standards, while additionally enforcing the more stringent general industry height requirement of 4 feet. This is an overlap of standards but provides the greatest level of worker protection.*

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, and industrial compliance; specifically air compliance.

*Control Measures:* Falls from ladder use are exempted from the fall protection standards (29 CFR 1926 Subpart M). Instead falls from ladders are outlined within Subpart X of 29 CFR 1926.1053, 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. **Note: PPM purposely chooses to reference the most stringent safety measures under construction industry standards, while additionally enforcing the more stringent general industry height requirement of 4 feet. This is an overlap of standards but provides the greatest level of worker protection.*

### 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, knuckle-boom truck-mounted crane, 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
- 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 scissor lifts is strictly prohibited. Company personnel are not appropriately trained for working with aerial and scissor lifts and are therefore not authorized on these machines without additional safety training and approval from the safety department. Workers should be aware that 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.

### 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:* When available, workers should carry sound level meters to assess noise levels. 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 strictly prohibited. Company personnel are not appropriately trained for working with scaffolding systems and are therefore not authorized on these systems without additional safety training and approval from the safety department. 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. Carbon change-outs, 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). 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:* 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

Carbon change-outs, 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. 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). 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.

*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. *When PPM does not incorporate these engineering controls, under no circumstances must any individual enter a trench/excavation with a depth of 4 feet or greater. 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:

*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 frostbite, trench foot, chilblains and hypothermia.

| COLD STRESS | DEFINITION | SYMPTOMS OF EXPOSURE |
|---|---|---|
| Trench foot | Injury to the feet when immersed in water for prolonged period of time; wet feet lose heat and blood vessels constrict causing cells to die due to lack of oxygen | Reddening of skin, numbness, leg cramps, swelling, tingling pain, blisters or ulcers, bleeding under skin, gangrene (foot turns dark purple, blue or gray) |
| Chilblain | Exposures to temperature slightly above freezing to 60°F causing damage to capillary blood vessels in skin; damage is permanent and returns with additional exposures | Redness and itching mostly on cheeks, ears, fingers and toes, possible blistering, inflammation, possible ulceration (severe cases) |
| Frostbite | Injury caused by freezing of the skin (nose, ears, cheeks, chin, fingers or toes); can lead to amputation | Reduced blood flow to hands/feet numbness, tingling or stinging, aching, bluish or pale, waxy skin |
| Hypothermia | Body is losing heat faster than it can be generated producing an abnormally low body temperature, which impairs the brain and makes a person unable to think clearly or move well; is extremely dangerous because a person may not realize it is happening | 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.
- West Nile (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 repellant 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 nearby 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.

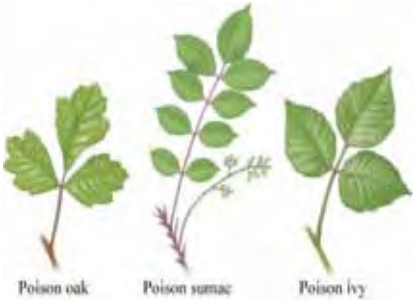
Highly vegetative areas and areas with trash or debris can be home to rodents such as rats or mice. Remediation systems provide warmth in colder climates and it is not uncommon to find rodents and other animals within or around the unit.

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, workers must be aware of any indicators of alligator presence, which require that workers immediately evacuate the area. General awareness and caution must be used when working in highly vegetative areas and workers must 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.

# 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. |
| 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). Workers must be aware that in order to wear respiratory protection, they 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 | -- |

| CONSTITUENT | TOXICITY | | | | | FIRE |
|---|---|---|---|---|---|---|
| | ACTION | PEL/TLV | STEL | CEILING | IDLH | LEL-UEL |
| 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[$H_2S$] | 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® | -- | -- | -- | -- | -- | -- |
| 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/m³] | 0.2[mg/m³] | -- | -- | -- | 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[$H_3PO_4$] | 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 | -- |

| CONSTITUENT | TOXICITY | | | | | FIRE |
|---|---|---|---|---|---|---|
| | ACTION | PEL/TLV | STEL | CEILING | IDLH | LEL-UEL |
| Sodium carbonate[base] | -- | -- | -- | -- | -- | -- |
| Sodium hydroxide[base] | 2 | 2 | -- | 2† | 10 | -- |
| Sulfuric acid[$H_2SO_4$] | 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 $mg/m^3$ – 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 ≥77ºF.

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 $^{+/-}$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

While the use of protective clothing/equipment provides protection against chemical and physical hazards, there are additional disadvantages associated with its usage. Personal protective equipment can be heavy, bulky and uncomfortable, slow down the work process and/or increase the degree of heat stress put on a worker. Therefore, the use of personal protective equipment is always a last resort. Only when other alternatives such as engineering, administrative or work practice controls fail to eliminate or reduce a hazard to an acceptable level will the use of protective clothing and/or equipment become a consideration.

### 5.1 PROTECTIVE CLOTHING AND EQUIPMENT

#### 5.1.1 Head Protection

In accordance with 29 CFR 1910.135, the company provides head protection from impact and penetration hazards posed by falling objects, projectiles, and shock/burn hazards posed by contact with electricity. While OSHA requires that head protection be provided, it is the American National Standards Institute (ANSI) that sets criteria for head protection. ANSI Z89.1-2014 separates protective helmets into different types and categories as follows:

| HARD HAT TYPES | |
|---|---|
| Type I – hard hat that provides protection from impact to the top of the head only | Type II – hard hat that provides protection from impact to the top and sides of the head |

| CLASSIFICATION | PROTECTION PROVIDED | |
|---|---|---|
| Class G [Formerly Class A] | G – General; intended to reduce the force of impact of falling objects and reduce the danger of contact with exposed low-voltage electrical conductors; proof-tested at 2,200 volts of electrical charge | |
| Class E [Formerly Class B] | E – Electrical; intended to reduce the force of impact of falling objects and reduce the danger of contact with exposed high-voltage electrical conductors; proof-tested at 20,000 volts | |
| Class C [Formerly Class C] | C – Conductive; intended to reduce the force of impact of falling objects, but offer no electrical protection | |

PPM's preference for hard hat selection is ANSI Z89.1-2014 approved Type II, Class E hard hat with ratchet suspension; however, Type I and Class G hard hats are permitted for use. PPM prohibits the use of Class C hard hats because they provide no protection against electrical hazards.

### 5.1.2 Eye and Face Protection

In accordance with 29 CFR 1910.133, the company requires each affected employee to use appropriate eye and/or face protection when exposed to hazards from particulates, flying particles (projectiles), molten metal, liquid chemicals, chemical gases, vapors, or fumes, metal shavings, and/or potentially injurious light radiation. PPM requires the use of safety glasses with side-shield protection for all outdoors field activities. Workers are permitted to use prescriptive lenses so long as side-shield protectors are used. Safety glasses may be upgraded to goggles or face shields when mixing chemicals, when dealing with chemical splash hazards, or when working in extremely dusty environments that cannot otherwise be addressed through the use of controls. Face shields may also be required when working with projectiles. Eye and face protection must be ANSI Z87.1-2010 approved.

### 5.1.3 Hand Protection

In accordance with 29 CFR 1910.138, the company requires workers to use appropriate hand protection when their hands are exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes. PPM bases this selection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards/potential hazards identified. The following gloves are recommended for typical company tasks:

- Nitrile gloves – good for working with oil and grease and can also protect against some dry chemicals; they are disposable and easy to use; this is the most commonly used glove provided by the company

- Neoprene, vinyl [PVC] and rubber gloves – also good for working with chemicals such as janitorial or cleaning products, fuels, oils and grease; can be purchased as disposable or reusable; neoprene is preferred when working with acids or bases
- Butyl or laminate gloves – good for working with ketones
- Latex gloves – good for working with bloodborne pathogens such as viral and bacterial agents; nitrile gloves will work as well so latex is not commonly provided by the company
- Cotton or leather gloves – good for material handling of heavy and abrasive objects; leather is sturdy and can resist splinters from wood products and provides some protection against heat
- Cut-resistant gloves – good when working with sharp or cutting objects; there are various brands of cut-resistant gloves including Kevlar®, Magid® and Ansell®

Hand protection must be ANSI/ISEA 105-2011 approved. *Note: ISEA is the International Safety Equipment Association*.

### 5.1.4 Foot Protection

In accordance with 29 CFR 1910.136, the company requires workers to use protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, sharp edges, slippery surfaces, and unlevel walking/working surfaces. PPM requires ASTM F2412/F2413-approved steel-toed footwear for all field sites. *Exception: Rubber boots or other footwear may be used when workers collect samples within body of water or when workers are required to enter a boat*. Composite-toed shoes are permitted when they meet the ASTM testing requirements for compressive strength.

### 5.1.5 Skin Protection and Visibility

Typical PPM jobsites warrant level D protective clothing, which consists of long pants and short or long-sleeved shirt. Other clothing may be required based on the hazard exposure and is outlined below:

- Fire-retardant clothing – required by clients within the oil and gas industry to access their facility
- High visibility clothing – reflective, high visibility company-provided t-shirts or DOT Class II/III reflective high visibility safety vests are required when working in/nearby active traffic and when working on/nearby roadway right-of-way

Special considerations may require that full-body protective suits such as Tyvek®, Saranex™, or Tychem® be worn. The need for this type of equipment requires pre-planning by the safety department and management and must be discussed during the proposal phase of a project. Skin protection must be ANSI 103-2010 approved.

### 5.1.6 Hearing Protection

Preservation of hearing is of utmost importance. Most of the hearing lost cannot ever be recovered. Through the aging process, workers will be prone to natural hearing loss. Therefore, it is the company's responsibility to distinguish between natural and work-related hearing loss and to ensure that workers exposed to noise levels ≥85 dB are provided with hearing protection. The most common form of hearing protection provided to workers is the earplug. Earplugs come in various shapes and sizes and are relatively inexpensive so they can be tailored to the comfort

preferences of the individual. Workers who do not respond well to the use of earplugs will be provided canal caps or ear muffs upon verbal request to the safety department. Hearing protection must be ANSI S12.68-2007 approved.

### 5.1.7 Respiratory Protection

In accordance with 29 CFR 1910.134, the company provides respiratory protection when workers are exposed to hazardous materials at triggered regulatory threshold limits. Only those workers who have been medically cleared by a physician are permitted to wear respiratory equipment. Workers that have been medically cleared must also be fit-tested prior to respirator use. Documentation must be received by the safety department before a worker is approved for respiratory use.

Because workers are not required to work with extremely hazardous materials, with unknowns or within oxygen-deficient environments, supplied-air respiratory equipment is not applicable to current company processes. PPM purchases a variety of National Institute for Occupational Safety and Health (NIOSH)-approved air-purifying half-mask and full-face respirators to be worn when ambient chemical concentrations trigger company-assigned action limits. It should be noted that because most field work is conducted in outdoor, open environments, respiratory protection is generally not required.

### 5.1.8 Electrical Protective Equipment

Insulating equipment such as rubber insulating blankets, rubber insulating matting, rubber insulating covers, rubber insulating line hose, rubber insulating gloves, and rubber insulating sleeves is required when working on or near energized equipment and/or devices. Insulating equipment must be capable of withstanding, without failure, the voltages that may be imposed upon it. Insulating equipment must be proof-tested and inspected in accordance with the provisions outlined within 29 CFR 1910.137. Use of damage or defective insulating equipment is strictly prohibited!

### 5.1.9 Life Saving Equipment

In accordance with 29 CFR 1926.106, employees working over or near water, where the danger of drowning exists, must be provided a U.S. Coast-Guard-approved life jacket or buoyant work vest. Where applicable, ring buoys with at least 90 feet of line must be provided and readily available for emergency rescue operations. The distance between ring buoys cannot exceed 200 feet. In addition, at least one life-saving skiff must be immediately available at locations where employees are working over or adjacent to water.

## 5.2 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

## 5.3 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 | FIRE RETARDANT CLOTHING[9] |
| Asbestos inspections or sampling | X | X | X | X | | | | X | | | |
| Carbon change-out | X | | X | X | 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/$H_20$ | 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
2 – Safety glasses must be 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 – Fire-retardant clothing is a client-specific requirement; clients within the oil/gas industry generally require fire-retardant clothing

### 5.4 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.

## 6.0 SITE ACCESS, CONTROL, AND DECONTAMINATION

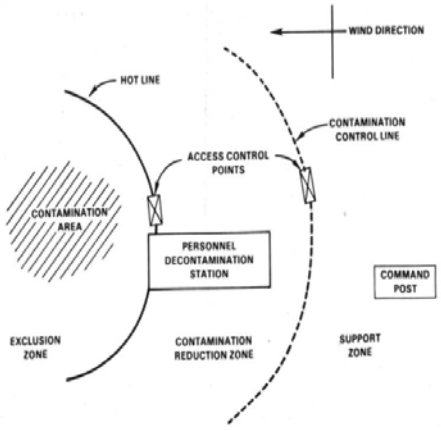
### 6.1 SITE ACCESS

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

Each jobsite must be assigned 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 exclusion zone. 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 exclusion zone, 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 use alconox®/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. |

| HAZARD CATEGORY | HAZARD | RESPONSE |
|---|---|---|
| Physical | Heat stress | Apply warm, moist 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. |

***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

*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.*

The GHS labeling system will replace the HMIS labeling system previously used by the company. In general, HMIS labels may still be used in conjunction with, or as a component of, the GHS labeling system. The international requirements for HMIS labeling are similar to those developed by the American Coatings Association with the exception that the degree of hazard severity as indicated by the numbering system is reversed (example: under the old system the higher the number, the higher the hazard severity; under international GHS requirements, the lower the number, the higher the hazard severity). Therefore, workers may continue to see HMIS labels as part of the GHS labeling system when used by other companies; however, PPM will discontinue the use of HMIS labels moving forward.

### 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:

- 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 other 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 |
| ANSI | American National Standards Institute |
| BGS | below ground surface |
| BTEX | benzene, toluene, ethylbenzene, and xylene |
| CFR | Code of Federal Regulations |
| CHMM | Certified Hazardous Materials Manager |
| $CO/CO_2$ | carbon monoxide/dioxide |
| CSP | Certified Safety Professional |
| dB | decibel |
| DEET | N,N-diethyl-meta-toluamide |
| DOT | Department of Transportation |
| fc | foot-candle |
| FID | flame ionization detector |
| GFCI | ground fault circuit interrupter |
| GHS | Globally Harmonized System of Chemical Classification and Labeling |
| GVWR | gross vehicle weight rating |
| HASP | health and safety plan |
| HEPA | high efficiency particulate air |
| HIV | human immunodeficiency virus |
| HMIS | hazardous materials information system |
| HSD | Health and Safety Director |
| HSSE | health, safety, security and environmental |
| IDLH | immediately dangerous to life and/or health |
| JSA | job safety analysis |
| kV | kilo volt |
| LEL | lower explosive limit |
| LFL | lower flammability limit |
| MTBE | methyl-tertiary butyl ether |
| NCHRP | National Cooperative Highway Research Program |
| NIOSH | National Institute for Occupational Safety and Health |
| NOAA | National Oceanic and Atmospheric Administration |
| $O_2/O_3$ | oxygen/ozone |
| ORC | oxygen release compound |
| OSHA | Occupational Safety and Health Administration |
| OVA | organic vapor analyzer |
| PACM | presumed asbestos-containing material |
| PAH | polycyclic aromatic hydrocarbon |
| PCB | polychlorinated biphenyl |
| P.E. | Professional Engineer |
| PEL | permissible exposure limit |
| P.G. | Professional Geologist |
| PIC | Principal-in-Charge |
| PID | photo-ionization detector |
| PPM | PPM Consultants, Inc. |
| ppm | parts per million |
| SDS | safety data sheet |
| SS | Safety Supervisor |
| SSO | Site Safety Officer |
| STEL | short-term exposure limit |
| SVOC | semi-volatile organic compound |
| TPH | total petroleum hydrocarbon |
| TLV | threshold limit value |
| TWA | time-weighted average |
| UEL | upper explosive limit |
| UFL | upper flammability limit |
| VOC | volatile organic compound |
| UST | underground storage tank |

# APPENDIX I – COST PROPOSAL NO. 13 – EQUIPMENT PURCHASE

# Alabama Tank Trust Fund
## Cost Proposal
## Part I

**I.1 Cost Proposal Information:**

| Cost Proposal Number: | Date of Cost Proposal (mm/dd/yy): |
|---|---|
| 13<br>40101501-EQP | 3/10/2022 |
| UST or AST Incident Number: | Facility I.D. Number: |
| UST19-05-03 | 20411-105-003683 |

**I.2 Facility Information**

| | |
|---|---|
| Facility Name: | Quick Shop No. 98 |
| Facility Address: | Highway 5<br>Brent, Alabama |

**I.3 Owner Information:**

| | |
|---|---|
| Owner Name: | D.C. Oil Company, Inc. |
| Owner Address: | P.O. Box 380394<br>Birmingham, Alabama 35244 |
| Employer Tax Number (IRS): | 63-1150252 |

**I.4 Response Action Contractor Information:**

| | |
|---|---|
| Approved Response Action Contractor Name:<br>Approved Response Action Contractor Address: | PPM Consultants, Inc.<br>5555 Bankhead Highway<br>Birmingham, Alabama 35210 |
| Project Contact: | Derek Prince, P.G. |
| Project Contact Phone #: | 205-836-5650 |
| Project Contact E-mail: | derek.prince@ppmco.com |
| Employer Tax Number (IRS): | 72-1256279 |
| | |

Cost Proposal Number: 13

Facility Name: Quick Shop No. 98

**I.5 Activity Information:**

| | Indicate below the activities for which the cost proposal is submitted: |
|---|---|
| | |
| | Site Stabilization/Initial Abatement |
| | Preliminary Investigation |
| | Secondary Investigation / Additional Well Installation |
| | Alabama Risk Based Corrective Action (ARBCA) |
| | Groundwater Sampling |
| | Free Product Removal/Mobile Enhanced Multiphase Extraction (MEME) |
| | Corrective Action Plan Evaluation |
| | Develop Corrective Action Plan |
| X | Corrective Action |
| | Stockpile Sampling / Management / Disposal |
| | Provision of Alternate Water Supply |
| | Pilot Test |
| | Monitoring/Recovery/Injection Well Abandonment |
| | System Decommissioning/Removal |

**Activities/Other/Brief Summary of Activities:**

System purchase, NPDES Permit NOI, ADEM Air Notification, Completion of a Solid Waste Profile application, Letter Report

Provide proposed completion date for this phase of work activities:

06/30/22

Provide projected date of cleanup completed:

12/31/27

**I.6 Subcontractor Information:**

Indicate Subcontractors to be used during this phase of work:

| Name & Address | Service Provided |
|---|---|
| PRM Filtration | DPVE system, GAC vessels |
| | |
| | |
| | |
| | |
| | |

| Cost Proposal Number: | Facility Name: |
|---|---|
| 13 | Quick Shop No. 98 |

Signatures must be provided in Sections I.7 and I.8 below for this proposal to be processed.

**I.7 Certification of Unintentional release of Motor Fuel & Cost Proposal- Owner Signature:**

*I certify that an unintentional release has occurred from a motor fuel underground or aboveground tank system at this site and I authorize this Cost Proposal amount for corrective action activities to be conducted at this site.*

| | |
|---|---|
| 1.Owner or Operator Signature: | R. David Collins |
| Typed or Printed Name and Title: | David Collins - President |
| Email address: | david@dcoilco.com |
| Date: | 03/11/2022 |

**I.8 Cost Proposal- Contractor Signature:**

| | |
|---|---|
| 2.Response Action Contractor Signature: | Michael L. Ellison |
| Typed or Printed Name and Title: | Michael L. Ellison, P.E., Principal |
| Date: | 03/11/2022 |

**I.9 Trust Fund Obligation Information:**

| | |
|---|---|
| Estimated Total Cost of all Anticipated Response Actions (To be updated overtime): | $900,000.00 |
| Total of Previously Approved Cost Proposals: | $166,258.56 |
| Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal): | $355,541.01 |
| Estimate Percent Completion of entire project to date: | 40% |

**I.10 Cost Proposal Amount**

| | | | |
|---|---|---|---|
| Proposed Costs under this Cost Proposal: | **$189,282.45** | **Personnel** | **$2,298.50** |
| | | **Field Equipment** | **$0.00** |
| Owners Required Contribution for UST Release($5,000): *Applicable for CP#1 Only* | | **Mileage** | **$0.00** |
| | | **Per Diem** | **$0.00** |
| | | **Drilling** | **$0.00** |
| Owners Required Contribution for AST Release($10,000): *Applicable for CP#1 Only* | | **Analytical** | **$0.00** |
| | | **Other** | **$186,983.95** |
| | | | |
| **Total of This Cost Proposal:** | **$189,282.45** | | |

# Cost Proposal Summary

| CP Total | Facility I.D. # | CP # | Incident Number | Site Name |
|---|---|---|---|---|
| $189,282.45 | 20411-105-003683 | 13 | UST19-05-03 | Quick Shop No. 98 |

## Part II- Alabama Tank Trust Fund Itemization Form "A" Cost Proposal

| Scenarios | Unit $ | Units | Quantity | Requested$ |
|---|---|---|---|---|
| System Purchase Letter | $1,311 | /ltr | 1 | $1,311.00 |
| General NPDES Application Preparation | $771 | /permit | 1 | $771.00 |
| ADEM Solid Waste Profile Preparation | $216.50 | /profile | 1 | $216.50 |
| **Total Report and Plan Costs** | | | | **$2,298.50** |

## Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal

| | | | | |
|---|---|---|---|---|
| Postage / Shipping and Copying (plans reports, ADEM and owner) | $85 | /sow | 1 | $85.00 |
| **Total Field Costs** | | | | **$85.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal

| | | | | |
|---|---|---|---|---|
| **Total Drilling Costs** | | | | **$0.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal

| | | Pass Through | Quoted Amoun | Requested$ |
|---|---|---|---|---|
| ADEM Solid Waste Profile (ADEM review fee) | | 5% | $217.00 | $227.85 |
| Corrective Action System Purchase | | 5% | $169,300.00 | $177,765.00 |
| NPDES Permit Application (permit fee) | | 5% | $1,387.00 | $1,456.35 |
| Other/Misc. (receipts required) | ADEM Greenfield Fee | 5% | $1,610.00 | $1,690.50 |
| Other/Misc. (receipts required) | System Shipment | 5% | $2,500.00 | $2,625.00 |
| Other/Misc. (receipts required) | Sound Insulation | 5% | $2,985.00 | $3,134.25 |
| **Total Subs / Vendors / Utilities** | | | | **$186,898.95** |

# APPENDIX J – COST PROPOSAL NO. 14 – DPVE SYSTEM INSTALL & STARTUP

# Alabama Tank Trust Fund
## Cost Proposal
## Part I

**I.1 Cost Proposal Information:**

| Cost Proposal Number: | Date of Cost Proposal (mm/dd/yy): |
|---|---|
| 14<br>40101501-INST | 3/10/2022 |
| UST or AST Incident Number: | Facility I.D. Number: |
| UST19-05-03 | 20411-105-003683 |

**I.2 Facility Information**

| | |
|---|---|
| Facility Name: | Quick Shop No. 98 |
| Facility Address: | Highway 5<br>Brent, Alabama |

**I.3 Owner Information:**

| | |
|---|---|
| Owner Name: | D.C. Oil Company, Inc. |
| Owner Address: | P.O. Box 380394<br>Birmingham, Alabama 35244 |
| Employer Tax Number (IRS): | 63-1150252 |

**I.4 Response Action Contractor Information:**

| | |
|---|---|
| Approved Response Action Contractor Name:<br>Approved Response Action Contractor Address: | PPM Consultants, Inc.<br>5555 Bankhead Highway<br>Birmingham, Alabama 35210 |
| Project Contact: | Derek Prince, P.G. |
| Project Contact Phone #: | 205-836-5650 |
| Project Contact E-mail: | derek.prince@ppmco.com |
| Employer Tax Number (IRS): | 72-1256279 |
| | |

Cost Proposal Number: 14

Facility Name: Quick Shop No. 98

**I.5 Activity Information:**

| | Indicate below the activities for which the cost proposal is submitted: |
|---|---|
| | |
| | Site Stabilization/Initial Abatement |
| | Preliminary Investigation |
| | Secondary Investigation / Additional Well Installation |
| | Alabama Risk Based Corrective Action (ARBCA) |
| | Groundwater Sampling |
| | Free Product Removal/Mobile Enhanced Multiphase Extraction (MEME) |
| | Corrective Action Plan Evaluation |
| | Develop Corrective Action Plan |
| X | Corrective Action |
| | Stockpile Sampling / Management / Disposal |
| | Provision of Alternate Water Supply |
| | Pilot Test |
| | Monitoring/Recovery/Injection Well Abandonment |
| | System Decommissioning/Removal |

**Activities/Other/Brief Summary of Activities:**

Installing 14 4-inch recovery wells; installing 2 recovery trenches; installing a manifold; connection of recovery wells and recovery trenches to manifold; installing piping to system; installing the DPVE system; installing GAC vessels; installing effluent piping; electrical work; construction of fencing; site cleanup; and reporting

(Cost Proposal includes additional mileage and travel time from site to hotel)

Provide proposed completion date for this phase of work activities:

8/31/2022

Provide projected date of cleanup completed:

12/31/2027

**I.6 Subcontractor Information:**

Indicate Subcontractors to be used during this phase of work:

| Name & Address | Service Provided |
|---|---|
| Technical Drilling | Recovery well installation |
| Complete Environmental | System installation |
| Tortorice Electric | Electrical work |
| Black Warrior Solid Waste Facility | Soil disposal |
| Sutherland Environmental | Effluent analysis |
| PRM Filtration | System Start-up |

| Cost Proposal Number: | Facility Name: |
|---|---|
| 14 | Quick Shop No. 98 |

Signatures must be provided in Sections I.7 and I.8 below for this proposal to be processed.

**I.7 Certification of Unintentional release of Motor Fuel & Cost Proposal- Owner Signature:**

*I certify that an unintentional release has occurred from a motor fuel underground or aboveground tank system at this site and I authorize this Cost Proposal amount for corrective action activities to be conducted at this site.*

| | |
|---|---|
| 1.Owner or Operator Signature: | R. David Collins |
| Typed or Printed Name and Title: | David Collins - President |
| Email address: | david@dcoilco.com |
| Date: | 03/11/2022 |

**I.8 Cost Proposal- Contractor Signature:**

| | |
|---|---|
| 2.Response Action Contractor Signature: | Michael L. Ellison |
| Typed or Printed Name and Title: | Michael L. Ellison, P.E., Principal |
| Date: | 03/11/2022 |

**I.9 Trust Fund Obligation Information:**

| | |
|---|---|
| Estimated Total Cost of all Anticipated Response Actions (To be updated overtime): | $900,000.00 |
| Total of Previously Approved Cost Proposals: | $355,541.01 |
| Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal): | $535,719.16 |
| Estimate Percent Completion of entire project to date: | 60% |

**I.10 Cost Proposal Amount**

| | | | |
|---|---|---|---|
| Proposed Costs under this Cost Proposal: | **$180,178.15** | **Personnel** | **$31,837.50** |
| | | **Field Equipment** | **$1,390.00** |
| Owners Required Contribution for UST Release($5,000): *Applicable for CP#1 Only* | | **Mileage** | **$877.50** |
| | | **Per Diem** | **$2,400.00** |
| | | **Drilling** | **$12,198.90** |
| Owners Required Contribution for AST Release($10,000): *Applicable for CP#1 Only* | | **Analytical** | **$225.75** |
| | | **Other** | **$131,248.50** |
| | | | |
| **Total of This Cost Proposal:** | **$180,178.15** | | |

# Cost Proposal Summary

| CP Total | Facility I.D. # | CP # | Incident Number | Site Name |
|---|---|---|---|---|
| $180,178.15 | 20411-105-003683 | 14 | UST20-08-05 | Quick Shop No. 98 |

## Part II- Alabama Tank Trust Fund Itemization Form "A" Cost Proposal

| Scenarios | Unit $ | Units | Quantity | Requested$ |
|---|---|---|---|---|
| CA System Installation Report (all Classes same) | $7,552 | /report | 1 | $7,552.00 |
| **Total Report and Plan Costs** | | | | **$7,552.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal

| | | | | |
|---|---|---|---|---|
| Porous material 0-30 feet | $324 | /well | 14 | $4,536.00 |
| Site Survey during Investigation (not a Licensed Surveyor) | $252.00 | /sow | 1 | $252.00 |
| System Installation Oversight (up to 7 days in field) | $8,714 | /system | 1 | $8,714.00 |
| System Installation Oversight Adder (per day over 7 doc req.) | $974 | /day | 8 | $7,792.00 |
| System Startup | $1,664 | /system | 1 | $1,664.00 |
| **Travel** | | | | |
| **Mileage Rate** | | | $0.585 | |
| Mileage (One way office to site) | | | 75 | |
| Number of round trips to site | | | 6 | $526.50 |
| Other Mileage (enter total mileage not including office to site) | | | 600 | $351.00 |
| Technician(s)-travel time | $63 | /hr | 2.5 | $157.50 |
| Geologist/Engineer-travel time | $87 | /hr | 10 | $870.00 |
| PG/PE-travel time | $120 | /hr | 2.5 | $300.00 |
| Per diem >2 consecutive days (overnight)(invoice(s) required) | $100 | /day | 24 | $2,400.00 |
| **Equipment and Equipment Kits** | | | | |
| Sampling Expendables(gloves, ice, string, jars, foil, distilled water, paper towels, | $50 | /sow | 1 | $50.00 |
| Monitoring Well/Boring Installation | $60 | /day | 5 | $300.00 |
| DPVE, SVE, AS, P&T O&M | $145 | /day | 2 | $290.00 |
| Initial Abatement | $50 | /day | 15 | $750.00 |
| Postage / Shipping and Copying (plans reports, ADEM and owner) | $85 | /sow | 1 | $85.00 |
| Postage / Shipping (Sample Shipping) | $50 | /samples | 1 | $50.00 |

## Analytical Samples

| | Method | | Pass Through | Sample # | |
|---|---|---|---|---|---|
| BTEX/MTBE/Naph (water) | 8260 | $65 /sample | 5% | 1 | $68.25 |
| Oil & Grease | | $50 /sample | 5% | 1 | $52.50 |
| Air Samples (System Influent) | | $100 /sample | 5% | 1 | $105.00 |
| **Total Field Costs** | | | | | **$29,313.75** |

## Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal

| Scenarios | Unit $ | Unit | Quantity | Requested$ |
|---|---|---|---|---|
| Mileage Rate (Current Federal Rate) | | | $0.585 | |
| Mileage (drilling device driven or ATV) (**ONE WAY** mileage up to 450 | $2.34 | /mile | 100 | |

# Cost Proposal Summary

| CP Total | Facility I.D. # | CP # | Incident Number | Site Name |
|---|---|---|---|---|
| $180,178.15 | 20411-105-003683 | 14 | UST20-08-05 | Quick Shop No. 98 |

| | | | | |
|---|---|---|---|---|
| Number of Mobilizations (includes $200 mob/demob amount) | | | 1 | $668.00 |
| 4" Monitoring Well (HSA) [3] | $45.00 | /foot | 210 | $9,450.00 |
| Per Diem (overnight) (man days)(hotel receipts required) | $100.00 | /day | 15 | $1,500.00 |
| Pass Through (if appropriate) Enter "5" or "10" as appropriate | | | 5% | $580.90 |
| **Total Drilling Costs** | | | | **$12,198.90** |

## Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal

| | | Pass Through | Quoted Amoun | Requested$ |
|---|---|---|---|---|
| Corrective Action System Install | | 5% | $108,370.00 | $113,788.50 |
| Solid Waste Soil Disposal (to include hauling/handli | | 5% | $4,000.00 | $4,200.00 |
| Other/Misc. (receipts required) | Miscellaneous Materials | 5% | $2,000.00 | $2,100.00 |
| Other/Misc. (receipts required) | Tortorice Electric | 5% | $7,500.00 | $7,875.00 |
| Other/Misc. (receipts required) | PRM Filtration - Start-up | 5% | $3,000.00 | $3,150.00 |
| **Total Subs / Vendors / Utilities** | | | | **$131,113.50** |

## Part II- Alabama Tank Trust Fund Itemization Form "E" Cost Proposal

Per diem allowed for Alabama Tank Trust Fund Contractor Personnel Only
Maximum allowable rates are referenced on the "Maximum Rates" Tab in this document.
This page should be submitted whenever per diem is being claimed.

| Points of Travel From | To | Projected Date mm/dd/yy | Personnel Classification | Hour of Departure am/pm | Hour of Return am/pm | Activity To Be Performed | Amount Per diem claimed |
|---|---|---|---|---|---|---|---|
| Use this section to enter claims for daily per diems | | | | | | | |
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| | | | | Total number of daily per diems | | | 0 |
| Use this section to enter claims for extended daily per diems | | | | | | | |
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| | | | | Total number of ext. daily per diems | | | 0 |
| Use this section to enter claims for overnight per diems | | | | | | | |
| Irondale | Brent | | Geo/Eng | | | Drilling | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Drilling | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Drilling | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Drilling | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Drilling | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| | | | | Total number of overnight per diems | | | 16 |

## Part II- Alabama Tank Trust Fund Itemization Form "E" Cost Proposal Additional Sheet

Per diem allowed for Alabama Tank Trust Fund Contractor Personnel Only
Maximum allowable rates are referenced on the "Maximum Rates" Tab in this document.

| Points of Travel From | To | Projected Date mm/dd/yy | Personnel Classification | Hour of Departure am/pm | Hour of Return am/pm | City of Overnight Stay | Amount Per diem claimed |
|---|---|---|---|---|---|---|---|
| Use this section to enter claims for daily per diems | | | | | | | |
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| | | | | Total number of daily per diems | | | 0 |
| Use this section to enter claims for extended daily per diems | | | | | | | |
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| | | | | Total number of ext. daily per diems | | | 0 |
| Use this section to enter claims for overnight per diems | | | | | | | |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | Geo/Eng | | | Install | $100.00 |
| Irondale | Brent | | PG | | | Start-up | $100.00 |
| Irondale | Brent | | PG | | | Start-up | $100.00 |
| Irondale | Brent | | Tech | | | Start-up | $100.00 |
| Irondale | Brent | | Tech | | | Start-up | $100.00 |
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| | | | | Total number of overnight per diems | | | 8 |

# APPENDIX K – COST PROPOSAL NO. 15 – FIRST QUARTER O&M AND GROUNDWATER SAMPLING

# Alabama Tank Trust Fund
## Cost Proposal
## Part I

**I.1 Cost Proposal Information:**

| Cost Proposal Number: | Date of Cost Proposal (mm/dd/yy): |
|---|---|
| 15<br>40101501-OM01 | 3/10/2022 |
| UST or AST Incident Number: | Facility I.D. Number: |
| UST19-05-03 | 20411-105-003683 |

**I.2 Facility Information**

| | |
|---|---|
| Facility Name: | Quick Shop No. 98 |
| Facility Address: | Highway 5<br>Brent, Alabama |

**I.3 Owner Information:**

| | |
|---|---|
| Owner Name: | D.C. Oil Company, Inc. |
| Owner Address: | P.O. Box 380394<br>Birmingham, Alabama 35244 |
| Employer Tax Number (IRS): | 63-1150252 |

**I.4 Response Action Contractor Information:**

| | |
|---|---|
| Approved Response Action Contractor Name: | PPM Consultants, Inc.<br>5555 Bankhead Highway<br>Birmingham, Alabama 35210 |
| Approved Response Action Contractor Address: | |
| Project Contact: | Derek Prince, P.G. |
| Project Contact Phone #: | 205-836-5650 |
| Project Contact E-mail: | derek.prince@ppmco.com |
| Employer Tax Number (IRS): | 72-1256279 |
| | |

Cost Proposal Number: 15

Facility Name: Quick Shop No. 98

**I.5 Activity Information:**

| | Indicate below the activities for which the cost proposal is submitted: |
|---|---|
| | |
| | Site Stabilization/Initial Abatement |
| | Preliminary Investigation |
| | Secondary Investigation / Additional Well Installation |
| | Alabama Risk Based Corrective Action (ARBCA) |
| X | Groundwater Sampling |
| | Free Product Removal/Mobile Enhanced Multiphase Extraction (MEME) |
| | Corrective Action Plan Evaluation |
| | Develop Corrective Action Plan |
| X | Corrective Action |
| | Stockpile Sampling / Management / Disposal |
| | Provision of Alternate Water Supply |
| | Pilot Test |
| | Monitoring/Recovery/Injection Well Abandonment |
| | System Decommissioning/Removal |

**Activities/Other/Brief Summary of Activities:**

O&M of DPVE system; Air and water effluent sampling; Limited groundwater sampling of 12 2-inch monitoring wells; Gauging water levels in seven monitoring wells and 14 recovery wells; Reporting

Provide proposed completion date for this phase of work activities:

12/31/2022

Provide projected date of cleanup completed:

12/31/2027

**I.6 Subcontractor Information:**

Indicate Subcontractors to be used during this phase of work:

| Name & Address | Service Provided |
|---|---|
| Sutherland Environmental | Analytical services |
| | |
| | |
| | |
| | |
| | |

| Cost Proposal Number: | Facility Name: |
|---|---|
| 15 | Quick Shop No. 98 |

Signatures must be provided in Sections I.7 and I.8 below for this proposal to be processed.

**I.7 Certification of Unintentional release of Motor Fuel & Cost Proposal- Owner Signature:**

*I certify that an unintentional release has occurred from a motor fuel underground or aboveground tank system at this site and I authorize this Cost Proposal amount for corrective action activities to be conducted at this site.*

| | |
|---|---|
| 1.Owner or Operator Signature: | R. David Collins |
| Typed or Printed Name and Title: | David Collins - President |
| Email address: | david@dcoilco.com |
| Date: | 03/11/2022 |

**I.8 Cost Proposal- Contractor Signature:**

| | |
|---|---|
| 2.Response Action Contractor Signature: | Michael L. Ellison |
| Typed or Printed Name and Title: | Michael L. Ellison, P.E., Principal |
| Date: | 03/11/2022 |

**I.9 Trust Fund Obligation Information:**

| | |
|---|---|
| Estimated Total Cost of all Anticipated Response Actions (To be updated overtime): | $900,000.00 |
| Total of Previously Approved Cost Proposals: | $535,719.16 |
| Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal): | $558,396.91 |
| Estimate Percent Completion of entire project to date: | 62% |

**I.10 Cost Proposal Amount**

| | | | |
|---|---|---|---|
| Proposed Costs under this Cost Proposal: | **$22,677.75** | **Personnel** | **$11,255.75** |
| | | **Field Equipment** | **$1,364.00** |
| Owners Required Contribution for UST Release($5,000): *Applicable for CP#1 Only* | | **Mileage** | **$702.00** |
| | | **Per Diem** | **$102.00** |
| | | **Drilling** | **$0.00** |
| Owners Required Contribution for AST Release($10,000): *Applicable for CP#1 Only* | | **Analytical** | **$1,419.00** |
| | | **Other** | **$7,835.00** |
| | | | |
| **Total of This Cost Proposal:** | **$22,677.75** | | |

# Cost Proposal Summary

| CP Total | Facility I.D. # | CP # | Incident Number | Site Name |
|---|---|---|---|---|
| $22,677.75 | 20411-105-003683 | 15 | UST20-08-05 | Quick Shop No. 98 |

## Part II- Alabama Tank Trust Fund Itemization Form "A" Cost Proposal

| Scenarios | Unit $ | Units | Quantity | Requested$ |
|---|---|---|---|---|
| SEMR - DPVE, P&T Reports | | | | |
| 1-12 wells, BTEX/MTBE/Naphthalene | $4,927 | /report | 1 | $4,927.00 |
| **Total Report and Plan Costs** | | | | **$4,927.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal

| | | | | |
|---|---|---|---|---|
| Groundwater Sampling Set-up (2hrs tech time) | $126.00 | /sow | 1 | $126.00 |
| Gauging Well (no sampling) | $15.75 | /well | 21 | $330.75 |
| Groundwater Sampling and Gauging 2" Well | $63.00 | /well | 12 | $756.00 |
| DPVE, Pump and Treat O&M 3 months | $3,856 | /quarter | 1 | $3,856.00 |
| **Travel** | | | | |
| **Mileage Rate** | | | $0.585 | |
| Mileage (One way office to site) | | | 75 | |
| Number of round trips to site | | | 8 | $702.00 |
| Technician(s)-travel time | $63 | /hr | 20 | $1,260.00 |
| Per diem (6-12hrs) | $12.75 | /day | 8 | $102.00 |
| **Equipment and Equipment Kits** | | | | |
| 55-Gallon Drums | $50 | /drum | 1 | $50.00 |
| Sampling Expendables(gloves, ice, string, jars, foil, distilled water, paper towels, | $50 | /sow | 1 | $50.00 |
| Expendables O&M | $25 | /day | 6 | $150.00 |
| Groundwater Monitoring | $160 | /day | 1 | $160.00 |
| Bailers | $7 | /bailer | 12 | $84.00 |
| DPVE, SVE, AS, P&T O&M | $145 | /day | 6 | $870.00 |
| Postage / Shipping and Copying (plans reports, ADEM and owner) | $85 | /sow | 1 | $85.00 |
| Postage / Shipping (Sample Shipping) | $50 | /samples | 1 | $50.00 |

## Analytical Samples

| | Method | | | Pass Through | Sample # | |
|---|---|---|---|---|---|---|
| BTEX/MTBE/Naph (water) | 8260 | $65 | /sample | 10% | 12 | $858.00 |
| Oil & Grease | | $50 | /sample | 10% | 3 | $165.00 |
| Air Samples (System Influent) | | $100 | /sample | 10% | 1 | $110.00 |
| Other | QA/QC - 8260 | $65.00 | /sample | 10% | 1 | $71.50 |
| Other | Effluent - 8260 | $65.00 | /sample | 10% | 3 | $214.50 |
| **Total Field Costs** | | | | | | **$10,050.75** |

## Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal

| | | |
|---|---|---|
| **Total Drilling Costs** | | **$0.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal

# Cost Proposal Summary

| CP Total | Facility I.D. # | CP # | Incident Number | Site Name |
|---|---|---|---|---|
| $22,677.75 | 20411-105-003683 | 15 | UST20-08-05 | Quick Shop No. 98 |

| | | Pass Through | Quoted Amoun | Requested$ |
|---|---|---|---|---|
| Phone Costs (telemetry) | | 10% | $250.00 | $275.00 |
| Power Costs | | 10% | $6,000.00 | $6,600.00 |
| Other/Misc. (receipts required) | Oil for DPVE | 10% | $750.00 | $825.00 |
| | **Total Subs / Vendors / Utilities** | | | **$7,700.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "E" Cost Proposal

Per diem allowed for Alabama Tank Trust Fund Contractor Personnel Only
Maximum allowable rates are referenced on the "Maximum Rates" Tab in this document.
This page should be submitted whenever per diem is being claimed.

| Points of Travel From | To | Projected Date mm/dd/yy | Personnel Classification | Hour of Departure am/pm | Hour of Return am/pm | Activity To Be Performed | Amount Per diem claimed |
|---|---|---|---|---|---|---|---|
| Use this section to enter claims for daily per diems | | | | | | | |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | GWS | $12.75 |
| Irondale | Brent | | Tech | | | GWS | $12.75 |
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| | | | | Total number of daily per diems | | | 8 |
| Use this section to enter claims for extended daily per diems | | | | | | | |
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| | | | | Total number of ext. daily per diems | | | 0 |
| Use this section to enter claims for overnight per diems | | | | | | | |
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| | | | | Total number of overnight per diems | | | 0 |

# APPENDIX L – COST PROPOSAL NO. 16 – SECOND QUARTER O&M AND GROUNDWATER SAMPLING

# Alabama Tank Trust Fund
## Cost Proposal
## Part I

**I.1 Cost Proposal Information:**

| Cost Proposal Number: | Date of Cost Proposal (mm/dd/yy): |
|---|---|
| 16<br>40101501-OM02 | 3/10/2022 |
| UST or AST Incident Number: | Facility I.D. Number: |
| UST19-05-03 | 20411-105-003683 |

**I.2 Facility Information**

| | |
|---|---|
| Facility Name: | Quick Shop No. 98 |
| Facility Address: | Highway 5<br>Brent, Alabama |

**I.3 Owner Information:**

| | |
|---|---|
| Owner Name: | D.C. Oil Company, Inc. |
| Owner Address: | P.O. Box 380394<br>Birmingham, Alabama 35244 |
| Employer Tax Number (IRS): | 63-1150252 |

**I.4 Response Action Contractor Information:**

| | |
|---|---|
| Approved Response Action Contractor Name:<br>Approved Response Action Contractor Address: | PPM Consultants, Inc.<br>5555 Bankhead Highway<br>Birmingham, Alabama 35210 |
| Project Contact: | Derek Prince, P.G. |
| Project Contact Phone #: | 205-836-5650 |
| Project Contact E-mail: | derek.prince@ppmco.com |
| Employer Tax Number (IRS): | 72-1256279 |
| | |

Cost Proposal Number: 16

Facility Name: Quick Shop No. 98

**I.5 Activity Information:**

| | Indicate below the activities for which the cost proposal is submitted: |
|---|---|
| | |
| | Site Stabilization/Initial Abatement |
| | Preliminary Investigation |
| | Secondary Investigation / Additional Well Installation |
| | Alabama Risk Based Corrective Action (ARBCA) |
| X | Groundwater Sampling |
| | Free Product Removal/Mobile Enhanced Multiphase Extraction (MEME) |
| | Corrective Action Plan Evaluation |
| | Develop Corrective Action Plan |
| X | Corrective Action |
| | Stockpile Sampling / Management / Disposal |
| | Provision of Alternate Water Supply |
| | Pilot Test |
| | Monitoring/Recovery/Injection Well Abandonment |
| | System Decommissioning/Removal |

**Activities/Other/Brief Summary of Activities:**

O&M of DPVE system; Air and water effluent sampling; Limited groundwater sampling of 12 2-inch monitoring wells; Gauging water levels in seven monitoring wells and 14 recovery wells; Reporting

Provide proposed completion date for this phase of work activities:

4/30/2022

Provide projected date of cleanup completed:

12/31/2027

**I.6 Subcontractor Information:**

Indicate Subcontractors to be used during this phase of work:

| Name & Address | Service Provided |
|---|---|
| Sutherland Environmental | Analytical services |
| | |
| | |
| | |
| | |
| | |

| Cost Proposal Number: | Facility Name: |
|---|---|
| 16 | Quick Shop No. 98 |

Signatures must be provided in Sections I.7 and I.8 below for this proposal to be processed.

**I.7 Certification of Unintentional release of Motor Fuel & Cost Proposal- Owner Signature:**

*I certify that an unintentional release has occurred from a motor fuel underground or aboveground tank system at this site and I authorize this Cost Proposal amount for corrective action activities to be conducted at this site.*

| | |
|---|---|
| 1.Owner or Operator Signature: | R. David Collins |
| Typed or Printed Name and Title: | David Collins - President |
| Email address: | david@dcoilco.com |
| Date: | |

**I.8 Cost Proposal- Contractor Signature:**

| | |
|---|---|
| 2.Response Action Contractor Signature: | Michael L. Ellison |
| Typed or Printed Name and Title: | Michael L. Ellison, P.E., Principal |
| Date: | 03/11/2022 |

**I.9 Trust Fund Obligation Information:**

| | |
|---|---|
| Estimated Total Cost of all Anticipated Response Actions (To be updated overtime): | $900,000.00 |
| Total of Previously Approved Cost Proposals: | $558,396.91 |
| Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal): | $581,074.66 |
| Estimate Percent Completion of entire project to date: | 65% |

**I.10 Cost Proposal Amount**

| | | | |
|---|---|---|---|
| Proposed Costs under this Cost Proposal: | **$22,677.75** | **Personnel** | **$11,255.75** |
| | | **Field Equipment** | **$1,364.00** |
| Owners Required Contribution for UST Release($5,000): *Applicable for CP#1 Only* | | **Mileage** | **$702.00** |
| | | **Per Diem** | **$102.00** |
| | | **Drilling** | **$0.00** |
| Owners Required Contribution for AST Release($10,000): *Applicable for CP#1 Only* | | **Analytical** | **$1,419.00** |
| | | **Other** | **$7,835.00** |
| | | | |
| **Total of This Cost Proposal:** | **$22,677.75** | | |

# Cost Proposal Summary

| CP Total | Facility I.D. # | CP # | Incident Number | Site Name |
|---|---|---|---|---|
| $22,677.75 | 20411-105-003683 | 16 | UST20-08-05 | Quick Shop No. 98 |

## Part II- Alabama Tank Trust Fund Itemization Form "A" Cost Proposal

| Scenarios | Unit $ | Units | Quantity | Requested$ |
|---|---|---|---|---|
| SEMR - DPVE, P&T Reports | | | | |
| 1-12 wells, BTEX/MTBE/Naphthalene | $4,927 | /report | 1 | $4,927.00 |
| **Total Report and Plan Costs** | | | | **$4,927.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal

| | | | | |
|---|---|---|---|---|
| Groundwater Sampling Set-up (2hrs tech time) | $126.00 | /sow | 1 | $126.00 |
| Gauging Well (no sampling) | $15.75 | /well | 21 | $330.75 |
| Groundwater Sampling and Gauging 2" Well | $63.00 | /well | 12 | $756.00 |
| DPVE, Pump and Treat O&M 3 months | $3,856 | /quarter | 1 | $3,856.00 |
| **Travel** | | | | |
| **Mileage Rate** | | | $0.585 | |
| Mileage (One way office to site) | | | 75 | |
| Number of round trips to site | | | 8 | $702.00 |
| Technician(s)-travel time | $63 | /hr | 20 | $1,260.00 |
| Per diem (6-12hrs) | $12.75 | /day | 8 | $102.00 |
| **Equipment and Equipment Kits** | | | | |
| 55-Gallon Drums | $50 | /drum | 1 | $50.00 |
| Sampling Expendables(gloves, ice, string, jars, foil, distilled water, paper towels. | $50 | /sow | 1 | $50.00 |
| Expendables O&M | $25 | /day | 6 | $150.00 |
| Groundwater Monitoring | $160 | /day | 1 | $160.00 |
| Bailers | $7 | /bailer | 12 | $84.00 |
| DPVE, SVE, AS, P&T O&M | $145 | /day | 6 | $870.00 |
| Postage / Shipping and Copying (plans reports, ADEM and owner) | $85 | /sow | 1 | $85.00 |
| Postage / Shipping (Sample Shipping) | $50 | /samples | 1 | $50.00 |

## Analytical Samples

| | Method | | | Pass Through | Sample # | |
|---|---|---|---|---|---|---|
| BTEX/MTBE/Naph (water) | 8260 | $65 | /sample | 10% | 12 | $858.00 |
| Oil & Grease | | $50 | /sample | 10% | 3 | $165.00 |
| Air Samples (System Influent) | | $100 | /sample | 10% | 1 | $110.00 |
| Other | QA/QC - 8260 | $65.00 | /sample | 10% | 1 | $71.50 |
| Other | Effluent - 8260 | $65.00 | /sample | 10% | 3 | $214.50 |
| **Total Field Costs** | | | | | | **$10,050.75** |

## Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal

| | |
|---|---|
| **Total Drilling Costs** | **$0.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal

# Cost Proposal Summary

| CP Total | Facility I.D. # | CP # | Incident Number | Site Name |
|---|---|---|---|---|
| $22,677.75 | 20411-105-003683 | 16 | UST20-08-05 | Quick Shop No. 98 |

| | | Pass Through | Quoted Amoun | Requested$ |
|---|---|---|---|---|
| Phone Costs (telemetry) | | 10% | $250.00 | $275.00 |
| Power Costs | | 10% | $6,000.00 | $6,600.00 |
| Other/Misc. (receipts required) | Oil for DPVE | 10% | $750.00 | $825.00 |
| | **Total Subs / Vendors / Utilities** | | | **$7,700.00** |

## Part II- Alabama Tank Trust Fund Itemization Form "E" Cost Proposal

Per diem allowed for Alabama Tank Trust Fund Contractor Personnel Only
Maximum allowable rates are referenced on the "Maximum Rates" Tab in this document.
This page should be submitted whenever per diem is being claimed.

| Points of Travel From | To | Projected Date mm/dd/yy | Personnel Classification | Hour of Departure am/pm | Hour of Return am/pm | Activity To Be Performed | Amount Per diem claimed |
|---|---|---|---|---|---|---|---|
| Use this section to enter claims for daily per diems | | | | | | | |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | O&M | $12.75 |
| Irondale | Brent | | Tech | | | GWS | $12.75 |
| Irondale | Brent | | Tech | | | GWS | $12.75 |
| | | | | | | | |
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| | | | | | | | |
| | | | | Total number of daily per diems | | | 8 |
| Use this section to enter claims for extended daily per diems | | | | | | | |
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| | | | | Total number of ext. daily per diems | | | 0 |
| Use this section to enter claims for overnight per diems | | | | | | | |
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| | | | | Total number of overnight per diems | | | 0 |