

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

**HICKS OIL COMPANY, INC.  
FORMER BILL'S 31 AMOCO  
1216 PRYOR STREET EAST  
ATHENS, ALABAMA**

**FACILITY I.D. NO. 15531-083-008369  
INCIDENT NO. UST18-11-04**

**PPM PROJECT NO. 420001-CAPD**

**MAY 16, 2019**



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(COST PROPOSAL NO. 10)**

**FOR**

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1216 PRYOR STREET EAST  
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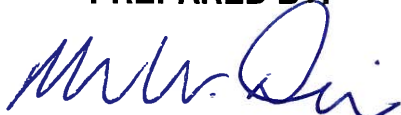
**PREPARED FOR:**

**HICKS OIL COMPANY, INC.  
20073 YARBROUGH ROAD  
ATHENS, ALABAMA 35611**

**PPM PROJECT NO. 420001-CAPD**

**MAY 16, 2019**

**PREPARED BY:**



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## CERTIFICATION PAGE

*I certify under penalty of law that the Corrective Action Plan for the Former Bill's 31 Amoco located at 1216 Pryor Street East in Athens, 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

05/16/19

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Date

# UST RELEASE FACT SHEET

**GENERAL INFORMATION:**

SITE NAME: Former Bill's 31 Amoco

ADDRESS: 1216 Pryor Street East, Athens, Alabama

FACILITY I.D. NO.: 15531-083-008369

INCIDENT NO.: UST18-11-04

**RESULTS OF EXPOSURE ASSESSMENT:**

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

**CONTAMINATION DESCRIPTION:**

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

Free product present in wells?  Yes  No

|  |  |
|--|--|
| Maximum BTEX or PAH concentration measured in soil:<br>(February 22, 2018) | 0.519 mg/kg benzene (SB-2-15)<br>58.433 mg/kg BTEX (SB-2-15)<br><0.100 mg/kg MTBE (SB-2-15, SB-5-15)<br>10.600 mg/kg naphthalene (SB-2-15) |
|--|--|

|  |   |
|--|---|
| Current maximum COC concentrations measured in groundwater:<br>(April 5, 2019) | 0.955 mg/L benzene (MW-2)<br>12.203 mg/L BTEX (MW-5)<br>0.088 mg/L MTBE (MW-2)<br>3.320 mg/L naphthalene (MW-5) |
|--|---|

## 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: Former Bill's 31 Amoco  
 SITE ADDRESS: 1216 Pryor Street East, Athens, Alabama

FACILITY I.D. NO.: 15531-083-008369  
 INCIDENT NO.: UST18-11-04

OWNER NAME: Hicks Oil Company, Inc.  
 OWNER ADDRESS: 20073 Yarbrough Road, Athens, Alabama 35611

NAME & ADDRESS OF PERSON  
 COMPLETING THIS FORM: Michael W. Dillon, P.G., PPM Consultants, Inc.  
5555 Bankhead Highway, Birmingham, Alabama 35210

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

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

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

**ADDITIONAL COMMENTS:**

According to Athens Utilities, the City of Athens obtains its drinking water from the Elk River, approximately 9.9 miles north west of the site. There are no public drinking water wells or surface water intakes for public drinking water within a one-mile radius of the site.

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

|  |            |
|--|------------|
| Enter the determined classification ranking: | <b>G.1</b> |
|--|------------|

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

## 1.0 INTRODUCTION

PPM Consultants, Inc. (PPM) has prepared this Corrective Action Plan (CAP) on behalf of Hicks Oil Company, Inc. for the Former Bill's 31 Amoco facility located at 1216 Pryor Street East in Athens, Alabama. The CAP was required by the Alabama Department of Environmental Management (ADEM) in correspondence dated March 11, 2019. Investigative and corrective actions at the site are in response to an accidental release of petroleum hydrocarbons from an underground storage tank (UST) system. Constituents of concern (COCs) for the site include benzene, ethylbenzene, toluene, and total xylenes (BTEX), methyl tertiary butyl ether (MTBE), and naphthalene. The CAP provides site background information, a summary of pertinent environmental activities conducted to date, information regarding subsurface conditions, and a detailed description of the selected method of site remediation. A schedule and cost proposals are included for the implementation of the CAP.

## 2.0 BACKGROUND

### 2.1 SITE LOCATION

The Former Bill's 31 Amoco facility is a former retail petroleum station (now vacant) located at 1216 Pryor Street East in Athens, Alabama. The site is situated in the southeast  $\frac{1}{4}$  of the southeast  $\frac{1}{4}$  of Section 4, Township 3 South, Range 4 West of the Athens, Alabama, Quadrangle. More specifically, the site is located at  $34^{\circ} 48' 23''$  north latitude and  $86^{\circ} 57' 01''$  west longitude. The site location is shown in **Figure 1, Site Location Map in Appendix A, Figures.**

### 2.2 SURROUNDING AREA

The property is a vacant lot located at the southwest corner of the intersection of Pryor Street East and US Highway 31 in a commercial/residential area of Athens, Alabama. Dollar General is located north of the facility, across Pryor Street East. Athens High School is located across US Highway 31 to the east of the facility. A vacant field and a Big Kmart are located south-southwest of the facility property. Seventh Day Adventist Church is located west of the facility property across Pryor Street East. Residential properties are located further west of the facility property.

### 2.3 SITE DESCRIPTION

The topography of the site gently slopes to the southeast. Former structures at the site included the former petroleum station building and UST components. The building was

demolished in 2018 and the lot is now vacant. The UST system was closed by removal in 2000. Prior to closure, the site included: one 8,000-gallon regular gasoline UST, one 4,000-gallon mid-grade gasoline UST, one 4,000-gallon premium gasoline UST, and associated product transfer piping. At the time of the closure, the steel USTs and piping ranged in estimated age from 22 to 39 years. A 550-gallon used oil UST and associated piping were closed by removal more recently on February 18, 2018. The three gasoline USTs were located within a single UST pit located adjacent to the northern side of the facility building. The former product piping extended from the tank pit toward the east-southeast to two dispensers located east of the facility building. The used oil UST was located adjacent to the western side of the facility building. The former product piping extended from the tank pit toward the east into the facility-building garage. Site features are shown on **Figure 2, Site Map**.

Underground utilities identified at the site include water, telecommunications, and natural gas. The water lines traverse from southwest to northeast along the northwest side of Highway 31 and from southeast to northwest from the water meter to across Pryor Street East. The storm water piping and drainage ditch also traverse from southwest to northeast along the northwest side of Highway 31. Telecommunication lines are located in the grass island area near the intersection of Pryor Street East and Highway 31. The natural gas line traverses from southwest to northeast along the southeast side of Pryor Street East. The location of underground utility service laterals could not be located. Approximate utility locations are shown in **Figure 2**.

## **2.4 SITE HISTORY**

The following provides a brief summary of pertinent activities conducted at the site to date.

Hicks Oil Company, Inc. owned and operated the former petroleum UST system since purchase of the system on August 26, 1988, until UST closure was conducted in 2000. In response to review of the UST closure report dated July 3, 2000, ADEM issued a site status of No Further Action on August 8, 2000. Previously, the UST system was owned and operated by A & R Oil Company, and the facility was named Kelly's 31 Amoco.

### **Phase II Environmental Site Assessment**

On behalf of Athens City Schools, GSE, Inc. (GSE) conducted a Phase II Environmental Site Assessment (ESA) at the facility property in August 2017. The field investigation included the collection of 14 soil samples and four groundwater samples at the facility property, more

specifically, at the Former Bill's 31 Amoco and Tall Paul's Rent-All facilities. Regarding Bill's 31 Amoco, the Phase II ESA revealed that the used oil UST and associated piping remained in-place. Approximately 0.33 feet of free product gasoline was observed on groundwater at a depth of approximately 13 feet below ground surface (BGS) near the former petroleum dispensers. Ethylbenzene [9.010 milligrams per kilogram (mg/kg)], xylenes (140 mg/kg), and lead (184 mg/kg) were detected in soil above Initial Screening Levels (ISLs) near the former dispensers. Lead was detected above the ISL in soil near the former tank pit (6.43 mg/kg) and near the former wastewater sump (35.2 mg/kg). Lead was also detected above the ISL in groundwater near the former tank pit [0.670 milligrams per liter (mg/L)] and at the former dispensers (55 mg/L).

Based on the results of the Phase II ESA, ADEM notified Hicks Oil Company, Inc. of the requirement to conduct investigative and corrective actions and assigned Incident No. UST18-11-04 to the potential release in correspondence dated December 29, 2017. Additionally, the release was determined to be eligible for Alabama Tank Trust Fund (ATTF) coverage and Cost Proposal No. 1 (CP-1) for conducting a Preliminary Investigation and developing a Secondary Investigation Plan was pre-approved.

### **Used Oil UST Removal**

On behalf of Athens City Schools, GSE removed the used oil UST that was found in-place during the Phase II Site Assessment. On February 28, 2018, approximately 250 gallons of used oil were removed from the tank, a concrete slab was removed from the ground surface above the tank system, and the tank and associated piping were removed by excavation. No holes were observed on the tank or piping. The excavation was approximately 10 feet by 8 feet by 6 feet.

### **Preliminary Investigation**

A Preliminary Investigation was conducted in February 2018, which included the advancement of five soil borings, SB-1 through SB-5. Five Type II monitoring wells (MW-1 through MW-5) were constructed in soil borings SB-1 through SB-5. Soil and groundwater samples were collected during the investigation to evaluate potential COC impact to the subsurface.

Free product was observed in soil boring SB-2 from 18 to 19 feet BGS. Analytical results indicated that COC concentrations in soil exceeded ADEM's ISLs in borings SB-2 and SB-5. Free product was not observed on the groundwater surface. COC concentrations in

groundwater exceeded ISLs at monitoring wells MW-2, MW-3, MW-4, and MW-5. The extent of COC impact to groundwater was not adequately delineated. The Preliminary Investigation Report was submitted to ADEM on March 30, 2018.

### **Secondary Investigation**

The Secondary Investigation site activities began on August 13, 2018, and included the advancement of five soil borings (SB-6 through SB-10) and installation of two, 2-inch inside diameter (I.D.), Type II monitoring wells (MW-6 through MW-10). Monitoring well MW-10 was installed as a Type II residuum deep well to a depth of approximately 48 feet and set just into the top of weathered limestone bedrock. Soil and groundwater samples were collected during the investigation to evaluate potential COC impact to the subsurface.

During groundwater sampling activities on August 17, 2018, no free product was observed at the site. The dissolved benzene concentrations exceeded the ISL of 0.005 mg/L in monitoring well MW-2 (0.815 mg/L), MW-4 (0.008 mg/L), MW-5 (0.352 mg/L), MW-6 (0.027 mg/L), and MW-7 (0.820 mg/L). Dissolved ethylbenzene concentrations exceeded the ISL of 0.70 mg/L in MW-2 (1.300 mg/L), MW-5 (5.420 mg/L), MW-6 (3.730 mg/L), and MW-7 (2.640 mg/L). The dissolved xylene concentration exceeded the ISL of 10 mg/L in MW-5 (11.200 mg/L). The dissolved MTBE concentrations exceeded the ISL of 0.020 mg/L in MW-2 (0.116 mg/L) and MW-7 (0.329 mg/L), and the detection limit was above the ISL at MW-5 (<0.100 mg/L) and MW-6 (<0.100 mg/L). Dissolved naphthalene concentrations exceeded the ISL of 0.020 mg/L in MW-2 (1.220 mg/L), MW-3 (0.029 mg/L), MW-4 (0.296 mg/L), MW-5 (6.210 mg/L), MW-6 (8.170 mg/L), and MW-7 (1.570 mg/L). The horizontal extent of impact to groundwater was not defined for benzene, MTBE, and naphthalene to the north. Attempts to obtain offsite access to install wells to the north, across Pryor Street East, on Dollar General Property were unsuccessful. The vertical extent of impact to groundwater was defined by MW-10. The Secondary Investigation Report was submitted to ADEM on September 25, 2018.

### **Alabama Risk-Based Corrective Action (ARBCA) Evaluation**

PPM conducted an ARBCA Evaluation for the site to assess current and potential future risk for the subject property and adjacent properties. The ARBCA Evaluation was submitted to ADEM on January 31, 2019. Results of the evaluation indicated representative benzene and xylenes concentrations in on-site soil exceeded the approved Site-Specific Corrective Action Levels (SSCALs) for indoor inhalation for resident children. The representative naphthalene concentrations in on-site and off-site groundwater exceeded the SSCAL for resident children.



Additionally, the representative naphthalene concentration in groundwater at the source and in point of compliance (POC) well MW-6 exceeded the Groundwater Resource Protection (GRP) values. ADEM approved the SSCALs in a letter dated February 7, 2019.

### **Groundwater Monitoring and Well Abandonment**

Quarterly groundwater monitoring events are being conducted at the site, which started in January 2019. During the first quarter of groundwater monitoring, three monitoring wells (MW-6, MW-7, and MW-8) were abandoned by grouting in-place because of road construction associated with the widening of Pryor Street. The wells were abandoned on January 28, 2019, after completion of the January 14, 2019, groundwater sampling.

### **CAP Evaluation**

In correspondence dated October 24, 2018, ADEM requested evaluation of corrective action alternatives for the site. PPM conducted a CAP Evaluation and recommended periodic remediation by natural attenuation (RNA) groundwater monitoring and mobile-enhanced multiphase extraction (MEME) events as the most efficient and economical remedial approach for the site to reduce COC impact in soil and groundwater in a timely and efficient manner. PPM submitted the evaluation to ADEM on February 26, 2019. ADEM reviewed the CAP Evaluation and in correspondence dated March 11, 2019, requested a RNA and MEME CAP be developed.

## **2.5 SITE CONDITIONS**

### **2.5.1 Soil**

Subsurface soil was identified from visual inspection during advancement of borings. The soil generally consisted of gravelly clay containing chert gravel and in locations, chert cobbles. At soil borings SB-1, SB-4, SB-5, and MW-7, small to medium chert cobbles were observed at depths ranging from 10 to 20 feet BGS. At soil boring SB-10, small to medium chert cobbles were observed from 22 to 30 feet BGS and no recovery occurred from 30 feet to 40 feet. Highly weathered limestone bedrock was encountered in SB-10 at a depth of 45 feet BGS. The soil and bedrock are consistent with what is expected above the Fort Payne Chert.

Representative cross-sections of the soil encountered at the site are presented in **Figure 3, Cross-Section A-A'** and **Figure 4, Cross-Section B-B'**. Soil boring logs and monitoring

well construction logs are provided in **Appendix B, Soil Boring Logs/Monitoring Well Construction Logs**.

### **2.5.2 Groundwater**

During the Preliminary and Secondary Investigations, the initial zone of saturation was encountered at approximately 14 to 19.5 feet BGS at SB-1 through SB-9. Static groundwater measured in shallow Type II monitoring wells on February 26, 2018, ranged from 2.75 to 3.94 feet below top of casing (BTOC).

Groundwater depths historically fluctuate from 2.75 to 12.01 feet BTOC in the shallow Type II monitoring wells. During the most current groundwater sampling event conducted on April 5, 2019, event, depth to groundwater in the shallow Type II monitoring wells ranged from 5.65 feet BTOC in monitoring well MW-3 to 10.15 feet BTOC in MW-1. Based on these measurements, the groundwater flow from the area of the release appears to be generally toward the northwest; however, on August 17, 2018, groundwater flow was to the southwest. The hydraulic gradient between monitoring wells MW-4 and MW-1 was estimated to be 0.072 feet per foot (ft/ft).

Groundwater elevations measured at the site are shown in **Table 1, Groundwater Elevation Survey Data, Appendix C, Tables** and in **Figure 5, Groundwater Elevation Map (April 5, 2019)**.

### **2.5.3 COCs in Soil**

A free product sheen was observed in soil during the Preliminary Investigation at soil boring SB-2 from 18 to 19 feet BGS. Free product was not encountered in any other borings advanced at the site. Results from headspace analyses ranged from 0 to >11,000 parts per million by volume (ppmv). The highest headspace reading (>11,000 ppmv) was measured in boring SB-2 at 15 and 20 feet BGS. Soil boring SB-2 is located adjacent to and east of the UST pit.

COC concentrations were detected in soil samples from boring SB-2, SB-5, and SB-7. Benzene and xylenes concentrations in soil samples collected from SB-2 and SB-7 exceeded the approved SSCALs for indoor inhalation for resident children; however, these samples were collected at 15 feet BGS, below the measured water table. COC concentrations in the remaining soil samples were below the SSCALs. A summary of this data is presented in

**Table 2, Soil Analytical Summary.** The soil data is also presented on **Figure 6, COC Concentrations in Soil.**

#### **2.5.4 COCs in Groundwater**

During the April 5, 2019, groundwater sampling event, the dissolved naphthalene concentration exceeded the SSCAL at monitoring well MW-5 (3.320 mg/L). No other constituents were above SSCALs. The horizontal extent of impact to groundwater is not defined for benzene, MTBE, and naphthalene to the north. The vertical extent of impact to groundwater is defined.

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 7, Dissolved Benzene Isoconcentration Map (April 5, 2019)**
- **Figure 8, Dissolved MTBE Isoconcentration Map (April 5, 2019)**
- **Figure 9, Dissolved Naphthalene Isoconcentration Map (April 5, 2019).**

#### **2.5.5 Exposure Assessment**

An ARBCA Evaluation was completed for the site on January 31, 2019. A detailed exposure assessment was included as part of the evaluation. The exposure assessment considered current and potential future use of the property impacted by COCs and potential impacts to off-site properties.

#### **2.5.6 Site Conceptual Exposure Model**

Based on the Site-Conceptual Exposure Model (SCEM) that was completed during the ARBCA Evaluation, the complete routes of exposure have been identified as outdoor inhalation of vapors from subsurface soil (for on-site locations) and outdoor inhalation of vapors from groundwater (for on- and off-site locations). Indoor inhalation for soil and groundwater were considered for future use. Human receptors considered for the study included residential, commercial worker, and construction worker for current and potential future on-site property use and residential child and adult, commercial worker, and construction worker for current and potential future off-site property use.

The routes of exposure through which the selected on- and off-site human receptors could potentially be exposed to COC by current and/or future conditions were selected based on

complete pathway(s), presence of a potential receptor, and the presence of COC concentrations above ISLs for soil and/or groundwater.

### **2.5.7 Potential Migration Pathways**

Potential migration pathways identified at the site include underground utilities for natural gas and water lines located on or near the site. UST system components were removed from the subsurface during the UST system closure in 2000. There are no other known underground manmade structures, such as basements or accessible utility vaults, on the site. Based on the depth to groundwater, it appears that subsurface utilities are at risk of contact with groundwater during times of higher groundwater elevation. The approximate locations of site utilities are shown on **Figure 2**.

Biological receptors such as plants and animals in the site vicinity do not appear to have been impacted by the release.

The nearest surface water body is Swan Creek located approximately 1,190 feet southeast of the site. Surface water runoff from the area ultimately ends up in the Swan Creek. Swan Creek flows generally toward the south and ultimately empties into the Tennessee River approximately 9.3 miles south-southwest of the site. Based on the overall distance to Swan Creek and its tributary, it is unlikely they have been impacted by a release from the UST system.

### **2.5.8 Potential Drinking Water Receptors**

PPM performed a door-to-door survey of residences and business within a 1,000-foot radius of the site. Based on conversations with those available at the time of this survey, no private water supply wells were identified during the Preliminary Investigation. A letter/survey form and self-addressed, postage-paid envelope were left for those not available at the time of the survey. All those interviewed and the returned forms indicated there are no private wells and that Athens Utilities provides drinking water to the area.

PPM contacted Athens Utilities and inquired about water well usage in the general area. According to information relayed to PPM and as discussed above, there are no public drinking water wells or public drinking water surface intakes located within a 1-mile radius of the site and the site is not located within a Wellhead Protection Area. According to the Athens Water Department, the city obtains its drinking water from the Elk River. The intake is located approximately 9.9 miles northwest of the site.

The use of private wells in this area is unlikely as commercial and residential developments in the area are connected to city water (Athens Water System).

### 2.5.9 Most Stringent Exposure Pathways

SSCALs are comprised of Site-Specific Target Levels (SSTLs) and GRP values, each for soil and groundwater. The SSCALs are based on the most stringent pathway for each route of exposure (SSTLs) and select POC (GRP values). These include:

SSTLs for Soil: Indoor and Outdoor Inhalation – Resident Child (Future Conditions On-site, and Current and Future Conditions Off-site)

SSTLs for Groundwater: Indoor and Outdoor Inhalation – Resident Child (Future Conditions On-site, and Current and Future Conditions Off-site)

GRP Values: Source soil, source groundwater, and groundwater at each POC.

The SSCALs for soil and groundwater are provided in the COC summary tables for soil and groundwater, **Table 2** and **Table 3**, respectively.

## 3.0 REMEDIAL OBJECTIVES

This CAP has been prepared to achieve the following objectives:

- Reduce the potential for further migration of dissolved COCs
- Reduce COC concentrations in soil and groundwater to below SSCALs
- Accomplish site objectives in a safe, timely, and cost-effective manner.

## 4.0 REMEDIAL APPROACH

A CAP Evaluation was conducted to assess remedial strategies that will effectively and efficiently, decrease COC concentrations in soil and groundwater to below SSCALs established for the site. The CAP Evaluation was submitted to ADEM on February 26, 2019, and recommended RNA monitoring combined with MEME events and potential future air or ozone sparging if needed. ADEM agreed with the recommendation and in correspondence dated March 11, 2019, requested the CAP be prepared for conducting RNA monitoring and MEME events.

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

#### **4.1 MEME**

MEME is a common remedial technology that has proven to be effective at removing select absorbed and dissolved phase contaminants from the soil and groundwater. The concept is similar to conventional dual-phase vacuum extraction (DPVE) in that vacuum is applied to a well to facilitate removal of volatile organic compounds (VOCs). This technology involves the application of vacuum to the soil matrix, creating a negative pressure gradient that results in the removal of contaminants from soil and subsequent movement of vapors toward a recovery point. Induced vacuum may be accomplished by means of an appropriately sized blower (regenerative or liquid ring, typical) that is connected to multiple extraction points strategically positioned at key areas within the zone of impact.

MEME also creates favorable conditions for biological activity. Oxygen can be delivered to bacteria in previously saturated soils much faster by air than by liquid phase transport. Soil gases sweeping across the surface of the aquifer will typically help maintain moist soil conditions. A moist, oxygenated environment enhances bacterial growth and activity, which aids VOC desorption from soil particles.

Prior experience with similar projects has indicated that MEME technology is successful in removing COC impact in soil at most UST sites and is somewhat effective at removing COC impact in groundwater. Soil at the site is primarily gravelly clay which limits the effectiveness of MEME in treating groundwater; however, because of lower dissolved COC concentrations, the cost effectiveness of the technology, and the added benefit to biodegradation, MEME events are considered a feasible approach for the site.

#### **4.2 RNA**

RNA 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 often augmented by use of MEME events to aid in source removal.

RNA is typically not considered for sites with elevated petroleum concentrations or free product, as it will generally not achieve site objectives within a reasonable time frame.

However, RNA is often selected for sites with low to moderate impact that show indications that it may be effective as a standalone technology or in conjunction with other remedial methods that address contaminant source control.

Because dissolved COC concentrations appear to be stable and are relatively low, an RNA monitoring program may be successful at the site. RNA supplemented with MEME events and potentially mobile air sparge events would not only reduce the overall contaminant mass, but would also create conditions conducive to microbial activity.

RNA monitoring combined with MEME events and/or short-term duration ozone sparge events appear to be the best alternative for remediating soil and groundwater at the site. Initially, RNA and MEME events can be implemented. Ozone sparging can be implemented in the event that MEME events appear insufficient for timely remediation of impacted media. If ozone sparging is implemented, an Underground Injection Control (UIC) permit would be required and preferably sparge wells would need to be installed in strategic locations of the site. Additionally, an electrical power connection would need to be installed for the short-term duration ozone sparging.

#### **4.3 ANTICIPATED SITE RESPONSE**

Based on analytical data that generally indicates decreasing dissolved COC concentrations at most locations on site, it is anticipated site conditions will continue to improve with respect to overall groundwater quality. PPM anticipates that MEME combined with RNA groundwater monitoring will enhance the site cleanup; however, it is difficult to quantitatively predict the clean-up time. With that being said, PPM anticipates one to three years or more to reduce dissolved COC concentrations to below SSCALs.

### **5.0 PROPOSED SCOPE OF WORK**

The scope of work for the proposed corrective action consists of the following activities on a quarterly basis:

- Performance of quarterly 8-hour MEME events
- Completion of quarterly groundwater elevation surveys
- Collection of groundwater samples on a quarterly basis from seven site wells for analysis of COCs per Environmental Protection Agency (EPA) Method 8260

- Disposal of accumulated purge water and water recovered from the MEME events
- Preparation of quarterly RNA groundwater monitoring reports that present the findings and conclusions from the MEME event and sampling event as well as recommendations for any further actions.

Field activities will be conducted in general accordance with PPM's Quality Assurance/Quality Control (QA/QC) Plan for groundwater sampling consistent with EPA/ADEM protocol. No deviation from the proposed scope of work will be made without approval from ADEM.

## **6.0 FIELDWORK METHODOLOGY**

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

### **6.1 MEME EVENTS**

To reduce adsorbed and dissolved COC concentrations at the site, one 8-hour MEME event will be conducted approximately one month after quarterly groundwater sampling efforts. This will result in four MEME events over the course of the first year of effectiveness monitoring.

A representative of PPM will be on site during the MEME event, which will be conducted by Brown Remediation, Inc. utilizing a vacuum truck equipped with a thermal oxidizer treatment system. The thermal oxidizer will be used to treat off-gases prior to release to the atmosphere. The ADEM Air Division will be notified prior to initiating MEME events at the site. The MEME events will concentrate at extracting impact primarily from monitoring wells MW-2, MW-4, and MW-5.

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



containing free product and/or exhibiting COC concentrations above SSCALs will be the primary recovery points. Other locations may be selected based on existing COC data.

The duration/frequency of the MEME events can be modified, with ADEM approval, based on results of subsequent groundwater sampling activities.

## **6.2 GROUNDWATER ELEVATION SURVEY**

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

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

## **6.3 GROUNDWATER SAMPLING**

Monitoring wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-9 and MW-10 will be sampled quarterly in general accordance with PPM's internal QA/QC plan. Groundwater sampling will occur approximately one month prior to the 8-hour MEME event to be conducted at the site. Prior to sampling, each well will be purged of approximately three well-casing volumes (or to near dryness) in an effort to obtain samples representative of subsurface conditions. Single use, disposable polyvinyl chloride (PVC) bailers, and nylon rope will be used to purge each well and to facilitate sample collection. Purge water from all wells will be temporarily stored in drums and removed from the site during the subsequent 8-hour MEME event. Brown Remediation, Inc. will transport the water to Allied Energy Company in Birmingham, Alabama for final disposal.

Each sample will be transferred from the bailer into 40-milliliter (ml) glass vials containing hydrochloric acid (HCl) as a preservative. Each container will be filled with the sample, promptly capped, and appropriately labeled to indicate the sample origin. Containers will be

subsequently placed in an iced cooler for preservation during shipment to the laboratory. A duplicate sample will be collected from one well in accordance with QA/QC protocol.

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

#### **6.4 SAMPLE PRESERVATION AND DISPATCH**

Groundwater samples retained for laboratory analyses will be promptly placed on ice and cooled to or near 4 degrees Celsius ( $^{\circ}\text{C}$ ). The samples will be labeled to document the appropriate project information. Samples will be sealed within insulated coolers and transported (via common courier or PPM) under chain-of-custody protocol to an independent laboratory for analysis.

#### **6.5 LABORATORY ANALYSES**

Groundwater samples collected during each sampling event will be analyzed for BTEX, MTBE, and naphthalene per EPA Method 8260.

### **7.0 REPORTING**

Quarterly RNA monitoring reports will be prepared and submitted within approximately 45 days of each groundwater sampling event. Reports will include a detailed description of the work performed during the MEME events and groundwater sampling events and a summary of the associated findings. Current and historical groundwater elevation and analytical data will be presented in summary tables. In addition, figures will be provided indicating the apparent direction of groundwater flow and estimated extent of COC impact. The report will be reviewed by an engineer or geologist experienced in conducting subsurface environmental investigations and corrective actions.

### **8.0 SITE HEALTH AND SAFETY**

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

## 9.0 PROJECT SCHEDULE

PPM proposes to conduct the MEME events and effectiveness monitoring on a quarterly basis for at least one year or until COC concentrations at the facility remain at or below SSCALs for two consecutive quarterly periods. If concentrations do not decrease in a timely manner, PPM will recommend installation of 4-inch diameter recovery wells to increase the removal rate. Groundwater sampling will be conducted approximately one month prior to the MEME event. Quarterly groundwater sampling events are already approved through October 2019. Once the CAP is approved, PPM will submit addendums to add RNA and MEME activities to the remaining approved groundwater sampling events. Two cost proposals for quarterly RNA monitoring and MEME events are provided in this CAP. If at any time during these activities it is deemed necessary to perform additional efforts, PPM will contact ADEM to discuss and subsequently submit an addendum request to perform the additional work.

## 10.0 COST ESTIMATE

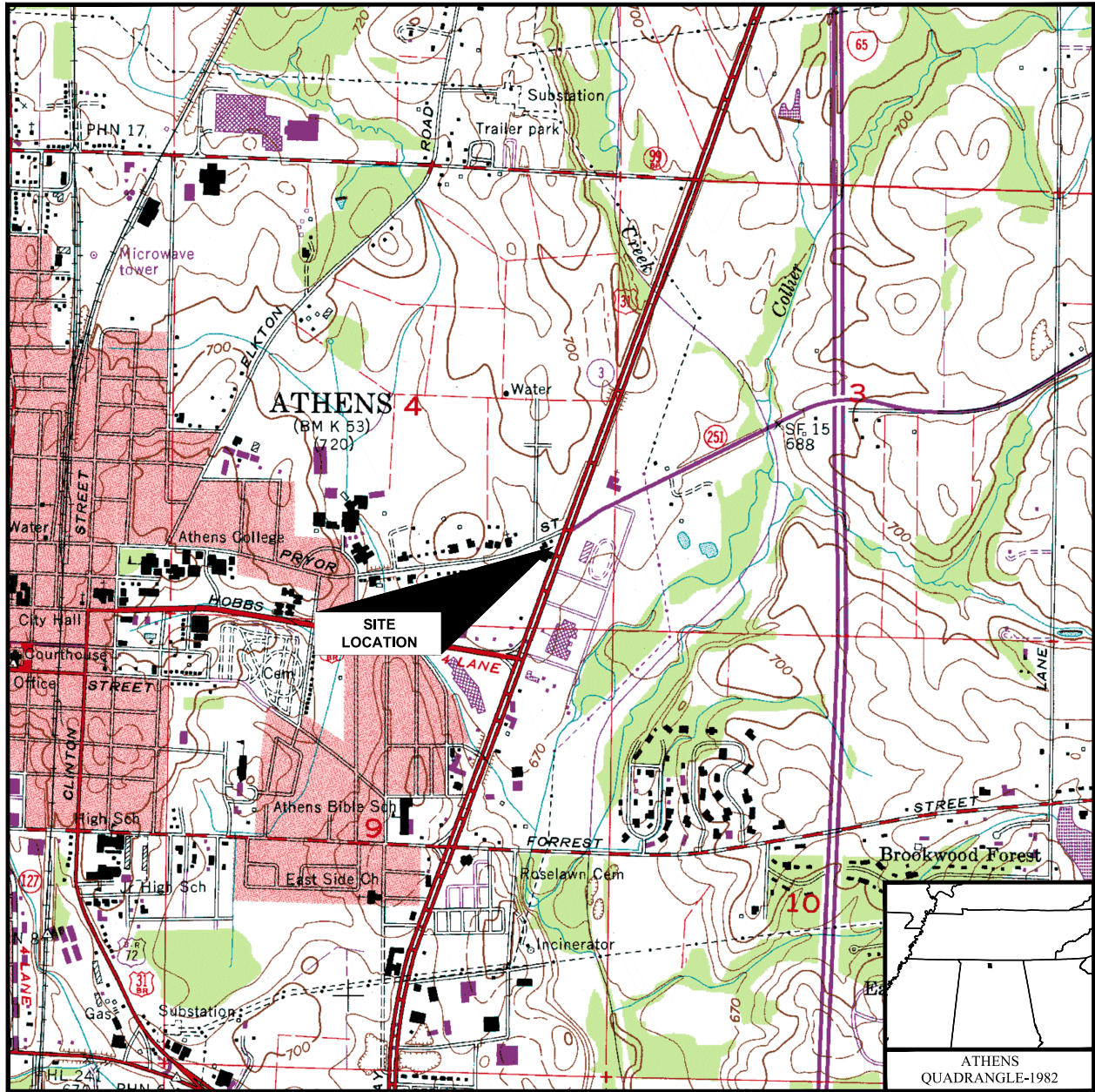
The work elements for CAP implementation are eligible for reimbursement from the ATTF. Cost proposals for implementation of the CAP are included as follows.

- **Appendix E – Cost Proposal No. 11 – First Quarterly MEME and RNA Groundwater Monitoring**
- **Appendix F – Cost Proposal No. 12 – Second Quarterly MEME and RNA Groundwater Monitoring**

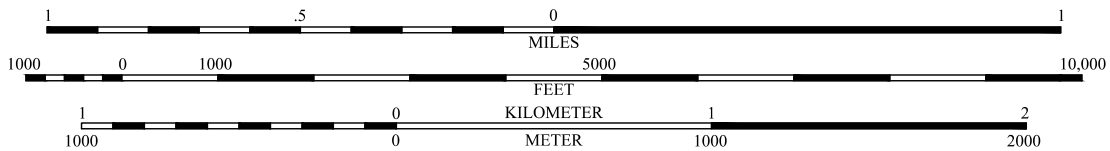
A copy of the quote from Brown Remediation, Inc. is included as **Appendix G, Subcontractor Quote**.


## **APPENDICES**

## **APPENDIX A – FIGURES**



SCALE: 1 : 24,000



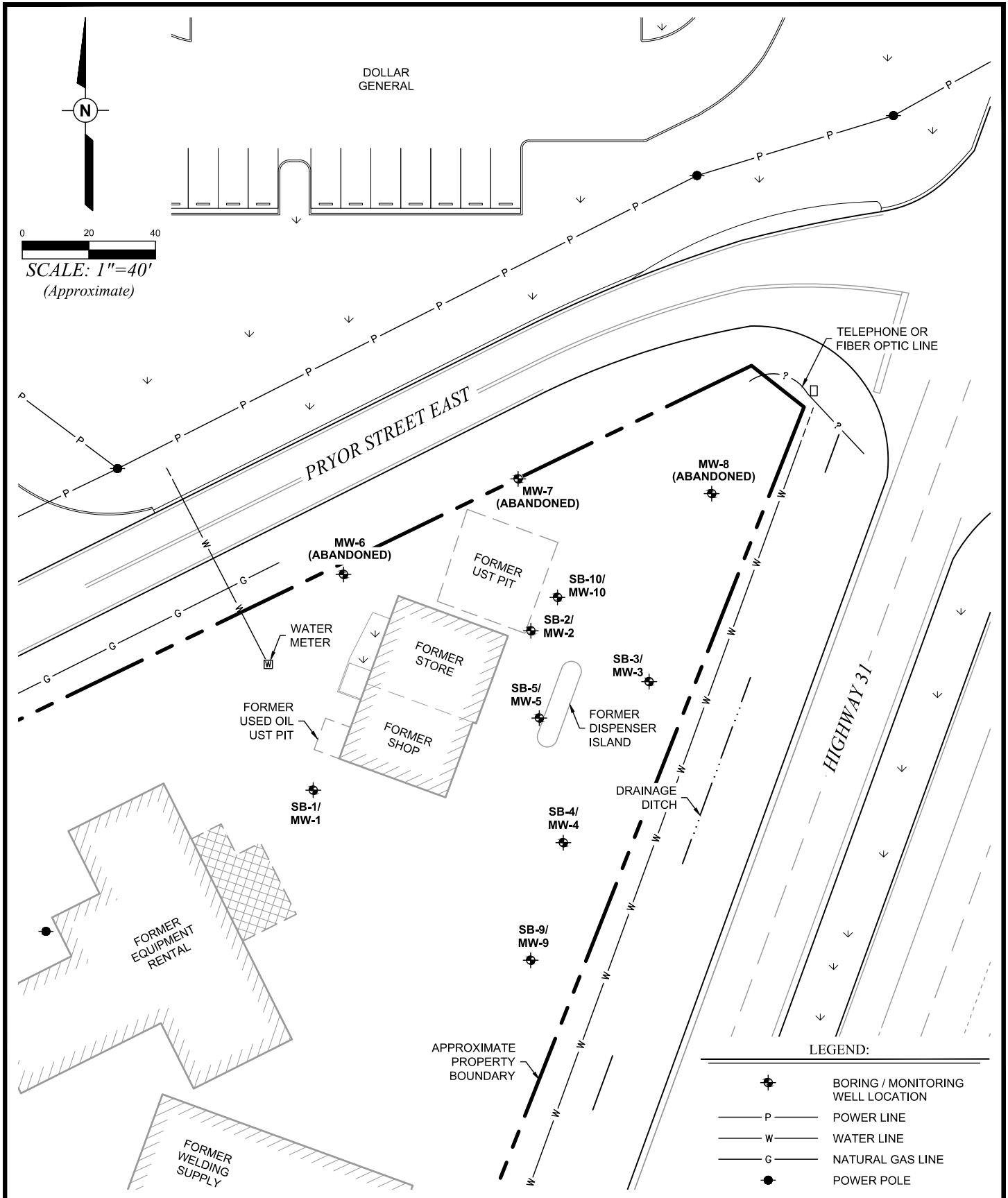
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|  <b>PPM CONSULTANTS, INC.</b><br><a href="http://www.ppmco.com">www.ppmco.com</a> |                                |
| DRAWN BY:<br><b>BWH</b>  | DRAWN DATE:<br><b>05/06/19</b> |
| PROJECT NUMBER:<br><b>420001</b>   | PHASE:<br><b>CAPD</b>          |


**HICKS OIL COMPANY, INC.**  
**FORMER BILL'S 31 AMOCO**  
 1216 PRYOR STREET EAST  
 ATHENS, ALABAMA

**SITE LOCATION MAP**

FIGURE NUMBER

**1**



|   |                                |
|---|--------------------------------|
|  <b>PPM CONSULTANTS, INC.</b><br>www.ppmco.com |                                |
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**HICKS OIL COMPANY, INC.**  
**FORMER BILL'S 31 AMOCO**  
 1216 PRYOR STREET EAST  
 ATHENS, ALABAMA

**SITE MAP**

FIGURE NUMBER  
**2**



LEGEND:

-  GRAVELLY CLAY, CHERT GRAVEL
-  CLAYEY GRAVEL OR GRAVELLY CLAY, CHERT GRAVEL, AND COBBLES
-  CONCRETE
-  TOP SOIL

TOC=685.00 TOP OF CASING (ft.)

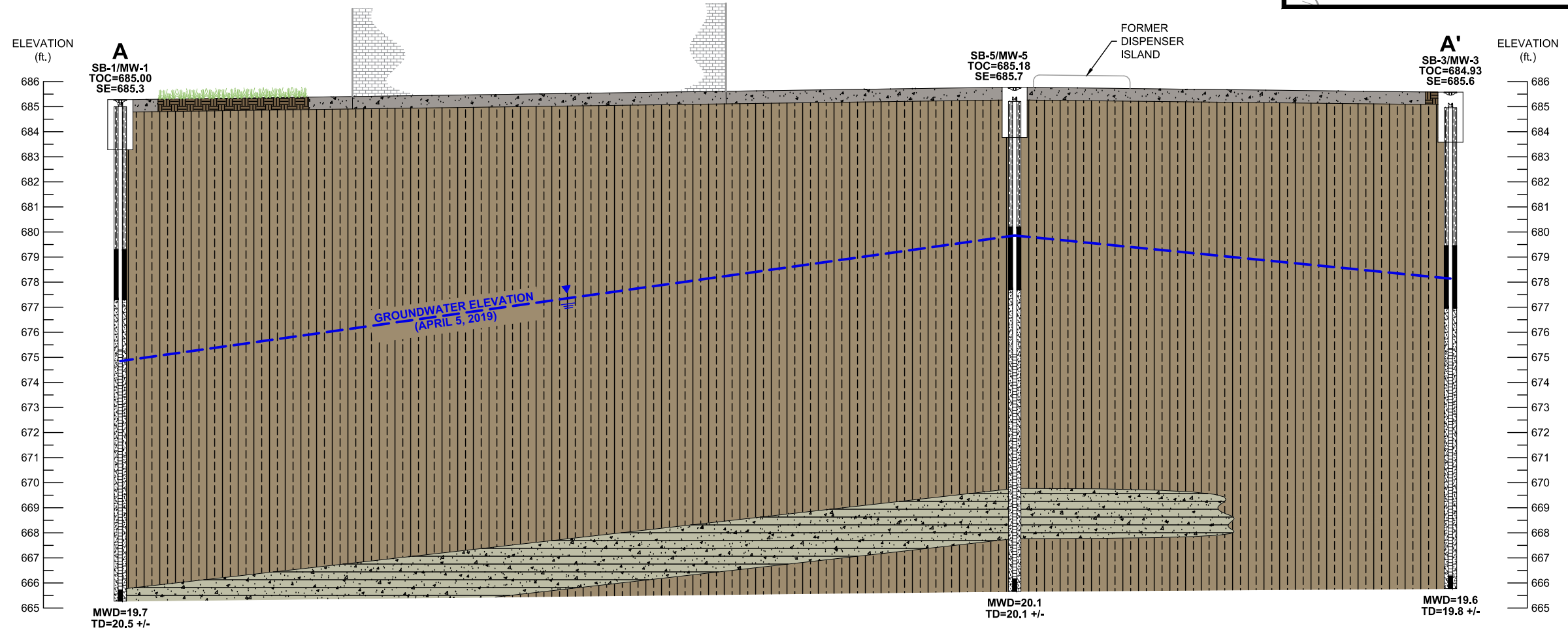
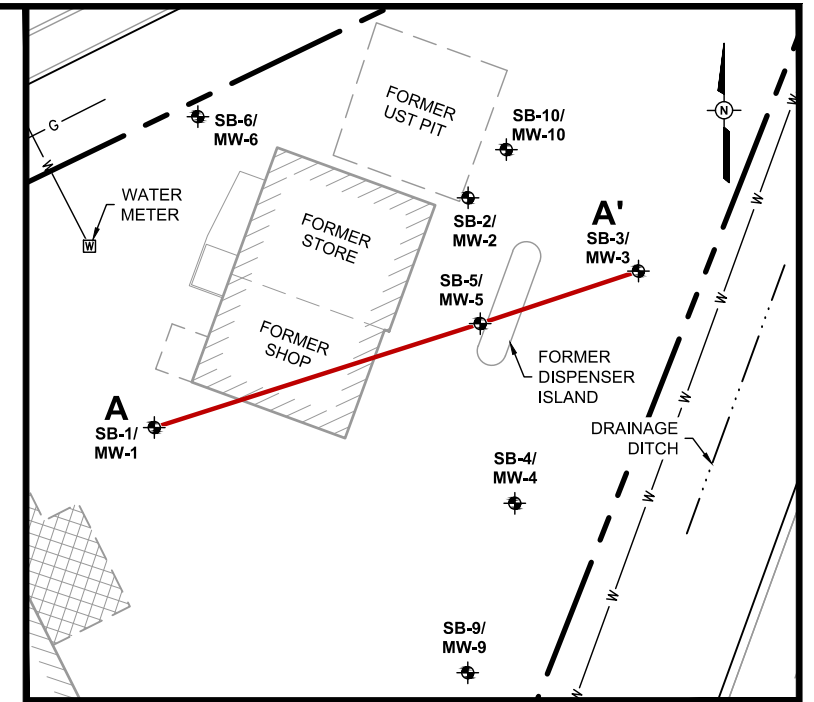
SE=685.3 SURFACE ELEVATION (ft.)

TD=20.5 +/- TOTAL DEPTH OF BORING (ft.)

MWD=19.7 MEASURED WELL DEPTH (ft.)

 SCREENED INTERVAL W/SUMP

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



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| PROJECT NUMBER:<br><b>420001</b> | PHASE:<br><b>CAPD</b>          |

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1216 PRYOR STREET EAST  
ATHENS, ALABAMA

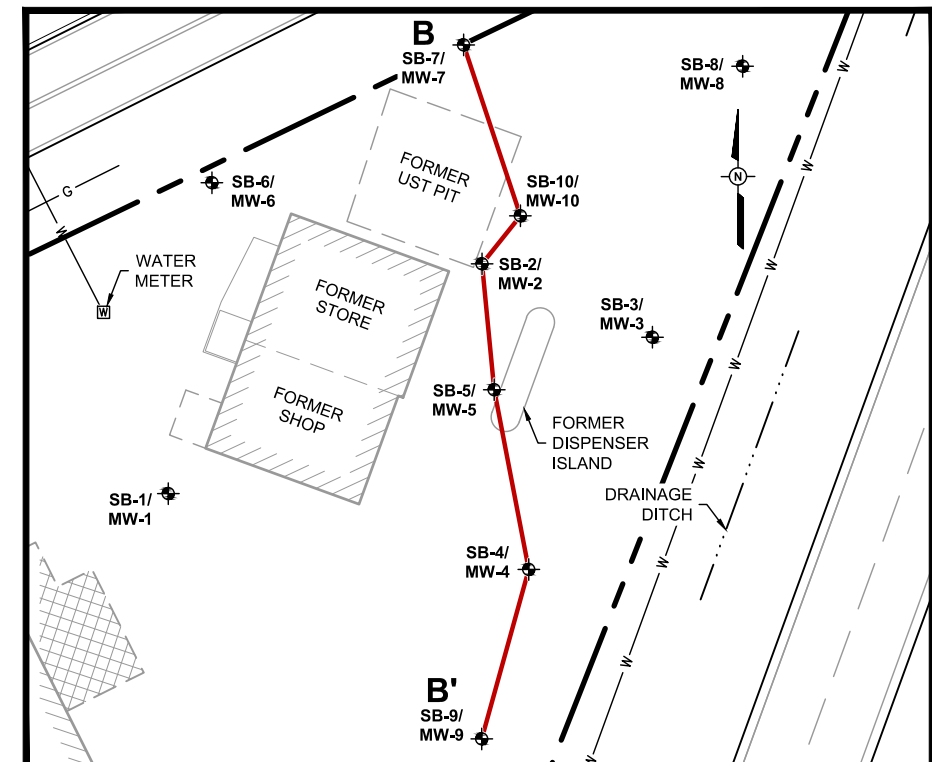
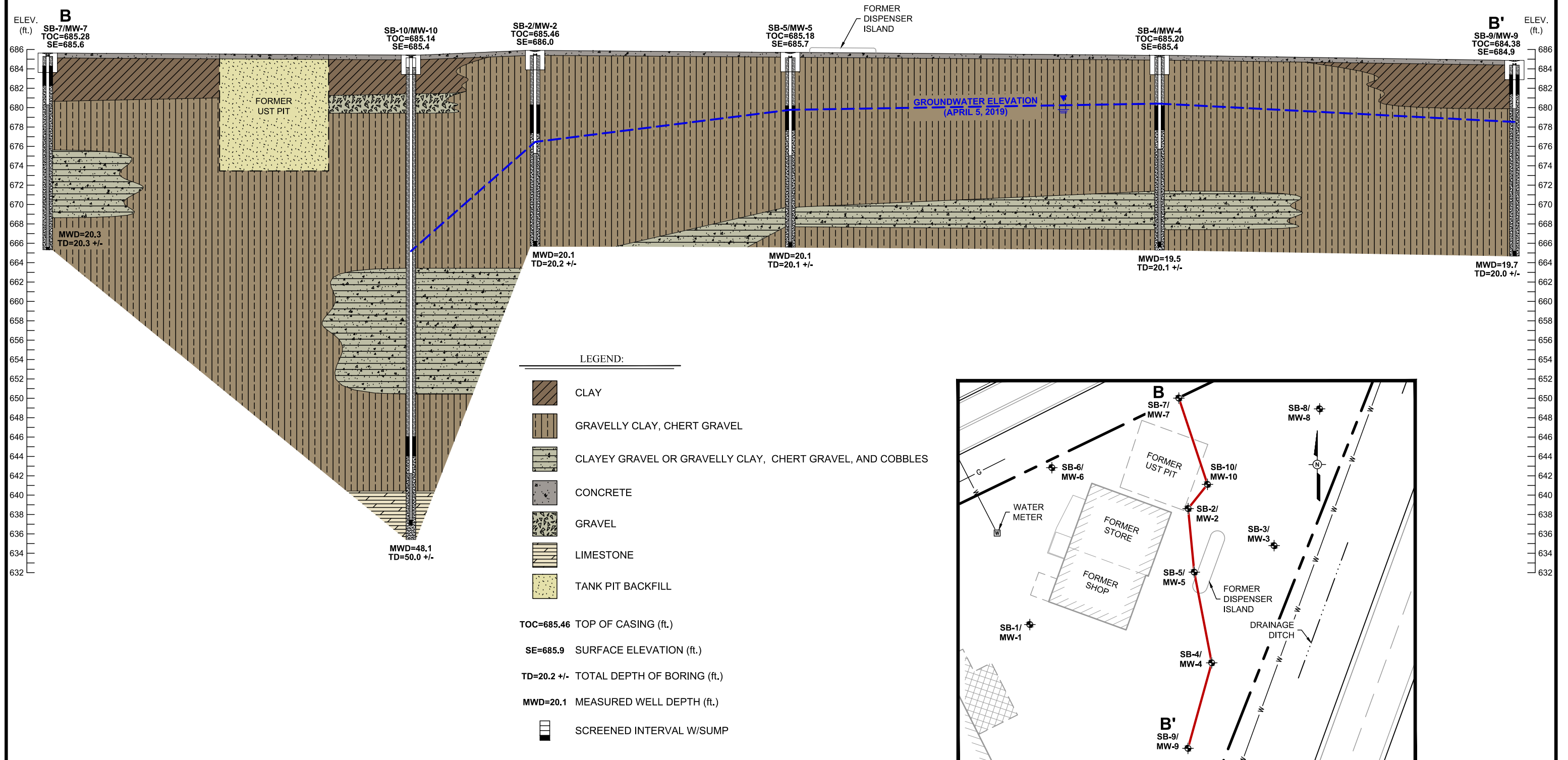
CROSS-SECTION  
A-A'

FIGURE  
NUMBER

**3**



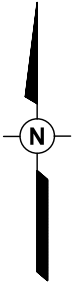
HORIZ. SCALE: 1"=10'  
 VERT. SCALE: 1"=10'



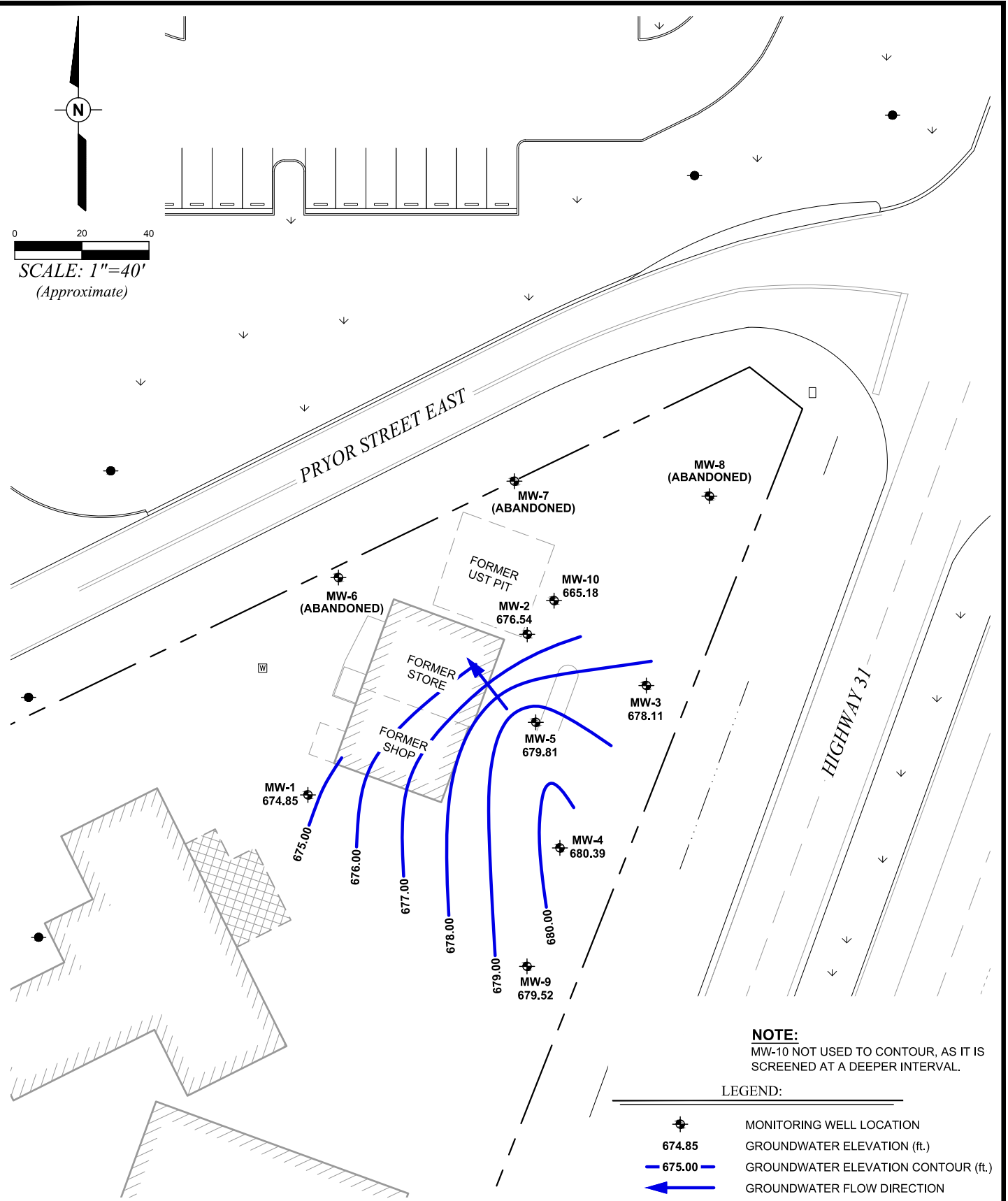
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CROSS-SECTION  
 B-B'



0 20 40  
 SCALE: 1"=40'  
 (Approximate)

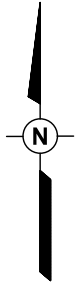


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 FORMER BILL'S 31 AMOCO  
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 ATHENS, ALABAMA

GROUNDWATER  
 ELEVATION MAP  
 (APRIL 5, 2019)

FIGURE  
 NUMBER  
**5**



0 20 40  
 SCALE: 1"=40'  
 (Approximate)

| SB-7/MW-7             | 08/13/18 |        |
|-----------------------|----------|--------|
|                       | 10'      | 15'    |
| BENZENE (mg/kg)       | 0.011    | 0.190  |
| TOLUENE (mg/kg)       | 0.010    | 0.051  |
| ETHYLBENZENE (mg/kg)  | 2.200    | 3.170  |
| TOTAL XYLENES (mg/kg) | 3.310    | 8.240  |
| TOTAL BTEX (mg/kg)    | 5.531    | 11.651 |
| MTBE (mg/kg)          | <0.010   | 0.014  |
| NAPHTHALENE (mg/kg)   | 1.930    | 2.230  |

| SB-8/MW-8             | 08/13/18 |        |
|-----------------------|----------|--------|
|                       | 5'       | 15'    |
| 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)   | <0.025   | <0.025 |

| SB-6/MW-6             | 08/13/18 |        |
|-----------------------|----------|--------|
|                       | 10'      | 15'    |
| 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)   | <0.025   | <0.025 |

| SB-3/MW-3             | 02/22/18 |        |
|-----------------------|----------|--------|
|                       | 10'      | 15'    |
| 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)   | <0.025   | <0.025 |

| SB-2/MW-2             | 02/22/18 |        |
|-----------------------|----------|--------|
|                       | 10'      | 15'    |
| BENZENE (mg/kg)       | <0.005   | 0.519  |
| TOLUENE (mg/kg)       | <0.005   | 0.214  |
| ETHYLBENZENE (mg/kg)  | 0.016    | 17.000 |
| TOTAL XYLENES (mg/kg) | <0.015   | 40.700 |
| TOTAL BTEX (mg/kg)    | 0.016    | 58.433 |
| MTBE (mg/kg)          | <0.005   | <0.100 |
| NAPHTHALENE (mg/kg)   | <0.025   | 10.600 |

| SB-1/MW-1             | 02/22/18 |        |
|-----------------------|----------|--------|
|                       | 5'       | 15'    |
| 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)   | <0.025   | <0.025 |

| SB-9/MW-9             | 08/13/18 |        |
|-----------------------|----------|--------|
|                       | 10'      | 15'    |
| 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)   | <0.025   | <0.025 |

| SB-5/MW-5             | 02/22/18 |        |
|-----------------------|----------|--------|
|                       | 10'      | 15'    |
| BENZENE (mg/kg)       | <0.005   | 0.042  |
| TOLUENE (mg/kg)       | <0.005   | 0.020  |
| ETHYLBENZENE (mg/kg)  | 0.975    | 7.490  |
| TOTAL XYLENES (mg/kg) | 0.221    | 4.640  |
| TOTAL BTEX (mg/kg)    | 1.196    | 12.192 |
| MTBE (mg/kg)          | <0.005   | <0.100 |
| NAPHTHALENE (mg/kg)   | 2.550    | 6.090  |

| SB-4/MW-4             | 02/22/18 |        |
|-----------------------|----------|--------|
|                       | 5'       | 15'    |
| 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)   | <0.025   | <0.025 |

FORMER UST PIT

FORMER STORE

FORMER SHOP

SB-10/  
MW-10

LEGEND:

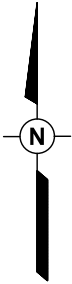
- BORING / MONITORING WELL LOCATION
- 0.519 RED VALUE EXCEEDS SSCAL
- BDL BELOW DETECTION LIMIT

|  |                         |
|--|-------------------------|
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| DRAWN BY:<br>BWH                       | DRAWN DATE:<br>05/06/19 |
| PROJECT NUMBER:<br>420001              | PHASE:<br>CAPD          |

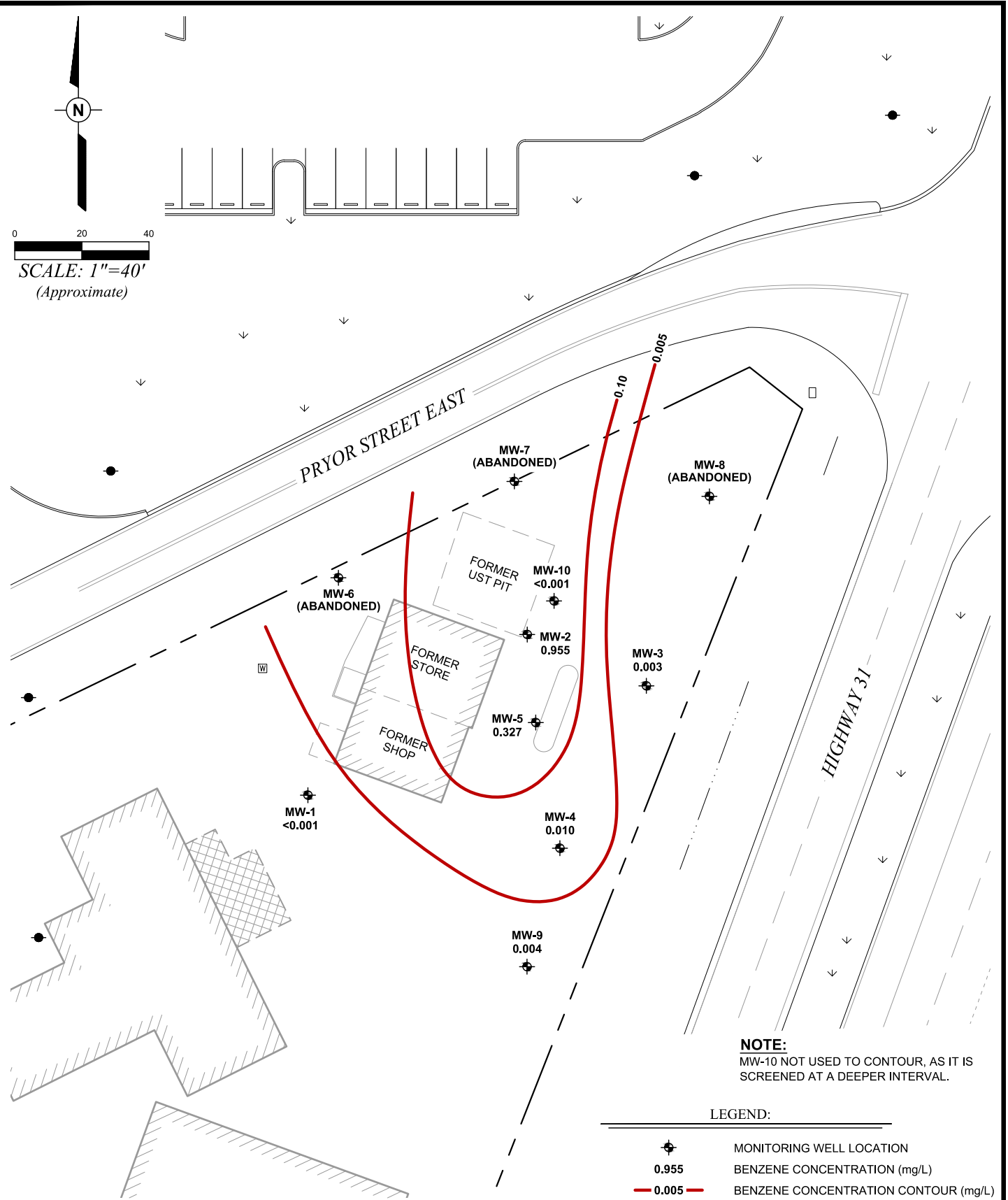
HICKS OIL COMPANY, INC.  
 FORMER BILL'S 31 AMOCO  
 1216 PRYOR STREET EAST  
 ATHENS, ALABAMA

COC  
 CONCENTRATIONS IN  
 SOIL

FIGURE  
 NUMBER  
 6





0 20 40  
 SCALE: 1"=40'  
 (Approximate)



**NOTE:**  
 MW-10 NOT USED TO CONTOUR, AS IT IS SCREENED AT A DEEPER INTERVAL.

LEGEND:

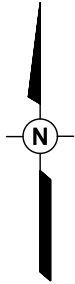
-  MONITORING WELL LOCATION
- 0.955 BENZENE CONCENTRATION (mg/L)
-  0.005 BENZENE CONCENTRATION CONTOUR (mg/L)

|   |                         |
|---|-------------------------|
| <b>PPM</b> PPM CONSULTANTS, INC.<br>www.ppmco.com |                         |
| DRAWN BY:<br>BWH                                  | DRAWN DATE:<br>05/06/19 |
| PROJECT NUMBER:<br>420001                         | PHASE:<br>CAPD          |

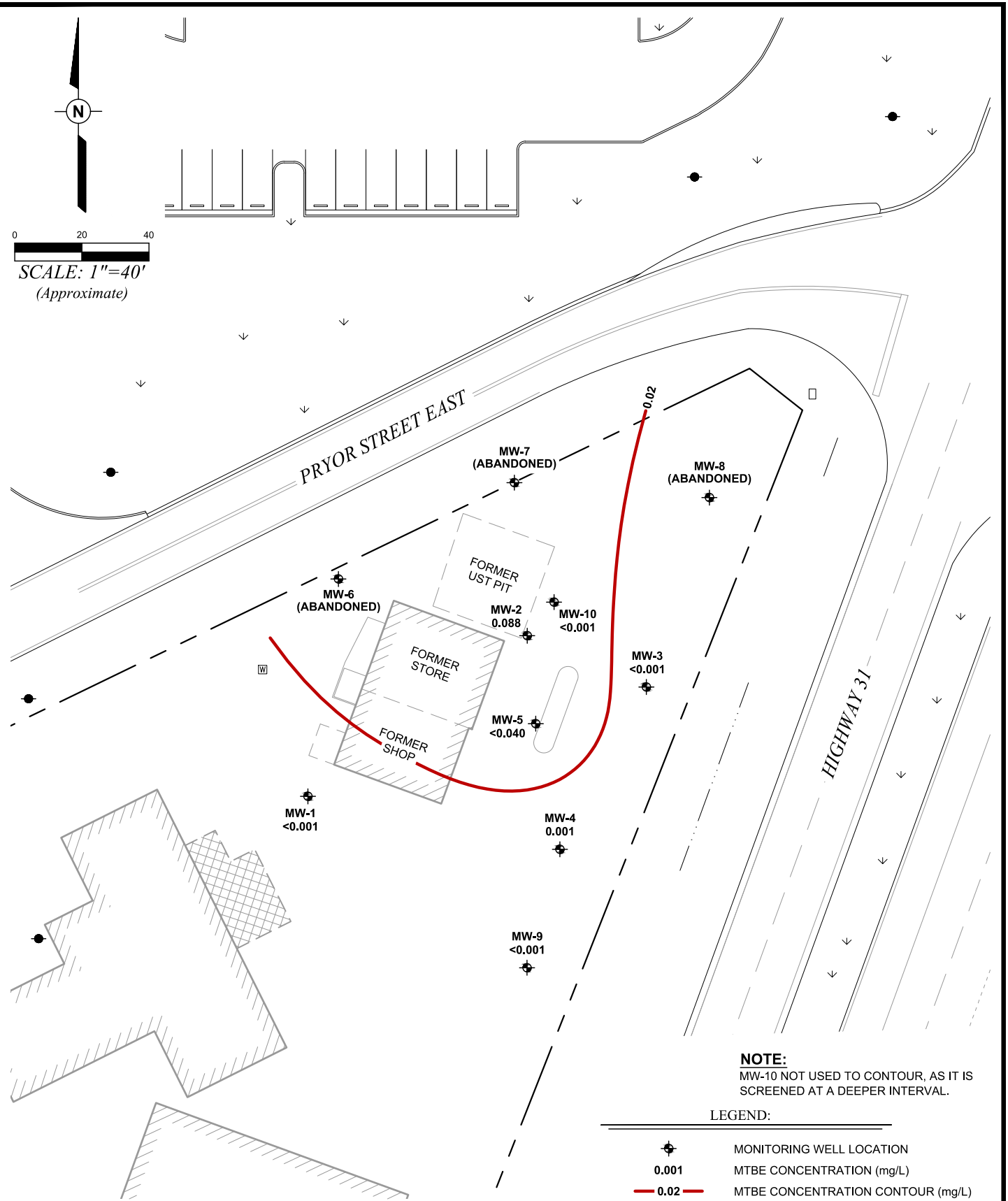
HICKS OIL COMPANY, INC.  
 FORMER BILL'S 31 AMOCO  
 1216 PRYOR STREET EAST  
 ATHENS, ALABAMA

DISSOLVED BENZENE  
 ISOCONCENTRATION  
 MAP  
 (APRIL 5, 2019)

FIGURE  
 NUMBER  
 7





0 20 40  
**SCALE: 1"=40'**  
 (Approximate)



**NOTE:**  
 MW-10 NOT USED TO CONTOUR, AS IT IS SCREENED AT A DEEPER INTERVAL.

**LEGEND:**

-  MONITORING WELL LOCATION
- 0.001** MTBE CONCENTRATION (mg/L)
-  **0.02** MTBE CONCENTRATION CONTOUR (mg/L)

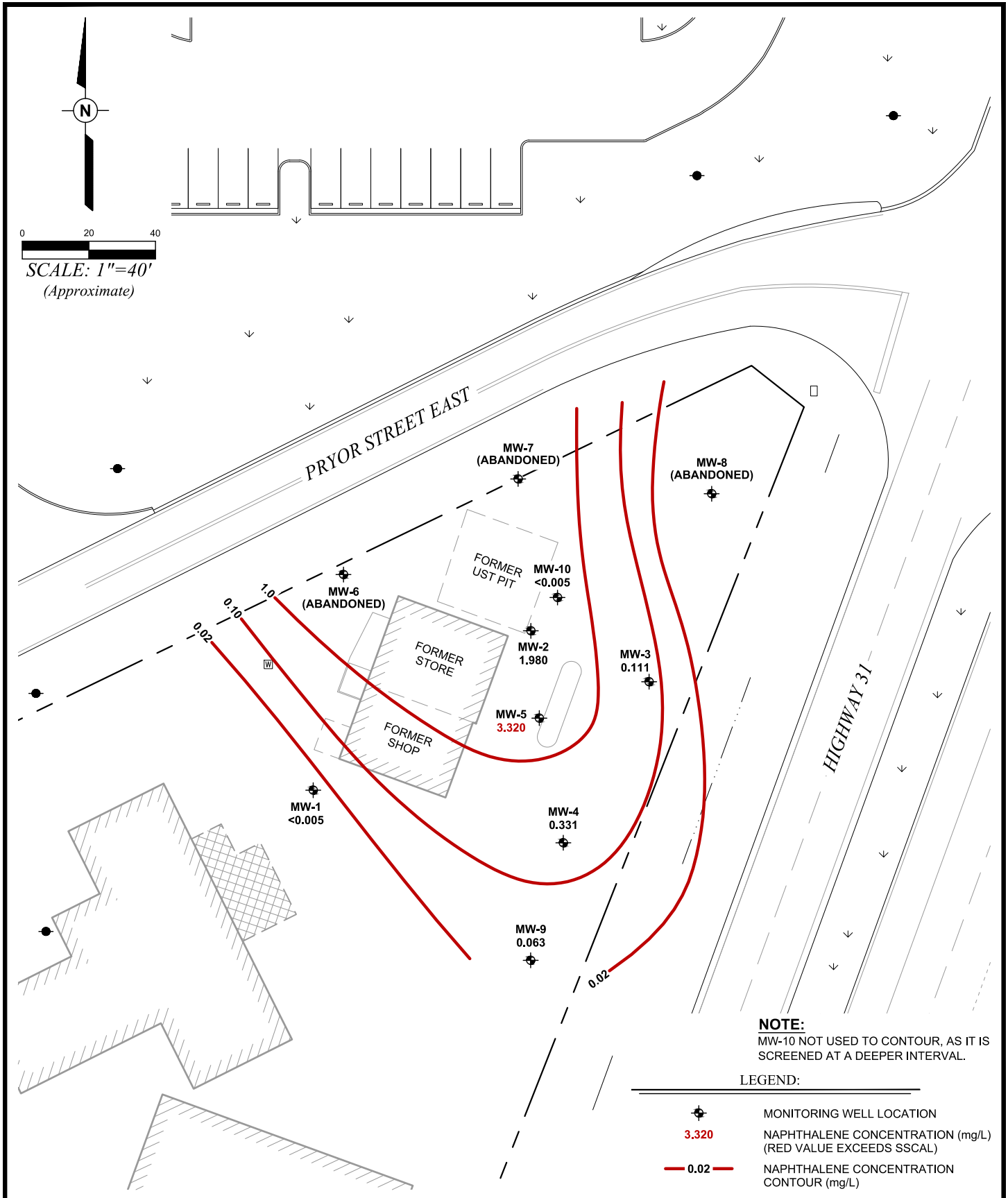
|   |                                |
|---|--------------------------------|
| <b>PPM</b> PPM CONSULTANTS, INC.<br>www.ppmco.com |                                |
| DRAWN BY:<br><b>BWH</b>                           | DRAWN DATE:<br><b>05/06/19</b> |
| PROJECT NUMBER:<br><b>420001</b>                  | PHASE:<br><b>CAPD</b>          |

**HICKS OIL COMPANY, INC.**  
**FORMER BILL'S 31 AMOCO**  
 1216 PRYOR STREET EAST  
 ATHENS, ALABAMA

**DISSOLVED MTBE  
 ISOCONCENTRATION  
 MAP  
 (APRIL 5, 2019)**

FIGURE  
 NUMBER

**8**



|   |                         |
|---|-------------------------|
| <b>PPM</b> PPM CONSULTANTS, INC.<br>www.ppmco.com |                         |
| DRAWN BY:<br>BWH                                  | DRAWN DATE:<br>05/06/19 |
| PROJECT NUMBER:<br>420001                         | PHASE:<br>CAPD          |

**HICKS OIL COMPANY, INC.**  
**FORMER BILL'S 31 AMOCO**  
 1216 PRYOR STREET EAST  
 ATHENS, ALABAMA

**DISSOLVED  
 NAPHTHALENE  
 ISOCONCENTRATION  
 MAP  
 (APRIL 5, 2019)**

FIGURE  
 NUMBER  
**9**

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

## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-PI  
 Project Type: Preliminary Investigation

### Boring Information:

Date / Time: 2-22-18 / 0830  
 Logged By: GO  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 20.5 ft BGS  
 Initial Saturation (ft)/Date: 15 ft BGS (2-22-18)  
 Static GW level (ft)/Date: 3.23 ft (2-26-18) BTOC  
 Surface Elevation (ft): 685.28 ft  
 Sampling Interval: Continuous (10 ft)

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 2-22-18  
 Total Well Depth: 19.7 ft BTOC  
 Screened Interval: 9.6 ft - 19.2 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 11 gal

| Depth in Feet                     | Surf. Elev. 685.28 | Water Level | USCS | GRAPHIC | Water Levels   |                      | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet | Well Schematic: MW-1                           |
|-----------------------------------|--------------------|-------------|------|---------|--|----------------------|--------|------------|--------------------------------|------------------|---------------|--|
|                                   |                    |             |      |         | ▼ Static GW level  | ▽ Initial Saturation |        |            |                                |                  |               |  |
| DESCRIPTION                       |                    |             |      |         |  |                      |        |            |                                |                  |               |  |
| 0                                 | 685                |             |      |         | GRAVELLY CLAY, high plasticity, firm, homogenous, moist, red, no odor, chert gravel is medium, angular, white/tan                              |                      |        |            |                                |                  | 0             | Manhole Cover<br>TOC Elev. 685.00              |
| 5                                 | 680                |             |      |         | GRAVELLY CLAY, moderate plasticity, soft, moist, black, brown, tan, mottled, no odor, gravel is medium to coarse, angular to subangular, black | 1                    | N/A    | 45*        | 100%                           |                  | 5             | Bentonite/Grout                                |
|                                   |                    |             |      |         | GRAVELLY CLAY, moderate plasticity, firm, moist, tan, black, mottled, no odor, gravel is medium to coarse, angular to subangular               |                      |        |            |                                |                  |               | 2" I.D. PVC Riser                              |
|                                   |                    |             |      |         | GRAVELLY CLAY, no plasticity, hard, dry to moist, orange, white, tan, mottled, no odor, gravel is fine to medium, angular to subangular        |                      |        |            |                                |                  |               | Bentonite Seal                                 |
| 10                                | 675                |             | CL   |         | GRAVELLY CLAY, moderate plasticity, firm, moist, white, orange, tan, mottled, no odor, gravel is medium to coarse, angular to subangular       | 2                    | N/A    | 0          | 100%                           |                  | 10            | Flush Threaded Joint<br>Top Screen Elev. 675.4 |
|                                   |                    |             |      |         | GRAVELLY CLAY, high plasticity, firm, wet, gray, brown, dark tan, mottled, no odor, gravel is coarse, angular to subangular                    |                      |        |            |                                |                  |               | 20/40 Well Rounded Silica Sand                 |
| 15                                | 670                |             |      |         | GRAVELLY CLAY, high plasticity, firm, wet, gray, brown, dark tan, mottled, no odor, gravel is coarse, angular to subangular                    | 3                    | N/A    | 170*       | 100%                           |                  | 15            | 2" I.D. Slotted PVC Screen                     |
|                                   |                    |             |      |         | GRAVELLY CLAY, high plasticity, firm, wet, gray, brown, dark tan, mottled, no odor, gravel is coarse, angular to subangular                    |                      |        |            |                                |                  |               | Bottom Screen Elev. 665.8                      |
| 20                                | 665                |             | GC   |         | CLAYEY GRAVEL, coarse, some medium cobbles, loose, angular to subangular, white, orange, tan, moist, no odor                                   | 4                    | N/A    | 470        | 100%                           |                  | 20            | Threaded Bottom Plug                           |
| (Boring terminated @ 20.5 ft BGS) |                    |             |      |         |  |                      |        |            |                                |                  |               |  |
| 25                                |                    |             |      |         |  |                      |        |            |                                |                  | 25            |  |

### NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- \* Sample submitted for laboratory analysis
- Headspace conducted using RKI Eagle 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: SB-2/MW-2

### Client / Site Information:

Client: Hicks Oil Company  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-PI  
 Project Type: Preliminary Investigation

### Boring Information:

Date / Time: 2-22-18 / 09:50  
 Logged By: GO  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 20.2 ft BGS  
 Initial Saturation (ft)/Date: 14.0 ft BGS (2-22-18)  
 Static GW level (ft)/Date: 3.27 ft (2-26-18) BTOC  
 Surface Elevation (ft): 685.98 ft  
 Sampling Interval: Continuous (10 ft)

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 2-22-18  
 Total Well Depth: 20.1 ft BTOC  
 Screened Interval: 10.0 ft - 19.6 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 18 gal

| Depth in Feet                     | Surf. Elev. 685.98 | Water Level | USCS | GRAPHIC | Water Levels  |                      | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet | Well Schematic: MW-2   |
|-----------------------------------|--------------------|-------------|------|---------|---|----------------------|--------|------------|--------------------------------|------------------|---------------|--|
|                                   |                    |             |      |         | ▼ Static GW level   | ▽ Initial Saturation |        |            |                                |                  |               |  |
| DESCRIPTION                       |                    |             |      |         |   |                      |        |            |                                |                  |               |  |
| 0                                 | 685                |             |      |         | CLAY, high plasticity, firm, homogeneous, moist, red, no odor,  |                      |        |            |                                |                  | 0             | Manhole Cover<br>TOC Elev. 685.46                            |
| 5                                 | 680                |             |      |         | GRAVELLY CLAY, moderate plasticity, firm, moist, red, tan, mottled, no odor, gravel is fine to medium, angular to subangular<br>GRAVELLY CLAY, moderate plasticity, firm, moist, brown, gray, tan, mottled, strong petroleum-like odor, gravel is medium to coarse, angular to subangular, staining | 1                    | N/A    | 360*       | 100%                           |                  | 5             | Bentonite/Grout<br>2" I.D. PVC Riser<br>Bentonite Seal       |
| 10                                | 675                |             | CL   |         | GRAVELLY CLAY, moderate plasticity, soft, moist to wet, brown, tan, mottled, moderate petroleum-like odor, gravel is medium to coarse, angular to subangular  | 2                    | N/A    | 920*       | 100%                           |                  | 10            | Flush Threaded Joint<br>Top Screen Elev. 675.5               |
| 15                                | 670                |             |      |         | GRAVELLY CLAY, high plasticity, firm, wet, brown, black, tan, mottled, moderate to strong petroleum-like odor, gravel is coarse, angular to subangular, staining  | 3                    | N/A    | >11,000*   | 100%                           |                  | 15            | 20/40 Well Rounded Silica Sand<br>2" I.D. Slotted PVC Screen |
| 20                                | 665                |             |      |         | GRAVELLY CLAY, moderate plasticity, soft, saturated, black, gray, tan, mottled, strong petroleum-like odor, gravel is coarse, angular to subangular, sheen of product 18'-19'   | 4                    | N/A    | >11,000    | 100%                           |                  | 20            | Bottom Screen Elev. 665.8<br>Threaded Bottom Plug            |
| (Boring terminated @ 20.2 ft BGS) |                    |             |      |         |   |                      |        |            |                                |                  |               |  |
| 25                                |                    |             |      |         |   |                      |        |            |                                |                  | 25            |  |

**NOTES:**

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

## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-PI  
 Project Type: Preliminary Investigation

### Boring Information:

Date / Time: 2-22-18 / 10:45  
 Logged By: GO  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 19.8 ft BGS  
 Initial Saturation (ft)/Date: 19.5 ft BGS (2-22-18)  
 Static GW level (ft)/Date: 2.75 ft (2-26-18) BTOC  
 Surface Elevation (ft): 685.55 ft  
 Sampling Interval: Continuous (10 ft)

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 2-22-18  
 Total Well Depth: 19.6 ft BTOC  
 Screened Interval: 9.5 ft - 19.1 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 15 gal

| Depth in Feet | Surf. Elev. 685.55 | Water Level | USCS | GRAPHIC | Water Levels  |                      | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet | Well Schematic: MW-3                              |
|---------------|--------------------|-------------|------|---------|---|----------------------|--------|------------|--------------------------------|------------------|---------------|---|
|               |                    |             |      |         | ▼ Static GW level   | ▽ Initial Saturation |        |            |                                |                  |               |   |
| DESCRIPTION   |                    |             |      |         |   |                      |        |            |                                |                  |               |   |
| 0             | 685                |             |      |         | GRAVELLY CLAY, high plasticity, firm, homogeneous, moist, red, no odor, gravel is fine to medium, angular to subangular   |                      |        |            |                                |                  | 0             | Manhole Cover<br>TOC Elev. 684.93                 |
| 5             | 680                |             |      |         | GRAVELLY CLAY, no plasticity, firm, dry, orange, red, tan, mottled, no odor, gravel is fine to medium to coarse, angular to subangular                              |                      | 1      | N/A        | 45                             | 100%             | 5             | Bentonite/Grout                                   |
|               |                    |             |      |         | GRAVELLY CLAY, low plasticity, firm, moist, red, gray, tan, mottled, no odor, gravel is medium to coarse, angular to subangular                                     |                      |        |            |                                |                  |               | 2" I.D. PVC Riser                                 |
|               |                    |             |      |         | GRAVELLY CLAY, moderate plasticity, firm, moist, red, gray/white, tan, mottled, no odor, gravel is medium to coarse, angular to subangular                          |                      | 2      | N/A        | 330*                           | 100%             | 10            | Bentonite Seal                                    |
|               |                    |             | CL   |         | GRAVELLY CLAY, moderate plasticity, firm, moist, brown, white, tan, mottled, no odor, gravel is medium to coarse, angular to subangular                             |                      |        |            |                                |                  |               | Flush Threaded Joint<br>Top Screen Elev. 675.5    |
|               |                    |             |      |         | GRAVELLY CLAY, moderate plasticity, firm, moist, brown, white, tan, mottled, no odor, gravel is medium to coarse, angular to subangular                             |                      | 3      | N/A        | 95*                            | 100%             | 15            | 20/40 Well Rounded Silica Sand                    |
|               |                    |             |      |         | GRAVELLY CLAY, high plasticity, firm, moist to saturated, black, brown, tan, mottled, no odor, gravel is medium to coarse, angular to subangular, possible staining |                      |        |            |                                |                  |               | 2" I.D. Slotted PVC Screen                        |
| 20            | 665                |             |      |         | (Boring terminated @ 19.8 ft BGS)   |                      | 4      | N/A        | 120                            | 100%             | 20            | Bottom Screen Elev. 665.8<br>Threaded Bottom Plug |
| 25            |                    |             |      |         |   |                      |        |            |                                |                  | 25            |   |

### NOTES:

- Hand cleared to 4.0' BGS prior to drilling
- \* Sample submitted for laboratory analysis
- Headspace conducted using RKI Eagle 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: SB-4/MW-4

## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-PI  
 Project Type: Preliminary Investigation

### Boring Information:

Date / Time: 2-22-18 / 12:30  
 Logged By: GO  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 20.1 ft BGS  
 Initial Saturation (ft)/Date: 14.0 ft BGS (2-22-18)  
 Static GW level (ft)/Date: 3.29 ft (2-26-18) BTOC  
 Surface Elevation (ft): 685.38 ft  
 Sampling Interval: Continuous (10 ft)

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 2-22-18  
 Total Well Depth: 19.5 ft BTOC  
 Screened Interval: 9.4 ft - 19.0 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 50 gal

| Depth in Feet | Surf. Elev. 685.38 | Water Level | USCS | GRAPHIC | Water Levels  |                      | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet | Well Schematic: MW-4                              |
|---------------|--------------------|-------------|------|---------|---|----------------------|--------|------------|--------------------------------|------------------|---------------|---|
|               |                    |             |      |         | ▼ Static GW level   | ▽ Initial Saturation |        |            |                                |                  |               |   |
| DESCRIPTION   |                    |             |      |         |   |                      |        |            |                                |                  |               |   |
| 0             | 685                |             |      |         | GRAVELLY CLAY, high plasticity, firm, homogeneous, moist, red, no odor, gravel is fine to medium, angular to subangular                                     |                      |        |            |                                |                  | 0             | Manhole Cover<br>TOC Elev. 685.20                 |
| 5             | 680                |             |      |         | GRAVELLY CLAY, no to low plasticity, firm, moist, black, brown, tan, mottled, no odor, gravel is fine to medium to coarse, angular to subangular            | 1                    | N/A    | 170*       | 100%                           |                  | 5             | Bentonite/Grout                                   |
|               |                    |             |      |         | GRAVELLY CLAY, low plasticity, firm, moist, gray, brown, tan, mottled, slight petroleum-like odor, gravel is medium to coarse, angular to subangular        |                      |        |            |                                |                  |               | 2" I.D. PVC Riser                                 |
|               |                    |             |      |         | GRAVELLY CLAY, moderate plasticity, firm, moist, white/gray, tan, mottled, no odor, gravel is coarse, angular to subangular, some chert cobbles             | 2                    | N/A    | 5          | 100%                           |                  | 10            | Bentonite Seal                                    |
|               |                    |             | CL   |         | GRAVELLY CLAY, high plasticity, firm, homogeneous, wet, tan, brown, slight petroleum-like odor, gravel is coarse, angular to subangular, some chert cobbles | 3                    | N/A    | 440*       | 100%                           |                  | 15            | Flush Threaded Joint<br>Top Screen Elev. 675.8    |
|               |                    |             |      |         | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, saturated, tan, brown, slight petroleum-like odor, gravel is coarse, angular to subangular           | 4                    | N/A    | 350        | 100%                           |                  | 20            | 20/40 Well Rounded Silica Sand                    |
|               |                    |             |      |         | (Boring terminated @ 20.1 ft BGS)   |                      |        |            |                                |                  | 20            | 2" I.D. Slotted PVC Screen                        |
|               |                    |             |      |         |   |                      |        |            |                                |                  | 25            | Bottom Screen Elev. 666.2<br>Threaded Bottom Plug |

#### NOTES:

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

## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-PI  
 Project Type: Preliminary Investigation

### Boring Information:

Date / Time: 2-22-18 / 13:50  
 Logged By: GO  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 20.1 ft BGS  
 Initial Saturation (ft)/Date: 15 ft BGS (2-22-18)  
 Static GW level (ft)/Date: 7.90 ft (2-26-18) BTOC  
 Surface Elevation (ft): 685.74 ft  
 Sampling Interval: Continuous (10 ft)

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 2-22-18  
 Total Well Depth: 20.1 ft BTOC  
 Screened Interval: 10.0 ft - 19.6 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 12 gal

| Depth in Feet                     | Surf. Elev. 685.74 | Water Level | USCS | GRAPHIC | Water Levels   |                      | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet | Well Schematic: MW-5   |
|-----------------------------------|--------------------|-------------|------|---------|--|----------------------|--------|------------|--------------------------------|------------------|---------------|--|
|                                   |                    |             |      |         | ▼ Static GW level  | ▽ Initial Saturation |        |            |                                |                  |               |  |
| DESCRIPTION                       |                    |             |      |         |  |                      |        |            |                                |                  |               |  |
| 0                                 | 685                |             |      |         | GRAVELLY CLAY, high plasticity, firm, homogeneous, moist, red, mild petroleum-like odor, gravel is fine to medium, angular to subangular   |                      |        |            |                                |                  | 0             | Manhole Cover<br>TOC Elev. 685.18                            |
| 5                                 | 680                |             |      |         | GRAVELLY CLAY, low plasticity, firm, dry to moist, white, black, gray, tan, mottled, moderate petroleum-like odor, gravel is medium to coarse, angular to subangular   |                      | 1      | N/A        | 140                            | 100%             | 5             | Bentonite/Grout<br>2" I.D. PVC Riser<br>Bentonite Seal       |
| 10                                | 675                | ▼           | CL   |         | GRAVELLY CLAY, low plasticity, firm, moist, brown, gray, white, tan, mottled, moderate petroleum-like odor, gravel is coarse, angular to subangular  |                      | 2      | N/A        | 4,350*                         | 100%             | 10            | Flush Threaded Joint<br>Top Screen Elev. 675.2               |
| 15                                | 670                | ▽           |      |         | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, tan, brown, black, moderate petroleum-like odor, gravel is coarse, angular to subangular   |                      | 3      | N/A        | 920*                           | 100%             | 15            | 20/40 Well Rounded Silica Sand<br>2" I.D. Slotted PVC Screen |
| 20                                | 665                |             |      |         | GRAVELLY CLAY, high plasticity, firm, wet, black, brown, mottled, strong petroleum-like odor, gravel is coarse, angular to subangular, some large chert cobbles<br>GRAVELLY CLAY, high plasticity, firm, homogeneous, saturated, tan, brown, strong petroleum-like odor, gravel is coarse, angular to subangular |                      | 4      | N/A        | 570                            | 100%             | 20            | Bottom Screen Elev. 665.6<br>Threaded Bottom Plug            |
| (Boring terminated @ 20.1 ft BGS) |                    |             |      |         |  |                      |        |            |                                |                  |               |  |
| 25                                |                    |             |      |         |  |                      |        |            |                                |                  | 25            |  |

### NOTES:

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

## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company, Inc.  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-SI  
 Project Type: Secondary Investigation

### Boring Information:

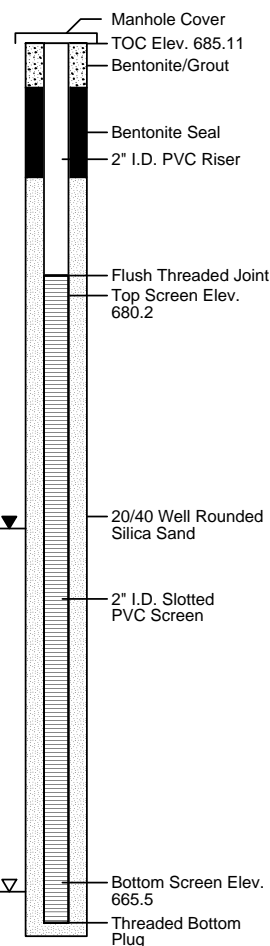
Date / Time: 8-13-18  
 Logged By: AP / CG  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 20.3 ft BGS  
 Initial Saturation (ft)/Date: 19.0 ft BGS  
 Static GW level (ft)/Date: 10.87 ft BTOC  
 Surface Elevation (ft): 685.3 ft  
 Sampling Interval: Continuous

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 8-13-18  
 Total Well Depth: 20.1 ft BTOC  
 Screened Interval: 4.9 ft - 19.7 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 24 gal

| Depth in Feet | Surf. Elev. 685.3 | Water Level | USCS | GRAPHIC | Water Levels      |                      | DESCRIPTION  | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet |
|---------------|-------------------|-------------|------|---------|-------------------|----------------------|--|--------|------------|--------------------------------|------------------|---------------|
|               |                   |             |      |         | ▼ Static GW level | ▽ Initial Saturation |  |        |            |                                |                  |               |
| 0             | 685               |             |      |         |                   |                      | CLAY, high plasticity, soft, homogeneous, moist, red, no odor  | 1      | N/A        | --                             | 100%             | 0             |
|               |                   |             |      |         |                   |                      | Shelby Tube  |        |            |                                |                  |               |
| 5             | 680               |             |      |         |                   |                      | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, reddish brown, no odor, gravel is fine to coarse, angular to subangular                    | 2      | N/A        | --                             | 100%             | 5             |
| 10            | 675               | ▼           | CL   |         |                   |                      | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, reddish brown, strong petroleum-like odor, gravel is fine to coarse, angular to subangular | 3      | N/A        | 15                             | 100%             | 10            |
| 15            | 670               |             |      |         |                   |                      | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, tan to light brown, strong petroleum-like odor   | 4      | N/A        | 360*                           | 100%             | 15            |
|               |                   |             |      |         |                   |                      | Shelby Tube (Failed attempt)   |        |            |                                |                  |               |
| 20            | 665               | ▽           |      |         |                   |                      | GRAVELLY CLAY, moderate plasticity, very soft, homogeneous, saturated, brown to gray, no odor, gravel is fine to coarse, angular to subangular           | 5      | N/A        | 870*                           | 100%             | 20            |
|               |                   |             |      |         |                   |                      | (Boring terminated @ 20.3 ft BGS)  | 6      | N/A        | 150                            | 100%             | 20            |
| 25            |                   |             |      |         |                   |                      |  |        |            |                                |                  | 25            |

Well Schematic: MW-6



**NOTES:**

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

## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company, Inc.  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-SI  
 Project Type: Secondary Investigation

### Boring Information:

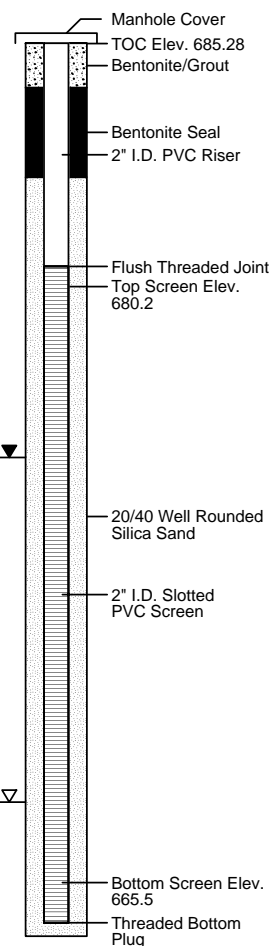
Date / Time: 8-13-18 / 13:45  
 Logged By: AP / CG  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 20.6 ft BGS  
 Initial Saturation (ft)/Date: 17.0 ft BGS  
 Static GW level (ft)/Date: 9.28 ft BTOC  
 Surface Elevation (ft): 685.3 ft  
 Sampling Interval: Continuous

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 8-13-18  
 Total Well Depth: 20.3 ft BTOC  
 Screened Interval: 4.9 ft - 19.7 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 8 gal

| Depth in Feet                     | Surf. Elev. 685.3 | Water Level | USCS | GRAPHIC | Water Levels   |                      | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet |
|-----------------------------------|-------------------|-------------|------|---------|--|----------------------|--------|------------|--------------------------------|------------------|---------------|
|                                   |                   |             |      |         | ▼ Static GW level  | ▽ Initial Saturation |        |            |                                |                  |               |
| DESCRIPTION                       |                   |             |      |         |  |                      |        |            |                                |                  |               |
| 0                                 | 685               |             |      |         | CLAY, moderate plasticity, firm, homogeneous, moist, red, no odor  |                      | 1      | N/A        | --                             | 100%             | 0             |
| 5                                 | 680               |             |      |         | GRAVELLY CLAY, moderate plasticity, soft, homogeneous, moist, tan to light brown, strong petroleum-like odor, gravel is fine to coarse, angular to subangular, chert       |                      | 2      | N/A        | 330                            | 100%             | 5             |
| 10                                | 675               | ▼           | CL   |         | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, brown, strong petroleum-like odor, gravel is fine to coarse, angular to subangular with cobbles              |                      | 3      | N/A        | 1,650*                         | 100%             | 10            |
| 15                                | 670               |             |      |         | GRAVELLY CLAY, moderate plasticity, soft, homogeneous, wet to saturated, brown to light brown, strong petroleum-like odor, gravel is fine to coarse, angular to subangular |                      | 4      | N/A        | 1,300*                         | 100%             | 15            |
| 20                                | 665               | ▽           |      |         |  |                      | 5      | N/A        | 130                            | 100%             | 20            |
| (Boring terminated @ 20.6 ft BGS) |                   |             |      |         |  |                      |        |            |                                |                  |               |

Well Schematic: MW-7



### NOTES:

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

## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company, Inc.  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-SI  
 Project Type: Secondary Investigation

### Boring Information:

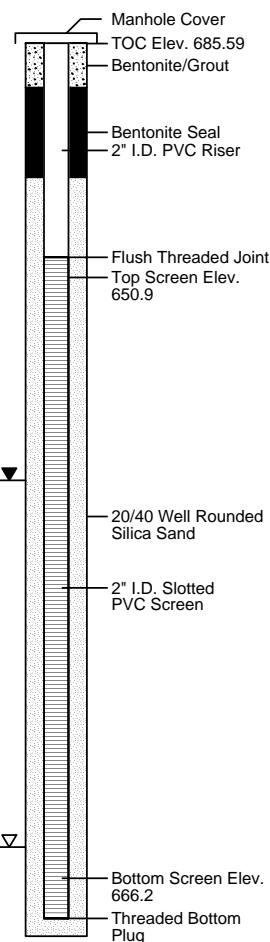
Date / Time: 8-13-18 / 12:30  
 Logged By: AP / CG  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 20.4 ft BGS  
 Initial Saturation (ft)/Date: 18.0 ft BGS  
 Static GW level (ft)/Date: 9.79 ft BTOC  
 Surface Elevation (ft): 685.8 ft  
 Sampling Interval: Continuous

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 8-13-18  
 Total Well Depth: 19.9 ft BTOC  
 Screened Interval: 4.7 ft - 19.4 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 20 gal

| Depth in Feet | Surf. Elev. 685.8 | Water Level | USCS | GRAPHIC | Water Levels      |                      | DESCRIPTION   | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet |
|---------------|-------------------|-------------|------|---------|-------------------|----------------------|---|--------|------------|--------------------------------|------------------|---------------|
|               |                   |             |      |         | ▼ Static GW level | ▽ Initial Saturation |   |        |            |                                |                  |               |
| 0             | 685               |             |      |         |                   |                      | CLAY, moderate plasticity, firm, homogeneous, moist, red to orange, no odor   | 1      | N/A        | --                             | 100%             | 0             |
| 5             | 680               |             |      |         |                   |                      | CLAY, moderate plasticity, firm, homogeneous, moist, red to orange, no odor   | 2      | N/A        | 100*                           | 100%             | 5             |
| 10            | 675               | ▼           | CL   |         |                   |                      | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, tan to light brown, no odor, gravel is fine to coarse, angular to subangular, chert   | 3      | N/A        | 95                             | 100%             | 10            |
| 15            | 670               |             |      |         |                   |                      | GRAVELLY CLAY, moderate plasticity, soft, homogeneous, moist, brown to light brown, no odor, gravel is fine to coarse, angular to subangular, chert | 4      | N/A        | 130*                           | 100%             | 15            |
| 20            | 665               | ▽           |      |         |                   |                      | GRAVELLY CLAY, low plasticity, very soft, homogeneous, saturated, tan to light brown, no odor, gravel is fine to coarse, angular to subangular      | 5      | N/A        | 50                             | 100%             | 20            |
| 20.4          |                   |             |      |         |                   |                      | (Boring terminated @ 20.4 ft BGS)   | 6      | N/A        | 40                             | 100%             | 20            |

Well Schematic: MW-8



### NOTES:

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



## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company, Inc.  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-SI  
 Project Type: Secondary Investigation

### Boring Information:

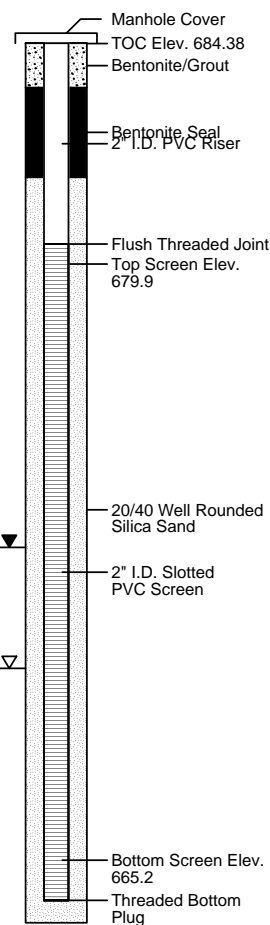
Date / Time: 8-13-18 / 16:20  
 Logged By: AP / CG  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 20.2 ft BGS  
 Initial Saturation (ft)/Date: 14.0 ft BGS  
 Static GW level (ft)/Date: 11.29 ft BTOC  
 Surface Elevation (ft): 684.9 ft  
 Sampling Interval: Continuous

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 8-13-18  
 Total Well Depth: 19.7 ft BTOC  
 Screened Interval: 4.5 ft - 19.2 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 15 gal

| Depth in Feet | Surf. Elev. 684.9 | Water Level | USCS | GRAPHIC | Water Levels   |                      | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet |
|---------------|-------------------|-------------|------|---------|--|----------------------|--------|------------|--------------------------------|------------------|---------------|
|               |                   |             |      |         | ▼ Static GW level  | ▽ Initial Saturation |        |            |                                |                  |               |
| DESCRIPTION   |                   |             |      |         |  |                      |        |            |                                |                  |               |
| 0             | 684               |             |      |         | CLAY, moderate plasticity, hard, homogeneous, moist, red, no odor  |                      | 1      | N/A        | --                             | 100%             | 0             |
| 5             | 679               |             |      |         | CLAY, moderate plasticity, firm, homogeneous, moist, red, brown, no odor<br>GRAVELLY CLAY, moderate plasticity, firm, moist, red, orange, tan, mottled, no odor, gravel is fine to coarse, angular to subangular |                      | 2      | N/A        | 0                              | 100%             | 5             |
| 10            | 674               | ▼           | CL   |         | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, light brown to tan, no odor, gravel is fine to coarse, angular to subangular   |                      | 3      | N/A        | 0                              | 100%             | 10            |
| 15            | 669               | ▽           |      |         | GRAVELLY CLAY, moderate plasticity, soft, homogeneous, wet, brown, no odor, gravel is fine to coarse, angular to subangular  |                      | 4      | N/A        | 20*                            | 100%             | 15            |
| 20            | 664               |             |      |         | GRAVELLY CLAY, low plasticity, very soft, homogeneous, saturated, brown to gray, no odor, gravel is fine to coarse, angular to subangular<br><i>(Boring terminated @ 20.2 ft BGS)</i>                            |                      | 5      | N/A        | 1,000*                         | 100%             | 20            |
| 25            |                   |             |      |         |  |                      | 6      | N/A        | 0                              | 100%             | 25            |

Well Schematic: MW-9



**NOTES:**

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



## CONSULTANTS

### Client / Site Information:

Client: Hicks Oil Company, Inc.  
 Site: Former Bill's 31 Amoco  
 Location: Athens, AL  
 Agency Interest No.: UST18-11-04  
 PPM Project No.: 420001-SI  
 Project Type: Secondary Investigation

### Boring Information:

Date / Time: 8-13-18 / 8:54  
 Logged By: AP / CG  
 Drilling Company / Driller: GSE  
 Drilling Method: Sonic  
 Total Boring Depth: 50.4 ft BGS  
 Initial Saturation (ft)/Date: NA  
 Static GW level (ft)/Date: 10.07 ft BTOC  
 Surface Elevation (ft): 685.4 ft  
 Sampling Interval: Continuous

### Well Information:

Well Type: Type II  
 Well Purpose: Monitoring  
 Well Construction Date: 8-13-18  
 Total Well Depth: 48.1 ft BTOC  
 Screened Interval: 42.9 ft - 47.7 ft BTOC  
 Screen Slot Size: 0.01 in  
 Development Method: Pump  
 Gallons Purged: 24 gal

| Depth in Feet | Surf. Elev. 685.4 | Water Level | USCS | GRAPHIC | DESCRIPTION   | Sample | Blow Count | Headspace Concentration (ppmv) | Percent Recovery | Depth in Feet | Well Schematic: MW-10  |
|---------------|-------------------|-------------|------|---------|---|--------|------------|--------------------------------|------------------|---------------|--|
|               |                   |             |      |         |   |        |            |                                |                  |               |  |
|               |                   |             |      |         | ▼ Static GW level<br>▽ Initial Saturation   |        |            |                                |                  |               |  |
| 0             | 685               |             | CL   |         | CLAY, moderate plasticity, firm, homogeneous, moist, reddish brown, no odor   | 1      | N/A        | --                             | 100%             | 0             | Manhole Cover<br>TOC Elev. 685.14  |
| 5             | 680               |             | CG   |         | GRAVEL, wet, black, mild petroleum-like odor, fine, rounded to sub-rounded, fill material   | 2      | N/A        | --                             | 100%             | 5             |  |
| 10            | 675               | ▼           |      |         | GRAVELLY CLAY, moderate plasticity, soft, wet, tan, gray, red, mottled, mild petroleum-like odor, gravel is fine to coarse, angular to subangular, chert  | 3      | N/A        | --                             | 100%             | 10            |  |
| 15            | 670               |             | CL   |         | GRAVELLY CLAY, moderate plasticity, firm, wet, tan, brown, red, mottled, mild petroleum-like odor, gravel is fine, coarse, angular to subangular, chert   | 4      | N/A        | --                             | 50%              | 15            |  |
| 20            | 665               |             | CL   |         | GRAVELLY CLAY, moderate plasticity, firm, wet, red, brown, tan, mottled, mild petroleum-like odor, gravel is fine to coarse, angular to subangular, chert | 5      | N/A        | --                             | 50%              | 20            | Bentonite/Grout  |
| 25            | 660               |             |      |         | GRAVELLY CLAY, moderate plasticity, hard, homogeneous, wet, black to gray, no odor, gravel is fine to coarse, angular to subangular, chert                | 6      | N/A        | --                             | 25%              | 25            | 2" I.D. PVC Riser  |
| 30            | 655               |             |      |         | GRAVELLY CLAY, low plasticity, soft, homogeneous, saturated, tan to light brown, no odor, gravel is fine to coarse, angular to subangular, cobbles        |        |            |                                |                  | 30            |  |
| 35            | 650               |             |      |         | No Recovery   |        |            |                                |                  | 35            |  |
| 40            | 645               |             | CL   |         | GRAVELLY CLAY, moderate plasticity, firm, homogeneous, moist, brown to red, no odor, gravel is fine to coarse, angular to subangular                      |        |            |                                |                  | 40            | Bentonite Seal   |
| 45            | 640               |             | LS   |         | WEATHERED LIMESTONE, moist, gray, brown, no odor<br>LIMESTONE, glauconitic  | 7      | N/A        | 0                              | 100%             | 45            | 20/40 Well Rounded Silica Sand<br>Flush Threaded Joint<br>Top Screen Elev. 642.2 |
| 50            | 635               |             |      |         | (Boring terminated @ 50.4 ft BGS)   | 8      | N/A        | 0                              | 100%             | 50            | 2" I.D. Slotted PVC Screen<br>Bottom Screen Elev. 637.5<br>Threaded Bottom Plug  |
| 55            |                   |             |      |         |   |        |            |                                |                  | 55            |  |

### NOTES:

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

## **APPENDIX C – TABLES**

**TABLE 1**  
**GROUNDWATER ELEVATION SURVEY DATA**  
**FORMER BILL'S 31 AMOCO**  
**ATHENS, ALABAMA**

| WELL I.D. | DATE      | TOP OF CASING ELEVATION (ft) | GROUND SURFACE ELEVATION (ft) | SCREENED INTERVAL (ft) | WELL DEPTH (ft-BTOC) | DEPTH TO FREE PRODUCT (ft-BTOC) | DEPTH TO WATER (ft-BTOC) | GROUND-WATER ELEVATION (ft) |
|-----------|-----------|------------------------------|-------------------------------|------------------------|----------------------|---------------------------------|--------------------------|-----------------------------|
| MW-1      | 2/26/2018 | 685.00                       | 685.3                         | 675.4-665.8            | 19.7                 | --                              | 3.23                     | 681.77                      |
|           | 8/17/2018 |                              |                               |                        | 19.7                 | --                              | 12.01                    | 672.99                      |
|           | 1/14/2019 |                              |                               |                        | 19.7                 | --                              | 7.00                     | 678.00                      |
|           | 4/5/2019  |                              |                               |                        | 19.7                 | --                              | 10.15                    | 674.85                      |
| MW-2      | 2/26/2018 | 685.46                       | 686.0                         | 675.5-665.8            | 20.1                 | --                              | 3.27                     | 682.19                      |
|           | 8/17/2018 |                              |                               |                        | 20.1                 | --                              | 10.95                    | 674.51                      |
|           | 1/14/2019 |                              |                               |                        | 20.1                 | --                              | 7.05                     | 678.41                      |
|           | 4/5/2019  |                              |                               |                        | 20.1                 | --                              | 8.92                     | 676.54                      |
| MW-3      | 2/26/2018 | 684.93                       | 685.6                         | 675.5-665.8            | 19.6                 | --                              | 2.75                     | 682.18                      |
|           | 8/17/2018 |                              |                               |                        | 19.6                 | --                              | 9.20                     | 675.73                      |
|           | 1/14/2019 |                              |                               |                        | 19.6                 | --                              | 5.03                     | 679.90                      |
|           | 4/5/2019  |                              |                               |                        | 19.6                 | --                              | 5.65                     | 679.28                      |
| MW-4      | 2/26/2018 | 685.20                       | 685.4                         | 675.8-666.2            | 19.5                 | --                              | 3.29                     | 681.91                      |
|           | 8/17/2018 |                              |                               |                        | 20.0                 | --                              | 11.73                    | 673.47                      |
|           | 1/14/2019 |                              |                               |                        | 20.1                 | --                              | 7.32                     | 677.88                      |
|           | 4/5/2019  |                              |                               |                        | 19.8                 | --                              | 9.90                     | 675.30                      |
| MW-5      | 2/26/2018 | 685.18                       | 685.7                         | 675.2-665.6            | 20.1                 | --                              | 3.94                     | 681.24                      |
|           | 8/17/2018 |                              |                               |                        | 19.4                 | --                              | 10.26                    | 674.92                      |
|           | 1/14/2019 |                              |                               |                        | 19.5                 | 7.30                            | 7.31                     | 677.88                      |
|           | 4/5/2019  |                              |                               |                        | 19.5                 | --                              | 8.45                     | 676.73                      |
| MW-6      | 8/17/2018 | 685.11                       | 685.3                         | 680.2-665.5            | 20.1                 | --                              | 10.87                    | 674.24                      |
|           | 1/14/2019 |                              |                               |                        | 20.2                 | --                              | 7.28                     | 677.83                      |
|           | 4/5/2019  |                              |                               |                        | ABANDONED            |                                 |                          |                             |
| MW-7      | 8/17/2018 | 685.28                       | 685.6                         | 680.2-665.5            | 20.3                 | --                              | 9.28                     | 676.00                      |
|           | 1/14/2019 |                              |                               |                        | 20.3                 | --                              | 5.46                     | 679.82                      |
|           | 4/5/2019  |                              |                               |                        | ABANDONED            |                                 |                          |                             |
| MW-8      | 8/17/2018 | 685.59                       | 685.8                         | 680.9-666.2            | 19.9                 | --                              | 9.79                     | 675.80                      |
|           | 1/14/2019 |                              |                               |                        | 20.1                 | --                              | 5.21                     | 680.38                      |
|           | 4/5/2019  |                              |                               |                        | ABANDONED            |                                 |                          |                             |
| MW-9      | 8/17/2018 | 684.38                       | 684.9                         | 679.9-665.2            | 19.7                 | --                              | 11.29                    | 673.09                      |
|           | 1/14/2019 |                              |                               |                        | 19.7                 | --                              | 6.82                     | 677.56                      |
|           | 4/5/2019  |                              |                               |                        | 19.6                 | --                              | 9.64                     | 674.74                      |
| MW-10     | 8/17/2018 | 685.14                       | 685.4                         | 642.2-637.5            | 48.1                 | --                              | 10.07                    | 675.07                      |
|           | 1/14/2019 |                              |                               |                        | 47.9                 | --                              | 6.04                     | 679.10                      |
|           | 4/5/2019  |                              |                               |                        | 48.2                 | --                              | 7.32                     | 677.82                      |

Notes: Elevations based on approximate National Geodetic Vertical Datum (NGVD) of 685 feet referenced from the USGS topographic map (Athens, Alabama, Quadrangle)  
ft-BTOC - feet below top of casing

Source: PPM Consultants, Inc.  
PPM Project No. 420001-CAPD

**TABLE 2  
SOIL ANALYTICAL SUMMARY  
FORMER BILL'S 31 AMOCO  
ATHENS, 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) | NAPHTHALENE (mg/kg) |
|-------------|-----------------------|-------------|--------------------------|-----------------|-----------------|-----------------------|-----------------|--------------------|--------------|---------------------|
| SB-1-5      | 5                     | 2/22/2018   | 45                       | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-1-15     | 15                    | 2/22/2018   | 170                      | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-2-10     | 10                    | 2/22/2018   | 920                      | <0.005          | <0.005          | 0.016                 | <0.015          | 0.016              | <0.005       | <0.025              |
| SB-2-15     | 15                    | 2/22/2018   | >11,000                  | <b>0.519</b>    | 0.214           | 17.000                | <b>40.700</b>   | 58.433             | <0.100       | 10.600              |
| SB-3-10     | 10                    | 2/22/2018   | 330                      | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-3-15     | 15                    | 2/22/2018   | 95                       | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-4-5      | 5                     | 2/22/2018   | 170                      | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-4-15     | 15                    | 2/22/2018   | 440                      | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-5-10     | 10                    | 2/22/2018   | 4,350                    | <0.005          | <0.005          | 0.975                 | 0.221           | 1.196              | <0.005       | 2.550               |
| SB-5-15     | 15                    | 2/22/2018   | 920                      | <i>0.042</i>    | <i>0.020</i>    | 7.490                 | 4.640           | 12.192             | <0.100       | 6.090               |
| SB-6-10     | 10                    | 8/13/2018   | 360                      | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-6-15     | 15                    | 8/13/2018   | 870                      | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-7-10     | 10                    | 8/13/2018   | 1,650                    | 0.011           | 0.010           | 2.200                 | 3.310           | 5.531              | <0.010       | 1.930               |
| SB-7-15     | 15                    | 8/13/2018   | 1,300                    | <b>0.190</b>    | 0.051           | 3.170                 | 8.240           | 11.651             | <i>0.014</i> | 2.230               |
| SB-8-5      | 5                     | 8/13/2018   | 100                      | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-8-15     | 15                    | 8/13/2018   | 130                      | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-9-10     | 10                    | 8/13/2018   | 20                       | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SB-9-15     | 15                    | 8/13/2018   | 1,000                    | <0.005          | <0.005          | <0.005                | <0.015          | BDL                | <0.005       | <0.025              |
| SSCAL       |                       |             |                          | 0.1063          | 12.64           | 46.90                 | 18.97           | --                 | 111.3        | 17.11               |

Notes:            *ft BGS - feet below ground surface*  
                      *mg/kg - milligrams per kilogram*  
                      *ppmv - parts per million by volume*  
                      *BDL - below detection limit*  
                      *Headspace analysis conducted with a RKI (calibrated to hexane)*  
                      *BTEX, MTBE, naphthalene analyses conducted per EPA Method 8260*  
                      *SSCAL - Site-specific corrective action level*  
                      **Bold type** indicates concentration exceeds ISL  
                      *Values in italics are estimated values below the practical detection limit and above the method detection limit*

Source:            *PPM Consultants, Inc.*  
                      *PPM Project No. 420001-CAPD*

**TABLE 3**  
**GROUNDWATER ANALYTICAL SUMMARY**  
**FORMER BILL'S 31 AMOCO**  
**ATHENS, ALABAMA**

| SAMPLE I.D. | SAMPLE DATE | BENZENE (mg/L) | TOLUENE (mg/L) | ETHYL-BENZENE (mg/L) | TOTAL XYLENES (mg/L) | TOTAL BTEX (mg/L) | MTBE (mg/L) | NAPHTH-ALENE (mg/L) |
|-------------|-------------|----------------|----------------|----------------------|----------------------|-------------------|-------------|---------------------|
| MW-1        | 2/26/2018   | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
|             | 8/17/2018   | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
|             | 1/14/2019   | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
|             | 4/5/2019    | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
| SSCAL       |             | 0.6138         | 95.74          | 85.93                | 79.11                | -                 | 2.455       | 2.455               |
| MW-2        | 2/26/2018   | <b>1.380</b>   | 1.660          | 22.400               | <b>114.000</b>       | 139.440           | 0.064       | <b>46.800</b>       |
|             | 8/17/2018   | 0.815          | 0.066          | 1.300                | 3.640                | 5.821             | 0.116       | 1.220               |
|             | 1/14/2019   | 0.710          | 0.064          | 1.110                | 3.160                | 5.044             | 0.053       | 1.020               |
|             | 4/5/2019    | 0.955          | 0.071          | 1.830                | 5.460                | 8.316             | 0.088       | 1.980               |
| SSCAL       |             | 1.258          | 95.74          | 169                  | 79.11                | -                 | 5.031       | 2.870               |
| MW-3        | 2/26/2018   | 0.001          | <0.001         | 0.045                | <0.003               | 0.046             | <0.001      | 0.032               |
|             | 8/17/2018   | 0.001          | <0.001         | 0.033                | <0.003               | 0.034             | <0.001      | 0.029               |
|             | 1/14/2019   | 0.003          | <0.001         | 0.047                | <0.003               | 0.050             | <0.001      | 0.077               |
|             | 4/5/2019    | 0.003          | <0.001         | 0.076                | 0.003                | 0.082             | <0.001      | 0.111               |
| SSCAL       |             | 1.064          | 95.74          | 149.0                | 79.11                | -                 | 4.257       | 2.870               |
| MW-4        | 2/26/2018   | 0.009          | 0.001          | 0.346                | 0.020                | 0.376             | <0.005      | 0.262               |
|             | 8/17/2018   | 0.008          | 0.001          | 0.272                | 0.029                | 0.310             | 0.001       | 0.296               |
|             | 1/14/2019   | 0.009          | 0.001          | 0.550                | 0.024                | 0.584             | <0.005      | 1.010               |
|             | 4/5/2019    | 0.010          | 0.001          | 0.288                | 0.015                | 0.314             | 0.001       | 0.331               |
| SSCAL       |             | 0.6660         | 95.74          | 93.24                | 79.11                | -                 | 2.664       | 2.664               |
| MW-5        | 2/26/2018   | 0.499          | 0.138          | 4.430                | 10.300               | 15.367            | <0.100      | 2.750               |
|             | 8/17/2018   | 0.352          | 0.154          | 5.420                | 11.200               | 17.126            | <0.100      | <b>6.210</b>        |
|             | 1/14/2019   | 0.332          | 0.324          | 3.880                | 8.170                | 12.706            | 0.022       | <b>2.950</b>        |
|             | 4/5/2019    | 0.327          | 0.116          | 3.560                | 8.200                | 12.203            | <0.040      | <b>3.320</b>        |
| SSCAL       |             | 1.232          | 95.74          | 169                  | 79.11                | -                 | 4.930       | 2.870               |
| MW-6        | 8/17/2018   | 0.027          | 0.039          | 3.730                | 9.950                | 13.746            | <0.100      | <b>8.170</b>        |
|             | 1/14/2019   | 0.014          | 0.184          | 1.280                | 2.970                | 4.448             | <0.050      | 1.590               |
|             | 4/5/2019    | ABANDONED      |                |                      |                      |                   |             |                     |
| SSCAL       |             | 1.207          | 95.74          | 169                  | 79.11                | -                 | 4.829       | 2.870               |
| MW-7        | 8/17/2018   | 0.820          | 0.570          | 2.640                | 6.660                | 10.690            | 0.329       | 1.570               |
|             | 1/14/2019   | 0.940          | 0.339          | 2.770                | 7.010                | 11.059            | 0.217       | 1.730               |
|             | 4/5/2019    | ABANDONED      |                |                      |                      |                   |             |                     |
| SSCAL       |             | 1.258          | 95.74          | 169                  | 79.11                | -                 | 5.031       | 2.870               |
| MW-8        | 8/17/2018   | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
|             | 1/14/2019   | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
|             | 4/5/2019    | ABANDONED      |                |                      |                      |                   |             |                     |
| SSCAL       |             | 0.9215         | 95.74          | 129.0                | 79.11                | -                 | 3.686       | 2.870               |
| MW-9        | 8/17/2018   | <0.001         | <0.001         | 0.001                | 0.003                | 0.004             | <0.001      | 0.006               |
|             | 1/14/2019   | 0.001          | <0.001         | 0.005                | <0.003               | 0.006             | <0.001      | 0.014               |
|             | 4/5/2019    | 0.004          | <0.001         | 0.022                | 0.004                | 0.030             | <0.001      | 0.063               |
| SSCAL       |             | 0.3494         | 69.89          | 48.92                | 79.11                | -                 | 1.398       | 1.398               |
| MW-10       | 8/17/2018   | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
|             | 1/14/2019   | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
|             | 4/5/2019    | <0.001         | <0.001         | <0.001               | <0.003               | BDL               | <0.001      | <0.005              |
| SSCAL       |             | 1.258          | 95.74          | 169                  | 79.11                | -                 | 5.031       | 2.870               |

**TABLE 3  
GROUNDWATER ANALYTICAL SUMMARY  
FORMER BILL'S 31 AMOCO  
ATHENS, ALABAMA**

| SAMPLE I.D. | SAMPLE DATE | BENZENE (mg/L) | TOLUENE (mg/L) | ETHYL-BENZENE (mg/L) | TOTAL XYLENES (mg/L) | TOTAL BTEX (mg/L) | MTBE (mg/L) | NAPHTH-ALENE (mg/L) |
|-------------|-------------|----------------|----------------|----------------------|----------------------|-------------------|-------------|---------------------|
| DUPLICATES  |             |                |                |                      |                      |                   |             |                     |
| DUP (MW-5)  | 2/26/2018   | 0.498          | 0.128          | 4.280                | 9.400                | 14.306            | <0.100      | 2.450               |
| DUP (MW-2)  | 8/17/2018   | 0.780          | 0.059          | 1.150                | 3.290                | 5.279             | 0.102       | 0.980               |
| DUP (MW-2)  | 1/14/2019   | 0.705          | 0.066          | 1.130                | 3.260                | 5.161             | 0.059       | 0.945               |
| DUP (MW-2)  | 4/5/2019    | 0.970          | 0.072          | 2.120                | 6.180                | 9.342             | 0.086       | 2.280               |

Notes: *mg/L - milligrams per liter*  
*BTEX/MTBE/naphthalene analysis conducted per EPA Method 8260*  
**Bold type** indicates concentration or laboratory detection limit exceeds SSCAL  
 SSCAL - site specific corrective action level (*Groundwater resource protection values with the exception of instances where the toluene, total xylenes, and naphthalene indoor inhalation values were lower*)  
*Values in italics are estimated values below the practical detection limit and above the method detection limit*

Source(s): *PPM Consultants, Inc.*  
*PPM Project No. 420001-CAPD*

**APPENDIX D – SITE HEALTH AND SAFETY PLAN**

# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

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## HEALTH AND SAFETY PLAN FOR

GROUNDWATER MONITORING, SYSTEM OPERATION AND MAINTENANCE, COMPLIANCE AUDITS,  
PHASE 1 ESA, AND MOBILE OZONE/VACUUM EVENTS



*LAST REVISED: 09/2016*



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# 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.

This information is provided in **Appendix A, Emergency Medical Facilities.**

### 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 | <a href="http://www.cdc.gov">www.cdc.gov</a>                     |
| CDC – Public Health Preparedness and Response   | 404-639-7405 | <a href="mailto:cdcinfo@cdc.gov">cdcinfo@cdc.gov</a>             |
| CDC – Bioterrorism Preparedness and Response    | 404-639-0385 | <a href="mailto:cdcinfo@cdc.gov">cdcinfo@cdc.gov</a>             |
| CDC – Toxic Substances and Disease Registry     | 770-488-7100 | <a href="mailto:cdcinfo@cdc.gov">cdcinfo@cdc.gov</a>             |
| Chemtrec [24-Hour Emergency Chemical Spill]     | 800-262-8200 | <a href="mailto:chemtrec@chemtrec.com">chemtrec@chemtrec.com</a> |
| EPA RCRA Superfund Hotline                      | 800-424-9346 | --   |
| Poison Control Center                           | 800-222-1222 | <a href="http://www.aapcc.org">www.aapcc.org</a>                 |

| 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.



# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

## HEALTH AND SAFETY PLAN

### 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 groundwater monitoring, system operation and maintenance, Phase I environmental site assessments (ESA), compliance audits, mobile ozone or vacuum events and other similar non-intrusive repetitive tasks. Any project involving a chemical or field-related task outside of this scope 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 safety department so that a site-specific HASP can be prepared. When possible, please allow five days for preparation.

This plan applies only to those redundant tasks that require no field documentation. Intrusive site activities such as drilling, excavating, chemical injection, system installation and demobilization as well as other similar tasks will require a site-specific HASP, which will be prepared by the Safety Supervisor upon written request.

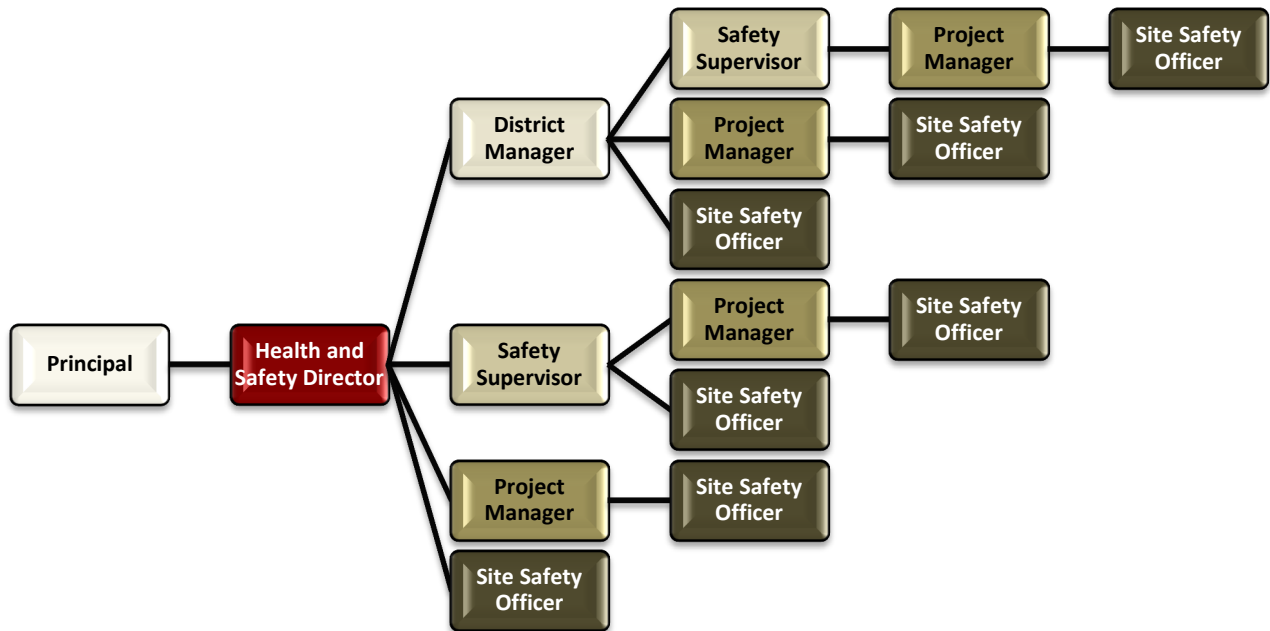
#### 1.5 MANAGEMENT OF CHANGE

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 Health and Safety Director (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 job safety analysis (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.

### 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





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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 and/or 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



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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<sub>2</sub>S) 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<sub>2</sub>S 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),



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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<sub>2</sub>S 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 Ozone

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

***Control Measures:*** Because ozone is injected into subsurface soils, worker exposures will likely result from a release at the monitoring wellhead, sparge point or other similar avenues that will lead the substance to ground surface. Workers must consistently air monitor sparge points and monitoring wells for evidence of ozone leakage. Collections must occur at the wellhead (source) as well as within the breathing zone of the worker. Ozone rapidly converts into O<sub>2</sub>, CO<sub>2</sub> 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.

#### 3.1.2.2 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 P100 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.





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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 P100 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 and can be leached into groundwater. Heavy metal exposures are most often inhalation hazards from dusty environments. PPM does not anticipate these types of exposure risks associated with the tasks covered by this written plan. Heavy metals are poisonous to humans and can cause severe health effects due to their proven or suspected carcinogenic characteristics. Common heavy metals encountered through company-related processes include:

- **Aluminum.** A silvery-white, malleable, ductile, and odorless solid (metal); combustible as a solid (although takes effort), but easily ignitable when in fine dust form which can cause explosions; can cause damage to the eyes, skin and respiratory system; symptoms include: skin, eye and respiratory irritation.
- **Arsenic.** A silver-gray or tin-white metal commonly associated with under-ground storage tanks; noncombustible in solid form but presents slight explosion hazard in dust form when exposed to flame; is considered potential lung and lymphatic system carcinogen and can also affect liver, kidneys and skin through inhalation, skin absorption, skin/eye contact and ingestion exposures; symptoms include: respiratory irritations such as ulceration of nasal septum, dermatitis, gastrointestinal disturbances, hyperpigmentation (darkening) of the skin, and peripheral neuropathy (problem with nerves that carry information to and from the brain and spinal cord which can result in pain, loss of sensation and inability to control muscles).



- **Barium.** A silvery-white metal that exists naturally in the environment; because it is very reactive in its natural state, it is often combined with other elements such as oxygen, carbon and sulfur; it has many uses, but one likely exposure source is that it is used by the oil and gas industry to make drilling mud, which lubricates the drill and simplifies the process when drilling through rock; barium in its natural state is highly flammable and reacts violently with water; may cause irritation of skin, eye, nose, throat and upper respiratory tract, allergic reactions, and central nervous system damage; symptoms include: corneal damage including blindness, poisoning, dermatitis, and skin, eye and throat burns.
- **Cadmium.** A soft, bluish-white metal commonly associated with underground storage tanks; noncombustible in solid form but will burn in powder form; is considered potential prostate and lung carcinogen and can also affect respiratory system, kidneys and blood through inhalation and ingestion exposures; symptoms include: pulmonary edema (fluid in air sacs of lungs) which causes difficult breathing, cough, chest tightness, substernal pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, loss of smell, emphysema, proteinuria (protein in urine), and mild anemia.
- **Chromium.** A hard, steel-gray metal commonly associated with underground storage tanks; noncombustible in solid form but finely dispersed dust particles will rapidly burn when exposed to a flame; chromium is not considered a likely carcinogen, but does affect skin, eyes and respiratory system through inhalation, ingestion and contact exposures; symptoms include: skin and eye irritation and lung fibrosis (scarring of the lungs).
- **Copper.** A soft, malleable reddish-orange metal commonly associated with underground storage tanks; noncombustible in solid form but may ignite when in powder form; copper is not considered a likely carcinogen, but does affect skin, eyes, respiratory system, liver and kidneys through inhalation, ingestion and contact exposures; symptoms include: skin, eye and pharynx irritation, nasal septum perforation, metallic taste, and dermatitis.
- **Iron.** A lustrous metal with a grayish tinge commonly used in industry in the construction of machinery, tools, automobiles, ships and building components; it is the most commonly used of all metals and can also be found in numerous dietary sources; elevated iron in the blood can react with peroxides to produce free radicals that can damage DNA, proteins, lipids and other cellular components; upon exposure, iron can cause skin, eye, mucous and respiratory irritations; it is also flammable as a fine dust.
- **Lead.** A soft, gray metal commonly associated with underground storage tanks, paints and coatings; noncombustible in solid form; lead is not considered a likely carcinogen, but does affect eyes, gastrointestinal tract, central nervous system, kidneys, blood and gingival tissue (soft tissue of the mouth surrounding the teeth) through inhalation, ingestion and contact exposures; symptoms include: eye irritation, weakness, exhaustion, insomnia, facial pallor (paleness), weight loss/anorexia, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis of wrist and ankles, encephalopathy (various brain disorders), kidney disease, and hypertension.
- **Magnesium.** A strong, silvery-white, light-weight metal that exists naturally in the environment; because it is very reactive in its natural state, it is often combined with other elements to form magnesium oxide, various salts, and other industrially-important compounds; magnesium is the third most commonly used metal; because it is light-weight, it is widely used in manufacturing numerous electronics; upon

exposure, magnesium can cause skin and eye irritations; it is also flammable as a fine dust.

- **Mercury.** A silver-white, liquid metal associated with underground storage tanks, batteries, fluorescent bulbs, thermometers and thermostats; noncombustible liquid; mercury is not considered a likely carcinogen but does affect skin, eyes, respiratory system, central nervous system and kidneys through inhalation, skin absorption, ingestion and contact exposures; symptoms include: skin and eye irritation, cough, chest pain, difficult breathing, bronchitis, pneumonia (lung inflammation), tremor, insomnia, irritability, indecision, headache, weakness, exhaustion, stomatitis (inflammation of lining within the mouth), salivation, gastrointestinal disturbance, weight loss/anorexia, and proteinuria (protein in urine).
- **Selenium.** Crystalline, red to gray solid that is considered to be combustible when in fine dust form; elemental selenium is rare – it is most commonly produced as a byproduct of refining copper or producing sulfuric acid; selenium can cause damage to the skin, eyes, respiratory system, liver, kidneys, blood and spleen; symptoms include: skin, eye, nose, and throat irritations, visual disturbance, headache, chills, fever, difficulty breathing, bronchitis, metallic taste, garlic breath, gastrointestinal disturbance, dermatitis, and skin and eye burns.
- **Silver.** A white, lustrous metal that is noncombustible in solid form but can become flammable when in dust form. Silver can cause damage to the nasal septum, skin and eyes. Symptoms include: blue-gray eyes, nasal septum, throat and skin, ulceration of skin, and gastrointestinal disturbance.
- **Zinc.** A bluish-white metal commonly associated with underground storage tanks and used as an anti-corrosion agent; zinc is commonly found in common cold lozenges and over-the-counter cold remedies, as a dietary supplement and also within common foods such as beans, nuts, whole grains and pumpkin/sunflower seeds; zinc is commonly considered non-toxic but in abundance can result in gastrointestinal irritation through ingestion exposures; symptoms include: loss of appetite, nausea, vomiting, stomach cramps, diarrhea and headaches.

***Control Measures:*** If dusty environments are encountered, soils should be wet and kept moist to reduce the amount of airborne dust concentrations generated. However, based on the likely exposure source (contact or unintentional ingestion of contaminated groundwater), workers should protective clothing and incorporate good sanitary procedures (i.e., washing hands) to prevent contact exposures.

#### 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 7° 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 withalconox® solution, it is then sprayed with isopropyl alcohol. Also referred to as isopropanol, isopropyl alcohol is a colorless, flammable liquid commonly known as rubbing alcohol. It is considered a skin, eye and respiratory system irritant that causes damage through inhalation, ingestion and skin/eye contact exposures. Symptoms of overexposure include: irritation of eyes, nose and throat, drowsiness, dizziness, headache and dry, cracking skin.

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

### 3.1.4.3 Methyl-Tertiary Butyl Ether (MTBE)

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

mucous membrane irritation, dizziness, nausea, headache, intoxication, loss of balance and coordination, unconsciousness, coma, respiratory failure and death.

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

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Increase frequency of air monitoring once action limits are triggered to ensure that all ignition sources are removed or isolated when flammability limits are triggered.

- **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<sub>2</sub>); 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<sup>-</sup>) and Aroclor® 1254 (contains 54% Cl<sup>-</sup>). 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





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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 porous material that is effective in the adsorption of gases and 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 pellets can also present a slip hazard.

***Control Measures:*** Keep pellets inside storage bag or carbon vessel and immediately remove spilled pellets 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.

#### 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.



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### 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 <sup>1</sup> | VD <sup>2</sup> | SG <sup>3</sup> | Sol <sup>4</sup> | FP <sup>5</sup> | LEL <sup>6</sup> | UEL <sup>7</sup> |
|---------------|-----------------|-----------------|-----------------|------------------|-----------------|------------------|------------------|
| 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 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.



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### 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 Cuts and Lacerations

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.

### 3.2.4 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

### 3.2.5 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.





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**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.

### 3.2.6 Electrical

#### 3.2.6.1 Overhead Utilities

Vacuum trucks must be parked away from overhead utility lines to avoid unintentional contact when installing the stack. 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.

**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.

#### 3.2.6.2 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 a ground fault circuit interrupter (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



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### 3.2.6.3 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.

### 3.2.7 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.

### 3.2.8 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.



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- 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.

### 3.2.9 Ladder Safety

#### 3.2.9.1 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.

***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.*



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### 3.2.9.2 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.*

### 3.2.10 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.

### 3.2.11 Mobile Equipment

#### 3.2.11.1 Heavy Equipment and Machinery

The most common type of heavy equipment used for the tasks covered by the plan is the mobile vacuum truck. The use of this type of equipment is mostly subcontracted, and PPM requires its subcontractors be adequately trained to safely operate the vacuum truck. Hazards associated with vacuum trucks include, but are not limited to, the following:

- Pinch points from hoses and connections
- Falls from climbing ladder to install stack
- Contact with overhead utility by installed stack
- Operator blind spots when the truck must be moved
- Truck creates blind spots to other onsite drivers
- Combustion from contact of concentrations coming from stack and running engine
- Hydraulic lines operate under pressure
- Accidental roll-off if air brakes are not set properly
- Hot equipment parts



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**Control Measures:** Use vacuum truck in accordance with its intended purpose. Vacuum truck must be grounded prior to use and parked at least 10 feet away from any overhead utility line unless the line has been otherwise isolated or shielded from accidental contact. Wheels must be chocked to secure truck 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 must be aware of operator blind spots which may require the use of a spotter. Workers must additionally use caution when moving around the truck because oncoming vehicles may not be able to see around the truck. Keep hands away from pressurized parts and use caution when connecting or disconnecting hoses to avoid pinch points.

### 3.2.11.2 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.

### 3.2.12 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  $\geq 90$  dB
- Heavy equipment operation (including vac trucks) – have been measured  $\geq 120$  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  $\geq 90$  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  $\geq 85$  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.



### 3.2.13 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.

### 3.2.14 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.

### 3.2.15 Slips, Trips, and Falls

Workers are subjected to slip, trip and fall hazards from improper materials storage, unlevel working surfaces, aboveground piping associated with remediation systems, open monitoring wells, climbing the ladder of the vacuum truck to install the stack, and climbing a ladder to access aboveground storage tanks for inspection and/or maintenance. Current field tasks do not require work at elevations of  $\geq 4$  feet; however, workers must recognize that additional safety measures and use of fall protective equipment is required when working at these elevations. Therefore, workers must report these occurrences to the safety department in advance so that additional training and protective measures can be addressed. Only personnel who have received additional fall protection training are considered competent to work at elevations  $\geq 4$  feet – all other workers are prohibited from working at elevations  $\geq 4$  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. Place and secure monitoring well covers when relocating to another well location. Use company truck and cones to isolate traffic from open monitoring wells while engaged in a task. Use caution when climbing ladder to install the stack or when collecting readings from the stack. Use both hands to climb ladder. Use personal fall arrest system to tie-off to stable structure when working on walking/working surfaces at elevations  $\geq 4$  feet (refer to Section 3.2.17). Refer to Section 3.2.9 for fall hazards associated with the use of ladders.

### 3.2.16 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.



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**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 3.2.9. 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.*

### 3.2.17 Walking/Working Surfaces

#### 3.2.17.1 Elevated Walking/Working Surfaces

Carbon change-outs, asbestos/lead sampling, and aboveground storage tank inspections and/or maintenance may require work at elevations  $\geq 4$  feet. In addition, use of catwalks may exist at heights  $\geq 4$  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,



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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  $\geq 4$  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.

### 3.2.17.2 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.

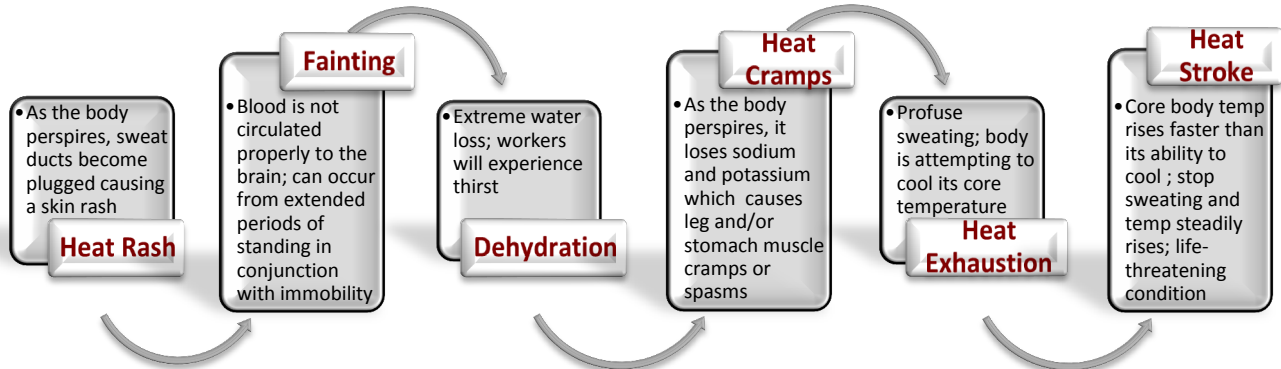
### 3.2.18 Weather

#### 3.2.18.1 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.

### 3.2.18.2 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 |



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**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.

### 3.2.18.3 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 (serious symptoms):** high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis; symptoms may last for several weeks and neurological symptoms may be permanent; occurs in 1 out of 250 people infected.
- **Zika:** mild fever, skin rashes, muscle and joint pain, and conjunctivitis (pink eye) that usually last between 2-7 days; can cause severe birth defects in offspring of pregnant women.

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

### 3.3.2 Ticks and Spiders

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



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

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

### 3.3.3 Rodents, Reptiles and Roaming Animals

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



**Southern Copperhead**



**Water Moccasin**



**E. Diamondback Rattler**



**Coral Snake**

Facilities located 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.

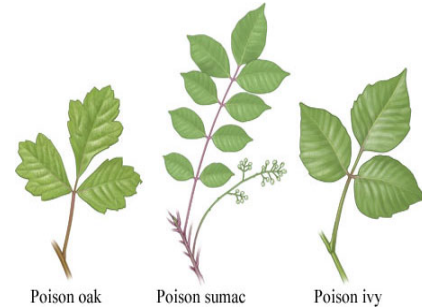
Sites located in populated areas may have wandering animals. Pets may be trained to attack when approached, may have mange (parasitic skin diseases) or may carry other diseases.

**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 began 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 body fluids as if known to be infectious for HIV, hepatitis B, or other bloodborne pathogens.





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### 4.0 EXPOSURE MONITORING

The tasks covered by this HASP are not anticipated to present inhalation hazards at or in excess of regulatory thresholds; therefore exposure monitoring will not be required for these activities. Ambient site conditions are monitored quarterly as a preventative measure. Employee exposures outside of these conditions will require the use of a separate, more stringent HASP.

#### 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 limits.  |
| 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-UFL) 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 mins.   |
| 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.



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### 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       | --         | --      | --     | --          |
| Analytix AN-754GH             | --       | --      | --         | --      | --     | --          |
| Arsenic[metal]                | 0.01     | 0.01    | --         | --      | 5      | --          |
| Asbestos                      | 0.1      | 0.1     | 1          | --      | --     | --          |
| Barium[metal]                 | 0.5      | 0.5     | --         | --      | --     | --          |
| Benzene                       | 1        | 1       | 5          | --      | 500    | 1,200-7,800 |
| n-Butane                      | 400      | 800     | --         | --      | --     | 1,600-8,400 |
| Cadmium[metal]                | 0.005    | 0.005   | --         | --      | 9      | --          |
| Calcium hydroxide[base]       | 5        | 5       | --         | --      | --     | --          |
| Carbon dioxide[dry ice]       | 2,500    | 5,000+  | 30,000     | --      | 40,000 | --          |
| Carbon tetrachloride          | 2        | 2+      | --         | 25      | 200    | --          |
| Chloroform                    | 2        | 2+      | 2 [60-min] | 50      | 500    | --          |
| Chromium[metal]               | 0.5      | 0.5     | --         | --      | 250    | --          |
| Coal tar pitch volatiles[PAH] | 0.2      | 0.2     | --         | --      | 80     | --          |
| Copper[metal]                 | 1        | 1       | --         | --      | 100    | --          |
| DDT[pesticide]                | 1        | 1       | --         | --      | 500    | --          |
| Dieldrin[pesticide]           | 0.25     | 0.25    | --         | --      | 50     | --          |



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| CONSTITUENT                                      | TOXICITY                |                         |                  |                         |          | FIRE          |
|--|-------------------------|-------------------------|------------------|-------------------------|----------|---------------|
|  | ACTION                  | PEL/TLV                 | STEL             | CEILING                 | IDLH     | LEL-UEL       |
| 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 <sup>+</sup>        | 125 <sup>+</sup> | --                      | 800      | 800-6,700     |
| Gasoline   | 100                     | 300 <sup>+</sup>        | 500 <sup>+</sup> | --                      | --       | 1,400-7,600   |
| Heptachlor[pesticide]                            | 0.5                     | 0.5                     | --               | --                      | 35       | --            |
| Hexane   | 50                      | 50 <sup>+</sup>         | --               | --                      | 1,100    | 1,100-7,500   |
| Hydrochloric acid[HCl]                           | --                      | --                      | --               | 5                       | 50       | --            |
| Hydrogen peroxide[30-50%]                        | 1                       | 1                       | --               | --                      | 75       | --            |
| Hydrogen sulfide[H <sub>2</sub> S]               | 1                       | 1                       | --               | 10                      | 100      | 4,000-44,000  |
| Iron[metal]                                      | --                      | --                      | --               | --                      | --       | --            |
| Isobutylene                                      | --                      | --                      | --               | --                      | --       | 1,800-9,600   |
| Isopropyl alcohol                                | 200                     | 400 <sup>+</sup>        | 500 <sup>+</sup> | --                      | 2,000    | 2,000-12,700  |
| Kerosene   | 50                      | 100                     | --               | --                      | --       | 700-5,000     |
| 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 <sup>+</sup> [skin] | --               | 0.1 <sup>+</sup> [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 <sup>+</sup>         | 15 <sup>+</sup>  | --                      | 250      | 900-5,900     |
| Nitric acid                                      | 2                       | 2 <sup>+</sup>          | 4 <sup>+</sup>   | --                      | 25       | --            |
| Oil[crude]                                       | 0.2[mg/m <sup>3</sup> ] | 0.2[mg/m <sup>3</sup> ] | --               | --                      | --       | 1,000-8,000   |
| Ozone  | 0.05                    | 0.1 <sup>+</sup>        | 0.3 <sup>+</sup> | 0.1                     | 5        | --            |
| PCB  | 0.5[skin]               | 0.5[skin]               | --               | --                      | 5        | --            |
| Perchloroethylene[PERC]                          | 25                      | 25 <sup>+</sup>         | --               | 150[cap]                | 150      | --            |
| Phosphoric acid[H <sub>3</sub> PO <sub>4</sub> ] | 1                       | 1 <sup>+</sup>          | 3 <sup>+</sup>   | --                      | 1,000    | --            |
| Potassium hydroxide[base]                        | 2                       | 2 <sup>+</sup>          | --               | 2                       | --       | --            |
| Propane  | 500                     | 1,000                   | --               | --                      | 2,100    | 2,100-9,500   |
| RegenOx A or B™                                  | --                      | --                      | --               | --                      | --       | --            |
| Selenium[metal]                                  | 0.2                     | 0.2                     | --               | --                      | 1        | --            |
| Silver[metal]                                    | 0.01                    | 0.01                    | --               | --                      | 10       | --            |
| Sodium carbonate[base]                           | --                      | --                      | --               | --                      | --       | --            |
| Sodium hydroxide[base]                           | 2                       | 2                       | --               | 2 <sup>+</sup>          | 10       | --            |
| Sulfuric acid[H <sub>2</sub> SO <sub>4</sub> ]   | 1                       | 1                       | 15 <sup>+</sup>  | --                      | 15       | --            |
| Tetrachloroethylene[PERC]                        | 25                      | 25 <sup>+</sup>         | --               | 150[cap]                | 150      | --            |
| Toluene  | 100                     | 100 <sup>+</sup>        | 150 <sup>+</sup> | 300                     | 500      | 1,100-7,100   |
| Trichloroethylene                                | 50                      | 50 <sup>+</sup>         | 200 <sup>+</sup> | 200                     | 1,000    | 8,000-10,500* |
| Vinyl chloride                                   | 1                       | 1                       | --               | 5[15-min]               | --       | 3,600-33,000  |
| Xylene   | 100                     | 100 <sup>+</sup>        | 150 <sup>+</sup> | --                      | 900      | 1,100-7,000   |
| Zinc[metal]                                      | --                      | --                      | --               | --                      | --       | --            |

**NOTES:**

† - More protective OSHA PELs vacated by the 11<sup>th</sup> 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<sup>3</sup> – not ppm!  
 Asbestos is measured as number of fibers per unit air (f/cc); Portland cement is measured as million parts per cubic feet (mppcf).  
 Action limit and PEL are time-weighted averages over 8-hour work period. STEL is TWA over 4 15-min periods, with the exception of asbestos, which has a 30-minute excursion limit. Others are instantaneous readings.  
 PAHs - coal tar pitch volatile components of TPH-D include anthracene, benzo(a)pyrene, chrysene, phenanthrene and pyrene, all of which have the same permissible exposure and IDLH limits; therefore, all components lumped into one group. The only other regulated component of PAH is naphthalene which is a component of crude or refined oil and is listed separately from other PAHs.  
 Only the regulated pesticide components of EPA SWA-846 Methods 8080/8081 are included above.  
 Perchloroethylene (PCE) has a ceiling limit of 200 ppm for 5 minutes within any 3-hr period not to exceed 300 ppm but this has been capped at 150 ppm to match IDLH concentrations for this material. Trichloroethylene's flammability range is effective ≥77°F.

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.



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





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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

As indicated previously, exposure monitoring is not required for tasks covered under this safety plan; however, ambient air monitoring is conducted as a preventive measure. All sites with a remediation system are monitored to ensure the system is functioning properly. Instantaneous samples are collected in various positions inside and around the system, monitoring wells, and/or sparge points. If at any point a regulatory threshold hold limit is triggered, the employee must immediately evacuate the area and contact the Project Manager, Office Manager, and safety department.

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/Safety Supply Checklist for dual- and single-phase vacuum systems, air sparge systems, and ozone systems. 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 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 Z89.1-1997 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  $\geq 85$  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



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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 damaged 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 <sup>1</sup> | SAFETY GLASSES <sup>2</sup> | HIGH VISIBILITY SHIRT VEST <sup>3</sup> | GLOVES <sup>4</sup> | HEARING PROTECTOR <sup>5</sup> | HARD HAT (CLASS E) <sup>6</sup> | GOGGLES/FACE SHIELD <sup>7</sup> | RESPIRATOR (APR) <sup>8</sup> | HARNESS/LANYARD | FLOTATION DEVICES/BUOYS | FIRE RETARDANT CLOTHING <sup>9</sup> |
| Asbestos inspections or sampling   | X                             | X                           | X                                       | X                   |                                |                                 |                                  | X                             |                 |                         |                                      |
| Carbon change-out  | X                             |                             | X                                       | X                   | X                              | X                               | X                                | X                             | X               |                         |                                      |
| Compliance audits/visual inspections[Phase 1]                                    | X                             | X                           | X                                       |                     |                                |                                 |                                  |                               |                 |                         |                                      |
| Groundwater sampling   | X                             | X                           | X                                       | X                   |                                |                                 |                                  |                               |                 |                         |                                      |
| Mobile vacuum event  | X                             | X                           | X                                       | X                   | X                              |                                 |                                  |                               |                 |                         |                                      |
| Mobile ozone   | X                             | X                           | X                                       | X                   | X                              |                                 |                                  |                               |                 |                         |                                      |
| Operation and maintenance of system  | 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                                    |

Notes:

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 or mixing powders or when working with liquids that present a 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 and 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



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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 or crawling beneath site fencing to secure site access.*

#### 6.2 DESIGNATED WORK ZONES

Due to the nature of tasks covered within this plan, it is unnecessary to designate work zones for this type of work. Because typical jobsites occur in areas accessible to the general public, the immediate work area must be clearly marked and isolated from unauthorized personnel as indicated in the following section.

#### 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 work area
- Use buddy system whenever feasible
- Perform pre-job inspection to establish appropriate baselines and to visually inspect for obstacles, clearances, etc.
- Avoid smoking on the jobsite unless within authorized areas (i.e., break areas when deemed appropriate by the SSO for smoking)



- Use appropriate safety devices (i.e., cones, barricades, etc.) to clearly identify work zones and break areas
- Prevent unauthorized entry and use stop-work authority as necessary
- Perform post-job inspection to ensure all materials have been removed from the site; pay close attention to the vehicles to ensure animals or person(s) are not located beneath the vehicle and that all cab and toolbox doors have been secured

### 6.6 DECONTAMINATION PROCEDURES

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

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

## 7.0 EMERGENCY RESPONSE

### 7.1 ALARMS AND ONSITE NOTIFICATIONS

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

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

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





# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

## HEALTH AND SAFETY PLAN

### 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:

- Auto-related accident regardless of fault
- Contact with overhead utility
- Chemical spill or release
- Slips, trips, or falls or other work-related injury/illness

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.



# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

## HEALTH AND SAFETY PLAN

### 7.5 GENERAL MEDICAL CARE AND FIRST AID

It is company policy that all field workers be trained in adult CPR and first aid. Workers who have received this level of training should be prepared to administer care for minor injuries. Certified workers may additionally be called upon to provide care to more seriously injured persons while waiting for additional medical attention. If the victim is conscious, workers must indicate that they are certified and they must additionally obtain consent prior to administering care. Consent is implied when the victim is unconscious. Some general emergency care provisions are outlined below (not all-inclusive):

| HAZARD CATEGORY | HAZARD                         | RESPONSE  |
|-----------------|--------------------------------|---|
| Chemical        | Inhalation                     | Move worker to fresh air. If vomiting, dizzy or groggy, seek medical attention immediately. Administer CPR if certified.  |
|                 | Dermal/Contact                 | Remove contaminated clothing and flush affected area with soap/water for ~20 minutes. Seek medical care if pain persists.   |
|                 | Ingestion                      | Seek immediate medical attention. Do not give fluids to an unconscious person. Do not induce vomiting.  |
|                 | Eye                            | Flush with copious amounts of water for ~20 minutes. Seek medical attention if pain persists.   |
| Physical        | Heat stress                    | Apply warm, 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.                         |
| Physical        | 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 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.

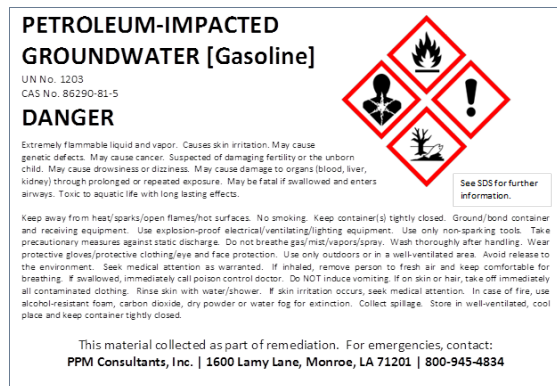
### 8.1 CONTAINER LABELING

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

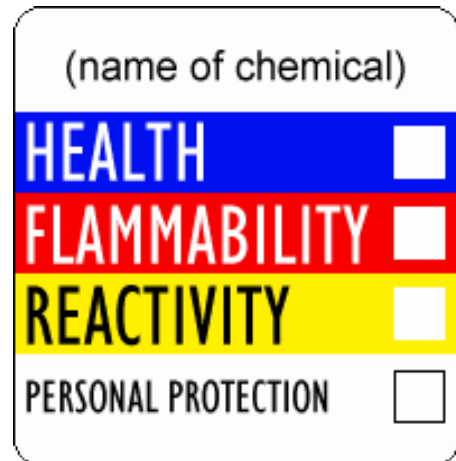
Any hazardous material or waste container(s) must be labeled in accordance with 29 CFR 1910.1200 using a globally harmonized system (GHS) for chemical classification and labeling. Tags using the same GHS-format should be used for soil bags and super sacks. Each label must contain six required elements, 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 results from exposure
- Supplier identification – name, address and telephone number of the manufacturer or supplier\*
- 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 supersede 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.



(name of chemical)

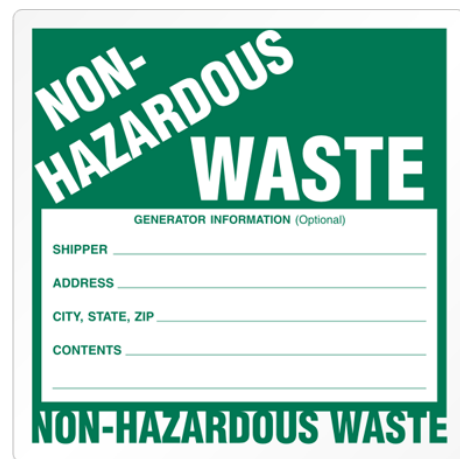
|                            |                          |
|----------------------------|--------------------------|
| <b>HEALTH</b>              | <input type="checkbox"/> |
| <b>FLAMMABILITY</b>        | <input type="checkbox"/> |
| <b>REACTIVITY</b>          | <input type="checkbox"/> |
| <b>PERSONAL PROTECTION</b> | <input type="checkbox"/> |

### 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.



NON-HAZARDOUS WASTE

GENERATOR INFORMATION (Optional)

SHIPPER \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

CONTENTS \_\_\_\_\_

NON-HAZARDOUS WASTE



# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

## HEALTH AND SAFETY PLAN

### 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. *Note: Because the tasks covered by this written plan are so repetitive, this HASP and all corresponding JSAs must be reviewed with personnel on an annual basis. The safety briefing is held as part of the company's annual 8-HR HAZWOPER refresher.*

## 10.0 CONTRACTOR SUPERVISION

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

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

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





# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

## HEALTH AND SAFETY PLAN

### 11.0 CONFINED SPACE

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

### 12.0 LIST OF ABBREVIATIONS

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

**EMERGENCY MEDICAL FACILITIES**





# HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

## EMERGENCY MEDICAL FACILITY

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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 HS Director 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.

Site Name: Hicks Oil Company, Inc. Project Number: 420001-CAPD

Address: 1216 Pryor Street City, State: Athens, AL Zip: 35611

Name of Hospital: Athens Limestone Hospital Phone: (256) 233-9151

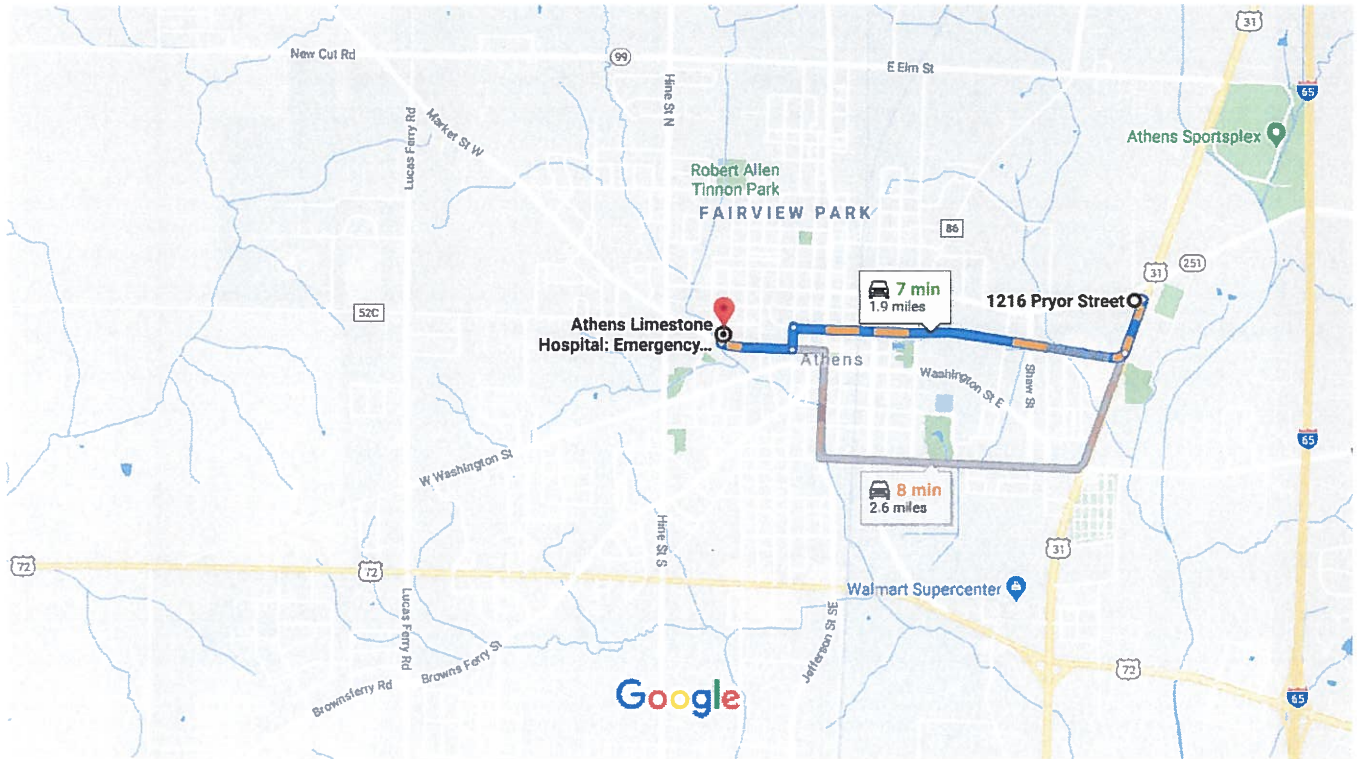
Address: 700 Market Street W City, State: Athens, AL Zip: 35611

Directions and Map: See attached (next page) Distance: 1.9 mi Time: 7 min



1216 Pryor St, Athens, AL 35611 to Athens Limestone Hospital: Emergency Room

Drive 1.9 miles, 7 min



Map data ©2019 Google 2000 ft

### 1216 Pryor St

Athens, AL 35611

- ↑ 1. Head east toward US-31 S  
59 ft
- ↘ 2. Turn right onto US-31 S  
0.2 mi
- ↘ 3. Turn right onto Hobbs St E  
1.3 mi
- ↙ 4. Turn left onto N Houston St  
469 ft
- ↘ 5. Turn right at the 1st cross street onto Buck Island Rd/Market St W  
0.3 mi
- ↘ 6. Turn right  
  - ⓘ Destination will be on the right
131 ft

### Athens Limestone Hospital: Emergency Room

**APPENDIX E – COST PROPOSAL NO. 11 – FIRST QUARTERLY MEME AND  
RNA GROUNDWATER MONITORING**

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

**I.1 Cost Proposal Information:**

|                             |                                   |
|-----------------------------|-----------------------------------|
| Cost Proposal Number:       | Date of Cost Proposal (mm/dd/yy): |
| 11<br>420001-RNA1           | 5/15/2019                         |
| UST or AST Incident Number: | Facility I.D. Number:             |
| UST18-11-04                 | 15531-083-008369                  |

**I.2 Facility Information**

|                   |                                      |
|-------------------|--------------------------------------|
| Facility Name:    | Former Bill's 31 Amoco               |
| Facility Address: | 1216 Pryor Street<br>Athens, Alabama |

**I.3 Owner Information:**

|                            |   |  |
|----------------------------|---|--|
| Owner Name:                | Hicks Oil Company, Inc.                       |  |
| Owner Address:             | 20073 Yarbrough Road<br>Athens, Alabama 35611 |  |
| Employer Tax Number (IRS): | 63-684303                                     |  |

**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:                             | Mike Dillon, P.G.   |
| Project Contact Phone #:                     | 205-836-5650  |
| Project Contact E-mail:                      | <a href="mailto:mike.dillon@ppmco.com">mike.dillon@ppmco.com</a>            |
| Employer Tax Number (IRS):                   | 72-1256279  |
|  |   |

Cost Proposal Number:

11

Facility Name:

Former Bill's 31 Amoco

**I.5 Activity Information:**

Indicate below the activities for which the cost proposal is submitted:

|                                     |   |
|-------------------------------------|---|
| <input type="checkbox"/>            | Site Stabilization/Initial Abatement                              |
| <input type="checkbox"/>            | Preliminary Investigation   |
| <input type="checkbox"/>            | Secondary Investigation / Additional Well Installation            |
| <input type="checkbox"/>            | Alabama Risk Based Corrective Action (ARBCA)                      |
| <input checked="" type="checkbox"/> | Groundwater Sampling  |
| <input type="checkbox"/>            | Free Product Removal/Mobile Enhanced Multiphase Extraction (MEME) |
| <input type="checkbox"/>            | Corrective Action Plan Evaluation                                 |
| <input type="checkbox"/>            | Develop Corrective Action Plan                                    |
| <input checked="" type="checkbox"/> | Corrective Action   |
| <input type="checkbox"/>            | Stockpile Sampling / Management / Disposal                        |
| <input type="checkbox"/>            | Provision of Alternate Water Supply                               |
| <input type="checkbox"/>            | Pilot Test  |
| <input type="checkbox"/>            | Monitoring/Recovery/Injection Well Abandonment                    |
| <input type="checkbox"/>            | System Decommissioning/Removal                                    |

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

Quarterly RNA groundwater sampling (7 wells) and quarterly 8-hour MEME event.  
(Nov 2019 - Jan 2010)

Provide proposed completion date for this phase of work activities:

02/29/20

Provide projected date of cleanup completed:

12/31/20

**I.6 Subcontractor Information:**

Indicate Subcontractors to be used during this phase of work:

| <b>Name &amp; Address</b>              | <b>Service Provided</b>          |
|--|----------------------------------|
| Sutherland Environmental Copmany, Inc. | Laboratory Analysis              |
| Brown Remediation                      | 8-Hour MEME Event/Water Disposal |
|  |                                  |
|  |                                  |
|  |                                  |
|  |                                  |

Cost Proposal Number:

11

Facility Name:

Former Bill's 31 Amoco


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:   |                                |
| Typed or Printed Name and Title: | Mr. Joe Hicks / Office Manager |
| Email address:                   | <a href="#">NA</a>             |
| Date:                            |                                |

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

|   |  |
|---|--|
| 2.Response Action Contractor Signature: |  |
| Typed or Printed Name and Title:        | Michael L. Ellison, P.E., Principal  |
| Date:                                   | 05/16/19   |

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

|  |              |
|--|--------------|
| Estimated Total Cost of all Anticipated Response Actions (To be updated overtime):       | \$200,000.00 |
| Total of Previously Approved Cost Proposals:   | \$87,539.49  |
| Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal): | \$96,920.39  |
| Estimate Percent Completion of entire project to date:                                   | 48%          |

**I.10 Cost Proposal Amount**

|   |                   |                 |            |
|---|-------------------|-----------------|------------|
| Proposed Costs under this Cost Proposal:  | \$9,380.90        | Personnel       | \$3,887.00 |
|   |                   | Field Equipment | \$379.00   |
| Owners Required Contribution for UST Release(\$5,000): <i>Applicable for CP#1 Only</i>  |                   | Mileage         | \$278.40   |
|   |                   | Per Diem        | \$59.50    |
|   |                   | Drilling        | \$0.00     |
|   |                   | Analytical      | \$572.00   |
| Owners Required Contribution for AST Release(\$10,000): <i>Applicable for CP#1 Only</i> |                   | Other           | \$4,205.00 |
|   |                   |                 |            |
| <b>Total of This Cost Proposal:</b>   | <b>\$9,380.90</b> |                 |            |

| Cost Proposal Summary  |                  |                 |                 |                        |                   |
|--|------------------|-----------------|-----------------|------------------------|-------------------|
| CP Total   | Facility I.D. #  | CP #            | Incident Number | Site Name              |                   |
| \$9,380.90   | 15531-083-008369 | 11              | UST18-11-04     | Former Bill's 31 Amoco |                   |
| Part II- Alabama Tank Trust Fund Itemization Form "A" Cost Proposal                  |                  |                 |                 |                        |                   |
| Scenarios  |                  | Unit \$         | Units           | Quantity Requested     | \$                |
| NAMR/GWM-Report  |                  |                 |                 |                        |                   |
| 1-12 wells, BTEX/MTBE/Naphthalene  |                  | \$1,180 /report |                 | 1                      | \$1,180.00        |
| MEME/Injection Events (adder to report)  |                  | \$754 /report   |                 | 1                      | \$754.00          |
| <b>Total Report and Plan Costs</b>   |                  |                 |                 |                        | <b>\$1,934.00</b> |
| Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal                  |                  |                 |                 |                        |                   |
| Groundwater Sampling Set-up (2hrs tech time)   |                  | \$126.00 /sow   |                 | 1                      | \$126.00          |
| Groundwater Sampling and Gauging 2" Well   |                  | \$63.00 /well   |                 | 7                      | \$441.00          |
| MEME Event/Pilot Test/Injection Event (hourly rate)                                  |                  | \$63 /hr        |                 | 10                     | \$630.00          |
| Travel   |                  |                 |                 |                        |                   |
| <b>Mileage Rate</b>  |                  |                 |                 | \$0.580                |                   |
| Mileage (One way office to site)   |                  |                 |                 | 120                    |                   |
| Number of round trips to site  |                  |                 |                 | 2                      | \$278.40          |
| Technician(s)-travel time  |                  | \$63 /hr        |                 | 12                     | \$756.00          |
| Per diem (6-12hrs)   |                  | \$12.75 /day    |                 | 2                      | \$25.50           |
| Per diem (greater than 12hrs)  |                  | \$34 /ext. day  |                 | 1                      | \$34.00           |
| 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           |
| Groundwater Monitoring   |                  | \$160 /day      |                 | 1                      | \$160.00          |
| Bailers  |                  | \$7 /bailer     |                 | 7                      | \$49.00           |
| MEME Event   |                  | \$70 /event     |                 | 1                      | \$70.00           |
| 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%             | 7                      | \$500.50          |
| Other  | 8260 - QA/QC     | \$65.00/sample  | 10%             | 1                      | \$71.50           |
| <b>Total Field Costs</b>   |                  |                 |                 |                        | <b>\$3,376.90</b> |
| Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal                  |                  |                 |                 |                        |                   |
| <b>Total Drilling Costs</b>  |                  |                 |                 |                        | <b>\$0.00</b>     |
| Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal                  |                  |                 |                 |                        |                   |
|  |                  |                 | Pass Through    | Quoted Amount          | Requested\$       |
| 8-hr MEME Event  |                  |                 | 10%             | \$3,000.00             | \$3,300.00        |
| MEME Water Disposal Amount includes hauling  |                  |                 | 10%             | \$700.00               | \$770.00          |



| <b>Cost Proposal Summary</b> |                  |      |   |                        |
|------------------------------|------------------|------|---|------------------------|
| CP Total                     | Facility I.D. #  | CP # | Incident Number                         | Site Name              |
| \$9,380.90                   | 15531-083-008369 | 11   | UST18-11-04                             | Former Bill's 31 Amoco |
|                              |                  |      | <b>Total Subs / Vendors / Utilities</b> | <b>\$4,070.00</b>      |



**APPENDIX F – COST PROPOSAL NO. 12 – SECOND QUARTERLY MEME  
AND RNA GROUNDWATER MONITORING**

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

**I.1 Cost Proposal Information:**

|                             |                                   |
|-----------------------------|-----------------------------------|
| Cost Proposal Number:       | Date of Cost Proposal (mm/dd/yy): |
| 12<br>420001-RNA2           | 5/15/2019                         |
| UST or AST Incident Number: | Facility I.D. Number:             |
| UST18-11-04                 | 15531-083-008369                  |

**I.2 Facility Information**

|                   |                                      |
|-------------------|--------------------------------------|
| Facility Name:    | Former Bill's 31 Amoco               |
| Facility Address: | 1216 Pryor Street<br>Athens, Alabama |

**I.3 Owner Information:**

|                            |   |  |
|----------------------------|---|--|
| Owner Name:                | Hicks Oil Company, Inc.                       |  |
| Owner Address:             | 20073 Yarbrough Road<br>Athens, Alabama 35611 |  |
| Employer Tax Number (IRS): | 63-684303                                     |  |

**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:                             | Mike Dillon, P.G.   |
| Project Contact Phone #:                     | 205-836-5650  |
| Project Contact E-mail:                      | <a href="mailto:mike.dillon@ppmco.com">mike.dillon@ppmco.com</a>            |
| Employer Tax Number (IRS):                   | 72-1256279  |
|  |   |

Cost Proposal Number:

12

Facility Name:

Former Bill's 31 Amoco

**I.5 Activity Information:**

Indicate below the activities for which the cost proposal is submitted:

|                                     |   |
|-------------------------------------|---|
| <input type="checkbox"/>            | Site Stabilization/Initial Abatement                              |
| <input type="checkbox"/>            | Preliminary Investigation   |
| <input type="checkbox"/>            | Secondary Investigation / Additional Well Installation            |
| <input type="checkbox"/>            | Alabama Risk Based Corrective Action (ARBCA)                      |
| <input checked="" type="checkbox"/> | Groundwater Sampling  |
| <input type="checkbox"/>            | Free Product Removal/Mobile Enhanced Multiphase Extraction (MEME) |
| <input type="checkbox"/>            | Corrective Action Plan Evaluation                                 |
| <input type="checkbox"/>            | Develop Corrective Action Plan                                    |
| <input checked="" type="checkbox"/> | Corrective Action   |
| <input type="checkbox"/>            | Stockpile Sampling / Management / Disposal                        |
| <input type="checkbox"/>            | Provision of Alternate Water Supply                               |
| <input type="checkbox"/>            | Pilot Test  |
| <input type="checkbox"/>            | Monitoring/Recovery/Injection Well Abandonment                    |
| <input type="checkbox"/>            | System Decommissioning/Removal                                    |

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

Quarterly RNA groundwater sampling (7 wells) and quarterly 8-hour MEME event.  
(Feb - Apr 2020)

Provide proposed completion date for this phase of work activities:

05/31/20

Provide projected date of cleanup completed:

12/31/20

**I.6 Subcontractor Information:**

Indicate Subcontractors to be used during this phase of work:

| Name & Address                         | Service Provided                 |
|--|----------------------------------|
| Sutherland Environmental Copmany, Inc. | Laboratory Analysis              |
| Brown Remediation                      | 8-Hour MEME Event/Water Disposal |
|  |                                  |
|  |                                  |
|  |                                  |
|  |                                  |

Cost Proposal Number:

12

Facility Name:

Former Bill's 31 Amoco


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:   |                                |
| Typed or Printed Name and Title: | Mr. Joe Hicks / Office Manager |
| Email address:                   | <a href="#">NA</a>             |
| Date:                            |                                |

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

|   |  |
|---|--|
| 2.Response Action Contractor Signature: |  |
| Typed or Printed Name and Title:        | Michael L. Ellison, P.E., Principal  |
| Date:                                   | 05/16/19   |

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

|  |              |
|--|--------------|
| Estimated Total Cost of all Anticipated Response Actions (To be updated overtime):       | \$200,000.00 |
| Total of Previously Approved Cost Proposals:   | \$96,920.39  |
| Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal): | \$106,301.29 |
| Estimate Percent Completion of entire project to date:                                   | 53%          |

**I.10 Cost Proposal Amount**

|   |                   |                 |            |
|---|-------------------|-----------------|------------|
| Proposed Costs under this Cost Proposal:  | \$9,380.90        | Personnel       | \$3,887.00 |
|   |                   | Field Equipment | \$379.00   |
| Owners Required Contribution for UST Release(\$5,000): <i>Applicable for CP#1 Only</i>  |                   | Mileage         | \$278.40   |
|   |                   | Per Diem        | \$59.50    |
|   |                   | Drilling        | \$0.00     |
|   |                   | Analytical      | \$572.00   |
| Owners Required Contribution for AST Release(\$10,000): <i>Applicable for CP#1 Only</i> |                   | Other           | \$4,205.00 |
|   |                   |                 |            |
| <b>Total of This Cost Proposal:</b>   | <b>\$9,380.90</b> |                 |            |

| Cost Proposal Summary  |                  |                 |                 |                        |                   |
|--|------------------|-----------------|-----------------|------------------------|-------------------|
| CP Total   | Facility I.D. #  | CP #            | Incident Number | Site Name              |                   |
| \$9,380.90   | 15531-083-008369 | 12              | UST18-11-04     | Former Bill's 31 Amoco |                   |
| Part II- Alabama Tank Trust Fund Itemization Form "A" Cost Proposal                  |                  |                 |                 |                        |                   |
| Scenarios  |                  | Unit \$         | Units           | Quantity Requested     | \$                |
| NAMR/GWM-Report  |                  |                 |                 |                        |                   |
| 1-12 wells, BTEX/MTBE/Naphthalene  |                  | \$1,180 /report |                 | 1                      | \$1,180.00        |
| MEME/Injection Events (adder to report)  |                  | \$754 /report   |                 | 1                      | \$754.00          |
| <b>Total Report and Plan Costs</b>   |                  |                 |                 |                        | <b>\$1,934.00</b> |
| Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal                  |                  |                 |                 |                        |                   |
| Groundwater Sampling Set-up (2hrs tech time)   |                  | \$126.00 /sow   |                 | 1                      | \$126.00          |
| Groundwater Sampling and Gauging 2" Well   |                  | \$63.00 /well   |                 | 7                      | \$441.00          |
| MEME Event/Pilot Test/Injection Event (hourly rate)                                  |                  | \$63 /hr        |                 | 10                     | \$630.00          |
| Travel   |                  |                 |                 |                        |                   |
| <b>Mileage Rate</b>  |                  |                 |                 | \$0.580                |                   |
| Mileage (One way office to site)   |                  |                 |                 | 120                    |                   |
| Number of round trips to site  |                  |                 |                 | 2                      | \$278.40          |
| Technician(s)-travel time  |                  | \$63 /hr        |                 | 12                     | \$756.00          |
| Per diem (6-12hrs)   |                  | \$12.75 /day    |                 | 2                      | \$25.50           |
| Per diem (greater than 12hrs)  |                  | \$34 /ext. day  |                 | 1                      | \$34.00           |
| 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           |
| Groundwater Monitoring   |                  | \$160 /day      |                 | 1                      | \$160.00          |
| Bailers  |                  | \$7 /bailer     |                 | 7                      | \$49.00           |
| MEME Event   |                  | \$70 /event     |                 | 1                      | \$70.00           |
| 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%             | 7                      | \$500.50          |
| Other  | 8260 - QA/QC     | \$65.00 /sample | 10%             | 1                      | \$71.50           |
| <b>Total Field Costs</b>   |                  |                 |                 |                        | <b>\$3,376.90</b> |
| Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal                  |                  |                 |                 |                        |                   |
| <b>Total Drilling Costs</b>  |                  |                 |                 |                        | <b>\$0.00</b>     |
| Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal                  |                  |                 |                 |                        |                   |
|  |                  |                 | Pass Through    | Quoted Amount          | Requested\$       |
| 8-hr MEME Event  |                  |                 | 10%             | \$3,000.00             | \$3,300.00        |
| MEME Water Disposal Amount includes hauling  |                  |                 | 10%             | \$700.00               | \$770.00          |



| <b>Cost Proposal Summary</b> |                  |      |   |                        |
|------------------------------|------------------|------|---|------------------------|
| CP Total                     | Facility I.D. #  | CP # | Incident Number                         | Site Name              |
| \$9,380.90                   | 15531-083-008369 | 12   | UST18-11-04                             | Former Bill's 31 Amoco |
|                              |                  |      | <b>Total Subs / Vendors / Utilities</b> | <b>\$4,070.00</b>      |



**APPENDIX G – SUBCONTRACTOR QUOTE**



227 Sandy Springs Place  
Suite D-122  
Atlanta, Georgia 30328-5918  
Phone 404 256 0667  
Fax 404 256 0668

April 9, 2019

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

Subject:  
8-Hour Multi-Phase Extraction Event  
Former Bill's 31 Amoco, 1216 Pryor Street, Athens, AL  
Brown Remediation, Inc. Proposal No. 040919-8

Dear Mr. Dillon:

Brown Remediation, Inc. is pleased to provide you with our Multi-Phase Extraction (MPE) service at the above-referenced facility. During the 8-hour MPE event, we will record monitoring well fluid levels, vacuum influence, vacuum pressures, vapor flow rates, extracted vapor concentrations, and total volume of recovered liquids. Brown Remediation will generate and submit a progress status report for the event.

Following is a breakdown of costs for these services:

|  |                                      |                   |
|--|--------------------------------------|-------------------|
| One 8-Hour MPE Event                   | Including report                     | \$3,000.00        |
| Petroleum Contact Water Transportation | local rate – flat fee*               | \$450.00          |
| Petroleum Contact Water Disposal       | Est. 1,000 gallons at \$0.25/gallon* | \$250.00          |
|  | <b>Total Lump Sum Estimate:</b>      | <b>\$3,700.00</b> |

\*This estimate is based on approximate quantities. Actual costs incurred for transportation and disposal of petroleum contact water will be billed.

All work will be performed pursuant to the attached terms and conditions. Any additional work authorized by PPM Consultants, Inc. will be performed based on a mutually agreed-upon fee.

We appreciate the opportunity to provide you with these services. If this proposal meets with your approval, please fax us a signed copy at 404-256-0668. Please do not hesitate to call if you have any questions.

Sincerely,  
Brown Remediation, Inc.

Director of Operations

Accepted by:  
Signature: \_\_\_\_\_  
Print Name: \_\_\_\_\_  
Date: \_\_\_\_\_

## TERMS AND CONDITIONS

**1. Changes in the Work.** At any time after execution of this agreement, PPM Consultants, Inc. (Client) may request changes to Brown Remediation, Inc. services consisting of additions, deletions, and revisions to the general scope of services being performed by Brown Remediation, Inc. under this agreement. Whenever a change in the scope and/or time for performance of services occurs, or if Client has notified Brown Remediation, Inc. of a change, Brown Remediation, Inc. shall submit to Client an estimate of the changes in cost and/or schedule, with supporting calculations and pricing. Pricing shall be in accordance with the pricing of this agreement.

**2. Termination of Agreement.** Either party may terminate this agreement without cause and/or for convenience after giving five (5) days' written notice to the other party. However, Brown Remediation, Inc. shall not have the right to terminate this agreement, without cause, prior to completion by Brown Remediation, Inc. of all services required under the agreement. In the event Client terminates Brown Remediation, Inc.'s services without cause and/or for Client's convenience, Client shall be liable to promptly pay Brown Remediation, Inc. for all work performed through the date of termination; all Brown Remediation, Inc. expenses directly attributable to the termination, including fair and reasonable sums for overhead and profit for work performed; and costs incurred by Brown Remediation, Inc. in terminating any contracts entered into in connection with the performance of its services.

**3. Use of Documents.** It is understood and agreed that all documents prepared pursuant to this agreement are the product of professional services intended for one-time use for the project that is the subject of this agreement. Such documents are and shall remain the property of Brown Remediation, Inc., and they are not intended or represented to be suitable for reuse by Client or others on extensions of the project or on any other project. With Brown Remediation, Inc. consent, Client may retain copies for information and reference in connection with the occupancy and use of the project. In the event project documents provided to Client in machine-readable form are so converted, or in the event of any reuse without written verification or adaptation by Brown Remediation, Inc. for the specific purposes intended, the Client agrees to assume all risks associated therewith and to the fullest extent permitted by law, to hold harmless and indemnify Brown Remediation, Inc. from and against all claims, liabilities, losses, damages, and costs. Any written verification or adaptation authorized or performed by Brown Remediation, Inc. will entitle Brown Remediation, Inc. to additional compensation at rates to be agreed upon by Brown Remediation, Inc. and Client.

The parties shall at all times remain entirely responsible for the results and consequences of their sole negligence and agree to indemnify and hold harmless the other party from and against any and all claims, losses, damages, costs, and expenses, including attorney's fees, which may arise or result from such sole negligence. For any services provided

by Brown Remediation, Inc. involving or relating to hazardous or non-hazardous waste elements, Client agrees to indemnify and hold harmless Brown Remediation, Inc. and its consultants, agents, and employees from and against all claims, damages, losses, and expenses, direct and indirect, or consequential damages, including but not limited to fees and charges of attorneys and court and arbitration costs, arising out of or resulting from the performance of the work by Brown Remediation, Inc., or claims against Brown Remediation, Inc. arising from the work of others, related to hazardous or non-hazardous waste.

**4. Limitation of Liability.** The total liability, in the aggregate, of Brown Remediation, Inc. and its directors, officers, or employees, and any of them, to Client or anyone claiming by, under or through Client for any and all injuries, claims, losses, expenses, and damages whatsoever arising out of or in any way related to Brown Remediation, Inc. services, shall be limited to the total fees paid to Brown Remediation, Inc. under this agreement. In no event, however, shall any liability to Client exceed the amount of applicable insurance that Brown Remediation, Inc. has procured for services under this agreement. Brown Remediation, Inc. agrees to correct, at its own expense, any services provided that do not conform to the standard of care hereunder for a period of one year following the completion of services. No other guarantee or warranty, express or implied, is intended by this agreement. Client and Brown Remediation, Inc. waive incidental, indirect, or consequential damages, lost revenues or profits from claims, disputes or other matters in question arising out of or relating to this agreement, whether such claims arise from negligence, breach of contract, or strict liability.

**5. Payment Terms.** Brown Remediation, Inc. shall invoice Client for services in accordance with Brown Remediation, Inc. standard invoicing practices. Invoices are due and payable on receipt and should be remitted by check or wire transfer of immediately available funds. If Client fails to make any payment due Brown Remediation, Inc. for services and expenses within sixty (60) days after date of invoice, the amounts due Brown Remediation, Inc. will be increased at the rate of 2.5% from accounts not paid within sixty (60) days.

If Client reasonably objects to any portion of an invoice, Client shall provide written notification to Brown Remediation, Inc. of Client's objection and the basis for such objection within fifteen (15) days of the date of receipt of the invoice. Client shall not offset amounts due Brown Remediation, Inc. under this agreement for any credit or disputes arising under a different agreement. Client shall waive any objections to Brown Remediation, Inc.'s invoice if it fails to timely provide such written notice to Brown Remediation, Inc. In the event of litigation or other proceeding to enforce performance of this agreement or any payment obligation under this agreement, the prevailing party shall be entitled to recover from the other party attorneys' fees and costs as may be reasonably incurred by reason of the litigation.