

**MODIFIED CORRECTIVE ACTION PLAN
(COST PROPOSAL NO. 27)**

**VULCAN OIL COMPANY, INC.
SPRING VALLEY MARKET
2620 RICKS LANE
LEIGHTON, ALABAMA**

**FACILITY I.D. NO. 15201-033-013348
INCIDENT NO. UST07-09-02**

PPM PROJECT NO. 479617-MCAP

FEBRUARY 18, 2020



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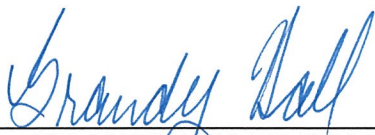
PREPARED FOR:

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SHANNON, ALABAMA 35142**

PPM PROJECT NO. 479617-MCAP

FEBRUARY 18, 2020

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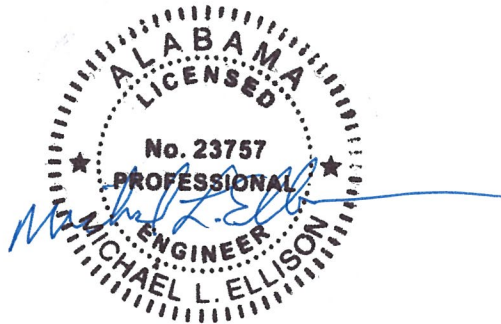
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Appendix E – Site Health and Safety Plan

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CERTIFICATION PAGE

I certify under penalty of law that this Modified Corrective Action Plan for the Spring Valley Market facility located at 2620 Ricks Lane, Leighton, 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. It is noted that all soil and most groundwater data used to develop this Modified CAP were obtained and reported by a prior consultant that completed the associated project work at this site. It has been assumed that this information is true, accurate, and complete.



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

02/18/20

Date

UST RELEASE FACT SHEET

GENERAL INFORMATION:

SITE NAME: Spring Valley Market

ADDRESS: 2620 Ricks Lane, Leighton, Alabama

FACILITY I.D. NO.: 15201-033-013348

INCIDENT NO.: UST07-09-02

RESULTS OF EXPOSURE ASSESSMENT:

How many private drinking water wells are located within 1,000 ft. of site?	3 (Inactive)
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: <input checked="" type="checkbox"/> Gasoline, <input type="checkbox"/> Diesel, <input type="checkbox"/> Waste Oil <input type="checkbox"/> Kerosene, <input type="checkbox"/> Other __	
Free product present in wells? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Maximum COC concentration measured in soil:	27.510 mg/kg TPH
Current maximum COC concentrations measured in groundwater: (11/7/19)	0.685 mg/L benzene (DW-1) 1.981 mg/L BTEX (RW-1) 0.088 mg/L MTBE (DW-4) 2.010 mg/L naphthalene (RW-1)

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: Spring Valley Market
 SITE ADDRESS: 2620 Ricks Lane, Leighton, Alabama

FACILITY I.D. NO.: 15201-033-013348
 INCIDENT NO.: UST07-09-02

OWNER NAME: Vulcan Oil Company, Inc.
 OWNER ADDRESS: P.O. Box 100, Shannon, Alabama 35142

NAME & ADDRESS OF PERSON COMPLETING THIS FORM: Brandy Baltz Hall, P.G., PPM Consultants, Inc.
5555 Bankhead Highway, Birmingham, Alabama 35210

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

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

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

ADDITIONAL COMMENTS:

Three domestic water wells have been identified within 1,000 feet of the site. The wells are not used for drinking water as city water has been provided for this area; however, the two residential wells are utilized for irrigation purposes during the dry season. The old school well (now Superior Septic) is not in use. It is believed that there may be more domestic water wells in the area, though confirmation has not been received.

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:	F.2
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ADEM GROUNDWATER BRANCH
SITE CLASSIFICATION CHECKLIST
(5/8/95)

1.0 INTRODUCTION

PPM Consultants, Inc. (PPM) was retained by Vulcan Oil Company, Inc. (Vulcan) to prepare this Modified Corrective Action Plan (CAP) for the Spring Valley Market facility located at 2620 Ricks Lane in Leighton, Alabama. The preparation of the Modified CAP was authorized by the Alabama Department of Environmental Management (ADEM) with approval of Cost Proposal No. 27 via letter dated August 1, 2019.

The purpose of this Modified CAP is to provide an approach to decrease constituent of concern (COC) concentrations in groundwater to below Site-Specific Corrective Action Levels (SSCALs). The COCs for the site include benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary butyl ether (MTBE), and naphthalene.

Prior corrective actions at the site have consisted of periodic mobile enhanced multi-phase extraction (MEME) events and remediation by natural attenuation (RNA) monitoring intended to address COC impact in groundwater. Although reductions in dissolved COC concentrations were observed over time, additional corrective actions are necessary to achieve site objectives in a more-timely manner.

Through discussions with ADEM, sparge points for air sparging will be installed to augment on-going MEME events within the target area.

This Modified CAP provides a summary of pertinent environmental activities conducted to date at the facility and a detailed description of the proposed approach for continued site remediation. A schedule and cost estimates are included for the implementation of the Modified CAP and associated effectiveness monitoring.

2.0 SITE BACKGROUND

2.1 SITE LOCATION

The Spring Valley Market facility is operated as a retail petroleum facility and convenience store located in a commercial/residential area of Leighton, Alabama. The site is located in the northwest ¼ of the northwest ¼ of Section 5, Township 4 South, Range 10 West of the Leighton, Alabama Quadrangle map. More specifically, the site is located at approximately 34° 39' 23" north latitude and 87° 36' 58" west longitude. The site location is shown in **Figure 1, Site Location Map** in **Appendix A, Figures**.

2.2 SURROUNDING AREA

The surrounding area is generally comprised of residential properties. Ricks Lane and County Road 77 border the site to the north and west, respectively. Residential areas are located to the east, south, and west of the site. Agricultural properties are located to the northwest and north along the opposing side of Ricks Lane.

2.3 SITE DESCRIPTION

The topography of the site is relatively flat. Structures present at the site include the store building, canopy, and two gasoline dispensers northwest of the store. Additionally, there are three storage sheds and a propane above ground storage tank (AST) located at the site. Asphalt covers the surface area of the site to the northwest of the facility building, gravel to the northeast and southwest of the store building and underground storage tank (UST) pit, concrete covers the UST pit and product lines, and grass covers the property to the south.

The UST system consists of four USTs of steel construction (situated in a single tank pit) and associated transfer lines. The UST pit is located southwest of the store building and contains one, 8,000-gallon unleaded gasoline tank, one 4,000-gallon diesel tank, and two 1,000-gallon premium gasoline tanks.

Service lines for water and natural gas are located on the property. The water and gas lines traverse west to east along Ricks Lane. The service water line traverses northeast to southwest to the eastern corner of the store building. The location of the service line for natural gas is unknown. Site features and utilities are shown in **Figure 2, Site Map**.

2.4 SITE HISTORY

The following provides a brief summary of pertinent activities conducted at the site as obtained from GeoService, Inc.:

The existing piping for the USTs currently located onsite was replaced in June 2007. An ADEM UST Closure Site Assessment Report was completed by Karst Environmental. During the UST Closure Site Assessment, soil samples were collected from the piping trench associated with the removed petroleum product piping. Results of the soil samples indicated total petroleum hydrocarbon (TPH) concentrations to be below the initial screening level (ISL) defined by ADEM. However, during the product piping removal

activities, petroleum impacted soil was observed. Based upon the results of the UST Closure Site Assessment, ADEM issued a Requirement to Conduct Investigative and Corrective Actions at the subject site.

Smith Drilling, Inc. initiated four soil borings on December 17, 2007. Soil boring MW-1 was converted into a 2-inch groundwater monitoring well. Free product was observed on the surface of the groundwater in MW-1. The Preliminary Investigation determined that the groundwater at the subject site had been impacted by an unintentional release of petroleum products. The extent of the contamination could not be determined at that time. GeoService recommended performing a Secondary Investigation to delineate the vertical and horizontal extent of the petroleum release at the subject site.

GeoService conducted site visits and free product recovery at the subject site on December 19, 2007, January 2, 2008, and January 14, 2008. MW-1 did not show any measurable product; however, a sheen was observed during each visit. Approximately 0.15 gallons of free product was recovered during the site visits.

Smith Drilling installed five soil borings on July 6, 2009. One of the soil borings was converted into MW-2, and one of the soil borings was converted into DW-1. The other soil borings were abandoned. Smith Drilling initiated four additional soil borings on August 13, 2009. Each of these soil borings were converted into Type III monitoring wells (DW-2 through DW-5). The Secondary Investigation determined that dissolved petroleum hydrocarbon contamination in soil and groundwater beneath the subject site extends generally in a northeastward direction across the subject site property. Free product was observed in MW-1 and DW-1. A groundwater monitoring event was conducted on August 25, 2009, and indicated that the MTBE concentrations in DW-2 through DW-5 were above the ISL. Groundwater flow was generally towards the northeast.

The Secondary Investigation Report was submitted to ADEM on March 22, 2010. Based upon the results of the Secondary Investigation, it was determined that the petroleum product plume at the subject site should be delineated offsite.

GeoService conducted a groundwater sampling event on January 31, 2014. Groundwater monitoring wells MW-1, MW-2, and DW-1 through DW-5 were sampled during this event. COC concentrations in the samples from MW-1, and DW-1 through DW-5 exceeded ISLs.

GeoService conducted a groundwater sampling event on July 22, 2014. Groundwater monitoring wells MW-1, MW-2, and DW-1 through DW-5 were sampled during the event.

COC concentrations in the samples collected from MW-1, DW-1, DW-3, DW-4, and DW-5 exceeded ISLs.

GeoService submitted an Additional Well Installation Plan to ADEM on August 6, 2014. Two additional Type II wells (DW-6 and DW-7) were installed on the adjacent properties to the north and east on February 11, 2015. Shallow bedrock was encountered at each boring location; therefore, the outer casing for typical Type III wells was not utilized. Soil samples were not collected from DW-7. The one soil sample collected from DW-6 was below detection limits (BDL) for all constituents. Groundwater sampling was conducted on March 23, 2015. COC concentration in the samples collected from MW-1, DW-1, DW-3, DW-4, and DW-5 exceeded ISLs.

An Alabama Risk Based Corrective Action (ARBCA) Evaluation was submitted to ADEM in September 2014. At ADEM's request, a revised ARBCA Evaluation was submitted on January 21, 2015. ADEM approved the site specific target levels (SSTLs) in correspondence dated April 28, 2015.

GeoService submitted a CAP on August 22, 2016. The CAP recommended performing two 24-hour MEME events along with limited groundwater sampling. ADEM requested that the CAP and associated cost proposals be revised to include the installation of at least one recovery well. A revised CAP was submitted on October 14, 2016, and was approved on December 6, 2016.

On December 28, 2016, monitoring well MW-1 was over-drilled and replaced with a 4-inch recovery well (RW-1). 24-hour MEME events were conducted in February and March 2017, and a groundwater sampling event was conducted on March 17, 2017. Triannual groundwater monitoring with MEME events has been ongoing since that time.

Vulcan retained PPM on July 15, 2019, to be the Alabama Tank Trust Fund (ATTF) contractor for future investigative and corrective actions for the incident.

RNA Monitoring

A 24-hour MEME event was conducted at the site in September 2019, and a groundwater sampling event was completed at the site in November 2019, followed by another 24-hour MEME event conducted in November 2019. COC concentrations exceeded the SSCALs in samples collected from DW-1 and RW-1. Dissolved COC concentrations decreased

below the SSCALs in DW-5. An estimated 209.7 pounds (34.1 equivalent gallons) of hydrocarbons were removed from the site during the period.

2.5 SITE CONDITIONS

2.5.1 COCs in Soil

Analytical data for soil samples obtained during prior investigations conducted at the site indicate that COC concentrations were detected in the soil borings for MW-1 (now RW-1), MW-2, and DW-1. These detected concentrations were located between 5 and 14 feet below ground surface (BGS). Based on the results of prior investigations, soil impact appears to be localized in the area near the UST system. COC concentrations exceeded the SSCALs in the samples collected from the soil borings for MW-1 (converted to RW-1) and DW-1.

A summary of COC concentrations in soil is provided in **Table 1, Soil Analytical Summary** in **Appendix B, Tables**.

2.5.2 Groundwater Elevations

Groundwater levels measured in the monitoring wells on November 7, 2019, ranged from 2.16 feet below top of casing (BTOC) in DW-2 to 20.78 feet BTOC in DW-6.

The groundwater flow direction appeared to be generally toward the northeast, which is similar to observations noted during previous events. The hydraulic gradient measured between monitoring wells DW-1 and DW-6 was estimated to be 0.097 feet/foot (ft/ft). **Figure 3, Groundwater Elevation Map (November 7, 2019)** depicts the groundwater elevation and estimated flow direction. Groundwater elevation data are shown in **Table 2, Groundwater Elevation Survey Data**.

2.5.3 COCs in Groundwater

No measurable free product was encountered in any of the monitoring wells sampled on November 7, 2019. The following ranges of dissolved COC concentrations were observed during the current event:

- Benzene: <0.001 milligrams per liter (mg/L) – 0.685 mg/L
- Toluene: <0.001 mg/L – 0.645 mg/L
- Ethylbenzene: <0.001 mg/L – 0.822 mg/L

- Total Xylenes: <0.003 mg/L – 0.645 mg/L
- Total BTEX: BDL – 1.981 mg/L
- MTBE: <0.001 mg/L – 0.088 mg/L
- Naphthalene: <0.005 mg/L – 2.010 mg/L.

The dissolved benzene and naphthalene concentrations at DW-1 and RW-1 exceeded the respective SSCALs. Benzene concentrations at RW-1 have steadily declined since the installation of the well in 2017 and the most recent concentration is the lowest detected at the well. However, the most recent naphthalene concentration is the highest detected at the well since MW-1 was converted into RW-1. Benzene and naphthalene concentrations at DW-1 have fluctuated consistently throughout the sampling efforts.

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

- **Figure 4, Dissolved Benzene Isoconcentration Map (November 7, 2019)**
- **Figure 5, Dissolved MTBE Isoconcentration Map (November 7, 2019)**
- **Figure 6, Dissolved Naphthalene Isoconcentration Map (November 7, 2019).**

3.0 REMEDIAL APPROACH

3.1 REMEDIAL OBJECTIVES

This Modified CAP has been prepared to achieve the following objectives:

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

3.2 CORRECTIVE ACTION OVERVIEW

Continued corrective action will consist of air sparge (AS) techniques in conjunction with MEME events. The MEME/AS events will be conducted by Fruits & Associates, Inc. Once air sparge efforts are discontinued, RNA monitoring will resume at the site.

Subsequent groundwater monitoring events are recommended throughout corrective action activities to assess the overall effectiveness of the remedial approach and to aid in selecting the future course of actions at the site. The following provides a description of the proposed corrective actions and associated effectiveness monitoring.

3.3 OVERVIEW OF AIR SPARGE

Air sparging involves injecting or sparging contaminant-free air at controlled pressures and volumes into the groundwater via a well that is screened within the groundwater. The sparged air migrates upward through the groundwater into the unsaturated zone. Two important processes occur as the air travels through the subsurface and groundwater: 1) in-situ stripping and volatilization of select contaminants occurs within the screened zone of the groundwater, and 2) enhanced biodegradation of both dissolved and adsorbed phase contaminants occurs because of increase in dissolved oxygen levels.

Temporary air sparging events at moderate to high volumes were considered as a viable technology in conjunction with MEME events for removal of vapor and groundwater and to reduce the potential for spreading COC impact to other areas. Air sparging during MEME events could be a viable approach should MEME events alone prove to be unsuccessful at reaching cleanup goals.

3.4 OVERVIEW OF MEME EVENTS

MEME is a common remedial technology that has proven to be effective at removing select adsorbed 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. Additionally, MEME technology has had success at the site in the past. Soil at the site is primarily clay which limits the effectiveness of MEME in treating groundwater; however, because of lower dissolved COC concentrations and the cost effectiveness of the technology, MEME events are considered a feasible approach for the site.

3.5 REMEDIATION BY NATURAL ATTENUATION

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

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

If dissolved COC concentrations appear to be stable and are at or just below SSCALs, an RNA monitoring program may be implemented at the site. It is anticipated that ozone sparge will not only reduce the overall contaminant mass, but will also create conditions conducive to microbial activity. If so, an RNA monitoring program may be necessary to ensure that active remediation is no longer warranted at the site.

Select water quality parameters [pH, temperature, specific conductance, oxidation reduction potential (ORP), and dissolved oxygen (DO)] will also be monitored during the RNA groundwater monitoring events.

3.6 SPARGE POINTS

PPM recommends that air sparge be applied to the subsurface by means of three sparge points strategically placed on the property.

The air sparge points will be constructed to a depth of approximately 15 feet BGS with 2-inch inside diameter (I.D.) Schedule (SCH) 40 polyvinyl chloride (PVC) riser with approximate 10-foot lengths of flush threaded, 0.01-inch slotted screen. Well sorted sand will be placed in the boring annulus for the new points to approximately 1-foot above the screen. A bentonite seal approximately 3 to 4 feet thick will be constructed above the sand pack, and the remaining annular space will be grouted to just below the ground surface. The sparge points will be completed at the surface with 12-inch diameter steel manhole covers and set in 2-foot by 2-foot concrete pads. The sparge points will be furnished with watertight locking caps for protection against infiltration and tampering.

The locations of the proposed sparge points can be seen on **Figure 7, Proposed Sparge Point Locations**. Construction details for the proposed sparge points are located in **Appendix C, Schematic**. The quote provided by Technical Drilling Services, Inc. is included in **Appendix D, Subcontractor Quotes**.

Existing monitoring wells will be used to monitor site response and to serve as locations for measuring pressure gradients. Should the radius of influence from these sparge points be deemed insufficient to contact the majority of COC impact over time, additional sparge points may be added as needed.

3.7 ANTICIPATED SITE RESPONSE

PPM anticipates that MEME/AS combined with RNA groundwater monitoring will enhance the site cleanup; however, it is difficult to quantitatively predict the clean-up time. As a conservative approach, PPM anticipates one to three years to reduce dissolved COC concentrations to below SSCALs.

3.8 PERMITS

Once the CAP and associated cost proposals are approved, PPM will apply for an Underground Injection Control (UIC) permit, which is required prior to sparging air at the site. Notification to the ADEM Air Division will be required for the emissions from the periodic MEME/AS events. A waste profile will be required for disposal of solid waste generated during the sparge point installation process.

4.0 PROPOSED SCOPE OF WORK

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

- Performance of bi-weekly 8-hour MEME/AS events as needed to reduce petroleum hydrocarbons
- Completion of quarterly groundwater elevation surveys
- Collection of groundwater samples from site wells on a quarterly basis for analysis of COCs per Environmental Protection Agency (EPA) Method 8260
- Disposal of accumulated purge water and water recovered from the MEME/AS events
- Preparation of quarterly RNA groundwater monitoring reports that present the findings and conclusions from the MEME/AS events 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.

5.0 FIELDWORK METHODOLOGY

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

5.1 MEME/AS EVENTS

To reduce adsorbed and dissolved COC concentrations at the site, bi-weekly 8-hour MEME/AS events will be conducted twice a month during the first two quarters, then once a month for the following quarters.

A representative of PPM will be on site during the MEME/AS events, which will be conducted by Fruits & Associates, 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/AS events will concentrate at extracting impact primarily from monitoring well DW-1 and recovery well RW-1. Additionally, air will be sparged into the subsurface during the events, utilizing the three proposed sparge points. The quote provided by Fruits & Associates can be found in **Appendix D**.

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 during the events. 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/AS events can be modified, with ADEM approval, based on results of subsequent groundwater sampling activities.

5.2 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.

5.3 GROUNDWATER SAMPLING

Monitoring wells will be sampled quarterly in general accordance with PPM's internal QA/QC plan. Full scope sampling will be conducted during each quarter. Groundwater sampling will occur approximately one week prior to the sixth 8-hour MEME/AS event to be conducted at the site for the quarter. Prior to sampling, each well will be purged of approximately three well-casing volumes (or to near dryness) in an effort to obtain samples representative of subsurface conditions. Single use, disposable PVC bailers, and nylon rope will be used to purge each well and to facilitate sample collection. Purge water from all wells will be temporarily stored in drums and removed from the site during the subsequent 8-hour MEME/AS event. Fruits & Associates, Inc. will transport the water to Sunoco, LLC 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.

5.4 SAMPLE PRESERVATION AND DISPATCH

Groundwater samples retained for laboratory analyses will be promptly placed on ice and cooled to or near 4 degrees Celsius (°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.

5.5 LABORATORY ANALYSES

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

6.0 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/AS 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.

7.0 SITE HEALTH AND SAFETY

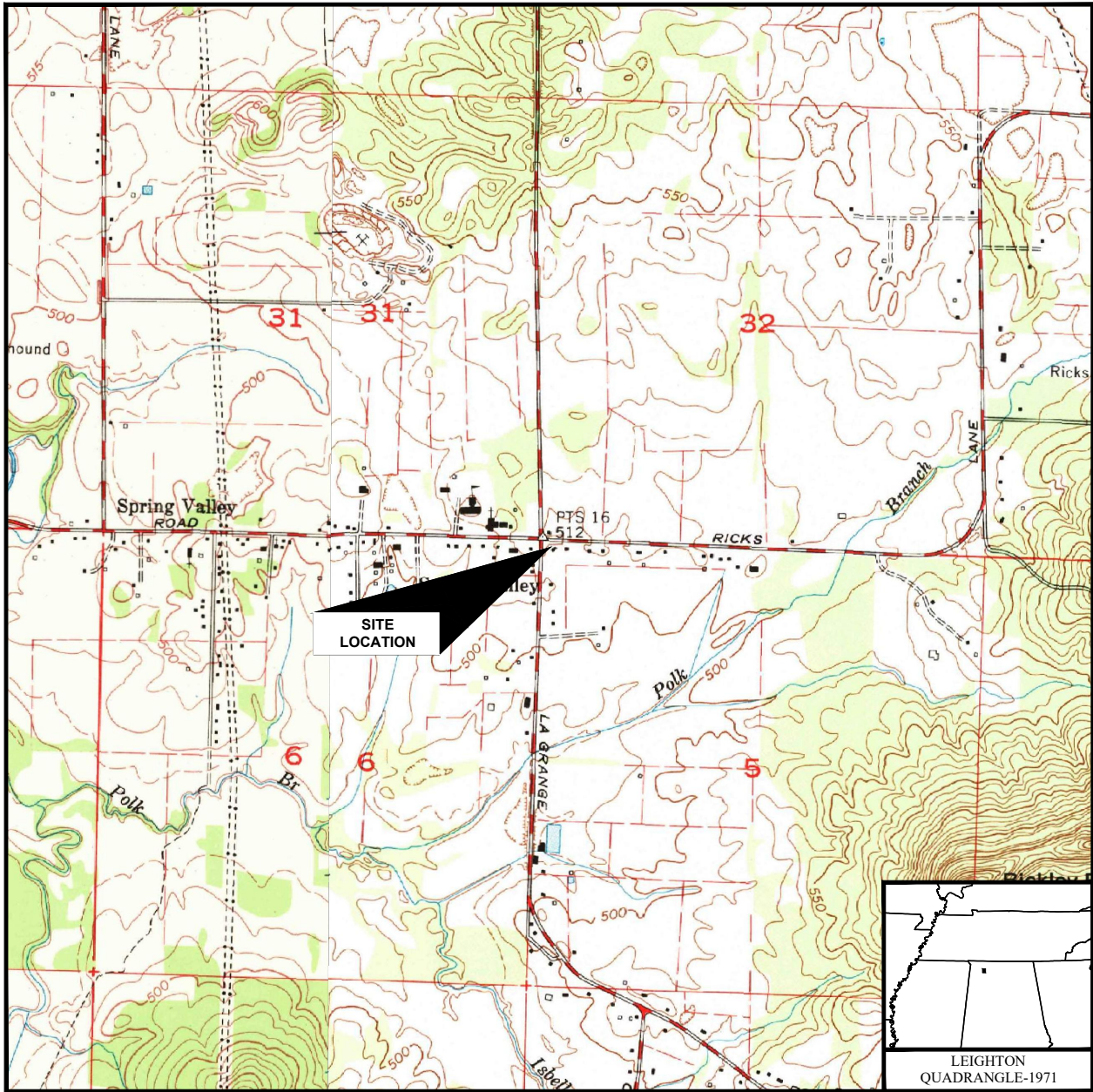
A site-specific Health and Safety Plan (HASP) for the proposed corrective action activities at the facility is included in **Appendix E, Site Health and Safety Plan**. The HASP was specifically designed to address the proposed activities at the site. All project personnel will be familiar with the HASP,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

8.0 PROJECT SCHEDULE

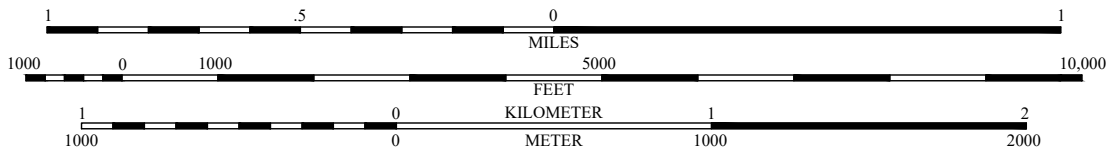
PPM proposes to conduct the MEME/AS events and effectiveness monitoring on a quarterly basis for at least one year or until COC concentrations at the facility remain at or below SSCALs for two consecutive quarterly periods. Groundwater sampling will be conducted approximately one week prior to the final MEME/AS event of each quarter. 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. If COC concentrations in DW-1 do not decrease, PPM will recommend over-drilling the well to convert into a recovery well and installing a sparge point into bedrock. Cost Proposals for this work are included in **Appendix F, Cost Proposals**.


APPENDICES

APPENDIX A – FIGURES



SCALE: 1 : 24,000



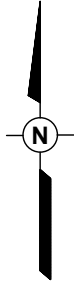
 PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: BWH	DRAWN DATE: 02/12/20
PROJECT NUMBER: 479617	PHASE: MCAP

VULCAN OIL COMPANY, INC.
SPRING VALLEY MARKET
 2620 RICKS LANE
 LEIGHTON, ALABAMA

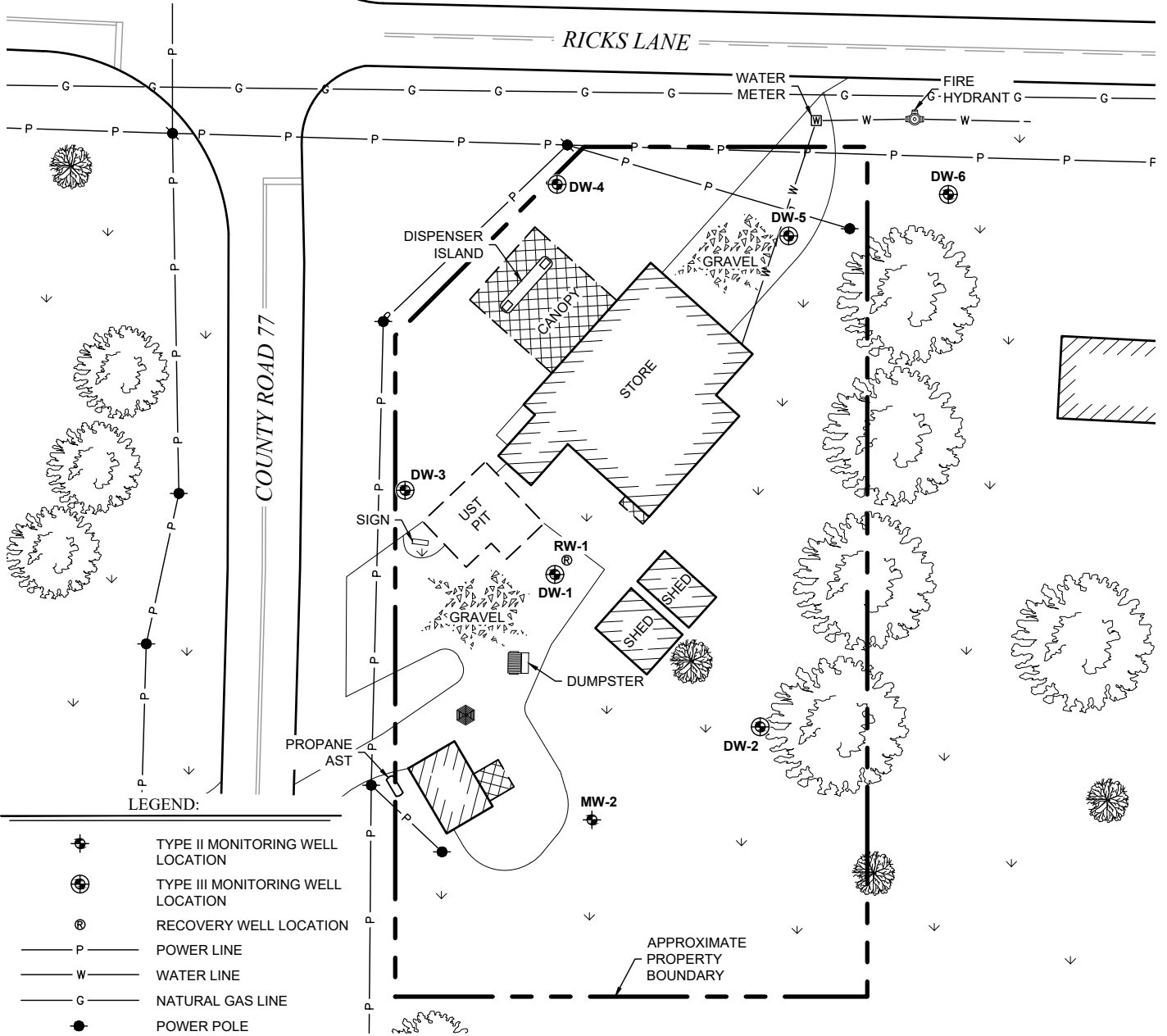
SITE LOCATION MAP

FIGURE NUMBER

1



0 25 50
SCALE: 1"=50'
 (Approximate)



LEGEND:

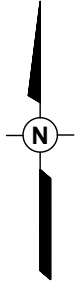
- TYPE II MONITORING WELL LOCATION
- TYPE III MONITORING WELL LOCATION
- RECOVERY WELL LOCATION
- POWER LINE
- WATER LINE
- NATURAL GAS LINE
- POWER POLE

PPM PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: BWH	DRAWN DATE: 02/12/20
PROJECT NUMBER: 479617	PHASE: MCAP

VULCAN OIL COMPANY, INC.
SPRING VALLEY MARKET
 2620 RICKS LANE
 LEIGHTON, ALABAMA

SITE MAP

FIGURE NUMBER
2

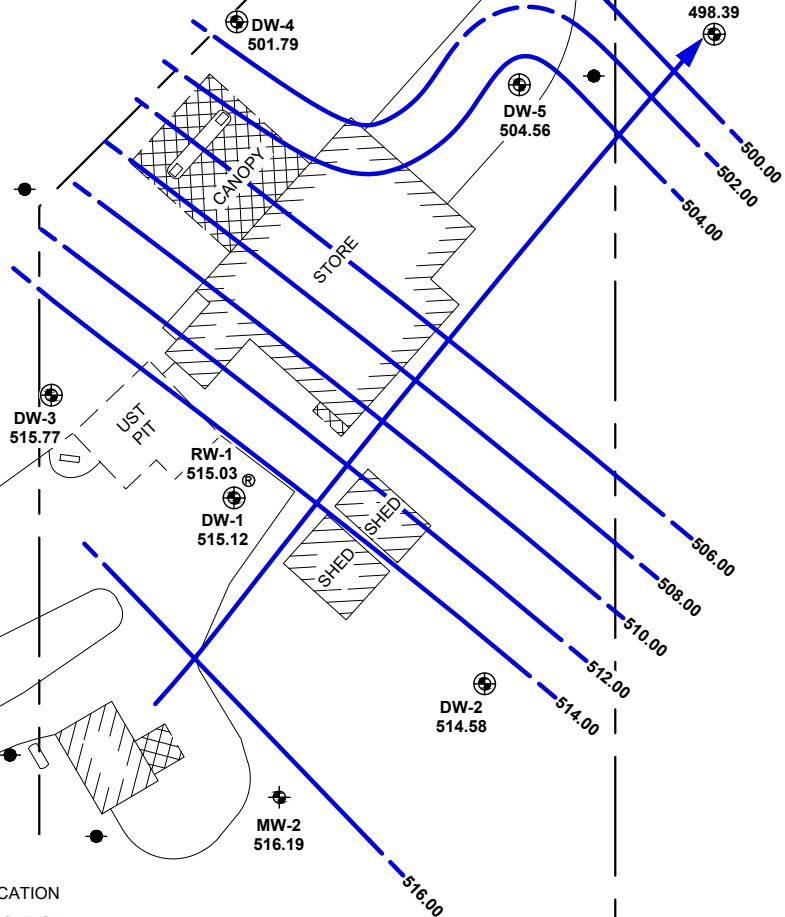


0 25 50
SCALE: 1"=50'
 (Approximate)

DW-7
 NOT LOCATED

RICKS LANE

COUNTY ROAD 77



LEGEND:

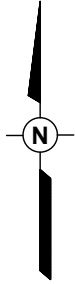
- TYPE II MONITORING WELL LOCATION
- TYPE III MONITORING WELL LOCATION
- RECOVERY WELL LOCATION
- 516.19 GROUNDWATER ELEVATION (ft.)
- GROUNDWATER ELEVATION CONTOUR (ft.)
- GROUNDWATER FLOW DIRECTION

PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: BWH	DRAWN DATE: 02/12/20
PROJECT NUMBER: 479617	PHASE: MCAP

VULCAN OIL COMPANY, INC.
SPRING VALLEY MARKET
 2620 RICKS LANE
 LEIGHTON, ALABAMA

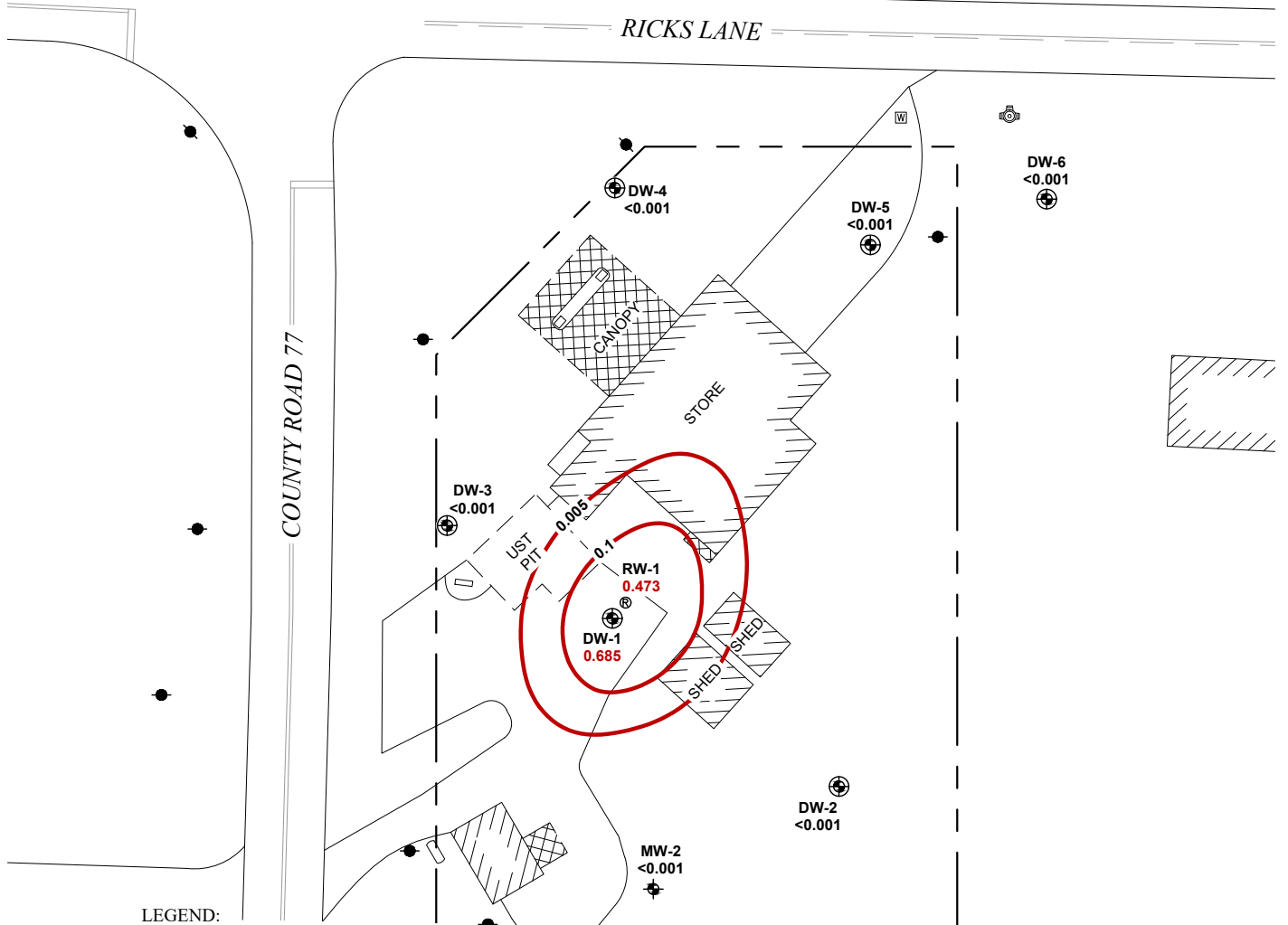
GROUNDWATER
 ELEVATION MAP
 (NOVEMBER 7, 2019)

FIGURE
 NUMBER
3






0 25 50

SCALE: 1"=50'
(Approximate)



LEGEND:

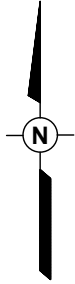
-  TYPE II MONITORING WELL LOCATION
-  TYPE III MONITORING WELL LOCATION
-  RECOVERY WELL LOCATION
- 0.473 BENZENE CONCENTRATION (mg/L)
(VALUES IN RED EXCEED ISL)
- - - 0.005 BENZENE CONCENTRATION CONTOUR (mg/L)
- NS NOT SAMPLED

PPM PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: BWH	DRAWN DATE: 02/12/20
PROJECT NUMBER: 479617	PHASE: MCAP

VULCAN OIL COMPANY, INC.
SPRING VALLEY MARKET
 2620 RICKS LANE
 LEIGHTON, ALABAMA

**DISSOLVED BENZENE
 ISOCONCENTRATION
 MAP
 (NOVEMBER 7, 2019)**

FIGURE
 NUMBER
4

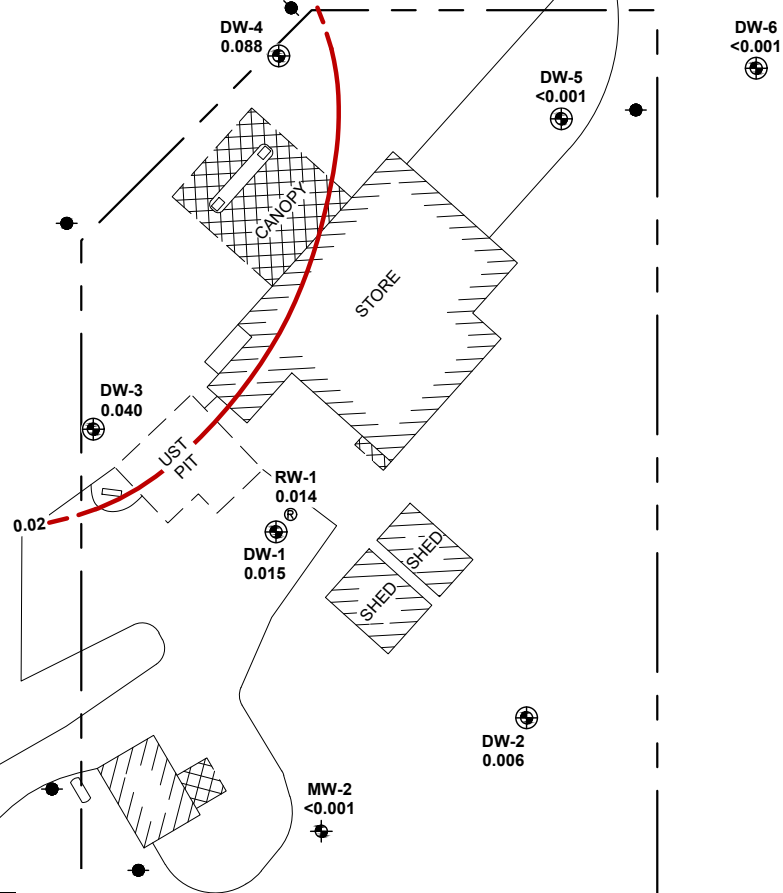


0 25 50




SCALE: 1"=50'
(Approximate)


COUNTY ROAD 77

RICKS LANE



LEGEND:

-  TYPE II MONITORING WELL LOCATION
-  TYPE III MONITORING WELL LOCATION
-  RECOVERY WELL LOCATION
- 0.014** MTBE CONCENTRATION (mg/L)
- 0.02** MTBE CONCENTRATION CONTOUR (mg/L)
- NS** NOT SAMPLED

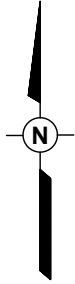
 PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: BWH	DRAWN DATE: 02/12/20
PROJECT NUMBER: 479617	PHASE: MCAP

VULCAN OIL COMPANY, INC.
SPRING VALLEY MARKET
2620 RICKS LANE
LEIGHTON, ALABAMA

DISSOLVED MTBE
ISOCONCENTRATION
MAP
(NOVEMBER 7, 2019)

FIGURE
NUMBER

5



0 25 50

SCALE: 1"=50'
(Approximate)

RICKS LANE

COUNTY ROAD 77

DW-7
NS

DW-6
<0.005

DW-5
<0.005

DW-4
<0.005

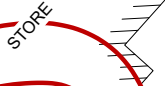
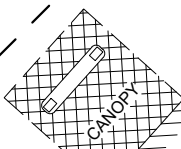
DW-3
<0.005

DW-1
0.655

MW-2
<0.005

DW-2
<0.005

RW-1
2.010



LEGEND:



TYPE II MONITORING WELL LOCATION



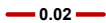
TYPE III MONITORING WELL LOCATION



RECOVERY WELL LOCATION

2.010

NAPHTHALENE CONCENTRATION (mg/L)
(VALUES IN RED EXCEED ISL)



NAPHTHALENE CONCENTRATION CONTOUR (mg/L)

NS

NOT SAMPLED



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SPRING VALLEY MARKET
2620 RICKS LANE
LEIGHTON, ALABAMA

DISSOLVED
NAPHTHALENE
ISOCONCENTRATION
MAP
(NOVEMBER 7, 2019)

FIGURE
NUMBER

6

DRAWN BY:

BWH

DRAWN DATE:

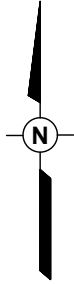
02/12/20

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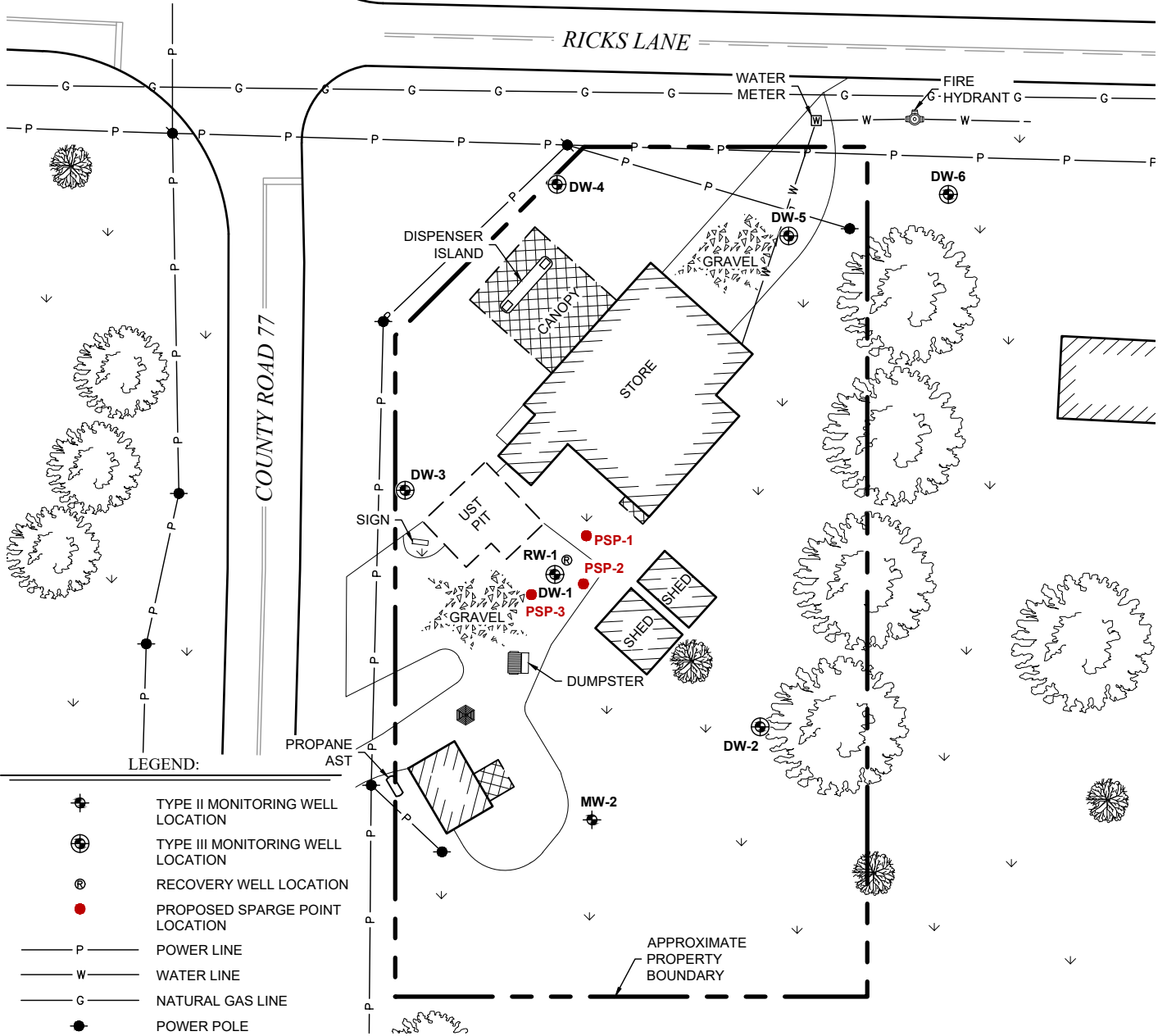
479617


PHASE:

MCAP



0 25 50
SCALE: 1"=50'
 (Approximate)



 PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: BWH	DRAWN DATE: 02/12/20
PROJECT NUMBER: 479617	PHASE: MCAP

VULCAN OIL COMPANY, INC.
SPRING VALLEY MARKET
 2620 RICKS LANE
 LEIGHTON, ALABAMA

**PROPOSED
 SPARGE POINT
 LOCATIONS**

FIGURE
 NUMBER
7

APPENDIX B – TABLES

**TABLE 1
SOIL ANALYTICAL SUMMARY
SPRING VALLEY MARKET
LEIGHTON, ALABAMA**

SAMPLE I.D.	SAMPLE DEPTH (ft BGS)	SAMPLE DATE	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL-BENZENE (mg/kg)	XYLENES (mg/kg)	TOTAL BTEX (mg/kg)	MTBE (mg/kg)	NAPH-THALENE (mg/kg)
MW-1 8-10	8-10	12/17/07	0.750	1.960	4.800	20.000	27.510	<0.250	6.950
MW-1 13-14	13-14	12/17/07	0.120	0.010	0.280	0.260	0.670	<0.035	0.650
B-2 3-5	3-5	12/17/07	<0.005	<0.005	<0.005	<0.005	BDL	<0.005	<0.050
B-3 3-5	3-5	12/17/07	<0.005	<0.005	<0.005	<0.005	BDL	<0.005	<0.050
B-4 3-5	3-5	12/17/07	<0.005	<0.005	<0.005	<0.005	BDL	<0.005	<0.050
B1-1 (MW-2)	5	07/06/09	0.005	0.032	0.013	0.077	0.127	<0.005	<0.050
B2-1	5	07/06/09	<0.005	0.027	0.011	0.065	0.103	<0.005	<0.050
B3-1	5	07/06/09	<0.005	0.011	0.007	0.045	0.063	<0.005	<0.050
B4-1	5	07/06/09	<0.005	<0.005	<0.005	<0.005	BDL	<0.005	<0.050
B5-1 (DW-1)	5	07/06/09	0.160	<0.025	0.395	5.030	5.585	<0.025	2.540
B5-2 (DW-1)	10	07/06/09	0.016	0.013	0.049	0.275	0.353	0.014	<0.050
DW-6	0-2	02/11/15	<0.005	<0.005	<0.005	<0.015	BDL	<0.005	<0.050
SSCALs - Commercial Ind. Inh.			2,480	8,750	4,080	5,150	--	79,000	4,330
SSCALs - GRP Values (Source)			0.508	227	230	400	--	0.448	0.380

Notes: *ft BGS - feet below ground surface (approximate)*
 ppmv - parts per million by volume
 mg/kg - milligrams per kilogram
 BDL - below detection limit
 SSCALs - Site Specific Corrective Action Levels
 GRP - Groundwater Resource Protection
 Bold type indicates concentration exceeds SSCAL

Source: *GeoService, Inc.*
 PPM Consultants, Inc.
 PPM Project No. 479617-MCAP

**TABLE 2
GROUNDWATER ELEVATION SURVEY DATA
SPRING VALLEY MARKET
LEIGHTON, ALABAMA**

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	GROUND-WATER ELEVATION (ft)
MW-1	8/25/2009	520.00	14.0	9.0-14.0	7.91	512.09
	1/31/2014				7.13	512.87
	4/17/2014				4.89	515.11
	7/22/2014				4.38	515.62
	10/23/2014				5.68	514.32
	3/23/2015				4.30	515.70
	8/21/2015				4.83	515.17
	11/4/2015				4.83	515.17
	2/3/2016				3.67	516.33
	5/17/2016				8.09	511.91
Monitoring well was replaced with RW-1 in 2017.						
MW-2	8/25/2009	519.67	8.0	3.0-8.0	5.98	513.69
	1/31/2014				5.35	514.32
	4/17/2014				4.51	515.16
	7/22/2014				4.09	515.58
	10/23/2014				3.95	515.72
	3/23/2015				3.25	516.42
	8/21/2015				4.13	515.54
	11/4/2015				4.30	515.37
	2/3/2016				3.55	516.12
	5/17/2016				5.59	514.08
	3/17/2017				3.22	516.45
	6/29/2017				4.92	514.75
	11/10/2017				3.56	516.11
	3/2/2018				1.24	518.43
	6/28/2018				3.96	515.71
	10/12/2018				5.45	514.22
1/28/2019	2.56	517.11				
7/2/2019	4.46	515.21				
11/7/2019	519.65	8.2	3.46	516.19		
DW-1	8/25/2009	520.08	20.0	13.0-20.0	8.05	512.03
	1/31/2014				6.75	513.33
	4/17/2014				4.89	515.19
	7/22/2014				4.22	515.86
	10/23/2014				5.79	514.29
	3/23/2015				3.66	516.42
	8/21/2015				4.92	515.16
	11/4/2015				4.91	515.17
	2/3/2016				3.76	516.32
	5/17/2016				6.95	513.13
	3/17/2017				4.71	515.37
	6/29/2017				6.42	513.66
	11/10/2017				4.26	515.82
	3/2/2018				1.56	518.52
	6/28/2018				5.15	514.93
	10/12/2018				7.60	512.48
	1/28/2019				3.52	516.56
	7/2/2019				6.56	513.52
11/7/2019	520.08	18.9	4.96	515.12		

**TABLE 2
GROUNDWATER ELEVATION SURVEY DATA
SPRING VALLEY MARKET
LEIGHTON, ALABAMA**

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	GROUND-WATER ELEVATION (ft)
DW-2	8/25/2009	517.74	18.0	12.0-18.0	6.14	511.60
	1/31/2014				3.80	513.94
	4/17/2014				2.31	515.43
	7/22/2014				2.27	515.47
	10/23/2014				2.63	515.11
	3/23/2015				1.04	516.70
	8/21/2015				2.61	515.13
	11/4/2015				2.50	515.24
	2/3/2016				NM	NM
	5/17/2016				3.55	514.19
	3/17/2017				1.64	516.10
	6/29/2017				3.78	513.96
	11/10/2017				2.22	515.52
	3/2/2018				NM	NM
	6/28/2018				2.10	515.64
	10/12/2018	3.69	514.05			
1/28/2019	1.80	515.94				
7/2/2019	3.89	513.85				
11/7/2019	516.74	18.0		2.16	514.58	
DW-3	8/25/2009	521.18	20.0	10.0-20.0	8.12	513.06
	1/31/2014				6.59	514.59
	4/17/2014				5.85	515.33
	7/22/2014				5.47	515.71
	10/23/2014				6.31	514.87
	3/23/2015				4.45	516.73
	8/21/2015				5.84	515.34
	11/4/2015				7.22	513.96
	2/3/2016				5.26	515.92
	5/17/2016				7.85	513.33
	3/17/2017				5.46	515.72
	6/29/2017				7.00	514.18
	11/10/2017				6.70	514.48
	3/2/2018				2.93	518.25
	6/28/2018				5.70	515.48
	10/12/2018	7.79	513.39			
1/28/2019	4.45	516.73				
7/2/2019	7.02	514.16				
11/7/2019	520.99	19.7		5.22	515.77	

TABLE 2
GROUNDWATER ELEVATION SURVEY DATA
SPRING VALLEY MARKET
LEIGHTON, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	GROUND-WATER ELEVATION (ft)
DW-4	8/25/2009	524.41	29.0	19.0-29.0	22.76	501.65
	1/31/2014				20.23	504.18
	4/17/2014				19.25	505.16
	7/22/2014				18.25	506.16
	10/23/2014				19.91	504.50
	3/23/2015				16.47	507.94
	8/21/2015				20.35	504.06
	11/4/2015				20.54	503.87
	2/3/2016				13.69	510.72
	5/17/2016				20.37	504.04
	3/17/2017				18.49	505.92
	6/29/2017				20.31	504.10
	11/10/2017				19.16	505.25
	3/2/2018				3.80	520.61
	6/28/2018				19.79	504.62
	10/12/2018				20.32	504.09
1/28/2019	11.61	512.80				
7/2/2019	20.55	503.86				
11/7/2019	521.47	29.0	19.68	501.79		
DW-5	8/25/2009	519.84	25.0	15.0-25.0	17.30	502.54
	1/31/2014				16.13	503.71
	4/17/2014				15.88	503.96
	7/22/2014				15.27	504.57
	10/23/2014				15.82	504.02
	3/23/2015				15.30	504.54
	8/21/2015				15.93	503.91
	11/4/2015				15.73	504.11
	2/3/2016				10.91	508.93
	5/17/2016				16.50	503.34
	3/17/2017				15.35	504.49
	6/29/2017				16.20	503.64
	11/10/2017				15.76	504.08
	3/2/2018				2.38	517.46
	6/28/2018				16.18	503.66
	10/12/2018				16.96	502.88
1/28/2019	10.09	509.75				
7/2/2019	16.56	503.28				
11/7/2019	520.08	21.9	15.52	504.56		
DW-6	3/23/2015	518.91	25.0	10.0-25.0	17.33	501.58
	8/21/2015				23.31	495.60
	11/4/2015				23.29	495.62
	2/3/2016				9.47	509.44
	5/17/2016				23.82	495.09
	3/17/2017				19.24	499.67
	6/29/2017				19.49	499.42
	11/10/2017				21.32	497.59
	3/2/2018				13.97	504.94
	6/28/2018				22.88	496.03
	10/12/2018				DRY	DRY
	1/28/2019				10.10	508.81
	7/2/2019				DRY	DRY
11/7/2019	519.17	24.2	20.78	498.39		

**TABLE 2
GROUNDWATER ELEVATION SURVEY DATA
SPRING VALLEY MARKET
LEIGHTON, ALABAMA**

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	GROUND-WATER ELEVATION (ft)
DW-7	3/23/2015	519.72	25.0	10.0-25.0	18.74	500.98
	8/21/2015				22.53	497.19
	11/4/2015				23.09	496.63
	2/3/2016				10.08	509.64
	5/17/2016				23.30	496.42
	3/17/2017				20.55	499.17
	6/29/2017				NM	NM
	11/10/2017				NM	NM
	3/2/2018				16.01	503.71
	6/28/2018				21.98	497.74
	10/12/2018				23.85	495.87
	1/28/2019				11.08	508.64
	7/2/2019				NM	NM
	11/7/2019				NL	NL
RW-1	7/2/2019	NM	14.0	4.0-14.0	6.70	NM
	11/7/2019	520.13	13.9		5.10	515.03

Notes: *ft-BTOC - feet below top of casing*
Elevations based on survey performed by GeoService, Inc.
NM - Not Measured

Source(s): *GeoService, Inc.*
PPM Consultants, Inc.
PPM Project No. 479617-MCAP

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
SPRING VALLEY MARKET
LEIGHTON, ALABAMA

SAMPLE I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTHALENE (mg/L)
MW-1	8/25/2009	NS-FP	NS-FP	NS-FP	NS-FP	NS-FP	NS-FP	NS-FP
	1/31/2014	3.460	0.050	1.810	0.188	5.508	0.050	0.375
	4/17/2014	3.560	0.042	1.430	0.230	5.262	0.052	1.390
	7/22/2014	3.360	0.052	1.820	0.388	5.620	0.036	2.700
	10/23/2014	2.080	0.034	1.240	0.304	3.658	0.040	0.446
	3/23/2015	2.060	0.036	1.080	0.306	3.482	0.029	0.096
	8/21/2015	2.500	0.039	1.420	0.432	4.391	0.039	0.844
	11/4/2015	2.020	0.038	1.210	0.302	3.570	<0.001	0.544
	2/3/2016	2.000	0.035	1.120	0.310	3.465	0.026	0.860
5/17/2016	1.890	0.030	1.120	0.288	3.328	0.042	1.460	
Monitoring well converted into RW-1 in 2017.								
SSCALs		0.068	13.5	9.45	135	--	0.27	0.27
MW-2	8/25/2009	<0.001	<0.001	<0.001	<0.005	BDL	<0.005	<0.001
	1/31/2014	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	4/17/2014	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	7/22/2014	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	10/23/2014	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	3/23/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	8/21/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	11/4/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	2/3/2016	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	5/17/2016	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	3/17/2017	NS	NS	NS	NS	NS	NS	NS
	6/29/2017	NS	NS	NS	NS	NS	NS	NS
	11/10/2017	NS	NS	NS	NS	NS	NS	NS
	3/2/2018	NS	NS	NS	NS	NS	NS	NS
	6/28/2018	NS	NS	NS	NS	NS	NS	NS
10/12/2018	NS	NS	NS	NS	NS	NS	NS	
1/28/2019	NS	NS	NS	NS	NS	NS	NS	
7/2/2019	NS	NS	NS	NS	NS	NS	NS	
11/7/2019	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005	
SSCALs		0.011	2.16	1.51	21.6	--	0.043	0.043
DW-1	8/25/2009	NS-FP	NS-FP	NS-FP	NS-FP	NS-FP	NS-FP	NS-FP
	1/31/2014	1.810	0.038	0.492	0.086	2.426	0.036	0.344
	4/17/2014	2.390	0.043	0.550	0.169	3.152	0.041	0.799
	7/22/2014	2.010	0.048	0.608	0.250	2.916	0.027	1.910
	10/23/2014	1.510	0.033	0.440	0.109	2.092	0.029	0.936
	3/23/2015	1.200	0.030	0.477	0.174	1.881	0.019	0.078
	8/21/2015	1.200	0.034	0.457	0.129	1.820	0.026	0.640
	11/4/2015	1.210	0.034	0.450	0.122	1.816	<0.001	1.080
	2/3/2016	0.916	0.027	0.370	0.097	1.410	0.018	0.722
	5/17/2016	0.792	0.032	0.342	0.089	1.255	0.035	0.811
	3/17/2017	0.794	0.160	0.432	0.260	1.646	0.019	0.828
	6/29/2017	0.674	0.106	0.620	0.327	1.727	0.015	0.616
	11/10/2017	0.580	0.177	0.418	0.197	1.372	0.010	0.678
	3/2/2018	0.475	0.053	0.490	0.181	1.199	0.012	0.447
	6/28/2018	0.708	0.313	0.428	0.148	1.597	0.059	0.616
10/12/2018	0.520	0.032	0.415	0.094	1.061	0.010	1.120	
1/28/2019	0.441	0.019	0.317	0.072	0.849	0.007	0.746	
7/2/2019	0.305	0.018	0.223	0.045	0.591	0.006	0.610	
11/7/2019	0.685	0.645	0.242	0.070	1.642	0.015	0.655	
SSCALs		0.068	13.5	9.45	135	--	0.27	0.27

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
SPRING VALLEY MARKET
LEIGHTON, ALABAMA

SAMPLE I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTHALENE (mg/L)
DW-2	8/25/2009	<0.001	<0.001	<0.001	<0.005	BDL	0.032	<0.001
	1/31/2014	<0.001	<0.001	<0.001	<0.003	BDL	0.024	<0.005
	4/17/2014	<0.001	<0.001	<0.001	<0.003	BDL	0.013	<0.005
	7/22/2014	<0.001	<0.001	<0.001	<0.003	BDL	0.010	<0.005
	10/23/2014	<0.001	<0.001	<0.001	<0.003	BDL	0.015	<0.005
	3/23/2015	<0.001	<0.001	<0.001	<0.003	BDL	0.010	<0.005
	8/21/2015	<0.001	<0.001	<0.001	<0.003	BDL	0.005	<0.005
	11/4/2015	<0.001	<0.001	<0.001	<0.003	BDL	0.008	<0.005
	2/3/2016	<0.001	0.002	<0.001	<0.003	0.002	<0.001	<0.005
	5/17/2016	<0.001	<0.001	<0.001	<0.003	BDL	0.005	<0.005
	3/17/2017	<0.001	<0.001	<0.001	<0.003	BDL	0.006	<0.005
	6/29/2017	<0.001	0.017	<0.001	<0.003	0.017	0.006	<0.005
	11/10/2017	<0.001	0.014	<0.001	<0.003	0.014	0.002	<0.005
	3/2/2018	NS	NS	NS	NS	NS	NS	NS
	6/28/2018	<0.001	<0.001	<0.001	<0.003	BDL	0.005	<0.005
10/12/2018	<0.001	<0.001	<0.001	<0.003	BDL	0.006	<0.005	
1/28/2019	<0.001	<0.001	<0.001	<0.003	BDL	0.009	<0.005	
7/2/2019	<0.001	<0.001	<0.001	<0.003	BDL	0.005	<0.005	
11/7/2019	<0.001	<0.001	<0.001	<0.003	BDL	0.006	<0.005	
SSCALs		0.011	2.16	1.51	21.6	--	0.043	0.043
DW-3	8/25/2009	0.002	<0.001	<0.001	<0.005	0.002	0.293	<0.001
	1/31/2014	<0.001	<0.001	<0.001	<0.003	BDL	0.168	0.002
	4/17/2014	0.007	<0.001	0.002	<0.003	0.009	0.144	<0.005
	7/22/2014	0.001	<0.001	<0.001	<0.003	0.001	0.114	0.006
	10/23/2014	<0.001	<0.001	<0.001	<0.003	BDL	0.130	<0.005
	3/23/2015	0.001	<0.001	<0.001	<0.003	0.001	0.142	<0.005
	8/21/2015	<0.001	<0.001	<0.001	<0.003	BDL	0.166	<0.005
	11/4/2015	<0.001	<0.001	<0.001	<0.003	BDL	0.067	<0.005
	2/3/2016	<0.001	<0.001	<0.001	<0.003	BDL	0.161	<0.005
	5/17/2016	<0.001	<0.001	<0.001	<0.003	BDL	0.188	<0.005
	3/17/2017	0.001	<0.001	<0.001	<0.003	0.001	0.082	<0.005
	6/29/2017	0.001	<0.001	<0.001	<0.003	0.001	0.107	<0.005
	11/10/2017	<0.001	<0.001	<0.001	<0.003	BDL	0.073	<0.005
	3/2/2018	<0.001	<0.001	<0.001	<0.003	BDL	0.088	<0.005
	6/28/2018	<0.001	<0.001	<0.001	<0.003	BDL	0.087	<0.005
10/12/2018	<0.001	<0.001	<0.001	<0.003	BDL	0.023	<0.005	
1/28/2019	<0.001	<0.001	<0.001	<0.003	BDL	0.018	<0.005	
7/2/2019	<0.001	<0.001	<0.001	<0.003	BDL	0.054	<0.005	
11/7/2019	<0.001	<0.001	<0.001	<0.003	BDL	0.040	<0.005	
SSCALs		0.068	13.5	9.45	135	--	0.27	0.27

**TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
SPRING VALLEY MARKET
LEIGHTON, ALABAMA**

SAMPLE I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTHALENE (mg/L)
DW-4	8/25/2009	0.018	<0.001	<0.001	<0.005	0.018	0.176	<0.001
	1/31/2014	0.099	0.004	0.005	0.008	0.116	0.143	0.116
	4/17/2014	0.062	0.002	0.001	<0.003	0.065	0.167	0.021
	7/22/2014	0.216	0.005	0.006	0.012	0.239	0.104	0.157
	10/23/2014	<0.001	<0.001	<0.001	<0.003	BDL	0.198	<0.005
	3/23/2015	0.023	<0.001	0.001	<0.003	0.024	0.085	0.011
	8/21/2015	0.014	0.001	0.002	<0.003	0.017	0.117	0.011
	11/4/2015	0.004	0.001	0.002	<0.003	0.007	0.101	0.032
	2/3/2016	0.008	<0.001	0.001	<0.003	0.009	0.090	0.014
	5/17/2016	0.006	<0.001	<0.001	<0.003	0.006	0.190	0.010
	3/17/2017	0.004	0.001	<0.001	<0.003	0.005	0.100	0.053
	6/29/2017	0.009	0.001	0.001	0.005	0.016	0.141	0.051
	11/10/2017	0.002	<0.001	<0.001	<0.003	0.002	0.099	0.009
	3/2/2018	0.005	<0.001	<0.001	<0.003	0.005	0.105	<0.005
	6/28/2018	0.013	0.001	0.001	<0.003	0.015	0.124	0.070
10/12/2018	0.006	0.002	0.001	0.005	0.014	0.149	0.135	
1/28/2019	0.006	<0.001	<0.001	<0.003	0.006	0.090	0.015	
7/2/2019	<0.001	<0.001	<0.001	<0.003	BDL	0.102	<0.005	
11/7/2019	<0.001	<0.001	<0.001	<0.003	BDL	0.088	<0.005	
SSCALs		0.067	13.4	9.36	134	--	0.268	0.268
DW-5	8/25/2009	0.129	0.003	0.005	0.008	0.145	0.093	0.011
	1/31/2014	0.123	0.005	0.019	0.008	0.155	0.050	0.106
	4/17/2014	0.214	0.006	0.019	0.013	0.252	0.047	0.119
	7/22/2014	0.276	0.007	0.012	0.022	0.317	0.052	0.230
	10/23/2014	0.144	0.004	0.012	0.010	0.170	0.072	0.167
	3/23/2015	0.196	0.007	0.035	0.022	0.260	0.049	0.020
	8/21/2015	0.014	0.006	0.010	0.016	0.046	0.060	0.214
	11/4/2015	0.096	0.004	0.008	0.012	0.120	0.034	0.375
	2/3/2016	0.060	0.004	0.010	0.011	0.085	0.038	0.299
	5/17/2016	0.120	0.006	0.010	0.012	0.148	0.069	0.341
	3/17/2017	0.174	0.011	0.026	0.016	0.227	0.049	0.256
	6/29/2017	0.202	0.012	0.039	0.025	0.278	0.053	0.225
	11/10/2017	0.169	0.008	0.012	0.021	0.210	0.031	0.307
	3/2/2018	0.014	0.001	<0.001	<0.003	0.015	0.007	0.014
	6/28/2018	0.111	0.005	0.005	0.015	0.136	0.051	0.258
10/12/2018	0.017	0.001	0.003	0.005	0.026	0.018	0.056	
1/28/2019	0.058	0.004	0.013	0.010	0.085	0.033	0.134	
7/2/2019	0.037	0.003	0.002	0.007	0.049	0.027	0.108	
11/7/2019	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005	
SSCALs		0.011	2.16	1.51	21.6	--	0.043	0.043
DW-6	3/23/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	8/21/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	11/4/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	2/3/2016	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	5/17/2016	NS-DRY	NS-DRY	NS-DRY	NS-DRY	NS-DRY	NS-DRY	NS-DRY
	3/17/2017	NS	NS	NS	NS	NS	NS	NS
	6/29/2017	NS	NS	NS	NS	NS	NS	NS
	11/10/2017	NS	NS	NS	NS	NS	NS	NS
	3/2/2018	NS	NS	NS	NS	NS	NS	NS
	6/28/2018	NS	NS	NS	NS	NS	NS	NS
	10/12/2018	NS	NS	NS	NS	NS	NS	NS
1/28/2019	NS	NS	NS	NS	NS	NS	NS	
7/2/2019	NS	NS	NS	NS	NS	NS	NS	
11/7/2019	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005	
SSCALs		0.011	2.16	1.51	21.6	--	0.043	0.043

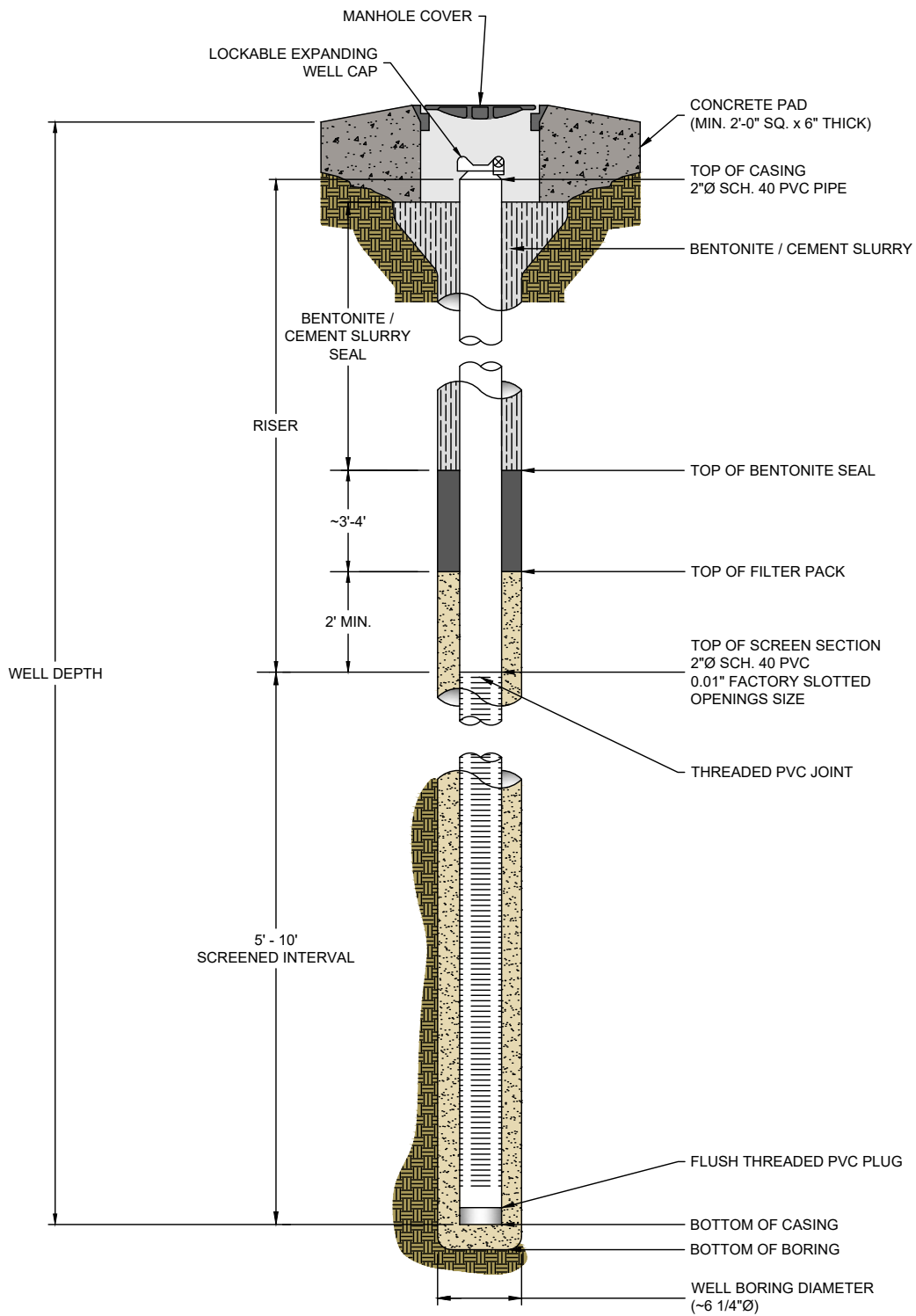
TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
SPRING VALLEY MARKET
LEIGHTON, ALABAMA

SAMPLE I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTHALENE (mg/L)
DW-7	3/23/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	8/21/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	11/4/2015	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	2/3/2016	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	5/17/2016	<0.001	0.003	<0.001	<0.003	0.003	<0.001	<0.005
	3/17/2017	NS	NS	NS	NS	NS	NS	NS
	6/29/2017	NS	NS	NS	NS	NS	NS	NS
	11/10/2017	NS	NS	NS	NS	NS	NS	NS
	3/2/2018	NS	NS	NS	NS	NS	NS	NS
	6/28/2018	NS	NS	NS	NS	NS	NS	NS
	10/12/2018	NS	NS	NS	NS	NS	NS	NS
	1/28/2019	NS	NS	NS	NS	NS	NS	NS
7/2/2019	NS	NS	NS	NS	NS	NS	NS	
11/7/2019	NS	NS	NS	NS	NS	NS	NS	NS
SSCALs		0.011	2.16	1.51	21.6	--	0.043	0.043
RW-1	3/17/2017	1.280	0.131	0.868	0.842	3.121	0.030	1.360
	6/29/2017	1.040	0.170	0.972	1.030	3.212	0.018	0.726
	11/10/2017	0.853	0.128	0.831	0.920	2.732	0.012	1.110
	3/2/2018	0.740	0.058	0.901	1.050	2.749	0.013	0.649
	6/28/2018	0.835	0.100	1.120	0.796	2.851	<0.001	0.852
	10/12/2018	0.604	0.034	0.524	0.301	1.463	0.009	1.270
	1/28/2019	0.744	0.025	0.547	0.354	1.670	0.009	1.270
	7/2/2019	0.473	0.020	0.531	0.318	1.342	0.006	0.816
11/7/2019	0.473	0.041	0.822	0.645	1.981	0.014	2.010	
SSCALs		0.068	13.5	9.45	135	--	0.27	0.27
DUPLICATE RESULTS								
DUP (DW-1)	11/7/2019	0.771	0.764	0.271	0.082	1.888	0.017	0.703

Notes: mg/L - milligrams per liter
 BTEX, MTBE, and Naphthalene analysis conducted per EPA Method 8260
 SSCAL - Site Specific Corrective Action Level
Bold type indicates concentration exceeds SSCAL
 NS - Not Sampled
 NS-FP - Not Sampled due to presence of Free Product

Source(s): GeoService, Inc.
 PPM Consultants, Inc.
 PPM Project No. 479617-MCAP

APPENDIX C – SCHEMATIC



APPENDIX D – SUBCONTRACTOR QUOTES

**TECHNICAL DRILLING SERVICES, INC.
QUOTE FORM**

**For
PPM CONSULTANTS, INC.
SPRING VALLEY MARKET
LEIGHTON, ALABAMA**

Revised: February 12, 2020

Description	Units	Estimated Quantity	Unit Cost	Total Cost
Mobilization/demobilization	LS	1	200.00	200.00
Mobilization/demobilization	Mile	290	2.30	667.00
Mobilization/demobilization	Mile	0	1.15	0.00
Per diem (3 man crew)	Day	2	255.00	510.00
Drill, sample & install a 2" PVC Type II well in soil	Foot	45	43.00	1935.00
Drill, sample & install a 4" PVC Type II well in soil	Foot	0	45.00	0.00
Drill, sample & install a 2" PVC Type III well in soil	Foot	0	95.00	0.00
Additional Soil Sample (frequency >5' intervals)	Each	0	20.00	0.00
Construct a concrete pad & install an 8" manhole cover	Each	3	150.00	450.00
Shelby tube sample	Each	0	50.00	0.00
55 Gallon Drum	Each	0	50.00	0.00
Standby rate	Hour	0	200.00	0.00

TOTAL JOB ESTIMATE: \$3,762.00

TECHNICAL DRILLING SERVICES, INC.
QUOTE FORM
For
PPM CONSULTANTS, INC.
SPRING VALLEY MARKET
LEIGHTON, ALABAMA

February 5, 2020

Description	Units	Estimated Quantity	Unit Cost	Total Cost
Dump truck mobilization and hauling debris	LS	1	900.00	900.00
Per diem (3 man crew)	Day	0	255.00	0.00
Black Warrior Landfill charge (cost +10%)	Ton	1	34.10	34.10
Dump trailer/truck pick up/return	Each	2	75.00	150.00
Dump trailer rental (4 yard)	Day	1	300.00	300.00

TOTAL JOB ESTIMATE: \$1,384.10

January 22, 2019

Brandy Baltz Hall
PPM Consultants
5555 Bankhead Hwy
Birmingham, AL 35210

Subject:
8-Hour Air Sparge/Soil Vapor Extraction Night Event
Spring Valley Market
Leighton, Alabama
Fruits & Associates, Inc Proposal No. P-20-24



500 Northpoint Pkwy SE
Acworth, GA 30102
www.fruits-us.com
(866) 974-6999
(770) 974-6999

Dear Brandy:

Fruits & Associates, Inc. will perform an 8-hour Air-Sparge/Soil Vapor Extraction (AS/SVE) event at the above referenced facility using our High-Vacuum Remediation (HVR) service to provide SVE and our Air Sparge trailer mounted system. During the 8-hours, our trained technicians will record monitoring well fluid gauging (before and during the event), vacuum and pressure influence, vacuum and air pressures, vapor flow rates, extracted vapor concentrations, PSH mass removal, and the total volume of recovered liquids. A project status report will be generated and submitted for the event. A final influent and effluent reading will be obtained after the event is complete, and a removal rate will be calculated using these results.

• One 8-Hour AS/HVR Event	Including report	4800.00
• Petroleum Contact Water Disposal (PCW)	Est. 3,000 gal. @ \$0.25/gal. *See Note	750.00
• Petroleum Contact Water Transportation	110 miles @ \$4.10 *See Note	451.00
• Per diem	Included	0.00
	Total Lump Sum Estimate:	\$ 6,001.00

• Note: Actual costs incurred for transportation and disposal of the contaminated groundwater will be billed. This estimate is based on approximate quantities. If the PCW contains hazardous levels of lead (>5PPM), the cost per gallon for disposal may be higher.

All work will be performed on the approved unit rates as shown or in accordance with Fruits & Associates' current fee schedule. Any additional work authorized by PPM Consultants will be billed based on Fruits & Associates, Inc. standard unit costs. Invoices will reflect actual work performed on approved tasks.

Terms: Net 30 days from invoiced date. A 1-½ % per month interest charge will be added to past due amounts exceeding these terms.

Sincerely,
Fruits & Associates, Inc.

John M. Fruits

Accepted by: _____

Title: _____

Date: _____

APPENDIX E – SITE HEALTH AND SAFETY PLAN

HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

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



PREPARED UNDER THE DIRECTION OF:
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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	www.cdc.gov
CDC – Public Health Preparedness and Response	404-639-7405	cdcinfo@cdc.gov
CDC – Bioterrorism Preparedness and Response	404-639-0385	cdcinfo@cdc.gov
CDC – Toxic Substances and Disease Registry	770-488-7100	cdcinfo@cdc.gov
Chemtrec [24-Hour Emergency Chemical Spill]	800-262-8200	chemtrec@chemtrec.com
EPA RCRA Superfund Hotline	800-424-9346	--
Poison Control Center	800-222-1222	www.aapcc.org

PPM Contact Information	Representative	Office	Cell
Principal [Primary Regional Safety PIC]	Shawn Ivey	318-323-7270	318-237-0677
Principal [Alternate Regional Safety PIC]	Zane Hood	205-836-5650	205-240-9883
Health and Safety Director	Jeri Thrasher	318-812-3454	318-884-8188
Safety Supervisor [Baton Rouge]	David Durbin	225-293-7270	225-603-8050
Safety Supervisor [Birmingham]	Brandy Hall	205-836-5650	205-913-5471
Safety Supervisor [Jackson]	Regan Byrd	601-956-8233	601-862-8693
Safety Supervisor [Mobile/Pensacola]	Kay Williams	251-990-9000	251-753-4455
Safety Supervisor [Monroe]	Matt Colvin	318-812-3467	318-355-6415
Safety Supervisor [Orlando]	Amy Guilfoyle	407-240-1127	941-730-5600

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

Designated Break and Evacuation Locations:

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



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.

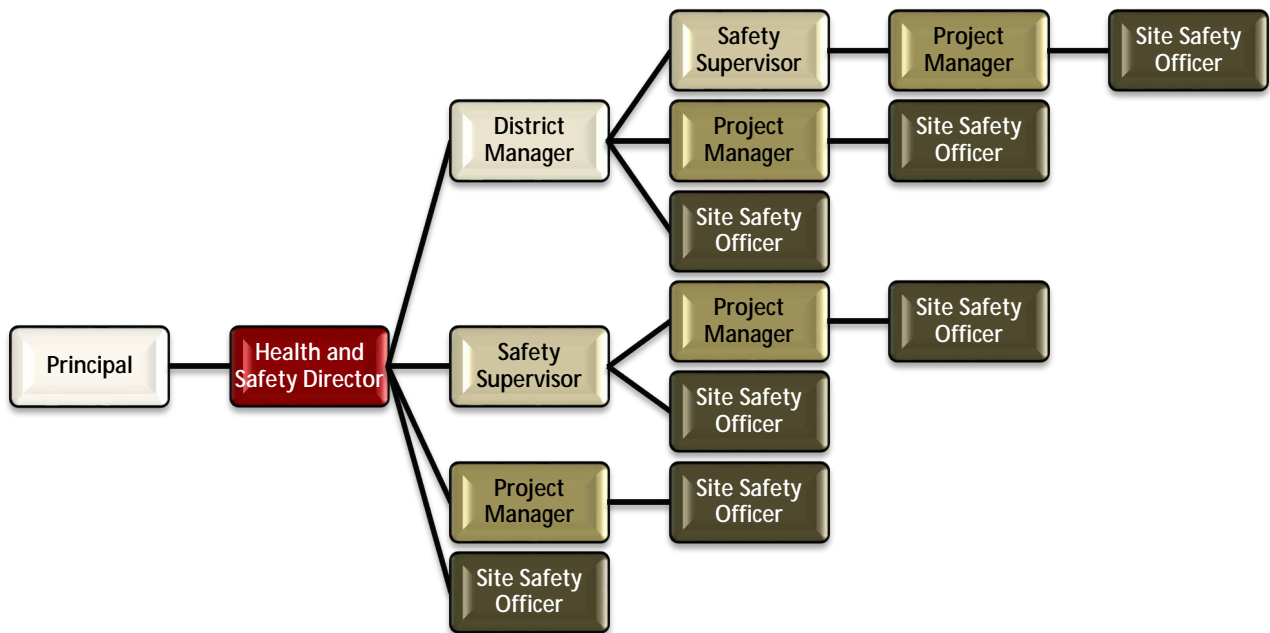
1.5 MANAGEMENT OF CHANGE

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 refresher. This



HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

HEALTH AND SAFETY PLAN

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



HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

HEALTH AND SAFETY PLAN

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



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

3.1.2 Oxidizers

3.1.2.1 Ozone

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

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

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

3.1.2.2 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 CO₂); however, during combustion it does release large amounts of soot which can lead to acid rain, smog and poor health conditions. PAHs are found in crude oil and soot and are also a by-product of petroleum processing or combustion, specifically the incomplete burning of oil and gas. Common PAH constituents include: acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene,

benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h) anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. The regulated PAH constituents are outlined below:

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

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

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

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

3.1.4.5 Pesticides

A pesticide is another type of organochlorine commonly used for crop dusting agricultural farmland not only to kill insects, rodents and germs, but is also used for weed and mildew control. The term “pesticide” includes a broad category of chemicals that can be further broken down into insecticides, rodenticides and fungicides. Some older and more recently banned pesticides (such as DDT) tend to be environmentally persistent. Workers are potentially exposed to pesticides as part of the assessment or remediation of impacted farmland as well as commercial pesticide manufacturing and/or storage facilities. Similarly to chlorinated solvents, pesticides can be volatile making inhalation the primary route of worker exposures. However, workers may additionally be exposed to pesticides through ingestion, absorption and skin/eye contact. There are numerous pesticides tested as part of assessment and remediation of impacted sites; however, the following pesticides are OSHA-regulated materials that pose a potential health risk to workers:

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

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

3.1.4.6 Polychlorinated Biphenyls (PCB)

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



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

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

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

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

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

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

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

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

3.2 PHYSICAL HAZARDS AND CONTROLS

3.2.1 Combustion/Flammability

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

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

3.2.2 Contaminated Water/Splash Hazards



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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

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



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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 ≥ 90 dB
- § Heavy equipment operation (including vac trucks) – have been measured ≥ 120 dB
- § Use of power tools – sound levels vary (electric drill – 95 dB, power saw 110 dB, power drill – 130 dB, pneumatic drill – 120 dB)
- § Work conducted nearby high traffic roadways – typical freeway traffic is 70 dB; however, large 18-wheelers have been measured ≥ 90 dB

Control Measures: When available, workers should carry sound level meters to assess noise levels. In the absence of monitoring equipment, workers who must shout at a co-worker 5 feet away are likely triggering regulatory threshold limits for noise exposures. Those environments ≥ 85 dB require the use of administrative controls or protective equipment. Administrative measures such as limiting work hours within noisy environments should be the first line of defense used to control worker exposures to noise levels in excess of 85 dB. When this cannot be achieved use hearing protectors such as earplugs, canal caps or ear muffs to protect worker hearing.



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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 ≥ 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 ≥ 4 feet – all other workers are prohibited from working at elevations ≥ 4 feet without additional training and certification.

Control Measures: Store all materials away from work areas until ready for use and keep all travel paths unobstructed. Walk around materials – never walk over them. 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 ≥ 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 ≥ 4 feet. In addition, use of catwalks may exist at heights ≥ 4 feet. According to §1910.21, a catwalk is considered a runway which is defined as a passageway for persons, elevated above the surrounding floor or ground level, such as a footwalk along shafting or a walkway between buildings. When working on multilevel surfaces, any floor deteriorations or openings must be obstructed to prevent inadvertent falls from an elevated surface. Working at elevated heights can create fall hazards that can result in a fatality or serious physical impairment. Due to these risks, tasks such as these may require additional safety



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measures such as the use of fall protective equipment (i.e. full-body harness and lanyard). Only personnel who have received additional fall protection training are considered competent for performing these tasks - all other workers are prohibited from working at elevations ≥ 4 feet without additional training and certification.

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

3.2.17.2 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.

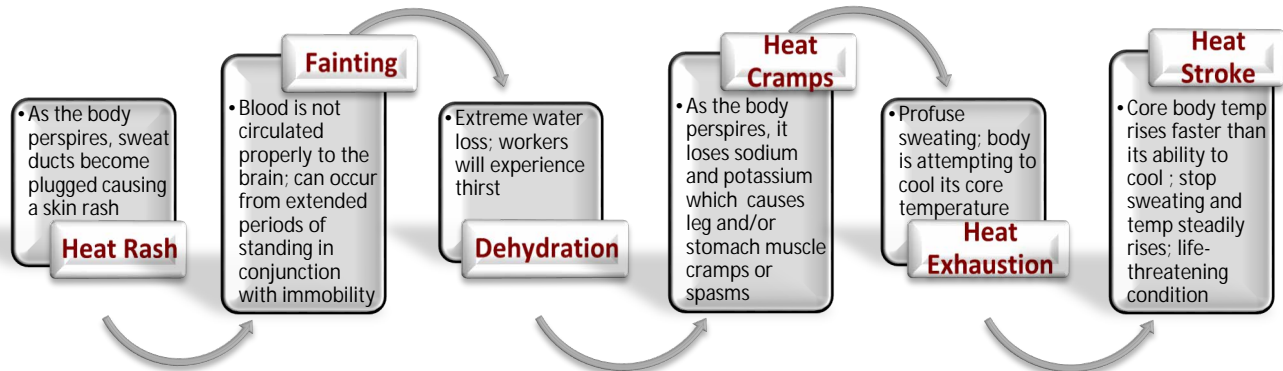
Control Measures: When work is to be performed at an inactive facility, bring weed eaters and sprayer to address overgrown vegetation. When grounds keeping is the responsibility of the client, the Project Manager should call in advance and request site maintenance be performed prior to PPM's arrival 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.



Black Widow

Brown Widow

Brown Recluse

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.

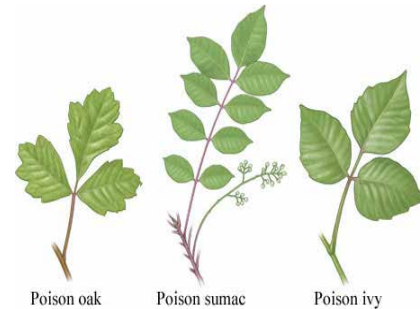
Sites located in populated areas may have wandering animals. Pets may be trained to attack when approached, may have mange (parasitic skin diseases) or may carry other diseases.

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†	125†	--	800	800-6,700
Gasoline	100	300†	500†	--	--	1,400-7,600
Heptachlor[pesticide]	0.5	0.5	--	--	35	--
Hexane	50	50†	--	--	1,100	1,100-7,500
Hydrochloric acid[HCl]	--	--	--	5	50	--
Hydrogen peroxide[30-50%]	1	1	--	--	75	--
Hydrogen sulfide[H ₂ S]	1	1	--	10	100	4,000-44,000
Iron[metal]	--	--	--	--	--	--
Isobutylene	--	--	--	--	--	1,800-9,600
Isopropyl alcohol	200	400†	500†	--	2,000	2,000-12,700
Kerosene	50	100	--	--	--	700-5,000
Lead[metal]	0.05	0.05	--	--	100	--
Lindane[pesticide]	0.5	0.5	--	--	50	--
Liquinox	--	--	--	--	--	--
Lubricating oils[motor oil]	--	--	--	--	--	--
Magnesium[metal]	--	--	--	--	--	--
Mercury[metal/vapor]	0.1[skin]	0.1†[skin]	--	0.1†[skin]	10[skin]	--
Methane	--	--	--	--	--	5,000-15,000
Methylene chloride	25	25	125	--	2,300	13,000-23,000
MTBE	50	50	--	--	--	1,000-8,000
Muriatic acid[HCl]	--	--	--	5	50	--
Naphthalene[PAH]	10	10†	15†	--	250	900-5,900
Nitric acid	2	2†	4†	--	25	--
Oil[crude]	0.2[mg/m ³]	0.2[mg/m ³]	--	--	--	1,000-8,000
Ozone	0.05	0.1†	0.3†	0.1	5	--
PCB	0.5[skin]	0.5[skin]	--	--	5	--
Perchloroethylene[PERC]	25	25†	--	150[cap]	150	--
Phosphoric acid[H ₃ PO ₄]	1	1†	3†	--	1,000	--
Potassium hydroxide[base]	2	2†	--	2	--	--
Propane	500	1,000	--	--	2,100	2,100-9,500
RegenOx A or B™	--	--	--	--	--	--
Selenium[metal]	0.2	0.2	--	--	1	--
Silver[metal]	0.01	0.01	--	--	10	--
Sodium carbonate[base]	--	--	--	--	--	--
Sodium hydroxide[base]	2	2	--	2†	10	--
Sulfuric acid[H ₂ SO ₄]	1	1	15†	--	15	--
Tetrachloroethylene[PERC]	25	25†	--	150[cap]	150	--
Toluene	100	100†	150†	300	500	1,100-7,100
Trichloroethylene	50	50†	200†	200	1,000	8,000-10,500*
Vinyl chloride	1	1	--	5[15-min]	--	3,600-33,000
Xylene	100	100†	150†	--	900	1,100-7,000
Zinc[metal]	--	--	--	--	--	--

NOTES:

† - More protective OSHA PELs vacated by the 11th Circuit Court of Appeals in July 1992; however, OSHA can enforce under the General Duty Clause. PPM will adhere to these exposure limits to ensure worker health and wellbeing is maintained.
 Diesel, dusts, heavy metals, bases/alkalis, Trap & Treat BOS-200, and PCBs are all measured as mg/m³ – not ppm!
 Asbestos is measured as number of fibers per unit air (f/cc); Portland cement is measured as million parts per cubic feet (mppcf).
 Action limit and PEL are time-weighted averages over 8-hour work period. STEL is TWA over 4 15-min periods, with the exception of asbestos, which has a 30-minute excursion limit. Others are instantaneous readings.
 PAHs - coal tar pitch volatile components of TPH-D include anthracene, benzo(a)pyrene, chrysene, phenanthrene and pyrene, all of which have the same permissible exposure and IDLH limits; therefore, all components lumped into one group. The only other regulated component of PAH is naphthalene which is a component of crude or refined oil and is listed separately from other PAHs.
 Only the regulated pesticide components of EPA SWA-846 Methods 8080/8081 are included above.
 Perchloroethylene (PCE) has a ceiling limit of 200 ppm for 5 minutes within any 3-hr period not to exceed 300 ppm but this has been capped at 150 ppm to match IDLH concentrations for this material. Trichloroethylene's flammability range is effective ≥77°F.

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 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



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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 ≥ 85 dB are provided with hearing protection. The most common form of hearing protection provided to workers is the earplug. Earplugs come in various shapes and sizes and are relatively inexpensive so they can be tailored to the comfort



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

5.1.7 Respiratory Protection

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

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

5.1.8 Electrical Protective Equipment

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

5.1.9 Life Saving Equipment

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

5.2 OTHER PROTECTIVE AIDS

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

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



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- § Lockout/tagout devices
- § Handheld eyewash bottles

5.3 PROJECT-SPECIFIC PPE REQUIREMENTS

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

FIELD TASK	PROTECTIVE CLOTHING/EQUIPMENT										
	STEEL-TOED SHOES ¹	SAFETY GLASSES ²	HIGH VISIBILITY SHIRT VEST ³	GLOVES ⁴	HEARING PROTECTOR ⁵	HARD HAT (CLASS E) ⁶	GOGGLES/FACE SHIELD ⁷	RESPIRATOR (APR) ⁸	HARNES/LANYARD	FLOTATION DEVICES/BUOYS	FIRE RETARDANT CLOTHING ⁹
Asbestos inspections or sampling	X	X	X	X				X			
Carbon change-out	X		X	X	X	X	X	X	X		
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



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

6.6 DECONTAMINATION PROCEDURES

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

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

7.0 EMERGENCY RESPONSE

7.1 ALARMS AND ONSITE NOTIFICATIONS

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

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

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



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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.



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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.

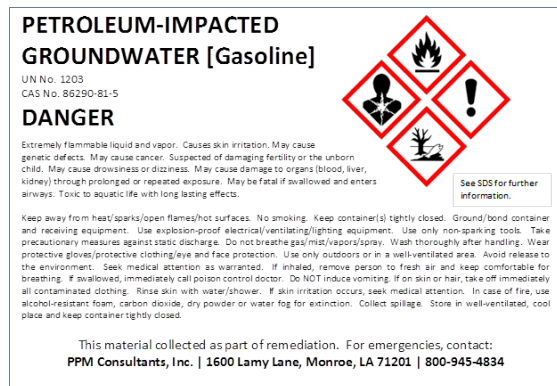
8.1 CONTAINER LABELING

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

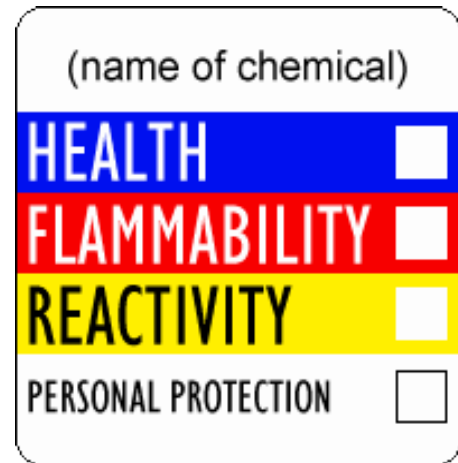
Any hazardous material or waste container(s) must be labeled in accordance with 29 CFR 1910.1200 using a globally harmonized system (GHS) for chemical classification and labeling. Tags using the same GHS-format should be used for soil bags and super sacks. Each label must contain six required elements,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

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



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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.

11.0 CONFINED SPACE



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

12.0 LIST OF ABBREVIATIONS

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

APPENDIX F – COST PROPOSALS

COST PROPOSAL NO. 28

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

I.1 Cost Proposal Information:

Cost Proposal Number:	Date of Cost Proposal (mm/dd/yy):
28 479617-RNA3	2/18/2020
UST or AST Incident Number:	Facility I.D. Number:
UST07-09-02	15201-033-013348

I.2 Facility Information

Facility Name:	Spring Valley Market
Facility Address:	2620 Ricks Lane Leighton, Colbert County, Alabama

I.3 Owner Information:

Owner Name:	Vulcan Oil Company, Inc.	
Owner Address:	P.O. Box 100 Shannon, Alabama 65124	
Employer Tax Number (IRS):	63-0571648	

I.4 Response Action Contractor Information:

Approved Response Action Contractor Name:	PPM Consultants, Inc. 5555 Bankhead Highway Birmingham, Alabama 35210
Approved Response Action Contractor Address:	
Project Contact:	Brandy Baltz Hall, P.G.
Project Contact Phone #:	205-836-5650
Project Contact E-mail:	brandy.hall@ppmco.com
Employer Tax Number (IRS):	72-1256279

Cost Proposal Number:

28

Facility Name:

Spring Valley Market

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 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:

Application for Underground Injection Control (UIC) permit and fee; Drill and install three sparge points; Soil Disposal; Conduct 6 8-hour MEME/Air sparge events; Comprehensive groundwater sampling event (8 monitoring wells, 1 recovery well); etc.
(April through June 2020)

Provide proposed completion date for this phase of work activities:

07/31/20

Provide projected date of cleanup completed:

12/31/22

I.6 Subcontractor Information:

Indicate Subcontractors to be used during this phase of work:

Name & Address	Service Provided
Technical Drilling Services, Inc.	Drilling/Soil Disposal
Fruits & Associates, Inc.	MEME/Air Sparge Events/Water Disposal
Sutherland Environmental Company, Inc.	Laboratory Analyses

Cost Proposal Number:

28

Facility Name:

Spring Valley Market

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:

Todd Sitton, President

Email address:

tsitton@vulcanoilco.com

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:

02/18/20

I.9 Trust Fund Obligation Information:

Estimated Total Cost of all
Anticipated Response Actions
(To be updated overtime):

\$700,000.00

Total of Previously Approved Cost
Proposals:

\$328,711.12

Total Proposed Costs to Date
(Approved Costs Plus Costs Proposed in
this Cost Proposal):

\$392,964.83

Estimate Percent Completion of entire project to date:

56%

I.10 Cost Proposal Amount

Proposed Costs under this Cost Proposal:	\$64,253.71	Personnel	\$13,730.20
		Field Equipment	\$938.00
Owners Required Contribution for UST Release(\$5,000): <i>Applicable for CP#1 Only</i>		Mileage	\$1,293.75
		Per Diem	\$412.25
		Drilling	\$4,138.20
Owners Required Contribution for AST Release(\$10,000): <i>Applicable for CP#1 Only</i>		Analytical	\$715.00
		Other	\$43,026.31
Total of This Cost Proposal:	\$64,253.71		

Cost Proposal Summary				
CP Total	Facility I.D. #	CP #	Incident Number	Site Name
\$64,253.71	15201-033-013348	28	UST07-09-02	Spring Valley Market
Part II- Alabama Tank Trust Fund Itemization Form "A" Cost Proposal				
Scenarios	Unit \$	Units	Quantity	Requested\$
Additional Well Installation Report (1-4 wells)(as an adder)	\$1,163 /report		1	\$1,163.00
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
Adder amount for >3 MEME/Injection Events (per approved period)	\$295 /report		1	\$295.00
UIC General Permit Application Preparation	\$771 /permit		1	\$771.00
ADEM Solid Waste Profile Preparation	\$216.50 /profile		1	\$216.50
Total Report and Plan Costs				\$4,379.50
Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal				
Porous material 0-30 feet	\$324 /well		3	\$972.00
Site Survey during Investigation (not a Licensed Surveyor)	\$252.00 /sow		1	\$252.00
Groundwater Sampling Set-up (2hrs tech time)	\$126.00 /sow		1	\$126.00
Gauging Well (no sampling)	\$15.75 /well		3	\$47.25
Groundwater Sampling and Gauging 2" Well	\$63.00 /well		8	\$504.00
Groundwater Sampling and Gauging 4" Well	\$72.45 /well		1	\$72.45
MEME Event/Pilot Test/Injection Event (hourly rate)	\$63 /hr		60	\$3,780.00
Travel				
Mileage Rate			\$0.575	
Mileage (One way office to site)			125	
Number of round trips to site			9	\$1,293.75
Technician(s)-travel time	\$63 /hr		49.5	\$3,118.50
Geologist/Engineer-travel time	\$87 /hr		5.5	\$478.50
Per diem (6-12hrs)	\$12.75 /day		3	\$38.25
Per diem (greater than 12hrs)	\$34 /ext. day		6	\$204.00
Per diem 2 days (overnight)(invoice(s) required)	\$85 /day		2	\$170.00
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
Monitoring Well Development	\$75 /day		1	\$75.00
Monitoring Well/Boring Installation	\$60 /day		2	\$120.00
Groundwater Monitoring	\$160 /day		1	\$160.00
Bailers	\$7 /bailer		9	\$63.00
MEME Event	\$70 /event		6	\$420.00
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				

Cost Proposal Summary																								
CP Total	Facility I.D. #	CP #	Incident Number	Site Name																				
\$64,253.71	15201-033-013348	28	UST07-09-02	Spring Valley Market																				
<table border="1"> <thead> <tr> <th>Method</th> <th></th> <th>Pass Through</th> <th>Sample #</th> <th></th> </tr> </thead> <tbody> <tr> <td>BTEX/MTBE/Naph (water)</td> <td>8260</td> <td>10%</td> <td>9</td> <td>\$643.50</td> </tr> <tr> <td>Other</td> <td>QA/QC - 8260</td> <td>10%</td> <td>1</td> <td>\$71.50</td> </tr> <tr> <td colspan="4">Total Field Costs</td> <td>\$12,844.70</td> </tr> </tbody> </table>					Method		Pass Through	Sample #		BTEX/MTBE/Naph (water)	8260	10%	9	\$643.50	Other	QA/QC - 8260	10%	1	\$71.50	Total Field Costs				\$12,844.70
Method		Pass Through	Sample #																					
BTEX/MTBE/Naph (water)	8260	10%	9	\$643.50																				
Other	QA/QC - 8260	10%	1	\$71.50																				
Total Field Costs				\$12,844.70																				
Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal																								
Scenarios	Unit \$	Unit	Quantity	Requested\$																				
Mileage Rate (Current Federal Rate)			\$0.575																					
Mileage (drilling device driven or ATV) (ONE WAY mileage up to 450	\$2.30 /mile		145																					
Number of Mobilizations (includes \$200 mob/demob amount)			1	\$867.00																				
Well Pad Completions for Monitoring Wells (2" and 4")(up to 8" cover	\$150.00 /well		3	\$450.00																				
1" / 2" Monitoring Well/Injection Well (HSA) ³	\$43.00 /foot		45	\$1,935.00																				
Per Diem (overnight) (man days)(hotel receipts required)	\$85.00 /day		6	\$510.00																				
Pass Through (if appropriate) Enter "5" or "10" as appropriate			10%	\$376.20																				
Total Drilling Costs				\$4,138.20																				
Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal																								
		Pass Through	Quoted Amount	Requested\$																				
8-hr MEME Event		10%	\$28,800.00	\$31,680.00																				
MEME Water Disposal Amount includes hauling		10%	\$7,206.00	\$7,926.60																				
ADEM Solid Waste Profile (ADEM review fee)		10%	\$217.00	\$238.70																				
Solid Waste Soil Disposal (to include hauling/handli		10%	\$1,384.10	\$1,522.51																				
UIC Permit Application (permit fee)		10%	\$1,385.00	\$1,523.50																				
Total Subs / Vendors / Utilities				\$42,891.31																				

Part II- Alabama Tank Trust Fund Itemization Form "E" Cost Proposal							
Per diem allowed for Alabama Tank Trust Fund Contractor Personnel Only							
Maximum allowable rates are referenced on the "Maximum Rates" Tab in this document.							
This page should be submitted whenever per diem is being claimed.							
Points of Travel		Projected Date	Personnel Classification	Hour of Departure	Hour of Return	Activity To Be Performed	Amount Per diem claimed
From	To	mm/dd/yy		am/pm	am/pm		
Use this section to enter claims for daily per diems							
Birmingham	Leighton		Tech			Development	\$12.75
Birmingham	Leighton		Tech			GWS	\$12.75
Birmingham	Leighton		Tech			GWS	\$12.75
Total number of daily per diems							3
Use this section to enter claims for extended daily per diems							
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Total number of ext. daily per diems							6
Use this section to enter claims for overnight per diems							
Birmingham	Leighton		Geo			Drilling	\$85.00
Birmingham	Leighton		Geo			Drilling	\$85.00
Total number of overnight per diems							2

COST PROPOSAL NO. 29

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

I.1 Cost Proposal Information:

Cost Proposal Number:	Date of Cost Proposal (mm/dd/yy):
29 479617-RNA4	2/18/2020
UST or AST Incident Number:	Facility I.D. Number:
UST07-09-02	15201-033-013348

I.2 Facility Information

Facility Name:	Spring Valley Market
Facility Address:	2620 Ricks Lane Leighton, Colbert County, Alabama

I.3 Owner Information:

Owner Name:	Vulcan Oil Company, Inc.	
Owner Address:	P.O. Box 100 Shannon, Alabama 65124	
Employer Tax Number (IRS):	63-0571648	

I.4 Response Action Contractor Information:

Approved Response Action Contractor Name:	PPM Consultants, Inc. 5555 Bankhead Highway Birmingham, Alabama 35210
Approved Response Action Contractor Address:	
Project Contact:	Brandy Baltz Hall, P.G.
Project Contact Phone #:	205-836-5650
Project Contact E-mail:	brandy.hall@ppmco.com
Employer Tax Number (IRS):	72-1256279

Cost Proposal Number:

29

Facility Name:

Spring Valley Market

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 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:

Conduct 6 8-hour MEME/Air sparge events; Comprehensive groundwater sampling event (8 monitoring wells, 1 recovery well); etc.
(July through September 2020)

Provide proposed completion date for this phase of work activities:

10/31/20

Provide projected date of cleanup completed:

12/31/22

I.6 Subcontractor Information:

Indicate Subcontractors to be used during this phase of work:

Name & Address	Service Provided
Fruits & Associates, Inc.	MEME/Air Sparge Events/Water Disposal
Sutherland Environmental Company, Inc.	Laboratory Analyses

Cost Proposal Number:

29

Facility Name:

Spring Valley Market

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:

Todd Sitton, President

Email address:

tsitton@vulcanoilco.com

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:

02/18/20

I.9 Trust Fund Obligation Information:

Estimated Total Cost of all
Anticipated Response Actions
(To be updated overtime):

\$700,000.00

Total of Previously Approved Cost
Proposals:

\$392,964.83

Total Proposed Costs to Date
(Approved Costs Plus Costs Proposed in
this Cost Proposal):

\$444,930.88

Estimate Percent Completion of entire project to date:

64%

I.10 Cost Proposal Amount

Proposed Costs under this Cost Proposal:	\$51,966.05	Personnel	\$9,530.70
		Field Equipment	\$743.00
Owners Required Contribution for UST Release(\$5,000): <i>Applicable for CP#1 Only</i>		Mileage	\$1,006.25
		Per Diem	\$229.50
		Drilling	\$0.00
		Analytical	\$715.00
Owners Required Contribution for AST Release(\$10,000): <i>Applicable for CP#1 Only</i>		Other	\$39,741.60
Total of This Cost Proposal:	\$51,966.05		

Cost Proposal Summary					
CP Total	Facility I.D. #	CP #	Incident Number	Site Name	
\$51,966.05	15201-033-013348	29	UST07-09-02	Spring Valley Market	
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
Adder amount for >3 MEME/Injection Events (per approved period)		\$295 /report		1	\$295.00
Total Report and Plan Costs					\$2,229.00
Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal					
Groundwater Sampling Set-up (2hrs tech time)		\$126.00 /sow		1	\$126.00
Gauging Well (no sampling)		\$15.75 /well		3	\$47.25
Groundwater Sampling and Gauging 2" Well		\$63.00 /well		8	\$504.00
Groundwater Sampling and Gauging 4" Well		\$72.45 /well		1	\$72.45
MEME Event/Pilot Test/Injection Event (hourly rate)		\$63 /hr		60	\$3,780.00
Travel					
Mileage Rate				\$0.575	
Mileage (One way office to site)				125	
Number of round trips to site				7	\$1,006.25
Technician(s)-travel time		\$63 /hr		44	\$2,772.00
Per diem (6-12hrs)		\$12.75 /day		2	\$25.50
Per diem (greater than 12hrs)		\$34 /ext. day		6	\$204.00
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		9	\$63.00
MEME Event		\$70 /event		6	\$420.00
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%	9	\$643.50
Other	QA/QC - 8260	\$65.00 /sample	10%	1	\$71.50
Total Field Costs					\$10,130.45
Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal					
Total Drilling Costs					\$0.00
Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal					

Cost Proposal Summary													
CP Total	Facility I.D. #	CP #	Incident Number	Site Name									
\$51,966.05	15201-033-013348	29	UST07-09-02	Spring Valley Market									
				<table border="1"> <thead> <tr> <th>Pass Through</th> <th>Quoted Amount</th> <th>Requested\$</th> </tr> </thead> <tbody> <tr> <td>10%</td> <td>\$28,800.00</td> <td>\$31,680.00</td> </tr> <tr> <td>10%</td> <td>\$7,206.00</td> <td>\$7,926.60</td> </tr> </tbody> </table>	Pass Through	Quoted Amount	Requested\$	10%	\$28,800.00	\$31,680.00	10%	\$7,206.00	\$7,926.60
Pass Through	Quoted Amount	Requested\$											
10%	\$28,800.00	\$31,680.00											
10%	\$7,206.00	\$7,926.60											
8-hr MEME Event													
MEME Water Disposal Amount includes hauling													
Total Subs / Vendors / Utilities				\$39,606.60									

Part II- Alabama Tank Trust Fund Itemization Form "E" Cost Proposal							
Per diem allowed for Alabama Tank Trust Fund Contractor Personnel Only							
Maximum allowable rates are referenced on the "Maximum Rates" Tab in this document.							
This page should be submitted whenever per diem is being claimed.							
Points of Travel		Projected Date	Personnel Classification	Hour of Departure	Hour of Return	Activity To Be Performed	Amount Per diem claimed
From	To	mm/dd/yy		am/pm	am/pm		
Use this section to enter claims for daily per diems							
Birmingham	Leighton		Tech			GWS	\$12.75
Birmingham	Leighton		Tech			GWS	\$12.75
Total number of daily per diems							2
Use this section to enter claims for extended daily per diems							
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Total number of ext. daily per diems							6
Use this section to enter claims for overnight per diems							
Total number of overnight per diems							0

COST PROPOSAL NO. 30

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

I.1 Cost Proposal Information:

Cost Proposal Number:	Date of Cost Proposal (mm/dd/yy):
30 479617-RNA5	2/18/2020
UST or AST Incident Number:	Facility I.D. Number:
UST07-09-02	15201-033-013348

I.2 Facility Information

Facility Name:	Spring Valley Market
Facility Address:	2620 Ricks Lane Leighton, Colbert County, Alabama

I.3 Owner Information:

Owner Name:	Vulcan Oil Company, Inc.	
Owner Address:	P.O. Box 100 Shannon, Alabama 65124	
Employer Tax Number (IRS):	63-0571648	

I.4 Response Action Contractor Information:

Approved Response Action Contractor Name:	PPM Consultants, Inc. 5555 Bankhead Highway Birmingham, Alabama 35210
Approved Response Action Contractor Address:	
Project Contact:	Brandy Baltz Hall, P.G.
Project Contact Phone #:	205-836-5650
Project Contact E-mail:	brandy.hall@ppmco.com
Employer Tax Number (IRS):	72-1256279

Cost Proposal Number:

30

Facility Name:

Spring Valley Market

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 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:

Conduct 3 8-hour MEME/Air sparge events; Comprehensive groundwater sampling event (8 monitoring wells, 1 recovery well); etc.
(October through December 2020)

Provide proposed completion date for this phase of work activities:

01/31/21

Provide projected date of cleanup completed:

12/31/22

I.6 Subcontractor Information:

Indicate Subcontractors to be used during this phase of work:

Name & Address	Service Provided
Fruits & Associates, Inc.	MEME/Air Sparge Events/Water Disposal
Sutherland Environmental Company, Inc.	Laboratory Analyses

Cost Proposal Number:

30

Facility Name:

Spring Valley Market

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:

Todd Sitton, President

Email address:

tsitton@vulcanoilco.com

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:

02/18/20

I.9 Trust Fund Obligation Information:

Estimated Total Cost of all
Anticipated Response Actions
(To be updated overtime):

\$700,000.00

Total of Previously Approved Cost
Proposals:

\$444,930.88

Total Proposed Costs to Date
(Approved Costs Plus Costs Proposed in
this Cost Proposal):

\$473,125.88

Estimate Percent Completion of entire project to date:

68%

I.10 Cost Proposal Amount

Proposed Costs under this Cost Proposal:	\$28,195.00	Personnel	\$6,306.20
		Field Equipment	\$533.00
Owners Required Contribution for UST Release(\$5,000): <i>Applicable for CP#1 Only</i>		Mileage	\$575.00
		Per Diem	\$127.50
		Drilling	\$0.00
Owners Required Contribution for AST Release(\$10,000): <i>Applicable for CP#1 Only</i>		Analytical	\$715.00
		Other	\$19,938.30
Total of This Cost Proposal:	\$28,195.00		

Cost Proposal Summary				
CP Total	Facility I.D. #	CP #	Incident Number	Site Name
\$28,195.00	15201-033-013348	30	UST07-09-02	Spring Valley Market
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
Total Report and Plan Costs				\$1,934.00
Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal				
Groundwater Sampling Set-up (2hrs tech time)		\$126.00 /sow	1	\$126.00
Gauging Well (no sampling)		\$15.75 /well	3	\$47.25
Groundwater Sampling and Gauging 2" Well		\$63.00 /well	8	\$504.00
Groundwater Sampling and Gauging 4" Well		\$72.45 /well	1	\$72.45
MEME Event/Pilot Test/Injection Event (hourly rate)		\$63 /hr	30	\$1,890.00
Travel				
Mileage Rate			\$0.575	
Mileage (One way office to site)			125	
Number of round trips to site			4	\$575.00
Technician(s)-travel time		\$63 /hr	27.5	\$1,732.50
Per diem (6-12hrs)		\$12.75 /day	2	\$25.50
Per diem (greater than 12hrs)		\$34 /ext. day	3	\$102.00
Equipment and Equipment Kits				
55-Gallon Drums		\$50 /drum	1	\$50.00
Sampling Expendables(gloves, ice, string, jars, foil, distilled water, paper towels,		\$50 /sow	1	\$50.00
Groundwater Monitoring		\$160 /day	1	\$160.00
Bailers		\$7 /bailer	9	\$63.00
MEME Event		\$70 /event	3	\$210.00
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%	9
Other	QA/QC - 8260	\$65.00 /sample	10%	1
Total Field Costs				\$6,457.70
Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal				
Total Drilling Costs				\$0.00
Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal				
		Pass Through	Quoted Amount	Requested\$

Cost Proposal Summary						
CP Total	Facility I.D. #	CP #	Incident Number	Site Name		
\$28,195.00	15201-033-013348	30	UST07-09-02	Spring Valley Market		
8-hr MEME Event				10%	\$14,400.00	\$15,840.00
MEME Water Disposal Amount includes hauling				10%	\$3,603.00	\$3,963.30
				Total Subs / Vendors / Utilities		\$19,803.30

Part II- Alabama Tank Trust Fund Itemization Form "E" Cost Proposal							
Per diem allowed for Alabama Tank Trust Fund Contractor Personnel Only							
Maximum allowable rates are referenced on the "Maximum Rates" Tab in this document.							
This page should be submitted whenever per diem is being claimed.							
Points of Travel		Projected Date	Personnel Classification	Hour of Departure	Hour of Return	Activity To Be Performed	Amount Per diem claimed
From	To	mm/dd/yy		am/pm	am/pm		
Use this section to enter claims for daily per diems							
Birmingham	Leighton		Tech			GWS	\$12.75
Birmingham	Leighton		Tech			GWS	\$12.75
Total number of daily per diems							2
Use this section to enter claims for extended daily per diems							
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Birmingham	Leighton		Tech			MEME/AS	\$34.00
Total number of ext. daily per diems							3
Use this section to enter claims for overnight per diems							
Total number of overnight per diems							0

COST PROPOSAL NO. 31

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

I.1 Cost Proposal Information:

Cost Proposal Number:	Date of Cost Proposal (mm/dd/yy):
31 479617-RNA6	2/18/2020
UST or AST Incident Number:	Facility I.D. Number:
UST07-09-02	15201-033-013348

I.2 Facility Information

Facility Name:	Spring Valley Market
Facility Address:	2620 Ricks Lane Leighton, Colbert County, Alabama

I.3 Owner Information:

Owner Name:	Vulcan Oil Company, Inc.	
Owner Address:	P.O. Box 100 Shannon, Alabama 65124	
Employer Tax Number (IRS):	63-0571648	

I.4 Response Action Contractor Information:

Approved Response Action Contractor Name:	PPM Consultants, Inc. 5555 Bankhead Highway Birmingham, Alabama 35210
Approved Response Action Contractor Address:	
Project Contact:	Brandy Baltz Hall, P.G.
Project Contact Phone #:	205-836-5650
Project Contact E-mail:	brandy.hall@ppmco.com
Employer Tax Number (IRS):	72-1256279

Cost Proposal Number:

31

Facility Name:

Spring Valley Market

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 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:

Conduct 3 8-hour MEME/Air sparge events; Comprehensive groundwater sampling event (8 monitoring wells, 1 recovery well); etc.
(January through March 2021)

Provide proposed completion date for this phase of work activities:

04/30/21

Provide projected date of cleanup completed:

12/31/22

I.6 Subcontractor Information:

Indicate Subcontractors to be used during this phase of work:

Name & Address	Service Provided
Fruits & Associates, Inc.	MEME/Air Sparge Events/Water Disposal
Sutherland Environmental Company, Inc.	Laboratory Analyses

Cost Proposal Number:

31

Facility Name:

Spring Valley Market


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:	Todd Sitton, President
Email address:	tsitton@vulcanoilco.com
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:	02/18/20

I.9 Trust Fund Obligation Information:

Estimated Total Cost of all Anticipated Response Actions (To be updated overtime):	\$700,000.00
Total of Previously Approved Cost Proposals:	\$473,125.88
Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal):	\$501,320.88
Estimate Percent Completion of entire project to date:	72%

I.10 Cost Proposal Amount

Proposed Costs under this Cost Proposal:	\$28,195.00	Personnel	\$6,306.20
		Field Equipment	\$533.00
Owners Required Contribution for UST Release(\$5,000): <i>Applicable for CP#1 Only</i>		Mileage	\$575.00
		Per Diem	\$127.50
		Drilling	\$0.00
		Analytical	\$715.00
Owners Required Contribution for AST Release(\$10,000): <i>Applicable for CP#1 Only</i>		Other	\$19,938.30
Total of This Cost Proposal:	\$28,195.00		

Cost Proposal Summary				
CP Total	Facility I.D. #	CP #	Incident Number	Site Name
\$28,195.00	15201-033-013348	31	UST07-09-02	Spring Valley Market
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
Total Report and Plan Costs				\$1,934.00
Part II- Alabama Tank Trust Fund Itemization Form "B" Cost Proposal				
Groundwater Sampling Set-up (2hrs tech time)		\$126.00 /sow	1	\$126.00
Gauging Well (no sampling)		\$15.75 /well	3	\$47.25
Groundwater Sampling and Gauging 2" Well		\$63.00 /well	8	\$504.00
Groundwater Sampling and Gauging 4" Well		\$72.45 /well	1	\$72.45
MEME Event/Pilot Test/Injection Event (hourly rate)		\$63 /hr	30	\$1,890.00
Travel				
Mileage Rate			\$0.575	
Mileage (One way office to site)			125	
Number of round trips to site			4	\$575.00
Technician(s)-travel time		\$63 /hr	27.5	\$1,732.50
Per diem (6-12hrs)		\$12.75 /day	2	\$25.50
Per diem (greater than 12hrs)		\$34 /ext. day	3	\$102.00
Equipment and Equipment Kits				
55-Gallon Drums		\$50 /drum	1	\$50.00
Sampling Expendables(gloves, ice, string, jars, foil, distilled water, paper towels,		\$50 /sow	1	\$50.00
Groundwater Monitoring		\$160 /day	1	\$160.00
Bailers		\$7 /bailer	9	\$63.00
MEME Event		\$70 /event	3	\$210.00
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%	9
Other	QA/QC - 8260	\$65.00 /sample	10%	1
Total Field Costs				\$6,457.70
Part II- Alabama Tank Trust Fund Itemization Form "C" Cost Proposal				
Total Drilling Costs				\$0.00
Part II- Alabama Tank Trust Fund Itemization Form "D" Cost Proposal				
		Pass Through	Quoted Amount	Requested\$

Cost Proposal Summary						
CP Total	Facility I.D. #	CP #	Incident Number	Site Name		
\$28,195.00	15201-033-013348	31	UST07-09-02	Spring Valley Market		
8-hr MEME Event				10%	\$14,400.00	\$15,840.00
MEME Water Disposal Amount includes hauling				10%	\$3,603.00	\$3,963.30
				Total Subs / Vendors / Utilities		\$19,803.30

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Total number of overnight per diems							0