MODIFIED CORRECTIVE ACTION PLAN (COST PROPOSAL NO. 60)

IRA PHILLIPS, INC.
FORMER MARTIN'S TEXACO
36950 U.S. 231 NORTH
ASHVILLE, ALABAMA

FACILITY I.D. NO. 12534-115-011417
INCIDENT NO. UST05-08-06

PPM PROJECT NO. 451601-MCAP

SEPTEMBER 5, 2019

PPM CONSULTANTS

MODIFIED CORRECTIVE ACTION PLAN
(COST PROPOSAL NO. 60)

FOR

FORMER MARTIN'S TEXACO
36950 US HIGHWAY 231 NORTH
ASHVILLE, ALABAMA

FACILITY I.D. NO. 12534-115-011417
INCIDENT NO. UST05-08-06

PREPARED FOR:

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PPM PROJECT NO. 451601-MCAP

SEPTEMBER 5, 2019

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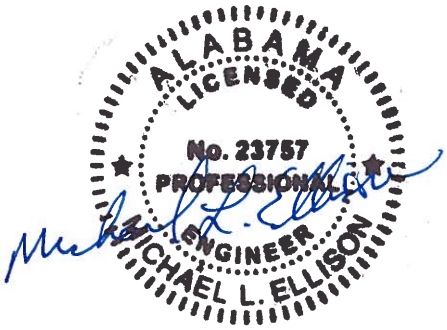
CERTIFICATION PAGE

I certify under penalty of law that this Modified Corrective Action Plan for the Martin's Texaco facility located at 36950 US Highway 231 North in Ashville, Alabama, and the plans, specifications, and technical data submitted within were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiring of the person or persons who directly gathered the enclosed information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information.



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

09/05/19
Date

UST RELEASE FACT SHEET

GENERAL INFORMATION:

SITE NAME: Former Martin's Texaco

ADDRESS: 36950 US Highway 231 N., Ashville, St. Clair County, Alabama

FACILITY I.D. NO.: 12534-115-011417

UST INCIDENT NO.: UST05-08-06

RESULTS OF EXPOSURE ASSESSMENT:

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

CONTAMINATION DESCRIPTION:

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

Free product present in wells? { } Yes {X} No Last observed 0.12 feet in RW-7 on 10/22/2018

Maximum COC concentrations measured in soil:	348 mg/kg BTEX (RW-3 at 9.5') 1.64 mg/kg MTBE (MW-5 at 4-6') 32.3 mg/kg naphthalene (RW-4 at 9.5')

Current maximum COC concentrations in groundwater: (5/13/19)	40.8 mg/L benzene in RW-2R 91.0 mg/L Total BTEX in RW-2R 1.27 mg/L MTBE in RW-2R 3.76 mg/L naphthalene in RW-7

ADEM Form 479 8/02

ADEM GROUNDWATER BRANCH
UST SITE CLASSIFICATION SYSTEM CHECKLIST

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

SITE NAME: Former Martin's Texaco
SITE ADDRESS: 36950 US Highway 231 N., Ashville, St. Clair County, Alabama

FACILITY I.D. NO.: 12534-115-011417
UST INCIDENT NO.: UST05-08-06

OWNER NAME: Ira Phillips, Inc.
OWNER ADDRESS: P.O. Box 799, Gadsden, Alabama 35902

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

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

ADEM GROUNDWATER BRANCH
UST SITE CLASSIFICATION SYSTEM CHECKLIST (continued)

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

ADDITIONAL COMMENTS:

One private well was located approximately 1,000' northwest of the site, but according to the owner it was abandoned many years ago. Free product appears periodically in three recovery wells. The last observation of free product was 0.12' in recovery well RW-7 on 10/22/2018.

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

Enter the determined classification ranking:	**G.1**

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

1.0 INTRODUCTION

PPM Consultants, Inc. (PPM) was retained by Ira Phillips, Inc. (Phillips) to prepare a Modified Corrective Action Plan (MCAP) for the former Martin's Texaco facility located at 36950 US Highway 231 North, in Ashville, St. Clair County, Alabama. The preparation of the MCAP was authorized by the Alabama Department of Environmental Management (ADEM) with their approval of Cost Proposal No. 60 via letter dated April 10, 2019.

The purpose of this MCAP 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.

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

2.0 BACKGROUND

2.1 SITE LOCATION

Martin's Texaco is the former name of a retail petroleum and convenience store facility that is still active under a different name, although the owner is still Ira Phillips, Inc. The subject site is located in a commercial area at 36950 U. S. Highway 231 North at the intersection of Interstate Highway 59 in Ashville, Alabama.

Geographically, the site is located in the northwest ¼ of the northwest ¼ of Section 36, Township 13 South, Range 3 East at approximate Latitude 33° 51' 50" N and Longitude 86° 17' 14" W within the *Ashville, Alabama, 7.5-minute Quadrangle United States Geological Survey* (USGS) topographic map. The site location is shown in **Figure 1, Site Location Map** in **Appendix A, Figures**.

2.2 SURROUNDING AREA

The site is located in a commercial area along US Highway 231 North, immediately north of its intersection with Interstate 59. A fast food restaurant is located adjacent to the north of the site. Vacant wooded or grassed acreage is located adjacent to the east and across the

highway to the west of the site. The nearest residential properties appear to be located approximately 1,200 feet north-northwest and south-southeast of the site.

2.3 SITE DESCRIPTION

Approximately 60 percent of the site land surface is covered with asphalt or concrete and the remaining is soil or gravel.

The underground storage tank (UST) system is comprised of a 4,000-gallon premium diesel tank, two manifolded regular diesel tanks with a 14,000-gallon capacity each, two manifolded regular-grade gasoline tanks with a 12,000-gallon capacity each, and a 6,000-gallon premium gasoline tank. All of the USTs are located in a single pit on the southeast side of the store building. Four gasoline dispensers are located along two dispenser islands in front (southwest side) of the store building. Three diesel dispensers are located near the tank pit on the southeast side of the store. Site features are shown on **Figure 2, Site Map**.

2.4 SITE HISTORY

The following provides a brief summary of pertinent activities conducted at the site to date. Activities completed prior to May 2014 were conducted by prior consultants.

Following is a summary of the history of the site:

Compliance Audit – A release was discovered at this site when a small amount of free product was discovered in a tank pit well in October 2005 during a routine compliance audit. The release was immediately reported to the ADEM and a Notification of Requirement to Conduct Investigative and Corrective Actions was issued on December 21, 2005.

Initial Abatement – Oak Environmental Services (OES) performed a mobile enhanced multiphase extraction (MEME) event on January 6, 2006, from the tank pit observation well in which the free product was observed. During the event, 0.5 gallons of separate phase hydrocarbons was recovered and another 0.3 equivalent gallons was removed in the vapor phase.

Preliminary Investigation – Four monitoring wells (MW-1 to MW-4) were installed in the Preliminary Investigation, which was performed on February 10, 2006. Soil borings were advanced and monitoring wells were installed at four locations (MW-1 to MW-4). Two

soil samples were collected at or above the water table in each boring for analysis of BTEX and MTBE per Environmental Protection Agency (EPA) Method 8260 and polynuclear aromatic hydrocarbons (PAHs) including naphthalene per EPA Method 8270. Total BTEX concentrations ranged from non-detectable to 1.272 milligrams per kilograms (mg/kg), benzene from <0.005 to 0.323 mg/kg, MTBE from <0.005 to 0.351 mg/kg. Naphthalene concentrations were not detectable. Dissolved COC concentrations exceeded ADEM Initial Screening Levels (ISLs) for benzene, toluene, and ethylbenzene in monitoring wells MW-1, MW-3, and MW-4. Total xylenes, MTBE, and/or naphthalene concentrations also exceeded ISLs in those monitoring wells. Based on the results of the investigation, the ADEM required that a Secondary Investigation be conducted at the site.

Secondary Investigation – The Secondary Investigation was conducted by NewFields in two phases from October 13, 2006, to July 17, 2007. The investigation included eleven soil borings in which soil samples were collected and monitoring wells were installed (MW-5 to MW-14 and MW-7D). All of the monitoring wells were completed to depths of less than 30 feet below ground surface (BGS) except MW-7D, which was completed as Type II monitoring well to 43.5 feet and was designed to evaluate the vertical extent of COC impacts. The COC concentrations in soil exceeded the ADEM ISL for benzene and MTBE in a sample from MW-5. In the last sampling event of the Secondary Investigation (July 2007), the COC concentrations in groundwater exceeded the ADEM ISL for one or more of the COCs in samples from MW-1, MW-3 to MW-7, and MW-12 to MW-14. Free product was observed in MW-4 (0.02 feet). The vertical and horizontal extents of COC impact were delineated in all directions during the investigation.

Alabama Risk-based Corrective Action (ARBCA) Evaluation – At the request of the ADEM, NewFields completed an ARBCA Evaluation on January 30, 2008. SSCALs were established for indoor and outdoor inhalation of vapors for both residential and commercial properties and for groundwater resource protection (GRP). Concentrations of benzene, MTBE, and/or naphthalene exceeded the SSCALs for GRP in compliance wells MW-5, MW-6, MW-7, and MW-13. ADEM approved the SSCALs in correspondence dated March 13, 2008.

Groundwater Monitoring – NewFields performed four quarters of groundwater monitoring at the site from October 16, 2007, through July 30, 2008. At the end of the series, COC concentrations exceeded one or more of the SSCALs (for benzene, MTBE, and/or naphthalene) in monitoring wells MW-5, MW-6, MW-7, and MW-13.

Pilot Test and Corrective Action Plan – NewFields conducted a MEME on June 20, 2008, from two of the monitoring wells (MW-4 and MW-5) to determine vapor flow rates at the site. The MEME indicated low permeability based on flow rates of 54 actual cubic feet per minute (ACFM) or less from each well but also suggested that thin conduits of higher permeability may be present since a vacuum was induced and the water table was drawn down in a well located over 70 feet away from one of the extraction wells.

The Corrective Action Plan (CAP) was prepared by NewFields and submitted to ADEM on July 25, 2008. The CAP recommended dual-phase vapor extraction (DPVE) in the source area near the gasoline dispensers west of the store and ozone injection near the downgradient edge of the groundwater plume to prevent migration offsite.

Cost Proposal Nos. 12 to 16 were submitted by NewFields for purchase, installation, start-up, and operation of DPVE and ozone systems in 2008. The cost proposals were resubmitted under the new contractor's name, G & RK Consulting Services, LLC (GRK), as Cost Proposal Nos. 17 to 21 in September 2008. The CAP submitted in July 2008 was not approved, and the cost proposals were eventually denied.

Additional Well Installation – One additional monitoring well, MW-15, was installed near the southwest corner of the gasoline dispenser islands in June 2010. A soil sample from the boring exceeded the SSCAL for benzene and a groundwater sample collected from the well in the same month also exceeded the benzene SSCAL.

Groundwater Monitoring and MEMEs – After discussions with ADEM, continued groundwater monitoring and periodic MEMEs were proposed by GRK under Cost Proposal Nos. 22 to 27. The monitoring was performed from January 2009 through May 2011. The MEMEs were conducted on a monthly basis from June 2010 to January 2011 and recovered 43.6 equivalent gallons of gasoline during that period. In the groundwater sampling event of May 2011, one or more of the SSCALs were exceeded in monitoring wells MW-5, MW-6, MW-7, MW-13, and MW-15.

Corrective Action Plan – GRK submitted another CAP for the site on April 11, 2011. The CAP recommended periodic MEMEs in the source area and air sparging near the downgradient edge of the groundwater plume to prevent migration offsite. This CAP was approved by ADEM in a letter dated August 19, 2011.

Recovery Well Installation and Air-Sparging System Installation/Start-Up – In September 2011, ten recovery wells (RW-1 to RW-10) were installed around the gasoline

dispenser islands on the southwest side of the store for use in the MEME events proposed under the CAP. Free product was measured in three of the recovery wells, RW-6 to RW-8, at thicknesses up to 0.14 feet.

An air-sparging system consisting of a blower driven by a 3-horsepower electric motor, a 6-point manifold with individual air-flow meters, a discharge silencer, a discharge relief valve, a pressure gauge, an hour meter, and a timer was installed in November 2011. Six injection wells (IW-1 to IW-6) were installed at the same time on the northeast edge of the site to prevent plume migration offsite. Air sparging operations commenced in December 2011 but the equipment was destroyed by an overturned log truck in February 2012. A rebuilt system was installed and air-sparging commenced again in June 2012.

Periodic MEMEs – GRK contracted with EPS of Vermont, Inc. (EPS) to conduct 15 MEMEs at the site from October 5, 2011, through April 8, 2014. Approximately 91 equivalent gallons of gasoline and 1,802 gallons of water were recovered from the site during that period.

Operation of Air-Sparging System and Quarterly Groundwater Sampling – GRK continued to sparge air through IW-1 to IW-6 from June 2012 until April 30, 2014. Groundwater sampling events were conducted each quarter during that time period. In the April 2011 event, SSCALs for benzene, MTBE, and/or naphthalene were still exceeded in MW-5, MW-6, and MW-15. SSCALs were no longer exceeded in MW-7 and MW-13 in April 2014.

Underground Injection Control (UIC) Permit / CAP Modification / Horizontal Well Installation / Well Replacement – PPM took over as the UST contractor for the site in May 2014 and continued operating the air-sparging system, performing periodic MEME events, and conducting triannual groundwater monitoring events. Also in 2014, ADEM began requiring a UIC permit for air sparging activities. PPM applied for and received a UIC permit for the site on June 17, 2015. The permit expires in June 2020.

In a letter dated November 15, 2015, PPM submitted modifications to the CAP for the site that included abandonment and replacement of three recovery wells, abandonment and replacement of four monitoring wells, and installation of a horizontal well. Cost Proposal No. 51 for the recommended modifications was approved by ADEM on March 15, 2016.

The horizontal well (HW-1) was installed on April 13, 2016, and was constructed of 4-inch nominal diameter polyvinyl chloride (PVC) casing with 60 feet of 0.01-inch slotted screen

positioned within the source area at a depth of 10 feet BGS. The recovery wells RW-2, RW-3, and RW-4, which had been screened across both the perched zone and the water table aquifer, were abandoned and replaced with recovery wells screened only in the perched zone (RW-2R, RW-3R, and RW-4R). Monitoring wells MW-4, MW-5, MW-6, and MW-15, which were screened across both the perched zone and the water table aquifer were abandoned and screened in either the perched zone (MW-6R) or the water table aquifer only (MW-4R, MW-5R, and MW-15R). All of the well abandonment/replacement work was performed from April 12 through April 15, 2016.

Continued MEMEs, Operation of Air-Sparging System, and Quarterly Groundwater Sampling – PPM continued to operate the air-sparging system and perform periodic MEME events and groundwater sampling events under approved Cost Proposal Nos. 51 through 56. While completing the remediation activities under Cost Proposal No. 56, the blower on the air sparging system seized and the system went down on February 20, 2018. The air sparging system has not been repaired and restarted since that time. In the report for the period covered by Cost Proposal No. 56, PPM recommended performing a low-level leak detection test of the UST system using tracer compounds to determine if an ongoing leak was occurring. PPM also recommended recalculating the SSCALs for the site, performing an ozone-sparging pilot test, repairing and restarting the existing air-sparging system, and continuing groundwater monitoring and MEME events on a tri-annual basis. ADEM requested approximate costs for the recommended work but, after their review, asked only for a cost proposal to perform tank tightness testing in lieu of the tracer test and a cost proposal to continue groundwater sampling.

Tank Tightness Testing – PPM submitted Cost Proposal No. 57 to perform tightness tests on the six active USTs located at the site along with the pressurized product transfer lines associated with the gasoline USTs. ADEM approved Cost Proposal No. 57 on July 13, 2018, and the tightness tests were performed on September 5, 2018. An acoustic test determined that a slow drip was occurring from the submersible pump containment sump into one of the two manifolded regular-grade gasoline USTs. All of the other USTs and the pressurized piping connected to the gasoline USTs tested tight. The sump gasket between the sump and the regular unleaded tank was replaced and the UST was retested on October 3, 2018. The UST passed the tightness test performed after the repair.

Continued Groundwater Monitoring and MEME Events – After the air-sparging system was discontinued, groundwater monitoring events were conducted at the site in October 2018, January 2019, and May 2019 under Cost Proposal Nos. 58, 59, and 61, respectively. MEME events were performed in October 2018 and January 2019; however, each MEME

event recovered less than 1 equivalent gallon of hydrocarbons. PPM concluded that the MEMEs were not being effective and a MEME event was not performed during the period covered by the May 2019 groundwater sampling. Another groundwater sampling event is scheduled for August 2019 under Cost Proposal No. 62.

Revised Tier 2 GRP Calculations – In a letter dated January 31, 2019, PPM proposed revised GRP SSCALs based on the lack of drinking water wells in the area and a redefinition of the source area. ADEM approved the revised SSCALs on April 11, 2019.

Modified CAP – Dissolved COC concentrations have remained near historic high levels in the recovery wells near the source area. Therefore, PPM recommended evaluation of alternate corrective actions. ADEM agreed and, on January 30, 2019, directed the facility to modify the CAP. Cost Proposal No. 60 for the CAP modification was approved by ADEM on April 10, 2019.

2.5 SITE CONDITIONS

2.5.1 Soil

Subsurface soils were described from visual inspection during advancement of borings at the site. The paved western portion of the site, in the area of the tank pit and store building, appears to have been built up with approximately 10 feet or more of gravelly clay fill material. The native soil below the fill appears to be a silty clay residuum developed over interbedded argillaceous dolomite/limestone and calcareous shale. Bedrock was encountered at approximately 19 feet BGS on the western portion of the site. In the eastern portion, which is much lower in elevation, bedrock was encountered at approximately 10 feet BGS. A detailed description of the soil encountered at the site is shown in the boring logs in **Appendix B, Soil Boring/Monitoring Well Construction Logs**. A cross-section taken from an earlier report prepared in 2006 by Newfields is included as **Figure 3, Cross-Section A-A'**.

2.5.2 Groundwater

Groundwater is perched in gravel lenses within the fill material on the western portion of the site. Static water levels in the perched zone have typically been measured in the range of 3 to 10 feet BGS, with the shallowest water encountered in wells nearest the tank pit and fuel piping trenches. A lower water-bearing zone, which has been designated the surficial aquifer in previous reports, typically occurs near the top of the residuum at depths ranging from approximately 12 to 18 feet BGS in the western portion of the site. Shallower

surficial water depths, typically ranging from 4 to 12 feet BGS, are observed in the eastern portion of the site where the surface elevation is significantly lower. Groundwater elevation data are included in **Table 1**, **Groundwater Elevation Survey Data**, in **Appendix C, Tables**.

Groundwater flow in the perched aquifer, in which the highest COC concentrations have been found, is radial from the tank pit and the gasoline dispenser islands. **Figure 4A, Groundwater Elevation Map – Perched Aquifer (May 13, 2019)** depicts the groundwater surface and estimated flow direction in the perched aquifer.

In the surficial aquifer, the general groundwater flow direction is usually to the east-northeast. In the May 2019 sampling event, the hydraulic gradient between monitoring wells MW-5R and MW-2 was estimated to be 0.028 feet/feet (ft/ft). Between monitoring wells MW-2 and MW-13, the hydraulic gradient was estimated to be 0.032 ft/ft. **Figure 4B**, **Groundwater Elevation Map – Surficial Aquifer (May 13, 2019)** depicts the groundwater elevation and estimated flow direction in the surficial aquifer.

2.5.3 COCs in Soil

No COC concentrations exceed an approved SSCAL. A summary of soil data is presented in **Table 2, Soil Analytical Summary** and is also shown in **Figure 5, Constituent-of-Concern Concentrations in Soil**.

2.5.4 COCs in Groundwater

Free product was last observed on October 22, 2018, during a groundwater sampling event. At that time, 0.12 feet of free product was measured in recovery well RW-7. Free product was also measured on the same date in RW-6 (0.09 feet) and RW-9 (0.02 feet). Other wells in which free product has been measured include RW-8 (last observed at 0.10 feet in September 2012) and MW-4 (last observed at 0.02 feet in October 2007).

The range of dissolved COC concentrations observed during the most recent sampling event in May 13, 2019 was as follows:

- Benzene: <0.001 to 40.8 milligrams per liter (mg/L)
- Toluene: <0.001 to 3.08 mg/L
- Ethylbenzene: <0.001 to 9.72 mg/L
- Xylenes: <0.003 to 37.4 mg/L

- MTBE: <0.001 to 1.27 mg/L
- Naphthalene: <0.005 to 3.76 mg/L.

In the limited May 2019 event, the dissolved concentrations of benzene were above the SSCALs in MW-4R (3.40 mg/L), MW-5R (5.76 mg/L), RW-2R (40.8 mg/L), RW-3R (13.9 mg/L), RW-4R (3.79 mg/L), RW-7 (16.4 mg/L), and RW-9 (25.2 mg/L). Compared to the most recent sampling event in January 2019, the benzene concentrations increased in MW-4R, MW-5R, RW-2R, and RW-3R but decreased in RW-4R, RW-7, and RW-9. The dissolved concentrations of benzene continue to fluctuate at or near historic high levels. None of the other COCs were above their respective SSCALs in any of the sampled wells.

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

- **Figure 6, Dissolved Benzene Isoconcentration Map (May 13, 2019)**
- **Figure 7, Dissolved MTBE Isoconcentration Map (May 13, 2019)**
- **Figure 8, Dissolved Naphthalene Isoconcentration Map (May 13, 2019)**.

3.0 REMEDIAL APPROACH

3.1 REMEDIAL OBJECTIVES

This MCAP 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

The following combination of remedial techniques is recommended by PPM:

- Ozone sparging in the areas of highest dissolved benzene concentrations
- Installation of ozone monitoring devices in two vapor monitoring points installed within the fuel piping trenches

- Vapor recovery from the existing horizontal well during periods when water levels are measured below the horizontal well screen
- Remediation by natural attenuation (RNA) monitoring to track changes in groundwater chemistry such as dissolved oxygen (DO) and oxidation-reduction potential (ORP).

A baseline groundwater monitoring event should be conducted to provide site conditions just prior to initiating ozone sparge 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 OZONE SPARGE

Ozone (O_3) is an allotrope of oxygen, consisting of three oxygen atoms that are less stable than diatomic oxygen (O_2). Ozone is more soluble than oxygen in water and is commonly used in municipal water treatment applications for disinfectant purposes. However, the use of ozone for soil and groundwater remediation projects has increased over the last decade as alternative methods have been pursued and the technology has subsequently evolved.

In general, the ozone-based process for site remediation is similar to other chemical oxidation techniques in which the oxidant of choice is sparged into the desired treatment area. However, the use of ozone is different from most oxidation processes as the ozone can be injected as a gas or liquid (as ozonated water). This approach provides the opportunity to deliver more continuous oxidation as opposed to batch applications typically associated with other techniques.

An ozone generator uses electrical current to convert O_2 (readily available in atmospheric air) to O_3. A compressor is then used to sparge the ozone into the subsurface using one or more sparge points. Once delivered to the subsurface, the ozone facilitates deconstruction of COC molecules and other oxidizable substances. As an added benefit, the reaction results in the release of oxygen that is beneficial in producing conditions that are conducive to aerobic degradation of select contaminants. As COC concentrations decrease over time, the volume of ozone and, in this case, oxygen sparged into the subsurface can be decreased accordingly and individual sparge points can gradually be taken off line.

At this site, PPM proposes to sparge ozone into the subsurface through nine sparge points located near the gasoline dispenser islands on the west side of the store building. Five of the sparge points will be installed at a depth of approximately 16 feet BGS to treat the perched aquifer. Four of the sparge points will be installed at a depth of 20 feet BGS to treat the surficial aquifer. Because of the depth of sparging and the high mass of hydrocarbons dissolved in groundwater, ozone escape into fuel piping trenches is unlikely. However, to reduce the potential for ozone contact with the UST system, PPM proposes to install ozone monitoring points inside the fuel piping trenches near the dispenser islands. As dissolved COC concentrations decrease over time, sparge times for the various points will be adjusted accordingly in an effort to reduce the potential for ozone migration to sensitive areas. The locations of the sparge points and ozone monitoring points are indicated in **Figure 9, Proposed System Layout** and **Figure 10, Detail of Dispenser Area**.

3.4 OVERVIEW OF SOIL VAPOR EXTRACTION

Soil vapor extraction (SVE) is a common remedial technology that has proven to be effective at treating the vadose zone. This technology involves the application of vacuum to the soil matrix, creating a negative pressure gradient that causes movement of vapors toward extraction points. The increased flow of oxygen that occurs in the subsurface resulting from the SVE process promotes increased biological degradation, aiding in potentially shorter cleanup duration. At this site, the existing horizontal well (HW-1) will be utilized to remove soil vapor during times when the water level is below the horizontal well screen. The location of the horizontal well and its screen is shown in **Figures 9** and **10**.

3.5 OZONE SPARGE AND SVE DESIGN CONSIDERATIONS

PPM has selected a remedial approach that should achieve site objectives in a cost effective and timely manner. One of the most important aspects of any chemical oxidation program is providing adequate contact with the substance to be oxidized. Typically, most applications deliver the oxidant throughout the area of impact in an effort to provide a greater amount of destruction. Sparge points are strategically placed across the area of impact to provide overlap of the oxidant injections.

PPM used existing COC concentration data to estimate the mass of contaminants requiring treatment. In addition, consideration was also given to other oxidizable materials known or suspected to be present in the subsurface. A site oxidant demand was then estimated

using this information. Based on the oxidant demand, an ozone sparge system was selected capable of producing a sufficient mass of ozone per day so that site objectives could be achieved within a reasonable time frame. A summary of these calculations is provided in **Appendix D**, **Design Calculations**.

Ozone sparge materials consisting of delivery tubing and sparge points are required to be resistant to corrosion because of contact with the ozone gas. At this site, Teflon delivery tubing and stainless steel sparge points will be utilized. PPM requested a quote for the ozone sparge materials and ozone-producing equipment from both H_2O Engineering, Inc. (H_2O) and Ozone Solutions, Inc. Copies of the bid documents and ozone sparge materials and equipment quotes are included in **Appendix E**, **Equipment Specifications and Quotations**. The subcontractor quotes for installation services are included in **Appendix F**, **Installation Subcontractor Specifications and Quotations**.

The SVE system, in addition to removing adsorbed COCs from the soil, will be required at this site to recover potential vapors that may be produced during deconstruction of hydrocarbons in the subsurface. For those purposes, SVE will be employed in the existing horizontal well (HW-1), which is located between the two gasoline dispenser islands. PPM requested quotes for the SVE equipment from both Mid-Atlantic Environmental Equipment, Inc. (MAE_2) and MK Environmental, Inc. Copies of the bid documents and quotes are included in **Appendix E**.

To monitor the effectiveness of the systems, PPM proposes to conduct groundwater monitoring events prior to and on a quarterly basis after implementation of this CAP. Groundwater sampling methodology and recommended sampling frequency are discussed further in **Section 3.11**.

3.5.1 Ozone Sparge Unit

PPM recommends using a trailer-mounted ozone unit manufactured by Ozone Solutions at the site. The unit is capable of producing up to 250 grams per hour, which is equivalent to approximately 13.2 pounds per day (ppd) of ozone for remedial efforts. Pressure can be boosted to a maximum of 40 pounds per square inch (psi), at a total flow rate of approximately 8 to 9 standard cubic feet per minute (scfm) through up to 20 ozone sparge points. Individually, each sparge point should be capable of a flow rate up to 3 scfm.

The unit has a field programmable controller with an interface panel viewer. The system will be constructed with ten units on the manifold with each unit capable of operating two

wells at a time. However, one sparge point will initially be assigned per each manifold unit so that independent time duration control (none to continuous flow) will be available for each sparge point.

System components that are in contact with ozone are manufactured of ozone resistant material to maintain acceptable runtime during the project. Components can be easily replaced during maintenance intervals recommended by the equipment manufacturer. More detailed information regarding the unit is provided in **Appendix E**.

3.5.2 Fail-safe Components

The ozone unit will contain a fail-safe automatic shutdown device to stop ozone production and sparging in the event that an ozone leak is detected within the unit or within the trailer. Ozone monitoring sensors will also be placed within two ozone monitoring points, OM-1 and OM-2 as shown on **Figures 9** and **10**, installed within the fuel piping trenches. These sensors will also be connected to an automatic shutdown device in the event that ozone is detected in the fuel piping trenches in order to reduce the potential for ozone contact with susceptible materials. Along with an ambient ozone monitor sensor, the unit will be equipped with a built-in high limit pressure switch, and a pressure relief valve to protect against equipment damage. The specifications for the ozone monitoring points are shown in **Figure 11, Ozone Sparge Point and Monitoring Point Construction Details**.

The unit will be equipped with a telemetry system to provide remote system monitoring. A Siemens programmable logic controller (PLC) will be connected to the telemetry system to allow the ozone system to be monitored and manipulated remotely through the internet. An Ewon Flexy router will be installed to provide a firewall for system internet security. A wireless cellular provider, or similar, will be utilized to facilitate communication with the telemetry system.

Although it is anticipated that ozone sparged into the subsurface will be depleted during the oxidation process, it is possible that some residual ozone may remain after the oxidant demand has been met. If this should occur, ozone escape is not anticipated to be an issue for outdoor inhalation or indoor inhalation within surface structures, primarily due to dilution effects with ambient air.

3.5.3 SVE Unit

PPM recommends using a SVE unit manufactured by MK Environmental that utilizes a 147 scfm (maximum) regenerative vacuum blower to recover potential vapors that may be generated during the oxidation process and to remove adsorbed COC impact in soil. The blower produces a negative pressure at select areas on site to remove vapors and transfer them through a 400-pound granulated activated carbon (GAC) vessel prior to discharge to the atmosphere. Water extracted along with vapors from the subsurface will be removed from the air-stream in a knock-out tank. Water may also be periodically evacuated from the horizontal well with the use of a dedicated submersible purge pump, if deemed necessary. The water will be piped to a 1,000-gallon polyethylene storage tank when the level in the knock-out tank is high. More detailed information regarding the unit is provided in **Appendix E**.

The SVE blower will be interlocked with a high-level switch in the storage tank and a high pressure sensor to shut down the SVE system when the tank is full or the well screen is flooded and incapable of vapor flow. EPS will mobilize to the site to collect groundwater removed during SVE operations for final disposal at Sunoco LLC in Birmingham, Alabama. For budgeting purposes, it is estimated that the 1,000-gallon tank will be filled and require removal of the accumulated groundwater approximately six times per year.

3.5.4 Horizontal Boring and Trenches

To limit disruption to normal facility operations, PPM proposes to utilize horizontally-drilled borings where efficient to install subsurface conduits for the ozone tubing and ozone monitor wiring to near the sparge points and ozone monitoring points. SVE piping will also be installed in one of the horizontally-drilled borings. In all, three borings will be advanced with a rig designed to push a bit along an inclined path from the ground surface to a point below known utilities. One borehole will be advanced from an entry point near the surface completion of HW-1 to an exit point at the system equipment compound proposed to be located along the northeastern corner of the store parking lot. The entry point for that boring will also serve as an entry point for two additional borings: one to be advanced along a path near sparge points SP-1 through SP-4 and a second boring along a path near sparge points SP-5 through SP-9. The borehole angle will be adjusted so that it is brought within approximately 18 inches of the ground surface near each of the sparge points. The locations of the horizontally-drilled borings are shown in **Figures 9** and **10**.

At the end of each boring, a reamer bit will be attached to the drill string and a flexible strap will be utilized to pull the appropriate number of 1-inch nominal diameter high-density polyethylene (HDPE) pipe strings back through the boring along with nylon cord to allow ozone delivery tubing to be pulled through the pipes. Spare conduits will be installed at the same time in case additional sparge points are needed in the future. In the initial boring between the entry point and the equipment compound, 2-inch nominal diameter PVC piping will be pulled through the boring to be used as SVE piping. The total length of the horizontal borings is expected to be approximately 395 feet. A 2-foot square metal vault will be installed at the common entry point to allow access for pulling ozone tubing and wiring through the conduits. The construction of the junction box vault is shown in **Figure 12, Trench and Junction Box Construction Details**.

Shallow trenches will be excavated from the two southern horizontally-drilled borings to each of the sparge points (SP-1 through SP-9) and ozone monitoring points (OM-1 and OM-2). One-inch nominal diameter HDPE or Schedule (SCH) 40 PVC conduits will be placed in the trenches and connected to separate conduits run through the horizontal borings so that the ozone tubing and the wiring for each of the ozone monitors can be contained within separate conduits. Another shallow trench will be excavated from the entry point of the horizontally-drilled borings to the surface completion of HW-1, and 2-inch nominal diameter PVC piping will be installed to connect HW-1 with the SVE piping installed in the boring to the equipment compound. The excavated trenches will likely cross the existing fuel piping trenches at two locations and will be excavated by hand at those points. The approximate locations of the excavated trenches are shown in **Figure 10**. The construction of the monitoring points is shown in **Figure 11**. The construction of the trench is shown in **Figure 12**.

3.5.5 Ozone Sparge / SVE System Electrical Components

The ozone sparge and SVE units will utilize three-phase, 240-volt, 200-amp electrical service. Power will be connected to a power supply provided by Alabama Power Company.

3.6 SPARGE POINTS

PPM recommends that ozone be applied to the subsurface by means of nine sparge points. Sparge points SP-2 and SP-4 through SP-7 will each be installed to a depth of approximately 16 feet BGS. Sparge points SP-1, SP-3, S-8, and SP-9 will each be installed to a depth of approximately 20 feet BGS. Ozone sparge at these locations should achieve an overall decrease of COC concentrations within the vicinity of each sparge point. An

estimate of approximately 15 feet was chosen as the design radius of influence. The sparge points will be placed so that overlapping areas of influence can be achieved. The placement of the proposed sparge points is provided on **Figure 10**.

Ozone sparge points will be constructed of 1-inch nominal diameter SCH 80 PVC risers connected to a 0.75-inch outside diameter (O.D.) stainless steel oxidation point approximately 12 inches long at the base of the riser pipe. The risers and oxidation points will be joined using ozone-resistant union fittings.

The sparge points will be installed in borings advanced using a minimum of 6.25-inch O.D. hollow-stem augers to the depths noted above. Sand will be placed in the boring annulus for each proposed sparge point from the bottom of the boring to approximately 6 to 12 inches above the top of the sparge point. A bentonite seal approximately 2 to 4 feet thick will be constructed at the top of the sand pack. A cement/bentonite grout will be placed above the bentonite seal to within approximately 2 feet BGS. The bentonite seal and grout are intended to reduce the potential for ozone escaping up the boring and to the land surface.

The proposed sparge points will be set within 12-inch diameter steel manhole covers surrounded by concrete pads. The larger diameter manhole covers are necessary to facilitate easy access to the well head connections. The manhole covers will extend slightly above the existing land surface in an effort to reduce the potential for inflow from the land surface. Each sparge point will be completed with a well head connection that will facilitate ozone delivery. An illustration of the wellhead and sparging point construction is provided in **Figure 11**.

Existing monitoring wells will be used to monitor site response and to serve as locations for measuring pressure gradients once the system is operational. 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 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 may be effective in down-gradient areas with low to moderate impact and may be used in conjunction with other remedial methods that address contaminants in the source area. In this case, RNA may be effective in the eastern portion of the plume after ozone sparge is applied to the source area on the western side of the plume.

It is anticipated that ozone sparge will not only reduce the overall contaminant mass, but will also create conditions conducive to microbial activity. Therefore, an RNA monitoring program will be implemented at the site to determine the effectiveness of RNA in the area where ozone is not being sparged. In addition, an RNA monitoring program may be necessary once it is determined that active remediation is no longer warranted at the site.

Select water quality parameters (pH, temperature, specific conductance, ORP, and DO) will be monitored during the RNA groundwater monitoring events.

3.8 ANTICIPATED SITE RESPONSE

The following provides information regarding the anticipated site response to treatment based on actual and assumed site conditions.

3.8.1 Oxidation of COC

Ozone sparged into the subsurface will rapidly react with oxidizable substances that it comes in contact with, essentially deconstructing the molecules in a short time period. An important factor in this process is providing an adequate mass of ozone based on the oxidant demand. The actual oxidant demand for the site is unknown, but has been estimated using the assumptions outlined in **Appendix D**. Nine ozone sparge points are proposed to provide sufficient contact in the treatment area.

3.8.2 Removal of Soil Vapors and Potential Free Product

The use of SVE over extended periods through the horizontal well is designed to remove vapors in the area between the gasoline dispensers more efficiently than the use of MEME events, which are limited in time. In particular, SVE is expected to be most effective during periods of low water levels that typically occur in the mid- to late-Fall. Seven of the

nine most effective MEME events have occurred in the months from October through December. Above average MEME recoveries have also occurred in the months of May through July. Therefore, SVE could be effective during approximately half the months of a typical year.

3.8.3 Remediation by Natural Attenuation

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

3.9 PERMITS

PPM spoke with Mr. Randy Thompson, the Coordinator for the Building and Zoning Department of the City of Ashville. According to Mr. Thompson, the city will require a building permit for the construction activities and provided PPM with a schedule of expected fees. Upon approval of the MCAP and associated cost proposals by ADEM, the building permit application will be submitted to the City of Ashville.

PPM will also submit a waste profile and request approval for disposal of solid waste generated during the installation process. The Air Division of ADEM will be notified to obtain permission to operate the SVE system. After consultation with ADEM, a new general UIC permit will not be required until the existing permit expires in June 2020.

3.10 OZONE SPARGE / SVE SYSTEM INSTALLATION

3.10.1 General

The ozone sparge unit and SVE unit will be located inside a fence on the northeastern corner of the store parking lot. The primary reason for selecting this area was to minimize disruption to the facility operations, which involve moderate truck traffic. The proposed location of the unit is shown on **Figure 9**.

Implementation dates will be based on the approval date of this MCAP by ADEM, issuance of a building permit by the City of Ashville, equipment availability, and subcontractor scheduling. Initial implementation activities will consist of the following:

- Installation of nine borings using hollow stem augers
- Construction of nine ozone sparge points (SP-1 through SP-9)
- Construction of two ozone monitoring points (OM-1 and OM-2)
- Installation of protective piping and ozone/oxygen delivery tubing from sparge points SP-1 through SP-9 to the ozone system location through excavated trenches and directionally-drilled boreholes
- Installation of protective piping and wiring from ozone monitoring points OM-1 and OM-2 to the ozone system location through excavated trenches and directionally-drilled boreholes
- Installation of SVE piping and water-removal piping from horizontal well HW-1 to the SVE system through an excavated trench and a directionally-drilled borehole
- Mobilization of the ozone system and SVE system units to the site
- Installation of required electrical power supply equipment and lines
- Preliminary testing of the ozone and SVE systems.

Technical Drilling Services, Inc. of Knoxville, Alabama, has been selected as the installation contractor for the proposed system.

3.10.2 Soil Borings

Alabama One Call will be notified so that underground utilities will be marked prior to soil boring advancement and subsurface disturbance. PPM will also conduct a GPR survey to attempt to locate potential subsurface utilities, fuel piping, and other structures that may be present in the area where the sparge points, directionally-drilled borings and trenches are proposed. Once the utility location and GPR survey are complete, the locations of the proposed borings and trenches may be modified as necessary. Ground Penetrating Radar Services (GPRS) provided a quote for completing the private line locate with GPR. A copy of the quote is included in **Appendix G, Ground-Penetrating Radar Survey Quote**. Additionally, the first 4 feet of each new boring will be advanced with hand-held equipment to check for the presence of unmarked utilities.

The borings for the proposed sparge points will be advanced with hollow stem auger drilling equipment using a minimum of 6.25-inch O.D. hollow-stem augers. Borings for sparge points SP-1, SP-3, SP-8, and SP-9 will each be advanced to approximately 20 feet BGS. Borings for sparge points SP-2 and SP-4 through SP-7 will each be advanced to approximately 16 feet BGS. Borings for ozone monitoring points OM-1 and OM-2 will each be advanced by hand auger or similar hand-method to approximately 5 feet BGS.

Down-hole equipment will be cleaned prior to use at each location with a high-pressure rinse. Soil cuttings generated during boring advancement will be placed into roll-off containers and hauled to either the Star Ridge Landfill in Moody, Alabama, or the Cedar Hill Landfill in Ragland, Alabama. A waste profile will be submitted to ADEM for approval of the waste disposal. A copy of the roll-off rental and transportation quote is included in **Appendix H, Waste Disposal Quote**.

3.10.3 Ozone Sparge Point Installation

Ozone sparge points will be constructed of a 1-inch nominal diameter SCH 80 PVC riser connected to 0.75-inch O.D. stainless steel oxidation point approximately 12 inches long. The risers and oxidation points will be joined using ozone-resistant union fittings.

Sand will be placed in the boring annulus for each proposed sparge point from the bottom of the boring to approximately 6 to 12 inches above the top of the oxidation point. A bentonite seal approximately 2 to 4 feet thick will be constructed at the top of the sand pack. A cement/bentonite grout will be placed above the bentonite seal to within approximately 2 feet BGS. The bentonite seal and grout are intended to reduce the potential for ozone escaping up the boring and to the land surface.

The proposed sparge points will be set within 12-inch diameter steel manhole covers surrounded by concrete pads. The larger diameter manhole covers are necessary to facilitate easy access to the well head connections. The manhole covers will extend slightly above the existing land surface in an effort to reduce the potential for inflow from the land surface. Each sparge point will be completed with a well head connection that will facilitate ozone delivery. Sparge well construction details are shown in **Figure 11**.

3.10.4 Electrical Hookup

An electrical subcontractor will provide the connection from the service provider to the main disconnect for the system. The electrical supply will be from a new, temporary power pole and meter. The pole will be set near the system enclosure by the electrical subcontractor. The electrical service line will be dropped to the pole and a meter set by Alabama Power Company. Electrical work will be performed in accordance with applicable local codes.

3.10.5 Sparge Point Configuration

Sparge point locations were strategically selected so that remedial objectives can be obtained within a reasonable time period. The area selected for treatment at the site is focused in and around the known extent of dissolved COC impact above SSCALs on the property. Placement of sparge points is intended to reduce existing COC impact in these areas and reduce the potential for further COC migration.

Sparge point specifications will consist of the following:

- Installation of a 12-inch diameter by 12-inch deep vault at each proposed sparge point
- Installation of a well head connection including a SCH 80 flush threaded cap, a stainless steel tee, and a compression fitting
- Connection of the delivery tubing to the well head via the compression fitting
- Installation of an independent 1-inch nominal diameter piping consisting of either SCH 40 PVC or HDPE from the manhole to the ozone sparge system.

Typical construction details of sparge points are presented on **Figure 11**.

3.10.6 Protective Piping

Ozone resistant tubing [1/2-inch O.D. by 3/8-inch inner diameter (I.D.)] will be used to convey the ozone from the system to each sparge point. The tubing will be placed inside 1-inch nominal diameter HDPE piping for protection. The piping beneath asphalt and concrete pavement will be installed to a depth of approximately 12 inches below the base of the pavement except at entry/exit points and adjacent to each sparge point. Efforts will be made to ensure that the piping does not interfere with existing underground utilities. Construction details are depicted on **Figures 11** and **12**.

Soil cuttings, asphalt, and concrete generated during the installation of the directionally-drilled borings, well and junction box vaults, and trenching will be disposed of at either the Star Ridge Landfill in Moody, Alabama, or the Cedar Hill Landfill in Ragland, Alabama.

3.10.7 Security

The ozone sparge system and SVE system will be contained in trailer-mounted enclosures placed inside a chain-link fence with privacy slats. Appropriate warning signs and emergency contact information will be installed on the fence.

3.11 GROUNDWATER MONITORING

A groundwater monitoring event will be conducted at the site prior to system start-up to establish baseline conditions prior to initiating corrective actions. Samples will be collected from each accessible monitoring well and recovery well on-site for analysis of COCs per EPA Method 8260.

The following provides a detailed description of the fieldwork methodology for effectiveness monitoring events.

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

Each monitoring well and recovery well scheduled for sampling will be sampled in general accordance with PPM's internal Quality Assurance/Quality Control (QA/QC) plan. Prior to sampling, each well will be purged of approximately three well-casing volumes (or to near dryness) utilizing single use, disposable PVC bailers and nylon rope. Purge water from sampled monitoring wells will be contained in 55-gallon drums and placed in the on-site storage tank for temporary storage. EPS will mobilize to the site to collect the purge water and any groundwater removed during SVE operations for final disposal at Sunoco LLC in Birmingham, Alabama. It is estimated that less than 100 gallons of purge water will be generated during each sampling event.

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

PPM personnel will wear disposable nitrile gloves during well purge and sample collection activities in an effort to reduce the potential for cross-contamination and as part of personal

protective equipment (PPE) for the project. Gloves will be changed and discarded between each sample acquisition.

Select water quality parameters (pH, temperature, specific conductance, ORP, and DO) will be measured during sample collection. Measurements will be performed for each well sampled and will be representative of the water collected from the well. Instrument readings will be documented in the project field book.

On completion of sampling activities, sample coolers will be transported or shipped under standard chain-of-custody protocol to an independent testing laboratory for analyses. A copy of PPM's **Technical Sampling and QA/QC Plan** is provided in **Appendix I**.

3.12 OZONE SPARGE / SVE SYSTEM START-UP / INITIAL OPTIMIZATION

PPM personnel will be on site during system startup and initial operation. System components will be monitored to ensure that the systems are operating properly prior to departure from the site. During the first day of operation of the sparge system, oxygen will be gradually sparged to the various points. Connections, piping, and well heads will be checked for the presence of leaks and modifications/repairs will be promptly made upon discovery. Data will be collected to evaluate the initial pressure gradient generated throughout the sparge areas and fluctuations in groundwater elevations (if any). During the first day of operation of the SVE system, horizontal well HW-1 will be cleared of water using the peristaltic pump and a vacuum will be applied to determine the air flow.

The initial startup period is anticipated to be completed in approximately two days. Once it has been determined that the ozone sparge system is functioning properly, ozone will be sparged into the subsurface. Based on the results of the first day of operations of the SVE system, a decision will be made at the time about its operating schedule.

System information will be collected and recorded, on a daily basis during the first two days of the optimization study. These measurements will be used to perform modifications and adjustments to the systems as needed to enhance the remedial efforts.

3.13 SYSTEM OPERATIONS AND MAINTENANCE

Following completion of the optimization study, PPM will periodically visit the site to conduct operation and maintenance (O&M) and monitoring activities. These activities will

be conducted by a PPM engineer, geologist, or technician experienced in subsurface investigations and remediation.

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

Normal operations will include O&M of the systems and continuing optimization of system performances as needed. Scheduled visits will be made to maintain the system components and ensure the systems are operating as intended. Minor system components will be regularly inspected and replaced or repaired as required. If a shutdown of the systems occurs, PPM will attempt to provide personnel to restart/repair the system within 72 hours of receiving notification of shutdown.

Typical ozone sparge and SVE O&M activities will include the following:

- Visual inspection of system components and their condition (including tubing connections for potential leaks)
- Monitoring of pressure/vacuum readings and air flow
- Monitoring of SVE effluent concentrations
- Monitoring of sparge times
- Checking SVE blower oil level and air filter conditions
- Greasing equipment fittings.

3.14 EFFECTIVENESS MONITORING

The progress of corrective action activities will be monitored to evaluate if the remedial objectives are being met. Results from baseline groundwater sampling will be used to gauge the progress of groundwater remediation efforts.

3.14.1 System Monitoring

System monitoring will include routine measurement of parameters discussed in **Section 3.13** and will coincide with O&M activities. Additional parameters to be measured, recorded, or calculated during the routine activities are as follows:

- Date of each site visit
- Measuring groundwater elevations in select monitoring wells (minimum of once per quarter)
- Measurement of DO and ORP in select monitoring wells to aid in evaluation of the radius of influence (minimum of once per month)
- Total system runtimes and explanations of unscheduled shutdowns
- O&M activities and system conditions
- Progress of the remedial system toward achieving site cleanup objectives.

An example of a monitoring form to be used is included in **Appendix J**, **Remediation Monitoring Forms**.

3.14.2 Groundwater Sampling

PPM recommends groundwater samples be collected from all monitoring and recovery wells on a quarterly basis for the first year of operation. Following four quarters of sampling, PPM may recommend to reduce the number of wells sampled each quarter. Groundwater samples will be analyzed for BTEX, MTBE, and naphthalene per EPA Method 8260. Analytical data obtained during these events will be evaluated to ascertain if modifications to the ozone sparge program are warranted. This may include removing the ozone system, performing alternating months of sparging, adjusting the ozone sparge cycle time or modifying the number of sparge points used.

The system will be shut down at least 48 to 72 hours in advance of each scheduled monitoring event. Sampling activities will be conducted in accordance with the methodology outlined in **Section 3.10**.

4.0 REPORTING

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

1. <u>System Delivery</u>

2. Report of Corrective Action Implementation
   This report will be submitted within 60 days of system start-up and will include as-built drawings of the system layout and a description of the work performed.

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

4. Site Closure Report/Monitoring Well Abandonment
   This report will describe in detail the closure of the site and removal of all remediation equipment.

5.0 CLOSURE EVALUATION

The data collected during site monitoring activities will be evaluated on a quarterly basis or more frequently if needed. Criteria for considering termination of remedial activities will include reduction of COC concentrations to at or below SSCALs or a determination that asymptotic levels have been reached.

Remedial measures will be terminated following approval from ADEM. The site will be monitored for potential increases in COC concentrations (rebound) once corrective actions have ceased. Recommendations will be made concerning further remedial action should COC concentrations rebound.

6.0 SITE HEALTH AND SAFETY

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

7.0 PROJECT SCHEDULE

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

7.1 ESTIMATED SCHEDULE FOR SYSTEM INSTALLATION

Upon approval of the MCAP by ADEM, PPM will prepare the Air Division notification and applications for the building permit, and the utility permit. After consultation with ADEM, a new general UIC permit application will not be required until the existing UIC permit expires in June 2020. The permits should require six weeks for approval. PPM estimates that sparge point installation activities will be completed in three work days. Trenching, directional-drilling, and system installation will require approximately nine work days to complete, pending site and weather conditions encountered. This includes installing the ozone system, the SVE system, connection of power, ozone tubing and monitoring point wiring connections, and construction of the fence. A baseline groundwater monitoring event will be completed less than one month prior to completion of system installation activities.

System start-up activities will require approximately two days for adequate system monitoring prior to departing from the site. A site visit will be conducted approximately one week following start-up activities to further optimize system operation. Based on this anticipated schedule, PPM estimates that well installation, system installation, start-up, and initial optimization efforts can be completed within 30 days of initiating site activities. A report can be prepared within 30 days of start-up. Therefore, the report can be submitted within 120 days of authorization from ADEM.

7.2 ESTIMATED CLEANUP TIME

Although the length of time required to obtain cleanup objectives from ozone sparging cannot be accurately predicted, it is anticipated that active remedial efforts will be required for approximately two to three years. This time frame is based on several factors including, but not limited to: estimated mass of COC in soil and groundwater; estimated mass of oxidizable substances in the subsurface (non COC material); estimated radii of influence for sparge points; estimated ozone delivery rate from the system; and estimated system runtime. A summary of design calculations, including estimated cleanup time, is

provided in **Appendix D**. It is noted that this is a theoretical estimate only and the actual cleanup time can be expected to vary from that predicted.

A more accurate prediction of cleanup time can be provided once the system has been in operation long enough to establish trends for dissolved COC concentrations during system operation.

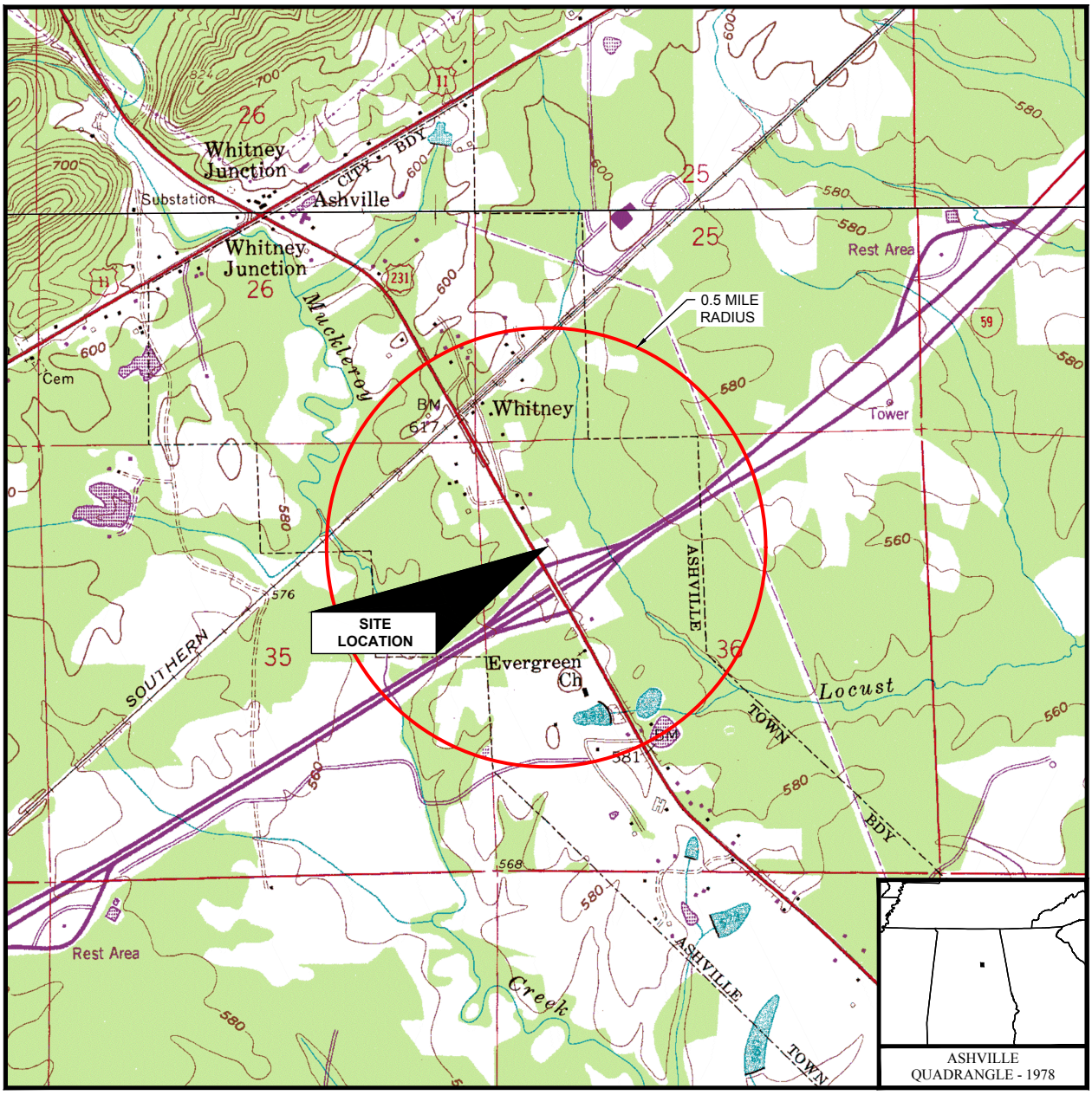
8.0 COST ESTIMATE

The work elements for this MCAP are eligible for reimbursement from the Alabama Tank Trust Fund (ATTF). Cost proposals for completion of the activities associated with implementation of the MCAP are included as follows:

- **Appendix L – Cost Proposal No. 63 – System Equipment Purchase**
- **Appendix M – Cost Proposal No. 64 – System Installation, Baseline Groundwater Monitoring, and Start-up**
- **Appendix N – Cost Proposal No. 65 – First Quarter O&M and Effectiveness Monitoring**
- **Appendix O – Cost Proposal No. 66 – Second Quarter O&M and Effectiveness Monitoring**.

APPENDICES

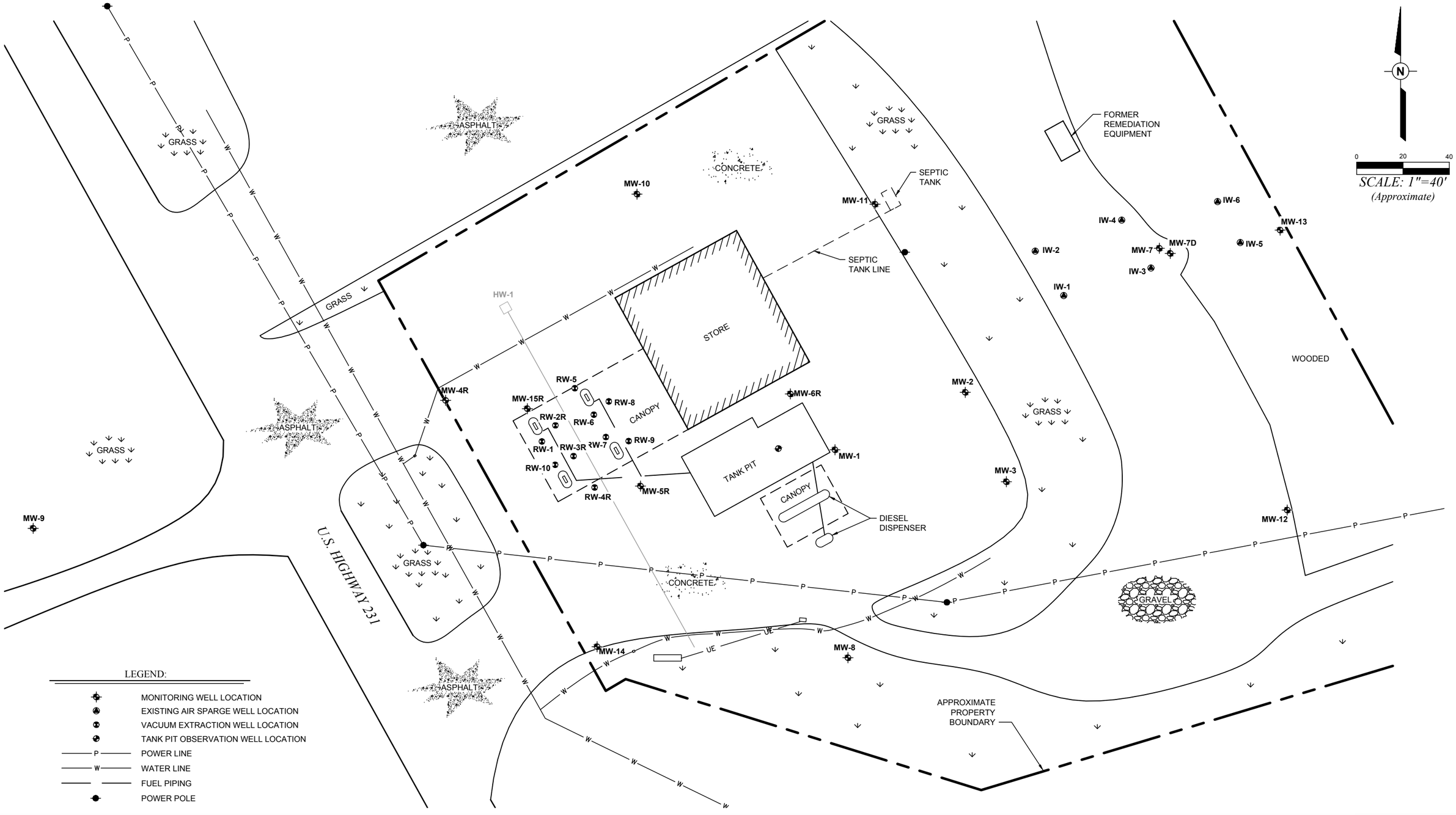
APPENDIX A – FIGURES



SCALE: 1 : 24,000

1 .5 0 1
MILES
1000 0 1000 5000 10,000
FEET
1 0 KILOMETER 1 2
1000 0 METER 1000 2000

PPM CONSULTANTS, INC. www.ppmco.com		IRA PHILLIPS, INC. **FORMER MARTIN'S TEXACO** 36950 U.S. 231 NORTH ASHVILLE, ALABAMA	SITE LOCATION MAP	FIGURE NUMBER 1
DRAWN BY: JCP	DRAWN DATE: 08/02/19			
PROJECT NUMBER: 451601	PHASE: MCAP			



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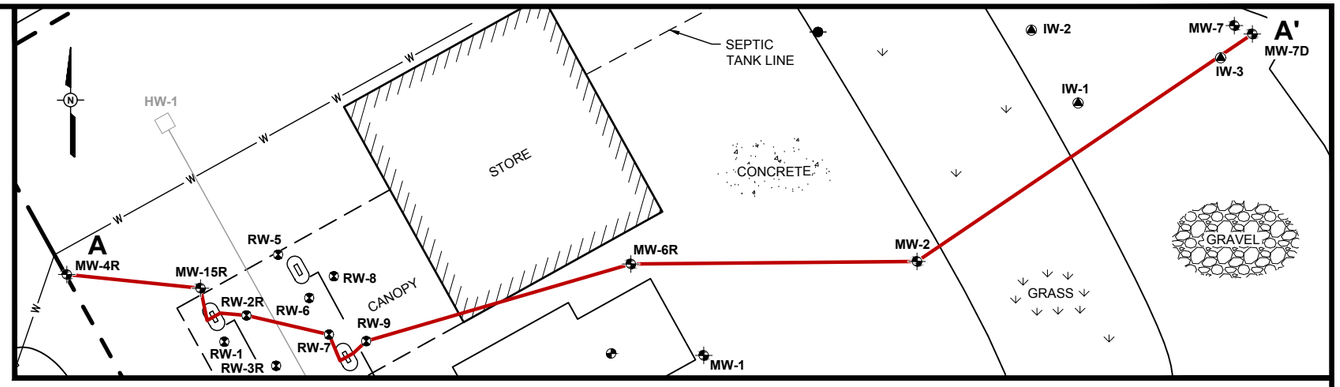
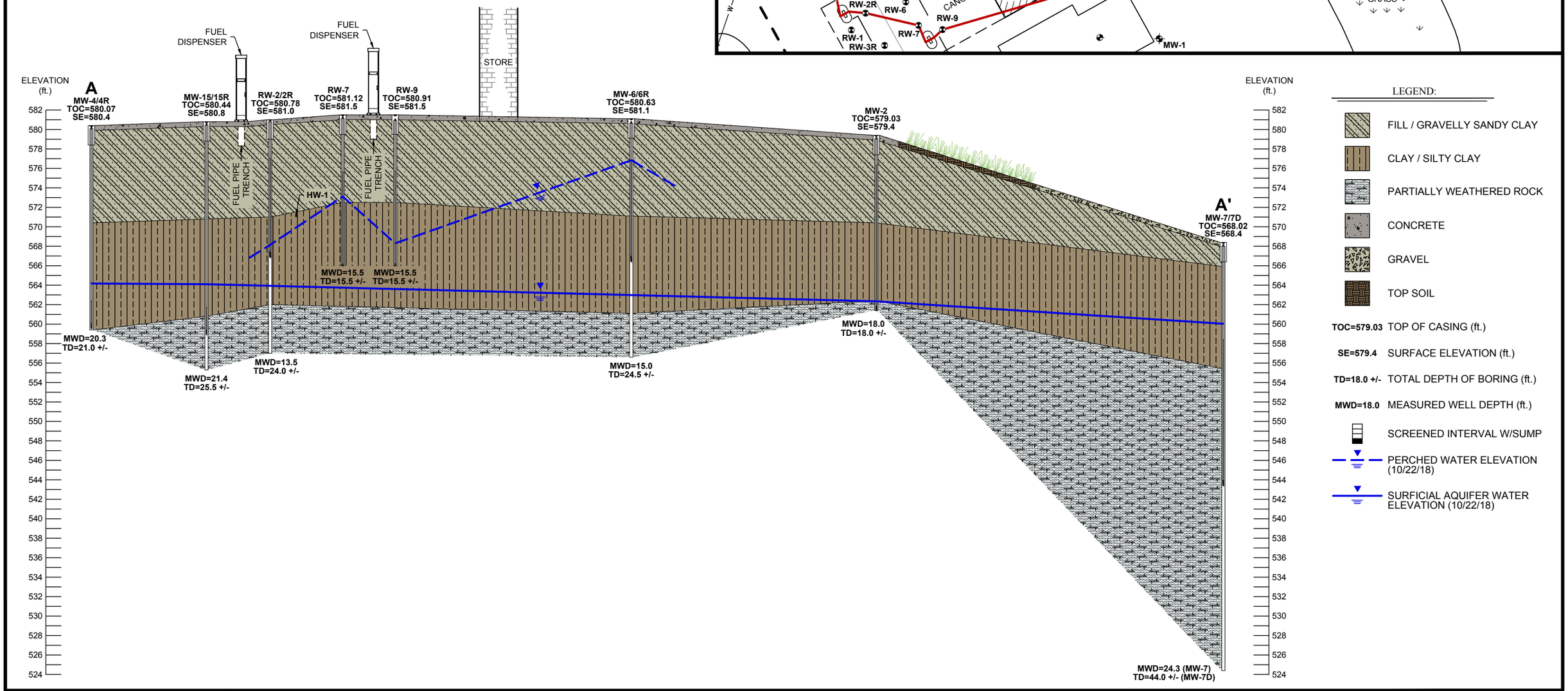
IRA PHILLIPS, INC.
FORMER MARTIN'S TEXACO
36950 U.S. 231 NORTH
ASHVILLE, ALABAMA

SITE MAP

FIGURE NUMBER
2

HORIZ. SCALE: 1"=30'
VERT. SCALE: 1"=10'





LEGEND:

- FILL / GRAVELLY SANDY CLAY
- CLAY / SILTY CLAY
- PARTIALLY WEATHERED ROCK
- CONCRETE
- GRAVEL
- TOP SOIL

TOC=579.03 TOP OF CASING (ft.)

SE=579.4 SURFACE ELEVATION (ft.)

TD=18.0 +/- TOTAL DEPTH OF BORING (ft.)

MWD=18.0 MEASURED WELL DEPTH (ft.)

SCREENED INTERVAL W/SUMP

PERCHED WATER ELEVATION (10/22/18)

SURFICIAL AQUIFER WATER ELEVATION (10/22/18)

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PROJECT NUMBER:	PHASE:
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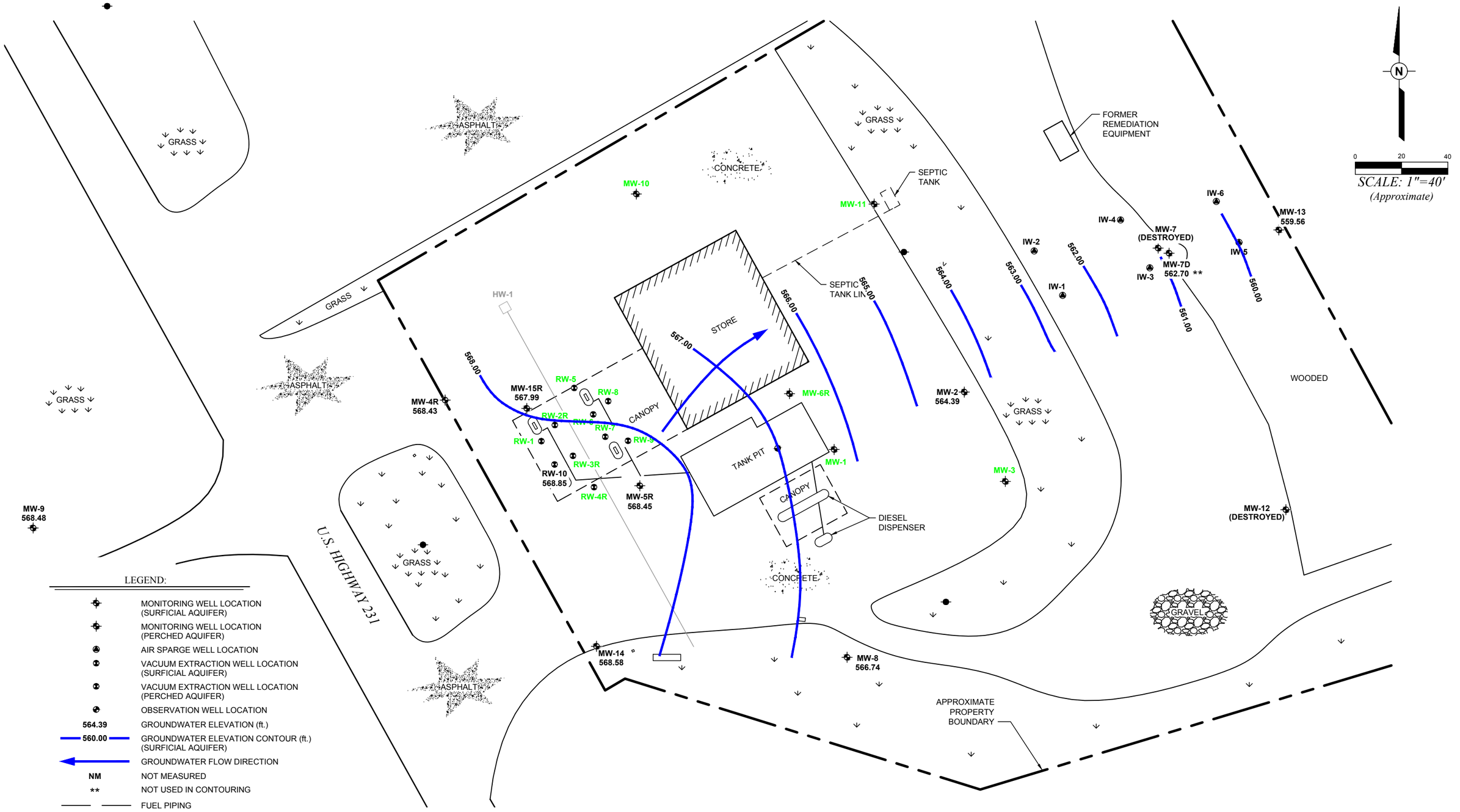
ASHVILLE, ALABAMA

GEOLOGIC CROSS-SECTION
A-A'

FIGURE NUMBER
3

PPM CONSULTANTS, INC. www.ppmco.com	IRA PHILLIPS, INC. **FORMER MARTIN'S TEXACO** 36950 U.S. 231 NORTH ASHVILLE, ALABAMA	GROUNDWATER ELEVATION MAP - PERCHED AQUIFER (MAY 13, 2019)	FIGURE NUMBER 4A
DRAWN BY: JCP / DRAWN DATE: 08/02/19			
PROJECT NUMBER: 451601 / PHASE: MCAP			



LEGEND:

- MONITORING WELL LOCATION (SURFICIAL AQUIFER)
- MONITORING WELL LOCATION (PERCHED AQUIFER)
- AIR SPARGE WELL LOCATION
- VACUUM EXTRACTION WELL LOCATION (SURFICIAL AQUIFER)
- VACUUM EXTRACTION WELL LOCATION (PERCHED AQUIFER)
- OBSERVATION WELL LOCATION
- 564.39 — GROUNDWATER ELEVATION (ft.)
- 560.00 — GROUNDWATER ELEVATION CONTOUR (ft.) (SURFICIAL AQUIFER)
- GROUNDWATER FLOW DIRECTION
- NM — NOT MEASURED
- ** — NOT USED IN CONTOURING
- FUEL PIPING

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PROJECT NUMBER:	PHASE:
451601	MCAP

IRA PHILLIPS, INC.
FORMER MARTIN'S TEXACO
36950 U.S. 231 NORTH
ASHVILLE, ALABAMA

GROUNDWATER ELEVATION MAP - SURFICIAL AQUIFER (MAY 13, 2019)

FIGURE NUMBER
4B

RW-1A	09/19/11
	11'
BENZENE (mg/kg)	0.020
TOLUENE (mg/kg)	<0.005
ETHYLBENZENE (mg/kg)	<0.005
TOTAL XYLENES (mg/kg)	0.006
TOTAL BTEX (mg/kg)	0.026
MTBE (mg/kg)	0.016
NAPHTHALENE (mg/kg)	<0.005

RW-1	09/20/11
	9.5'
BENZENE (mg/kg)	0.089
TOLUENE (mg/kg)	0.057
ETHYLBENZENE (mg/kg)	0.013
TOTAL XYLENES (mg/kg)	0.075
TOTAL BTEX (mg/kg)	0.234
MTBE (mg/kg)	0.045
NAPHTHALENE (mg/kg)	0.065

HW-1

MW-15	06/03/10	
	5'	10'
BENZENE (mg/kg)	<0.005	19.8
TOLUENE (mg/kg)	<0.005	37.8
ETHYLBENZENE (mg/kg)	<0.005	32.5
TOTAL XYLENES (mg/kg)	<0.005	118
TOTAL BTEX (mg/kg)	BDL	208
MTBE (mg/kg)	<0.005	<1.0
NAPHTHALENE (mg/kg)	<0.005	14.3

RW-5	09/20/11
	9.5'
BENZENE (mg/kg)	11.0
TOLUENE (mg/kg)	30.0
ETHYLBENZENE (mg/kg)	25.5
TOTAL XYLENES (mg/kg)	120
TOTAL BTEX (mg/kg)	187
MTBE (mg/kg)	<1.0
NAPHTHALENE (mg/kg)	10.7

MW-2	02/10/06	
	1'	4'-6'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	<0.005
ETHYLBENZENE (mg/kg)	<0.005	<0.005
TOTAL XYLENES (mg/kg)	<0.010	<0.010
TOTAL BTEX (mg/kg)	BDL	BDL
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<3.30	<0.33

MW-4	02/10/06	
	4'-6'	9'-11'
BENZENE (mg/kg)	0.272	0.323
TOLUENE (mg/kg)	0.073	0.337
ETHYLBENZENE (mg/kg)	0.035	0.102
TOTAL XYLENES (mg/kg)	0.08	0.51
TOTAL BTEX (mg/kg)	0.46	1.272
MTBE (mg/kg)	<0.005	0.025
NAPHTHALENE (mg/kg)	<3.30	<0.33

RW-2	09/19/11
	9.5'
BENZENE (mg/kg)	9.04
TOLUENE (mg/kg)	32.6
ETHYLBENZENE (mg/kg)	28.6
TOTAL XYLENES (mg/kg)	106
TOTAL BTEX (mg/kg)	176
MTBE (mg/kg)	<0.5
NAPHTHALENE (mg/kg)	14.2

RW-6	09/20/11
	9.5'
BENZENE (mg/kg)	20.8
TOLUENE (mg/kg)	53.6
ETHYLBENZENE (mg/kg)	35.9
TOTAL XYLENES (mg/kg)	182
TOTAL BTEX (mg/kg)	292
MTBE (mg/kg)	<1.0
NAPHTHALENE (mg/kg)	19.8

RW-8	09/21/11
	9'
BENZENE (mg/kg)	11.5
TOLUENE (mg/kg)	29.4
ETHYLBENZENE (mg/kg)	44.3
TOTAL XYLENES (mg/kg)	106
TOTAL BTEX (mg/kg)	191
MTBE (mg/kg)	<0.5
NAPHTHALENE (mg/kg)	12.6

RW-7	09/20/11
	9.5'
BENZENE (mg/kg)	3.16
TOLUENE (mg/kg)	11.7
ETHYLBENZENE (mg/kg)	2.97
TOTAL XYLENES (mg/kg)	41.0
TOTAL BTEX (mg/kg)	58.8
MTBE (mg/kg)	<0.25
NAPHTHALENE (mg/kg)	4.77

RW-1B	09/19/11
	10'
BENZENE (mg/kg)	0.125
TOLUENE (mg/kg)	0.029
ETHYLBENZENE (mg/kg)	0.007
TOTAL XYLENES (mg/kg)	0.079
TOTAL BTEX (mg/kg)	0.240
MTBE (mg/kg)	0.077
NAPHTHALENE (mg/kg)	0.011

MW-6	10/10/06
	4'-6'
BENZENE (mg/kg)	<0.005
TOLUENE (mg/kg)	<0.005
ETHYLBENZENE (mg/kg)	<0.005
TOTAL XYLENES (mg/kg)	<0.010
TOTAL BTEX (mg/kg)	BDL
MTBE (mg/kg)	<0.005
NAPHTHALENE (mg/kg)	<0.33

RW-3	09/19/11
	9.5'
BENZENE (mg/kg)	13.5
TOLUENE (mg/kg)	72.1
ETHYLBENZENE (mg/kg)	31.7
TOTAL XYLENES (mg/kg)	231
TOTAL BTEX (mg/kg)	348
MTBE (mg/kg)	<1.0
NAPHTHALENE (mg/kg)	28.6

RW-9	09/21/11
	9.5'
BENZENE (mg/kg)	1.67
TOLUENE (mg/kg)	29.3
ETHYLBENZENE (mg/kg)	3.68
TOTAL XYLENES (mg/kg)	122
TOTAL BTEX (mg/kg)	157
MTBE (mg/kg)	<0.25
NAPHTHALENE (mg/kg)	7.71

MW-1	02/10/06	
	1'	4'-6'
BENZENE (mg/kg)	0.005	0.101
TOLUENE (mg/kg)	<0.005	0.009
ETHYLBENZENE (mg/kg)	<0.005	0.011
TOTAL XYLENES (mg/kg)	0.021	0.038
TOTAL BTEX (mg/kg)	0.026	0.159
MTBE (mg/kg)	<0.005	0.351
NAPHTHALENE (mg/kg)	<3.30	<0.33

RW-10	09/20/11
	9'
BENZENE (mg/kg)	2.54
TOLUENE (mg/kg)	8.75
ETHYLBENZENE (mg/kg)	0.266
TOTAL XYLENES (mg/kg)	19.7
TOTAL BTEX (mg/kg)	31.3
MTBE (mg/kg)	<0.25
NAPHTHALENE (mg/kg)	7.25

RW-4	09/19/11
	9.5'
BENZENE (mg/kg)	14.6
TOLUENE (mg/kg)	86.6
ETHYLBENZENE (mg/kg)	3.06
TOTAL XYLENES (mg/kg)	229
TOTAL BTEX (mg/kg)	333
MTBE (mg/kg)	<1.0
NAPHTHALENE (mg/kg)	32.3

MW-5	10/10/06
	4'-6'
BENZENE (mg/kg)	0.151
TOLUENE (mg/kg)	0.009
ETHYLBENZENE (mg/kg)	0.027
TOTAL XYLENES (mg/kg)	0.047
TOTAL BTEX (mg/kg)	0.234
MTBE (mg/kg)	1.64
NAPHTHALENE (mg/kg)	<0.33

MW-8	10/10/06
	4'-6'
BENZENE (mg/kg)	<0.005
TOLUENE (mg/kg)	<0.005
ETHYLBENZENE (mg/kg)	<0.005
TOTAL XYLENES (mg/kg)	<0.010
TOTAL BTEX (mg/kg)	BDL
MTBE (mg/kg)	<0.005
NAPHTHALENE (mg/kg)	<0.33

MW-14	07/11/07	
	4'-6'	9'-11'
BENZENE (mg/kg)	<0.005	<0.005
TOLUENE (mg/kg)	<0.005	<0.005
ETHYLBENZENE (mg/kg)	<0.005	<0.005
TOTAL XYLENES (mg/kg)	<0.005	<0.005
TOTAL BTEX (mg/kg)	BDL	BDL
MTBE (mg/kg)	<0.005	<0.005
NAPHTHALENE (mg/kg)	<0.035	<0.035

N

0 10 20

SCALE: 1"=20'
(Approximate)

CANOPY
WATER METER
GRASS
TANK PIT
CANOPY
CONCRETE
AIR COMPRESSOR
SIGN
WATER METER

LEGEND:

- MONITORING WELL LOCATION
- EXISTING AIR SPARGE WELL LOCATION
- VACUUM EXTRACTION WELL LOCATION
- TANK PIT OBSERVATION WELL LOCATION

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FORMER MARTIN'S TEXACO
36950 U.S. 231 NORTH
ASHVILLE, ALABAMA

CONSTITUENT-OF-CONCERN CONCENTRATIONS IN SOIL

FIGURE NUMBER
5

LEGEND:

- MONITORING WELL LOCATION (SURFICIAL AQUIFER)
- MONITORING WELL LOCATION (PERCHED AQUIFER)
- AIR SPARGE WELL LOCATION
- VACUUM EXTRACTION WELL LOCATION (SURFICIAL AQUIFER)
- VACUUM EXTRACTION WELL LOCATION (PERCHED AQUIFER)
- OBSERVATION WELL LOCATION
- 5.760 — BENZENE CONCENTRATION (mg/L) (RED TEXT INDICATES CONCENTRATION EXCEEDS PROPOSED S
- 10.0 — PERCHED AQUIFER ISOCONCENTRATION CONTOUR (mg/L)
- 10.0 — PERCHED AQUIFER ISOCONCENTRATION CONTOUR (mg/L)
- NS — NOT SAMPLED
- FUEL PIPING

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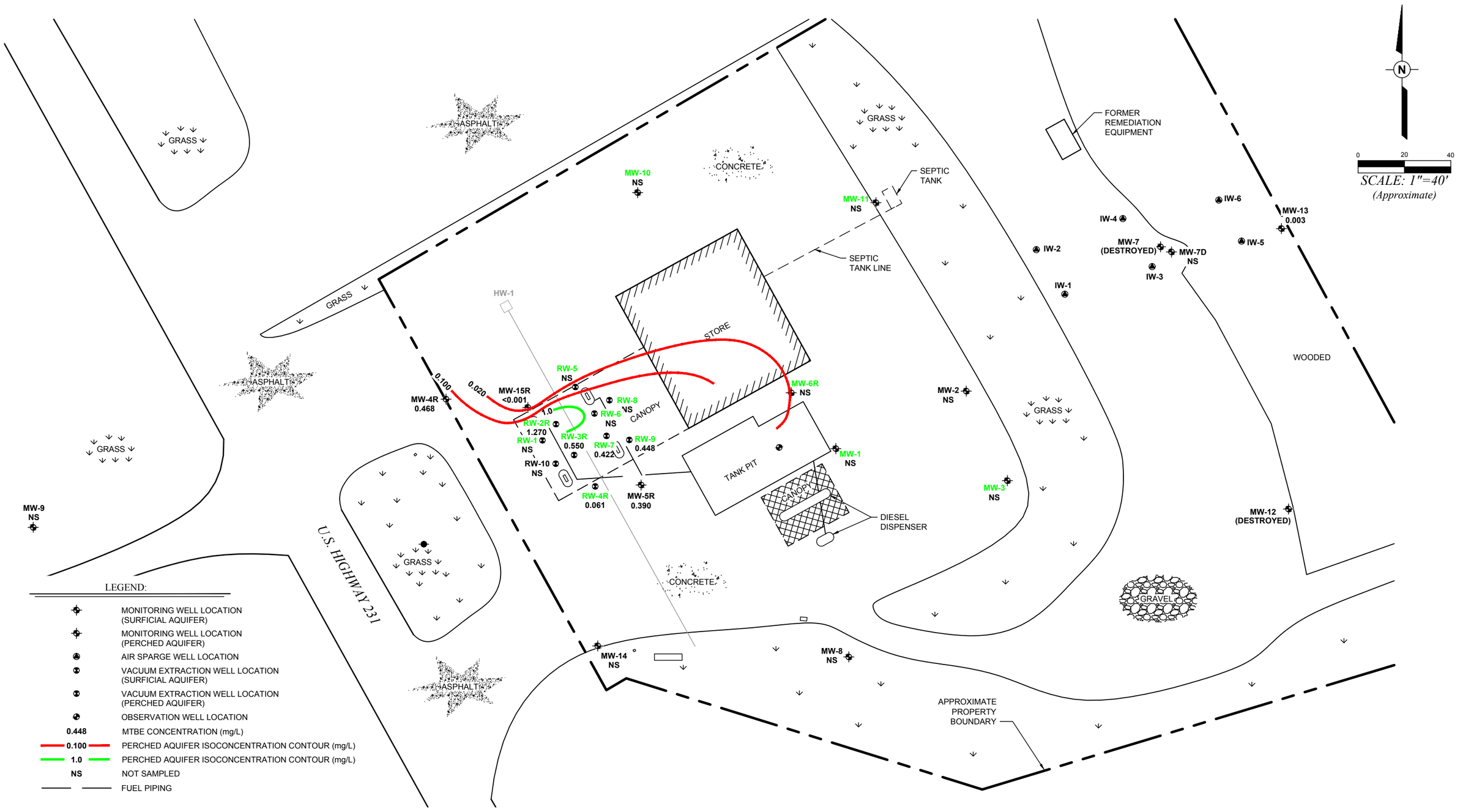
ASHVILLE, ALABAMA

DISSOLVED BENZENE ISOCONCENTRATION MAP (MAY 13, 2019)

FIGURE NUMBER 6



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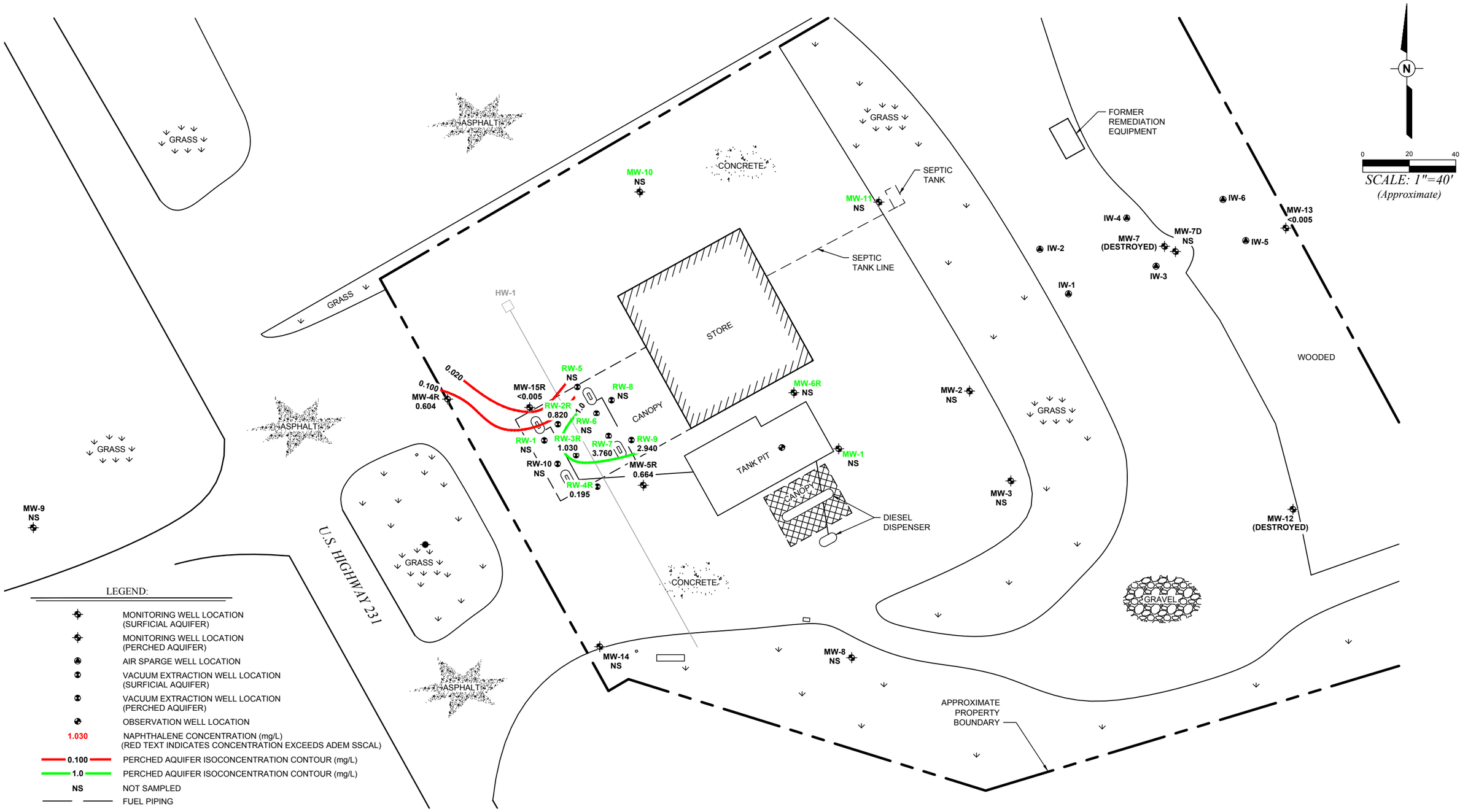
ASHVILLE, ALABAMA

DISSOLVED MTBE ISOCONCENTRATION MAP (MAY 13, 2019)

FIGURE NUMBER
7



LEGEND:

- MONITORING WELL LOCATION (SURFICIAL AQUIFER)
- MONITORING WELL LOCATION (PERCHED AQUIFER)
- AIR SPARGE WELL LOCATION
- VACUUM EXTRACTION WELL LOCATION (SURFICIAL AQUIFER)
- VACUUM EXTRACTION WELL LOCATION (PERCHED AQUIFER)
- OBSERVATION WELL LOCATION
- 1.030 — NAPHTHALENE CONCENTRATION (mg/L) (RED TEXT INDICATES CONCENTRATION EXCEEDS ADEM SSCAL)
- 0.100 — PERCHED AQUIFER ISOCONCENTRATION CONTOUR (mg/L)
- 1.0 — PERCHED AQUIFER ISOCONCENTRATION CONTOUR (mg/L)
- NS — NOT SAMPLED
- FUEL PIPING

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PROJECT NUMBER: 451601	PHASE: MCAP

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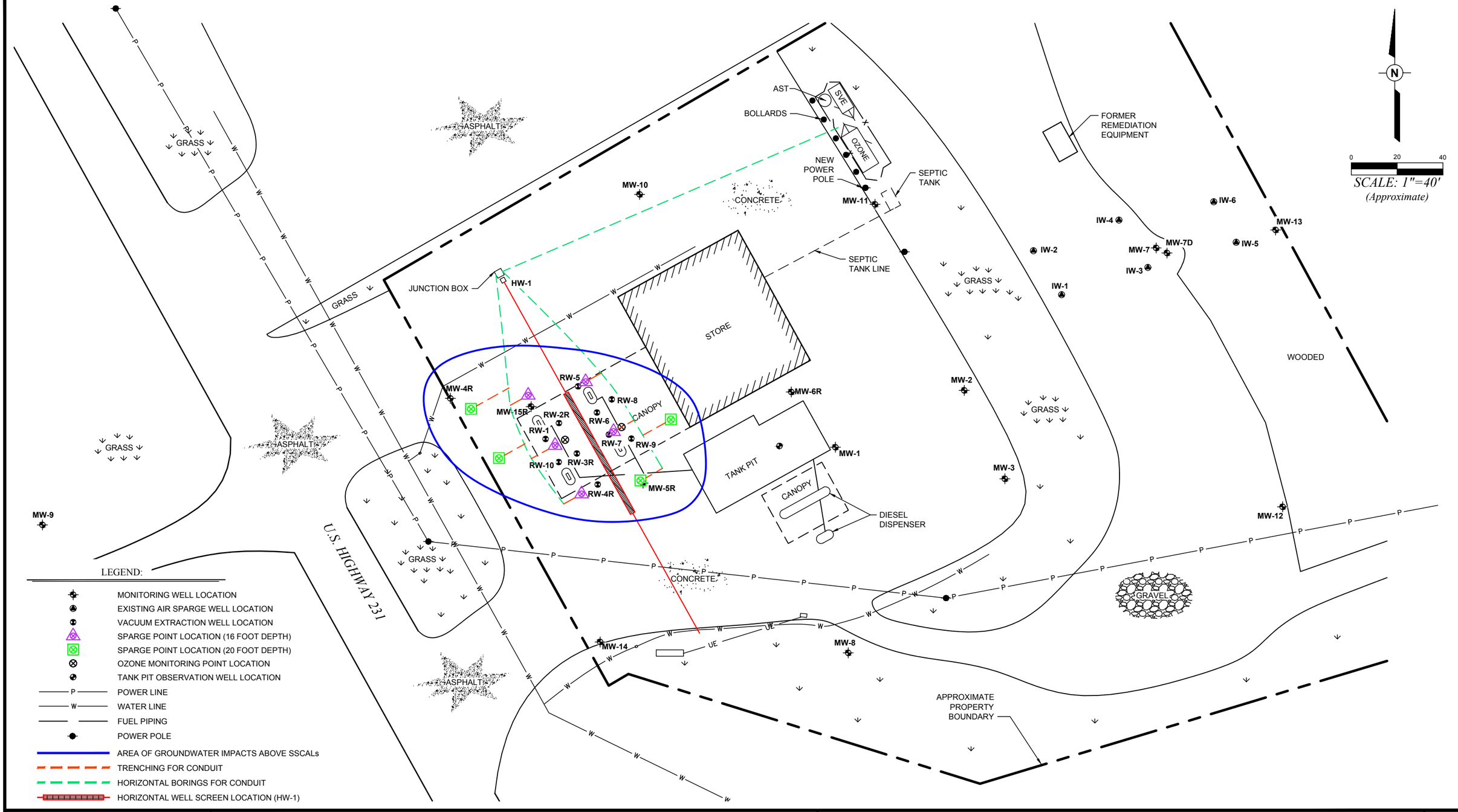
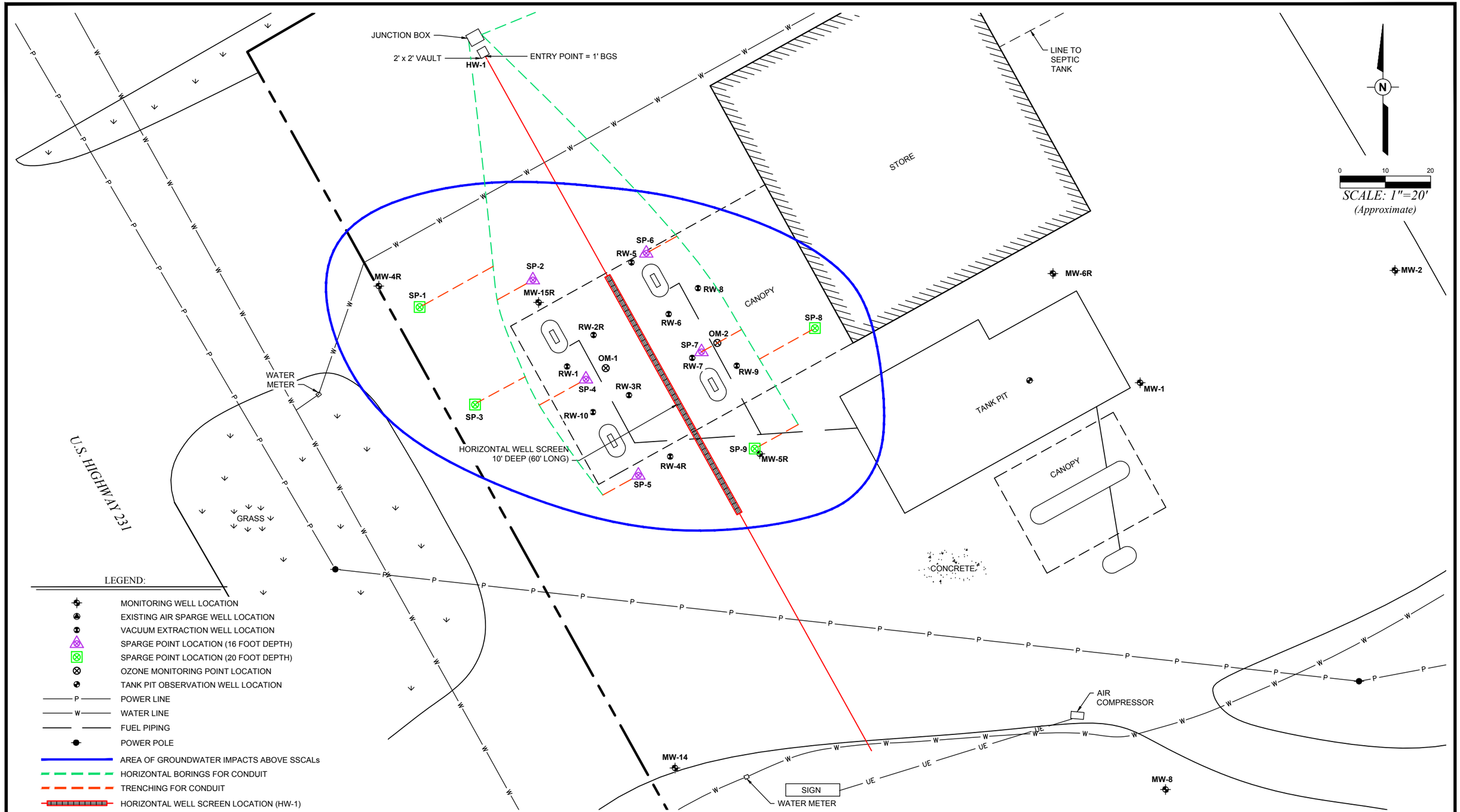
DISSOLVED NAPHTHALENE ISOCONCENTRATION MAP (MAY 13, 2019)

FIGURE NUMBER 8



PPM CONSULTANTS, INC. www.ppmco.com	IRA PHILLIPS, INC. **FORMER MARTIN'S TEXACO** 36950 U.S. 231 NORTH ASHVILLE, ALABAMA	PROPOSED SYSTEM LAYOUT	FIGURE NUMBER 9
DRAWN BY: JCP / DRAWN DATE: 08/02/19			
PROJECT NUMBER: 451601 / PHASE: MCAP			



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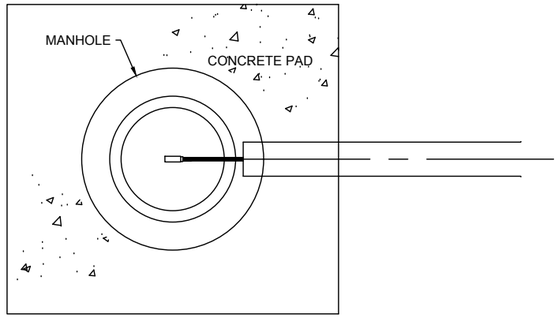
ASHVILLE, ALABAMA

DETAIL OF DISPENSER AREA

FIGURE NUMBER
10

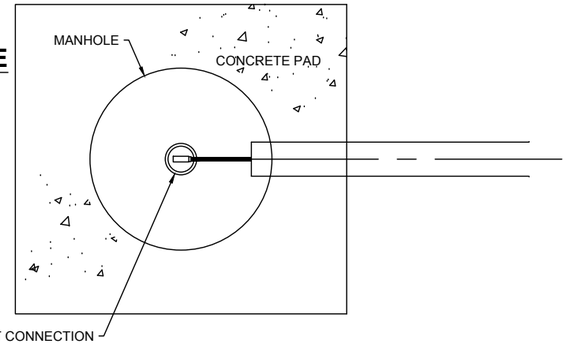
NOTES:

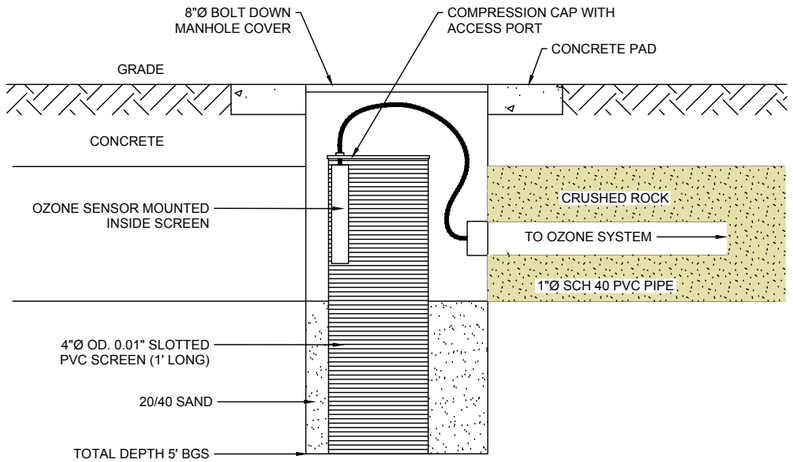
1. WELLHEAD CONNECTIONS, RISER AND OXIDATION POINTS TO BE PROVIDED BY EQUIPMENT MANUFACTURER.
2. OZONE DELIVERY TUBING TO BE PROVIDED BY EQUIPMENT MANUFACTURER.
3. OZONE DELIVERY TUBING TO BE INSTALLED DURING PLACEMENT OF 1"Ø SCHEDULE 40 PVC CONDUIT.
4. MANHOLE COVERING TO BE PROVIDED AND INSTALLED BY SYSTEM INSTALLATION CONTRACTOR.
5. OZONE SENSORS TO BE PROVIDED BY EQUIPMENT MANUFACTURER.



TYPICAL OZONE / OXYGEN SPARGE WELL PLAN VIEW

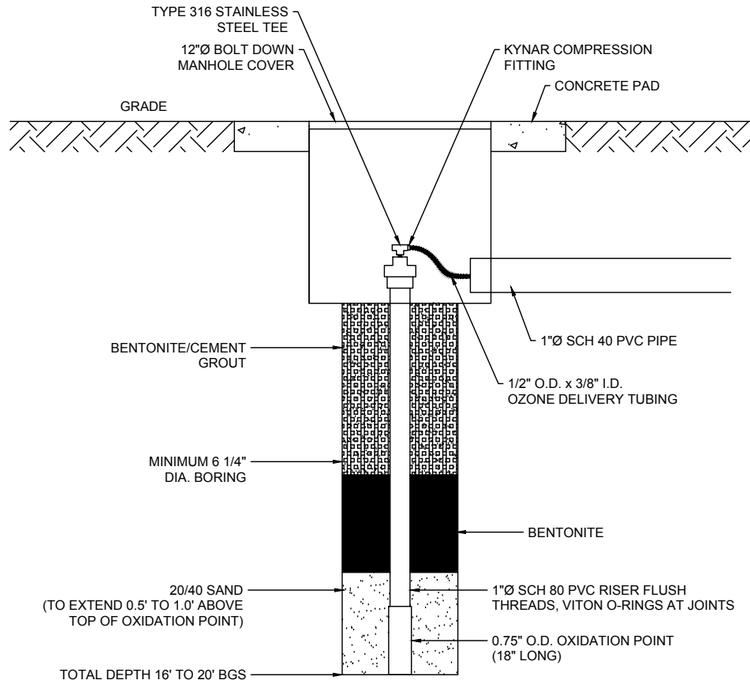
NOT TO SCALE





OZONE MONITORING POINT DETAIL

NOT TO SCALE



TYPICAL SPARGING WELL DETAIL

NOT TO SCALE

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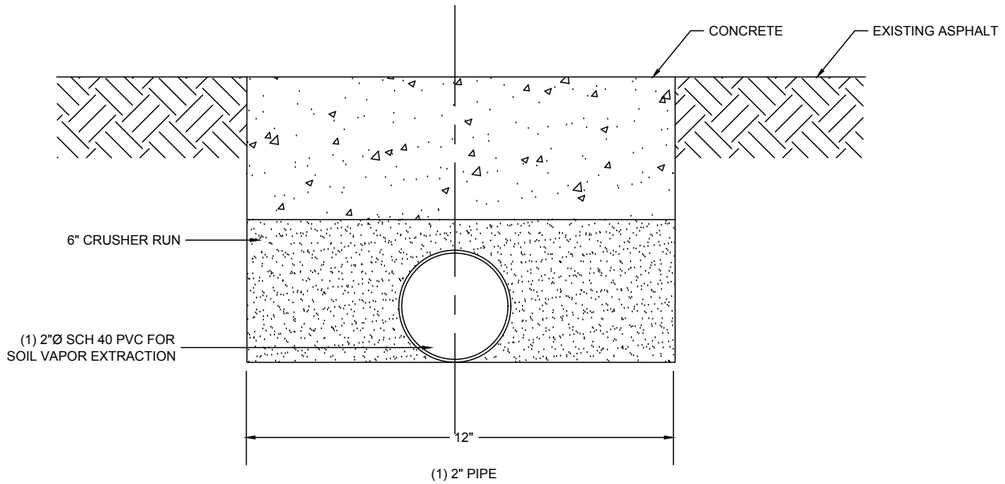
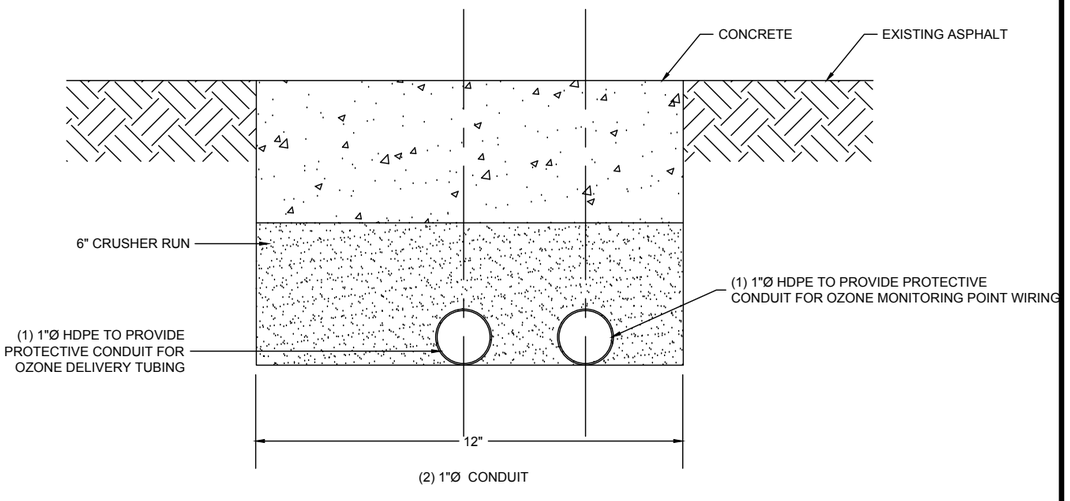
DRAWN BY: JCP	DRAWN DATE: 08/02/19		FIGURE NUMBER 11
PROJECT NUMBER: 451601	PHASE: MCAP		



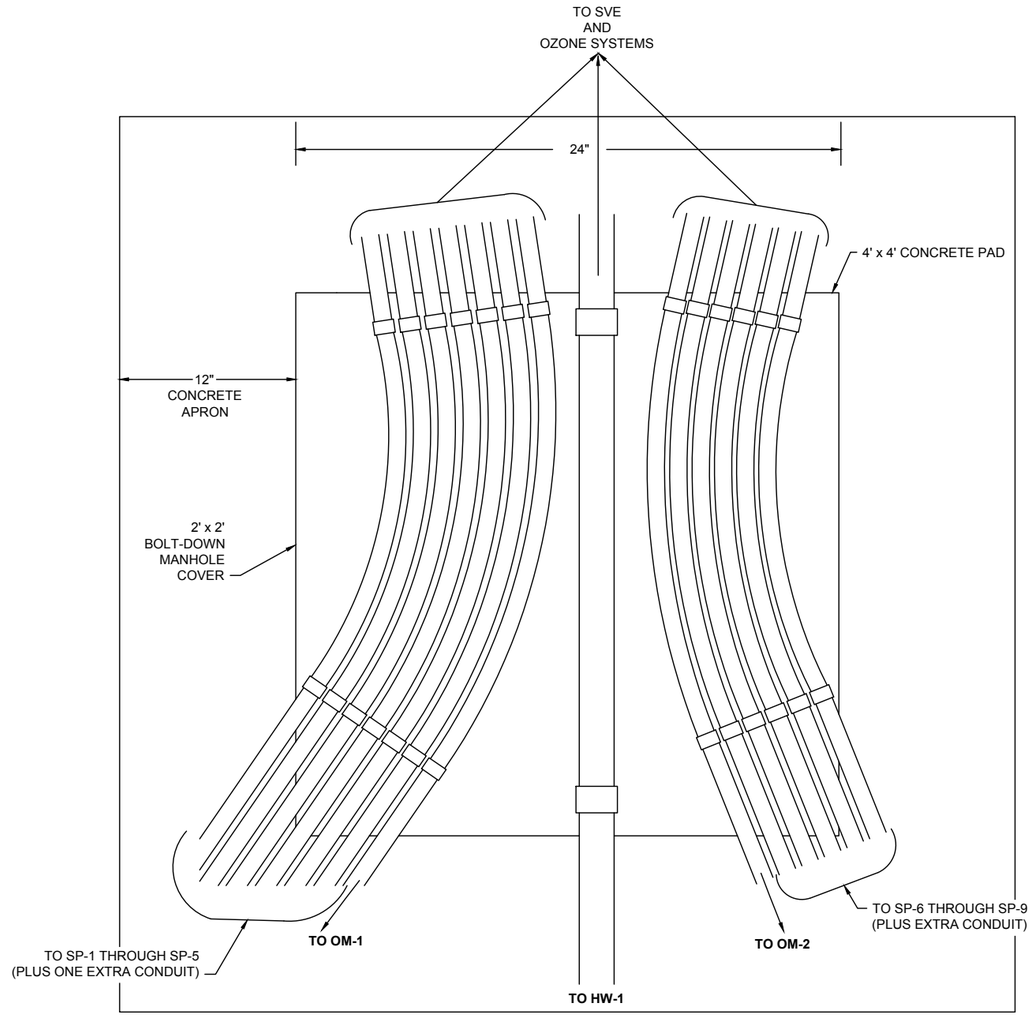
TYPICAL TRENCH DETAIL - JUNCTION BOX TO HW-1

NOT TO SCALE



TYPICAL TRENCH DETAIL - TO SP-4 OR SP-7

NOT TO SCALE



JUNCTION BOX DETAIL

NOT TO SCALE

PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: JCP	DRAWN DATE: 08/02/19
PROJECT NUMBER: 451601	PHASE: MCAP

IRA PHILLIPS, INC.
FORMER MARTIN'S TEXACO
36950 U.S. 231 NORTH
ASHVILLE, ALABAMA

TRENCH AND JUNCTION BOX CONSTRUCTION DETAILS

FIGURE NUMBER
12

APPENDIX B – SOIL BORING/MONITORING WELL CONSTRUCTION LOGS

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2 Riverchase Ofc Plaza, Ste 103, Birmingham, AL 35244
Voice: (205) 985-4000 Fax: (205) 985-4094

BORING LOG

Boring No. MW-1 Page 1 of 1 Project Number 4371-2502

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~4' N of NE corner of diesel tank pit Ground Elevation:

Drilling Method/Equipment: HSA Top of Casing Elev.:

Date: 2/10/06 Start: 1010 Finish: Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	Grab 1'	MW-1-1	1020	-	2572	Collected w/ posthole digger ▽		Concrete @ surface Silty sand - v. dark gray, loose, slightly moist, some angular gravel, to ~3'
5	4-6	MW-1-4	1030	90	2050			Silty clay. olive gray, soft, wet, some scattered rock fragments, poss faint petroleum odor.
10	9-11		1035	20	3700			Silty clay - AA exc. more rock fragments
15	14-16		1040	100	7180			Silty clay. olive gray (mottled w/ brown) exc. yellow-tan in last 4" apparent small roots @ 15', v. moist, firm
20								TD @ 17.5 Screen @ 2.5-17.5' Sand to 2', Bentonite to 1'

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BORING LOG

Boring No. MW-2 Page 1 of 1 Project Number 4771-2502

Project: Martin's Texaco Drilling Contractor: Technical Drilling

Boring Location: ~60' N of diesel tank pit Ground Elevation:

Drilling Method/Equipment: HSA Top of Casing Elev.:

Date: 2/10/06 Start: Finish: Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	Grabel'	MW-2-1	1250	-	648	collected with post hole digger		Concrete @ surface Clayey Gravel - light brown moist, angular gravel to 1½" diam.
5	4-6	MW-2-4	1255	20	-	Insufficient sample for field-screening	▽	Gravelly Clay - grayish brown, wet, soft some small gravel
10	9-11		1300	50	2063			Silty clay - tannish brown to olive gray, firm, some small rock fragments v. moist, firm
15	14-16		1305	90	1651			Silty clay - greenish-gray @ top, brown w/ reddish brown mottling @ base, small rootlets, v. moist, firm
20								TD @ 18' Screen from 2-18' Sand to 2', Bentonite to 1'

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BORING LOG

Boring No. MW-3 Page 1 of 1 Project Number 4371-2502

Project: Martin's Drilling Contractor: Technical Drilling Services

Boring Location: ~65' NE of diesel tank pit Ground Elevation:

Drilling Method/Equipment: HSA Top of Casing Elev.:

Date: 2/10/06 Start: 1110 Finish: Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
	Grab 1'	~~Grab 1'~~ MW-3-1	1115	-	17.6			Concrete @ surface Gravelly sand - brown, moist, loose, avg. gravel to 3/4"
5	4-6	MW-3-4	1120	25	-	Insufficient volume for field-screening	▽	Gravelly sand - AA exc. v. moist
10	9-11		1125	25	2433			Gravelly sand - AA in top 3"
15	14-16		1130	90	763			Silty Clay - olive gray mottled with tan, soft, wet
20	19-21		1140	100	1287			Silty Clay - tan-gray, mottled, firm wet, several pieces of wood, small rock fragments @ base (last 3")
								Partially weathered rock - tannish-gray, fissile, argillaceous limestone fragments

Screen @ 4-19, Sand to 3', Bent. to 1.5'

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BORING LOG

Boring No. MW-4 Page 1 of 1 Project Number 4371-2502

Project: Martin's Texaco Drilling Contractor: Technical Drilling

Boring Location: ~35' SW of front dispenser Ground Elevation:

Drilling Method/Equipment: HSA Top of Casing Elev.:

Date: 2/10/06 Start: 0920 Finish: 1000 Logger: W. Hanley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Asphalt @ surface. Gravel- large (3") to gravel fill w/ clayey, sandy matrix, wet @ 0.5'
5	4-6	MW-4-4	0925	60	4538			Clay - olive gray, soft, wet
	6-8		0930	20	5398	Insufficient volume to sample		Clay - AA in top 2" Clayey Gravel - brown, angular gravel (fine $\frac{1}{4}$") wet
10	9-11	MW-4-9	0935	100	1943	Gasoline odor while drilling		Clayey Gravel - AA to 10' 9.5'
								Silty Clay - some olive gray, some scattered gravel, soft, v. wet
15	14-16		0940	90	3053			Silty Clay - AA, exc grades to tan & firm from 15'-16', poss. faint odor
20	19-21		0945	100	5497			Silty clay - tan, stiff, some partially weathered rock near base, moist

Screen from 4-19', Sand to 3', Bent. to 1.5'

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BORING LOG

Boring No. MW-5 Page 1 of 2 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~9' SE of gas dispensers Ground Elevation: -

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: -

Date: 10/10/06 Start: 1425 Finish: 1450 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Concrete surface
5		MW-5-46 (BTEX/MTBE & PAH)	1425	100	-			Silty clay - yellowish tan, firm, plastic in part, some LS fragments, v. moist, possible odor.
10		9-11	1430	100	1714		▽	Silty clay - light gray, tan, v. moist, abund small rock fragments (shale + LS), strong odor, small amount of free water in spoon.
15		14-16	1435	75	166			Silty clay - yellowish tan, some gray, plastic, some weathered rock fragments, moderate petroleum odor.
20		19-21	1440	100	-			Partially weathered rock (PWR) - light tannish gray, very friable, v. slightly moist, mostly calcareous shale, some clay at base (6"), no odor

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BORING LOG

Boring No. MW-5 Page 2 of 2 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~9' SE of gas dispensers Ground Elevation: -

Drilling Method/Equipment: HSA Top of Casing Elev.: -

Date: 10/10/06 Start: 1425 Finish: 1450 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25		24-26	1450	40	-			Partially weathered rock - light tannish gray, very friable, mostly calcareous shale with some argillaceous limestone,
~~10~~						TD @ 25.5' Screen @ 10-25' (6" sump) Sand to 8' Bentonite to 6'		
~~15~~								
~~20~~								

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BORING LOG

Boring No. MW-6 Page 1 of 2 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: NW edge of diesel tanks Ground Elevation: -

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: -

Date: 10/10/06 Start: 1635 Finish: 1655 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Concrete surface Post-hole to 4'
5		MW-6-4-6 (BTEX/MTBE & PAH)	1635	25	-			Gravelly clay - yellowish brown, abund rock fragments (chert?), v. moist, no odor
10		9-11	1640	40	53			Silty clay - light olive gray, some tan, plastic, abundant wood fragments @ top, possible odor
15		14-16	1645	50	-			Silty clay - olive gray-tan, some weathered shale fragments, v. moist, ~~plastic~~ moderately plastic, slight odor
20		19-21	1650	100	-			Silty clay, AA to 20' Partially weathered rock - tan-gray calcareous shale and silty clay, moist, no odor

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BORING LOG

Boring No. MW-6 Page 2 of 2 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: NW edge of diesel tanks Ground Elevation: -

Drilling Method/Equipment: HSA Top of Casing Elev.: -

Date: 10/10/06 Start: 1635 Finish: 1655 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25		24-26	1655	40	-			Partially weathered rock - olive tan, calcareous shale and silty clay with some argillaceous limestone, slightly moist.
10						TD @ 24.5' Screen @ 9-24' (6" sump) Sand to 7.5' Bentonite to 5.5'		
15								
20								

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BORING LOG

Boring No. MW-7 Page 1 of 3 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~100' NE of MW-2 Ground Elevation: ~

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: ~

Date: 10/9/06 Start: 1000 Finish: 1300 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Gravel surface
		MW-7-1-3 (BTEX/MTBE & PAH)	1000	30	-			Gravelly silty clay - orangish brown, stiff, dry, <5% gravel up to 2", (FILL)
5		4-6	1010	100	-			Gravelly silty clay - orangish brown, stiff, slightly moist, gravel: ang, chert(?), up to ¼" diam,
10		9-11	1015	25	-			Gravelly silty clay - AA
								Silty Clay - olive tan, firm, v. moist, wet @ base (in shoe), slight odor @ hole while drilling through
15		14-16	1020	100	-			(PWR) Partially weathered rock - light olive gray, some reddish gray, blocky fracture, v. calcareous (argillaceous LS).
							▽	
20		19-21	1030	100	-			PWR - light olive gray w/ blocky fracture calcareous (argillaceous LS) and brownish gray w/ thin bedding, calcareous (weathered shale)

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BORING LOG

Boring No. MW-7 Page 2 of 3 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~100' NE of MW-2. Ground Elevation: -

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: -

Date: 10/9/06 Start: 1000 Finish: 1300 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25		24-26	1040	100	-			PWR - Medium gray, argillaceous, calcareous, alternating layers w/ blocky fracture & thin bedding plane fracture (argillaceous LS + calcareous shale).
30			1045	20	-			PWR - med. gray, calcareous shale
35		29-31 34-36	1155	20	-	Stopped for lunch @ 34' 10' water in hole when resumed.		PWR - AA
40		39-41	1205	20	-			PWR - AA except several lenses of argillaceous LS

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BORING LOG

Boring No. MW-7 Page 3 of 3 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~100' NE of MW-2 Ground Elevation: -

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: -

Date: 10/9/06 Start: 1000 Finish: 1300 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
45		44-46	1220	-		Spoon driven to 46' but augered only to 44'		Partially weathered rock- calcareous shale w/ thin beds of LS
10							MW-7D	Total depth @ 44' Set 10' screen @ 33.5-43.5' (6" sump) Sand to 31' Bentonite seal to 26' 1320-1420: Drilled adjacent boring to 26' (~7' NW of deep boring)
15							MW-7	Set 15' screen @ 9.5-24.5' (6" sump + 1' fall-in above) Sand to 7' Bentonite to ~~11.5~~ 5'
20								

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BORING LOG

Boring No. MW-8 Page 1 of _____ Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~65' SE of diesel dispensers Ground Elevation: -

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: -

Date: 10/10/06 Start: 0900 Finish: 1000 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Grass surface
5		MW-8-4-6 (BTEX/MTBE & PAH)	0905	30	-			Gravelly clay - orangish brown, abundant chert gravel (20%), slightly moist
		MW-8-6-8	0915	60	-	UD Tube		
10		9-11	0930	10	-			Silty Clay - light olive brown, stiff, moist, LS fragments
		MW-8-11-13	0940	60	-	UD Tube		
15		14-16	0945	100	393			Silty clay - light olive brown, stiff, moist, visible thin bedding, plastic in last 6"
						TD @ 25.5' Screen @ 10-25' Sand to 8' Bentonite to 6'		
20		19-21	0950	100	-			Silty clay - AA except tan & very friable,
		24-26	1000	100				Partially weathered rock - olive brown, gray, calcareous shale

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BORING LOG

Boring No. MW-9 Page 1 of 2 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: S side of US 231 Ground Elevation:

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.:

Date: 10/9/06 Start: 1445 Finish: 1550 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Grass surface
5		MW-9-4-6 (BTEX/MTBE & PAH)	1455	100	–			Silty Clay - yellowish tan, firm, slightly moist, wood fragments
10		9-11	1500	100	52.8			Highly weathered shale - light brown, w/some yellowish brown mottling, v. slightly moist, some LS fragments, thin relict bedding.
15		14-16	1510	100	–		▽	Silty clay - light grayish tan, slight blocky fracture, some LS fragments, v. slightly moist
20		19-21	1515	40	–			Partially weathered rock (PWR) - light gray, calcareous shale

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BORING LOG

Boring No. MW-9 Page 2 of 2 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: S side of US 231 Ground Elevation: -

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: -

Date: 10/9/06 Start: 1445 Finish: 1550 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25		24-26	1525	0	-	Couldn't drive but ~6"		No recovery
30		29-29.5	1550	100	-			Partially weathered rock. medium gray, fissile, calcareous shale
15								TD @ 29 (auger) 29.5 (spoon) Set screen @ 14-29' Sand to 12' Bentonite to 10'
20								

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BORING LOG

Boring No. MW-10 Page 1 of _____ Project Number 0884-001-170

Project: Martins Texaco Drilling Contractor: Technical Drlg.

Boring Location: ~40' NW of store Ground Elevation: -

Drilling Method/Equipment: HSA Top of Casing Elev.: -

Date: 10/11/06 Start: 0600 Finish: 0705 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Concrete surface
5		MW-10-4-6 (BTEX/MTBE & PAH)	0640	100	203			Silty Clay - orangish brown, firm, mod. plastic, moist
10		9-11	0645	50	-			Silty Clay - brown, some dark gray organic material @ base, moist, some angular small gravel (Fill)
15		14-16	0650	10	-			Silty Clay - grayish tan, firm, some small rock fragments, moist, mod. plastic
20		19-21	0655	100	-	TD @ 25.5' Screen 10-25 (6" sump) Sand to 8' Bentonite to 6'		Silty clay - orange tan - tan, some v. dark gray, moist, low plasticity
		24-26	0705	50	-			Weathered argillaceous limestone - gray

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BORING LOG

Boring No. MW-11 Page 1 of _____ Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~55' NE of store Ground Elevation: -

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: -

Date: 10/10/06 Start: 1015 Finish: 1155 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
			1015			Post-hole to 4'		Grass surface Silty sand - rooted, dark gray, rock & trash (FILL)
5		4-6	1030	0	-			No recovery
10		MW11-911 (BTEX/MTBE & PAH)	1135	20	-	insufficient volume to completely fill sample bottles		Silty clay - olive tan, firm, v. moist, possible odor
15		14-16	1140	100	1015			Silty clay - olive tan, gray, plastic, some weathered shale, v. moist
20		19-21	1145	100	-	TD @ 25.5 screen @ 10-25' (6' sump) sand to 8' Bentonite to 6'		Partially weathered rock - calcareous shale weathered to silty clay, Olive tan to gray, slightly moist
		24-26	1155	100	-			PWR - Apx ex. outside of spoon wet

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BORING LOG

Boring No. MW-12 Page 1 of 1 Project Number 0884-001-170

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: ~100' SE of MW-7 Ground Elevation: -

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: -

Date: 10/10/06 Start: 0630 Finish: 0650 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Gravel surface
5		MW-12-4-6 (BTEX/MTBE & PAH)	0635	15	-	Insufficient volume sample for bulk BTEX sample		Gravelly clay - reddish orange, abundant chert gravel (25-30%), stiff, moist
10		9-11	0640	100	319			Silty clay - olive brown, some orangish brown, firm, some weathered shale, slightly moist
15		14-16	0645	100	-		▽	Partially weathered rock - olive brown, calcareous shale w/ relict bedding visible, v. slightly moist
20		19-21	0650	100	-	TD @ 20.5 Set screen @ 10-20' (6' sump) Sand to 8' Bentonite to 6'		Silty clay - light grayish brown, firm, slightly moist, some thin bedding visible, few limestone fragments.

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BORING LOG

Boring No. MW-13 Page 1 of 1 Project Number 0879-001-170-2

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: 50' E of MW-7 Ground Elevation: —

Drilling Method/Equipment: HSA Top of Casing Elev.:

Date: 7/11/07 Start: 1120 Finish: 1215 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
						Cleared area w/ bobcat		Earthen surface (graded)
		MW-13-1 (BTEX/MTBE, PAH)	1125	30				Gravelly Clay – orange brown, firm, moist, angular gravel up to 1/8" diam, small roots @ top
5			1130	100				Gravelly Clay – AA to 4.5' Silty Clay – lt. olive brown w/ some orange mottling near top, firm, moist, limestone rock in last 6" (weathered)
								Partially Weathered Rock (PWR) (silty clay w/ relict bedding visible) – light olive brown, firm, few small rock fragments, moist
10			1135					
								PWR (Silty Clay) AA except no ~~white~~ rock frags & wet on outside spoon
15			1145					
						screen @ 8-18 Sand to 6' Bentonite to 4' 3' stick up guard. (3½ bags sand + 1 bucket bentonite pellets)		TD @ 18'
20								

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BORING LOG

Boring No. MW-14 Page 1 of _____ Project Number 0884-001-170-2

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: SW corner of property Ground Elevation: –

Drilling Method/Equipment: HSA Top of Casing Elev.: _____

Date: 7/11/07 Start: 1400 Finish: 1505 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
						Post-hole to 4'		Grass surface Gravelly clay - soft, brown, lt brown
5		MW-14-4 (BTEX/MTBE, PAH)	1410	100				Gravelly Clay - tan mottled w/ orange-tan, soft, v. moist - wet, ~20% gravel (~¼" diam, angular) [FILL]
10		MW-14-9 (BTEX/MTBE, PAH) (also Duplicate)	1415	100				Some brown Silty Clay - sandy in part, tan, soft, v. moist, fine roots in lower half
15			1420	60				Silty Clay - light olive brown, fissile, slightly moist, gray rock fragments in shoe, relict bedding visible (PWR)
20			1430	80				Silty Clay - tan, some orange mottling, fissile, slightly moist, few small gray rock fragments, bedding visible (PWR)

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BORING LOG

Boring No. MW-14 Page 2 of 2 Project Number 0884-001-170-2

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services
Boring Location: SW corner of property Ground Elevation: -
Drilling Method/Equipment: HSA Top of Casing Elev.:
Date: 7/11/07 Start: 1400 Finish: 1505 Logger: W. Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25			1440	90				Highly weathered calcareous shale - brownish gray, blocky fracture, some weathered to fine silt, wet on spoon.
30						Screen from 13-28', Sand to 11', Bentonite to 9' Flush-mounted well guard. (4½ bags sand + 1 bucket bentonite pellets)		Boring terminated @ 28'
35								
40								

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BORING LOG

Boring No. MW-15 Page 2 of 2 Project Number IRA-MAR-24

Project: Martins Texaco Drilling Contractor: --

Boring Location: 6' N of W dispenser island Ground Elevation: --

Drilling Method/Equipment: HSA Top of Casing Elev.: --

Date: 6/3/10 Start: 1400 Finish: 1450 Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25		~~1W~~	1445	100	0.0			PWR - grayish brown dolomite ? and silty clay, dry
								Boring terminated @ 25.5'
10								
15								
20								

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BORING LOG

Boring No. MW-15 Page 1 of 1 Project Number JRA-MAR-24

Project: Martin's Texaco Drilling Contractor: --

Boring Location: ~6' N of W dispenser island Ground Elevation: --

Drilling Method/Equipment: HSA/split spoon Top of Casing Elev.: --

Date: 6/3/10 Start: 1400 Finish: 1450 Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
						Post-hole to 4'		Concrete
5		MW-15-5	1420	75	22			Gravelly clay - grayish brown, organic material including roots, moist, no odor
10		MW-15-10	1425	75	2208			Sandy clay - gray, brown, wet, v. cse sand (angular, gray), strong odor, to 10.5'
15			1430	80	17			Clay - greenish gray, soft-firm, weathered petro. odor, to base Clay - brown, mottled with dark gray, soft-firm, no odor
20			1435	100	8.5			Silty Clay - light brown w/ greenish gray striations, some PWR, dry, no odor

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BORING LOG

Boring No. RW-1 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~4' S of NW dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/20/11 Start: 1540 Finish: Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5						Post-hole to 4'		Concrete surface Gravelly Clay - tan to gray, cobbles and rock fragments to 3', wet @ 2-3', strong odor, slight sheen on standing water in hole, less rocks from 3-4' Silty Clay - tan to gray, firm
10		RW1-9.5	1640 1645	80 100	~~3.0~~ ~~12.8~~ 12.9 14.9	@8.5'		wet, slight odor, small clayey gravel lenses in last foot Silty Clay - tan to gray, firm, very moist, gravelly lens at 9.5-9.7' and at 11.5-11.2', slight odor in both
15								
20						Set 10' screen (4") at 5-15' with 5' sump.		Boring terminated @ 15.5'

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BORING LOG

Boring No. RW-1A Page 1 of 1 Project Number IRA-MAR

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~15' NW of NW dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/19/11 Start: 0715 Finish: Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5/25						Post-hole to 4'		Asphalt surface (4") Silty Clay - tan to greenish gray, moist, firm
10/30			0740	100	3.0	@8.5'		Silty Clay - tan with wood and rock fragments to 6.5', then olive gray with small rock fragments, very moist, moderate odor. Silty Clay - tan to gray rock wood
15/35		RW1A-11	0750	100	1.5			fragments to 11.5', then tan to brownish gray, firm, moist no odor throughout Silty Clay with some Partially
20/40			0800	90	2.0	@17'		weathered Rock - olive gray, firm, slightly moist, no odor Boring terminated at 19' Did not set well

review CPS map
simplify RBS table
ignore AOC data - locs could not be confirmed
+ water data

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BORING LOG

Boring No. RW-1B Page 1 of 2 Project Number

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/19/11 Start: 1600 Finish: Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Concrete surface (6")
								Silty Clay - tan to gray, firm, moist, no odo-
5								Silty Clay - tan to olive gray, moist, firm, no odor
			1645	100	7.7	@ 7'		
10		RW1B-10	1655	100	47.3			Silty Clay - as above to 11', then gray to tan with roots & wood fragments to 13', then firm, tan to olive tan ~~silty~~ and very moist to 14', no odor
15								Silty Clay and Partially Weathered
			1705	100	3.2	@ 15.5'		Rock- olive gray, abundant rock fragments, slightly moist, no odor
20								Boring terminated at 19'
								Did not set well

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BORING LOG

Boring No. RW-2 Page 1 of 2 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~8'SE of NW dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/19/11 Start: 1345 Finish: 1500 Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5	0-5					Post-hole to 4'		Concrete surface (8") Silty Clay - reddish tan, some gray, moist, firm-stiff, no odor except at 3.5-4' (slight)
10	5-10		1400	100	419	@8.5'		Silty Clay - tan to greenish gray, moist to very moist, firm, slight odor at 4-4.5', strong odor at 8-9'.
10	5-10	RW2-9.5	1410	100	1081	@9.5'		Silty Clay - greenish gray with small rock fragments to 10', then tan to gray, firm, roots and wood fragments, firm. Odor from 9-10', then possible faint odor
15	10-15							Silty Clay - olive gray, firm-stiff, some weathered rock fragments, no odor slightly moist
20	15-20		1420	100	18.4	@16.5'		

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BORING LOG

Boring No. RW-2 Page 2 of 2 Project Number IRA-MR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~8' SE of NW dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/19/11 Start: 1345 Finish: 1500 Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25			1430	100	0.5	@ 21.5'		Silty Clay and Partially Weathered Rock - tan to light brown, abundant rock fragments (shale and limestone), moist, no odor Boring terminated at 24'
30								Set 15' of 4" screen from 7.5-22.5' with 5' sump (lowest slot ~22½' from bottom of screen joint)
35								
40								

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BORING LOG

Boring No. RW-3 Page 1 of 2 Project Number JRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~8' NE of SW dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/19/11 Start: 1105 Finish: Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
						Post-hole to 4		Concrete surface Silty Clay - greenish gray mottled with red, firm, strong odor at 2.5-3.5'
5			1140	90 100	60.2	@6.5'		Silty Clay - greenish gray to reddish tan, firm, odor @6-7' and 8.5-9', moist
10		RW3-9.5'	1150	100	1047			Silty Clay - greenish gray to 10' with very small rock fragments, V. moist, strong odor
15			1200	100	23.9	@16'		Silty Clay - reddish tan with some gray, v. moist, moderate plasticity, roots at 10', slight odor Silty Clay - reddish tan, firm-soft, moist, no odor, to 15'; then green to gray, firm-stiff partially weathered rock fragments, slightly moist, no odor
20								

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BORING LOG

Boring No. RW-3 Page 2 of 2 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~8' NE of SW dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/19/11 Start: 1105 Finish: 1245 Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25			1220	100				Silty Clay and Partially Weathered Rock - tan with some gray, shale and limestone (dolomite?) fragments, slightly moist, no odor Boring Terminated at 24'
30								Set 4" screen from 7.7'-22.7' plus 5' sump (lowest slot at 22.4')
35								
40								

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BORING LOG

Boring No. RW-4 Page 1 of 2 Project Number IRA-MAR-30

Project: Martin's Texaco
Drilling Contractor: Technical Drilliing Services
Boring Location: ~10' SE of SW Dispenser
Ground Elevation: --
Drilling Method/Equipment: Hollow-stem augers
Top of Casing Elev.: --
Date: 9/19/11 Start: 0900 Finish: 1015
Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
						Post-hole to 4' Augered out with 7 7/8" OD HSA		Concrete surface (8")
								Clay - tan, greenish brown, silty, some gravel & rock, firm, moist
5								Clay - greenish tan, silty, some gravel & rock, firm, high plasticity @ base of sample, very moist
			0930	100	39.0	@8.5'		
10		RW4-9.5	0940	100	731			Silty Clay - greenish-gray to orange tan, firm, strong odor at 9-10', the moderate odor, moderate plasticity, v. moist
15			0945	100	23.8	@15.5'		Silty Clay - Tan to gray, abundant partially weathered rock fragments (shale & limestone), slightly moist, no odor
20								

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BORING LOG

Boring No. RW-4 Page 2 of 2 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~10'SE of SW Dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/19/11 Start: 0900 Finish: 1015 Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
25			0955	100	0.0	@ 21.5'		Silty Clay and Partially Weathered Rock. tan, some gray, shale & limestone rock fragments, slightly moist, no odor
30						Top of casing ~6" bgs		Boring terminated at 25' Set 4" screen @ 8.7 - 23.7' with 5" sump @ base (lowest slot @ 23.5')
35								
40								

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BORING LOG

Boring No. RW-5 Page 1 of 1 Project Number 1RA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: 3' NW of NE dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/20/11 Start: 0850 Finish: Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
						Post hole to 4'		Concrete surface
								Silty Clay - tan to gray, firm, moist, no odor
5								Silty Clay - tan to olive tan, gray from 8-9', firm, strong gasoline odor @ 8-9'
			0910	100	83.8	@ 8.5'		
10		RW5-9.5	0920	100	17.5			Silty Clay - olive gray, firm to soft, strong odor, wet from 9-10', then tan to gray, firm, v. moist, slight odor to 14'
15								Silty Clay - olive gray to tan, firm, ~~slightly~~ moist, no odor to 17', then
			0930	100	0.7	@ 16.5'		Partially Weathered Rock and Silty Clay - brownish gray, abundant small rock fragments, slightly moist, no odor
20						Set 10' screen (4") from 5-15' with 5" sump.		Boring terminated @ 19'

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BORING LOG

Boring No. RW-6 Page 1 of 1 Project Number IRA-7AR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~5's of NE dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/20/11 Start: ____ Finish: ____ Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
								Concrete surface (8")
								Silty Clay - olive and tan, abundant large cobbles, wet with strong odor @ 2-3'; then moderate odor
5								
								Silty clay - tan to olive gray, very moist, moderate odor to faint odor @ 4-8.5'; then gray with strong odor and abundant small rocks to 9'
			1050	100	130	@8.5'		
10		RW6-9.5	1100	100	106			Silty Clay - gray, wet, with abundant small rocks, ~~to 10' strong~~ odor to 10', then tan and gray, firm, moist, faint to no odor to 14' wood fragments
15								Silty Clay - tan to brownish gray, firm, moist, no odor to 16', the weathered rock and Silty Clay-
			1110	100	7.6	@16		Partially Olive gray, slightly moist, possible faint odor
						Set 10' screen (4") from 5-15'		Boring terminated at 19'
20								

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BORING LOG

Boring No. RW-7 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~5' N of SE dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/20/11 Start: 1210 Finish: / Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5						Post-hole to 4'		Concrete surface (8") Silty Clay & Gravel - tan to gray, abundant cobbles, wet strong odor from 2-3', then no gravel and slight odor to 4'
10		RW7-9.5	1305 1315	100 100	441 33.5	@ 8.5'		Gravelly Clay - tan to olive gray, rock fragments up to 1" diameter, roots & wood fragments near loose, strong odor @ 8-9', abundant small rocks @ 8.5-9', wet Silty Clay - olive gray, some tan firm, few rock fragments @ 9-10', strong odor @ 9-10', then faint to no odor to base.
15						set 10' screen (4") from 5-15' with 5" sump		
20								Boring terminated @ 15.5'

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BORING LOG

Boring No. RW-8 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: 6'E of NW Dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/21 Start: 0855 Finish: 1015 Logger: ~~Walt Henley~~ Scott Wood

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5						Post hole to 4'		Concrete Surface Gravelly clay cobbles & rock fragments mottled olive & gray increased clay, less rocks 3-4' moist Mild odor.
10		RW8-8	1000	100%				4-5' Gravelly Silty clay red to tan 5-6.5' Silty clay - gravelly tan to olive Larger gravel lenses @ 6' 7' Silty clay - rootlets; wet strong odor; sheen olive to gray w/ tan mottling 9' Silty clay wet sheen odor olive gray
15		RW8-9	1005	100%	19.5	Analytical Collected		9-10' Silty clay Olive gray odor 10' Silty clay gravel lenses Soft odor 11' Silty clay olive gray increased plasticity & gravelly 12-14' Silty clay roots present Common. No odor detected Boring terminated @ 15.5'
20								

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BORING LOG

Boring No. RW-9 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: 6' ~~West~~ East of ~~SW~~ SE dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/21/11 Start: 1045 Finish: 1200 Logger: ~~Walt Henley~~ Scott Wood

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5						Posthole to 4'		Concrete Surface Silty clay - gravelly Light Brown Cobble Stones common to 3', wet@3'. Faint odor. Silty clay with gravel lens
10		RW9-8.5	11:30	80%		-8.5'		motled gray, tan, brown odor @7' increased plasticity SAA 8.5-9' large roots increased odor. 9-9.5 Silty clay tan olive mottled
		RW9-9.5	1135	40%	47.5	-9.5' Analytical Collected		9.5-11' Olive Silty clay gravelly strong odor and sheen.
15								11'-12.5 increased plasticity more tan in color SI odor shale lens 12.5-13.5' Silty clay high organics & rootlets dark brown SI odor 13.5-14 Silty clay - Plastic some rootlets mottled Olive tan Faint odor
20								Boring terminated 15.5'

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BORING LOG

Boring No. RW-10 Page 1 of 1 Project Number

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~4' N of SW dispenser Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/20/11 Start: 1415 Finish: Logger: Walt Henley

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5/25						Post-hole to 4'		Concrete surface (8") Gravelly Clay - gray, tan, abundant cobbles, wet @ 2', strong odor Silty Clay - olive gray to tan, gravelly lenses, especially from 8-9', very moist, moderate odor
10/30		RW10-9	1450 1455	90 100	11.0 51.4	@ 8'		Silty Clay - as above with roots to 11', odor from 9-10'
15/35								Silty Clay - tan, firm, very moist, faint odor.
20/40								Boring terminated @ 15.5' Set 10' screen (4") from 5-15 with 5" sump

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BORING LOG

Boring No. IW-1 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: 40' W of MW-7D Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/21/11 Start: 0715 Finish: 0815 Logger: ~~Walt Henley~~ Scott Wood

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5								Limestone gravel/surface Gravelly clay - red to 4' Silty clay - gravelly gray-brown Mottling. wet at bottom
10								Gravelly Silty clay - brownish orange 5-6' ~~wet~~ moist Organic silty clay w/ gravel lens black to olive mottled 6-8' wet Silty clay - gravelly olive-tan color Dry 8-10'
15								10-11' Orangic black to olive tan silty clay 11-13' Clayey Shaley Silt olive color 13-14' Silty clay with shale & chert lenses olive color. sl odor. 14-15 Clayey silt w/ shale olive color sl odor.
20								V. Silty clay - shaley olive color faint odor 15-20' V Moist Chert lens at 17.5'
								Boring terminated @ 20'

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BORING LOG

Boring No. ~~TW~~-2 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: 40 WNW of MW-7~~B~~ Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/22/11 Start: 0830 Finish: 930 Logger: ~~Walt Henley~~ Scott Wood

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments: Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5				80%				Gravel Surface Silty Clay - Gravelly Orangered color to 4' 4-5' Silty Clay Gravelly; Brown sl odor Wet@4'
10				65%				SAA 8' Gravel lens, rootlets visible mottled gray tan 9-10' Silty Clay - Shaley rootlets ~~Mottled~~ Brown olive mottlmg sl odor
15				80%				10-12' SAA Increased odor dolomite lens at 12' 12-13' Silty Clay olive to gray mottling sl odor 13-14' Silty clay gray and orange tan mottling No odor detected 14-15' Silty Shalby Clay Brown faint odor
20								15-16.5' SAA 16.5-17 Silty Clay gray olive Mottling 17-18' Silty Shalby Clay Olive brown mottling No odor dolomite lens @18' 18-20' Shaley Silty Clay olive brown color (no mottling) Faint odor
								Boring terminated@ 20'

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BORING LOG

Boring No. IW-3 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco
Drilling Contractor: Technical Drilliing Services
Boring Location: ~7' W of MW-7D
Ground Elevation: --
Drilling Method/Equipment: Hollow-stem augers
Top of Casing Elev.: --
Date: 9/22/11 Start: 1130 Finish: 1230
Logger: ~~Walt Henley~~ Scott Wood

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5				80%				Gravel surface Gravelly Silty clay Orange-red color No odor Sl moist.
10				80				SAA to 7' with roots moist 7-7.25' Silty Clay some shale abundant roots. black color. Sl odor. Moderate plasticity 7.25-8.5' Silty Clay abundant roots blocky olive yellow color. 8.5-10' silty clay plastic rootlets odor Sl moist
15				90				SAA to 11' 11-12.5' Shaley Silty clay mottled olive dark gray. dolomite lens Sl odor. Sl moist 12.5-15' Shaley Silty clay mottled olive-gray-orange. Some rootlets & dolomite gravel lenses. dry. no odor
20				75%				SAA to 16.5' 16.5-20' shaley Silty Clay olive to tan color dolomite gravel lenses. dry. Sl. odor
								Boring terminated @ 20'

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BORING LOG

Boring No. IW-4 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~6'W, 15 N of MW-7 Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/22/11 Start: 1000 Finish: 1100 Logger: ~~Walt Henley~~ Scott Wood

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5 ~~25~~				95%				Gravel Surface Silty clay - gravelly red, Sl odor 1'-5'
10 ~~50~~				100%				5-6.5' SAA Wet at 5.5' odor 6.5-6.75' Silty clay odor black common rootlets 6.75-7.50 Silty Clay olive yellow rootlets Sl odor 7.5-9 Silty Clay Lt Brown Faint odor 9-10' Silty Shaley Clay olive Brown Mottled Faint odor
15 ~~35~~				80				10-11' Layer of dolomite gravel 11-13.5' Silty Clay - Shaley olive fair ly strong odor, dry 13.5-15' Alternating 6" layers of Olive colored Silty clay Shaley and Mottled gray olive plastic silty clay rare shale Slight odor
20 ~~40~~				90%				Shaley Silty Clay light olive Color with dolomite gravel leases dry Faint odor (15-20')
								Boring terminated @ 20'

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BORING LOG

Boring No. IW-5 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilling Services

Boring Location: 30' West of MW-7D Ground Elevation: --

Drilling Method/Equipment: Hollow-Stem Augers Top of Casing Elev.: --

Date: 9/22/11 Start: 1430 Finish: 1530 Logger: Scott Wood

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5				95				0-4' Gravelly Silty Clay (dolomitic) orange-red 4-4.5' Olive brown silty clay abundant roots 4.5-5' Orange tan plastic Silty Clay dry no odor
10				90				5-6' SAP 6-8' Silty clay slightly shaley odor; wet@6' 8-8.5' Dolomite gravel 8.5-10' Silty clay olive gray dry; slight odor some weathered shale
15				30				Silty shaley clay tan-olive slight odor dry; stiff; gravel lenses.
20	Could not Sample Past 18'							Silty Shaley Clay with dolomite lenses; stiff; dry; Sl odor.
								Boring TD at 20'

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BORING LOG

Boring No. IW-6 Page 1 of 1 Project Number IRA-MAR-30

Project: Martin's Texaco Drilling Contractor: Technical Drilliing Services

Boring Location: ~30' WNW of MW-7 Ground Elevation: --

Drilling Method/Equipment: Hollow-stem augers Top of Casing Elev.: --

Date: 9/22/11 Start: 1300 Finish: 1400 Logger: ~~Walt Henley~~ Scott Wood

Depth Below Ground Surface (feet)	Sample Interval	Type and Number	Time	Rec %	OVA Peak/ Avg (ppm)	Remarks	Log	Soil Description/Comments Name, Gradation, Plasticity, Particle Size, Distribution, Color, Moisture, Density, Consistency, Soil Structure, Mineralogy, USCS Group Symbol
5				100				0-4' Silty clay-gravelly. multiple gravel lenses Orange color rootlets dry 3.9-4.0' lens of Black organic rooted silty clay 4-5' yellowolive gravelly Silty clay rooted dry
10				100				5-7.5' Silty clay, rootlets dry yellow olive color 7.5-9.5' Shaley silty clay Olive color. odor @9.0' Dry 9.5' Dolomite lens @9.4' 9.5 Olive gray silty shaley clay sl odor dry
15				70				10-15' Olive gray Silty Shaley clay with several dolomite gravel lenses and 1 lense of Shaley Silty clay yellow olive mottling all dry w/ sl. ght odor
20				75				15-17' Olive silty shaley clay Slight odor, v moist towet 16' 17.0-17.25 yellow gray olive mottled silty clay moist sl odor 17.25 Olive gray silty Shaley clay dry slight odor. Dolomite lens @ 19.5'
								Boring TD @ 20.0'

APPENDIX C – TABLES

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-1 (Perched Aquifer)	02/23/06	580.00	NR	2.0 - 16.5	1.81	--	--	578.19
	10/13/06		NR		4.56	--	--	575.44
	07/17/07		NR		4.15	--	--	575.85
	10/16/07		NR		4.73	--	--	575.27
	01/18/08		NR		4.25	--	--	575.75
	04/21/08		NR		3.41	--	--	576.59
	07/30/08		NR		4.45	--	--	575.55
	01/22/09		NR		2.65	--	--	577.35
	05/05/09		NR		2.55	--	--	577.45
	08/20/09		NR		2.90	--	--	577.10
	08/05/10		NR		3.88	--	--	576.12
	11/16/10		NR		4.14	--	--	575.86
	02/16/11		NR		2.72	--	--	577.28
	05/17/11		NR		3.22	--	--	576.78
	02/02/12		NR		3.23	--	--	576.77
	05/07/12		NR		4.00	--	--	576.00
	09/10/12		NR		3.94	--	--	576.06
	12/07/12		NR		4.85	--	--	575.15
	03/07/13		NR		3.14	--	--	576.86
	06/11/13		NR		4.09	--	--	575.91
	01/09/14		NR		3.12	--	--	576.88
	04/29/14		NR		3.50	--	--	576.50
	08/25/14		NR		4.65	--	--	575.35
	12/19/14		17.1		3.90	--	--	576.10
	04/30/15		17.1		3.53	--	--	576.47
	08/31/15		17.1		3.88	--	--	576.12
	12/18/15		17.1		3.74	--	--	576.26
	06/22/16		17.1		4.39	--	--	575.61
	10/24/16		17.1		5.35	--	--	574.65
	02/13/17		17.1		3.12	--	--	576.88
	06/05/17		17.1		3.26	--	--	576.74
	10/05/17		17.1		3.90	--	--	576.10
	02/19/18		17.1		2.88	--	--	577.12
	10/22/18		17.1		4.27	--	--	575.73
	01/11/19		17.1		3.42	--	--	576.58
	05/13/19		17.0		3.84	--	--	576.16

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-2 (Surficial Aquifer)	02/23/06	579.03	NR	2.7 - 17.2	15.39	--	--	563.64
	10/13/06		NR		DRY	--	--	DRY
	07/17/07		NR		DRY	--	--	DRY
	10/16/07		NR		DRY	--	--	DRY
	04/21/08		NR		15.53	--	--	563.50
	07/30/08		NR		DRY	--	--	DRY
	01/22/09		NR		15.20	--	--	563.83
	05/05/09		NR		14.45	--	--	564.58
	08/20/09		NR		DRY	--	--	DRY
	08/05/10		NR		16.77	--	--	562.26
	11/16/10		NR		17.24	--	--	561.79
	02/16/11		NR		14.83	--	--	564.20
	05/17/11		NR		14.61	--	--	564.42
	02/02/12		NR		13.95	--	--	565.08
	05/07/12		NR		15.95	--	--	563.08
	09/10/12		NR		15.63	--	--	563.40
	12/07/12		NR		15.90	--	--	563.13
	03/07/13		NR		13.53	--	--	565.50
	06/11/13		NR		16.12	--	--	562.91
	01/09/14		NR		14.17	--	--	564.86
	04/29/14		NR		13.85	--	--	565.18
	08/25/14		NR		17.29	--	--	561.74
	12/19/14		17.9		16.58	--	--	562.45
	04/30/15		17.9		12.46	--	--	566.57
	08/31/15		17.9		15.32	--	--	563.71
	12/18/15		17.9		14.76	--	--	564.27
	06/22/16		17.8		17.29	--	--	561.74
	10/24/16		17.7		DRY	--	--	<561.3
	02/13/17		17.8		15.44	--	--	563.59
	06/05/17		17.9		13.21	--	--	565.82
	10/05/17		17.7		15.80	--	--	563.23
	02/19/18		17.9		14.88	--	--	564.15
	10/22/18		17.9		16.69	--	--	562.34
	01/11/19		17.9		13.68	--	--	565.35
	05/13/19		17.8		14.64	--	--	564.39

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-3 (Perched Aquifer)	02/23/06	578.35	NR	3.1 - 17.6	6.94	--	--	571.41
	10/13/06		NR		11.05	--	--	567.30
	07/17/07		NR		8.39	--	--	569.96
	10/16/07		NR		9.41	--	--	568.94
	01/18/08		NR		8.64	--	--	569.71
	04/21/08		NR		7.37	--	--	570.98
	07/30/08		NR		7.91	--	--	570.44
	01/22/09		NR		7.35	--	--	571.00
	05/05/09		NR		7.02	--	--	571.33
	08/20/09		NR		7.63	--	--	570.72
	08/05/10		NR		7.64	--	--	570.71
	11/16/10		NR		8.18	--	--	570.17
	02/16/11		NR		7.07	--	--	571.28
	05/17/11		NR		6.84	--	--	571.51
	02/02/12		NR		6.80	--	--	571.55
	05/07/12		NR		7.85	--	--	570.50
	09/10/12		NR		7.65	--	--	570.70
	12/07/12		NR		8.78	--	--	569.57
	03/07/13		NR		7.18	--	--	571.17
	06/11/13		NR		7.77	--	--	570.58
	01/09/14		NR		7.66	--	--	570.69
	04/29/14		NR		7.35	--	--	571.00
	08/25/14		NR		9.65	--	--	568.70
	12/19/14		18.2		8.87	--	--	569.48
	04/30/15		18.2		6.73	--	--	571.62
	08/31/15		18.2		7.91	--	--	570.44
	12/18/15		18.2		7.80	--	--	570.55
	06/22/16		18.2		7.95	--	--	570.40
	10/24/16		17.9		8.33	--	--	570.02
	02/13/17		18.2		7.39	--	--	570.96
	06/05/17		17.9		6.64	--	--	571.71
	10/05/17		18.2		7.92	--	--	570.43
	02/19/18		18.2		6.94	--	--	571.41
	10/22/18		18.2		8.20	--	--	570.15
	01/11/19		18.2		6.92	--	--	571.43
	05/13/19		17.9		7.22	--	--	571.13

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-4 (Surficial Aquifer)	02/23/06	579.98	NR	3.1 - 17.6	13.09	--	--	566.89
	10/13/06		NR		17.61	--	--	562.37
	07/17/07		NR		17.53	17.51	0.02	562.44
	10/16/07		NR		17.42	17.40	0.02	562.55
	01/18/08		NR		16.84	--	--	563.14
	04/21/08		NR		10.72	--	--	569.26
	07/30/08		NR		16.13	--	--	563.85
	01/22/09		NR		11.98	--	--	568.00
	05/05/09		NR		11.54	--	--	568.44
	08/20/09		NR		15.75	--	--	564.23
	08/05/10		NR		14.84	--	--	565.14
	11/16/10		NR		18.00	--	--	561.98
	02/16/11		NR		12.02	--	--	567.96
	05/17/11		NR		7.38	--	--	572.60
	02/02/12		NR		11.51	--	--	568.47
	05/07/12		NR		13.28	--	--	566.70
	09/10/12		NR		16.21	--	--	563.77
	12/07/12		NR		16.51	--	--	563.47
	03/07/13		NR		11.40	--	--	568.58
	06/11/13		NR		12.65	--	--	567.33
	01/09/14		NR		12.54	--	--	567.44
	04/29/14		NR		11.49	--	--	568.49
	08/25/14		NR		16.30	--	--	563.68
	12/19/14		18.2		16.04	--	--	563.94
	04/30/15		18.2		10.05	--	--	569.93
	08/31/15		18.2		17.05	--	--	562.93
	12/18/15		18.2		14.46	--	--	565.52
MW-4R (Surficial Aquifer)	06/22/16	580.07	20.4	17.7 - 20.0	15.23	--	--	564.84
	10/24/16		20.4		DRY	--	--	<559.7
	02/13/17		20.4		16.04	--	--	564.03
	06/05/17		20.4		9.92	--	--	570.15
	10/05/17		20.4		14.10	--	--	565.97
	02/19/18		20.4		10.59	--	--	569.48
	10/22/18		20.4		15.90	--	--	564.17
	01/11/19		20.4		11.14	--	--	568.93
	05/13/19		20.3		11.64	--	--	568.43

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-5 (Surficial Aquifer)	10/13/06	580.77	NR	9.9 - 24.4	19.95	--	--	560.82
	07/17/07		NR		18.51	--	--	562.26
	10/16/07		NR		20.49	--	--	560.28
	01/18/08		NR		19.08	--	--	561.69
	04/21/08		NR		12.19	--	--	568.58
	07/30/08		NR		17.89	--	--	562.88
	01/22/09		NR		12.38	--	--	568.39
	05/05/09		NR		11.60	--	--	569.17
	08/20/09		NR		16.05	--	--	564.72
	08/05/10		NR		15.49	--	--	565.28
	11/16/10		NR		18.99	--	--	561.78
	02/16/11		NR		12.36	--	--	568.41
	05/17/11		NR		12.44	--	--	568.33
	02/02/12		NR		11.40	--	--	569.37
	05/07/12		NR		14.43	--	--	566.34
	09/10/12		NR		16.04	--	--	564.73
	12/07/12		NR		17.19	--	--	563.58
	03/07/13		NR		11.20	--	--	569.57
	06/11/13		NR		13.02	--	--	567.75
	01/09/14		NR		13.09	--	--	567.68
	04/29/14		NR		11.56	--	--	569.21
	08/25/14		NR		17.02	--	--	563.75
	12/19/14		25.1		17.12	--	--	563.65
	04/30/15		25.1		10.81	--	--	569.96
	08/31/15		25.1		17.62	--	--	563.15
	12/18/15		25.0		15.02	--	--	565.75
MW-5R (Surficial Aquifer)	06/22/16	580.60	21.6	18.9 - 21.2	15.92	--	--	564.68
	10/24/16		21.7		DRY	--	--	<558.9
	02/13/17		21.6		17.03	--	--	563.57
	06/05/17		21.7		10.71	--	--	569.89
	10/05/17		21.7		14.80	--	--	565.80
	02/19/18		21.7		11.43	--	--	569.17
	10/22/18		21.7		16.01	--	--	564.59
	01/11/19		21.7		12.00	--	--	568.60
	05/13/19		21.7		12.15	--	--	568.45

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-6 (Perched Aquifer)	10/13/06	580.67	NR	7.7 - 22.2	6.05	--	--	574.62
	07/17/07		NR		6.81	--	--	573.86
	10/16/07		NR		8.61	--	--	572.06
	01/18/08		NR		9.48	--	--	571.19
	04/21/08		NR		6.76	--	--	573.91
	07/30/08		NR		7.57	--	--	573.10
	01/22/09		NR		5.62	--	--	575.05
	05/05/09		NR		4.85	--	--	575.82
	08/20/09		NR		5.65	--	--	575.02
	08/05/10		NR		11.72	--	--	568.95
	11/16/10		NR		15.02	--	--	565.65
	02/16/11		NR		11.20	--	--	569.47
	05/17/11		NR		10.73	--	--	569.94
	02/02/12		NR		10.36	--	--	570.31
	05/07/12		NR		13.15	--	--	567.52
	09/10/12		NR		13.34	--	--	567.33
	12/07/12		NR		15.30	--	--	565.37
	03/07/13		NR		10.40	--	--	570.27
	06/11/13		NR		12.04	--	--	568.63
	01/09/14		NR		11.86	--	--	568.81
	04/29/14		NR		10.59	--	--	570.08
	08/25/14		NR		15.78	--	--	564.89
	12/19/14		22.9		15.15	--	--	565.52
	04/30/15		22.9		10.12	--	--	570.55
	08/31/15		22.9		14.88	--	--	565.79
	12/18/15		22.9		13.58	--	--	567.09
MW-6R (Perched Aquifer)	06/22/16	580.63	14.1	3.9 - 13.7	3.29	--	--	577.34
	10/24/16		14.1		4.86	--	--	575.77
	02/13/17		14.1		3.16	--	--	577.47
	06/05/17		14.1		2.61	--	--	578.02
	10/05/17		14.1		3.58	--	--	577.05
	02/19/18		NM		NM	--	--	NM
	10/22/18		14.1		3.80	--	--	576.83
	01/11/19		NM		NM	--	--	NM
	05/13/19		NM		NM	--	--	NM

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-7 (Surficial Aquifer)	10/13/06	568.03	NR	9.6 - 24.1	11.40	--	--	556.63
	07/17/07		NR		10.33	--	--	557.70
	10/16/07		NR		11.48	--	--	556.55
	01/18/08		NR		8.46	--	--	559.57
	04/21/08		NR		7.15	--	--	560.88
	07/30/08		NR		10.41	--	--	557.62
	01/22/09		NR		7.41	--	--	560.62
	05/05/09		NR		6.90	--	--	561.13
	08/20/09		NR		8.70	--	--	559.33
	08/05/10		NR		9.02	--	--	559.01
	11/16/10		NR		10.01	--	--	558.02
	02/16/11		NR		7.37	--	--	560.66
	05/17/11		NR		7.47	--	--	560.56
	02/02/12		NR		6.16	--	--	561.87
	05/07/12		NR		8.39	--	--	559.64
	09/10/12		NR		7.88	--	--	560.15
	12/07/12		NR		8.51	--	--	559.52
	03/07/13		NR		6.64	--	--	561.39
	06/11/13		NR		7.97	--	--	560.06
	01/09/14		NR		7.74	--	--	560.29
	04/29/14		NR		6.49	--	--	561.54
	08/25/14		NR		10.86	--	--	557.17
	12/19/14		24.9		8.56	--	--	559.47
	04/30/15		24.8		7.93	--	--	560.10
	08/31/15		24.8		8.33	--	--	559.70
	12/18/15		24.7		8.27	--	--	559.76
	06/22/16		24.5		9.13	--	--	558.90
	10/24/16		24.5		14.58	--	--	553.45
	02/13/17		24.4		8.35	--	--	559.68
	06/05/17		24.5		7.94	--	--	560.09
	10/05/17		24.5		8.87	--	--	559.16
	02/19/18		24.4		8.14	--	--	559.89
	10/22/18		24.3		9.98	--	--	558.05
	01/11/19	Well destroyed						

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-7D (Deep Well)	10/13/06	568.10	NR	33.1 - 42.6	9.73	--	--	558.37
	07/17/07		NR		8.60	--	--	559.50
	10/16/07		NR		9.90	--	--	558.20
	01/18/08		NR		7.78	--	--	560.32
	04/21/08		NR		5.55	--	--	562.55
	07/30/08		NR		8.56	--	--	559.54
	01/22/09		NR		5.70	--	--	562.40
	05/05/09		NR		5.26	--	--	562.84
	08/20/09		NR		7.41	--	--	560.69
	08/05/10		NR		7.75	--	--	560.35
	11/16/10		NR		8.94	--	--	559.16
	02/16/11		NR		6.47	--	--	561.63
	05/17/11		NR		5.54	--	--	562.56
	02/02/12		NR		4.40	--	--	563.70
	05/07/12		NR		6.45	--	--	561.65
	09/10/12		NR		5.60	--	--	562.50
	12/07/12		NR		6.51	--	--	561.59
	03/07/13		NR		4.27	--	--	563.83
	06/11/13		NR		5.43	--	--	562.67
	01/09/14		NR		5.06	--	--	563.04
	04/29/14		NR		4.59	--	--	563.51
	08/25/14		NR		8.31	--	--	559.79
	12/19/14		43.3		7.22	--	--	560.88
	04/30/15		43.3		4.74	--	--	563.36
	08/31/15		43.3		6.14	--	--	561.96
	12/18/15		43.3		6.19	--	--	561.91
	06/22/16		43.2		7.63	--	--	560.47
	10/24/16		43.3		11.64	--	--	556.46
	02/13/17		43.2		6.45	--	--	561.65
	06/05/17		43.1		4.46	--	--	563.64
	10/05/17		43.3		6.58	--	--	561.52
	02/19/18		43.3		5.17	--	--	562.93
	10/22/18		43.3		7.97	--	--	560.13
	01/11/19		43.2		5.45	--	--	562.65
	05/13/19		43.1		5.40	--	--	562.70

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-8 (Surficial Aquifer)	10/13/06	577.97	NR	9.8 - 24.3	19.75	--	--	558.22
	07/17/07		NR		17.26	--	--	560.71
	10/16/07		NR		18.99	--	--	558.98
	01/18/08		NR		15.74	--	--	562.23
	04/21/08		NR		12.93	--	--	565.04
	07/30/08		NR		17.49	--	--	560.48
	01/22/09		NR		12.06	--	--	565.91
	05/05/09		NR		11.16	--	--	566.81
	08/20/09		NR		14.90	--	--	563.07
	08/05/10		NR		14.64	--	--	563.33
	11/16/10		NR		17.33	--	--	560.64
	02/16/11		NR		12.01	--	--	565.96
	05/17/11		NR		11.68	--	--	566.29
	02/02/12		NR		10.78	--	--	567.19
	05/07/12		NR		13.63	--	--	564.34
	09/10/12		NR		13.03	--	--	564.94
	12/07/12		NR		15.51	--	--	562.46
	03/07/13		NR		10.84	--	--	567.13
	06/11/13		NR		11.95	--	--	566.02
	01/09/14		NR		11.80	--	--	566.17
	04/29/14		NR		11.10	--	--	566.87
	08/25/14		NR		16.56	--	--	561.41
	12/19/14		25.0		14.72	--	--	563.25
	04/30/15		25.0		10.61	--	--	567.36
	08/31/15		25.0		14.14	--	--	563.83
	12/18/15		25.0		12.90	--	--	565.07
	06/22/16		25.0		15.68	--	--	562.29
	10/24/16		25.0		20.34	--	--	557.63
	02/13/17		25.0		14.00	--	--	563.97
	06/05/17		25.0		11.18	--	--	566.79
	10/05/17		25.0		13.79	--	--	564.18
	02/19/18		25.0		11.19	--	--	566.78
	10/22/18		25.0		15.18	--	--	562.79
	01/11/19		25.0		11.03	--	--	566.94
	05/13/19		24.8		11.23	--	--	566.74

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-9 (Surficial Aquifer)	10/13/06	573.44	NR	14.2 - 28.7	13.97	--	--	559.47
	07/17/07		NR		12.37	--	--	561.07
	10/16/07		NR		14.44	--	--	559.00
	01/18/08		NR		13.04	--	--	560.40
	04/21/08		NR		5.14	--	--	568.30
	07/30/08		NR		10.50	--	--	562.94
	01/22/09		NR		5.36	--	--	568.08
	05/05/09		NR		3.94	--	--	569.50
	08/20/09		NR		9.96	--	--	563.48
	08/05/10		NR		9.05	--	--	564.39
	11/16/10		NR		13.08	--	--	560.36
	02/16/11		NR		5.21	--	--	568.23
	05/17/11		NR		5.80	--	--	567.64
	02/02/12		NR		4.19	--	--	569.25
	05/07/12		NR		7.98	--	--	565.46
	09/10/12		NR		10.13	--	--	563.31
	12/07/12		NR		11.05	--	--	562.39
	03/07/13		NR		4.27	--	--	569.17
	06/11/13		NR		6.59	--	--	566.85
	01/09/14		NR		5.78	--	--	567.66
	04/29/14		NR		4.70	--	--	568.74
	08/25/14		NL		NL	--	--	NL
	12/19/14		29.4		10.34	--	--	563.10
	04/30/15		29.4		4.12	--	--	569.32
	08/31/15		29.4		12.03	--	--	561.41
	12/18/15		29.5		7.99	--	--	565.45
	06/22/16		29.4		9.90	--	--	563.54
	10/24/16		29.4		15.36	--	--	558.08
	02/13/17		29.4		8.69	--	--	564.75
	06/05/17		29.4		2.82	--	--	570.62
	10/05/17		29.4		8.40	--	--	565.04
	02/19/18		29.4		3.51	--	--	569.93
	10/22/18		29.4		10.66	--	--	562.78
	01/11/19		29.4		4.67	--	--	568.77
	05/13/19		29.1		4.96	--	--	568.48

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-10 (Perched Aquifer)	10/13/06	578.82	NR	9.7 - 24.2	8.16	--	--	570.66
	07/17/07		NR		6.75	--	--	572.07
	10/16/07		NR		7.40	--	--	571.42
	01/18/08		NR		7.00	--	--	571.82
	04/21/08		NR		6.05	--	--	572.77
	07/30/08		NR		6.65	--	--	572.17
	01/22/09		NR		5.91	--	--	572.91
	05/05/09		NR		5.63	--	--	573.19
	08/20/09		NR		6.56	--	--	572.26
	08/05/10		NR		6.84	--	--	571.98
	11/16/10		NR		6.47	--	--	572.35
	02/16/11		NR		5.58	--	--	573.24
	05/17/11		NR		4.21	--	--	574.61
	02/02/12		NR		5.40	--	--	573.42
	05/07/12		NR		6.51	--	--	572.31
	09/10/12		NR		6.30	--	--	572.52
	12/07/12		NR		7.50	--	--	571.32
	03/07/13		NR		5.68	--	--	573.14
	06/11/13		NR		6.48	--	--	572.34
	01/09/14		NR		5.96	--	--	572.86
	04/29/14		NR		5.85	--	--	572.97
	08/25/14		NR		8.30	--	--	570.52
	12/19/14		24.9		7.25	--	--	571.57
	04/30/15		24.9		5.22	--	--	573.60
	08/31/15		24.9		6.52	--	--	572.30
	12/18/15		24.9		6.32	--	--	572.50
	06/22/16		24.8		7.39	--	--	571.43
	10/24/16		24.8		8.05	--	--	570.77
	02/13/17		24.8		5.45	--	--	573.37
	06/05/17		24.9		4.91	--	--	573.91
	10/05/17		24.9		7.24	--	--	571.58
	02/19/18		24.8		5.39	--	--	573.43
	10/22/18		24.9		7.11	--	--	571.71
	01/11/19		24.9		5.58	--	--	573.24
	05/13/19		24.9		5.96	--	--	572.86

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-11 (Perched Aquifer)	10/13/06	579.06	NR	10.2 - 24.7	19.49	--	--	559.57
	07/17/07		NR		18.23	--	--	560.83
	10/16/07		NR		19.87	--	--	559.19
	01/18/08		NR		18.21	--	--	560.85
	04/21/08		NR		15.00	--	--	564.06
	07/30/08		NR		17.80	--	--	561.26
	01/22/09		NR		14.94	--	--	564.12
	05/05/09		NR		14.05	--	--	565.01
	08/20/09		NR		15.30	--	--	563.76
	08/05/10		NR		16.77	--	--	562.29
	11/16/10		NR		18.03	--	--	561.03
	02/16/11		NR		14.56	--	--	564.50
	05/17/11		NR		13.83	--	--	565.23
	02/02/12		NR		14.09	--	--	564.97
	05/07/12		NR		15.35	--	--	563.71
	09/10/12		NR		14.72	--	--	564.34
	12/07/12		NR		17.03	--	--	562.03
	03/07/13		NR		11.99	--	--	567.07
	06/11/13		NR		13.73	--	--	565.33
	01/09/14		NR		11.37	--	--	567.69
	04/29/14		NR		9.70	--	--	569.36
	08/25/14		NL		NL	--	--	NL
	12/19/14		NL		NL	--	--	NL
	04/30/15		NL		NL	--	--	NL
	08/31/15		NL		NL	--	--	NL
	12/18/15		NL		NL	--	--	NL
	06/22/16		25.2		10.10	--	--	568.96
	10/24/16		25.2		14.05	--	--	565.01
	02/13/17		25.2		9.48	--	--	569.58
	06/05/17		25.2		7.37	--	--	571.69
	10/05/17		25.3		9.41	--	--	569.65
	02/19/18		25.2		7.77	--	--	571.29
	10/22/18		NL		NL	--	--	NL
	01/11/19		25.3		7.51	--	--	571.55
	05/13/19		25.3		8.20	--	--	570.86

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-12 (Surficial Aquifer)	10/13/06	568.39	NR	9.6 - 19.1	13.35	--	--	555.04
	07/17/07		NR		12.46	--	--	555.93
	10/16/07		NR		13.12	--	--	555.27
	01/18/08		NR		8.66	--	--	559.73
	04/21/08		NR		7.21	--	--	561.18
	07/30/08		NR		12.59	--	--	555.80
	01/22/09		NR		7.43	--	--	560.96
	05/05/09		NR		6.78	--	--	561.61
	08/20/09		NR		11.00	--	--	557.39
	08/05/10		NR		10.94	--	--	557.45
	11/16/10		NR		11.63	--	--	556.76
	02/16/11		NR		7.32	--	--	561.07
	05/17/11		NR		7.68	--	--	560.71
	02/02/12		NR		6.28	--	--	562.11
	05/07/12		NR		9.94	--	--	558.45
	09/10/12		NR		8.87	--	--	559.52
	12/07/12		NR		9.60	--	--	558.79
	03/07/13		NR		6.26	--	--	562.13
	06/11/13		NR		8.12	--	--	560.27
	01/09/14		NR		7.38	--	--	561.01
	04/29/14		NR		6.66	--	--	561.73
	08/25/14		NL		NL	--	--	NL
	12/19/14		19.8		9.06	--	--	559.33
	04/30/15		19.8		6.65	--	--	561.74
	08/31/15		19.8		11.00	--	--	557.39
	12/18/15		19.6		7.87	--	--	560.52
	06/22/16		19.6		12.00	--	--	556.39
	10/24/16		19.5		15.64	--	--	552.75
	02/13/17		19.5		7.38	--	--	561.01
	06/05/17		19.7		6.20	--	--	562.19
	10/05/17		19.6		NM	--	--	NM
	02/19/18		19.6		6.33	--	--	562.06
	10/22/18	Destroyed						

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-13 (Surficial Aquifer)	07/17/07	566.91	NR	11.7 - 21.2	11.10	--	--	555.81
	10/16/07		NR		12.00	--	--	554.91
	01/18/08		NR		9.28	--	--	557.63
	04/21/08		NR		7.10	--	--	559.81
	07/30/08		NR		11.73	--	--	555.18
	01/22/09		NR		7.06	--	--	559.85
	05/05/09		NR		6.50	--	--	560.41
	08/20/09		NR		9.96	--	--	556.95
	08/05/10		NR		10.68	--	--	556.23
	11/16/10		NR		9.72	--	--	557.19
	02/16/11		NR		7.07	--	--	559.84
	05/17/11		NR		7.42	--	--	559.49
	02/02/12		NR		6.21	--	--	560.70
	05/07/12		NR		8.82	--	--	558.09
	09/10/12		NR		8.34	--	--	558.57
	12/07/12		NR		8.57	--	--	558.34
	03/07/13		NR		6.57	--	--	560.34
	06/11/13		NR		7.71	--	--	559.20
	01/09/14		NR		7.42	--	--	559.49
	04/29/14		NR		6.91	--	--	560.00
	08/25/14		NR		11.81	--	--	555.10
	12/19/14		21.8		8.58	--	--	558.33
	04/30/15		21.8		7.41	--	--	559.50
	08/31/15		21.8		9.70	--	--	557.21
	12/18/15		21.7		7.92	--	--	558.99
	06/22/16		21.5		11.28	--	--	555.63
	10/24/16		21.7		14.85	--	--	552.06
	02/13/17		21.7		7.56	--	--	559.35
	06/05/17		21.5		6.95	--	--	559.96
	10/05/17		21.7		10.11	--	--	556.80
	02/19/18		21.8		7.31	--	--	559.60
	10/22/18		21.7		11.16	--	--	555.75
	01/11/19		21.8		7.33	--	--	559.58
	05/13/19		21.4		7.35	--	--	559.56

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-14 (Surficial Aquifer)	07/17/07	579.72	NR	12.6 - 27.1	17.74	--	--	561.98
	10/16/07		NR		19.71	--	--	560.01
	01/18/08		NR		18.03	--	--	561.69
	04/21/08		NR		11.11	--	--	568.61
	07/30/08		NR		16.05	--	--	563.67
	01/22/09		NR		11.85	--	--	567.87
	05/05/09		NR		10.50	--	--	569.22
	08/20/09		NR		15.15	--	--	564.57
	08/05/10		NR		14.43	--	--	565.29
	11/16/10		NR		18.15	--	--	561.57
	02/16/11		NR		11.31	--	--	568.41
	05/17/11		NR		11.44	--	--	568.28
	02/02/12		NR		10.31	--	--	569.41
	05/07/12		NR		13.37	--	--	566.35
	09/10/12		NR		15.08	--	--	564.64
	12/07/12		NR		16.38	--	--	563.34
	03/07/13		NR		10.16	--	--	569.56
	06/11/13		NR		11.98	--	--	567.74
	01/09/14		NR		12.10	--	--	567.62
	04/29/14		NR		10.45	--	--	569.27
	08/25/14		NR		16.21	--	--	563.51
	12/19/14		27.7		16.26	--	--	563.46
	04/30/15		27.7		9.80	--	--	569.92
	08/31/15		27.7		16.73	--	--	562.99
	12/18/15		27.7		14.02	--	--	565.70
	06/22/16		27.6		15.36	--	--	564.36
	10/24/16		27.6		20.63	--	--	559.09
	02/13/17		27.6		15.94	--	--	563.78
	06/05/17		27.4		9.75	--	--	569.97
	10/05/17		27.7		14.07	--	--	565.65
	02/19/18		27.6		10.39	--	--	569.33
	10/22/18		27.6		15.36	--	--	564.36
	01/11/19		27.6		10.88	--	--	568.84
	05/13/19		27.6		11.14	--	--	568.58

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
MW-15 (Surficial Aquifer)	08/05/10	580.36	NR	7.1 - 21.6	15.40	--	--	564.96
	11/16/10		NR		19.27	--	--	561.09
	02/16/11		NR		12.14	--	--	568.22
	05/17/11		NR		12.91	--	--	567.45
	02/02/12		NR		11.36	--	--	569.00
	05/07/12		NR		14.40	--	--	565.96
	09/10/12		NR		16.29	--	--	564.07
	12/07/12		NR		17.23	--	--	563.13
	03/07/13		NR		10.85	--	--	569.51
	06/11/13		NR		13.02	--	--	567.34
	01/09/14		NR		12.99	--	--	567.37
	04/29/14		NR		11.40	--	--	568.96
	08/25/14		NR		17.01	--	--	563.35
	12/19/14		22.2		17.17	--	--	563.19
	04/30/15		22.2		11.00	--	--	569.36
	08/31/15		22.1		17.86	--	--	562.50
	12/18/15		22.2		14.97	--	--	565.39
MW-15R (Surficial Aquifer)	06/22/16	580.44	21.4	18.7 - 21.0	16.35	--	--	564.09
	10/24/16		21.4		DRY	--	--	<559.1
	02/13/17		21.4		16.92	--	--	563.52
	06/05/17		21.4		10.91	--	--	569.53
	10/05/17		21.4		15.00	--	--	565.44
	02/19/18		21.4		11.50	--	--	568.94
	10/22/18		21.4		16.34	--	--	564.10
	01/11/19		21.4		11.98	--	--	568.46
	05/13/19		21.4		12.45	--	--	567.99
RW-1 (Perched Aquifer)	02/02/12	580.78	NR	5.6 - 15.1	12.07	--	--	568.71
	05/07/12		NR		14.61	--	--	566.17
	03/07/13		NR		11.30	--	--	569.48
	06/11/13		NR		13.23	--	--	567.55
	01/09/14		NR		13.12	--	--	567.66
	04/29/14		NR		11.77	--	--	569.01
	08/25/14		NR		NM	--	--	NM
	12/19/14		NM		NM	--	--	NM
	04/30/15		15.7		10.93	--	--	569.85
	08/31/15		NM		15.15	--	--	565.63
	12/18/15		15.7		13.91	--	--	566.87
	06/22/16		15.7		15.06	--	--	565.72
	10/24/16		15.7		DRY	--	--	<565.1
	02/13/17		15.6		10.13	--	--	570.65
	06/05/17		15.7		6.81	--	--	573.97
	10/05/17		15.6		11.40	--	--	569.38
	02/19/18		15.7		7.57	--	--	573.21
	10/22/18		15.6		8.69	--	--	572.09
	01/11/19		15.6		7.40	--	--	573.38
	05/13/19		15.6		6.48	--	--	574.30

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
RW-2 (Surficial Aquifer)	02/02/12	580.73	NR	7.9 - 22.4	12.21	--	--	568.52
	05/07/12		NR		13.77	--	--	566.96
	03/07/13		NR		12.14	--	--	568.59
	06/11/13		NR		13.15	--	--	567.58
	01/09/14		NR		14.01	--	--	566.72
	04/29/14		NR		12.30	--	--	568.43
	08/25/14		NR		NM	--	--	NM
	12/19/14		NM		NM	--	--	NM
	04/30/15		23.0		10.92	--	--	569.81
	08/31/15		NM		18.11	--	--	562.62
	12/18/15		23.0		15.15	--	--	565.58
RW-2R (Perched Aquifer)	06/22/16	580.78	13.9	3.7 - 13.4	7.68	--	--	573.10
	10/24/16		13.9		9.56	--	--	571.22
	02/13/17		13.7		11.48	--	--	569.30
	06/05/17		13.5		9.81	--	--	570.97
	10/05/17		13.6		11.61	--	--	569.17
	02/19/18		13.8		11.38	--	--	569.40
	10/22/18		13.8		12.64	--	--	568.14
	01/11/19		13.8		10.38	--	--	570.40
	05/13/19		13.5		10.15	--	--	570.63
RW-3 (Surficial Aquifer)	02/02/12	580.88	NR	8.5 - 23.0	12.19	--	--	568.69
	05/07/12		NR		14.83	--	--	566.05
	03/07/13		NR		11.20	--	--	569.68
	06/11/13		NR		13.11	--	--	567.77
	01/09/14		NR		13.21	--	--	567.67
	04/29/14		NR		11.60	--	--	569.28
	08/25/14		NR		NM	--	--	NM
	12/19/14		NM		NM	--	--	NM
	04/30/15		23.6		10.95	--	--	569.93
	08/31/15		NM		18.18	--	--	562.70
	12/18/15		23.4		15.35	--	--	565.53
RW-3R (Perched Aquifer)	06/22/16	580.85	13.8	3.6 - 13.3	7.85	--	--	573.00
	10/24/16		13.8		10.29	--	--	570.56
	02/13/17		13.7		10.64	--	--	570.21
	06/05/17		13.8		9.84	--	--	571.01
	10/05/17		13.8		DRY	--	--	<567.1
	02/19/18		13.8		10.42	--	--	570.43
	10/22/18		13.7		DRY	--	--	<567.1
	01/11/19		13.8		9.94	--	--	570.91
	05/13/19		13.5		10.74	--	--	570.11

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
RW-4 (Surficial Aquifer)	02/02/12	580.54	NR	8.6 - 23.1	11.95	--	--	568.59
	05/07/12		NR		14.44	--	--	566.10
	03/07/13		NR		11.67	--	--	568.87
	06/11/13		NR		13.39	--	--	567.15
	01/09/14		NR		13.32	--	--	567.22
	04/29/14		NR		11.61	--	--	568.93
	08/25/14		NR		NM	--	--	NM
	12/19/14		NM		NM	--	--	NM
	04/30/15		23.7		10.67	--	--	569.87
	08/31/15		NM		17.52	--	--	563.02
	12/18/15		23.8		14.87	--	--	565.67
RW-4R (Perched Aquifer)	06/22/16	580.64	14.1	3.9 - 13.6	10.74	--	--	569.90
	10/24/16		14.1		11.44	--	--	569.20
	02/13/17		14.0		10.65	--	--	569.99
	06/05/17		13.8		9.77	--	--	570.87
	10/05/17		14.1		11.17	--	--	569.47
	02/19/18		14.1		10.29	--	--	570.35
	10/22/18		14.1		11.40	--	--	569.24
	01/11/19		14.1		10.42	--	--	570.22
	05/13/19		13.7		9.80	--	--	570.84
RW-5 (Perched Aquifer)	02/02/12	580.92	NR	5.4 - 14.9	6.71	--	--	574.21
	05/07/12		NR		6.24	--	--	574.68
	09/10/12		NR		6.49	--	--	574.43
	03/07/13		NR		6.43	--	--	574.49
	06/11/13		NR		5.98	--	--	574.94
	01/09/14		NR		6.73	--	--	574.19
	04/29/14		NR		5.78	--	--	575.14
	08/25/14		NR		5.92	--	--	575.00
	12/19/14		NM		7.02	--	--	573.90
	04/30/15		15.5		5.36	--	--	575.56
	08/31/15		NM		8.31	--	--	572.61
	12/18/15		15.6		6.47	--	--	574.45
	06/22/16		15.6		5.69	--	--	575.23
	10/24/16		15.5		7.46	--	--	573.46
	02/13/17		15.5		6.96	--	--	573.96
	06/05/17		15.6		5.49	--	--	575.43
	10/05/17		15.4		6.61	--	--	574.31
	02/19/18		15.6		6.11	--	--	574.81
	10/22/18		15.5		6.68	--	--	574.24
	01/11/19		15.5		6.48	--	--	574.44
	05/13/19		15.6		5.48	--	--	575.44

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
RW-6 (Perched Aquifer)	02/02/12	581.00	NR	5.4 - 14.9	7.45	--	--	573.55
	05/07/12		NR		10.28	--	--	570.72
	09/10/12		NR		9.30	--	--	571.70
	12/07/12		NR		12.95	--	--	568.05
	03/07/13		NR		6.99	--	--	574.01
	06/11/13		NR		7.19	7.15	0.04	573.78
	01/09/14		NR		10.62	--	--	570.38
	04/29/14		NR		9.82	--	--	571.18
	08/25/14		NR		13.51	--	--	567.49
	12/19/14		NM		13.48	--	--	567.52
	04/30/15		15.5		7.41	--	--	573.59
	08/31/15		NM		6.23	6.22	0.01	574.76
	12/18/15		15.7		6.51	--	--	574.49
	06/22/16		15.7		5.83	--	--	575.17
	10/24/16		15.7		7.50	--	--	573.50
	02/13/17		15.7		7.93	--	--	573.07
	06/05/17		15.7		5.51	--	--	575.49
	10/05/17		15.8		8.42	--	--	572.58
	02/19/18		15.7		6.27	--	--	574.73
	10/22/18		15.7		7.88	7.79	0.09	573.05
	01/11/19		15.7		6.82	--	--	574.18
	05/13/19		15.7		6.26	--	--	574.74
RW-7 (Perched Aquifer)	02/02/12	581.12	NR	5.5 - 15.0	8.76	--	--	572.36
	05/07/12		NR		8.56	8.54	0.02	572.55
	09/10/12		NR		8.67	8.66	0.01	572.44
	12/07/12		NR		11.36	--	--	569.76
	03/07/13		NR		7.33	--	--	573.79
	06/11/13		NR		7.67	--	--	573.45
	01/09/14		NR		9.66	--	--	571.46
	04/29/14		NR		8.86	--	--	572.26
	08/25/14		NR		9.60	--	--	571.52
	12/19/14		NM		9.87	--	--	571.25
	04/30/15		15.6		7.47	--	--	573.65
	08/31/15		NM		6.01	--	--	575.11
	12/18/15		15.8		6.57	--	--	574.55
	06/22/16		15.8		5.92	--	--	575.20
	10/24/16		15.8		7.40	--	--	573.72
	02/13/17		15.7		7.48	--	--	573.64
	06/05/17		15.8		7.29	--	--	573.83
	10/05/17		NM		7.85	7.81	0.04	573.24
	02/19/18		15.8		6.83	--	--	574.29
	10/22/18		15.8		8.01	7.89	0.12	573.02
	01/11/19		15.8		6.94	--	--	574.18
	05/13/19		15.8		7.87	--	--	573.25

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
RW-8 (Perched Aquifer)	02/02/12	580.84	NR	5.4 - 14.9	7.69	--	--	573.15
	05/07/12		NR		12.27	--	--	568.57
	09/10/12		NR		13.61	13.51	0.10	567.23
	12/07/12		NR		14.90	--	--	565.94
	03/07/13		NR		10.76	--	--	570.08
	06/11/13		NR		14.27	--	--	566.57
	01/09/14		NR		10.05	--	--	570.79
	04/29/14		NR		9.13	--	--	571.71
	08/25/14		NR		11.41	--	--	569.43
	12/19/14		NM		10.93	--	--	569.91
	04/30/15		15.5		5.97	--	--	574.87
	08/31/15		NM		9.75	--	--	571.09
	12/18/15		15.4		11.55	--	--	569.29
	06/22/16		15.5		11.29	--	--	569.55
	10/24/16		15.5		11.95	--	--	568.89
	02/13/17		15.4		13.10	--	--	567.74
	06/05/17		15.5		8.21	--	--	572.63
	10/05/17		15.5		10.42	--	--	570.42
	02/19/18		15.6		9.74	--	--	571.10
	10/22/18		15.5		12.35	--	--	568.49
	01/11/19		15.5		10.98	--	--	569.86
	05/13/19		17.4		10.82	--	--	570.02
RW-9 (Perched Aquifer)	02/02/12	580.91	NR	5.2 - 14.7	10.89	--	--	570.02
	05/07/12		NR		7.83	--	--	573.08
	09/10/12		NR		6.26	--	--	574.65
	12/07/12		NR		7.03	--	--	573.88
	03/07/13		NR		6.21	--	--	574.70
	06/11/13		NR		5.87	--	--	575.04
	01/09/14		NR		6.42	--	--	574.49
	04/29/14		NR		5.66	--	--	575.25
	08/25/14		NR		13.68	--	--	567.23
	12/19/14		NM		13.25	--	--	567.66
	04/30/15		15.3		5.70	--	--	575.21
	08/31/15		NM		9.88	--	--	571.03
	12/18/15		15.3		9.06	--	--	571.85
	06/22/16		15.3		10.69	--	--	570.22
	10/24/16		15.3		10.66	--	--	570.25
	02/13/17		15.2		11.01	--	--	569.90
	06/05/17		15.3		9.31	--	--	571.60
	10/05/17		15.3		12.30	--	--	568.61
	02/19/18		15.3		9.27	--	--	571.64
	10/22/18		15.3		12.61	12.59	0.02	568.29
	01/11/19		15.3		8.56	--	--	572.35
	05/13/19		15.3		9.26	--	--	571.65

TABLE 1
GROUNDWATER ELEVATION SURVEY DATA
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	DATE	TOP OF CASING ELEVATION (ft)	WELL DEPTH (ft-BTOC)	SCREENED INTERVAL (ft-BTOC)	DEPTH TO WATER (ft-BTOC)	DEPTH TO PRODUCT (ft-BTOC)	THICKNESS OF PRODUCT (ft)	GROUND-WATER ELEVATION (ft)
RW-10 (Surficial Aquifer)	02/02/12	581.02	NR	5.5 - 15.0	12.51	--	--	568.51
	05/07/12		NR		14.74	--	--	566.28
	03/07/13		NR		11.53	--	--	569.49
	06/11/13		NR		13.43	--	--	567.59
	01/09/14		NR		13.56	--	--	567.46
	04/29/14		NR		11.32	--	--	569.70
	08/25/14		NR		NM	--	--	NM
	12/19/14		NM		NM	--	--	NM
	04/30/15		15.6		10.46	--	--	570.56
	08/31/15		NM		15.02	--	--	566.00
	12/18/15		15.6		14.33	--	--	566.69
	06/22/16		15.6		15.03	--	--	565.99
	10/24/16		15.6		DRY	--	--	<565.4
	02/13/17		15.5		DRY	--	--	<566.0
	06/05/17		15.6		10.66	--	--	570.36
	10/05/17		15.6		14.05	--	--	566.97
	02/19/18		15.7		12.05	--	--	568.97
	10/22/18		15.5		15.03	--	--	565.99
	01/11/19		15.6		12.18	--	--	568.84
	05/13/19		15.5		12.17	--	--	568.85

Notes: *ft-BTOC - feet below top of casing*
NR - Not Reported
Depths of screens measured from ground level during well installation.
Depths of screens from top of casing estimated from measured total depth of well minus 3 inches for base sump.
NM - Not Measured
NL - Not Located

Sources: *PPM Consultants, Inc.*
Oak Environmental Services, NewFields, G & RK Consulting Associates
PPM Project No. 451601-MCAP

TABLE 2
SOIL ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

SAMPLE I.D.	DEPTH OF SAMPLE (ft BGS)	DATE COLLECTED	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL-BENZENE (mg/kg)	XYLENES (mg/kg)	TOTAL BTEX (mg/kg)	MTBE (mg/kg)	NAPHTHALENE (mg/kg)
PRELIMINARY INVESTIGATION									
MW-1-1	1	02/10/06	0.005	<0.005	<0.005	0.021	0.026	<0.005	<3.30
MW-1-4	4-6	02/10/06	0.101	0.009	0.011	0.038	0.159	0.351	<0.33
MW-2-1	1	02/10/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<3.30
MW-2-4	4-6	02/10/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
MW-3-1	1	02/10/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<3.30
MW-3-4	4-6	02/10/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
MW-4-4	4-6	02/10/06	0.272	0.073	0.035	0.08	0.46	<0.005	<3.30
MW-4-9	9-11	02/10/06	0.323	0.337	0.102	0.51	1.272	0.025	<0.33
SECONDARY INVESTIGATION									
MW-5-4-6	4-6	10/10/06	0.151	0.009	0.027	0.047	0.234	1.64	<0.33
MW-6-4-6	4-6	10/10/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
MW-7-1-3	1-3	10/09/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
MW-8-4-6	4-6	10/10/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
MW-9-4-6	4-6	10/09/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
MW-10-4-6	4-6	10/11/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
MW-11-9-11	9-11	10/10/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
MW-12-4-6	4-6	10/10/06	<0.005	<0.005	<0.005	<0.010	BDL	<0.005	<0.33
OFFSITE SECONDARY INVESTIGATION									
MW-13-1	1-3	07/11/07	<0.005	<0.005	<0.005	<0.005	BDL	<0.005	<0.035
MW-14-4	4-6	07/11/07	<0.005	<0.005	<0.005	<0.005	BDL	<0.005	<0.035
MW-14-9	9-11	07/11/07	<0.005	<0.005	<0.005	<0.005	BDL	<0.005	<0.035
ADDITIONAL WELL									
MW-15-5	5	06/03/10	<0.005	<0.005	<0.005	<0.005	BDL	<0.005	<0.005
MW-15-10	10	06/03/10	19.8	37.8	32.5	118	208	<1.0	14.3
EXTRACTION WELLS									
RW1-9.5	9.5	09/20/11	0.089	0.057	0.013	0.075	0.234	0.045	0.065
RW1A-11	11	09/19/11	0.020	<0.005	<0.005	0.006	0.026	0.016	<0.005
RW1B-10	10	09/19/11	0.125	0.029	0.007	0.079	0.240	0.077	0.011
RW2-9.5	9.5	09/19/11	9.04	32.6	28.6	106	176	<0.5	14.2
RW3-9.5	9.5	09/19/11	13.5	72.1	31.7	231	348	<1.0	28.6
RW4-9.5	9.5	09/19/11	14.6	86.6	3.06	229	333	<1.0	32.3
RW5-9.5	9.5	09/20/11	11.0	30.0	25.5	120	187	<1.0	10.7
RW6-9.5	9.5	09/20/11	20.8	53.6	35.9	182	292	<1.0	19.8
RW7-9.5	9.5	09/20/11	3.16	11.7	2.97	41.0	58.8	<0.25	4.77
RW8-9	9	09/21/11	11.5	29.4	44.3	106	191	<0.5	12.6
RW9-9.5	9.5	09/21/11	1.67	29.3	3.68	122	157	<0.25	7.71
RW10-9	9	09/20/11	2.54	8.75	0.266	19.7	31.3	<0.25	7.25
SSTL - INHAL			21.6	1,160	533	668	--	14,300	550
GRP SOURCE SOIL			44.1	1,160	533	668	--	50.5	550

Notes: *All values in milligrams per kilogram (mg/kg)*
SSTL-INHAL - Site Specific Target Levels based on indoor inhalation of groundwater vapors (all wells)
GRP SOURCE - Groundwater resource protection (revised and approved by ADEM on 4/11/19)
BDL - Below detection limit
ft BGS - feet below ground surface

Sources: *PPM Consultants, Inc.*
Oak Environmental Services, NewFields, G & RK Consulting Associates
PPM Project No. 451601-MCAP

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-1 (Perched aquifer)	02/23/06	0.123	0.04	0.067	0.131	0.361	0.641	<0.01
	10/13/06	0.226	0.007	0.009	<0.01	0.242	0.368	<0.01
	07/17/07	**0.382**	<0.05	<0.05	<0.05	0.382	0.287	0.003
	10/16/07	0.126	<0.005	0.011	<0.005	0.137	0.333	0.018
	01/18/08	0.187	0.005	<0.005	0.009	0.201	0.081	0.014
	04/21/08	0.074	<0.005	<0.005	0.006	0.080	0.089	0.008
	07/30/08	0.041	<0.005	<0.005	<0.005	0.041	0.070	0.008
	01/22/09	0.009	<0.005	<0.005	<0.005	0.009	0.046	<0.005
	05/05/09	0.041	0.003	0.033	0.007	0.084	0.041	0.080
	08/20/09	0.006	<0.001	0.003	0.001	0.010	0.031	0.010
	08/05/10	0.002	<0.001	<0.001	0.003	0.005	0.005	0.005
	02/03/12	0.015	0.002	0.003	0.002	0.022	0.022	0.006
	03/07/13	0.008	<0.005	<0.005	<0.005	0.008	0.014	<0.005
	04/29/14	0.008	<0.001	<0.001	<0.001	0.008	0.004	<0.001
	08/25/14	NS	NS	NS	NS	NS	NS	NS
	12/19/14	NS	NS	NS	NS	NS	NS	NS
	04/30/15	0.019	<0.001	<0.001	<0.003	0.019	0.004	<0.005
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	0.019	<0.001	<0.001	<0.003	0.019	0.002	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	0.008	<0.001	<0.001	<0.003	0.008	0.004	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	0.011	<0.001	<0.001	<0.003	0.011	0.002	<0.005
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.3319**	**66.38**	**46.46**	**175**	**--**	**1.328**	**1.328**
MW-2 (Surficial Aquifer)	02/23/06	**13.9**	**29.1**	2.93	14.1	60.03	**1.37**	0.088
	10/13/06	DRY						
	07/17/07	DRY						
	10/16/07	DRY						
	01/18/08	DRY						
	04/21/08	DRY						
	07/30/08	DRY						
	01/22/09	**1.31**	0.181	0.157	0.367	2.02	0.078	0.028
	05/05/09	**0.620**	0.072	0.066	0.106	0.864	0.040	0.131
	08/20/09	DRY						
	08/05/10	0.070	<0.005	<0.005	<0.005	0.070	0.012	0.010
	02/03/12	**0.188**	0.029	0.023	0.031	0.271	0.014	<0.005
	03/07/13	**1.91**	0.272	0.103	0.162	2.447	0.048	0.014
	04/29/14	**1.48**	1.18	0.189	5.6	8.449	**0.580**	0.028
	08/25/14	NS	NS	NS	NS	NS	NS	NS
	12/19/14	NS	NS	NS	NS	NS	NS	NS
	04/30/15	**0.727**	0.040	0.126	1.180	2.073	0.213	*0.031*
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	**0.381**	0.250	0.088	1.81	2.529	0.268	0.057
	10/24/16	DRY						
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	**0.552**	0.013	0.087	0.385	1.037	0.062	*0.011*
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	**0.149**	0.001	0.003	0.009	0.162	0.084	<0.005
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.1348**	**26.97**	**18.88**	**175**	**--**	**0.539**	**0.5393**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-3 (Perched Aquifer)	02/23/06	**0.19**	0.012	<0.005	0.008	0.210	0.371	<0.01
	10/13/06	0.085	<0.005	<0.005	<0.01	0.085	0.092	<0.01
	07/17/07	0.057	<0.010	<0.010	<0.010	0.057	0.035	0.007
	10/16/07	0.068	<0.005	<0.005	0.007	0.075	0.043	0.005
	01/18/08	0.052	<0.005	<0.005	0.009	0.061	0.034	0.006
	04/21/08	**0.191**	<0.005	<0.005	0.018	0.209	0.037	0.005
	07/30/08	**0.123**	<0.005	<0.005	0.017	0.140	0.024	0.005
	01/22/09	0.106	0.001	<0.001	0.009	0.116	0.016	0.003
	05/05/09	0.081	0.002	<0.001	0.021	0.104	0.008	0.004
	08/20/09	**0.141**	0.002	<0.001	0.018	0.161	0.010	0.007
	08/05/10	**0.138**	0.003	<0.001	0.019	0.160	0.004	0.004
	02/03/12	**0.175**	0.005	<0.005	0.021	0.201	0.009	0.006
	03/07/13	**0.225**	0.010	<0.005	0.012	0.247	<0.005	0.007
	04/29/14	**0.164**	0.012	<0.005	0.059	0.235	0.008	0.006
	08/25/14	NS	NS	NS	NS	NS	NS	NS
	12/19/14	NS	NS	NS	NS	NS	NS	NS
	04/30/15	0.049	0.003	<0.001	0.017	0.069	0.003	<0.005
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	0.022	0.003	<0.001	0.021	0.046	0.003	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	0.038	0.004	<0.001	0.021	0.063	0.003	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	0.042	0.003	<0.001	0.016	0.061	<0.001	<0.005
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.1112**	**22.25**	**15.57**	**175**	**--**	**0.4450**	**0.4450**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-4 (Surficial Aquifer)	02/23/06	0.092	0.044	0.005	0.103	0.244	0.442	<0.01
	07/17/07	**Free Product**						
	10/16/07	**Free Product**						
	01/18/08	**11.5**	13.2	3.22	12.0	39.9	0.517	0.734
	04/21/08	**3.85**	2.47	1.48	14.6	22.4	0.699	1.28
	07/30/08	**5.57**	5.9	0.776	5.13	17.4	0.588	0.906
	01/22/09	**13.9**	12.0	1.95	13.3	41.2	0.789	0.927
	05/05/09	**5.12**	3.15	0.971	10.2	19.4	0.498	0.823
	08/20/09	**12.8**	4.78	1.50	12.7	31.8	0.789	0.865
	08/05/10	**1.62**	1.50	0.464	5.85	9.43	0.308	0.975
	02/03/12	0.007	<0.005	0.121	<0.005	0.128	0.181	0.016
	05/07/12	0.018	<0.005	0.203	<0.005	0.221	0.191	0.009
	09/10/12	**1.13**	0.045	0.172	0.332	1.679	0.122	0.107
	12/07/12	<0.005	<0.005	<0.005	<0.005	BDL	0.118	0.012
	03/07/13	0.063	<0.010	<0.010	<0.010	0.063	0.245	<0.010
	06/11/13	<0.005	<0.005	<0.005	<0.005	BDL	0.188	0.012
	01/09/14	0.002	0.008	<0.001	<0.001	0.010	0.092	<0.001
	04/29/14	0.003	0.003	<0.001	0.005	0.011	0.146	0.008
	08/25/14	0.370	0.011	<0.001	0.032	0.413	0.221	<0.005
	12/19/14	0.785	0.294	0.014	0.025	1.118	0.148	<0.005
	04/30/15	**6.950**	2.400	0.925	1.900	12.175	0.775	0.086
	08/31/15	**4.420**	2.180	1.640	5.750	13.990	0.284	*0.176*
	12/18/15	**3.430**	1.030	0.537	2.220	7.217	<0.100	0.564
MW-4R Surficial Aquifer)	06/22/16	**9.150**	0.449	1.360	3.370	14.329	0.486	0.580
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	2/13/17**	**8.970**	0.061	0.501	2.650	12.182	0.037	*0.263*
	06/05/17	**13.700**	0.173	1.670	5.150	20.693	0.123	1.090
	10/05/17	**10.200**	0.083	1.620	5.000	16.903	0.106	*0.411*
	02/19/18	**9.020**	0.220	1.750	2.180	13.170	0.131	*0.256*
	10/22/18	0.328	0.022	0.239	0.036	0.625	0.044	0.505
	01/11/19	0.959	0.017	0.261	0.033	1.270	0.031	0.333
	05/13/19	**3.400**	0.148	2.380	2.41	8.338	0.468	0.604
SSCAL (GRP-POC)		**1.008**	**201.7**	**141.2**	**175**	**--**	**4.033**	**4.033**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-5 (Surficial Aquifer)	10/13/06	**5.45**	3.20	2.57	13.8	25.06	0.74	0.384
	07/17/07	**7.67**	1.23	3.88	13.1	25.88	0.881	0.686
	10/16/07	**9.37**	0.423	4.28	9.61	23.68	1.13	0.787
	01/18/08	**10.1**	0.547	3.22	6.55	20.42	1.13	0.555
	04/21/08	**5.23**	2.52	3.58	11.7	23.03	0.562	0.579
	07/30/08	**8.35**	2.78	3.28	18.4	32.81	0.780	0.781
	01/22/09	**7.96**	2.68	3.89	17.7	32.23	0.734	0.702
	05/05/09	**4.86**	1.21	3.12	10.4	19.59	0.515	0.633
	08/20/09	**7.77**	1.63	4.38	15.0	28.78	0.754	0.796
	08/05/10	**5.38**	0.369	0.269	5.68	11.698	0.473	0.623
	11/16/10	0.739	0.097	0.139	0.353	1.328	0.197	0.112
	02/16/11	**3.46**	1.14	4.20	12.8	21.60	0.221	1.10
	05/17/11	**4.37**	1.15	5.44	17.3	28.26	0.275	0.661
	02/03/12	**3.76**	0.784	3.37	10.9	18.814	0.424	0.577
	05/07/12	**4.29**	0.976	4.44	14.0	23.706	0.504	0.640
	09/10/12	**4.16**	0.804	3.81	13.2	21.974	0.197	0.818
	12/07/12	**3.36**	0.983	4.16	13.1	21.603	0.273	0.739
	03/07/13	**3.33**	1.07	3.86	13.8	22.06	0.226	0.883
	06/11/13	**3.14**	0.756	4.53	12.6	21.026	0.254	0.770
	01/09/14	**2.72**	0.504	3.47	10.2	16.894	0.162	0.383
	04/30/14	**3.38**	0.848	6.36	16.0	26.588	0.293	0.758
	08/25/14	**16.600**	0.614	5.420	20.600	43.234	0.488	1.020
	12/19/14	**2.900**	0.935	5.900	17.600	27.335	0.132	*0.433*
	04/30/15	**4.020**	0.587	3.380	8.080	16.067	0.298	0.784
	08/31/15	**5.940**	0.917	6.500	16.500	29.857	0.341	1.210
	12/18/15	**5.640**	0.893	6.210	16.500	29.243	<0.100	0.823
MW-5R (Surficial Aquifer)	06/22/16	**4.390**	0.324	2.480	5.010	12.204	0.356	0.559
	10/24/16	DRY						
	02/13/17	**4.080**	0.268	1.840	2.600	8.788	0.359	*0.232*
	06/05/17	**5.920**	0.395	2.860	3.600	12.775	0.484	2.600
	10/05/17	**5.640**	0.320	3.370	3.970	13.300	0.436	0.505
	02/19/18	**5.980**	0.301	3.970	3.790	14.041	0.305	*0.334*
	10/22/18	**3.940**	0.159	2.890	2.320	9.309	*0.095*	*0.104*
	01/11/19	**4.390**	0.121	2.620	1.810	8.941	0.235	0.590
	05/13/19	**5.760**	0.156	3.770	2.040	11.726	0.390	0.664
SSCAL (GRP-Source)		**1.161**	**232.1**	**162.5**	**175**	**--**	**4.643**	**4.643**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-6 (Perched Aquifer)	10/13/06	**0.449**	0.007	0.012	0.014	0.482	1.05	<0.01
	07/17/07	0.433	0.005	0.023	0.019	0.480	0.299	0.042
	10/16/07	**1.64**	0.233	0.167	0.106	2.146	0.420	0.119
	01/18/08	**1.01**	<0.025	0.074	0.068	1.152	0.237	0.093
	04/21/08	**1.54**	0.035	0.066	0.096	1.737	0.257	0.079
	07/30/08	**1.01**	0.028	0.052	0.077	1.167	0.135	0.072
	01/22/09	**1.32**	<0.010	0.015	0.045	1.380	0.085	0.028
	05/05/09	**0.584**	<0.010	0.013	0.032	0.629	0.031	0.043
	08/20/09	**0.969**	0.016	0.024	0.051	1.060	0.048	0.055
	08/05/10	**0.908**	0.016	0.148	0.159	1.231	0.048	0.090
	11/16/10	**1.62**	0.011	0.098	0.128	1.857	0.059	0.042
	02/16/11	**1.36**	0.018	0.142	0.131	1.651	0.057	0.092
	05/17/11	**1.95**	0.018	0.196	0.148	2.312	0.064	0.147
	02/03/12	**1.80**	0.018	0.074	0.046	1.938	0.052	0.079
	05/07/12	**2.06**	0.016	0.083	0.04	2.199	0.062	0.106
	09/10/12	**1.11**	<0.025	0.034	0.087	1.231	<0.025	0.037
	12/07/12	**1.20**	0.010	<0.010	0.019	1.229	0.018	0.030
	03/07/13	**1.27**	0.010	0.026	0.024	1.330	0.017	0.023
	06/11/13	**0.864**	0.011	0.018	0.016	0.909	0.015	0.091
	01/09/14	**0.875**	0.015	0.020	0.012	0.922	0.014	0.021
	04/30/14	**0.848**	0.012	<0.010	0.014	0.874	0.012	0.028
	08/25/14	**2.600**	0.010	0.027	0.035	2.672	0.007	0.077
	12/19/14	**0.742**	0.010	0.022	*0.014*	0.788	*0.009*	<0.050
	04/30/15	**0.746**	0.012	0.034	*0.020*	0.812	*0.009*	*0.009*
	08/31/15	**0.705**	0.011	0.017	0.024	0.757	<0.005	*0.005*
	12/18/15	**0.640**	0.010	0.023	0.021	0.694	<0.005	<0.025
MW-6R (Perched Aquifer)	06/22/16	0.013	<0.001	<0.001	<0.003	0.013	0.003	<0.005
	10/24/16	0.008	<0.001	<0.001	<0.003	0.008	0.003	<0.005
	2/13/17**	0.002	<0.001	<0.001	<0.003	0.002	0.003	<0.005
	06/05/17	0.001	<0.001	<0.001	<0.003	0.001	0.002	<0.005
	10/05/17	0.002	<0.001	<0.001	<0.003	0.002	0.003	<0.005
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	NS	NS	NS	NS	NS	NS	NS
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.4359**	**87.17**	**61.02**	**175**	**--**	**1.743**	**1.743**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-7 (Surficial Aquifer)	10/13/06	**0.304**	0.023	0.020	0.037	0.384	**1.79**	NA
	07/17/07	**0.944**	<0.1	<0.1	0.172	1.116	**2.01**	0.011
	10/16/07	**0.164**	<0.025	<0.025	<0.025	0.164	**1.98**	<0.025
	01/18/08	**0.090**	<0.025	<0.025	<0.025	0.090	**0.952**	<0.025
	04/21/08	**0.814**	0.056	0.118	0.203	1.191	**1.51**	0.05
	07/30/08	**0.570**	0.020	0.032	0.043	0.665	**1.32**	0.019
	01/23/09	**0.766**	0.043	0.153	0.283	1.245	**1.08**	0.024
	05/06/09	**0.369**	0.038	0.104	0.258	0.769	**0.244**	0.040
	08/20/09	**0.097**	0.006	<0.005	0.058	0.161	0.073	0.036
	08/05/10	**0.155**	<0.01	<0.01	0.096	0.251	0.064	0.031
	11/16/10	**0.160**	<0.005	<0.005	<0.005	0.160	**0.642**	<0.005
	02/16/11	**1.520**	0.112	0.211	0.406	2.249	**0.445**	0.063
	05/17/11	**1.85**	0.201	0.400	0.782	3.233	**0.314**	0.14
	02/03/12	**0.345**	0.013	0.035	0.078	0.471	0.116	0.019
	05/07/12	**0.995**	0.070	0.189	0.373	1.627	0.153	0.056
	09/10/12	**0.454**	<0.025	0.055	0.136	0.645	0.074	0.033
	12/07/12	**0.273**	0.010	0.028	0.075	0.386	0.096	0.020
	03/08/13	**0.308**	0.014	0.058	0.092	0.472	0.108	0.040
	06/11/13	**0.149**	0.007	0.027	0.059	0.242	0.111	0.019
	01/09/14	<0.001	<0.001	<0.001	<0.001	BDL	0.016	<0.001
	04/30/14	<0.001	<0.001	<0.001	<0.001	BDL	0.008	<0.001
	08/25/14	<0.001	<0.001	<0.001	<0.003	BDL	0.051	<0.005
	12/19/14	<0.001	<0.001	<0.001	<0.003	BDL	0.011	<0.005
	04/30/15	<0.001	<0.001	<0.001	<0.003	BDL	0.015	<0.005
	08/31/15	<0.001	<0.001	<0.001	<0.003	BDL	0.016	<0.005
	12/18/15	<0.001	<0.001	<0.001	<0.003	BDL	0.010	<0.005
	06/22/16	<0.001	<0.001	<0.001	<0.003	BDL	0.015	<0.005
	10/24/16	<0.001	<0.001	<0.001	<0.003	BDL	0.019	<0.005
	02/13/17	<0.001	<0.001	<0.001	<0.003	BDL	0.004	<0.005
	06/05/17	<0.001	<0.001	<0.001	<0.003	BDL	0.001	<0.005
	10/05/17	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	02/19/18	<0.001	<0.001	<0.001	<0.003	BDL	0.005	<0.005
	10/22/18	<0.001	<0.001	<0.001	<0.003	BDL	0.007	<0.005
	01/11/19	Well destroyed						
SSCAL (GRP-POC)		**0.0511**	**10.22**	**7.153**	**175**	**--**	**0.2044**	**0.2044**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-7D (Deep Well)	10/13/06	<0.005	<0.005	<0.005	<0.01	BDL	0.010	<0.01
	07/17/07	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	10/16/07	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	01/18/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	04/21/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	05/07/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/05/10	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	02/03/12	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	03/08/13	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	04/30/14	<0.001	<0.001	<0.001	<0.001	BDL	0.002	<0.001
	08/25/14	NS	NS	NS	NS	BDL	NS	NS
	12/19/14	NS	NS	NS	NS	BDL	NS	NS
	04/30/15	<0.001	<0.001	<0.001	<0.003	BDL	0.002	<0.005
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	<0.001	<0.001	<0.001	<0.003	BDL	0.002	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	0.002	<0.001	<0.001	<0.003	0.002	0.003	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.0495**	**9.903**	**6.932**	**99.03**	**--**	**0.1981**	**0.1981**
MW-8 (Surficial Aquifer)	10/13/06	<0.005	<0.005	<0.005	<0.01	BDL	0.005	<0.01
	07/17/07	0.001	<0.001	0.001	<0.001	0.002	0.004	<0.001
	10/16/07	<0.001	<0.001	<0.001	<0.001	BDL	0.003	<0.001
	01/18/08	<0.001	<0.001	<0.001	<0.001	BDL	0.006	<0.001
	04/21/08	<0.001	<0.001	<0.001	<0.001	BDL	0.01	<0.001
	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	0.004	<0.001
	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	0.009	<0.001
	05/07/09	<0.001	<0.001	<0.001	<0.001	BDL	0.002	<0.001
	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	0.002	<0.001
	08/05/10	<0.001	<0.001	<0.001	<0.001	BDL	0.003	<0.001
	02/03/12	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	03/08/13	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	04/30/14	0.009	<0.001	<0.001	<0.001	0.009	0.002	<0.001
	08/25/14	NS	NS	NS	NS	NS	NS	NS
	12/19/14	NS	NS	NS	NS	NS	NS	NS
	04/30/15	0.004	<0.001	<0.001	<0.003	0.004	0.005	<0.005
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	<0.001	<0.001	<0.001	<0.003	BDL	0.003	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	0.003	<0.001	<0.001	<0.003	0.003	0.002	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.1737**	**34.73**	**24.31**	**175**	**--**	**0.6946**	**0.6946**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-9 (Surficial Aquifer)	10/13/06	<0.005	0.006	0.007	0.026	0.039	<0.005	<0.01
	07/17/07	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	10/16/07	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	01/18/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	04/21/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	05/07/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/05/10	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	02/03/12	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	03/08/13	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	04/30/14	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/25/14	NL	NL	NL	NL	NL	NL	NL
	12/19/14	NS	NS	NS	NS	NS	NS	NS
	04/30/15	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.0657**	**13.15**	**9.204**	**131.5**	**--**	**0.2630**	**0.2630**
MW-10 (Perched Aquifer)	10/13/06	0.008	0.011	<0.005	<0.01	0.019	<0.005	<0.01
	07/17/07	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	10/16/07	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	01/18/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	04/21/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	0.017	<0.001
	05/07/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/05/10	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	02/03/12	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	03/07/13	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	04/30/14	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/25/14	NS	NS	NS	NS	NS	NS	NS
	12/19/14	NS	NS	NS	NS	NS	NS	NS
	04/30/15	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	<0.001	<0.001	<0.001	<0.003	BDL	0.002	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.3578**	**71.56**	**50.09**	**175**	**--**	**1.431**	**1.431**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-11 (Perched Aquifer)	10/13/06	<0.005	<0.005	<0.005	<0.01	BDL	0.01	<0.01
	07/17/07	<0.001	<0.001	<0.001	<0.001	BDL	0.015	<0.001
	10/16/07	<0.001	<0.001	<0.001	<0.001	BDL	0.008	<0.001
	01/18/08	<0.001	<0.001	<0.001	<0.001	BDL	0.01	<0.001
	04/21/08	<0.001	<0.001	<0.001	<0.001	BDL	0.16	<0.001
	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	0.009	<0.001
	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	05/07/09	<0.001	<0.001	<0.001	<0.001	BDL	0.006	<0.001
	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	0.013	<0.001
	08/05/10	<0.001	<0.001	<0.001	<0.001	BDL	0.010	<0.001
	02/03/12	<0.001	<0.001	<0.001	<0.001	BDL	0.017	<0.001
	03/07/13	<0.001	<0.001	<0.001	<0.001	BDL	0.012	<0.001
	04/30/14	<0.001	<0.001	<0.001	<0.001	BDL	0.009	<0.001
	08/25/14	NL	NL	NL	NL	NL	NL	NL
	12/19/14	NL	NL	NL	NL	NL	NL	NL
	04/30/15	NL	NL	NL	NL	NL	NL	NL
	08/31/15	NL	NL	NL	NL	NL	NL	NL
	12/18/15	NL	NL	NL	NL	NL	NL	NL
	06/22/16	<0.001	<0.001	<0.001	<0.003	BDL	0.005	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	<0.001	<0.001	<0.001	<0.003	BDL	0.008	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	NS	NS	NS	NS	NS	NS	NS
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.1383**	**27.66**	**19.36**	**175**	**--**	**0.5531**	**0.5531**
MW-12 (Surficial Aquifer)	10/13/06	<0.005	<0.005	<0.005	<0.01	BDL	0.087	<0.01
	07/17/07	<0.001	<0.001	<0.001	<0.001	BDL	0.09	<0.001
	10/16/07	<0.001	<0.001	<0.001	<0.001	BDL	0.076	<0.001
	01/18/08	<0.001	<0.001	<0.001	<0.001	BDL	0.077	<0.001
	04/21/08	<0.001	<0.001	<0.001	<0.001	BDL	0.094	<0.001
	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	0.081	<0.001
	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	0.083	<0.001
	05/07/09	<0.001	<0.001	<0.001	<0.001	BDL	0.032	<0.001
	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	0.046	<0.001
	08/05/10	<0.001	<0.001	<0.001	<0.001	BDL	0.035	<0.001
	02/03/12	<0.001	<0.001	<0.001	<0.001	BDL	0.014	<0.001
	03/08/13	<0.001	<0.001	<0.001	<0.001	BDL	0.006	<0.001
	04/30/14	<0.001	<0.001	<0.001	<0.001	BDL	0.003	<0.001
	08/25/14	NL	NL	NL	NL	NL	NL	NL
	12/19/14	NS	NS	NS	NS	NS	NS	NS
	04/30/15	<0.001	<0.001	<0.001	<0.003	BDL	0.003	<0.005
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	<0.001	<0.001	<0.001	<0.003	BDL	0.003	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	<0.001	<0.001	<0.001	<0.003	BDL	0.003	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	Well destroyed						
SSCAL (GRP-POC)		**0.0381**	**7.615**	**5.330**	**76.15**	**--**	**0.1523**	**0.1523**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-13 (Surficial Aquifer)	07/17/07	<0.001	<0.001	<0.001	<0.001	BDL	**0.146**	<0.001
	10/16/07	<0.001	<0.001	<0.001	<0.001	BDL	0.122	<0.001
	01/18/08	<0.001	<0.001	<0.001	<0.001	BDL	0.134	<0.001
	04/21/08	<0.001	<0.001	<0.001	<0.001	BDL	**0.208**	<0.001
	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	**0.156**	<0.001
	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	**0.153**	<0.001
	05/07/09	0.019	<0.001	<0.001	<0.001	0.019	0.126	<0.001
	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	**0.180**	<0.001
	08/05/10	**0.045**	<0.005	<0.005	<0.005	0.045	**0.227**	<0.005
	11/16/10	<0.001	<0.001	<0.001	<0.001	BDL	0.068	<0.001
	02/16/11	0.030	0.003	0.004	0.007	0.044	0.075	0.002
	05/17/11	0.004	<0.001	<0.001	<0.001	0.004	0.066	<0.001
	02/03/12	<0.001	<0.001	<0.001	<0.001	BDL	0.038	<0.001
	05/07/12	<0.001	<0.001	<0.001	<0.001	BDL	0.042	<0.001
	09/10/12	<0.001	<0.001	<0.001	<0.001	BDL	0.019	<0.001
	12/07/12	<0.001	<0.001	<0.001	<0.001	BDL	0.009	<0.001
	03/08/13	<0.001	<0.001	<0.001	<0.001	BDL	0.010	<0.001
	06/11/13	<0.001	<0.001	<0.001	<0.001	BDL	0.007	<0.001
	01/09/14	<0.001	<0.001	<0.001	<0.001	BDL	0.007	<0.001
	04/30/14	<0.001	<0.001	<0.001	<0.001	BDL	0.005	<0.001
	08/25/14	<0.001	<0.001	<0.001	<0.003	BDL	0.007	<0.005
	12/19/14	<0.001	<0.001	<0.001	<0.003	BDL	0.013	<0.005
	04/30/15	<0.001	<0.001	<0.001	<0.003	BDL	0.008	<0.005
	08/31/15	<0.001	<0.001	<0.001	<0.003	BDL	0.013	<0.005
	12/18/15	<0.001	<0.001	<0.001	<0.003	BDL	0.006	<0.005
	06/22/16	<0.001	<0.001	<0.001	<0.003	BDL	0.009	<0.005
	10/24/16	<0.001	<0.001	<0.001	<0.003	BDL	0.011	<0.005
	02/13/17	<0.001	<0.001	<0.001	<0.003	BDL	0.003	<0.005
	06/05/17	<0.001	<0.001	<0.001	<0.003	BDL	0.005	<0.005
	10/05/17	<0.001	<0.001	<0.001	<0.003	BDL	0.006	<0.005
	02/19/18	<0.001	<0.001	<0.001	<0.003	BDL	0.002	<0.005
	10/22/18	<0.001	<0.001	<0.001	<0.003	BDL	0.002	<0.005
	01/11/19	<0.001	<0.001	<0.001	<0.003	BDL	0.003	<0.005
	05/13/19	<0.001	<0.001	<0.001	<0.003	BDL	0.001	<0.005
SSCAL (GRP-POC)		**0.0351**	**7.025**	**4.918**	**70.25**	**--**	**0.1405**	**0.1405**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
MW-14 (Surficial Aquifer)	07/17/07	<0.001	<0.001	<0.001	<0.001	BDL	0.038	<0.001
	10/16/07	<0.001	<0.001	<0.001	<0.001	BDL	0.169	<0.001
	01/18/08	<0.001	<0.001	<0.001	<0.001	BDL	0.096	<0.001
	04/21/08	<0.001	<0.001	<0.001	<0.001	BDL	0.027	<0.001
	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	0.015	<0.001
	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	0.022	<0.001
	05/07/09	<0.001	<0.001	<0.001	<0.001	BDL	0.002	<0.001
	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	0.008	<0.001
	08/05/10	<0.001	<0.001	<0.001	<0.001	BDL	0.005	<0.001
	02/03/12	<0.001	<0.001	<0.001	<0.001	BDL	0.003	<0.001
	03/07/13	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	04/30/14	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
	08/25/14	NS	NS	NS	NS	NS	NS	NS
	12/19/15	NS	NS	NS	NS	NS	NS	NS
	04/30/15	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	08/31/15	NS	NS	NS	NS	NS	NS	NS
	12/18/15	NS	NS	NS	NS	NS	NS	NS
	06/22/16	0.003	<0.001	<0.001	<0.003	0.003	0.002	<0.005
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	0.013	<0.001	<0.001	<0.003	0.013	0.001	<0.005
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	NS	NS	NS	NS	NS	NS	NS
	10/22/18	<0.001	<0.001	<0.001	<0.003	BDL	0.002	<0.005
	01/11/19	NS	NS	NS	NS	NS	NS	NS
	05/13/19	NS	NS	NS	NS	NS	NS	NS
SSCAL (GRP-POC)		**0.5042**	**100.8**	**70.59**	**175**	**--**	**2.017**	**2.017**
MW-15 (Surficial Aquifer)	06/03/10	0.619	0.389	0.236	0.9	2.144	0.033	0.078
	08/05/10	**9.60**	1.34	<0.10	1.23	12.2	1.70	<0.10
	11/16/10	0.082	0.039	0.012	0.040	0.173	0.510	0.012
	02/16/11	**28.2**	7.70	2.58	10.1	48.6	2.43	0.816
	05/17/11	**44.0**	15.10	4.56	14.1	77.8	2.28	1.53
	02/03/12	**9.51**	2.44	0.911	4.60	17.5	2.84	0.797
	05/07/12	**38.6**	10.2	2.16	7.54	58.5	3.03	1.05
	09/10/12	**34.2**	8.41	3.78	16.9	63.3	1.68	1.09
	12/07/12	**1.58**	0.087	0.228	0.491	2.39	1.50	0.069
	03/07/13	**54.2**	13.5	4.76	17.7	90.2	1.93	2.16
	06/11/13	**12.3**	2.7	0.951	4.65	20.6	2.20	1.11
	01/09/14	**2.15**	0.519	0.286	1.59	4.55	0.877	0.451
	04/30/14	**35.2**	10.2	5.28	16.6	67.3	2.04	0.894
	08/25/14	**42.600**	4.840	2.840	13.600	63.880	1.180	*0.220*
	12/19/14	**10.800**	0.456	1.230	5.300	17.786	1.200	*0.468*
	04/30/15	**15.600**	3.670	2.740	9.140	31.150	1.530	0.655
	08/31/15	**19.000**	0.605	2.850	12.000	34.455	1.630	0.634
	12/18/15	**17.800**	0.536	2.960	9.540	30.836	0.930	*0.532*
MW-15R (Surficial Aquifer)	06/22/16	0.026	0.003	0.003	0.008	0.040	0.048	<0.005
	10/24/16	DRY						
	02/13/17	0.039	0.003	0.002	0.014	0.058	0.015	<0.005
	06/05/17	<0.001	<0.001	<0.001	<0.003	BDL	0.001	<0.005
	10/05/17	0.002	0.002	<0.001	<0.003	0.004	0.001	<0.005
	02/19/18	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	10/22/18	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
	01/11/19	0.004	<0.001	<0.001	<0.003	0.004	<0.001	<0.005
	05/13/19	<0.001	<0.001	<0.001	<0.003	BDL	<0.001	<0.005
SSCAL (GRP-Source)		**1.161**	**232.1**	**162.5**	**175**	**--**	**4.643**	**4.643**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
RW-2R (Perched Aquifer)	06/22/16	**14.400**	3.130	3.020	9.910	30.460	0.949	*0.031*
	10/24/16	**21.300**	4.880	3.980	9.270	39.430	1.180	*0.406*
	02/13/17	**10.900**	1.900	1.760	4.030	18.590	0.797	*0.337*
	06/05/17	**32.200**	7.060	7.020	24.400	70.680	1.790	2.080
	10/05/17	**34.400**	4.740	6.820	23.000	68.960	1.660	1.570
	02/19/18	**28.000**	1.760	5.120	16.300	51.180	0.982	*0.276*
	10/22/18	**29.400**	0.532	6.360	19.500	55.792	0.310	*0.242*
	01/11/19	**9.600**	0.189	0.571	2.380	12.740	0.840	*0.184*
	05/13/19	**40.800**	3.080	9.720	37.400	91.000	1.270	0.820
SSCAL (GRP-Source)		**1.161**	**232.1**	**162.5**	**175**	**--**	**4.643**	**4.643**
RW-3R (Perched Aquifer)	06/22/16	**15.100**	0.627	5.400	12.600	33.727	0.867	*0.451*
	10/24/16	**18.800**	0.791	6.310	13.600	39.501	1.010	1.870
	02/13/17	**12.500**	0.455	5.360	12.200	30.515	0.815	0.774
	06/05/17	**14.500**	0.410	6.630	15.200	36.740	0.951	1.570
	10/05/17	NS	NS	NS	NS	NS	NS	NS
	02/19/18	**19.400**	0.470	9.760	20.700	50.330	0.814	*0.782*
	10/22/18	NS	NS	NS	NS	NS	NS	NS
	01/11/19	**13.300**	0.234	6.200	11.900	31.634	0.324	1.730
	05/13/19	**13.900**	0.179	4.640	9.730	28.449	0.550	1.030
SSCAL (GRP-Source)		**1.161**	**232.1**	**162.5**	**175**	**--**	**4.643**	**4.643**
RW-4R (Perched Aquifer)	06/22/16	NS	NS	NS	NS	NS	NS	*NS*
	10/24/16	**8.100**	0.404	4.990	5.330	18.824	1.160	1.300
	02/13/17	**5.370**	0.276	4.010	3.980	13.636	0.711	0.520
	06/05/17	**5.450**	0.139	3.620	3.570	12.779	1.040	*0.278*
	10/05/17	**7.020**	0.296	5.360	5.460	18.136	1.080	1.610
	02/19/18	**6.500**	0.255	4.670	3.900	15.325	0.876	*0.363*
	10/22/18	**2.640**	0.092	1.550	1.450	5.732	0.326	0.440
	01/11/19	**7.320**	0.173	3.160	2.540	13.193	0.516	*0.390*
	05/13/19	**3.790**	0.060	0.950	0.191	4.991	0.061	*0.195*
SSCAL (GRP-Source)		**1.161**	**232.1**	**162.5**	**175**	**--**	**4.643**	**4.643**
RW-7 (Perched Aquifer)	06/22/16	NS	NS	NS	NS	NS	NS	*NS*
	10/24/16	NS	NS	NS	NS	NC	NS	NS
	02/13/17	NS	NS	NS	NS	NC	NS	NS
	06/05/17	NS	NS	NS	NS	NC	NS	NS
	10/05/17	NS	NS	NS	NS	NC	NS	NS
	02/19/18	NS	NS	NS	NS	NC	NS	NS
	10/22/18	**14.500**	0.848	7.920	27.400	50.668	*0.076*	1.610
	01/11/19	**17.600**	0.922	5.600	27.600	51.722	*0.198*	**5.020**
	05/13/19	**16.400**	0.816	5.900	30.600	53.716	0.422	3.760
SSCAL (GRP-Source)		**1.161**	**232.1**	**162.5**	**175**	**--**	**4.643**	**4.643**
RW-9 (Perched Aquifer)	06/22/16	**16.300**	3.940	5.900	22.400	48.540	0.508	**8.580**
	10/24/16	NS	NS	NS	NS	NS	NS	NS
	02/13/17	NS	NS	NS	NS	NS	NS	NS
	06/05/17	**17.500**	3.070	9.380	30.000	59.950	0.465	**9.370**
	10/05/17	**19.800**	1.810	9.800	32.400	63.810	0.490	**13.300**
	02/19/18	**21.600**	0.774	9.980	33.300	65.654	0.300	**4.960**
	10/22/18	**17.900**	0.858	10.400	31.400	60.558	*0.150*	**6.960**
	01/11/19	**46.000**	0.852	14.200	44.000	105.052	*0.364*	**5.440**
	05/13/19	**25.200**	0.868	13.000	40.300	79.368	*0.448*	2.940
SSCAL (GRP-Source)		**1.161**	**232.1**	**162.5**	**175**	**--**	**4.643**	**4.643**

TABLE 3
GROUNDWATER ANALYTICAL SUMMARY
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

WELL I.D.	SAMPLE DATE	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL-BENZENE (mg/L)	XYLENES (mg/L)	TOTAL BTEX (mg/L)	MTBE (mg/L)	NAPHTH-ALENE (mg/L)
DUPLICATES								
DUP (MW-1)	10/13/06	0.227	0.006	0.008	<0.005	0.241	0.406	<0.01
DUP (MW-10)	07/17/07	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
DUP (MW-6)	10/16/07	1.64	0.238	0.164	0.103	2.15	0.434	0.123
DUP (MW-5)	01/18/08	10.6	0.555	3.3	6.57	21.0	1.20	0.56
DUP (MW-8)	07/30/08	<0.001	<0.001	<0.001	<0.001	BDL	0.004	<0.001
DUP (MW-10)	01/23/09	<0.001	<0.001	<0.001	<0.001	BDL	<0.001	<0.001
DUP (MW-13)	05/07/09	0.019	<0.001	<0.001	<0.001	0.019	0.126	<0.001
DUP (MW-12)	08/20/09	<0.001	<0.001	<0.001	<0.001	BDL	0.048	<0.001
DUP (MW-1)	08/05/10	0.003	<0.001	<0.001	0.003	0.006	0.007	0.006
DUP (MW-15)	11/16/10	0.085	0.037	0.013	0.040	0.175	0.528	0.015
DUP (MW-5)	02/16/11	3.70	1.23	4.52	12.5	22.0	0.229	1.05
DUP (MW-5)	05/17/11	4.43	1.17	5.59	17.0	28.2	0.269	0.662
DUP (MW-15)	02/03/12	9.45	2.42	0.869	4.67	17.4	2.68	0.774
DUP (MW-5)	09/10/12	4.05	0.832	3.87	13.3	22.1	0.191	0.848
DUP (MW-7)	12/07/12	0.288	0.012	0.030	0.076	0.406	0.103	0.020
DUP (MW-6)	03/07/13	1.26	0.011	0.028	0.026	1.325	0.018	0.025
DUP (MW-5)	06/11/13	3.26	0.760	4.75	13.2	22.0	0.263	0.778
DUP (MW-4)	01/09/14	0.003	0.008	<0.001	<0.001	0.011	0.092	<0.001
DUP (MW-15)	08/25/14	43.000	5.040	2.840	13.200	64.080	1.260	*0.182*
DUP (MW-15)	12/19/14	10.700	0.470	1.260	5.530	17.960	1.160	*0.477*
DUP (MW-15)	04/30/15	16.600	4.050	2.960	9.750	33.360	1.600	0.754
DUP (MW-15)	08/31/15	18.800	0.665	3.140	13.200	35.805	1.560	0.770
DUP (MW-15)	12/18/15	17.600	0.500	2.820	9.140	30.060	0.950	*0.490*
DUP (MW-6R)	06/22/16	0.011	<0.001	<0.001	<0.003	0.011	0.003	<0.005
DUP (MW-6R)	10/24/16	0.008	<0.001	<0.001	<0.003	0.008	0.003	<0.005
DUP (MW-15R)	02/13/17	0.039	0.003	0.003	0.014	0.059	0.015	<0.005
DUP (MW-6R)	06/05/17	0.001	<0.001	<0.001	<0.003	0.001	0.002	<0.005
DUP (MW-6R)	10/05/17	0.003	<0.001	<0.001	<0.003	0.003	0.003	<0.005
DUP (MW-7)	02/19/18	<0.001	<0.001	<0.001	<0.003	BDL	0.006	<0.005
DUP (MW-3)	10/22/18	0.042	0.003	<0.001	0.016	0.061	0.001	<0.005
DUP (MW-5R)	01/11/19	4.570	0.125	2.620	1.850	9.165	0.223	0.535
DUP (MW-5R)	05/13/19	5.360	0.149	3.630	2.040	11.179	0.366	0.580

Notes:
mg/L - Milligrams per liter
BDL - Below detection limit
NS - Not sampled
SSCAL - Site-Specific Corrective Action Level (approved 4/11/2019)
GRP-POC - SSCALs at Points of Compliance (POC) based on Groundwater Resource Potection (GRP) values
GRP-Source - SSCALs at Source wells (within 15 feet of gasoline dispenser islands) based on Groundwater Resource Protection (GRP) values
*** - Samples from MW-4R and MW-6R were accidentally mislabeled and interchanged in field on 2/13/2017. Correct values shown on table.*
*Values in **bold** indicate concentration exceeds SSCAL*
NL - Not Located
Numbers in italics indicate result was reported above method detection limit and below the reporting limit

Sources:
PPM Consultants, Inc.
Oak Environmental Services, NewFields, G & RK Consulting Associates
PPM Project No. 451601-MCAP

APPENDIX D – DESIGN CALCULATIONS

PPM Consultants, Inc.

MASS REDUCTION ESTIMATE

Geologist: Walt Henley
Checked By: Matt Ebbert
Site Name: Martin's Texaco

1) Dissolved COC Reduction Required in Groundwater:

Data from the last year of groundwater monitoring events were averaged to represent COC concentrations in groundwater.

Sample ID	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-4R	1.562	0.062	0.960	0.826	0.181	0.481
MW-5R	4.697	0.145	3.093	2.057	0.240	0.453
RW-2R	26.600	1.267	5.550	19.760	0.807	0.415
RW-3R	13.600	0.207	5.420	10.815	0.437	1.380
RW-4R	4.583	0.108	1.887	1.394	0.301	0.342
RW-7	16.167	0.862	6.473	28.533	0.232	3.463
RW-9	29.700	0.859	12.533	38.567	0.321	5.113
Average	**13.84**	**0.5014**	**5.131**	**14.56**	**0.3599**	**1.664**
SSCAL (Source)	**1.161**	**232.1**	**162.5**	**175**	**4.643**	**4.643**
Reduction Goal	**12.68**	**0.4011**	**4.105**	**11.65**	**0.2879**	**1.331**

Note: where average COC cocentration is below SSCAL, an 80% reduction target is utilized for the reduction goal.

2) Adsorbed COC Reduction Required in Soil:

COC concentrations in soil are based on the average soil concentrations from borings within the area of proposed ozone treatment.

Sample ID	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	MTBE (mg/kg)	Naphthalene (mg/kg)
MW-4-4	0.272	0.035	0.073	0.080	0.005	3.30
MW4-9	0.323	0.102	0.337	0.510	0.025	0.330
MW-5-4-6	0.151	0.009	0.027	0.047	1.64	0.330
RW-1-9.5	0.089	0.057	0.013	0.075	0.045	0.065
RW-1A-11	0.020	0.005	0.005	0.006	0.016	0.005
RW-1B-10	0.125	0.029	0.007	0.079	0.077	0.011
RW-2-9.5	9.04	32.6	28.6	106	0.500	14.2
RW-3-9.4	13.5	72.1	31.7	231	1.00	28.6
RW-4-9.5	14.6	86.6	3.06	229	1.00	32.3
RW-5-9.5	11.0	30.0	25.5	120	1.00	10.7
RW-6-9.5	20.8	53.6	35.9	182	1.00	19.8
RW-7-9.5	3.16	11.7	2.97	41.0	0.250	4.77
RW-8-9	11.5	29.4	44.3	106	0.500	12.6
RW-9-9.5	1.67	29.3	3.68	122	0.250	7.71
RW-10-9	2.54	8.75	0.266	19.7	0.250	7.25
Average	**5.919**	**23.62**	**11.76**	**77.17**	**0.5039**	**9.465**
Lowest SSCAL	**21.6**	**1,160**	**533**	**668**	**50.5**	**550**
Reduction Goal	**4.735**	**18.90**	**9.410**	**61.73**	**0.4031**	**7.572**

Note: where average COC concentration is below SSCAL, an 80% reduction target is utilized for the reduction goal.

3) Groundwater Treatment Volume:

The areal extent of hydrocarbon-impacts will be estimated using the equation for an ellipsoid:

$$V = (4/3) \times \pi \times L \times W \times D \times P$$

Where:

L = Length (feet)
W = Width (feet)
D = Depth/Thickness (feet)
P = Porosity

Length (ft) =	130	
Width (ft) =	70	
Thickness (ft) =	8	
Porosity =	0.5441	From ARBCA Evaluation

Total Treatment Volume, GW =	165,920	ft^3
Total Treatment Volume, GW =	4,698,008	L

Notes:

1. COC impacts are estimated to be present within a water-bearing zone with an average thickness of 8 feet in the water bearing zone.

2. Areal extent of the groundwater treatment area is estimated based upon an elliptical area of the benzene plume exceeding the SSCALs in the sparge field.

PPM Consultants, Inc.

MASS REDUCTION ESTIMATE

Geologist: Walt Henley
Checked By: Matt Ebbert
Site Name: Martin's Texaco

4) Soil Treatment Volume:

The areal extent of hydrocarbon-impacts will be estimated using the equation for a rectangle:

V = L x W x D

Where:

L= Length (feet)
W= Width (feet)
D= Depth/Thickness (feet)

Length (ft) =	40	
Width (ft) =	40	
Thickness (ft) =	4	
Soil Density (lb/ft^3) =	116.8	From ARBCA Evaluation

Total Treatment Volume, Soil =	6,400	ft^3
Soil Weight =	747,520	lb
Soil Mass =	339,000	kg

Notes:
1. Areal extent of the soil treatment area is estimated based on area immediately around and between gasoline dispensers.

5) Dissolved COC Mass to be Removed

	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
Conc., mg/L	12.68	0.4011	4.105	11.65	0.2879	1.331
mass, mg	5.96E+07	1.88E+06	1.93E+07	5.47E+07	1.35E+06	6.25E+06
Weight, lb	131.4	4.155	42.52	120.7	2.982	13.79
Total lbs.	316					

6) Adsorbed Hydrocarbon Mass to be Removed

	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthalene
Conc., mg/kg	4.735	18.90	9.410	61.73	0.4031	7.572
mass, mg	1.61E+06	6.41E+06	3.19E+06	2.09E+07	1.37E+05	2.57E+06
Weight, lb	3.540	14.12	7.0	46.1	0.30	5.66
Total lbs.	76.8					

Total Mass of COCs to be Removed =	392	lbs

7) Ozone Required for Treatment

Number of COCs	6	
Gram Equivalent to Oxidize COC (13.6 g/g for BTEX, 3.0 g/g for MTBE, 3.0 g/g for nap.)	19.6	g/g
Total Mass of Ozone Required for COCs	1,282	lbs
Assume COCs Comprise 30% of Hydrocarbons Released	30%	
Total Mass of Ozone Required for all Hydrocarbons	4,272	lbs
Pounds of Ozone Per Day System Can Generate	13.2	lbs/day
No. of Days Required for all Hydrocarbons	324	days
Safety Factor for Naturally Occurring Oxidant Demand	20%	
No. Days Required for Hydrocarbons and Nat. Occurring Oxidant Demand	388	days
General Safety Factor	25%	
No. Days Required for Hydrocarbons, Nat. Oxidant Demand, and Safety Factor	485	
No. of Years Required for Hydrocarbons, Nat. Oxidant Demand, and Safety Factor	1.3	years
No. of Years Required assuming 75% Runtime	1.8	years

It is noted that the estimated cleanup time does not take into account the affects of natural attenuation.

APPENDIX E – EQUIPMENT SPECIFICATIONS AND QUOTATIONS

SUBCONTRACTOR COMPARISONS - OZONE EQUIPMENT
FORMER MARTIN'S TEXACO
ASHVILLE, ALABAMA

SCOPE ITEM	Ozone Solutions (13.2 pounds/day unit)				H2O (11 pounds/day unit)			
	Units		Rate	Total	Units		Rate	Total
Ozone Unit with Trailer	1	L.S.	106,072.00	$106,072.00	1	L.S.	$119,500.00	$119,500.00
Materials (points, risers, wellhead connections, tubing)	1	L.S.	5,000.00	$5,000.00	1	L.S.	$16,019.11	$16,019.11
Materials (extra tubing)	200	feet	2.91	$582.00	200	feet	$4.33	$866.00
Telemetry	1	L.S.	3,150.00	$3,150.00		included	--	--
Ozone Monitors	2	L.S.	1,500.00	$3,000.00	2	L.S.	$2,372.50	$4,745.00
Shipping/Delivery	1	L.S.	2,200.00	$2,200.00	1	L.S.	$4,500.00	$4,500.00
Totals				**$120,004.00**				**$145,630.11**
Start-up/Training				$2,800.00				$1,000.00
				$122,804.00				$146,630.11

Estimate/Quote

Ozone Solutions, Inc.

Ozone Solutions, Inc.
451 Black Forest Rd.
Hull IA 51239
United States
(712) 439-6880
Fax: (712) 439-6733

Date	7/15/2019
Estimate#	E25813
Expires	10/13/2019
Sales Rep	Jimmy W Moler
Terms	Net 30
Shipping Instructions	
Project	
Assoc. Trans(s)	

Bill To

Andrew
PPM Consultants
5555 Bankhead Hwy
Birmingham AL 35210
United States

Ship To

Andrew
PPM Consultants
5555 Bankhead Hwy
Birmingham AL 35210
United States

Item / Part #	Quantity	Description	Rate	Tax	Amount
Trailer 120 g/hr Ozone Generation System	1	Ozone Trailer - 120 g/hr Ozone Generator - Oxygen Concentrator - Refrigerant air dryer with air filtration - System Controller - Ozone leak sensor - Temperature switch - Oxygen pressure switch - Air Pressure switch - Oxygen purity monitor - Hour meter - PLC inputs and outputs for parameter monitoring - Manifold (2 wells per manifold, 10 manifold, 20 wells) - All equipment installed on a trailer system - Installation and Operation Manuals - Telemetry System - Monitoring System - On Site Startup and Commissioning. - Additional Extra Parts - Shipping Charges to the U.S.	91,133.00	Yes	91,133.00
Trailer 250g/hr Ozone Generation System	1	Ozone Trailer - 250 g/hr Ozone Generator - Oxygen Concentrator - Refrigerant air dryer with air filtration - System Controller - Ozone leak sensor - Temperature switch - Oxygen pressure switch - Air Pressure switch - Oxygen purity monitor - Hour meter - PLC inputs and outputs for parameter monitoring - Manifold (2 wells per manifold, 10 manifold, 20 wells) - All equipment installed on a trailer system - Installation and Operation Manuals - Telemetry System - Monitoring System - On Site Startup and Commissioning. - Additional Extra Parts - Shipping Charges to the U.S.	122,222...	Yes	122,222.00

8-16 weeks lead time.
Thank you,
Jimmy Moler

Total USD $213,355.00

To expedite the ordering process, please reference this Estimate/Quote# on any Purchase Orders.

Call 712-439-6880 with any questions.

To: Henley, Walt <walt.henley@ppmco.com>; Jimmy Moler <jimmy.moler@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Good Morning Walt,

Please see the information below:-

	100g/hr system	200g/hr system
Treatment Unit	$ 74,983.00	$ 106,072.00
Delivery/Shipping	$ 2,200.00	$ 2,200.00
Materials (points, riser pipe, wellhead connections, tubing)	$ 5,000.00	$ 5,000.00
Telemetry	$ 3,150.00	$ 3,150.00
Start-up Services	$ 2,800.00	$ 2,800.00
Monitors	$ 3,000.00	$ 3,000.00
Total system Cost	$ 91,133.00	$ 122,222.00

Thank you,

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The element of success.

SANNEL PATEL
Vice President of Engineering
Ozone Solutions | 451 Black Forest Rd. Hull, IA
Tel: 712.439.6880| Direct: 712.460.3736
LinkedIn: linkedin.com/in/Sannel

From: Henley, Walt <walt.henley@ppmco.com>
Sent: Friday, July 19, 2019 10:54 AM
To: Jimmy Moler <jimmy.moler@ozonesolutions.com>
Cc: Sannel Patel <sannel@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

If you can, please break out the ozone monitoring sensors also.

Thanks!
Walt

From: Henley, Walt
Sent: Friday, July 19, 2019 9:52 AM
To: Jimmy Moler <jimmy.moler@ozonesolutions.com>
Cc: Sannel Patel <sannel@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Jimmy and Sannel,

I need a cost breakdown of each of the quoted systems along the following lines, please:

- Treatment Unit

Henley, Walt

From: Sannel Patel <sannel@ozonesolutions.com>
Sent: Monday, August 12, 2019 11:50 AM
To: Henley, Walt
Cc: Jimmy Moler
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Walt,

The cost per foot is $2.91, therefore an additional cost of $582.

Please let me know if you have any questions,

Thank you,

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SANNEL PATEL
Vice President of Engineering
Ozone Solutions | 451 Black Forest Rd. Hull, IA
Tel: 712.439.6880| Direct: 712.460.3736
LinkedIn: linkedin.com/in/Sannel

From: Henley, Walt <walt.henley@ppmco.com>
Sent: Monday, August 12, 2019 12:04 PM
To: Sannel Patel <sannel@ozonesolutions.com>
Cc: Jimmy Moler <jimmy.moler@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Because the new location for the trailer is a bit farther away from the area being treated, we will need approximately 200 feet more of the ozone tubing to reach the sparge points. The tubing in your original quote was lumped in with other materials (pipe, points, wellhead connections). Can you revise your quote to include the additional tubing and smaller trailer?

Thanks!
Walt

From: Sannel Patel <sannel@ozonesolutions.com>
Sent: Monday, August 12, 2019 10:53 AM
To: Henley, Walt <walt.henley@ppmco.com>
Cc: Jimmy Moler <jimmy.moler@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Good Morning Walt,

We will be able to get the unit down to 18ft; we will get a new trailer of 18ft instead of 20ft.

From: Sannel Patel
To: Henley, Walt
Cc: Jimmy Moler
Subject: RE: Request for proposal - Ozone system at Martin"s Texaco, Ashville, Alabama
Date: Wednesday, July 24, 2019 2:42:47 PM
Attachments: image002.png
image015.png
image016.png
image017.png
image018.png
image019.png
image020.png
PPM Well Riser.pdf

Good Afternoon Walt,

Please see attached drawings and answers to questions below.

Please let me know if you have any additions questions,

Thank you,

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SANNEL PATEL
Vice President of Engineering
Ozone Solutions | 451 Black Forest Rd. Hull, IA
Tel: 712.439.6880| Direct: 712.460.3736
LinkedIn: linkedin.com/in/Sannel

From: Henley, Walt <walt.henley@ppmco.com>
Sent: Wednesday, July 24, 2019 11:22 AM
To: Sannel Patel <sannel@ozonesolutions.com>
Cc: Jimmy Moler <jimmy.moler@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Good morning, Sannel. I have several questions to complete our evaluation. Correct me if I assume something or misstate the questions, and please provide separate answers for each unit, if necessary.

- What is the maximum pressure of the ozone? 40 PSI
- Assuming a single point is on at any one time, what is the flow through a point? 40LPM of Ozone Flow, plus 7CFM of Compressed Sparge air.
- Are the sparge points the same type as quoted for the Tuscaloosa job (provide specs again if you don't mind)? Sparge air will be combined with the main air stream. And can be flown to the main injection point. It will be the same
- Can you give me some details on the heater, fan, and lighting in the trailer? LED lights. BARD 5-Ton unit with 5KW heat 230V 1PH
- What are the power supply requirements for each unit you quoted (single or three-phase, voltage)? 208-240V 3 phase
- What is the total amperage draw for each unit? 100g/hr. 100 Amps and 200g/hr. 120Amps (Maximum)
- Can you give me some specs on the telemetry (Wireless? Remote controls? What will it monitor? Can it

be programmed to allow input from separate SVE unit?) Telemetry will allow customer and ozone solutions to log in to the system, we will be able to monitor and program to customer specification. A lot of changing to the system will add additional cost.

- What are the risers constructed of? PVC schedule 80, Kynar and Stainless diffusor.
- Can you give me drawing of your typical wellhead connections? Please attached file.
- What are the tubing specs (e.g., material, diameter)? FEP tubing and 3/8" inner -1/2" outer dimension
- Can you give me specs on the external ozone monitors? They are intended to be mounted in a subsurface location (well/monitoring point). Any concerns about moisture or petroleum vapors? F-12 monitor- https://www.ozonesolutions.com/products/Ozone-Monitors/Ambient-Ozone/F12_Rugged_Ozone_Monitor_and_Controller - Moisture will be a problem, but we can get heated sensor if required.
- The quotes are presented together. Just want to make sure that the numbers are not contingent on purchase of both units, are they? We will likely go with a larger unit but we need the costs of both to make that evaluation. – Jimmy answered this questions.

Thank you for your help!
Walt

From: Sannel Patel <sannel@ozonesolutions.com>
Sent: Monday, July 22, 2019 5:23 PM
To: Henley, Walt <walt.henley@ppmco.com>
Cc: Jimmy Moler <jimmy.moler@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Good Evening Walt,

This is the trailer that we will be using for all three units. (first unit quoted earlier and the two new units)

TRAILER 8X20
H10120TT-100 H & H Topline Round Top Cargo Trailer
Tandem 5200# Torsion Axles, White Mod Wheels, Radial Tires
12" Additional Height - 94" Interior Height
12" Tongue Extension (Longest Available)
7K Drop Leg Jack
36" C/S Door w/Flushlock Latch and Bar Lock (min. 72" Tall)
12" O.C. Crossmembers, 16" O.C. Side Posts
3/4" Engineered Wood Floor, 3/4" Engineered Wood Sidewalls
White Vinyl Interior w/Insulation
.040 Screwless Aluminum Panels - White
Cargo Rear Doors

Please let me know if you have any additional questions,

Thank you,

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SANNEL PATEL
Vice President of Engineering
Ozone Solutions | 451 Black Forest Rd. Hull, IA
Tel: 712.439.6880| Direct: 712.460.3736
LinkedIn: linkedin.com/in/Sannel

From: Henley, Walt <walt.henley@ppmco.com>
Sent: Monday, July 22, 2019 5:16 PM
To: Sannel Patel <sannel@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

I don't see the overall dimensions. The compartment is 20' long and how wide? How long is the tongue of the trailer? If it's all to scale, I can measure it on the drawings.

From: Sannel Patel <sannel@ozonesolutions.com>
Sent: Monday, July 22, 2019 4:06 PM
To: Henley, Walt <walt.henley@ppmco.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Walt,

I have attached a drawing. **Please note that the trailer quoted is 20ft long not 18ft as drawn.** This will allow for more space between parts.

Thank you,

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SANNEL PATEL
Vice President of Engineering
Ozone Solutions | 451 Black Forest Rd. Hull, IA
Tel: 712.439.6880| Direct: 712.460.3736
LinkedIn: linkedin.com/in/Sannel

From: Henley, Walt <walt.henley@ppmco.com>
Sent: Monday, July 22, 2019 4:38 PM
To: Sannel Patel <sannel@ozonesolutions.com>
Subject: RE: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Sannel,

What are the actual dimensions of the trailer? And where is the power cabinet on the trailer? Maybe you could send me a drawing. I want to make sure I'm good on the layout plan.

Thanks!
Walt

From: Sannel Patel <sannel@ozonesolutions.com>
Sent: Monday, July 22, 2019 10:10 AM

- Delivery/Shipping
- Materials (points, riser pipe, wellhead connections, tubing)
- Telemetry
- Start-up Services

Thank you!
Walt

From: Jimmy Moler <jimmy.moler@ozonesolutions.com>
Sent: Monday, July 15, 2019 2:52 PM
To: Henley, Walt <walt.henley@ppmco.com>
Cc: Sannel Patel <sannel@ozonesolutions.com>
Subject: Re: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Walt,

I hope all is going great. I have attached all quote that our Sannel and his engineering team has put together. Please let me know if you have any questions. This is quoted just like that the last one was quoted.

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JIMMY MOLER

Vice President of Sales

Ozone Solutions 451 Black Forest Rd. Hull, IA

Direct: 479.530.3117

LinkedIn:linkedin.com/in/jimmy-moler

From: Henley, Walt <walt.henley@ppmco.com>
Sent: Wednesday, July 10, 2019 3:13 PM
To: Jimmy Moler
Subject: Request for proposal - Ozone system at Martin's Texaco, Ashville, Alabama

Jimmy,

Please find attached the RFP we discussed earlier today. As I mentioned, we'll need one quote for a 5.0-5.5

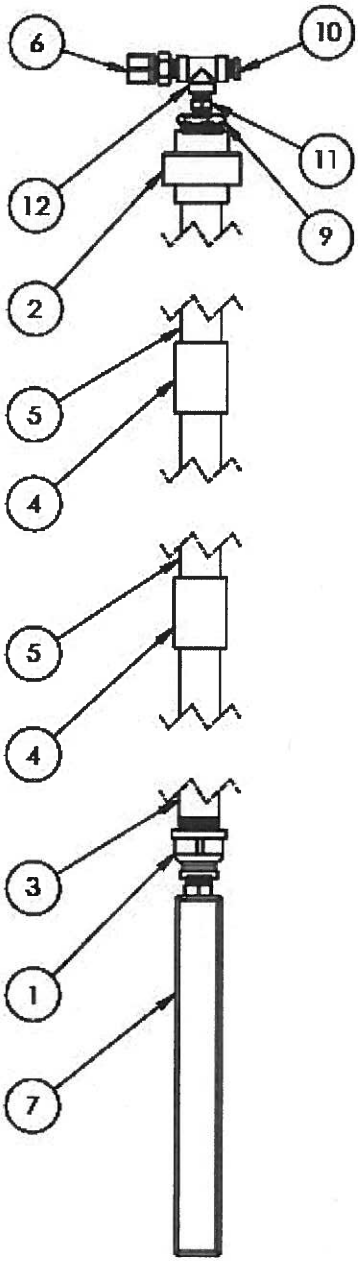
lb/day system and another one for a 10-11 lb/day system. Let me know if you have any questions.

Thank you!

Walt

PPM CONSULTANTS

Walter B. Henley, Jr., P.G.
Senior Geologist
(205) 836-5650
(205) 913-1452
Simplifying the Complex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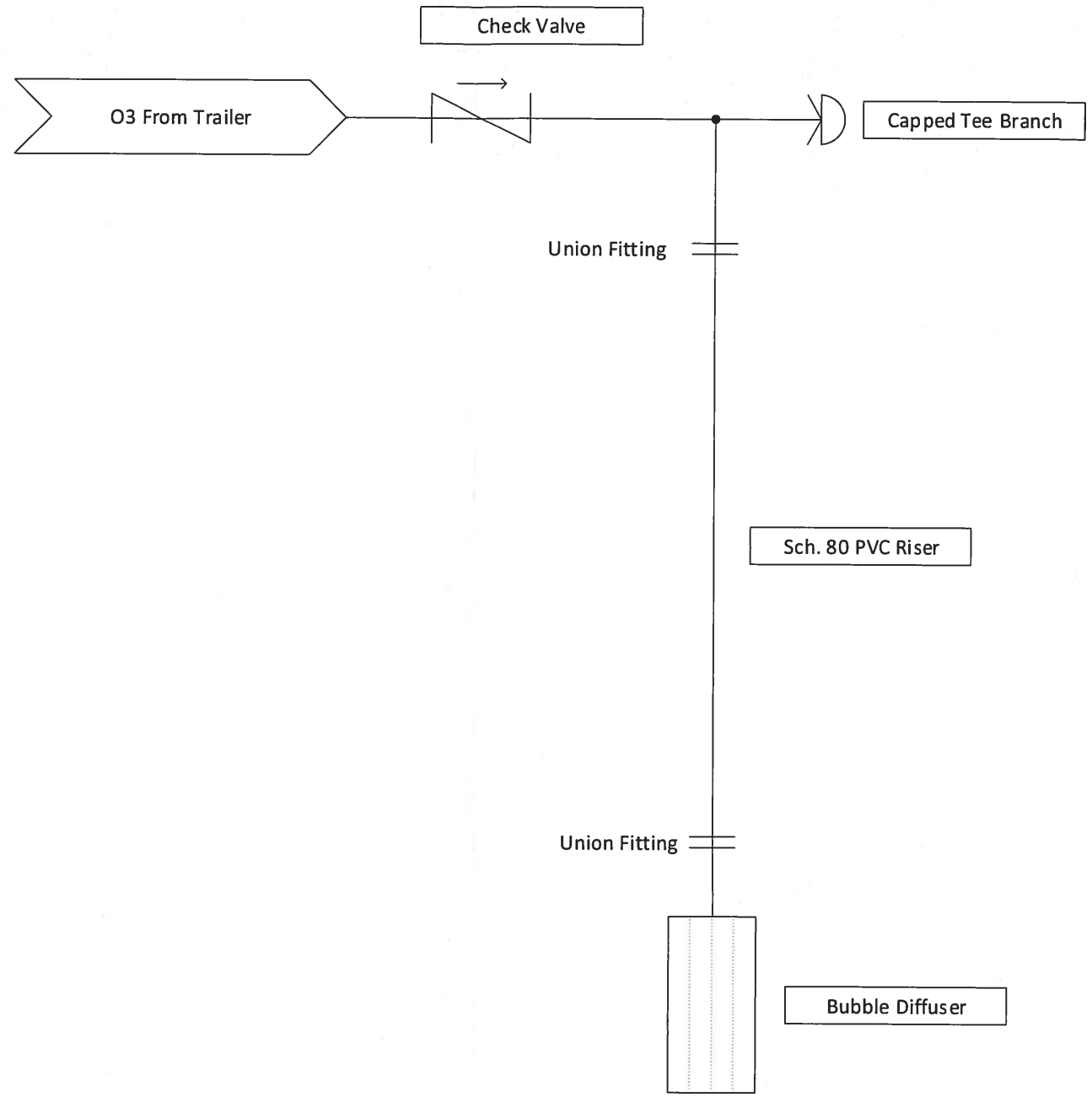

DWG NAME	Well Riser
TITLE	PPM Well Riser
PROJECT NUMBER	Employee Files
DWG TYPE	P&ID
DRAWN BY	Tyler Broich
EDITED BY	
REVISED	7/24/2019
PAGE	1 OF 1

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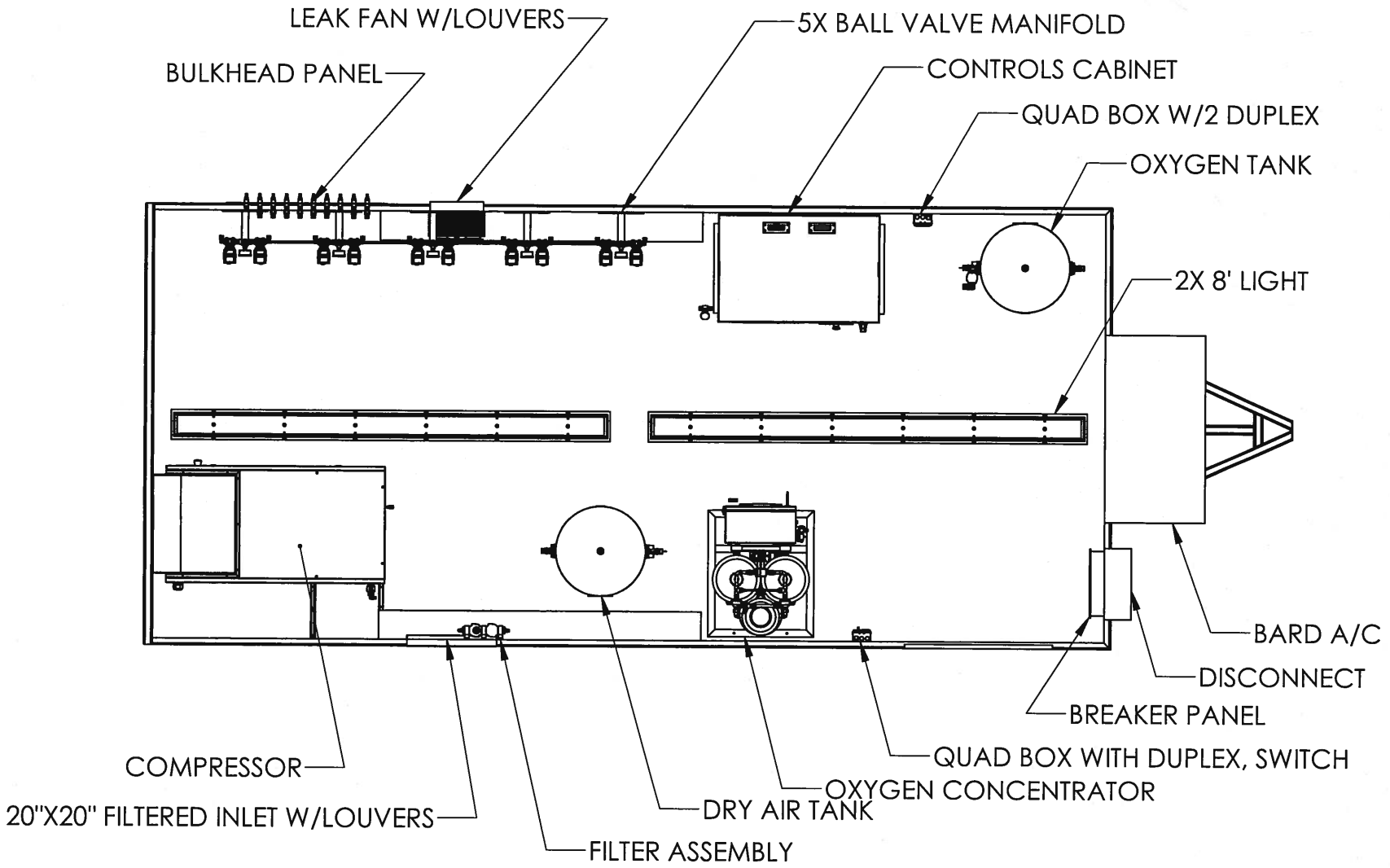

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/4 ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ±0.125 THREE PLACE DECIMAL ±0.0625	INTERPRET GEOMETRIC TOLERANCING PER: ASME Y-14.5-09 MATERIAL DO NOT SCALE DRAWING	COMMENTS:	DWG. NO. Components Overview	SIZE A	TITLE 2018-45965-A
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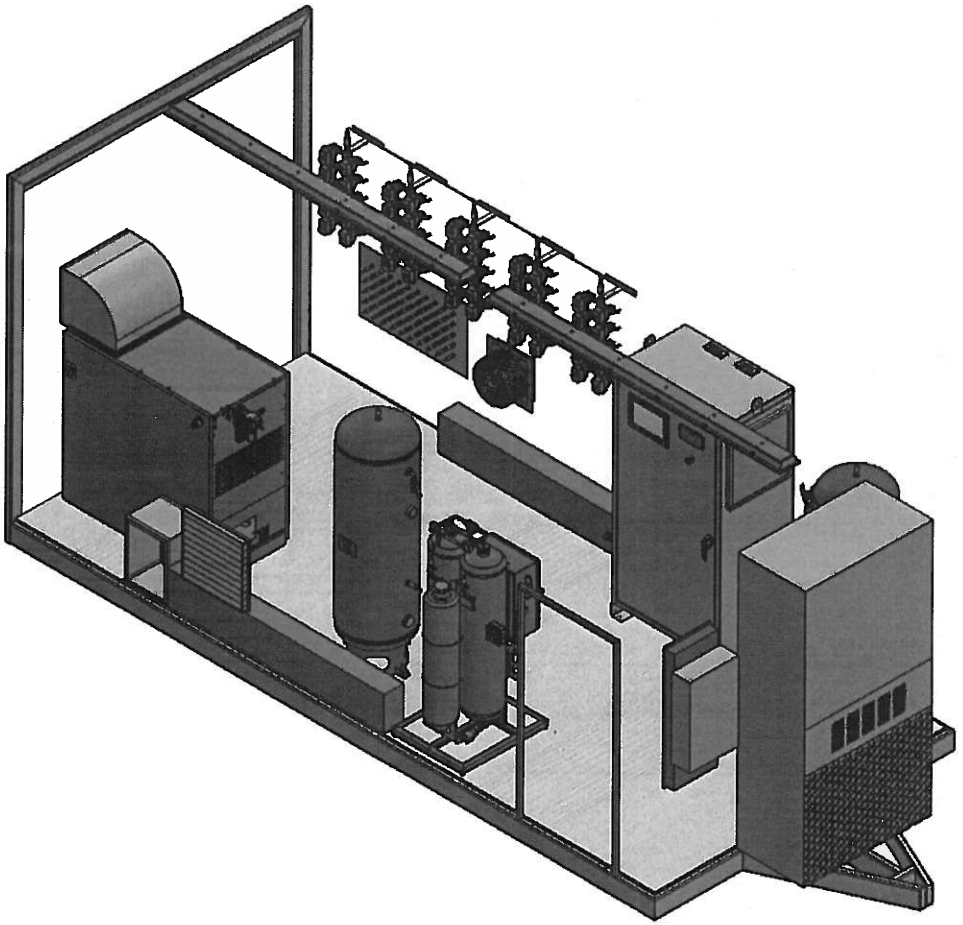

OZONE SOLUTIONS

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/4
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±0.125
THREE PLACE DECIMAL ±0.0625

INTERPRET GEOMETRIC TOLERANCING PER: ASME Y-14.5-09

MATERIAL

DO NOT SCALE DRAWING

COMMENTS:

	NAME	DATE
DRAWN	PM	10/24/2018
CHECKED		
OPERATIONS		
CONTROLS		
MFG APPR.		
Q.A. APPR.		

DWG. NO.

Assembly Manual

SIZE **A**

TITLE 2018-45965-A

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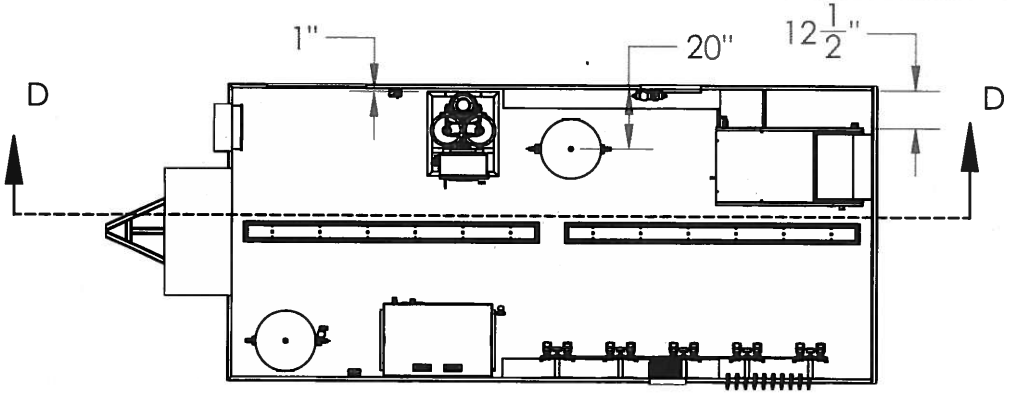

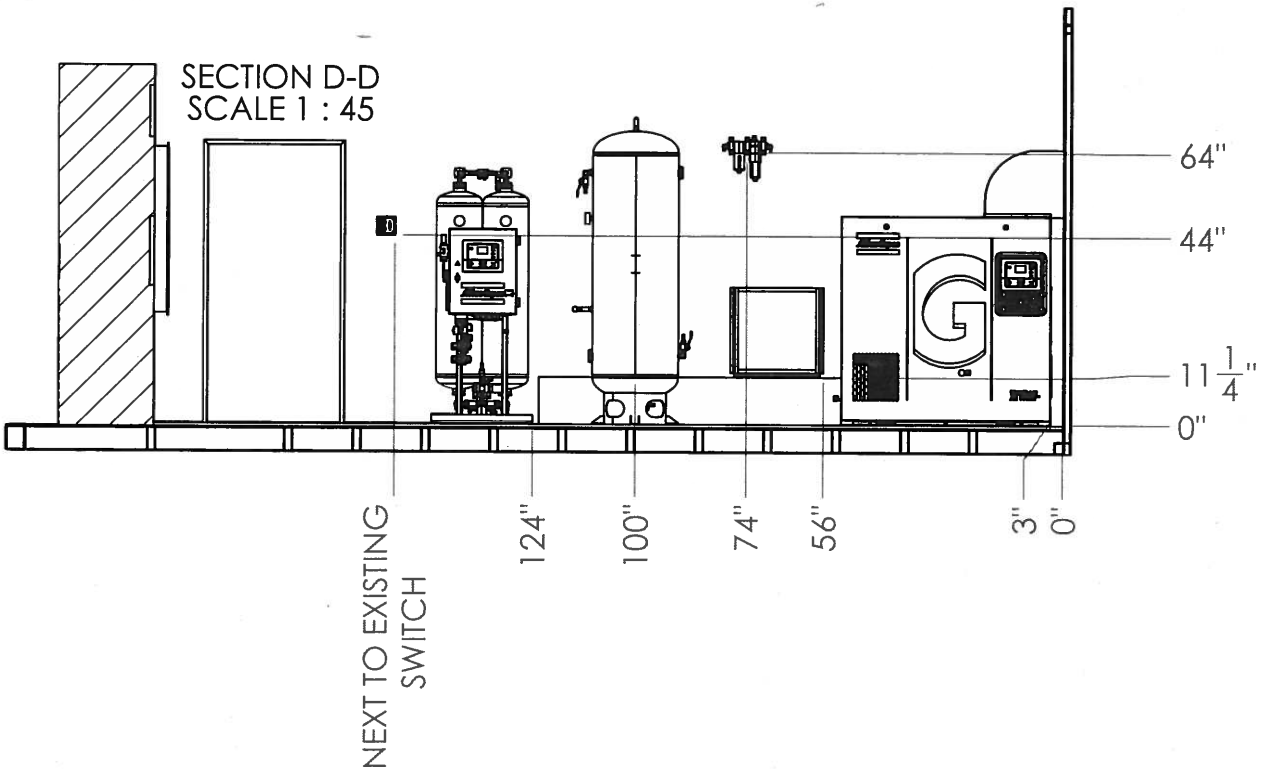

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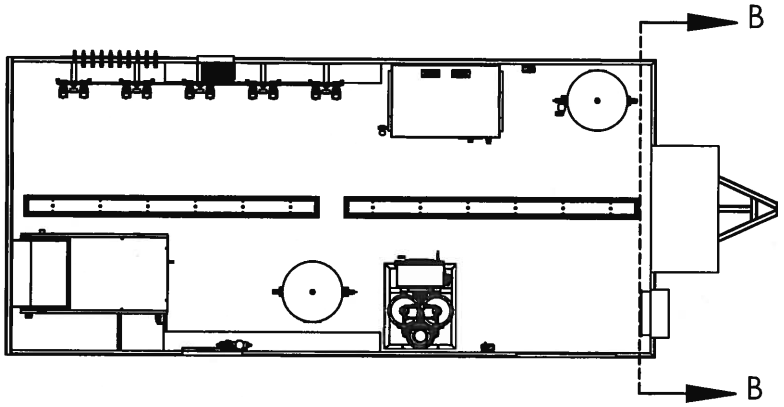
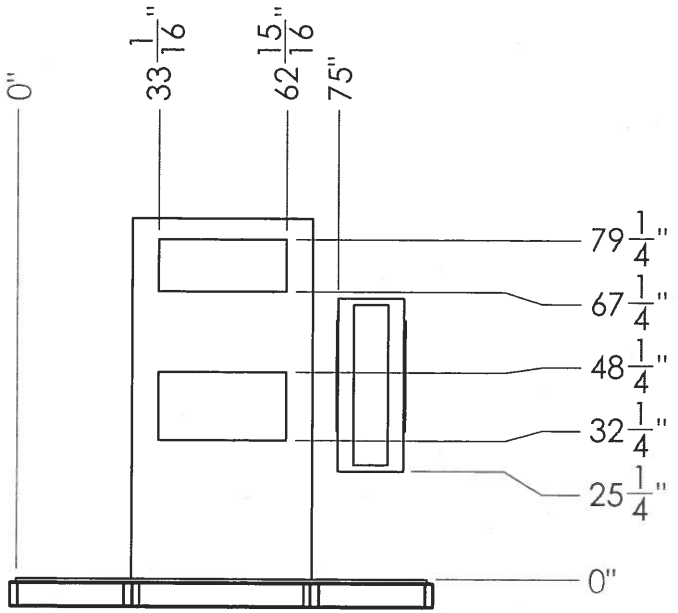


SECTION B-B
SCALE 1 : 45



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/4 ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ±0.125 THREE PLACE DECIMAL ±0.0625	INTERPRET GEOMETRIC TOLERANCING PER: ASME Y-14.5-09 MATERIAL DO NOT SCALE DRAWING	COMMENTS:	DWG. NO. Front	SIZE A	TITLE 2018-45965-A
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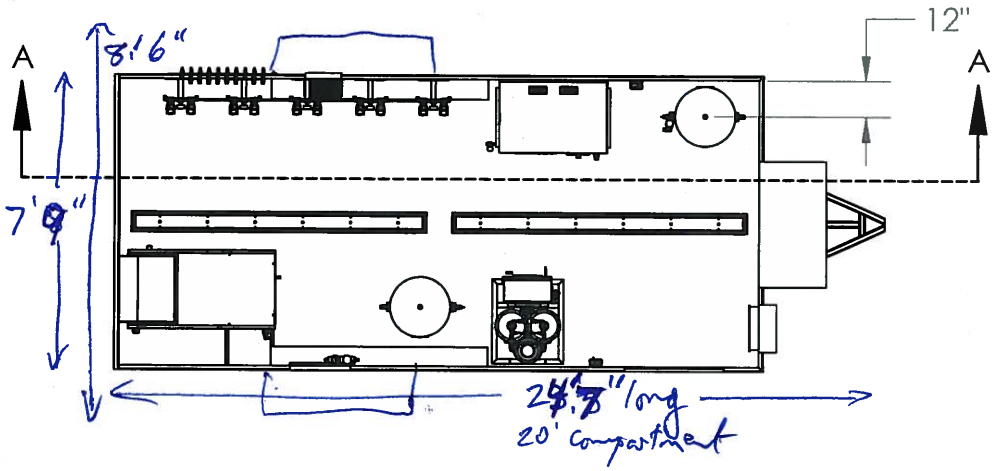
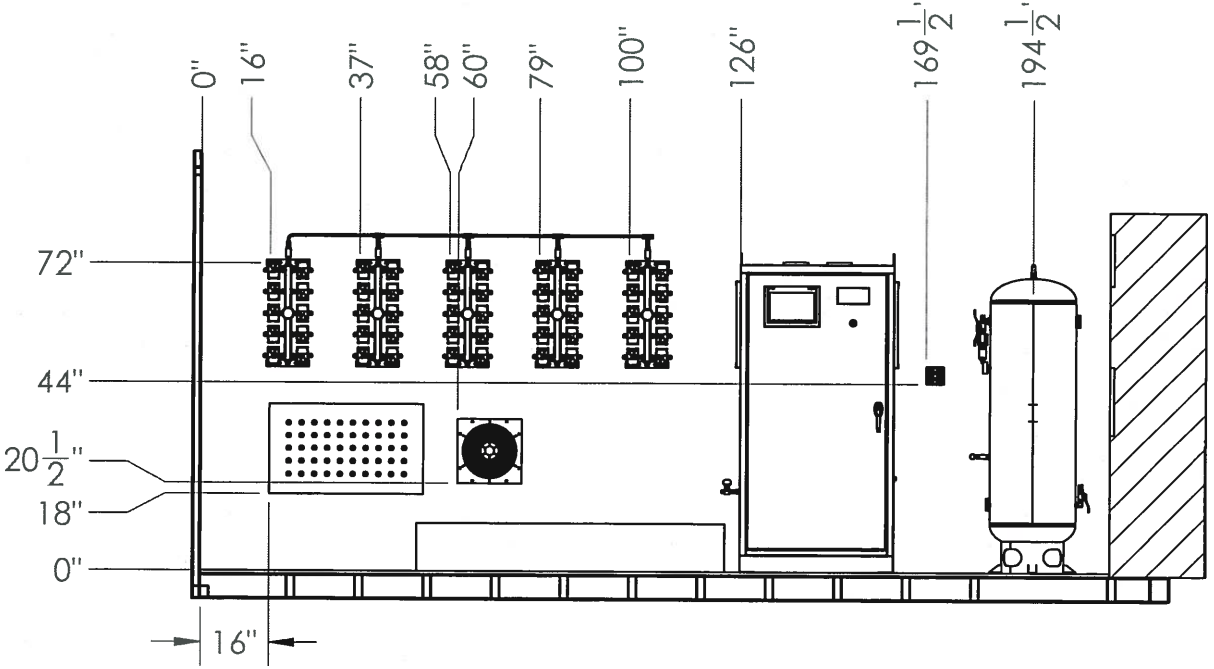
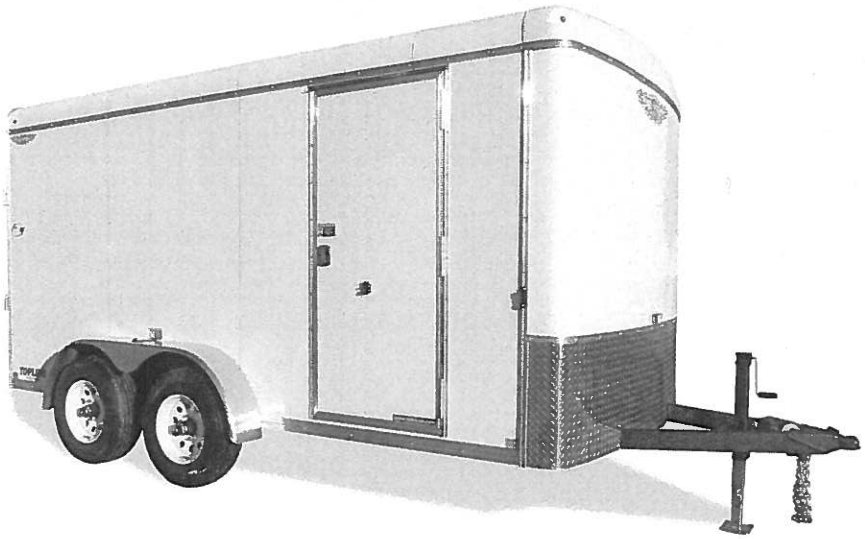




SECTION A-A
SCALE 1 : 45

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/4 ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ±0.125 THREE PLACE DECIMAL ±0.0625	INTERPRET GEOMETRIC TOLERANCING PER: ASME Y-14.5-09 MATERIAL DO NOT SCALE DRAWING	COMMENTS:	DWG. NO. Road Side	SIZE A	TITLE 2018-45965-A
				SCALE: 1:64	REV 3	SHEET 6 OF 26

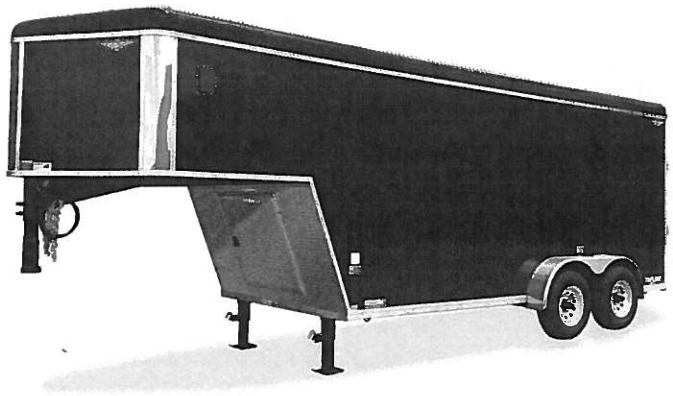
TOPLINE SERIES ROUND-TOP CARGO



FEATURES

- Full Tubular Steel Frame & Tongue
- 16" On Center Full Tubular Wall Uprights
- 16" On-Center Full Tubular Galvanized Steel Roof Bows
- 16" On-Center Full Tubular Steel Crossmembers
- Vapor Barrier
- Fully Undercoated Body
- Weather Coated Tongue & Rear Bulkhead
- Round Roof Design with .030 Aluminum
- Custom Fiberglass Nose Cap
- .040 Aluminum Exterior Sheeting
- 24" Aluminum Tread Plate Rock Guard
- 7K Set-Back Jack
- Full DOT Compliant, LED Lighting
- Torsion Brake Axles & EZ Lube Hubs
- Radial Tires on White Steel Wheels
- Side Door with RV Style, Flush-Lock Latch
- Aluminum Door Hold Back
- Spring Assisted Rear Ramp Door with Transition Flap & Spring Cover
- Engineered Wood Floor
- 3/8" Wood Interior Walls
- Aluminum H-Channel Wall Transitions
- (2) Interior 12v LED Dome Light(s) & Switch, Wall Mounted
- Posi-Vent System

Screwless exterior



Gooseneck Coupler Hitch Available - includes dual 12K drop leg jacks and fully enclosed, lockable storage under the neck. Ask your dealer for details.

TOPLINE SERIES ROUND-TOP CARGO

Tandem Axle

Model Size	7' x 12'	7' x 14'	7' x 16'	7' x 18'	7' x 20'
7K Models GAWR (lb/axle)	3500	3500	3500	3500	3500
Gross Capacity (GWVR)	7000	7000	7000	7000	7000
Curb Weight (lb)	2300	2415	2530	2810	3100
Payload Capacity (lb)	4700	4585	4470	4190	3900
10K Models GAWR (lb/axle)	5200	5200	5200	5200	5200
Gross Capacity (GWVR)	9900	9900	9900	9900	9900
Curb Weight (lb)	2585	2700	2800	3110	3400
Payload Capacity (lb)	7315	7200	7100	6790	6500
Frame Construction	4" Tube Steel	4" Tube Steel	4" Tube Steel	6" Tube Steel	6" Tube Steel
Crossmember Spacing	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC
Wall Uprights Spacing	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC
Roof Bow Spacing	Galvanized Tube Steel 16" OC	Galvanized Tube Steel 16" OC	Galvanized Tube Steel 16" OC	Galvanized Tube Steel 16" OC	Galvanized Tube Steel 16" OC
Exterior Sheeting	.040 Aluminum	.040 Aluminum	.040 Aluminum	.040 Aluminum	.040 Aluminum
Tongue Construction	4" Tube Steel A-frame	4" Tube Steel A-frame	4" Tube Steel A-frame	6" Tube Steel A-frame	6" Tube Steel A-frame
Tongue Length	41"	41"	41"	41"	41"
Coupler	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame
Coupler Height	17"	17"	17"	18"	18"
Safety Chains & Hooks	Yes	Yes	Yes	Yes	Yes
Jack	7K Rated, Set-back	7K Rated, Set-back	7K Rated, Set-back	7K Rated, Set-back	7K Rated, Set-back
Axle Type	Torsion Brake	Torsion Brake	Torsion Brake	Torsion Brake	Torsion Brake
Brakes	Yes	Yes	Yes	Yes	Yes
Breakaway Kit & Battery	Yes	Yes	Yes	Yes	Yes
Tire Size: 7K 10K	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75
Tire Load Range: 7K, 10K	C, D	C, D	C, D	C, D	C, D
Tire Ply	Radial	Radial	Radial	Radial	Radial
Rim Size	15"	15"	15"	15"	15"
Bolt Pattern: 7K 10K	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5
Trailer Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug
Exterior Lighting	LED	LED	LED	LED	LED
Interior Lighting	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light
Side Escape Door	Yes	Yes	Yes	Yes	Yes
Side Door Height	68"	68"	68"	68"	68"
Side Door Width	36"	36"	36"	36"	36"
Rear Door Type	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp
Rear Opening Height	74 1/2"	74 1/2"	74 1/2"	74 1/2"	74 1/2"
Rear Opening Width	78"	78"	78"	78"	78"
Ramp Load Capacity (lb)	4000	4000	4000	4000	4000
Overall Length	16'-7"	18'-7"	20'-7"	22'-7"	24'-7"
Overall Width	102"	102"	102"	102"	102"
Overall Height	102"-103"	102"-103"	102"-103"	102"-103"	102"-103"
Interior Length	12'-9"	14'-9"	16'-9"	18'-9"	20'-9"
Interior Width	81"	81"	81"	81'	81"
Between Wheel Wells	-	-	-	-	-
Interior Height	82"	82"	82"	82"	82"
Deck Height	18"-19"	18"-19"	18"-19"	20"-21"	20"-21"
Deck Box Length	11'-10"	13'-10"	15'-10"	17'-10"	19'-10"

TOPLINE SERIES ROUND-TOP CARGO

Tandem Axle Cont.

Model Size	8' x 16'	8' x 18'	8' x 20'	101" x 16'	101" x 18'	101" x 20'
7K Models GAWR (lb/axle)	3500	3500	3500	3500	3500	3500
Gross Capacity (GWVR)	7000	7000	7000	7000	7000	7000
Curb Weight (lb)	2770	3050	3270	2850	3130	3350
Payload Capacity (lb)	4230	3950	3730	4150	3870	3650
10K Models GAWR (lb/axle)	5200	5200	5200	5200	5200	5200
Gross Capacity (GWVR)	9900	9900	9900	9900	9900	9900
Curb Weight (lb)	2950	3250	3470	3050	3300	3550
Payload Capacity (lb)	6950	6650	6430	6850	6600	6350
Frame Construction	4" Tube Steel	6" Tube Steel	6" Tube Steel	4" Tube Steel	6" Tube Steel	6" Tube Steel
Crossmember Spacing	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC
Wall Uprights Spacing	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC
Roof Bow Spacing	Galvanized Tube Steel, 16" OC	Galvanized Tube Steel, 16" OC	Galvanized Tube Steel, 16" OC	Galvanized Tube Steel, 16" OC	Galvanized Tube Steel, 16" OC	Galvanized Tube Steel, 16" OC
Exterior Sheeting	.040 Aluminum	.040 Aluminum	.040 Aluminum	.040 Aluminum	.040 Aluminum	.040 Aluminum
Tongue Construction	4" Tube Steel A-frame	6" Tube Steel A-frame	6" Tube Steel A-frame	4" Tube Steel A-frame	6" Tube Steel A-frame	6" Tube Steel A-frame
Tongue Length	41"	41"	41"	41"	41"	41"
Coupler	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame
Coupler Height	21"	23"	23"	23"	23"	23"
Safety Chains & Hooks	Yes	Yes	Yes	Yes	Yes	Yes
Jack	7K Rated Set-back	7K Rated Set-back	7K Rated Set-back	7K Rated Set-back	7K Rated Set-back	7K Rated Set-back
Axle Type	Torsion Brake	Torsion Brake	Torsion Brake	Torsion Brake	Torsion Brake	Torsion Brake
Brakes	Yes	Yes	Yes	Yes	Yes	Yes
Breakaway Kit & Battery	Yes	Yes	Yes	Yes	Yes	Yes
Tire Size: 7K 10K	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75
Tire Load Range: 7K, 10K	C, D	C, D	C, D	C, D	C, D	C, D
Tire Ply	Radial	Radial	Radial	Radial	Radial	Radial
Rim Size	15"	15"	15"	15"	15"	15"
Bolt Pattern: 7K 10K	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5
Trailer Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug
Exterior Lighting	LED	LED	LED	LED	LED	LED
Interior Lighting	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light
Side Escape Door	Yes	Yes	Yes	Yes	Yes	Yes
Side Door Height	68"	68"	68"	68"	68"	68"
Side Door Width	36"	36"	36"	36"	36"	36"
Rear Door Type	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp
Rear Opening Height	74 1/2"	74 1/2"	74 1/2"	74 1/2"	74 1/2"	74 1/2"
Rear Opening Width	90"	90"	90"	95"	95"	95"
Ramp Load Capacity (lb)	4000	4000	4000	4000	4000	4000
Overall Length	20'-7"	22'-7"	24'-7"	20'-7"	22'-7"	24'-7"
Overall Width	102"	102"	102"	102"	102"	102"
Overall Height	104"-105"	104"-105"	104"-105"	104"-105"	104"-105"	104"-105"
Interior Length	16'-9"	18'-9"	20'-9"	16'-9"	18'-9"	20'-9"
Interior Width	93"	93"	93"	98 1/2"	98 1/2"	98 1/2"
Between Wheel Wells	82"	82"	82"	82"	82"	82"
Interior Height	82"	82"	82"	82"	82"	82"
Deck Height	22"-23"	22"-23"	22"-23"	22"-23"	22"-23"	22"-23"
Deck Box Length	15'-10"	17'-10"	19'-10"	15'-10"	17'-10"	19'-10"

Novae

TOPLINE SERIES ROUND-TOP CARGO

Gooseneck

Model Size	101" x 16' GN	101" x 18' GN	101" x 20' GN
10K Models GAWR (lb/axle)	5200	5200	5200
Gross Capacity (GWVR)	9900	9900	9900
Curb Weight (lb)	4700	4900	5100
Payload Capacity (lb)	5200	5000	4800
14K Models GAWR (lb/axle)	7000	7000	7000
Gross Capacity (GWVR)	14000	14000	14000
Curb Weight (lb)	4850	5050	5250
Payload Capacity (lb)	9150	8950	8750
16K Models GAWR (lb/axle)	8000	8000	8000
Gross Capacity (GWVR)	16000	16000	16000
Curb Weight (lb)	5150	5300	5500
Payload Capacity (lb)	10850	10700	10500
Frame Construction: 10K 14K & 16K	4" Tube Steel 6" Tube Steel	6" Tube Steel 6" Tube Steel	6" Tube Steel 6" Tube Steel
Crossmember Spacing	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC
Wall Uprights Spacing	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC	Full Tubular Steel 16" OC
Roof Bow Spacing	Galvanized Tube Steel 16" OC	Galvanized Tube Steel 16" OC	Galvanized Tube Steel 16" OC
Exterior Sheeting	.040 Aluminum	.040 Aluminum	.040 Aluminum
Tongue Construction	6" tube	6" tube	6" tube
Tongue Length	7'-3"	7'-3"	7'-3"
Coupler	2-5/16" Adj. Height	2-5/16" Adj. Height	2-5/16" Adj. Height
Coupler Height	35"-43"	35"-43"	35"-43"
Safety Chains & Hooks	Yes	Yes	Yes
Jack	(2) 12K Rated Drop Leg	(2) 12K Rated Drop Leg	(2) 12K Rated Drop Leg
Axle Type	Torsion Brake	Torsion Brake	Torsion Brake
Brakes	Yes	Yes	Yes
Breakaway Kit & Battery	Yes	Yes	Yes
Tire Size: 10K 14K 16K	ST225/75 ST235/80 ST215/75	ST225/75 ST235/80 ST215/75	ST225/75 ST235/80 ST215/75
Tire Load Range: 10K, 14K, 16K	D, E, HC	D, E, HC	D, E, HC
Tire Ply	Radial	Radial	Radial
Rim Size: 10K, 14K, 16K	15", 16", 17.5"	15", 16", 17.5"	15", 16", 17.5"
Bolt Pattern: 10K 14K 16k	6 on 5.5 8 on 6.5 8 on 275MM	6 on 5.5 8 on 6.5 8 on 275MM	6 on 5.5 8 on 6.5 8 on 275MM
Trailer Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug
Exterior Lighting	LED	LED	LED
Interior Lighting	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light
Side Escape Door	Yes	Yes	Yes
Side Door Height	68"	68"	68"
Side Door Width	36"	36"	36"
Rear Door Type	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp
Rear Opening Height	74 1/2"	74 1/2"	74 1/2"
Rear Opening Width	95"	95"	95"
Ramp Load Capacity (lb)	4000	4000	4000
Overall Length	24'-4"	26'-4"	28'-4"
Overall Width	102"	102"	102"
Overall Height	108"-110"	108"-110"	108"-110"
Interior Box Length	15'-6"	17'-6"	19-6"
Interior Width	98 1/2"	98 1/2"	98 1/2"
Between Wheel Wells	82"	82"	82"
Interior Height	83"	83"	83"
Deck Height	24"-26"	24"-26"	24"-26"
Deck Box Length	15'-6"	17'-6"	19'-6"

Novae

Proposal for

PPM-Birmingham
Martin's Texaco, Ashville, AL
Former Rental #24 MOSU20-208
7/19/2019

PPM CONSULTANTS

ENVIRONMENTAL SCIENCE AND ENGINEERING

Prepared for PPM Consultants
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Prepared by
Kevin Gomes | kgomes@h2oengineering.com | 805-547-0303

1 Executive Summary

H2O Engineering is pleased to provide PPM Consultants with the following proposal for Martin's Texaco, in Ashville, AL

This proposal is in response to a Request for Proposal provided by Walt Henley, Jr., P.G. for the Martin's Texaco site in Ashville, AL. Provided in the proposal are the Scope of supply, Engineering submittals, commissioning scope of work and commercial offer for a new MOSU20-208 ozone sparge trailer. Walt has agreed to allow H2O Engineering to provide costing for former rental #24 from the H2O rental fleet. This will come at a discounted price which is shown in the Commercial offer table.

A detailed scope of supply for the equipment and services proposed are provided in the following sections.

If you have any questions regarding our proposal, please do not hesitate to contact me.

Sincerely,

Kevin Gomes
Account Manager

M: 805.704.1337
D: 805.548.2304
kgomes@h2oengineering.com

189 Granada Drive
San Luis Obispo, CA 93401
www.h2oengineering.com

Table of Contents

2 H2O Engineering Scope of Supply

2.1 Base System Specifications

All ozone wetted parts to be of ozone compatible materials (i.e., stainless steel, glass, PVDF, PTFE, and Viton)

2.1.1 Design basis

- Ozone will be produced by four Plasma Technics model # 79120 generators. The ozone generators are rated to produce 208 g/h (11 lb/day). Ozone outlet flow is 120 SCFH at 10 PSI. Ozone pressure will be boosted through a double-head diaphragm pump to a maximum 50 psi.
- Oxygen will be created by a PSA (pressure swing adsorption) oxygen concentrator, Air Sep model # AS- E-135, providing 90-95% pure oxygen at 135 SCFH at 10 psi
- Air will be supplied from a rotary screw compressor, Kaeser model # SK-15T, providing 64 SCFM at 125 PSI
- Generated ozone will be routed through a 20-point manifold.
    - Manifold will connect to up to 20 sparge points ½-inch OD PFA tubes
    - Sparge flow rate for each sparge point is up to 10 SCFM
- 208 VAC, 3-phase, 4-wire electrical service required, 150A.
- Delivery flow and pressure displayed and logged via PLC, viewable from HMI
- Maximum ozone sparge pressure of 50 PSI
- Maximum air / breakthrough sparge pressure of 90 PSI
- Automatic regression from ozone to air / breakthrough mode upon high pressure detection
- User selectable delivery gas for each sequence step (ozone or oxygen, either with or without air flow boost, or air flow boost only)
- Independent time duration control for each sequence step (programmable from 1 to 120 minutes)
- User configurable valve sparge sequence ordering, allows user to repeat valves within the sequence or change sparge sequence order without plumbing changes
- Variable ozone output can be individually configured for each valve (10-100%)
- Programmable cycle lag time between sparge cycles (1 to 480 minutes).
- Independent time accumulators for tracking ozone vs. oxygen vs. air/breakthrough time per valve
- Suspend mode for planned nonoperational periods
- Timed oxygen purge solenoid valve for remote startup and maintenance of oxygen purity system
- Automated maintenance notifications
- Email Alarm Notifications
- VNC Server capability for remote control and monitoring
- Distinctive built-in safety features:
    - Emergency Stop pushbutton on control panel
    - Safety Switch on external wall of trailer
    - Ambient ozone alarm/shutdown sensor
    - High pressure alarm/shutdown
    - Built-in thermal protection, high / low temperature alarm set points 131˚F / 35˚F
    - Sensor failure alarm

    - Remote shutdown interface signal (interlock to SVE, etc.) can be user selected to stop sequence or switch to air only sparge
    - Remote ozone sensor connections
- Operation and Maintenance manual included
- Startup Service Kit included

2.1.2 Feed Gas Air Compressor

- Rotary screw compressor
- 230V, 3 phase TEFC motor
- Integrated refrigerated dryer
- Kaeser model # SK-15T
- 64 SCFM @ 125 PSI

2.1.3 Feed Gas Air Filtration

- Particulate filter downstream of compressor, Kaeser model # KPF-100
- Oil removal filter downstream of compressor, Kaeser model # KOR-100

2.1.4 Feed Gas Condensate Filtration

- Zero-loss drain valve from refrigerated dryer and all filter bowl drains plumbed to single oil/water separator
- Kaeser model # KCF25

2.1.5 Air Receiver Tank

- 60-gallon air receiver tank upstream of oxygen generator
- Isolation valves, pressure relief valve, and pressure gauge included
- Zero-loss condensate drain included, Kaeser ECO-Drain

2.1.6 Oxygen Generator Air Filtration

- Particulate filter downstream of receiver tank, included with AirSep AS-E135
- Oil removal filter downstream of receiver tank, included with AirSep AS-E135
- Oil vapor / fine particulate filter downstream of oxygen generator, Kaeser KVF-20

2.1.7 Oxygen Generator

- Calibrated to deliver 135 SCFH of 90 to 95% purity oxygen at a maximum delivery pressure of 10 PSIG
- Pressure swing adsorption style oxygen generator
- AirSep Corporation model #AS-E135

2.1.8 Oxygen Receiver Tank

- 60-gallon oxygen receiver tank upstream of ozone generator
- Isolation valves, pressure relief valve, and pressure gauge included
- Maximum oxygen storage pressure of 65 PSIG

2.1.9 Oxygen Purity Monitor

- Oxygen purity monitor located upstream of ozone generator to alarm if purity falls below 85%
- GMI brand

2.1.10 Ozone Generators

- 208 g/h (11 lb/day) at up to 5% by weight ozone from oxygen at 10 PSIG
- Four (4) Plasma Technics model # 79120 generators, liquid cooled
- Integrated alarms with dry contact to PLC
- Backpressure regulators downstream of generators to control feed gas pressure

2.1.11 Ozone Boost Pump

- One (1) double-head standard Dia-Vac pump
- Inlet pressure at 10 PSIG
- Outlet pressure at up to 50 PSIG

2.1.12 Valve Manifold

- 20 pneumatically actuated ball valves
- 3/8" full port ball valve
- 1/2" OD Kynar compression fittings
- Air actuated/spring return
- 316SS, PTFE seals and RTFE seats

2.2 Mobile Ozone Sparge System Enclosure

2.2.1 Dimensions

- Overall dimensions (detailed layout drawings to be finalized upon award of contract): 18'L x 8'6"Wx 10'H
- Layout shall be designed to allow sufficient access for equipment maintenance and subsequent removal, as necessary

2.2.2 Type

- Mobile, pre-constructed Look Element Flat Top trailer
- Tube mainframe construction
- Tandem Axle, spare tire, stabilizer jacks, 2-5/16" ball hitch, hitch lock, 7-pin trailer plug
- One set of rear double doors, lockable (latch, hasp, etc.)
- Access ports in walls/floors, as appropriate, for ventilation, air supply lines and ozone discharge lines
- Exterior painted white

2.2.3 Electric and Lighting

- Interior GFCI receptacle
- (2) 100 watt compact fluorescent lights inside enclosure, ceiling fixtures with clear glass and cast guard
- Interior ozone monitor: ATI A14 GasSens
- Connected to system PLC
- Alarm set point: 1 ppmv
- Interior emergency stop button tied to PLC
- Exterior service disconnect/emergency switch located on side wall of trailer
- HMI panel for safety, ease of use, and maintenance

2.2.4 Climate Control (heating)

- Interior foam-board and plywood insulation of walls and roof
- PLC controlled fan ventilation and heat
- One (1) 1,500 W wall mount space heaters

2.3 Control System Requirements

- Main disconnect panel (NEMA 3R) to be located on exterior of enclosure. Final electric service connection (208V/3ph) by others.
- All electrical components to be U.L. approved
- PLC based system located on interior wall of trailer
- Allen-Bradley MicroLogix base controller
- PC-input connection to be provided, via ethernet
- Allen Bradley PanelView Plus 400 4" Human Machine Interface (HMI) with touch pad to allow modification to programming while operating
- Emergency Stop Button (mushroom-style) located on enclosure (will shut down entire ozone sparge system)
- Further alarm detail and actions lists to be provided upon award of contract, if desired
- Cell-phone based telemetry system included (Verizon Wireless service contract required)
- Onboard VNC Server to allow control and monitoring of system from multiple computers, tablets, smartphones (free software clients and apps available)

2.4 Listing of Major Equipment Provided

- One (1) 7' x 14' tandem axle trailer, Look Element Flat Top series
- Four (4) Plasma Technics model # 79120 ozone generators

- One (1) 60-gallon air receiver tank
- One (1) AirSep model # AS-E135 oxygen generator
- One (1) 60-gallon oxygen receiver tank
- One (1) GMI oxygen purity sensor
- One (1) Air Dimensions Inc model # R227-FP-MA1-T
- One (1) ATI B124 GasSens, ozone monitor/transmitters
- One (1) Allen Bradley MicroLogix base PLC controller
- One (1) Allen Bradley PanelView Plus 400 HMI display unit with key pad
- Twenty (20) Inline Brand Pneumatic Actuated Ball Valve, 3/8" NPT, SS ball valve, PTFE seals and RTFE seats
- One (1) Kaeser model # SK-15T rotary screw air compressor
- One (1) Kaeser model # KPF-100 particulate air filter
- One (1) Kaeser model # KOR-100 oil removal air filter
- One (1) Kaeser model # KCF25 condensate filter
- One (1) Cradlepoint 3G cellular router with SIM card

2.5 Service Kits and Other Equipment Options

2.5.1 Service & Maintenance Kit Specifications

- S-CMP-O2-105-SK Oxygen Compressor Rebuild Kit
- S-CMP-AFB-103-SK Air Flow Booster Compressor Rebuild Kit
- F-OR-100 Inline Oil/Particulate Filter

2.5.2 Portable Oxygen Purity Analyzer: ACC-112

- Range: 0-100 % O2
- Display: digital readout in .01 % increments
- Includes flow cell and 10 ft. cable
- Size: 4.62 x 2.5 x 1.5 in.
- Weight: 1.37 lb
- Power requirements: 9V battery
- Battery Lifetime: 1400 hours approx.

2.5.3 Hand-held Passive Ambient Ozone Monitor: ACC-105

- Range: 0-10 ppm; sensitivity as low as .02 ppm
- Display: digital readout in .01 ppm increments
- Measurement principle: HMOS (heated metal oxide semiconductor) sensor
- Size: 50 × 100 × 25 mm (2 × 4 × 1 in)
- Weight: 170 grams (6 oz)
- Power requirements: 12 VDC unregulated; AC adapters available worldwide
- Battery: Rechargeable batteries last more than 8 hours

2.5.4 Portable Gas Leak Detector: ACC-175 + ACC-175a

- Range: Ozone, 0-5/200 PPM (20 PPM Std.)
- Display: Back-lit graphics liquid crystal display
- Accuracy: ± 5% of value
- Sensitivity: 1% of sensor module range
- Outputs: RS-232 output of stored gas values
- Memory: 12,000 data points
- Storage Interval: Programmable from 1 minute to 60 minutes
- Typical Capacity: 8 days at 1 minute storage interval
- Alarms: Three concentration alarms (caution, warning, and alarm with adjustable setpoints)
- Low flow and low battery alarms
- Alarms displayed on LCD & Indicated by audible beeper
- Power: D cell battery, alkaline recommended, 75 hours operation
- Internal rechargeable Nicad for backup power, 6 hours operation
- 120 or 220 VAC chargers available
- Operating Temp.: -25º to +55ºC
- Humidity: 0-95% Non-condensing
- Detector Material: Glass Filled Polycarbonate
- Includes Carrying Case
- Size: 3.5”(W) x 9”(H) x 5.5”(D)
- Shipping Weight: 7 lbs. (3.2 Kg.)

2.6 Service Kits for MOSUXX-208_C.2

2.6.1 MOSUXX-208 C.2 Six Month Service Kit, includes

- (1) S-IF-4.7-2.8 SK-15/20T Compressor Intake Filter
- (1) S-IF-19.5-20.5 SK-15/20T Filter Mat 19.5"x14.5"
- (2) S-IF-4-4 SK-15/20T Filter Mat 4"x4"
- (1) S-OF-SK15/20T SK15/20T Replacement Oil Filter
- (1) S-OWS-25-F KCF-25 Oil/Water Separator Filter
- (8) S-OIL-FSYN-QT Full Synthetic Oil
- (1) S-FB-OXS-200-PF Filter Element, Particulate Filter, AS-E Series
- (1) S-FB-OXS-200-OR Filter Element, Oil Removing, AS-E Series
- (1) S-FB-PF-F26KB-F Filter Element, Particulate Filter, for Kaeser F26KB
- (1) S-FB-OR-F26KE-F Filter Element, Oil Removing, for Kaeser F26KE
- (1) S-FB-OR-F6KE-F Filter Element, Fine, for F6KE
- (4) V-C-104 1/4" MPT 316SS Check Valve
- (2) V-C-107 3/8" MPT 316SS Check Valve

2.6.2 MOSUXX-208 C.2 Twelve Month Service Kit, includes

- (1) S-IF-4.7-2.8 SK-15/20T Compressor Intake Filter
- (1) S-IF-19.5-20.5 SK-15/20T Filter Mat 19.5"x20.5"
- (2) S-IF-4-4 SK-15/20T Filter Mat 4"x4"
- (1) S-OF-SK15/20T SK15/20T Replacement Oil Filter
- (1) S-OSC-SK15 SK15/20T Internal Oil Separator Filter
- (8) S-OIL-FSYN-QT SK15/20T and AS-25T Full Synthetic Oil/qt
- (1) S-DB-3772 Replacement Drive Belt
- (1) S-VVMK-SK15 Vent Valve Maintenance Kit
- (1) S-OWS-25-F KCF-25 Oil/Water Separator Filter
- (1) S-FB-PF-F26KB-F Filter Element, Inline Particulate, for F26KB
- (1) S-FB-OR-F26KE-F Filter Element, Inline Oil Removal, for F26KE
- (1) S-FB-OR-F6KE-F Filter Element, Fine, for F6KE
- (1) S-FB-OXS-200-PF Filter Element, Inline Particulate, for AS-E Series
- (1) S-FB-OXS-200-OR Filter Element, Inline Oil Removal, for AS-E Series
- (1) S-ECH-O3-200a Replacement O3 Sensor, 0-2ppm
- (4) V-C-104 1/4" MPT 316SS Check Valve
- (2) V-C-107 3/8" MPT 316SS Check Valve
- (1) V-PR-101 Valve, Pressure Relief, 100 PSI, 1/4"npt, SS
- (2) S-CMP-O3-100-SK ODP compressor Rebuild Kit

2.7.1 Remote Ozone Gas Detector System

- ATI Two Point Ozone Gas Detector System
  - (1) Power Supply Module, 120VAC
  - (1) Horn alarm
  - (2) B12 sensor receivers
  - (2) 25ft cables for sensors
  - (1) 3 module NEMA4X enclosure

(2) B12 Ozone sensors 0-2 ppm range

3 Engineering Submittals

3.1 Base Package

Deliverable	Description
P&ID – Process & Instrumentation Diagram	Diagram of all process components, sensors, instrumentation, pipe sizes and materials, main equipment specifications and control signals/alarms/interlocks.
System Overview Narrative	Document describing system operation to delineate primary functions of all major equipment and how each component is controlled.
Spare Parts List	Recommended critical spare parts list for the system.
Major Equipment Cut Sheets and Vendor Manuals	All cut sheets or user manuals for all major equipment on the skid. Includes items like pumps, controls, sensors, control valves, tanks etc.
1 Hour Webinar Design Review	1 Hour webinar reviewing total project scope and presented submittals.
Shipping Pack List	List of items shipping to customer including loose-packed items like filters or spare parts

3.2 Optional Engineering Documentation

The following is a list which can be provided to the client upon request. H2O Engineering to provide estimate based on scope of project.

Deliverable	Description
GA - Skid General Arrangement	Drawing of 3D skid with plan/elevation/side views to denote skid dimensions, plumbing inlet/outlet connections, electrical connections, lifting/loading points and includes main equipment bill of materials.
Seismic Anchorage Structural Engineering Package	Complete structural drawings for skid anchoring signed/stamped by PE Engineer.
Electrical Schematics	Drawing of main skid power connections, disconnect, equipment schedule and component layout of panel. Electrical schematic drawing showing all wire connections within the control panel and component layout of the panel.
Control Narrative	Document describing the overall control scheme for the skid, HMI menu overview and alarm scheme.
I/O Table and SOO	Spreadsheet and documentation of all skid control set points, PLC I/O, alarms, Sequence of Operation and PID control loops
PLC / HMI Code	PLC and HMI specific code the skid. These are the actual program files uploaded to the device. ***Requires executed limited use and license agreement***
User Manual	PDF document describing operation of skid. Includes information about safety, installation, operation, control, maintenance, troubleshooting, alarms, spare parts, drawings & warranty
In Person Design Review	An in person design review can be conducted with the customer's design and operations team.

4 Startup Services

Item	Description	Scope of Supply	
		H2O Engineering	PPM Consultants
Equipment Installation and Technical Advisory Services	Unloading the equipment, rigging the equipment into place, connecting existing power wiring to control panel, verifying adequate drainage, testing for adequate water pressure, and testing power supply.		X
	Remote technical support of Equipment Installation	X	
Plumbing, Electrical and Pre-Startup Inspection	Plumbing and electrical connections to be finalized before H2O Engineering installation visit. All plumbing and electrical connections to the equipment to be perform by the customer.		X
	Includes time to inspect installation work, address questions, develop punch list of completion items necessary prior to startup.	X	
Commissioning Checklist	H2O Engineering to provide pre-commissioning checklist to client.	X	
	Complete pre-commissioning checklist and send completed form to H2O Engineering prior to site mobilization for startup services.		X
Equipment Startup	Includes operating the equipment manually, operating the equipment automatically, setting and testing control system, and putting system into automatic operation. Also includes informal, hands-on training conducted by the service technician in front of the equipment.	X	

4.1 Startup Services Scope of Work

- This total assumes no weekends, or a holiday are required and is based on an eight-hour workday.
- Travel time to and from the job site for H2O Engineering Field Service personnel is included in this estimate.
- To ensure personnel availability, H2O Engineering requires a minimum of four weeks' advance notice to schedule equipment start-ups.
- The commissioning plan does not allow for site specific safety training. Any site-specific safety training required will be billed at H2O Engineering's Field Service Labor Rates.
- On-time completion of H2O Engineering's startup and commissioning services requires satisfactory installation of all equipment by Customer (where not included above). If additional service time is required for H2O Engineering's commissioning scope due to Customer's changes in scope or delays in completion of installation, additional charges will apply, billed at H2O Engineering's Field Service Labor Rates.

5 Commercial Offer

5.1 Base System

Description	Price
Former Rental #24 MOSU20-208	$119,500.00
Shipping Estimate one way for trailer	$4,500.00
Total	**$124,000.00**

5.2 Ancillary Materials

QTY:	Description	Unit Price	Total Price
9	**In-situ Oxidation Point**	$319.04	$2,871.36
13	**Riser Pipe (10 ft. Stick)**	$35.75	$464.75
5	**Riser Pipe (5 ft. Stick)**	$26.07	$130.35
9	**Well Head Connection**	$143.85	$1.294.65
2,600	**Ozone delivery tubing (per foot)**	$4.33	$11,258.00
Total			**$16,019.11**

5.3 Additional Equipment Options

Description	Price
Telemetry Package ($2,200.00 each)	Included
(2) Mounted Ozone Gas Leak Detectors ($2372.50 each)	$4,745.00
Total	**$4,745.00**

5.4 Startup Services

Startup conducted by H2O Engineering	Price
Price indicates cost for (1) H2O Engineering personnel to be on-site for (1) day. Additional days to be billed at H2O Engineering field service rate.	$7,027.00

OR

Startup conducted by PPM Consultants	Price
Price indicates cost for (1) H2O Engineering personnel to be on-site for (1) day. Additional days to be billed at H2O Engineering field service rate.	$1,000.00

5.5 Freight

A shipping estimate will be supplied upon contract award. All pricing is FOB/FCA (INCOTERMS 2010) from designated factory.

5.6 Invoicing and Payment Terms

Terms are as follows with credit approval.

5.6.1 Equipment

Equipment shipment is contingent on receipt of initial milestone payment.

- 50% invoiced with order due upon receipt of invoice
- 25% invoiced with engineering submittal due upon receipt of invoice
- 15% invoiced 2 weeks prior to shipment due NET 30
- 10% invoiced at shipment due NET 30

5.6.2 Consumables

- Invoiced upon shipment due NET 30

5.6.3 Labor Services

- Invoiced upon completion of work or at the end of the month; whichever occurs first, due NET 30.

5.7 Project Schedule

The Buyer and Seller will arrange a kick-off meeting after contract acceptance to develop firm deliverable and shipment schedule. Title and risk of loss will transfer upon delivery in accordance with FCA (INCOTERMS 2010) designated factory.

5.8 Equipment Shipment and Delivery

Firm shipment estimate to be determined upon award of contract. The Buyer and Seller will arrange a kick-off meeting after contract acceptance to develop firm shipment schedule. Title and risk of loss will transfer upon delivery in accordance with FCA (INCOTERMS 2010) designated factory.

Project cost is based on standardized shipping lead times (does not include expedited shipping)

5.9 Pricing Notes

- All prices quoted are in USD. Quote is good for 30 days from date of quotation.
- Any sales or value added tax is not included.
- The customer will pay all applicable local, state, provincial, or federal taxes and duties.
- The equipment delivery date, start date, and date of commencement of operations are to be negotiated.
- Commercial terms and conditions shall be in accordance with H2O Engineering's Standard Terms and Conditions of Sale.
- This proposal and the rates provided herein are subject to final site, environmental, H2O Engineering compliance check, and financial due diligence by H2O Engineering.
- This proposal supersedes all previous proposals and correspondence.
- Seller's price and delivery schedule are based on the assumption that Buyer will take delivery as and when foreseen by the schedule. Where this is not the case, the Parties must agree in advance an alternative place of delivery, failing which the Seller will be entitled to ship the equipment to

storage. Buyer shall issue a Change Order to take into account any additional cost or delay incurred by H2O Engineering in implementing this change.

- Seller may manufacture and source the Equipment and any part thereof globally in the country or countries of its choosing, provided that the Equipment complies with all of the requirements specified in this Agreement.

5.10 Conditional Offering

Customer understands that this proposal has been issued based upon the information provided by customer, and currently available to, H2O Engineering at the time of proposal issuance. Any changes or discrepancies in site conditions (including but not limited to system influent water characteristics, changes in environmental, health, and safety (EH&S) conditions, and/or newly discovered EH&S concerns), Customer financial standing, Customer requirements, or any other relevant change, or discrepancy in, the factual basis upon which this proposal was created, may lead to changes in the offering, including but not limited to changes in pricing, warranties, quoted specifications, or terms and conditions. H2O Engineering's offering in the proposal is conditioned upon a full H2O Engineering EH&S and Customer financial review.

5.11 After Sales Service

Should you want to learn more about H2O Engineering's expert service offerings on your equipment, please contact your local H2O Engineering Water Treatment Technologist or visit our website http://www.h2oengineering.com to get connected with a Customer Service Representative in your region. In North America, please dial 1-866-987-0303 to contact a customer service representative.

5.12 Limited Warranty and Disclaimers

5.12.1 Limited Express Warranty.

As to parts and/or equipment supplied by H2O Engineering, Inc. ("H2O Engineering"), H2O Engineering warrants these parts to be free from material defects in material or workmanship for a period of 12 months commencing on the date of original shipment from H2O Engineering; provided, however, the one (1) year warranty period shall begin on the earlier to occur of: (i) installation date, if the installation is performed by H2O Engineering; or (ii) on the sixtieth (60th) day following the date of the original shipment from H2O Engineering to Customer. This warranty shall be limited to the repair or replacement of parts and the labor and services required to repair the equipment. Notwithstanding anything to the contrary, any materials used in connection with such equipment that are not manufactured by H2O Engineering shall carry no warranty from H2O Engineering.

To assist us in providing you with services under this warranty, kindly return to H2O Engineering a copy of the invoice along with the following information:

- End user name;
- Complete address, including telephone number;
- Date installed;

- Complete model and serial number information; and
- Name of company from which the unit was purchased.

5.12.2 Repairs and replacement parts.

Repairs and Replacement parts provided under this warranty shall carry only the unexpired portion of this warranty or 90 days, whichever is longer. Implied warranties, including but not limited to warranties of fitness for particular purpose, merchantability, use or application, and all other obligations or liabilities on the part of H2O Engineering are null and void, unless such warranties, obligations or liabilities are expressly agreed to in a writing signed by H2O Engineering.

5.12.3 How to Obtain Service under H2O Engineering's Limited Warranty.

5.12.3.1 For Purchased Equipment.

If any parts appear defective, Customer immediately shall notify H2O Engineering in writing via email at warranty@h2oengineering.com and provide H2O Engineering with reasonable opportunity to make inspections and tests. H2O Engineering's obligations under this warranty are limited to the repair or replacement at its facility in San Luis Obispo, California of any part which proves to be defective. If Customer asks H2O Engineering to inspect, test and/or replace defective parts at Customer's premises, Customer agrees to pay for all reasonable traveling time, accommodations and associated expenses incurred by H2O Engineering's representative. Notwithstanding the foregoing, H2O Engineering's labor costs to complete the repair/replacement will be covered by H2O Engineering in accordance with the terms and conditions hereof. Equipment shall not be returned to H2O Engineering for inspection and testing without H2O Engineering's prior written authorization. H2O Engineering will provide Customer with a return goods authorization number ("RGA") to use for returned goods to be shipped to H2O Engineering, FOB San Luis Obispo, CA. The RGA number must appear prominently on the exterior of the shipped box(es). The product and/or part must be packaged either in its original packing material or in comparable and suitable packing material, if the original is not available. Customer is solely responsible for paying shipping charges to H2O Engineering and for any damage to the product and/or part that may occur during shipment. It is recommended that Customer insure the shipment for the amount originally paid for the product and/or part. Repaired or replaced items will be shipped back to Customer at Customer's sole cost by H2O Engineering, FOB San Luis Obispo, California. If upon inspection at H2O Engineering's facility, H2O Engineering determines that there is no defect or that the damage to the product and/or part resulted from causes not within the scope of this limited warranty, then the Customer shall bear the cost of H2O Engineering's labor in connection with inspecting and testing the product and/or part and all return freight charges. Any unauthorized attempt by Customer or any of its agents or employees to repair H2O Engineering manufactured products without prior permission shall void this express warranty. For service, contact H2O Engineering Service directly at (805) 547-0303 or via email at service@h2oengineering.com.

5.12.3.2 For Leased Equipment. Please refer to the warranty terms contained in the Equipment Lease between Customer and H2O Engineering.

5.12.4 Items Excluded from the Warranty.

This warranty does not apply to normally consumable parts or components, which shall include but not be limited to, filter cartridges, pump seals and/or fan filters. This warranty does not apply to any labor charges or property damage for physical removal or replacement of the equipment. This warranty does not extend to any product and/or part from which the assigned serial number has been removed or which has been damaged or rendered non-functioning as a result of any one or more of the following:

- an accident, misuse, alteration or abuse;
- an act of God such as flood, earthquake, hurricane, lightning or other disaster resulting only from the forces of nature;
- normal wear and tear;
- operation outside the usage parameters stated in the product user's manual;
- use of parts not sold by H2O Engineering;
- damage which may occur during shipping;
- service or unit modification not authorized by H2O Engineering;
- failure to meet service requirements as outlined in the Product Manual/User Guide;
- improper installation or application; and/or
- check value and solenoid valve failure.

5.12.5 Claims and Returns.

Customer must inspect shipment for damage in the presence of the carrier at the time of delivery. Failure to bring any damages (obvious or concealed) to the attention of the carrier and noting such damages on the bill of lading will void any claim made against the carrier. Customer should save all packaging materials and immediately notify H2O Engineering of the damages. On all products shipped FOB shipping point, it is the responsibility of H2O Engineering to file a damage claim with the carrier. Therefore, Customer must furnish H2O Engineering with complete damage information immediately via email to warranty@h2oengineering.com. Customer should verify contents of all shipments against the packing slip and carefully check all packaging materials for merchandise before discarding. Claims for shortages or inaccurate filling of orders must be made to H2O Engineering within ten (10) days of the shipment's delivery by the carrier. If any goods were shipped in error, H2O Engineering shall provide Customer with an RGA number. If H2O Engineering, in good faith, determines that any error was not H2O Engineering's, Customer shall be charged a 20% restocking fee for any products or parts returned for credit or exchange.

5.12.6 Exclusive Warranty; Miscellaneous Provisions.

Except for the express warranty provided herein, there is no other warranty (expressed or implied) on H2O products and/or parts; provided, however, that neither this warranty nor any other warranty, expressed or implied, including any implied warranties or merchantability of fitness, shall extend beyond the warranty period. Some states do not allow limitations on how long an implied warranty lasts, so that the above limitations or exclusions may not apply to all Customers.

No course of prior dealings between the parties and no usage of the trade shall be relevant to supplement or explain any term used in this warranty. Acceptance or acquiescence in a course of performance rendered under these terms shall not be relevant to determine the meaning of this warranty even though the accepting or acquiescing party has knowledge of the nature of the performance and opportunity for objection. Whenever a term defined by the California Uniform Commercial Code (the "Code") is used herein, the definition contained in the Code shall control.

It is stipulated by the parties that these terms shall be interpreted and construed according to the laws of the State of California and specifically the Uniform Commercial Code as adopted in the State of California as effective and in force on the effective date of this warranty (as provided below). Venue for any dispute arising under this Agreement shall be in the courts in and for San Luis Obispo County, California.

If any provision of this warranty or the application thereof is held to be unenforceable or invalid by any court of competent jurisdiction, the remainder of this warranty shall not be affected thereby and to this end only those provisions of this warranty are declared severable. If any provision of this warranty is determined by any court of competent jurisdiction to be invalid, illegal, or unenforceable to any extent, that provision shall, if possible, be construed as though more narrowly drawn, if a narrower construction would avoid such invalidity, illegality, or unenforceability or, if that is not possible, such provision shall, to the extent of such invalidity, illegality, or unenforceability, be severed, and the remaining provisions of this warranty shall remain in effect.

July 10, 2019

Mr. Jimmy Moler
Ozone Solutions
451 Black Forest Road
Hull, IA 51239

Re: **Request for Bid for Ozone/Oxygen Sparge Remediation Equipment**
Martin's Texaco
36950 US Highway 231 North
Ashville, Alabama
Facility I.D. No. 12534-115-011417
Incident No. UST05-08-06
PPM Project No. 451601-MCAP

Dear Mr. Moler:

On behalf of Ira Phillips, Inc., PPM Consultants Inc., (PPM) is requesting two separate quotes from your company to construct an ozone/oxygen sparge remediation system for use at the referenced site. One of the quotes should include a generator capable of delivering approximately 5.0 to 5.5 pounds of ozone per day and the other quote should include a generator capable of delivering approximately 10 to 11 pounds of ozone per day. Both systems should meet the following conditions:

- Capable of generating ozone at pressure up to 50 pounds per square inch (psi)
- Manifold capable of utilizing up to 20 points
- Sparge flow rate at each sparge point of approximately 4 standard cubic feet per minute (SCFM)
- Refrigerated air dryer
- System controls with wiring/sensors to monitor system status
- Wireless telemetry to accommodate system alarms
- Equipment to be mounted in well-ventilated utility trailer equipped with heater, fan, and lights

Additionally, please provide pricing for:

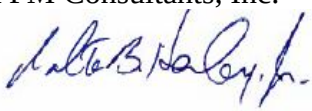
- Nine sparge points constructed of ozone-compatible material
- Riser pipe constructed of ozone-compatible material for five 16-foot deep sparge points and four 20-foot deep sparge points plus well-head connections for each point

- Ozone supply tubing constructed of ozone-compatible material to each of the nine sparge points (approximately 2,600 feet total with longest single run of approximately 265 feet)
- Ozone monitors inside equipment enclosure and in two subsurface points above fuel piping
- Wiring from system to subsurface ozone monitoring points (located approximately 245 and 250 feet from equipment enclosure)

Please note the power requirements for each system (e.g., single-phase or three-phase and voltage/amperage). Your quote should cover the one-time purchase of the equipment/materials and shipping of the equipment to the site and the materials to PPM's office. All information should be submitted by end of day, Monday, July 22, 2019.

If you have any comments or questions, please do not hesitate to contact me at (205) 836-5650.

Sincerely,
PPM Consultants, Inc.



Walter B. Henley, Jr., P.G.
Project Manager / Senior Geologist

c: Mr. Ira Phillips, Jr.

SUBCONTRACTOR COMPARISONS - SVE EQUIPMENT
FORMER MARTIN'S TEXACO
ASHVILLE, ALABAMA

	MK			MAE2		
SCOPE ITEM	**Units**	**Rate**	**Total**	**Units**	**Rate**	**Total**
SVE Unit with Trailer	1 L.S.	$30,715.00	$30,715.00	1 L.S.	$48,660.00	$48,660.00
Carbon Vessel	Included			1 L.S.	$3,418.00	$3,418.00
Shipping/Delivery	1 L.S.	$2,000.00	$2,000.00	1 L.S.	$750.00	$750.00
Totals			**$32,715.00**			**$52,828.00**
Start-Up/Training			$1,500.00			$1,000.00
Totals with Training			$34,215.00			$53,828.00

MK ENVIRONMENTAL INC.

QUOTATION

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

jgiltz@mkenv.com

Date	7/22/2019
Quote No.	219087
Reference	Martin's Texaco
Page No.	1 of 2
Freight	Included
Terms	Net 60 Days
Ship Via	Best
F.O.B.	Factory

SOLD TO:	SHIP TO:
Walt Henley	Facility I.D. No. 12534-115-011417
PPM Consulting, Inc.	Martin's Texaco
5555 Bankhead Highway	36950 U.S. Highway 231 Nortj
Birmingham, AL. 35210	Ashville, AL.
205-836-5650	PPM Project No. 451601-MCAP

Quotation valid for 90 days

QUANTITY		UNIT PRICE	AMOUNT
	100 amp 3/60/230 volt 4 wire plus ground electrical service Brought to NEMA 3R control Panel Interior electrical will comply with NEC requirements for Class 1, Division 2, Group D Hazardous locations Motors will be Totally Enclosed Fan-Cooled (TEFC) construction		
1	Soil Vapor Extraction (SVE) Samos regenerative blower model SB200 D or equal 3.0 HP, 230/460 volt, TEFC motor ~ 60 SCFM @ 89" wc vacuum (6.5"Hg) Maximum open flow: 147 SCFM Maximum vacuum: 89" wc (6.5"Hg) Inlet particulate filter with vacuum gauge 85 gallon knockout condensate drum with tangential inlet design High level k/o drum float switch Clean out port Manual drain valve Vacuum relief valve Dilution valve with filter/silencer Exhaust temperature gauge Exhaust sample port High temperature switch Vacuum transducer to measure vacuum via telemetry anlalog input. Telemetry by others.	30,715.00	$30,715.00
1	1.5 hp transfer pump, 3450 rpm, TEFC motor Cast Iron housing with composite impeller, anti air lock design manual "Pump ON" button inside building for sampling		
1	Master Control Panel System, Including: NEMA 3R weather proof enclosure Operator control knob Off/Run/Start Motor starter with MSP breaker and thermal overload protection Control transformer (4) intrinsically safe relays, (4) alarm indicator LED's, (8) output channels Hard wired relay logic SVE Hour meter Anti-falsing alarm circuit to prevent nuisance tripping (1) exterior GFCI utility outlet MCP to be mounted and wired outside the system trailer <u>SVE automatic shut down upon:</u> SVE condenstate k/o drum high liquid level SVE exhaust high temperature switch Poly tank high liquid level		
1	SVE Interlocks Contrrols MK supplied engineered interlock controls. If the SVE shuts down upon alarm it will send a signal to shut down the ozone equipment and vise-versa. The ozone equipment requires the same setup on its end. MK to wire its own interlock and ozone manufacturer to do the same. Separate conduit with interlock wires to be ran by the local electrician. Detailed conduit schedule with wire size and quantity will be supplied after approval and review of ozone logic.		

MK ENVIRONMENTAL INC.

Walt Henley
PPM Consulting, Inc.

Date 7/22/2019
Quote No. 219087
Reference Martin's Texa

QUANTITY		UNIT PRICE	AMOUNT
1	Mobile Trailer Unit 6'W x 10' or 12'L x 6' H footprint 3,500 lbs single axel trailer Rear swing door Side man door Insulated side walls and ceiling Ventilation fan Interior XP light fixture Mechanical and electrical installation Sound Insulation Blankets (installed on interior side walls) 12,000 BTU heater with XP thermostat. All components fully piped, wired and factory tested		
1	Vapor Phase Carbon Vessels - SVE offgas VR-400 lbs drums 400 lb initial load each 4" plain pipe fitting Off loading, placement & piping pı` Installed outside the system trailer by others		
1	1,000 Poly Tank Storage poly tank located outside the trailer system and piped by others. Inlet fitting and drain valve High level shut down switch with 30' of s.o. cord to wire to the master control panel logic.		
1	Startup & Training Services 1-day remediation system startup & training services. Based on 2 weeks prior notice.	1,500.00	$1,500.00
1	Freight Services Remediation system trailer transport to jobsite. Onsite supervision and placement by others.	2,000.00	$2,000.00
	Notes: Not sure what type, brand or model the ozone sparge equipment telemetry will be providing. The telemetry would require the following available input and outputs: (4) digital inputs - SVE on/off - SVE k/o tank high liquid level - SVE discharge temperature high _ Poly tank high liquid level (1) analog input - Vacuum reading, 4-20 mA signal (2) digital outputs - remote restart - remote shutdown		

EQUIP. SUB TOTAL	$34,215.00
EQUIP. SALES TAX	
START UP/TRAINING	
FREIGHT	
NET TOTAL	$34,215.00

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

Jerry Giltz,
MK Environmental, Inc.

Samos
SB 0050 – 1400 D/D2

Samos SB 0530 D

Description

Busch Samos SB regenerative blowers are designed for either pressure or vacuum. They are available in single and two stage models so they can operate over a wide range of flow and differential pressure.

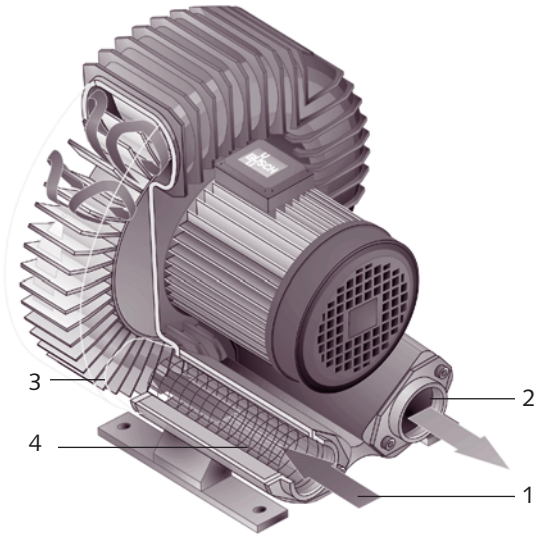
Low Maintenance and Environmentally Friendly

Samos low maintenance features include: rugged construction, sealed-for-life bearings, a fan cooled motor and a non-contacting impeller. They are oil-free, have a low power consumption, and are quiet due to internal silencers. Samos blowers can be installed in either a vertical or horizontal position.

Regenerative Blowers

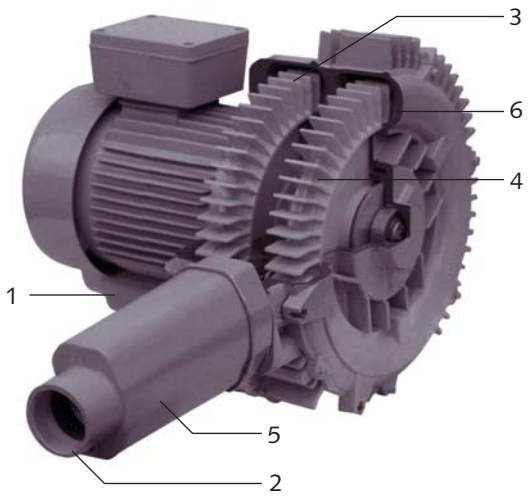
Operating Principle

Single-stage version



1. Gas Inlet
2. Gas outlet
3. Impeller
4. Silencer

Two-stage version



1. Gas inlet
2. Gas outlet
3. Impeller 1st stage
4. Impeller 2nd stage
5. Silencer
6. Side channel

Operating Principle

Gases are drawn in through the blower inlet. As the impeller rotates, it transfers kinetic energy to the gases being pumped. As a result, the gases move forward through a corkscrew shaped path and are compressed, then discharged through the pressure side exhaust silencer. The impeller is mounted directly on the motor shaft.

Applications

Pneumatic conveying

Transport and lifting system

Carton forming and packaging

Vacuum holddown

Materials handling

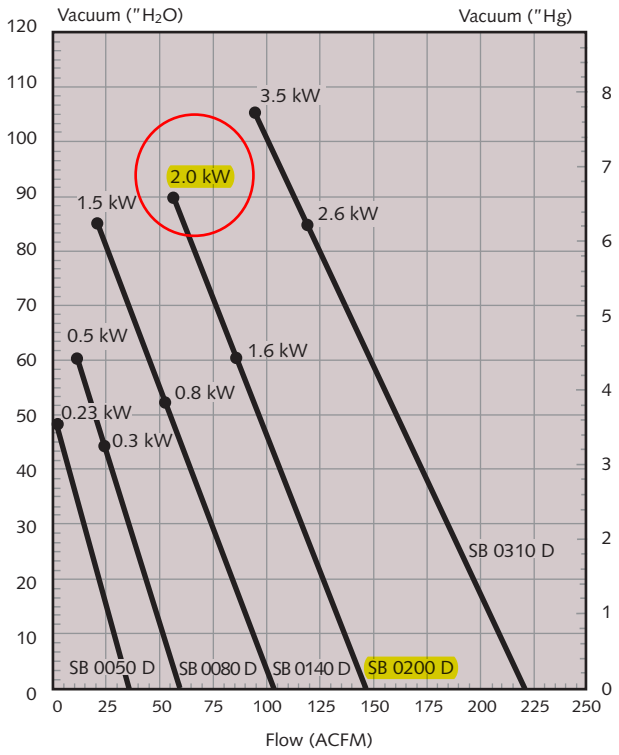
Soil remediation

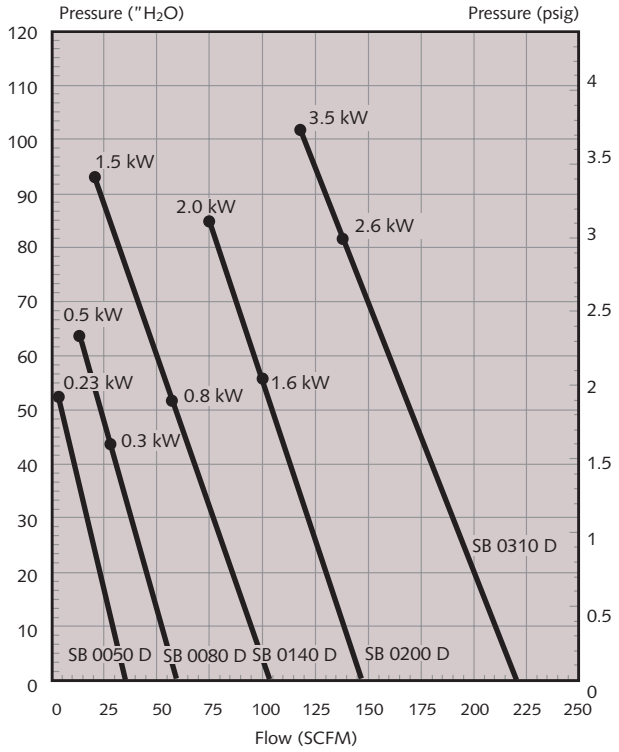
Trim removal

Wood routers

Printing industry applications

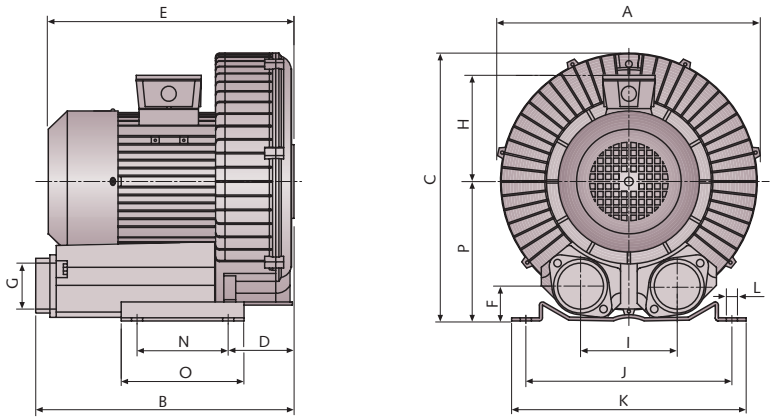
Technical Data Samos SB 0050 - 0310 D (single stage)





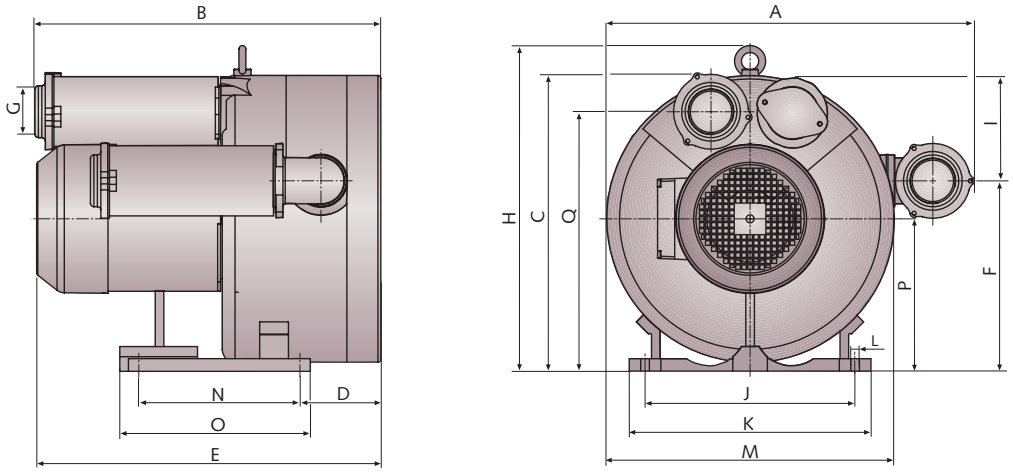
Technical Data Model	Nominal Pumping Speed ACFM	Max. Vacuum "H2O	Max. Vacuum "Hg	Max Pressure "H2O	Max Pressure psig	Motor (60 Hz) kW	Motor (60 Hz) Hp	RPM	Sound dB (A)	Weight lbs
SB 0050 D	35	48	3.5	52	1.9	0.23	0.31	3450	53	15
SB 0080 D	59	44	3.2	44	1.6	0.3	.40	3450	56	18
SB 0080 D	59	60	4.4	64	2.3	0.5	.67	3450	56	22
SB 0140 D	103	52	3.8	52	1.9	0.8	1.1	3450	64	29
SB 0140 D	103	85	6.2	93	3.4	1.5	2.0	3450	64	33
SB 0200 D	147	60	4.4	56	2.0	1.5	2.0	3450	70	44
SB 0200 D	147	89	6.5	85	3.1	2.1	2.8	3450	70	46
SB 0310 D	221	85	6.2	81	2.9	2.6	3.5	3450	72	64
SB 0310 D	221	105	7.7	101	3.6	3.5	4.7	3450	72	68

Dimensions Samos SB 0050 - 1400 D (single stage)



Model	A	B	C	D	E	F	G (NPT)	H	I	J	K	L	N	O	P
SB 0050 D	9 3/4	9 1/16	9 13/16	2 13/16	10 3/16	1 9/16	1 1/4	4 3/8	3 9/16	8 1/16	9 1/16	3/8	3 1/4	4 1/4	5 1/8
SB 0080 D	9 3/4	9 1/16	9 13/16	2 13/16	10 3/16	1 9/16	1 1/4	4 3/8	3 9/16	8 1/16	9 1/16	3/8	3 1/4	4 1/4	5 1/8
SB 0140 D	11 5/16	9 1/2	12	3	10 11/16	1 13/16	1 1/2	5 3/16	4 1/2	8 7/8	10 1/16	1/2	3 3/4	5 1/8	6 1/8
SB 0200 D	13 1/4	11 3/4	13 3/8	3 7/16	12 1/2	1 7/8	2	6 1/4	4 3/4	10 1/4	11 5/8	9/16	4 1/2	6 1/8	6 15/16
SB 0310 D	15 1/16	13 1/8	15 3/16	4 5/16	14 15/16	2 1/8	2	7 3/16	4 15/16	11 7/16	12 13/16	9/16	5 1/2	7 1/16	7 7/8
SB 0430 D	14 7/8	14 3/16	15 3/16	3 7/8	17 5/16	2 1/8	2	5 13/16	4 15/16	11 7/16	12 13/16	9/16	5 1/2	7 1/16	7 7/8
SB 0530 D	19 11/16	19 1/2	20 5/16	1 3/8	18 5/8	3 3/16	2 1/2	NA	5 11/16	14 3/8	16 9/16	9/16	11	12 7/16	10 1/2
SB 0710 D	19 11/16	19 1/2	20 5/16	11/16	19 7/16	3 3/16	2 1/2	NA	5 11/16	14 3/8	16 9/16	9/16	11	12 7/16	10 1/2
SB 1100 D	21 15/16	28 5/8	24 7/8	4 1/4	24 15/16	3 9/16	4	NA	8 1/8	14 3/16	16 5/16	9/16	23 7/16	NA	11 7/8
SB 1400 D	21	24 13/16	22 3/8	4 1/4	27 11/16	3 9/16	4	7 3/4	8 1/8	14 3/16	16	9/16	23 7/16	NA	11 7/8

Dimensions Samos SB 0530 D2 (two stage)



Model	A	B	C	D	E	F	G (NPT)	H	I	J	K	L	M	N	O	P	Q
SB 0530 D2	25 1/8	23 3/4	20 5/16	5 9/16	23 11/16	13 1/8	2 1/2	22 3/8	7 3/16	14 3/8	16 9/16	9/16	19 11/16	11	12 7/16	10 1/2	17 15/16

All dimensions in inches unless otherwise noted.

HH SERIES FLAT-TOP CARGO

Swivel jack

FEATURES

- Full Tubular Steel Frame & Tongue
- 24” On-Center Full Tubular Steel Wall Uprights
- 24” On-Center Full Tubular Galvanized Steel Roof Bows
- Formed Channel Steel Crossmembers
- Vapor Barrier
- Fully Undercoated Body
- Weather Coated Tongue & Rear Bulkhead
- 30” V-Nose with 24” ATP Rockguard
- Flat Roof Design with .024 Aluminum & Slightly Sloped
- .030 Aluminum Exterior Sheeting **NEW!**
- 24” Aluminum Treadplate Rock Guard
- Full DOT Compliant, LED Lighting
- 2K Rated Jack
- Drop Spring Axle (s) & EZ Lube Hubs
- Radial Tires on White Steel Wheels
- Side Door with RV Style, Flush-Lock Latch
- Aluminum Door Hold Back
- Spring Assisted Rear Ramp Door
- 3/4” Engineered Wood Flooring
- 5.2mm Wood Interior Walls
- Aluminum H-Channel Wall Transitions
- Interior 12v LED Dome Light(s) & Switch, Wall Mounted

Screwless exterior

HH SERIES FLAT-TOP CARGO

Single Axle

Model Size	5' x 8'	5' x 10'	6' x 10'	6' x 12'	6' x 14'	7' x 10'	7' x 12'
GAWR (lbs/axle)	3500	3500	3500	3500	3500	3500	3500
*Gross Capacity (GWVR)	2990	2990	2990	2990	2990	2990	2990
*Curb Weight (lbs)	1030	1100	1320	1375	1500	1530	1650
*Payload Capacity (lbs)	1960	1890	1670	1615	1490	1460	1340
Frame Construction	3" Tube Steel	3" Tube Steel	3" Tube Steel	3" Tube Steel	3" Tube Steel	4" Tube Steel	4" Tube Steel
Crossmember Spacing	Formed Channel Steel 24" OC	Formed Channel Steel 24" OC	Formed Channel Steel 24" OC	Formed Channel Steel 24" OC	Formed Channel Steel 24" OC	Formed Channel Steel 24" OC	Formed Channel Steel 24" OC
Wall Uprights Spacing	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC
Roof Bow Spacing	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC
Exterior Sheeting	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum
Tongue Construction	3" Tube Steel A-frame	3" Tube Steel A-frame	3" Tube Steel A-frame	3" Tube Steel A-frame	3" Tube Steel A-frame	4" Tube Steel A-frame	4" Tube Steel A-frame
Tongue Length	34"	34"	34"	34"	34"	38"	38"
Coupler	2" A-frame	2" A-frame	2" A-frame	2" A-frame	2" A-frame	2" A-frame	2" A-frame
Coupler Height	17"	17"	17"	17"	17"	17"	17"
Safety Chains & Hooks	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jack	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel
Axle Type	Drop Spring Idler	Drop Spring Idler	Drop Spring Idler	Drop Spring Idler	Drop Spring Idler	Drop Spring Idler	Drop Spring Idler
Breakaway Kit & Battery	-	-	-	-	-	-	-
Tire Size	ST205/75	ST205/75	ST205/75	ST205/75	ST205/75	ST205/75	ST205/75
Tire Load Range	C	C	C	C	C	C	C
Tire Ply	Radial	Radial	Radial	Radial	Radial	Radial	Radial
Rim Size	15"	15"	15"	15"	15"	15"	15"
Bolt Pattern	5 on 4.5	5 on 4.5	5 on 4.5	5 on 4.5	5 on 4.5	5 on 4.5	5 on 4.5
Trailer Plug	4-prong Flat	4-prong Flat	4-prong Flat	4-prong Flat	4-prong Flat	4-prong Flat	4-prong Flat
Exterior Lighting	LED	LED	LED	LED	LED	LED	LED
Interior Lighting	12V, LED Dome Light	12V, LED Dome Light	12V, LED Dome Light	12V, LED Dome Light	12V, LED Dome Light	12V, LED Dome Light	12V, LED Dome Light
Side Escape Door	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Side Door Height	-	64"	68"	68"	68"	68"	68"
Side Door Width	-	32"	32"	32"	32"	32"	32"
Rear Door Type	Side Swing	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp
Rear Opening Height	65"	65"	70"	70"	70"	70"	70"
Rear Opening Width	58"	58"	66"	66"	66"	78"	78"
Ramp Load Capacity (lb)	-	1000	1000	1000	1000	1000	1000
Overall Length	13'-6"	15'-6"	15'-6"	17'-6"	19'-6"	15'-6"	17'-6"
Overall Width	93"	93"	93"	93"	93"	102"	102"
Overall Height	7'-2"	7'-2"	7'-8"	7'-8"	7'-8"	8'-0"	8'-0"
Interior Length	12'-2"	14'-2"	14'-2"	16'-2"	12'-2"	14'-2"	14'-2"
Interior Width	57"	57"	69"	69"	81"	81"	81"
Between Wheel Wells	-	-	-	-	-	-	-
Interior Height	66"	66	73"	73"	73"	73"	73"
Deck Height	18"	18"	18"	18"	18"	18"	18"
Deck Box Length	9'-10"	11'-10"	11'-10"	13-10"	9'-10"	11'-10"	13'-10"

HH SERIES FLAT-TOP CARGO

Tandem Axle

Model Size	6' x 12'	7' x 12'	7' x 14'	7' x 16'	7' x 18'	7' x 20'
7K Models GAWR (lb/axle)	3500	3500	3500	3500	3500	3500
Gross Capacity (GWVR)	7000	7000	7000	7000	7000	7000
Curb Weight (lb)	1750	1930	2100	2220	2380	2470
Payload Capacity (lb)	5250	5070	4900	4780	4620	4530
10K Models GAWR (lb/axle)	na	5200	5200	5200	5200	5200
Gross Capacity (GWVR)	na	9900	9900	9900	9900	9900
Curb Weight (lb)	na	2200	2250	2400	2630	2870
Payload Capacity (lb)	na	7700	7650	7500	7270	7030
Frame Construction	4" Tube Steel	4" Tube Steel	4" Tube Steel	4" Tube Steel	6" Tube Steel	6" Tube Steel
Crossmember Spacing	Formed Channel Steel, 24" OC	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC
Wall Uprights Spacing	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC
Roof Bow Spacing	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC
Exterior Sheeting	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum
Tongue Construction	4" Tube Steel A-frame	4" Tube Steel A-frame	4" Tube Steel A-frame	4" Tube Steel A-frame	6" Tube Steel A-frame	6" Tube Steel A-frame
Tongue Length	34"	38"	38"	38"	38"	38"
Coupler	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame
Coupler Height	18"	18"	18"	18"	18"	18"
Safety Chains & Hooks	Yes	Yes	Yes	Yes	Yes	Yes
Jack	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel	2K Rated Swivel
Axle Type	Drop spring brake	Drop spring brake	Drop spring brake	Drop spring brake	Drop spring brake	Drop spring brake
Brakes	Yes	Yes	Yes	Yes	Yes	Yes
Breakaway Kit & Battery	Yes	Yes	Yes	Yes	Yes	Yes
Tire Size: 7K 10K	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75	ST205/75 ST225/75
Tire Load Range: 7K, 10K	C, D	C, D	C, D	C, D	C, D	C, D
Tire Ply	Radial	Radial	Radial	Radial	Radial	Radial
Rim Size	15"	15"	15"	15"	15"	15"
Bolt Pattern: 7K 10K	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5	5 on 4.5 6 on 5.5
Trailer Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug
Exterior Lighting	LED	LED	LED	LED	LED	LED
Interior Lighting	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light
Side Escape Door	Yes	Yes	Yes	Yes	Yes	Yes
Side Door Height	68"	68"	68"	68"	68"	68"
Side Door Width	36"	36"	36"	36"	36"	36"
Rear Door Type	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp
Rear Opening Height	69"	69"	69"	69"	69"	69"
Rear Opening Width	66"	78"	78"	78"	78"	78"
Ramp Load Capacity (lb)	1000	1000	1000	1000	1000	1000
Overall Length	17'-6"	17'-10"	19'-10"	21'-10"	23'-10"	26'-10"
Overall Width	92"	102"	102"	102"	102"	102"
Overall Height	7'-9"	8'-1"	8'-1"	8'-1"	8'-3"	8'-3"
Interior Length	14'-2"	14'-2"	16'-2"	18'-2"	20'-2"	22'-3"
Interior Width	69"	82"	82"	82"	82"	82"
Between Wheel Wells	-	-	-	-	-	-
Interior Height	73"	73"	73"	73"	73"	73"
Deck Height	19"	19"	19"	19"	20"	20"
Deck Box Length	11'-10"	11'-10"	13'-10"	15'-10"	17'-10"	19'-10"

HH SERIES FLAT-TOP CARGO

Tandem Axle Cont.

Model Size	8' x 16'	8' x 18'	8' x 20'	101" x 16'	101' x 18'	101" x 20'
7K Models GAWR (lb/axle)	3500	3500	3500	3500	3500	3500
Gross Capacity (GWVR)	7000	7000	7000	7000	7000	7000
Curb Weight (lb)	2500	2650	2760	2610	2810	3010
Payload Capacity (lb)	4500	4350	4240	4390	4190	3990
10K Models GAWR (lb/axle)	5200	5200	5200	5200	5200	5200
Gross Capacity (GWVR)	9900	9900	9900	9900	9900	9900
Curb Weight (lb)	2725	2950	3100	2850	3200	3330
Payload Capacity (lb)	7175	6950	6800	7050	6700	6570
Frame Construction	4" Tube Steel	6" Tube Steel	6" Tube Steel	4" Tube Steel	6" Tube Steel	6" Tube Steel
Crossmember Spacing	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC	Formed Channel Steel, 16" OC
Wall Uprights Spacing	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC	Tube Steel 24" OC
Roof Bow Spacing	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC	Galvanized Tube Steel 24" OC
Exterior Sheeting	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum	.030 Aluminum
Tongue Construction	4" Tube Steel A-frame	4" Tube Steel A-frame	4" Tube Steel A-frame	4" Tube Steel A-frame	6" Tube Steel A-frame	6" Tube Steel A-frame
Tongue Length	38"	38"	38"	38"	38"	38"
Coupler	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame	2-5/16" A-frame
Coupler Height	18"	18"	18"	18"	18"	18"
Safety Chains & Hooks	Yes	Yes	Yes	Yes	Yes	Yes
Jack	2K Rated Coupler Mount	2K Rated Coupler Mount	2K Rated Coupler Mount	2K Rated Coupler Mount	2K Rated Coupler Mount	2K Rated Coupler Mount
Axle Type	Drop Spring Brake	Drop Spring Brake	Drop Spring Brake	Drop Spring Brake	Drop Spring Brake	Drop Spring Brake
Brakes	Yes	Yes	Yes	Yes	Yes	Yes
Breakaway Kit & Battery	Yes	Yes	Yes	Yes	Yes	Yes
Tire Size: 7K	ST205/75	ST205/75	ST205/75	ST205/75	ST205/75	ST205/75
10K	ST225/75	ST225/75	ST225/75	ST225/75	ST225/75	ST225/75
Tire Load Range: 7K, 10K	C, D	C, D	C, D	C, D	C, D	C, D
Tire Ply	Radial	Radial	Radial	Radial	Radial	Radial
Rim Size	15"	15"	15"	15"	15"	15"
Bolt Pattern: 7K	5 on 4.5	5 on 4.5	5 on 4.5	5 on 4.5	5 on 4.5	5 on 4.5
10K	6 on 5.5	6 on 5.5	6 on 5.5	6 on 5.5	6 on 5.5	6 on 5.5
Trailer Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug	7-way RV Plug
Exterior Lighting	LED	LED	LED	LED	LED	LED
Interior Lighting	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light	(2) 12V, LED Dome Light
Side Escape Door	Yes	Yes	Yes	Yes	Yes	Yes
Side Door Height	68"	68"	68"	68"	68"	68"
Side Door Width	36"	36"	36"	36"	36"	36"
Rear Door Type	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp	Spring Assist Ramp
Rear Opening Height	68"	68"	68"	68"	68"	68"
Rear Opening Width	90"	90"	90"	95"	95"	95"
Ramp Load Capacity (lb)	4000	4000	4000	4000	4000	4000
Overall Length	21'-10"	23'-10"	26'-10"	21'-10"	23'-10"	26'-10"
Overall Width	102"	102"	102"	102"	102"	102"
Overall Height	97"-98"	99"-100"	99"-100"	97"-98"	99"-100"	99"-100"
Interior Length	18'-2"	20'-2"	22'-3"	18'-2"	20'-2"	22'-3"
Interior Width	93"	93"	93"	93"	93"	93"
Between Wheel Wells	82"	82"	82"	82"	82"	82"
Interior Height	73"	73"	73"	73"	73"	73"
Deck Height	19"-20"	20"-21"	20"-21"	19"-20"	20"-21"	20"-21"
Deck Box Length	15'-10"	17'-10"	19'-10"	15'-10"	17'-10"	19'-10"

MID-ATLANTIC ENVIRONMENTAL EQUIPMENT MAE2.com

QUOTE

Monday, July 29, 2019

Mr. Walt Henley
PPM
5555 Bankhead Highway
Birmingham, AL 35210

Subject: Martins Texaco

Mr. Henley,

We are pleased to provide the following proposal for (1) turnkey Regenerative Blower system based upon your specifications provided and an assumed site voltage of 240 volt, 60Hz, 3-phase. The system will be built to Class I Div. 2 NEC standards. We will supply the following equipment completely pre-piped, pre-wired, and pre-tested (unless stated otherwise) with appropriate piping, valves, and instrumentation to insure a minimum amount of field connections upon installation of the system. Major equipment is described below for your review and consideration:

VAPOR LIQUID SEPARATOR

Includes: **60 G vapor liquid separator** with:

- 2" Tangential inlet
- 2" outlet
- Aluminum construction
- Internal Demister Plate
- 6" cleanout port with plug
- 2" clear PVC sight tube with true union ends
- Stainless steel stem mounted level assembly
  - High High level alarm switch
  - High pump on switch
  - Low pump off switch
- 1 HP 230 volt 3 phase TEFC Centrifugal transfer pump
- 1" pump inlet brass ball valve
- 1" pump discharge brass swing check
- 1" pump discharge brass gate valve
- Pressure guage 0-100 psi
- 1000 Gallon poly holding tank with LSHH (installed on exterior of trailer)

MID-ATLANTIC ENVIRONMENTAL EQUIPMENT, INC.
Main Phone:
877-MAE2inc
(877-623-2462)
mae2.com

Corporate Headquarters
15 Carroll Drive
Bluffton, SC 29910
843-836-1804
Fax: 843-836-1805
Email: sevans@mae2.com

Assembly Plant
Hardeeville, SC
843-296-4580

Regional Sales Office
182 Spring Oaks Lane
Ruckersville, VA 22968
434-531-3472
Fax: 434-985-1214
Email: jfrydl@mae2.com

VACUUM BLOWER

Includes: One Rotron SLC-KMS-05-3- regenerative vacuum blower with 3HP 230/3P TEFC motor:

- Max Performance at inlet of blower: 150 ACFM max flow, 6.5" Hg max vacuum

Inlet piping to blower to contain:

- Vacuum gauge
- Vacuum transmitter (wired to Ozone PLC)
- Adjustable Vacuum relief valve
- One (1) 2" Solberg inline filter
- 2" Dilution valve with 2" Solberg Filter Silencer
- Sample Port
- 2" SCH80 PVC piping

Discharge piping from blower to contain:

- Sample port
- Pressure gauge 0-100" wc
- Temperature gauge 50-500 F
- Adjustable Temperature Switch
- 2" adsorptive discharge silencer
- 2" SCH40 Aluminized discharge stack with rain flapper cap

Vapor Phase Carbon:

MAE2 model VS 500 Vapor vessel with: (shipped loose for installation by others)

- 500 lbs of vapor phase carbon
- 4" inlet and outlet
- Low pressure drop
- Polyamide epoxy resin internal coating
- (1) 4" D 7' L hose with camlock to connect from system discharge to carbon inlet

Remediation Enclosure:

Built to NEC Class 1 Div 2 standards, all wiring intrinsically safe, all equipment pre-piped, factory tested

7' x 7' x 12' Enclosed Trailer with the following standard features:

- DOT lighting
- Hitch with safety chain
- Hitch Jack
- 1" insulation in walls and ceiling
- 3/8" unfinished plywood walls and ceiling
- ¾" pressure treated plywood floor with anti skid overlay
- White aluminum exterior siding siding
- Double end doors with locking hasp
- 36" man door with locking hasp
- Control panel mounted to front of trailer

Interior to contain the following:

- Vacuum extraction system
- Transfer pump
- (2) 100 watt Exp Light
- 16" EXP Ventilation fan with remote Tstat and sound attenuating rain hood
- 3.6 kW EXP heater with remote Tstat
- (3) 20" Passive vent louver with sound attenuating rain hood
-

Relay Control Panel

- Control enclosure, NEMA 4 UL698A listed
- Main circuit breaker, 230V, 3-pole 4 wire 75 amp
- Branch circuit protection for SVE motor, pump heater, vent fan, lights, GFI and controls
- 1 3 HP and 1 1 HP motor starter with thermal overload
- 2 Illuminated HOA for motor operation and run status
- 2 Hour meter
- 7 alarm lamps
- 1 warning lamp
- Reset push button
- Panel mounted estop
- Alarm interlocks for proper system operation
- Phase/voltage monitor
- Automatic restart after power failure
- Surge and lightening protection
- 24 VDC power supply
- IS relays for switches and transmitters
- Input relay for start stop control from remote panel PLC
- Alarm reset relay for reset restart by remote panel PLC
- All alarms wired with dry contact to terminal for remote PLC

Operation And Maintenance Manual (One Copy):

Operating instructions for all treatment system components
Copy of operating manual for each piece of equipment
Summary of operation controls and failsafes

Pricing Summary:

Regenerative Blower System	$ 45,826.00
Carbon Vessel with inlet hose	$ 3,418.00
Start Up and Training	$ 1,000.00
Freight to Ashville Alabama	$ 750.00

The above pricing does not include applicable state or local taxes.

Should you have any questions or concerns regarding this proposal please feel free to contact me at 1-843-836-1804.

Thank you for the opportunity to provide you with this proposal.

MAE2, Inc.

Shawn T. Evans
Vice President
15 Carroll Drive
Bluffton, SC 29910
Toll Free 877-623-2462
(843) 836-1804
Fx (843) 836-1804
www.mae2.com

Notes, Clarification, Exceptions, Terms and Conditions

1) MAE2 will not initiate work without proper documentation authorizing work to be performed (i.e. a signed purchase order or letter which includes the overall cost of system and options chosen), purchase order number, billing address and Tax Identification Number. This form along with MAE2 Authorization to Proceed must also be signed or referenced in customer's documentation as an attachment or Exhibit.

2) MAE2 will not initiate work without a completed Authorization to Proceed Form (Authorization to Proceed form available from MAE2 and is provided with this quote).

3) First time customers are subject to credit approval (credit approval form available from MAE2 upon request), and may require a down payment.

4) All prices are quoted in $US funds.

5) Terms of payment are per PPM MSA not to exceed Net 120 days after shipment unless otherwise agreed upon by both MAE2 and customer; and are must be specified in both the ATP (Authorization to Proceed) and customer's PO. If not specified in customer's purchase order, terms are defaulted to this item as stated above.

6) If MAE2 is given authorization from the customer to order components at the time of the order, typically delivery will occur in approximately 10 to 12 weeks provided the submittal package is approved in a timely fashion.

7) Proposal and pricing valid for 90 days unless extended by MAE2.

8) This proposal and pricing is based on our interpretation of the sections of the RFP or specification that have been made available to us. Exceptions have been noted where ever possible. In the event of a conflict between the language in the specification and the proposal, the language in the proposal takes precedence and is the basis of the proposed pricing.

9) Shipping charges are not included unless otherwise specified above in the pricing section. All quoted shipping charges are FOB Factory, freight prepaid and charged, unless otherwise specified.

10) All applicable Federal, State and Local sales or use taxes are not included unless otherwise specified above in the pricing section.

11) Electrical service and hook-up to system are not included and are the responsibility of the customer.

12) Local approvals and certificates are not included unless otherwise specified above in equipment description section.

13) At the customer's request, storage of completed systems may be provided. In this case MAE2 will invoice customer (see terms above) and store equipment, free of charge, for 30 days from the notice of readiness to ship. If MAE2 is requested to store equipment beyond 30 days, the customer will be invoiced for a storage fee in the amount of $500.00 per month and for a financing fee of 1% per month of the overall system value. If the customer wishes to initiate payment upon notice of readiness to ship (before actual shipment) the financing fee will not be applicable.

14) Order Cancellations: If a customer chooses to cancel an order before any components are ordered the following charges will apply:
    -Engineering hours spent on the design of the system at a rate of $105 per hour and a $500 administration fee.

Notes, Clarification, Exceptions, Terms, Conditions, and Warranty

(Continued)

15) Overdue accounts, unpaid after 30 days of the above terms, are subject to a finance charge of 1.5% per month. If legal proceedings are instituted for collection of unpaid accounts, the customer will be liable for all costs adjudged by the court, including court costs and reasonable attorney fees.

16) Order Cancellations: If a customer chooses to cancel an order before any components are ordered the following charges will apply: Engineering hours spent on the design of the system at a rate of $105 per hour and a $500 administration fee.

17) WARRANTY: MAE2 warrants and guarantees products of its manufacture against defective workmanship or material for a period of one year from the date of readiness to ship from the factory.

This warranty is expressly and strictly limited to replacing, without charge, any part or parts which prove to MAE2's satisfaction upon examination, to have been defective and which have not been neglected, abused or misapplied, provided the buyer gives MAE2 immediate written notice upon discovery of any claimed defect.

MAE2 will also guarantee component parts manufactured by others to the extent of the guarantee made by the manufacturer of such equipment. In any case, guarantees on specific components will be extended a minimum of one year from date of readiness to ship.

Warranty Exclusions:

Warranty coverage does not include:

(A) Freight, labor, travel, and living expenses associated with parts replacement;
(B) Normal maintenance items such as lubrication, fan belts, and cleaning of the equipment.

In the event the customer, or any installation contractor employed by the customer, contracts outside MAE2 for installation work or erection of quoted equipment, the customer shall assume full responsibility for said contract.

Conditions of Warranty:

MAE2 highly recommends that the system is started by a MAE2 factory trained startup technician to ensure the long term success of your project. We understand that this may not always be feasible in which case we would require a highly skilled startup technician capable of troubleshooting both mechanical and electrical aspects of a process treatment system. This individual shall be familiar with our manual, experienced with our equipment and capable of training the operator on operating and maintenance requirements of the treatment system.

A startup checklist must be provided and returned to the Product Support department at MAE2 to validate your equipment warranty which begins on the date of shipment from the factory.

By signing below, customer (and/or customer representative), understands and agrees to MAE2 Notes, Clarification, Exceptions, Terms, Conditions and Warranty as stated above:

_____ _____

Company Name Date

_____

Authorized Signature (Company Representative)

_____

Title

Mid-Atlantic Environmental Equipment, Inc.

Authorization to Proceed

Order and Customer Information:

Company Name: _____

Billing Address: _____

Technical Contact Name_____
(Technical person who will review submittal package)

Phone: _____

Email: _____

Ship to Address: _____
(Site)

Contact at site: _____ Phone: _____

Customer Project Name: _____

Customer Purchase Order: _____

ORDERING OF COMPONENTS:

- ☐ Order Components Immediately
- ☐ Order Components after Submittal Approval

Authorization to order components immediately will allow MAE2 to place orders for equipment and components of the system, based on the power supply information above and the description of the major system components in the referenced quote. Any changes to the major components or to the electrical supply made by the customer at a later date may require a change order and attract additional costs. The detailed design of the system will be confirmed with the customer in the detailed submittal package submitted by MAE2 when the specific configuration and layout will be developed with customer input.

POWER SUPPLY: VOLTAGE & PHASE (SELECT ONE):

- ☐ 575 V – 3 phase
- ☐ 460V – 3 phase
- ☐ 230V – 3 phase (no neutral)
- ☐ 115/230V – 3 phase (including a neutral high leg delta)
- ☐ 120V/208V – 3 phase (includes a neutral)
- ☐ 208V – 3 phase (no neutral)
- ☐ 115V/230V – 1 phase

Mid-Atlantic Environmental Equipment, Inc.

Authorization to Proceed

LAYOUT CONSTRAINTS:
Please sketch in any site constraints that our designers should consider when laying out our system. Please include desired locations for inlet and discharge lines as well as headers, walls, fence lines or boundary limitations that the system is required to fit within.

CONTROL LOGIC:

Cascading Alarms:

- ❑ High level alarms in water moving system to cascade back to the VLS (VES) or inlet (WTS) tank. **If yes**, answer questions below:
  - ❑ High level alarm in VLS (VES) or inlet tank (WTS) to deactivate if low level alarm is deactivated
  - ❑ High level alarm in VLS (VES) or inlet tank (WTS) to shut system down
- ❑ High level alarms in water moving system to shut down system

General:

- ❑ System to restart after a power failure, not applicable if an Oxidizer is part of the system
- ❑ I have not selected any of the above; please call me to discuss the above control logic.

I have verified the listing and category information above for accuracy and completeness and understand that the order may not proceed unless the information provided is complete.

_____ _____
Company Name Date

_____
Authorized Signature (Company Representative)

_____
Title

July 10, 2019

Mr. Jerry Giltz
MK Environmental Inc.
7150 S. Madison Street
Willowbrook, IL 60527

Re: **Request for Bid for Soil Vapor Extraction (SVE) Remediation Equipment**
Martin's Texaco
36950 US Highway 231 North
Ashville, Alabama
Facility I.D. No. 12534-115-011417
Incident No. UST05-08-06
PPM Project No. 451601-MCAP

Dear Mr. Giltz:

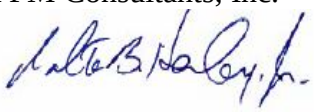
On behalf of Ira Phillips, Inc., PPM Consultants Inc., (PPM) is requesting a quote from your company to construct a soil vapor extraction (SVE) remediation system for use at the referenced site and that will meet the following conditions:

- Flow up to 75 cubic feet per minute (CFM) but typically in the 40 CFM range
- Vacuum of up to 10 inches mercury (in-Hg)
- Dilution valve to reduce vacuum at well head to approximately 1 in-Hg
- Knock-out tank of approximately 1,000 gallons equipped with high level switch
- One 500-pound canister with carbon to treat extracted vapors
- Explosion-proof motor capable of operating with single-phase, 240-volt power
- System controls with wiring/sensors to monitor power, pressure, and temperature conditions and capable of remote re-start (see telemetry notes below)
- Well-ventilated enclosure mounted on a trailer, if possible, with sound-dampening walls/blankets and equipped with heater, fan, and lights.

Please provide a quote for a one-time purchase of the equipment and shipping to the site. Please include in the quote your time required for start-up assistance to include wiring the controls for your equipment to the telemetry that will be provided with separate ozone sparge equipment (not provided by you) that will also be used at the site. All information should be submitted by close of business on July 22, 2019.

If you have any comments or questions, please do not hesitate to contact me at (205) 836-5650.

Sincerely,
PPM Consultants, Inc.



Walter B. Henley, Jr., P.G.
Project Manager / Senior Geologist

c: Mr. Ira Phillips, Jr.

APPENDIX F – INSTALLATION SUBCONTRACTOR SPECIFICATIONS AND QUOTATIONS

SUBCONTRACTOR COMPARISONS - SYSTEM INSTALLATION
FORMER MARTIN'S TEXACO
ASHVILLE, ALABAMA

	TDS			WHE		
SCOPE ITEM	**Units**	**Rate**	**Total**	**Units**	**Rate**	**Total**
SP Installation						
Mobilization	1 L.S.	$200.00	$200.00	1 L.S.	$200.00	$200.00
Mileage	250 miles	$2.32	$580.00	300 miles	$2.32	$696.00
Per Diem	3 days	$300.00	$900.00	4 days	$300.00	$1,200.00
Low-Profile Rig Surcharge	2 days	$250.00	$500.00	days		$0.00
Sparge Point Installation	160 feet	$40.00	$6,400.00	160 feet	$30.00	$4,800.00
Subtotal			**$8,580.00**			**$6,896.00**
System Installation						
Mobilization	1 L.S	$200.00	$200.00	1 L.S	$4,500.00	$4,500.00
Mileage	250 miles	$1.16	$290.00	miles		$0.00
Per Diem	5 days	$300.00	$1,500.00	days		$0.00
Sawcut Concrete	40 feet	$10.00	$400.00	Included in next item		$0.00
Sawcut Asphalt	85 feet	$4.00	$340.00	300 feet	$8.00	$2,400.00
Excavate 12"x12" trench/backfill	125 feet	$12.00	$1,500.00	120 feet	$30.00	$3,600.00
Excavate 12"x18" trench/backfill	10 feet	$17.00	$170.00	10 feet	$20.00	$200.00
Install 4"x1.5' O3 monitoring point	2 each	$65.00	$130.00	2 each	$475.00	$950.00
Install tubing/wiring through conduits	3,540 feet	$0.50	$1,770.00	included		$0.00
Wellhead hook-up	included		$0.00	9 wells	$150.00	$1,350.00
Install 8" manhole cover	2 each	$150.00	$300.00	included		$0.00
Install 12" manhole cover	9 each	$200.00	$1,800.00	9 each	$150.00	$1,350.00
Install 2'x2' vault	1 each	$750.00	$750.00	1 each	$850.00	$850.00
Cap 12" trench with concrete	125 feet	$15.00	$1,875.00	feet		$0.00
Install concrete dowels	40 each	$12.00	$480.00	each		$0.00
Traffic control signs/barricades (6')	7 ea/week	$150.00	$1,050.00	ea/week		$0.00
System hook-up/tie-down/clean-up	1 L.S	$2,300.00	$2,300.00	L.S		$0.00
Bobcat rental	1 week	$750.00	$750.00	week		$0.00
Equipment rental pickup/return	2 each	$125.00	$250.00	each		$0.00
Excavator/saw/compactor rental	5 days	$600.00	$3,000.00	days		$0.00
w/ HDPEor PVC pipe	1 L.S	$14,900.00	$14,900.00	1 L.S	$18,500.00	$18,500.00
1" conduit	included		$0.00	3,560 feet	$1.25	$4,450.00
2" PVC pipe	included		$0.00	180 feet	$2.00	$360.00
Electrical hook-up	1 L.S	$5,950.00	$5,950.00	1 L.S	$3,500.00	$3,500.00
Privacy fence w/ 3 gates (40' x 13' x 8')	1 L.S	$5,500.00	$5,500.00	106 feet	$52.00	$5,512.00
Place/level/compact stone in fenced area	1 L.S	$1,600.00	$1,600.00	1 L.S	$2,600.00	$2,600.00
Install bollards	5 each	$225.00	$1,125.00	5 each	$100.00	$500.00
Stand-by rate	hours	$200.00	$0.00	hours		$0.00
Subtotal			**$47,930.00**			**$50,622.00**
Days to Complete / Totals	**8 Days**		**$56,510.00**	**9 Days**		**$57,518.00**

TECHNICAL DRILLING SERVICES, INC.
QUOTE FORM
For
PPM CONSULTANTS, INC.
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

July 22, 2019

Description	Units	Estimated Quantity	Unit Cost	Total Cost
Mobilization/demobilization	LS	1	200.00	200.00
Mobilization/demobilization	Mile	250	2.32	580.00
Mobilization/demobilization	Mile	0	1.16	0.00
Per diem (3 man crew)	Day	3	300.00	900.00
Surcharge to use GeoProbe rig	Day	2	250.00	500.00
Drill, sample & install a sparge point in soil*	Foot	160	40.00	6400.00
Provide & install a 8" manhole cover	Each	0	150.00	0.00
Provide & install a 12" manhole cover	Each	0	200.00	0.00
Provide & install a 2' x 2' vault	Each	0	750.00	0.00
55-gallon drum	Each	0	50.00	0.00
Stand-by Rate (per crew)	Hour	0	200.00	0.00
			TOTAL JOB ESTIMATE:	**$8,580.00**

*Sparge points & pipe provided by the manufacturer.

TECHNICAL DRILLING SERVICES, INC.
QUOTE FORM
For
PPM CONSULTANTS, INC.
FORMER MARTINS TEXACO
ASHVILLE, ALABAMA

Revised: August 20, 2019

Description	Units	Estimated Quantity	Unit Cost	Total Cost
Mobilization/demobilization	LS	1	200.00	200.00
Mobilization/demobilization	Mile	0	2.32	0.00
Mobilization/demobilization	Mile	250	1.16	290.00
Per diem (3 man crew)	Day	5	300.00	1500.00
Cut trench in concrete pavement with concrete saw	Foot	40	10.00	400.00
Cut trench in asphalt pavement	Foot	85	4.00	340.00
Excavate a 12" x 12" trench & backfill with crusher run	Foot	125	12.00	1500.00
Excavate a 12" x 18" trench & backfill with crusher run	Foot	10	17.00	170.00
Install 4" x 1.5' PVC screen w/locking cap inside trench	Each	2	65.00	130.00
Install 2" PVC pipe in trench	Foot	0	2.00	0.00
Install tubing or wiring provided by client in HDPE pipe	Foot	3540	0.50	1770.00
Provide & install a 8" manhole cover	Each	2	150.00	300.00
Provide & install a 12" manhole cover	Each	9	200.00	1800.00
Provide & install a 2' x 2' vault	Each	1	750.00	750.00
Cap 12" trench with 6" 3000 psi concrete	Foot	125	15.00	1875.00
Cap soil excavation with grass seeds & hay	Foot	0	5.00	0.00
Install 1/2" steel dowels on 2' centers in existing concrete	Each	40	12.00	480.00
Traffic control signage & barricades (7 - 6' jersey barriers)	Ea/Wk	7	150.00	1050.00
System hook up, building tie down, site clean up	LS	1	2300.00	2300.00
Bobcat rental for movement of cuttings & debris	Week	1	750.00	750.00
Rental equipment pick up and return	Each	2	125.00	250.00
Excavator, concrete saw & compactor rental	Day	5	600.00	3000.00
Directional drilling services, incl. 1" HDPE & 2" HDPE pipe	LS	1	14900.00	14900.00
Electrical hook up services	LS	1	5950.00	5950.00
Construct 40' x 13' x 8' tall chain link fence w/three gates	LS	1	5500.00	5500.00
Place, level and compact #57 stone inside fenced area	LS	1	1600.00	1600.00
Provide & a install 4" x 5' bollard in concrete	Each	5	225.00	1125.00
Stand-by Rate (per crew)	Hour	0	200.00	0.00
			TOTAL JOB ESTIMATE:	**$47,930.00**

Cost Proposal

Date	Proposal #
7/15/2019	10744

PO Box 1147
Foxworth, MS 39483

Name / Address	Re:
PPM CONSULTANTS, INC. 5555 BANKHEAD HIGHWAY BIRMINGHAM, AL 35210	Environmental Services Martin's Texaco 36950 US Hwy 231 North Ashville, AL PPM Project No. 451601-MCAP

Description	Unit	Qty	Rate	Total
Mobilize/Demobilize (Drill Crew)	lump sum	1	200.00	200.00T
Mileage	per mile	300	2.32	696.00T
Drill & Install (9) up to 20'- 1" ozone wells	per ft.	160	30.00	4,800.00T
55 Gallon Drums	per each	0	50.00	0.00T
Per-Diem	per day	4	300.00	1,200.00T
Mobilize/Demobilize (System Crew)	lump sum	1	4,500.00	4,500.00T
Horizontal Boring to install 1" PVC conduit	lump sum	1	18,500.00	18,500.00T
Trench & Backfill - Soil	per ft.	10	20.00	200.00T
Trench & Backfill - Concrete/Asphalt	per ft.	120	30.00	3,600.00T
Saw Cutting	per ft.	300	8.00	2,400.00T
1" Conduit	per ft.	3,560	1.25	4,450.00T
2" PVC Sch 40 Piping	per ft.	180	2.00	360.00T
Well Head Hook-up	per each	9	150.00	1,350.00T
12" Flush Mount Cover	per each	9	150.00	1,350.00T
Electricity Hook-up	lump sum	1	3,500.00	3,500.00T
Setup & Level (2) Systems & (1) 1,000 gallon tank	lump sum	1	2,600.00	2,600.00T
Chainlink 8' Privacy Fence with slats	per ft.	106	52.00	5,512.00T
Guard Post	per each	5	100.00	500.00T
Install (2) 4" Ozone monitoring points with 8" manhole covers	per each	2	475.00	950.00T
24" Well Vault for junction box	per each	1	850.00	850.00T

Customer Acceptance of Cost Proposal

_____
Authorized Signature Date

*Payment Terms NTE 30 days upon project completion.
*1.5% Interest will be charged monthly to all overdue invoices.

Subtotal	$57,518.00
Tax (0.0%)	$0.00
Total	$57,518.00

Walker-Hill Environmental, Inc
Foxworth, MS Office
Phone: (601) 736-3500
Email: eric@whenv.com

July 10, 2019

Ms. Britette Lee
Technical Drilling Services, Inc.
16630 Shadow Wood Road
Knoxville, Alabama 35469

Re: Quotation Request for Installing Ozone Sparge/Soil Vapor Extraction System
Martin's Texaco
36950 US Highway 231 North
Ashville, Alabama
Facility I.D. 12534-115-011417
Incident No. UST05-08-06
PPM Project No. 451601-MCAP

Dear Ms. Lee:

PPM Consultants, Inc. (PPM) is proposing to install a groundwater remediation system at the referenced site and requests price quotations for the following three portions of the work elements:

Sparge Point and Ozone Monitoring Points Installation

- Install nine ozone sparge points (SP-1 through SP-9) using hollow-stem augers with a minimum 6.25-inch outside diameter (O.D.) at the locations shown on **Figure 1, Proposed System Layout** and **Figure 2, Detail of Dispenser Area** in **Attachment A, Figures**. Typical construction details are shown on **Figure 3, Ozone Sparge Point and Monitoring Point Construction Details**. The total depths of four of the sparge points are estimated to be approximately 20 feet below ground surface (BGS) and the total depths of the other five sparge points are estimated to be approximately 16 feet BGS. For costing purposes, please use a total of 160 feet of drilling for the sparge points. Work will be performed under a canopy; therefore, a low-profile rig will be required.

- All well construction materials (excluding sand pack, bentonite, grout, and manholes) will be provided by the equipment manufacturer. All down-hole drilling equipment will be properly cleaned prior to use at each location.

- Investigation-derived waste such as soil cuttings will be placed into a roll-off container provided by others.

Horizontal Boring Installation

- Most of the piping will be installed using directional drilling techniques to minimize disruption to facility operations. The horizontal borings will be installed in three sections by pushing a steering bit along an inclined path to a depth of at least 4 feet BGS, at which depth the boring will be maintained until near an exit point or near sparge points.

    - One section of the horizontal boring will be advanced from an entry point near the equipment enclosure and exit at a junction box located near the northwest corner of the property near the well vault for the existing horizontal well (HW-1). This part of the piping run and the equipment enclosure location are shown in **Figure 2**. Once the bit has exited the ground, the bit will be replaced with a reamer bit and thirteen (13) 1-inch nominal diameter high-density polyethylene (HDPE) conduits plus one 2-inch nominal diameter Schedule 40 PVC conduit will be attached with a flexible mesh strap. The drill pipe and conduits will be pulled back through the boring to the entry point. Each of the conduits will be stubbed up at both the junction box and the equipment enclosure.

    - A second portion of the boring will be advanced from the junction box along a path between sparge points SP-1 through SP-5 **(Figure 1)**. This section of the boring will be inclined to a depth of approximately 12 to 18 inches at points closest to each sparge point except at the southern end of the run where it will be brought to the surface. At that point, the bit will be replaced with a reamer bit, and seven 1-inch nominal diameter HDPE conduits will be attached to the drill string and pulled back through the boring to the junction box.

    - A second portion of the boring will be advanced from the junction box along a path between sparge points SP-6 through SP-9 **(Figure 1)**. This section of the boring will be inclined to a depth of approximately 12 to 18 inches at points closest to each sparge point except at the southern end of the run where it will be brought to the surface. At that point, the bit will be replaced with a reamer bit and six 1-inch nominal diameter HDPE conduits will be attached to the drill string and pulled back through the boring to the junction box.

- Investigation-derived waste such as soil cuttings and drilling fluids will be solidified and placed into a roll-off container provided by others.

Trenching and System Installation

- Installation of an 8-foot tall, chain link fence that is 20 feet by 30 feet with privacy slats to surround the system enclosure at the location designated on **Figure 1**. A double gate should be placed on the southwestern side.

- A total of five bollards, filled with concrete, will be installed along the western and southern sides of the equipment compound.

- Position one trailer-mounted ozone sparge system and one trailer-mounted soil vapor extraction (SVE) system (each provided by vendor) inside the fenced area, including set-up and leveling (1/2-inch over 2 feet) of the system components. The two trailers containing the systems shall be secured to the ground with tie-down straps at each corner.

- Position one 1,000-gallon knock-out tank (provided by vendor) for water generated by the SVE system inside the fenced area, including set-up and leveling. The tank shall be secured to the ground with tie-down straps at each corner.

- Provide power hook-up to the ozone sparge system. Two different sizes of the ozone system are being considered for purchase, but the largest requires three phase, 208-volt, 125-amp service. The SVE system requires single-phase, 60-amp service. All electrical work must be performed by a licensed electrician in accordance with state and local code. Site is located within the Ashville city limits and a business license will be required.

- Trench approximately 85 feet in asphalt (estimated to be 3 inches thick) and 35 feet in concrete (estimated to be 6 inches thick) for the installation of conduits from the horizontal borings to each of the sparge points and ozone monitoring points and the installation of SVE piping from the junction box to the well vault for HW-1 **(Figure 2)**. The piping should be installed no more than 6 inches below the base of the asphalt/concrete. PPM requests that the contractor minimize the width of the concrete cuts and trench (preferably less than one foot in width, if possible). ***The trench will require hand-digging in the areas where fuel piping is likely to be encountered (near SP-4, SP-7 and SP-9).*** Utilities will be attempted to be located by a ground-penetrating radar (GPR) provided by others prior to installation activities. **Figure 4, Trench and Junction Box Construction Details**, show the typical construction of the trenches and the junction box.

- Connect HDPE piping in trenches with appropriate HDPE piping in horizontal borings.

- Connect 2-inch nominal diameter PVC piping in trench with 4-inch nominal diameter riser at HW-1.

- Provide approximately 3,300 feet of 1-inch nominal diameter (I.D.) HDPE piping that will contain ozone delivery tubing or wiring for ozone monitoring points.

- Provide approximately 160 feet of 2-inch nominal diameter Schedule 40 PVC piping for use with the SVE system.

- Provide appropriate elbows and fittings to connect piping in trenches to piping in horizontal borings and to connect 2-inch nominal diameter SVE piping with the 4-inch nominal diameter riser at HW-1.

- Open trenches should be covered with steel plates rated for vehicular traffic until finished with concrete.

- Each sparge point (nine total) will have separate delivery tubing connected to the manifold at the ozone system. The ozone delivery tubing and wiring for the ozone monitoring points will be provided by the equipment manufacturer. Trenching and piping will be performed in accordance with the dimensions and details on the attached drawings. Trenches performed in asphalt and concrete will be backfilled with the gravel removed from the trench or new crusher run stone to approximately six inches below the top of pavement and covered with concrete (see below). Dowel rods should be installed at 2-foot center on either side of trenches advanced in concrete. Unit prices should be broken out accordingly. Technical specifications for installation of the ozone lines are included in **Attachment C**, **Ozone Sparge Lines**.

- Provide and install 4-inch nominal diameter slotted screen placed vertically to the base of the trench at the two subsurface ozone monitoring point locations. Eight-inch diameter manholes will be constructed in 2-foot by 2-foot, 6-inch thick concrete well pads over the ozone monitoring points. The construction of the ozone monitoring points is shown in **Figure 3**.

- Provide and install 12-inch diameter manholes at the nine sparge points ozone monitoring points. Manholes will be constructed in 2-foot by 2-foot, 6-inch thick concrete well pads.

- Provide and install 2-foot by 2-foot square vault at the junction box location shown in **Figures 1** and **2**. The vault will be set in a 4-foot by 4-foot, 6-inch thick concrete pad. Construction details for the junction box are shown in **Figure 4**.

- Trenches and manholes performed in asphalt and concrete will be completed at the surface with concrete. The finished grade of concrete should match the existing grade on both sides of the trench and a light broom finish should be applied after the concrete has been allowed to slightly cure. **Note: If the concrete work does not look professional, look clean, match the existing surface, or significantly cracks, the contractor may be required to remove and replace the concrete at their own costs**.

- Provide a licensed electrician to connect the ozone system to the power supply in accordance with state and local code. Electrical work shall be completed within one week of completion of concrete work. **Note: Charles Tortorice of Tortorice Electrical has worked with PPM on previous projects. His cell number is 205-965-4066**.

- Installation of materials and connections for ozone sparge points in accordance with **Figure 2**. This includes connecting the individual ozone delivery lines to the ozone system manifold.

- Excavated soil, asphalt, concrete, and waste will be placed into a roll-off container provided by others

- Restoration of site to original conditions. Specifications for site cleanup are included in **Attachment D, Cleanup, Repair, Etc.**

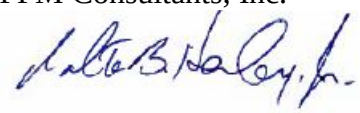
Work areas at the site shall be barricaded for safety reasons during all work. The contractor shall perform work in consecutive workdays until such time that the project is complete. A schedule of implementation should be submitted one week prior to initiation of work. Work for each phase shall be performed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

Please provide two separate estimates: one for Sparge Point and Ozone Monitoring Point Installation, and one for Horizontal Boring, Trenching, and System Installation. You are not required to submit estimates for both portions and PPM may award each portion to a separate contractor.

Please provide your estimates in a unit rate format that can be utilized if a work change order is necessary. Also, please provide your estimated number of days to complete each portion of the work. Payment will be made based on actual measurements following completion of the work. Should the estimated quantities be exceeded, a change order should be requested prior to initiation of work. If this is not practical, at a minimum, a verbal confirmation should be requested and followed up by written correspondence (fax). It is noted that all unit rates and pass-through fees should be consistent with Alabama Tank Trust Fund (ATTF) rates, when applicable.

PPM strongly recommends, but does not require, that you visit the site prior to your submittal. **Proposals are due to PPM by end of day, Monday, July 22, 2019**. If you have any questions or need additional information, please contact me at your convenience.

Sincerely,
PPM Consultants, Inc.



Walter B. Henley, Jr., P.G.
Project Manager

Attachments: Attachment A – Figures
Attachment B – Electrical
Attachment C – Ozone Sparge Lines
Attachment D – SVE Lines
Attachment E – Cleanup, Repair, Etc.

ATTACHMENTS

ATTACHMENT A

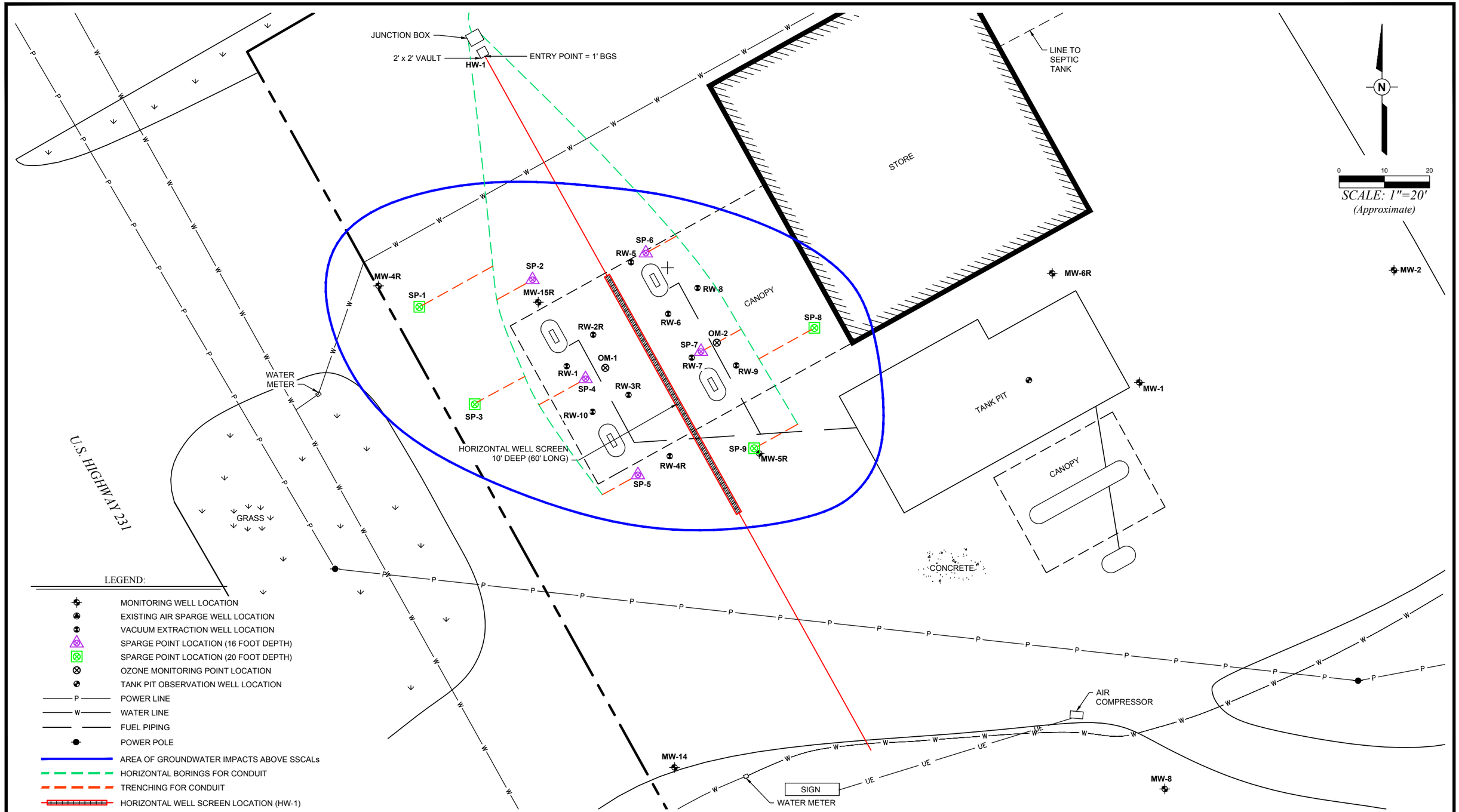
FIGURES

PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: JCP	DRAWN DATE: 07/08/19
PROJECT NUMBER: 451601	PHASE: MCAP

IRA PHILLIPS, INC.
FORMER MARTIN'S TEXACO
36950 U.S. 231 NORTH
ASHVILLE, ALABAMA

PROPOSED SYSTEM LAYOUT

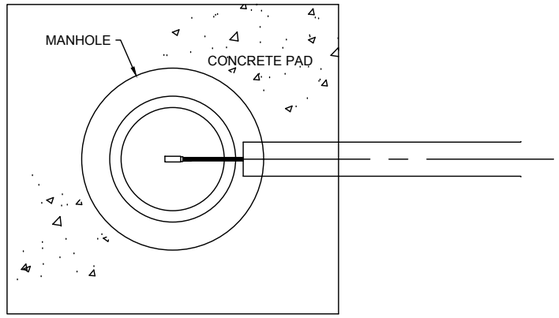
FIGURE NUMBER
1



PPM CONSULTANTS, INC. www.ppmco.com		IRA PHILLIPS, INC. **FORMER MARTIN'S TEXACO** 36950 U.S. 231 NORTH ASHVILLE, ALABAMA	DETAIL OF DISPENSER AREA
DRAWN BY: JCP	DRAWN DATE: 07/08/19		FIGURE NUMBER 2
PROJECT NUMBER: 451601	PHASE: MCAP		

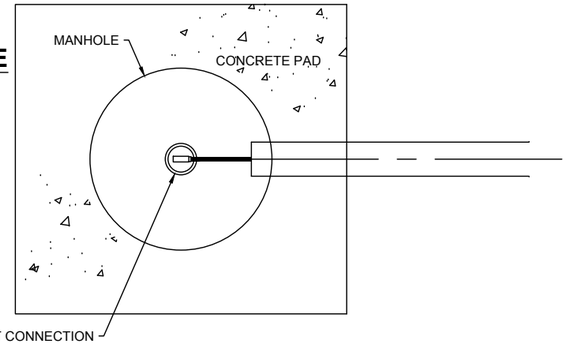
NOTES:

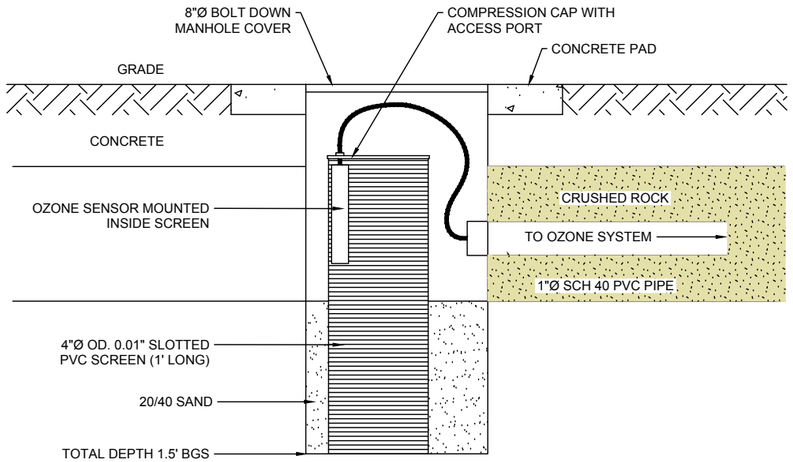
1. WELLHEAD CONNECTIONS, RISER AND OXIDATION POINTS TO BE PROVIDED BY EQUIPMENT MANUFACTURER.
2. OZONE DELIVERY TUBING TO BE PROVIDED BY EQUIPMENT MANUFACTURER.
3. OZONE DELIVERY TUBING TO BE INSTALLED DURING PLACEMENT OF 1"Ø SCHEDULE 40 PVC CONDUIT.
4. MANHOLE COVERING TO BE PROVIDED AND INSTALLED BY SYSTEM INSTALLATION CONTRACTOR.
5. OZONE SENSORS TO BE PROVIDED BY EQUIPMENT MANUFACTURER.



TYPICAL OZONE / OXYGEN SPARGE WELL PLAN VIEW

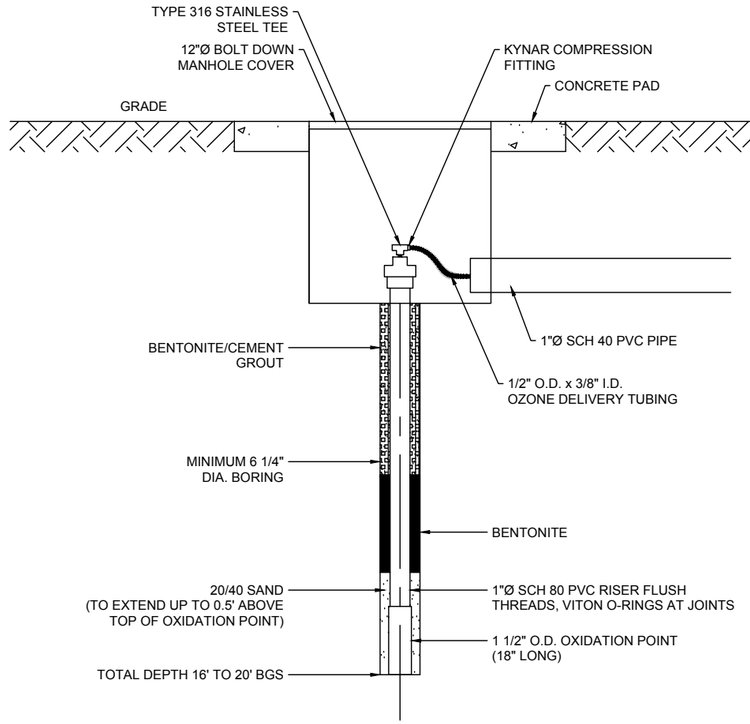
NOT TO SCALE





OZONE MONITORING POINT DETAIL

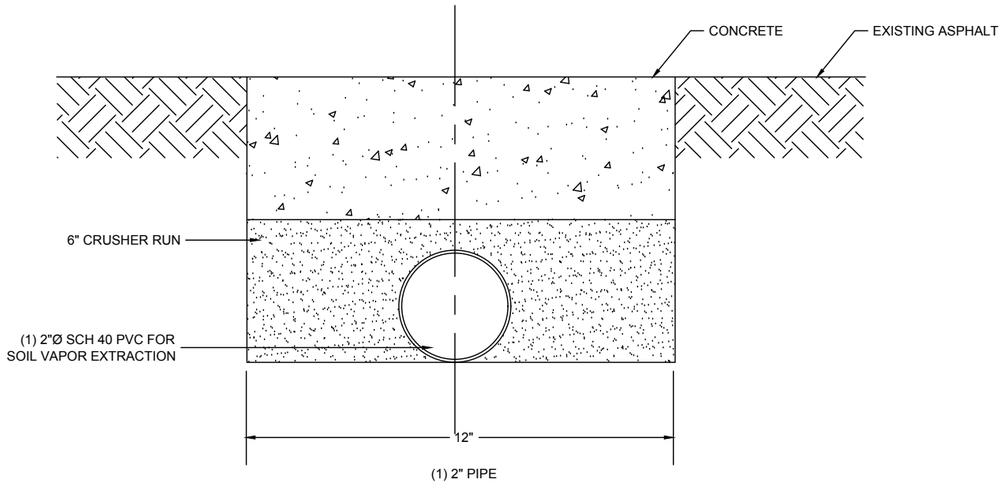
NOT TO SCALE



TYPICAL SPARGING WELL DETAIL

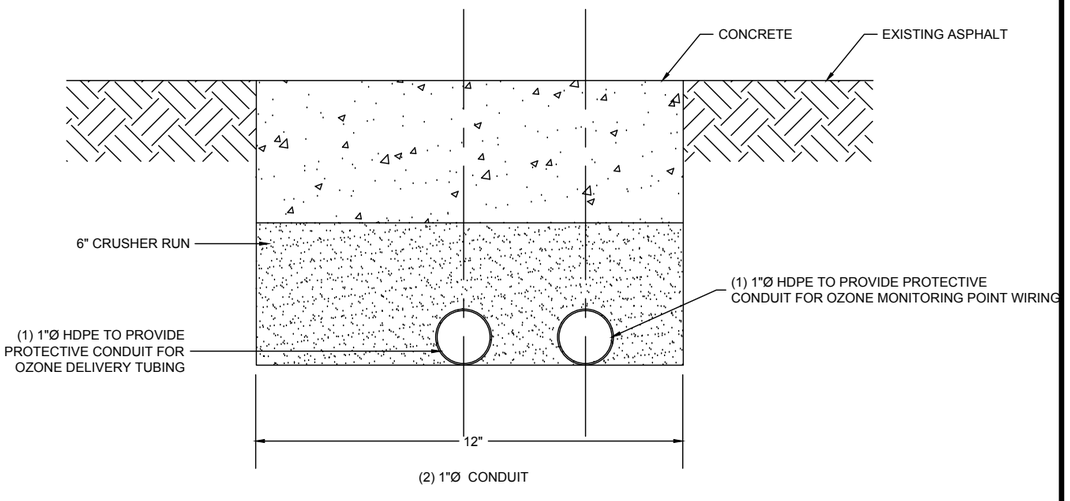
NOT TO SCALE

PPM CONSULTANTS, INC. www.ppmco.com		IRA PHILLIPS, INC. **FORMER MARTIN'S TEXACO** 36950 U.S. 231 NORTH ASHVILLE, ALABAMA	OZONE SPARGE POINT AND MONITORING POINT CONSTRUCTION DETAILS
DRAWN BY: JCP	DRAWN DATE: 07/08/19		FIGURE NUMBER 3
PROJECT NUMBER: 451601	PHASE: MCAP		



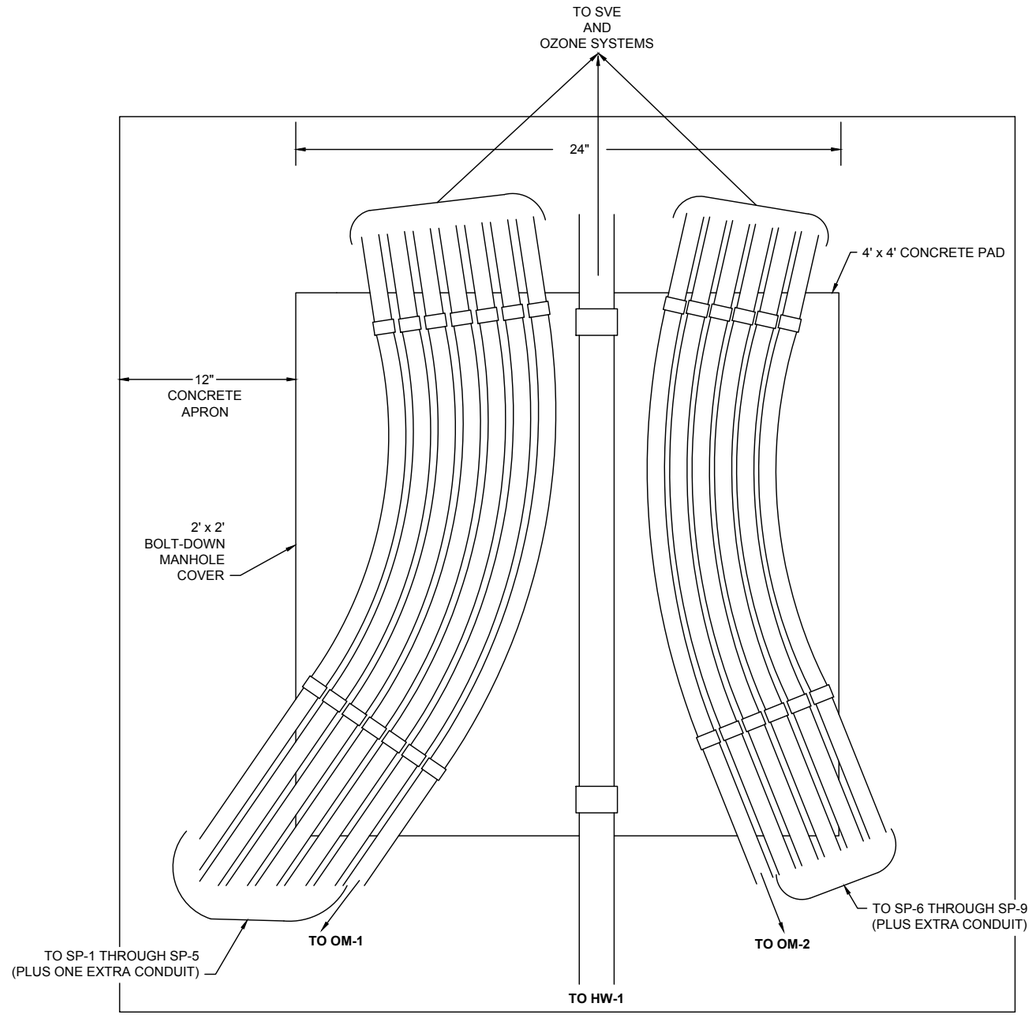
TYPICAL TRENCH DETAIL - JUNCTION BOX TO HW-1

NOT TO SCALE



TYPICAL TRENCH DETAIL - TO SP-4 OR SP-7

NOT TO SCALE



JUNCTION BOX DETAIL

NOT TO SCALE

PPM CONSULTANTS, INC. www.ppmco.com	
DRAWN BY: JCP	DRAWN DATE: 07/08/19
PROJECT NUMBER: 451601	PHASE: MCAP

IRA PHILLIPS, INC.
FORMER MARTIN'S TEXACO
36950 U.S. 231 NORTH
ASHVILLE, ALABAMA

TRENCH AND JUNCTION BOX CONSTRUCTION DETAILS

FIGURE NUMBER
4

APPENDIX G – GROUND-PENETRATING RADAR SURVEY QUOTE

July 30, 2019

PPM Consultants
Attn: Walt Henley
Phone: (205) 913-1452
Email: walt.henley@ppmco.com

Project: 36950 Highway 231 North, Ashville, Alabama

GPRS appreciates the opportunity to provide this proposal. I encourage you to visit our website (www.gprsinc.com) and contact any of the numerous references listed. Our insurance certificate and W-9 can also be downloaded here. Please feel free to contact me if you have any questions, or if you need additional information.

SCOPE OF WORK

We understand the scope to be to search for underground utilities in the vicinity of an L-shaped proposed work area measuring approximately 275' on the long side and 175' on the short side (20,000sf in total.) We will attempt to trace any utilities for which there are structures visible from the work area. The client will be responsible to provide drawings or notify GPRS of any utilities known to be entering the work area for which there are no apparent surface features or structures that are visible from the work area. The areas should be laid out, marked, and cleared of obstructions prior to our arrival in order to avoid additional charges. Please visit www.simspec.org for an overview of our industry-leading best practices that will be applied to this project.

EQUIPMENT

- **350/400 MHz GPR Antenna.** The antenna is mounted in a stroller frame which rolls over the surface. The surface needs to be reasonably smooth and unobstructed in order to obtain readable scans. Obstructions such as curbs, landscaping, and vegetation will limit the feasibility of GPR. The data is displayed on a screen and marked in the field in real time. GPR works by sending pulses of energy into a material and recording the strength and the time required for the return of the reflected signal. Reflections are produced when the energy pulses enter into a material with different electrical properties from the material it left. The strength of the reflection is determined by the contrast in signal speed between the two materials. The total depth achieved can be as much as 8' or more with this antenna but can vary widely depending on the conductivity of the materials. Conductive soil types such as clay may limit maximum depths to 3' or less. As depth increases, targets must be larger in order to be detected and nonmetallic targets can be especially difficult to locate. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: Link
- **Electromagnetic Pipe Locator.** The EM locator can passively detect the electromagnetic fields from live AC power or radio signals travelling along some conductive utilities. It can also be used in conjunction with a transmitter to connect directly to accessible, metallic pipes, risers, or tracer wires. A current is sent through the pipe or tracer wire at a specific frequency and the resulting EM field can then be detected by the receiver. A utility's ability to be located depends on a variety of factors including access to the utility, conductivity, grounding, interference from other fields, and many others. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: Link
- **Traceable Rodder.** The rodder has a copper wire encased in 5/16" of fiberglass. The line is pushed through accessible pipes before placing a current on the wire which is then traced from the surface. The maximum traceable depth is 10' depending on the soil conditions and the maximum distance is 300'. The line can be pushed through a pipe with direct access such as a sewer line at a cleanout or a storm drain catch basin. It may not be able to be pushed through deeper pipes within manholes and conduits will not be accessed by GPRS. The signal cannot be located through metallic pipes. For more information, please visit: Link
- **GPS.** This handheld GPS unit offers accuracy down to 4 inches, however, the accuracy will depend on the satellite environment and obstructions and should not be considered to be survey-grade. Features can be collected as points, lines, or areas and then exported into Google Earth or overlaid on a CAD drawing. For more information, please visit: Link

MAP OF SCAN AREA

PROJECT COSTS

SERVICE	SCOPE	PRICE	
SCANNING/FIELD MARKINGS	Described on Page 1		$1,000
GOOGLE EARTH OVERLAY	Included		Included
MOBILIZATION	Included		Included
TOTAL			***$1,000**
OPTIONAL SERVICES (INITIAL IF DESIRED)			
WRITTEN REPORT	Basic report of findings with photos and example data.	Initial ____	$200
CAD DRAWING	Findings will be drafted in AutoCAD with an aerial image background. A linework version will also be provided if the client provides an existing drawing. Results are not survey-grade accuracy.	Initial ____	$600

*This price assumes that we will be given access to perform the work during normal weekday business hours (6am-5pm). As-builts and any other applicable drawings should be made available to GPRS prior to the project. A thorough utility search can only be completed if GPRS is given access to all utility structures, interior and exterior. This service is never a replacement for the use of the state One Call system (811). All of our technicians have OSHA-10 safety training or greater. Site-specific safety training is not included in this quote. Please notify us if this project requires additional safety training.

TERMS & CONDITIONS

1. Customer agrees to meet and perform all requirements described in this document and has fully read and understands all items listed within this document.
2. Customer acknowledges it understands that our results are based upon the quality of the data retrieved which is determined by a variety of factors, including, but not limited to, the limitations listed in the "Equipment" section of this document. These limitations are inherent to all locating equipment. The decision to proceed with drilling, excavation or any destructive methods is left entirely up to the customer.
3. GPRS is not liable for inaccurate data reporting or for any other reason, and customer agrees to release and indemnify GPRS and its owners and agents from all losses and damages from all alleged negligence and/or contract claims by customer or any third party. These terms and conditions supersede any other previous terms and conditions, or representation, either oral or written.
4. If GPRS provides maps or CAD drawings, please note that the map is not survey quality. These are representations of GPRS' utility findings performed on a previous date. The GPRS scan performed was of limited scope and utilities outside this scope are not shown.
5. GPRS does not conduct an investigation, analysis, or interpretation of soil composition, soil conditions, or geological or geophysical information, Customer acknowledges it understands that we are merely reporting retrieved data and that we do NOT provide professional geophysical, geological, engineering, or land surveying services. Customer should contact a professional in those fields if such services are needed.
6. Payment is due upon receipt of invoice.
7. If for some reason the technician arrives on site and the work is cancelled there will be a charge of $500.00 per requested technician.

ACCEPTED AND AGREED:

Billing Company Name:_____

Billing Address: _____

Company Phone/Email: _____ PO#:_____ Job#:_____

Print Name:_____ Signature:_____ Date:_____

APPENDIX H – WASTE DISPOSAL QUOTE

SUBCONTRACTOR COMPARISONS - WASTE DISPOSAL
FORMER MARTIN'S TEXACO
ASHVILLE, ALABAMA

	Advanced Disposal				Republic			
SCOPE ITEM	**Units**		**Rate**	**Total**	**Units**		**Rate**	**Total**
20 cy Rolloff Delivery/Pickup (Roundtrip)	3	each	$192.43	$577.29	3	each	$190.58	$571.74
Haul charge	3	hauls	$187.97	$563.91	3	hauls	$355.63	$1,066.89
Disposal charge	30	tons	$54.449	$1,633.47	30	tons	$36.85	$1,105.50
Monthly rental charge		included		$0.00	1	month	$60.00	$60.00
Liners	3	each	$70.65	$211.95	3	each	$30.00	$90.00
Fees		included			1	estimate	$777.50	$777.50
Totals				**$2,986.62**				**$3,671.63**

Rolloffs	$789.24	$721.74
Hauling/Disposal	$2,197.38	$2,949.89

August 06 2019

PPM Consultents
Walt Henley

,

Dear Walt,

Although it's not something you think about every day, waste removal is an important part of your business operation. And when done correctly, by the right vendor, environmental service is something you should rarely have to spend time worrying about.

As your service provider, Advanced Disposal thanks you for your business and looks forward to our partnership with PPM Consultents for many years to come. Based on your existing service levels and your stated future needs, we know your most pressing waste-related issues.

As always, our goal is to continue to ensure you will rarely have to concentrate on waste removal services and you can stay focused on meeting your core business objectives. I will contact you to discuss this proposal in more detail and answer any questions you may have.

Sincerely,

Amanda Houck

Cost Analysis

Making a Smart Investment in Environmental Services Solution

Site Name: L0017761
Site Address: 36950 us hwy 231 n, ashville, al 35953

SERV #	SERV TYPE	ACTIVITY DESCRIPTION	QTY	CONT SIZE	ADS OWNED?	COMP.	FREQ	DELIVERY CHARGE	EXTRA PICK UP/HAUL RATE/PER SERVICE CHARGE	DISPOSAL CHARGE	MONTHLY CHARGE
A	TEMP RO TRASH	ROLL OFF ROUNDTRIP	2	20 Yard	Yes			$192.43	$187.97	$54.449/Ton	
A	TEMP RO TRASH	LINER	2		Yes				$258.62		
										Total EST Monthly/Recurring Charges (including Est Energy/Environmental/CBIC Charges)	$602.52

PLUS ANY APPLICABLE GOVERNMENTAL TAXES, SURCHARGES, AND OR FEES

Roll Off Est Monthly Hauls 1.00 **Roll Off Est Tons per Haul** 4

Henley, Walt

From: Mark Davis <Mark.Davis@advanceddisposal.com>
Sent: Thursday, August 29, 2019 3:16 PM
To: Henley, Walt
Subject: Re: Rolloff quote for Ashville site

Yes.

Sent via the Samsung Galaxy S8, an AT&T 4G LTE smartphone

-------- Original message --------
From: "Henley, Walt" <walt.henley@ppmco.com>
Date: 8/29/19 3:08 PM (GMT-06:00)
To: Mark Davis <Mark.Davis@advanceddisposal.com>
Subject: RE: Rolloff quote for Ashville site

So, another $192.43 for one extra delivery fee? And since they will all have a liner, the haul fee for each one will be $258.62 instead of $187.97? Do I have that right?

Walt

From: Mark Davis <Mark.Davis@advanceddisposal.com>
Sent: Thursday, August 29, 2019 2:52 PM
To: Henley, Walt <walt.henley@ppmco.com>
Subject: Re: Rolloff quote for Ashville site

I would estimate one more delivery fee..you will have a liner fee with each haul plus haul fee.....

Sent via the Samsung Galaxy S8, an AT&T 4G LTE smartphone

-------- Original message --------
From: "Henley, Walt" <walt.henley@ppmco.com>
Date: 8/29/19 2:46 PM (GMT-06:00)
To: Mark Davis <Mark.Davis@advanceddisposal.com>
Subject: Rolloff quote for Ashville site

Mark,

Thanks for talking to me today. I just wanted to make sure I understand the quote that Amanda sent me (attached) and am adding up the numbers correctly. So for instance, if I am planning on generating about 30 tons of material, I would suspect I would need three 20 cy rolloffs. Can you tell me if I have the numbers correct below?

- Delivery charge for 20 cy Rolloff #1 - $ 192.43
- Delivery charge for 20 cy Rolloff #2 - $ 192.43
- Haul charge for loaded (10 tons) Rolloff #1 - $ 187.97
- Haul charge for loaded (10 tons) Rolloff #2 - $ 187.97
- Rolloff #1 returned with liner & hauled again (10 tons) - $ 258.62
- Disposal charge for 30 tons (3 rolloffs) @ $54.449/ton - $ 1,633.47
- TOTAL **$ 2,652.89**

I'm assuming I can get 10 tons in each rolloff but please let me know if that's not feasible. The quote seems to say 4 tons per haul.

I didn't want to bother her at this time so I really appreciate your help! I hope her father will be okay.

Walt

Walter B. Henley, Jr., P.G.
Senior Geologist
PPM Consultants, Inc.
5555 Bankhead Highway
Birmingham, AL 35210
p: 205-909-1457
m: 205-913-1452
walt.henley@ppmco.com
www.ppmco.com

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

REPUBLIC SERVICES

PROPOSAL

7/29/2019

Walt Henley
PPM Texaco SPW Soil Temp
36950 Us Highway 231
Ashville, AL 35953
Quote: A194633687

PPM Consultants:

Below is our proposal of recommended services, customized for your business needs identified during our discussions. If you ever need additional services, or just need an extra pickup, please give us a call at 256-237-7219. It's that easy.

Service Details

LARGE CONTAINERS

Equipment Qty/Type/Size:	1 - Open Top 20.00Yd(s)	Haul Rate:	$355.63 per haul
Frequency:	On-Call	Disposal Rate:	$36.85 per ton
Material Type:	Special Waste	Basic Service Charge:	$60.00 per month
Hauls/ month:	3.0		

Estimated Monthly Amount *

Large Container Haul Charge	$1,066.89
Large Container Disposal Charge (30 tons)	$1,105.50
Large Container Rental Charge	$60.00
Additional Per Haul Items	
1 - Liner	$30.00
Total Fuel/ Environmental Recovery Fees**	$712.04
Administrative Fee**	$5.95
Total Estimated Amount	$2,980.38

One Time Charges

Delivery Charge Subtotal	$190.58
Total Fuel/ Environmental Recovery Fees**	$59.51
Total One-Time Amount	$250.09

Zachary Smith
Republic Services
205-255-3915
zsmith@republicservices.com
www.republicservices.com

* The Total Estimated Amount is merely an estimate of your typical monthly invoice amount without one-time start-up charges (e.g., delivery). It does not include any applicable taxes or local fees, which would be additional charges on your invoice.

** FRF, ERF & ADMIN: The Fuel Recovery Fee (FRF) is a variable charge that changes monthly. For more information on the FRF, Environmental Recovery Fee (ERF) and Administrative Fee, please visit the links available on the Bill Pay page of our website, www.republicservices.com. The proposed rates above are

APPENDIX I – TECHNICAL SAMPLING AND QA/QC PLAN

1.0 TECHNICAL SAMPLING AND ANALYSIS PLAN FOR GROUNDWATER MONITORING

1.1 PURPOSE

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

1.2 LIQUID GAUGING PROCEDURES

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

$$WTE = ETC - DTW$$

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

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

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

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

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

1.3 GROUNDWATER SAMPLING PROCEDURES

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

1.4 LABORATORY ANALYSES

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

2.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN

2.1 PURPOSE

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

2.2 GROUNDWATER SAMPLING

2.2.1 Well Purging

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

2.2.2 Sample Collection

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

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

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

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

2.2.3 Decontamination

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

2.2.4 Sample Dispatch

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

2.3 SAMPLE CUSTODY

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

2.3.1 Documentation

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

- Project number and location of the site.

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

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

2.3.2 Custody Procedures

COC procedures implemented during the project are as follows:

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

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

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

2.4 QUALITY CONTROL CHECKS

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

2.4.1 Trip Blanks

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

2.4.2 Duplicate Samples

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

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

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

Name	Signature	Affiliation	Date
Name	Signature	Affiliation	Date
Name	Signature	Affiliation	Date
Name	Signature	Affiliation	Date
Name	Signature	Affiliation	Date
Name	Signature	Affiliation	Date
Name	Signature	Affiliation	Date
Name	Signature	Affiliation	Date
Name	Signature	Affiliation	Date

APPENDIX J – REMEDIATION MONITORING FORMS

OZONE/SVE SYSTEM FIELD MONITORING FORM

Site ID:	*Former Martin's Texaco*	**Client:**	*Ira Phillips, Inc.*	**Project Number:**	*451601-OM*
Site Location:	*36950 US Highway 231 N, Ashville, AL*			**System Configuration:**	
Date:				**Time of Arrival / Departure:**	/
Personnel:				**Status of System:**	

SPARGE POINT DATA

Valve No.	Sparge Point	Online (Y/N)	Online? (O2 or O3)	Cycle Time	Pressure @ Manifold (psi)	Airflow @ Manifold (cfm)	Operational Time			
							Total	O_3	O_2	Air
1	SP-1									
2	SP-2									
3	SP-3									
4	SP-4									
5	SP-5									
6	SP-6									
7	SP-7									
8	SP-8									
9	SP-9									

SVE BLOWER DATA

Blower Operating When Arrive?		**SVE Blower Vac (in-H20)**	
Blower Effluent Temp		**Knock-Out Tank Level (gallons)**	
Airflow @ Blower (in-H20)		**Storage Tank Level (gallons)**	
Blower Effluent Pressure (in-H20)		**HW-1 Pumped?**	
Bearings Greased (Y/N)		**Pumping Duration (minutes)**	
Effluent Reading - Pre-Carbon (ppmv)		**Pumping Volume (gallons)**	
Effluent Reading - Post-Carbon (ppmv)		**Blower Operating When Left?**	

OZONE/SVE SYSTEM FIELD MONITORING FORM

MISCELLANEOUS ***Date*** ***Initials***

Ambient Temp. (°F)	Ozone Reading in Enclosure (ppm)	Cabinet Temp. (°F)	Building Temp. (°F)	O2 Moisture Indicator BLUE (Y/N)	A-Side			B-Side		
					ATF Inlet Pressure (psi)	O2 Airflow (scfm)	O3 Reactor Pressure (psi)	ATF Inlet Pressure (psi)	O2 Airflow (scfm)	O3 Reactor Pressure (psi)

O&M Readings Time	System Runtime (hrs)	Cycle Lag Time (minutes)	Air Tower Runtime (hrs)	A-Side ATF O2 Percent	B-Side ATF O2 Percent	Comp. Pres. (psi)	Comp. Temp. (°F)	Air to Manifold Reg. Pressure (psi)	System Comps. Checked for Leaks (Y / N)	System Comps. Checked for Leaks (Y / N)

Ozone Reading at OMP1 (ppmv)	Ozone Reading at OMP2 (ppmv)

MONITORING WELL DATA

Well ID	Depth to Water (ft BTOC)	Induced Pressure	Sparge Point(s) Online?	Other Info
MW-4R				
MW-5R				
MW-6				
MW-15R				
RW-1				
RW-2R				
RW-3R				
RW-4R				
RW-5				
RW-6				
RW-7				
RW-8				
RW-9				
RW-10				

Work to be Performed This Visit

OZONE/SVE SYSTEM FIELD MONITORING FORM

COMMENTS:

APPENDIX K – SITE HEALTH AND SAFETY PLAN

HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

HEALTH AND SAFETY PLAN

IRA PHILLIPS, INC.
FORMER MARTIN'S TEXACO
36950 U.S. HIGHWAY 231 NORTH
ASHVILEE, ALABAMA
ST. CLAIR COUNTY

PPM PROJECT NO. 451601-MCAP

AUGUST 1, 2019

PPM CONSULTANTS

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

HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

TABLE OF CONTENTS

PPM CONSULTANTS

HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

PROJECT CHECKLIST – HASP AND JSA

Project/Task and Corresponding Job Safety Analysis:

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

Hazard Assessment:

Chemical Hazards

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

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

Physical/Biological Hazards

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

Protective Equipment:

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

Documentation Required:

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

Return Pages in the Following Order:

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

HASP Generated By [Print Name]: Brandy Hall Date Generated: 8/1/19

HEALTH, SAFETY, SECURITY AND ENVIRONMENTAL PROGRAM

EMERGENCY SUMMARY INFORMATION

Medical Facility:

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

Name of Hospital: St. Vincent's Blount Phone: (205) 274-3000

Address: 150 Gilbreath Dr. City, State: Oneonta, AL Zip: 35121

Directions and Map: See attached (next page) Distance: 16 mi Time: 21 min

Company and Emergency Contact Information:

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

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

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

Designated Break and Evacuation Locations:

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

Break Area: _____ Evacuation Area: _____

1.0 INTRODUCTION

1.1 COMPANY COMMITMENT

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

1.2 HASP PURPOSE

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

1.3 APPLICABILITY

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

1.4 EXCEPTIONS

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

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

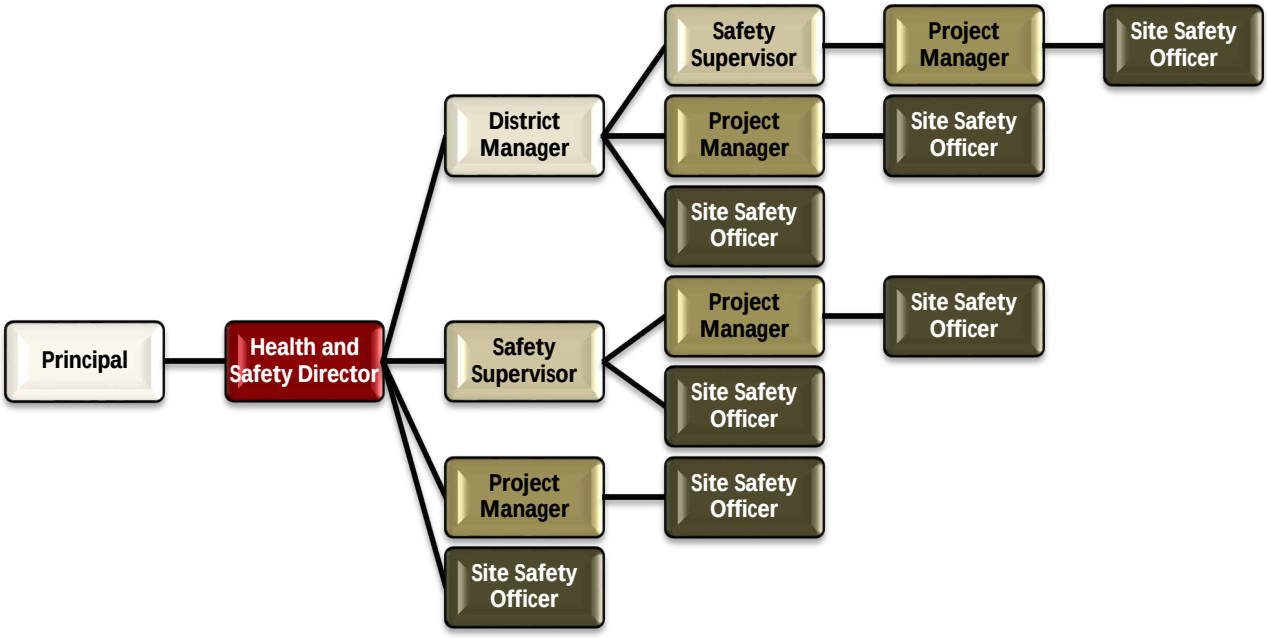
1.5 MANAGEMENT OF CHANGE

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

2.0 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

2.1 CHAIN-OF-COMMAND

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



2.2 PERSONNEL ROLES AND RESPONSIBILITIES

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

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

- **District Manager**. Each branch office has a designated District Manager who is responsible for ensuring that HSSE policies and procedures are implemented by the workers assigned to his or her office. The District Manager is directly accountable to the Principals for the safety performance of his/her office.
- **Safety Supervisor**. Each branch office has a designated Safety Supervisor (SS) assigned by the District Manager. The SS is responsible for ensuring HSSE compliance by all within his/her office through consistent toolbox training, unscheduled site safety inspections and any other task delegated by the HSD. The SS is directly accountable to the HSD for his/her supervisory role and is also accountable to his/her District Manager regarding the office's safety performance.
- **Project Manager**. Project Managers are responsible for all aspects of their assigned projects, including the safety and wellbeing of the workers assigned to their jobsite. Project Managers establish the overall scope-of-work for the project and must consider the appropriate safety provisions (i.e., engineering design, protective equipment, etc.) during the planning phase. Project Managers are directly accountable to their District Managers for the job-related safety aspects.
- **Site Safety Officer**. A site safety officer (SSO) is assigned to each field project. An alternate SSO is assigned to any field project with more than one PPM employee onsite. The SSO is responsible for jobsite safety, which includes, but is not limited to, the following:
  - → Designate break and evacuation areas based on current site conditions
  - → Review the provisions outlined within the HASP and JSA with all affected personnel, subcontractors, client, and regulatory officials
  - → Ensure site security and preventing unauthorized entry to the work zone
  - → Ensure subsurface utilities have been marked and appropriate Principal approval has been obtained for exclusion zone disturbances
  - → Locate emergency shut-off devices to pumps and heavy equipment
  - → Establish communication system with equipment operators
  - → Ensure all workers and contractors wear required protective equipment
  - → Prohibit onsite smoking, except when permitted within designated areas
  - → Complete required field documentation outlined within the HASP for worker exposure monitoring and other site safety inspections
  - → Report to management any incident or near-miss involving worker injury/illness, property damage, contact with overhead or subsurface utilities, chemical/product releases or auto accident

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

The following personnel are assigned to this project:

NAME	TITLE/POSITION
Michael Ellison	District Manager
Walt Henley	Project Manager
Jeri F. Thrasher, CSP	Health and Safety Director
Brandy Hall	Safety Supervisor (SS)
Andrew Paradis/Connor Gaston	Site Safety Officer (SSO)
Jeb Burttram/Walt Henley	Alternate SSO
Technical Drilling Services, Inc.	Subcontractor

2.3 SHORT SERVICE EMPLOYEES

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

2.4 TRAINING AND MEDICAL MONITORING

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

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

3.0 HAZARD ASSESSMENT AND CONTROL MEASURES

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

3.1 CHEMICAL HAZARDS AND CONTROLS

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

3.1.1 Gases and Fumes

3.1.1.1 Acids

Acids have a pH <7, change litmus paper to red, taste sour (most citrus fruits are acidic), are corrosive to metals, and are commonly found in car/forklift batteries, used as sample preservatives and used to prevent algae, calcium and other similar buildups in piping systems. Common acids encountered through company-related processes include but are not limited to: hydrochloric (muriatic), nitric, phosphoric and sulfuric acid. Acids can cause moderate to severe skin and eye burns, and breathing the fumes created by these materials can cause extreme burning of the respiratory system. Materials with a pH <2 must be disposed as a hazardous waste; however, acids can be neutralized with a bases/alkali.

Control Measures: Never pour water into acid! Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures

(i.e., stand upwind of concentrations) or upgrade protective equipment. Thoroughly wash exposed skin and hands upon completion of handling to avoid skin/eye irritations, itching and burning and prevent accidental ingestion. Prevent contact with metals.

3.1.1.2 Bases/Alkali

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

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

3.1.1.3 Calibration and Fuel Gases

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

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

3.1.1.4 Carbon Dioxide (Dry Ice)

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

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

3.1.1.5 Hydrogen Sulfide

Hydrogen sulfide (H_2S) is a colorless gas known for its pungent odor (often referred to as a "rotten egg" odor) at low concentrations. It is a highly flammable and toxic substance associated with oil and gas refining, mining, tanning, pulp and paper processing, and rayon manufacturing. It can also occur naturally in sewers, well water, oil and gas wells, manure pits, and volcanoes. Hydrogen sulfide is heavier than air so it settles in low-lying enclosed areas such as manholes, sewers, and underground telephone vaults. Another characteristic of hydrogen sulfide is that it fatigues a worker's sense of smell so it cannot be relied upon in determining the continuous presence of H_2S gas. Health effects depend upon the exposure concentration and include, but are not limited to: irritation of eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (tears), photophobia (intolerance to light), corneal vesiculation; dizziness, headache, weakness, exhaustion, irritability, insomnia; gastrointestinal disturbance; as a liquid: frostbite.

Control Measures: Air monitor site conditions to ensure assigned action limits are not triggered. Wear personal monitoring badges for H_2S within the breathing zone. Where applicable, rely upon stationary monitoring devices and when alarms are triggered, evacuate the area upwind immediately. Use escape only respiratory protection when issued by PPM and/or the client facility.

3.1.2 Oxidizers

3.1.2.1 Nano Xothermal Technology (NXT)

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

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

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

ORC® and ORC Advanced® are forms of enhanced aerobic bioremediation which supplies oxygen to accelerate the biodegradation of soil and groundwater contaminants. Both materials are a white powder that gets mixed with water and injected in subsurface soils. Once mixed, these materials have a pH of 10 [ORC] and 11-13 [ORC Advanced], making them a significant skin and eye irritant. Symptoms of exposure include: cough, sore throat, nose bleeds (extended exposures), eye watering and redness, eye lesions (extended exposures), nausea and vomiting if ingested and skin irritation.

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

3.1.2.3 Ozone

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

Control Measures: Because ozone is injected into subsurface soils, worker exposures will likely result from a release at the monitoring wellhead, sparge point or other similar avenues that will lead the substance to ground surface. Workers must consistently air monitor sparge points and monitoring wells for evidence of ozone leakage. Collections must occur at the wellhead (source) as well as within the breathing zone of the worker. Ozone rapidly coverts into O_2, CO_2 and other less toxic molecules but exposure limits can be triggered at the wellhead so workers must keep face away from the source while collecting the sample until it can be confirmed that the sample is acceptable for worker exposure.

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

3.1.2.4 RegenOx A and B™

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

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

3.1.2.5 Hydrogen Peroxide (30-50%)

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

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

3.1.3 Particulates and Fibers

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

3.1.3.1 Aluminum Oxide

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

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

3.1.3.2 Asbestos

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

- **Amosite**. Also called brown asbestos. Amphibole fiber formation (straight, needle-like fibers). Originated in Africa and used industrially as a fire retardant in thermal insulation, used in cement sheeting and is also found in ceiling tiles.

- **Chrysotile**. Also called white asbestos. Serpentine fiber formation (curled fibers). Is less friable (less-likely to be inhaled) than other types of asbestos and therefore viewed by many to be the safest type of the asbestos, which is why it is the most common form of asbestos used in the U.S. mostly in the form of building materials.

- **Crocidolite**. Also called blue asbestos. Amphibole fiber formation (straight, needle-like fibers). Originated in South Africa and Australia and used for thermal and chemical insulation as well as construction piping and water casings. Is considered to be the most dangerous type of asbestos.

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

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

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

3.1.3.3 Heavy Metals

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

- **Aluminum**. A silvery-white, malleable, ductile, and odorless solid (metal); combustible as a solid (although takes effort), but easily ignitable when in fine dust form which can cause explosions; can cause damage to the eyes, skin and respiratory system; symptoms include: skin, eye and respiratory irritation.
- **Arsenic**. A silver-gray or tin-white metal commonly associated with under-ground storage tanks; noncombustible in solid form but presents slight explosion hazard in dust form when exposed to flame; is considered potential lung and lymphatic system carcinogen and can also affect liver, kidneys and skin through inhalation, skin absorption, skin/eye contact and ingestion exposures; symptoms include: respiratory irritations such as ulceration of nasal septum, dermatitis, gastrointestinal disturbances, hyperpigmentation (darkening) of the skin, and peripheral neuropathy (problem with nerves that carry information to and from the brain and spinal cord which can result in pain, loss of sensation and inability to control muscles).
- **Barium**. A silvery-white metal that exists naturally in the environment; because it is very reactive in its natural state, it is often combined with other elements such as oxygen, carbon and sulfur; it has many uses, but one likely exposure source is that it is used by the oil and gas industry to make drilling mud, which lubricates the drill and simplifies the process when drilling through rock; barium in its natural state is highly flammable and reacts violently with water; may cause irritation of skin, eye, nose, throat and upper respiratory tract, allergic reactions, and central nervous system damage; symptoms include: corneal damage including blindness, poisoning, dermatitis, and skin, eye and throat burns.
- **Cadmium**. A soft, bluish-white metal commonly associated with underground storage tanks; noncombustible in solid form but will burn in powder form; is considered potential prostate and lung carcinogen and can also affect respiratory system, kidneys and blood through inhalation and ingestion exposures; symptoms include: pulmonary edema (fluid in air sacs of lungs) which causes difficult breathing, cough, chest tightness, substernal pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, loss of smell, emphysema, proteinuria (protein in urine), and mild anemia.
- **Chromium**. A hard, steel-gray metal commonly associated with underground storage tanks; noncombustible in solid form but finely dispersed dust particles will rapidly burn when exposed to a flame; chromium is not considered a likely carcinogen, but does affect skin, eyes and respiratory system through inhalation, ingestion and contact exposures; symptoms include: skin and eye irritation and lung fibrosis (scarring of the lungs).
- **Copper**. A soft, malleable reddish-orange metal commonly associated with underground storage tanks; noncombustible in solid form but may ignite when in powder form; copper is not considered a likely carcinogen, but does affect skin, eyes, respiratory system, liver and kidneys through inhalation, ingestion and contact exposures; symptoms include: skin, eye and pharynx irritation, nasal septum perforation, metallic taste, and dermatitis.
- **Iron**. A lustrous metal with a grayish tinge commonly used in industry in the construction of machinery, tools, automobiles, ships and building components; it is the most commonly used of all metals and can also be found in numerous dietary sources; elevated iron in the blood can react with peroxides to produce free radicals that can damage DNA, proteins, lipids and other cellular components; upon exposure, iron can cause skin, eye, mucous and respiratory irritations; it is also flammable as a fine dust.

- **Lead**. A soft, gray metal commonly associated with underground storage tanks, paints and coatings; noncombustible in solid form; lead is not considered a likely carcinogen, but does affect eyes, gastrointestinal tract, central nervous system, kidneys, blood and gingival tissue (soft tissue of the mouth surrounding the teeth) through inhalation, ingestion and contact exposures; symptoms include: eye irritation, weakness, exhaustion, insomnia, facial pallor (paleness), weight loss/anorexia, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis of wrist and ankles, encephalopathy (various brain disorders), kidney disease, and hypertension.
- **Magnesium**. A strong, silvery-white, light-weight metal that exists naturally in the environment; because it is very reactive in its natural state, it is often combined with other elements to form magnesium oxide, various salts, and other industrially-important compounds; magnesium is the third most commonly used metal; because it is light-weight, it is widely used in manufacturing numerous electronics; upon exposure, magnesium can cause skin and eye irritations; it is also flammable as a fine dust.
- **Mercury**. A silver-white, liquid metal associated with underground storage tanks, batteries, fluorescent bulbs, thermometers and thermostats; noncombustible liquid; mercury is not considered a likely carcinogen but does affect skin, eyes, respiratory system, central nervous system and kidneys through inhalation, skin absorption, ingestion and contact exposures; symptoms include: skin and eye irritation, cough, chest pain, difficult breathing, bronchitis, pnuemonitis (lung inflammation), tremor, insomnia, irritability, indecision, headache, weakness, exhaustion, stomatitis (inflammation of lining within the mouth), salivation, gastrointestinal disturbance, weight loss/anorexia, and proteinuria (protein in urine).
- **Selenium**. Crystalline, red to gray solid that is considered to be combustible when in fine dust form; elemental selenium is rare – it is most commonly produced as a byproduct of refining copper or producing sulfuric acid; selenium can cause damage to the skin, eyes, respiratory system, liver, kidneys, blood and spleen; symptoms include: skin, eye, nose, and throat irritations, visual disturbance, headache, chills, fever, difficulty breathing, bronchitis, metallic taste, garlic breath, gastrointestinal disturbance, dermatitis, and skin and eye burns.
- **Silver**. A white, lustrous metal that is noncombustible in solid form but can become flammable when in dust form. Silver can cause damage to the nasal septum, skin and eyes. Symptoms include: blue-gray eyes, nasal septum, throat and skin, ulceration of skin, and gastrointestinal disturbance.
- **Zinc**. A bluish-white metal commonly associated with underground storage tanks and used as an anti-corrosion agent; zinc is commonly found in common cold lozenges and over-the-counter cold remedies, as a dietary supplement and also within common foods such as beans, nuts, whole grains and pumpkin/sunflower seeds; zinc is commonly considered non-toxic but in abundance can result in gastrointestinal irritation through ingestion exposures; symptoms include: loss of appetite, nausea, vomiting, stomach cramps, diarrhea and headaches.

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

3.1.3.4 Nuisance and Concrete Dust

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

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

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

3.1.4 Volatile and Semi-Volatile Organic Compounds

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

3.1.4.1 Chlorinated Compounds

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

- **Carbon tetrachloride**. A noncombustible, colorless liquid with ether-like odor; considered a potential carcinogen with damaging effects to the central nervous system, eyes, lungs, liver, kidneys, and skin; symptoms include: skin and eye irritation, central nervous system depression, nausea, vomiting, drowsiness, dizziness, and incoordination.
- **Chloroform**. A noncombustible, colorless liquid with pleasant odor; considered a potential carcinogen with damaging effects to the liver, kidneys, heart, eyes, skin, and central nervous system; symptoms include: skin and eye irritation, dizziness, mental dullness, nausea, confusion, headache, weakness, exhaustion, anesthesia, and enlarged liver.
- **Methylene chloride**. A combustible, colorless liquid with chloroform-like odor; considered a potential carcinogen with damaging effects to the eyes, skin, cardiovascular system, and central nervous system; symptoms include: skin and eye irritation, weakness, exhaustion, drowsiness, dizziness, numb and tingling limbs, and nausea.
- **Perchloroethylene (Tetrachloroethylene)**. A noncombustible, colorless liquid with mild chloroform-like odor; when in a fire, it decomposes to hydrogen chloride and phosgene; considered a potential carcinogen with damaging effects to the eyes, skin, respiratory system, liver, kidneys and central nervous system; symptoms include: skin, eye, nose, throat and respiratory irritation, nausea, flushed face and neck, dizziness, incoordination, headache, drowsiness, skin redness, and liver damage.
- **Trichloroethylene**. A combustible, colorless liquid with chloroform-like odor; will burn when exposed to flame, but is difficult to burn; considered a potential carcinogen with damaging effects to the eyes, skin, respiratory system, heart, liver, kidneys, and central nervous system; symptoms include: skin and eye irritation, headache, visual disturbance, weakness, exhaustion, dizziness, tremor, drowsiness, nausea, vomiting, dermatitis, cardiac arrhythmias, parasthesia (tingling or numbness of the skin), and liver injury.
- **Vinyl chloride**. A combustible, colorless gas or liquid (below 7º F) with pleasant odor at high concentrations; considered a potential carcinogen with damaging effects to the liver, central nervous system, blood, respiratory system, and lymphatic system; symptoms include: weakness, exhaustion, abdominal pain, gastrointestinal bleeding, enlarged liver, pallor or cyanosis of extremities, and frostbite (as a liquid).

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

3.1.4.2 Isopropyl Alcohol

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

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

concentrations) or upgrade protective equipment. Increase frequency of air monitoring if action limits are triggered and remove or isolate all ignition sources if flammability limits are triggered. Thoroughly wash exposed skin and hands upon completion of handling to avoid skin/eye irritations.

3.1.4.3 Methyl-Tertiary Butyl Ether (MTBE)

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

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

3.1.4.4 Organic Hydrocarbons

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

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

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

→ Benzene – a colorless, flammable liquid with a sweet odor; makes up on average 0.62% to 1% of gasoline; is considered a known carcinogen with damaging effects to skin, eyes, respiratory system, blood, central nervous system and bone marrow, which can result in anemia (decreased red blood cell count making one weak and tired), decreased white blood cell count (difficult to fight off infections), and low blood platelet count (excessive bleeding); benzene causes damage through inhalation, skin absorption, ingestion and contact exposures; symptoms include: drowsiness, dizziness, headaches, confusion, tremors, skin/eye irritations, redness and blistering of the skin, vomiting, stomach irritation, convulsions, rapid heart rate, unconsciousness, leukemia (long-term) and death (large doses).

→ Toluene – a colorless, flammable liquid with benzene-like odor (smells like paint thinner); can produce damaging effects to skin, eyes, respiratory and central nervous systems, liver and kidneys; toluene causes damage through inhalation, skin absorption, ingestion, and contact exposures; symptoms include: eye and nose irritation, weakness, exhaustion, confusion, euphoria, dizziness, headaches, dilated pupils, lacrimation (tears), anxiety, muscle fatigue, insomnia, parathesia (tingling or numbness of the skin), dermatitis, and liver/kidney damage.

→ Ethylbenzene – a colorless, flammable liquid with aromatic odor (smells like gasoline); is considered a potential human carcinogen that can produce damaging effects to skin, eyes, respiratory and central nervous systems; ethylbenzene causes damage through inhalation, skin/eye contact and ingestion exposures; symptoms include: irritation of the eyes, skin and mucuous membranes, headaches, dizziness, dermatitis, narcosis (unconsciousness) and coma.

→ Xylene – colorless, flammable liquid with sweet, balsam-like odor; is a mixture of ortho-, meta- and para-xylene isomers that releases carbon monoxide gas when burned; can produce damaging effects to skin, eyes, respiratory and central nervous systems, gastrointestinal tract, blood, liver and kidneys; xylene causes damage through inhalation, skin absorption, ingestion and skin/eye contact exposures; symptoms include: irritation of skin, eyes, nose and throat, dizziness, excitement, drowsiness, incoord-ination, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain and dermatitis.

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

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

confusion, drowsiness; vomiting, diarrhea; dermatitis; and chemical pneumonitis (aspiration liquid). Kerosene is commonly referred to as paraffin in other countries.

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

§ **Diesel/polycyclic aromatic hydrocarbons (PAHs)**. Diesel is a source of fuel refined from crude oil and used in diesel trucks, boats, school and city buses, trains, cranes, farming equipment, emergency response vehicles and power generators. Diesel is an attractive fuel source because it is less volatile and emits smaller amounts of greenhouse gases (CO and CO_2); however, during combustion it does release large amounts of soot which can lead to acid rain, smog and poor health conditions. PAHs are found in crude oil and soot and are also a by-product of petroleum processing or combustion, specifically the incomplete burning of oil and gas. Common PAH constituents include: acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h) anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. The regulated PAH constituents are outlined below:

→ Coal tar pitch volatiles - PAH components anthracene, benzo(a)pyrene, chrysene, phenanthrene, and pyrene, all of which have the same chemical description, target organs, and regulatory threshold limits are not addressed by NIOSH as individual components. Instead, they are classified and regulated as coal tar pitch volatiles. Coal tar pitch volatiles may vary slightly but are described as combustible, black or brown amorphous residues and are considered a potential human carcinogen with damaging effects to respiratory system, skin, bladder, and kidneys. Symptoms include: dermatitis and bronchitis.

→ Naphthalene – Naphthalene is a combustible, colorless to brown solid with an odor or mothballs that causes damaging effects to eyes, skin, blood, liver, kidneys, and central nervous system. Symptoms include: eye irritation, headache, confusion, excitement, discomfort, nausea, vomiting, abdominal pain, bladder irritation, profuse sweating, jaundice, blood in urine, renal failure, dermatitis, optic and cornea damage.

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

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

Control Measures: Avoid prolonged exposures to oil mist, liquid or vapor. Air monitor site conditions to ensure assigned action limits are not triggered. Immediately report

any triggered action limit to the safety department and be prepared to temporarily shut down jobsite to incorporate control measures (i.e., stand upwind of concentrations) or upgrade protective equipment. Thoroughly wash exposed skin and hands upon completion of handling to avoid skin/eye irritations.

3.1.4.5 Pesticides

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

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

nose and throat irritation, headache, nausea, convulsions, respiratory difficulty, cyanosis, aplastic anemia, and muscle spasm.

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

3.1.4.6 Polychlorinated Biphenyls (PCB)

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

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

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

3.1.5 Other/Unknown Chemicals

3.1.5.1 Activated Carbon

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

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

3.1.5.2 Alconox®/Liquinox®

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

Control Measures: Keep face away from solution when mixing and wear safety glasses with side-shield protection or goggles depending upon the degree of splashing.

3.1.5.3 Descaling Agents (Analytix AN-754GH)

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

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

3.1.5.4 Unknown Chemicals and/or Concentrations

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

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

3.1.6 Chemical/Physical Properties

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

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

1 – Vapor Pressure (mmHg) – the higher the VP, the more likely it is to change from a liquid to a vapor with an increase in temperature.
2 – Vapor Density – how heavy the material is in air; anything >1 will sink into worker breathing zone; anything <1 will rise.
3 – Specific Gravity – how heavy the material is in water; anything >1 will sink in water; anything <1 will float on water.
4 – Solubility (%) – how likely the material is to be dissolved in water.
5 – Flash Point (°F) – lowest temp that material vapors will ignite/burn.
6 – Lower Explosive Limit (%) – lowest concentration in which vapors will ignite.
7 – Upper Explosive Limit (%) – highest concentration in which vapors will ignite.

3.2 PHYSICAL HAZARDS AND CONTROLS

3.2.1 Combustion/Flammability

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

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

3.2.2 Contaminated Water/Splash Hazards

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

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

3.2.3 Compressed Gas

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

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

3.2.4 Concrete Coring and Cutting

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

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

3.2.5 Cuts and Lacerations

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

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

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

- Secure the liner to a stable structure (i.e., the truck tailgate or portable table).
- Use the proper cutting tool for the job (see photo); subcontractors often have this tool.
- Cut the liner perpendicular to the body – avoid cutting towards the body.

3.2.6 Driving Safety

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

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

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

3.2.7 Drowning

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

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

3.2.8 Electrical

3.2.8.1 Subsurface and Overhead Utilities

Typical jobsites will pose both subsurface and overhead utility hazards. Also, remediation systems are electrically operated and pose similar electrical hazards. Contact with power lines or exposed electrical wires can result in electric shock, severe skin burns and electrocution. Electrical wires are generally insulated as a first line of defense; however, tears or damage to the insulated material can directly expose workers to the wire. Other utility lines may be present at common jobsites and include water, sewer, natural gas, telephone and fiber optic. A punctured natural gas line can spontaneously combust and cause a massive explosion. In addition, active retail gas stations contain subsurface product lines running from the tank pit to the dispenser islands and the layout of these lines can often be difficult to determine. Damage to some utilities may not necessarily pose a safety risk but damage to these structures can disrupt normal business functions and be very costly.

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

Pre-Work Clearance (Offsite and Onsite Preparations)

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

Subsurface Clearance Procedures

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

3.2.8.2 Electrical Tools and Power Cords

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

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

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

3.2.8.3 Lockout/Tagout

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

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

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

3.2.9 Hand and Power Tools

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

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

3.2.10 Illumination

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

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

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

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

SAMPLE TASKS (NOT ALL-INCLUSIVE)	ILLUMINATION LEVELS	AVERAGE MINIMUM MAINTAINED ILLUMINANCE
All work operation areas; setup of lane or road closures, lane closure tapes, and flagging stations	Level I	54 lux (5 foot-candles)
Areas on or around construction equipment; asphalt paving, milling and concrete placement and/or removal	Level II	108 lux (10 foot-candles)
Pavement or structural crack/ pothole filling; joint repair, pavement patching/repairs; installation of signal/electrical/ mechanical equipment	Level III	215 lux (20 foot-candles)

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

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

3.2.11 Ladder Safety

3.2.11.1 Portable Ladder Safety

Portable ladders are commonly used when replacing spent carbon with inactivated granular carbon or to access stationary aboveground storage tanks for inspections and/or maintenance. Carbon vessels consist of 55-gallon drums or other vessels that commonly range from 8-30 feet in height. It should be noted that carbon vessels can exceed 30 feet but these vessels are not common to current company processes. As part of this change-out process, workers must climb portable ladders at heights greater than 4 feet and they must do so carrying 50-lb sacks of granular carbon or other materials.

Control Measures: Falls from ladder use are exempted from the fall protection standards (29 CFR 1926 Subpart M). Instead falls from ladders are outlined within Subpart X of 29 CFR 1926.1053, which does not require the use of personal fall arrest system when working at elevations in excess of 4 feet. Use buddy system when able or check in periodically with the office to relay status. Use a portable A-frame ladder and ensure that it is locked in place. Place ladder on level, compact

ground surfaces and avoid wet areas. Never place ladder near entrance/exit or other pathway that could interfere with ladder usage. Use ladder for its intended purpose and in accordance with manufacturer's guidelines. Use two hands when ascending or descending. **Note: PPM purposely chooses to reference the most stringent safety measures under construction industry standards, while additionally enforcing the more stringent general industry height requirement of 4 feet. This is an overlap of standards but provides the greatest level of worker protection.*

3.2.11.2 Fixed Ladder Safety

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

Control Measures: Falls from ladder use are exempted from the fall protection standards (29 CFR 1926 Subpart M). Instead falls from ladders are outlined within Subpart X of 29 CFR 1926.1053, which does not require the use of personal fall arrest system when working at elevations in excess of 4 feet (general industry). According to OSHA requirements, fixed ladders must have cages, wells, ladder safety devices, or self-retracting lifelines when the climb is less than 24 feet but the top of the ladder is greater than 24 feet above lower levels. When a fixed ladder is greater than 24 feet, it must be equipped with one of the following: ladder safety devices or self-retracting lifelines with rest platforms at intervals not to exceed 150 feet. When able and it does not otherwise introduce additional safety hazards, personnel may be required to use personal fall arrest system. This will be determined on a case-by-case basis. **Note: PPM purposely chooses to reference the most stringent safety measures under construction industry standards, while additionally enforcing the more stringent general industry height requirement of 4 feet. This is an overlap of standards but provides the greatest level of worker protection.*

3.2.12 Material Handling and Back Safety

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

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

3.2.13 Mobile Equipment

3.2.13.1 Heavy Equipment and Machinery

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

documented and returned to the safety department for recordkeeping. Hazards associated with the use of heavy equipment include, but are not limited to, the following:

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

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

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

3.2.13.2 Aerial and Scissor Lifts

Use of aerial and scissor lifts is strictly prohibited. Company personnel are not appropriately trained for working with aerial and scissor lifts and are therefore not authorized on these machines without additional safety training and approval from the safety department. Workers should be aware that aerial and scissor lifts are not synonymous and are covered under two separate OSHA regulations. Regulatory requirements for aerial lifts can be found in §1926.453, while requirements for scissor lifts (defined by OSHA as a mobile scaffolding system) can be found in §1926.452(w). This equipment can reach elevations in excess of 4 feet triggering fall protection. It should be noted that per OSHA guidelines, aerial lifts require the use of personal fall arrest systems in conjunction with the use of a guardrail system, while scissor lifts require the use of personal fall arrest systems only in the absence of a guardrail system.

3.2.14 Noise

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

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

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

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

3.2.15 Repetitive Motion

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

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

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

3.2.16 Scaffolding

Use of scaffolding systems, which includes walking, working, assembling, disassembling, and/or other similar uses, is strictly prohibited. Company personnel are not appropriately trained for working with scaffolding systems and are therefore not authorized on these systems without additional safety training and approval from the safety department. Work requiring the use of a scaffolding system will be subcontracted to appropriately qualified contractors.

3.2.17 Slips, Trips, and Falls

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

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

3.2.18 Traffic and Secluded Areas

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

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

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

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

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

3.2.19 Walking/Working Surfaces

3.2.19.1 Elevated Walking/Working Surfaces

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

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

3.2.19.2 Uneven Walking/Working Surfaces

Uneven walking and/or working surfaces are not uncommon. Sites with minimal grounds-keeping can disguise potholes, which could result in trips/falls or foot injuries. Dense vegetation can also disguise dips and potholes. Using limbs, branches, or other similar debris to cross over streams creates an unstable ground surface that can become structurally unsafe after repeated use.

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

3.2.19.3 Unstable Soils and Cave-Ins

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

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

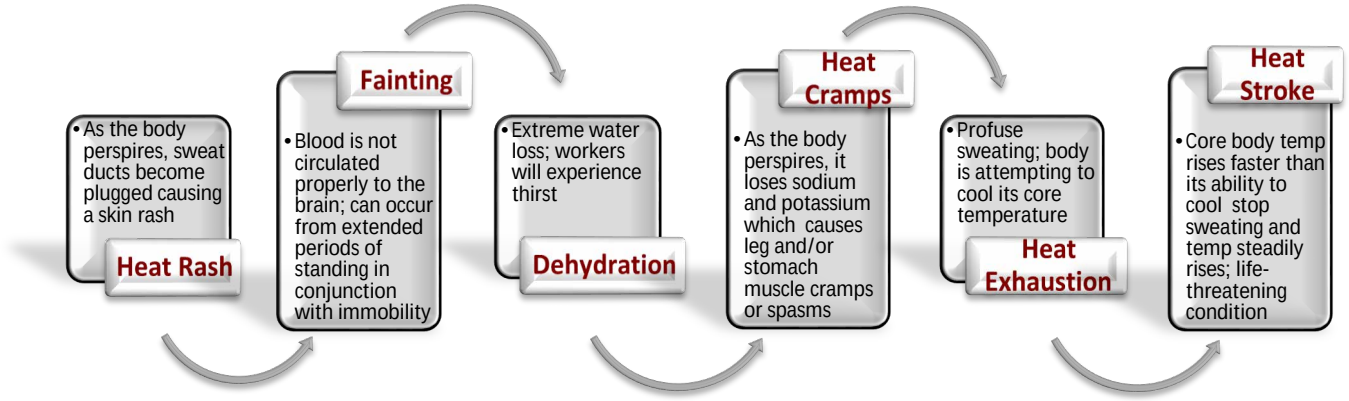
- § Perform visual inspections prior to start of work daily and conduct additional inspections warranted by changes in site conditions.
- § Provide onsite competent person with the knowledge and authority to correct any noted hazards derived from daily visual inspections.
- § Keep all tools, materials,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

OSHA requires that any trench/excavation with a depth ≥4 feet use engineering controls to prevent cave-ins. In addition, OSHA also requires that any trench/excavation with a depth ≥20 feet use a qualified engineer to determine the appropriate engineering control. *When PPM does not incorporate these engineering controls, under no circumstances must any individual enter a trench/excavation with a depth of 4 feet or greater. In addition, no equipment requiring an individual to be placed on or inside the equipment during its operation is permitted inside the trenched/excavated area. Soil packing and obtaining samples must be conducted through alternative methods*.

3.2.20 Weather

3.2.20.1 Heat Stress

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



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

3.2.20.2 Cold Stress

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

COLD STRESS	DEFINITION	SYMPTOMS OF EXPOSURE
Trench foot	Injury to the feet when immersed in water for prolonged period of time; wet feet lose heat and blood vessels constrict causing cells to die due to lack of oxygen	Reddening of skin, numbness, leg cramps, swelling, tingling pain, blisters or ulcers, bleeding under skin, gangrene (foot turns dark purple, blue or gray)
Chilblain	Exposures to temperature slightly above freezing to 60°F causing damage to capillary blood vessels in skin; damage is permanent and returns with additional exposures	Redness and itching mostly on cheeks, ears, fingers and toes, possible blistering, inflammation, possible ulceration (severe cases)
Frostbite	Injury caused by freezing of the skin (nose, ears, cheeks, chin, fingers or toes); can lead to amputation	Reduced blood flow to hands/feet numbness, tingling or stinging, aching, bluish or pale, waxy skin
Hypothermia	Body is losing heat faster than it can be generated producing an abnormally low body temperature, which impairs the brain and makes a person unable to think clearly or move well; is extremely dangerous because a person may not realize it is happening	Early symptoms - shivering, fatigue, loss of coordination, confusion and disorientation; Late symptoms – no shivering, blue skin, dilated pupils, slowed pulse and breathing and loss of consciousness

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

3.2.20.3 Adverse Weather Conditions

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

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

3.3 BIOLOGICAL HAZARDS AND CONTROLS

3.3.1 Insects and Mosquitoes

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

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

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

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

3.3.2 Ticks and Spiders

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


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.

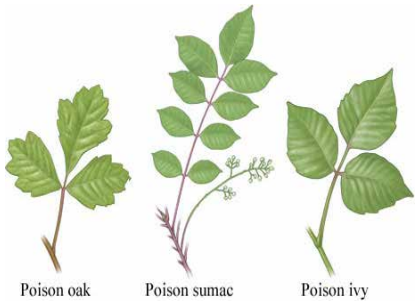
Sites located in populated areas may have wandering animals. Pets may be trained to attack when approached, may have mange (parasitic skin diseases) or may carry other diseases.

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 begin to ooze. This is spread by scratching affected areas and touching other unaffected areas.



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

3.3.5 Bloodborne Pathogens

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

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

4.0 EXPOSURE MONITORING

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

4.1 TERMINOLOGY/DEFINITIONS

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

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

4.2 ESTABLISHING EXPOSURE AND FLAMMABILITY LIMITS

4.2.1 Exposure Limits

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

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

4.2.2 Flammability Limits

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

4.3 REGULATORY EXPOSURE LIMITS

Whenever an action, regulatory or recommended exposure limit is triggered, workers must be prepared to immediately report site conditions to management, to develop and implement alternative control measures, to evacuate the site when warranted and/or be prepared to upgrade personal protective equipment (i.e., wear respiratory protection). Workers must be aware that in order to wear respiratory protection, they must first be medically cleared by a physician, be fit-tested to a specific respirator and have received training in accordance with the procedures outlined within the company's Respiratory Protection program. To ascertain eligibility, workers must receive authorization from the safety department prior to using a respirator.

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

CONSTITUENT	TOXICITY					FIRE
	ACTION	PEL/TLV	STEL	CEILING	IDLH	LEL-UEL
Activated carbon	--	--	--	--	--	--
Alconox®[nuisance dust]	5	5	--	--	--	--
Aldrin[pesticide]	0.25	0.25	--	--	25	--
Aluminum[metal]	5	5	--	--	--	--
Aluminum oxide[nuisance dust]	5	5	--	--	--	--
Ammonia[base]	50	50	35†	--	300	15,000-28,000
Arsenic[metal]	0.01	0.01	--	--	5	--
Analytix AN-754GH	--	--	--	--	--	--
Asbestos	0.1	0.1	1	--	--	--
Barium[metal]	0.5	0.5	--	--	--	--
Benzene	1	1	5	--	500	1,200-7,800
n-Butane	400	800	--	--	--	1,600-8,400
Cadmium[metal]	0.005	0.005	--	--	9	--
Calcium hydroxide[base]	5	5	--	--	--	--
Carbon dioxide[dry ice]	2,500	5,000†	30,000	--	40,000	--

CONSTITUENT	TOXICITY					FIRE
	ACTION	PEL/TLV	STEL	CEILING	IDLH	LEL-UEL
Carbon tetrachloride	2	2†	--	25	200	--
Chloroform	2	2†	2 [60-min]	50	500	--
Chromium[metal]	0.5	0.5	--	--	250	--
Coal tar pitch volatiles[PAH]	0.2	0.2	--	--	80	--
Copper[metal]	1	1	--	--	100	--
DDT[pesticide]	1	1	--	--	500	--
Dieldrin[pesticide]	0.25	0.25	--	--	50	--
Diesel	100[skin]	100[skin]	--	--	--	600-7,500
Dust [Total]	15	15	--	--	--	--
Dust [Respirable]	5	5	--	--	--	--
Dust [Portland Cement]	50	50	--	--	--	--
Endrin[pesticide]	0.1	0.1	--	--	2	--
Ethylbenzene	100	100†	125†	--	800	800-6,700
Gasoline	100	300†	500†	--	--	1,400-7,600
Heptachlor[pesticide]	0.5	0.5	--	--	35	--
Hexane	50	50†	--	--	1,100	1,100-7,500
Hydrochloric acid[HCl]	--	--	--	5	50	--
Hydrogen peroxide[30-50%]	1	1	--	--	75	--
Hydrogen Sulfide[H_2S]	1	1	--	10	100	4,000-44,000
Iron[metal]	--	--	--	--	--	--
Isobutylene	--	--	--	--	--	1,800-9,600
Isopropyl alcohol	200	400†	500†	--	2,000	2,000-12,700
Kerosene	50	100	--	--	--	700-5,000
Klozur[sodium persulfate]	5	5	--	--	--	--
Lead[metal]	0.05	0.05	--	--	100	--
Lindane[pesticide]	0.5	0.5	--	--	50	--
Liquinox®	--	--	--	--	--	--
Lubricating oils[motor oil]	--	--	--	--	--	--
Magnesium[metal]	--	--	--	--	--	--
Mercury[metal/vapor]	0.1[skin]	0.1†[skin]	--	0.1†[skin]	10[skin]	--
Methane	--	--	--	--	--	5,000-15,000
Methylene chloride	25	25	125	--	2,300	13,000-23,000
MTBE	50	50	--	--	--	1,000-8,000
Muriatic acid[HCl]	--	--	--	5	50	--
Naphthalene[PAH]	10	10†	15†	--	250	900-5,900
Nitric acid	2	2†	4†	--	25	--
NXT[Klozur – sodium persulfate]	5	5	--	--	--	--
Oil[crude]	0.2[mg/m³]	0.2[mg/m³]	--	--	--	1,000-8,000
ORC®/ORC Advanced®	5	5	--	--	--	--
Ozone	0.05	0.1†	0.3†	0.1	5	--
PCB	0.5[skin]	0.5[skin]	--	--	5	--
Perchloroethylene[PERC]	25	25†	--	150[cap]	150	--
Phosphoric acid[H_3PO_4]	1	1†	3†	--	1,000	--
Potassium hydroxide[base]	2	2†	--	2	--	--
Propane	500	1,000	--	--	2,100	2,100-9,500
RegenOx A or B™	--	--	--	--	--	--
Selenium[metal]	0.2	0.2	--	--	1	--
Silver[metal]	0.01	0.01	--	--	10	--

CONSTITUENT	TOXICITY					FIRE
	ACTION	PEL/TLV	STEL	CEILING	IDLH	LEL-UEL
Sodium carbonate[base]	--	--	--	--	--	--
Sodium hydroxide[base]	2	2	--	2†	10	--
Sulfuric acid[H_2SO_4]	1	1	15†	--	15	--
Tetrachloroethylene[PERC]	25	25†	100	150[cap]	150	--
Toluene	100	100†	150†	300	500	1,100-7,100
Trichloroethylene	50	50†	200†	200	1,000	8,000-10,500*
Vinyl chloride	1	1	--	5[15-min]	--	3,600-33,000
Xylene	100	100†	150†	--	900	1,100-7,000
Zinc[metal]	--	--	--	--	--	--

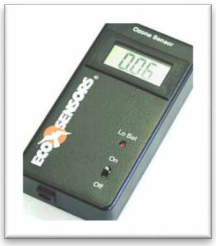
NOTES:
† - More protective OSHA PELs vacated by the 11th Circuit Court of Appeals in July 1992; however, OSHA can enforce under the General Duty Clause. PPM will adhere to these exposure limits to ensure worker health and wellbeing is maintained.
Diesel, dusts, heavy metals, bases/alkalis, Trap & Treat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

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

4.4 MONITORING EQUIPMENT AND CALIBRATION

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

- **Organic vapor analyzers (OVA)**. This monitoring device is used to detect volatile and semi-volatile substances. Some OVAs used by the company include MiniRAE 2000 PGM 7600, GasTech®, RKI Eagle® photoionization detector (PID), and Micro FID® flame ionization detector (FID). The advantage of this monitoring device is that it is a direct-read instrument and provides instantaneous readings. Some disadvantages of this equipment are that it generally does not provide readings less than 1 ppm, it does not give percent LEL or provide oxygen content. OVAs generally detect a group of chemicals and do not indicate which compound is being detected.



- **Ozone meters**. This monitoring device is used to detect ozone gas and is also a direct-read instrument. The ozone meter used by some offices within the company is the EcoSensor Ozone Sensor A-21ZX. It is chemical-specific but has some interference from other oxidizing gases.

- **PortaSens II gas detector**. The monitoring device is a portable, direct-read gas leak detector that has the ability to measure a variety of different gases by simply inserting a gas-specific sensor. This instrument is lightweight and can measure gases such as acetylene, ammonia, carbon monoxide, fluorine, formaldehyde, hydrogen, hydrogen chloride, hydrogen cyanide, hydrogen peroxide, hydrogen sulfide, oxygen, ozone, phosgene, and sulfur dioxide. For a composite list of gases, refer to the manufacturer's website.

- **Portable air monitoring pumps**. These monitoring devices are used to assess continuous personnel and background exposures and are commonly used for sampling heavy metals, asbestos, silica or nuisance/respirable dusts. A common portable air monitoring pump used by the company is the SKC AirChek52®. Pumps are set to a specific flow rate of air (can be low volume or high volume) and contaminants are captured using a filter, which is later sent for laboratory analysis. Some advantages of this monitoring equipment are that these pumps are small, light-weight and portable. Some disadvantages of this monitoring equipment are that they do not provide instantaneous readings; exposures are unknown until laboratory results are received.

- **Personal monitoring badges**. These monitoring devices are used to assess continuous personnel exposures. They are light-weight, easy to use and can target specific constituents as opposed to a group of compounds. Badges must be sent to lab for analysis so they do not provide instantaneous readings. In addition, other constituents with similar chemical make-up can cause interference giving inaccurate exposures so samplers must be able to identify potential cross-interference prior to sampling.

- **Colorimetric indicator tubes**. These monitoring devices are used to assess continuous personnel exposures. Passive diffusion tubes are used when determining longer term exposures and workers need only break off the tip of the tube to initiate sampling. Pumps can also be used to draw in air and generally give a short-term exposure assessment during the period of time the air is extracted. Tubes are contaminant-specific and change color when in contact with the constituent giving an instantaneous reading.

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

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

4.5 SAMPLE COLLECTION

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

4.6 MONITORING FREQUENCY AND DOCUMENTATION

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

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

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

5.0 PERSONAL PROTECTIVE EQUIPMENT

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

5.1 PROTECTIVE CLOTHING AND EQUIPMENT

5.1.1 Head Protection

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

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

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

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

5.1.2 Eye and Face Protection

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

5.1.3 Hand Protection

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

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

- Neoprene, vinyl [PVC] and rubber gloves – also good for working with chemicals such as janitorial or cleaning products, fuels, oils and grease; can be purchased as disposable or reusable; neoprene is preferred when working with acids or bases

- Butyl or laminate gloves – good for working with ketones
- Latex gloves – good for working with bloodborne pathogens such as viral and bacterial agents; nitrile gloves will work as well so latex is not commonly provided by the company

- Cotton or leather gloves – good for material handling of heavy and abrasive objects; leather is sturdy and can resist splinters from wood products and provides some protection against heat
- Cut-resistant gloves – good when working with sharp or cutting objects; there are various brands of cut-resistant gloves including Kevlar®, Magid® and Ansell®

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

5.1.4 Foot Protection

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

5.1.5 Skin Protection and Visibility

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

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

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

5.1.6 Hearing Protection

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

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

5.1.7 Respiratory Protection

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

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

5.1.8 Electrical Protective Equipment

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

5.1.9 Life Saving Equipment

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

5.2 OTHER PROTECTIVE AIDS

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

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

- § Lockout/tagout devices
- § Handheld eyewash bottles

5.3 PROJECT-SPECIFIC PPE REQUIREMENTS

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

FIELD TASK	PROTECTIVE CLOTHING/EQUIPMENT										
	STEEL-TOED SHOES[1]	SAFETY GLASSES[2]	HIGH VISIBILITY SHIRT/VEST[3]	GLOVES[4]	HEARING PROTECTOR[5]	HARD HAT (CLASS E)[6]	GOGGLES/FACE SHIELD[7]	RESPIRATOR (APR)[8]	HARNESS/LANYARD	FLOTATION DEVICES/BUOYS	FIRE RETARDANT CLOTHING[9]
Asbestos inspections or sampling	X	X	X	X				X			
Carbon change-out	X		X	X	X	X	X	X	X		
Chemical injection	X	X	X	X	X	X					
§ Working with dry powder	X		X	X	X	X	X	X			
§ Working with liquid/mixing w/H_20	X		X	X	X	X	X				
Compliance audits/visual inspections[Phase 1]	X	X	X								
DPT - drilling, geoprobing[Hand Auger]	X	X	X	X							
DPT - drilling, geoprobing[Heavy Equipment]	X	X	X	X	X	X					
Groundwater sampling	X	X	X	X							
Mobile vacuum event	X	X	X	X	X						
Mobile ozone	X	X	X	X	X						
Monitoring well plugging and abandonment	X	X	X	X	X	X					
Operation and maintenance of system	X	X	X	X	X						
Remediation system install/demobilization	X	X	X	X	X	X					
Spill bucket replacement/closure	X	X	X	X	X	X					
Trenching and excavating	X	X	X	X	X	X					
UST pull/closure	X	X	X	X	X	X					
Any work over or near water body		X		X			X			X	
Any work performed at oil and gas facility, terminals, or other similar property	X	X		X	X	X					X

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

5.4 REDUCTION OF PROTECTIVE CLOTHING AND EQUIPMENT

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

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

The break area must be clearly designated by posting cones, barricades, or caution tape. Affected personnel and subcontractors must be informed of the break area during the pre-work safety briefing. Only when inside the break area may protective clothing and/or equipment be removed. If the conditions noted above cannot be met, the safety department must be contacted. Variances may be granted based on certain site conditions.

6.0 SITE ACCESS, CONTROL, AND DECONTAMINATION

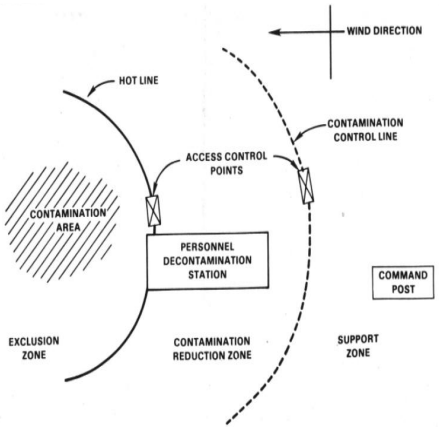
6.1 SITE ACCESS

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

6.2 DESIGNATED WORK ZONES

Each jobsite must be assigned designated work areas to isolate hazardous work areas from unprotected persons, to prevent the migration of contamination, and to prevent the transfer of contamination through impacted protective clothing as well as monitoring and sampling equipment. Designated work areas include the following:

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



6.3 AUTHORIZED PERSONNEL

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

6.4 STOP-WORK AUTHORITY

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

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

6.5 GENERAL SITE CONTROL AND SAFETY PRECAUTIONS

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

- Designated parking and pedestrian walkways in areas a reasonable distance away from active investigation
- Use buddy system whenever feasible
- Perform pre-job inspection to establish appropriate baselines and to visually inspect for obstacles, clearances, etc.
- Avoid smoking on the jobsite unless within authorized areas (i.e., break areas when deemed appropriate by the SSO for smoking)
- Use appropriate safety devices (i.e., cones, barricades, etc.) to clearly identify work zones and break areas
- Prevent unauthorized entry and use stop-work authority as necessary
- Perform post-job inspection to ensure all materials have been removed from the site; pay close attention to the vehicles to ensure animals or person(s) are not located beneath the vehicle and that all cab and toolbox doors have been secured

6.6 DECONTAMINATION PROCEDURES

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

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

7.0 EMERGENCY RESPONSE

7.1 ALARMS AND ONSITE NOTIFICATIONS

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

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

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

7.2 PERSONNEL ASSESSMENT AND EVACUATION

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

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

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

7.3 INCIDENT, NEAR-MISS, AND HAZARD RECOGNITION REPORTING

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

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

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

7.4 INJURY REPORTING AND CASE MANAGEMENT

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

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

7.5 GENERAL MEDICAL CARE AND FIRST AID

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

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

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

HAZARD CATEGORY	HAZARD	RESPONSE
Physical	Heat stress	Apply warm, moist heat and pressure to reduce pain in legs/ abdomen. Give electrolyte drinks by mouth, if conscious. Remove excess clothing and attempt to cool core body temperature promptly using cold water. Medical attention is warranted for extreme heat stress.
	Cold stress	Remove any wet clothing immediately and bundle in extra clothing and/or blankets. Drink warm fluids, if conscious. Attempt to warm core body temperature using heater or other methods. Medical attention is warranted for extreme cold stress.
	Sprain/strain	Use combination heat/cold therapies to reduce swelling and apply pain relief. Take an over-the-counter naproxen sodium (Aleve) or ibuprofen (Advil) for pain and inflammation. Seek medical attention if pain persists for more than a few days.
	Tingling/ numbness	Generally an indication of swelling but can lead to permanent nerve damage. Take an over-the-counter naproxen sodium (Aleve) or ibuprofen (Advil) for pain and inflammation. Seek medical attention if symptoms persist.
	Cuts/lacerations	Apply pressure to wound for blood to clot and use bandages to cover wound. Antibiotic creams can prevent infection. Seek medical attention for deep cuts that require stitches.
	Ringing in ears	Symptom of hearing loss, which will require medical testing to determine if this is a temporary or permanent hearing loss.
Biological	Needle stick	Immediately remove needle. Squeeze the area to extract blood from the wound. Seek immediate medical care and carry the needle with you to the medical clinic.
	Insect/spider/ tick/animal bite	Immediately remove insect or tick and pay close attention over the next few days for symptoms of delayed illness. Seek medical attention if noted. Seek medical attention for black/brown widow and brown recluse spider bites as well as animal bites.
	Poison plants	Pay attention for evidence of allergic reaction (itching, redness and irritation) and seek medical attention if over-the-counter remedies prove ineffective or if affected area spreads.

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

7.6 HAZARDOUS SUBSTANCE RELEASE

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

7.7 REGULATORY, CLIENT, OR OTHER AGENCY NOTIFICATIONS

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

8.0 WASTE MANAGEMENT

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

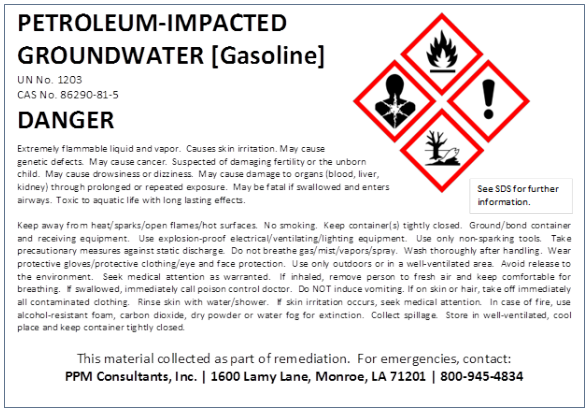
8.1 CONTAINER LABELING

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

8.1.1 Hazardous Material/Waste Labeling

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

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



- § Pictograms – graphical symbols used to convey specific hazard information visually

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

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

8.1.2 Nonhazardous Material/Waste Labeling

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

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

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

8.2 CONTAINER STORAGE AND DISPOSAL

In accordance with company policy, all wastes must be stored within fenced remediation systems, behind buildings or in other inconspicuous areas so as not to be disturbed by unauthorized individuals. Wastes must also be profiled and disposed within 90 days of task completion. Drums that are in accumulation may reside onsite for a period no greater than 365 days. Materials in accumulation must be profiled and disposed at least once per calendar year to ensure container integrity. Variances to this policy must be approved by the District Manager or safety department in advance.

8.3 CONTAINER INSPECTIONS

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

9.0 PERSONNEL/CONTRACTOR SAFETY REVIEW

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

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

10.0 CONTRACTOR RESPONSIBILITY AND SUPERVISION

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

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

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

11.0 CONFINED SPACE

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

12.0 LIST OF ABBREVIATIONS

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

APPENDIX L – COST PROPOSAL NO. 63 – SYSTEM EQUIPMENT PURCHASE

Alabama Tank Trust Fund
Cost Proposal
Part I

I.1 Cost Proposal Information:

Cost Proposal Number:	Date of Cost Proposal (mm/dd/yy):
63 451601-EQP	9/5/2019
UST or AST Incident Number:	Facility I.D. Number:
UST05-08-06	12534-115-011417

I.2 Facility Information

Facility Name:	Former Martin's Texaco
Facility Address:	36950 US Highway 231 North Ashville, St. Clair County, Alabama

I.3 Owner Information:

Owner Name:	Ira Phillips, Inc.
Owner Address:	P.O. Box 799 Gadsden, AL 35902
Employer Tax Number (IRS):	63-0422062

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:	Walt Henley
Project Contact Phone #:	205-836-5650
Project Contact E-mail:	walt.henley@ppmco.com
Employer Tax Number (IRS):	72-1256279

Cost Proposal Number: 63

Facility Name: Former Martin's Texaco

I.5 Activity Information:

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

Activities/Other/Brief Summary of Activities:

Purchase and shipping of Ozone Sparge equipment and materials; purchase and shipping of soil vapor extraction (SVE) equipment; purchase letter.

Provide proposed completion date for this phase of work activities:

02/28/20

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
MK Environmental, Inc.	SVE equipment
Ozone Solutions	Ozone sparge unit and materials

Cost Proposal Number:	Facility Name:
63	Former Martin's Texaco

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:	Ira Phillips, Jr., President
Email address:	doublepop@gmail.com
Date:	

I.8 Cost Proposal- Contractor Signature:

2.Response Action Contractor Signature:	
Typed or Printed Name and Title:	Matthew J. Ebbert, P.G., Sr. Geologist
Date:	9/4/19

I.9 Trust Fund Obligation Information:

Estimated Total Cost of all Anticipated Response Actions (To be updated overtime):	$1,400,000.00
Total of Previously Approved Cost Proposals:	$810,823.37
Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal):	$973,163.37
Estimate Percent Completion of entire project to date:	70%

I.10 Cost Proposal Amount

Proposed Costs under this Cost Proposal:	**$162,340.00**	**Personnel**	**$1,311.00**
		Field Equipment	**$0.00**
Owners Required Contribution for UST Release($5,000): *Applicable for CP#1 Only*		**Mileage**	**$0.00**
		Per Diem	**$0.00**
		Drilling	**$0.00**
Owners Required Contribution for AST Release($10,000): *Applicable for CP#1 Only*		**Analytical**	**$0.00**
		Other	**$161,029.00**
Total of This Cost Proposal:	**$162,340.00**		

Cost Proposal Summary

CP Total	Facility I.D. #	CP #	Incident Number	Site Name
$162,340.00	12534-115-011417	63	UST05-08-06	Former Martin's Texaco

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

Scenarios	Unit $	Units	Quantity	Requested$
System Purchase Letter	$1,311	/ltr	1	$1,311.00
Total Report and Plan Costs				**$1,311.00**

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

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

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

Total Drilling Costs				**$0.00**

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

		Pass Through	Quoted Amoun	Requested$
Corrective Action System Purchase		5%	$139,937.00	$146,933.85
Other/Misc. (receipts required)	Freight on Ozone system shipping	5%	$2,200.00	$2,310.00
Other/Misc. (receipts required)	Freight on SVE unit shipping	5%	$2,000.00	$2,100.00
Other/Misc. (receipts required)	Sparge points, riser, connections, tubing	5%	$5,582.00	$5,861.10
Other/Misc. (receipts required)	Mounted ozone gas leak detectors	5%	$3,000.00	$3,150.00
Other/Misc. (receipts required)	Dedicated peristaltic pump for HW-1	5%	$561.00	$589.05
Total Subs / Vendors / Utilities				**$160,944.00**

APPENDIX M – COST PROPOSAL NO. 64 – SYSTEM INSTALLATION, BASELINE GROUNDWATER MONITORING, AND START-UP

Alabama Tank Trust Fund
Cost Proposal
Part I

I.1 Cost Proposal Information:

Cost Proposal Number:	Date of Cost Proposal (mm/dd/yy):
64 451601-INST	9/5/2019
UST or AST Incident Number:	Facility I.D. Number:
UST05-08-06	12534-115-011417

I.2 Facility Information

Facility Name:	Former Martin's Texaco
Facility Address:	36950 US Highway 231 North Ashville, St. Clair County, Alabama

I.3 Owner Information:

Owner Name:	Ira Phillips, Inc.
Owner Address:	P.O. Box 799 Gadsden, AL 35902
Employer Tax Number (IRS):	63-0422062

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:	Walt Henley
Project Contact Phone #:	205-836-5650
Project Contact E-mail:	walt.henley@ppmco.com
Employer Tax Number (IRS):	72-1256279

Cost Proposal Number: 64

Facility Name: Former Martin's Texaco

I.5 Activity Information:

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

Activities/Other/Brief Summary of Activities:

Gauging of 14 MWs, 10 RWs, and 1 tank pit observation well on the former Martin's Texaco site; baseline sampling of 14 MWs and 5 RWs; purge water disposal. GPR survey. Install five ozone sparge points to approximately 16 feet BGS and four ozone sparge points to approximately 20 feet BGS; directionally-drill three borings for conduits; saw-cut asphalt/concrete, trench; install ozone tubing, conduit, and 2-inch diameter SVE piping; trailer/equipment/tank set-up; backfill trenches and concrete surface; site survey; power hookup; cellular setup; disposal of IDW; system start-up training; report.

Provide proposed completion date for this phase of work activities:

04/30/20

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
Sutherland Environmental Company, Inc.	Laboratory services
EPS of Vermont, Inc.	Purge water disposal
Technical Drilling Services, Inc.	Drilling/System installation (incl. electrician and directional borings)
MK Environmental, Inc.	Start-up training
Advanced Disposal	IDW disposal
GPSR	GPR survey

Cost Proposal Number:	Facility Name:
64	Former Martin's Texaco

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:	Ira Phillips, Jr., President
Email address:	doublepop@gmail.com
Date:	

I.8 Cost Proposal- Contractor Signature:

2.Response Action Contractor Signature:	
Typed or Printed Name and Title:	Matthew J. Ebbert, P.G., Sr. Geologist
Date:	9/4/19

I.9 Trust Fund Obligation Information:

Estimated Total Cost of all Anticipated Response Actions (To be updated overtime):	$1,400,000.00
Total of Previously Approved Cost Proposals:	$973,163.37
Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal):	$1,071,433.57
Estimate Percent Completion of entire project to date:	77%

I.10 Cost Proposal Amount

Proposed Costs under this Cost Proposal:	**$98,270.20**	**Personnel**	**$25,128.25**
		Field Equipment	**$1,073.00**
Owners Required Contribution for UST Release($5,000): *Applicable for CP#1 Only*		**Mileage**	**$730.80**
		Per Diem	**$0.00**
		Drilling	**$9,009.00**
Owners Required Contribution for AST Release($10,000): *Applicable for CP#1 Only*		**Analytical**	**$1,430.00**
		Other	**$60,899.15**
Total of This Cost Proposal:	**$98,270.20**		

Cost Proposal Summary

CP Total	Facility I.D. #	CP #	Incident Number	Site Name
$98,270.20	12534-115-011417	64	UST05-08-06	Former Martin's Texaco

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

Scenarios	Unit $	Units	Quantity	Requested$
CA System Installation Report (all Classes same)	$7,552	/report	1	$7,552.00
ADEM Solid Waste Profile Preparation	$216.50	/profile	1	$216.50
Total Report and Plan Costs				**$7,768.50**

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

Porous material 0-30 feet	$324	/well	9	$2,916.00
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
Purge/Development Water Handling (see Basis)	$94.50	/sow	1	$94.50
Gauging Well (no sampling)	$15.75	/well	6	$94.50
Groundwater Sampling and Gauging 2" Well	$63.00	/well	14	$882.00
Groundwater Sampling and Gauging 4" Well	$72.45	/well	5	$362.25
System Installation Oversight (up to 7 days in field)	$8,714	/system	1	$8,714.00
System Startup	$1,664	/system	1	$1,664.00
Other Field Work not listed (use Form "F" for input)	$261.00		1	$261.00

Travel

Mileage Rate			$0.580	
Mileage (One way office to site)			45	
Number of round trips to site			14	$730.80
Technician(s)-travel time	$63	/hr	6	$378.00
Geologist/Engineer-travel time	$87	/hr	16.5	$1,435.50
PG/PE-travel time	$120	/hr	1.5	$180.00

Equipment and Equipment Kits

55-Gallon Drums	$50	/drum	2	$100.00
Sampling Expendables(gloves, ice, string, jars, foil, distilled water, paper towels,	$50	/sow	1	$50.00
Expendables O&M	$25	/day	2	$50.00
Monitoring Well/Boring Installation	$60	/day	3	$180.00
Groundwater Monitoring	$160	/day	1	$160.00
Bailers	$7	/bailer	19	$133.00
Ozone Sparge O&M	$75	/day	2	$150.00
Initial Abatement	$50	/day	5	$250.00
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 #

Cost Proposal Summary

CP Total	Facility I.D. #	CP #	Incident Number	Site Name
$98,270.20	12534-115-011417	64	UST05-08-06	Former Martin's Texaco

BTEX/MTBE/Naph (water)	8260	$65 /sample		10%	19	$1,358.50
Other	QA/QC - 8260	$65.00 /sample		10%	1	$71.50
		Total Field Costs				**$20,728.55**

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

Scenarios		Unit $	Unit	Quantity	Requested$
Mileage Rate (Current Federal Rate)				$0.580	
Mileage (drilling device driven or ATV) (**ONE WAY** mileage up to 450		$2.32	/mile	125	
Number of Mobilizations (includes $200 mob/demob amount)				1	$780.00
Per Diem (overnight) (man days)(hotel receipts required)		$100.00	/day	9	$900.00
Other (receipts required)	Sparge point (PVC provid	$40.00		160	$6,400.00
Other (receipts required)	Low-profile rig surcharge	$250.00		2	$500.00
Pass Through (if appropriate) Enter "5" or "10" as appropriate				5%	$429.00
	Total Drilling Costs				**$9,009.00**

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

		Pass Through	Quoted Amoun	Requested$
ADEM Solid Waste Profile (ADEM review fee)		5%	$217.00	$227.85
Corrective Action System Install		5%	$47,930.00	$50,326.50
Phone Costs (telemetry)		5%	$100.00	$105.00
Power Costs		5%	$300.00	$315.00
Roll off Dumpster (includes hauling/handling)		5%	$789.24	$828.70
Solid Waste Soil Disposal (to include hauling/handli		5%	$2,197.38	$2,307.25
Water Treatment/Disposal	EPS of Vermont	5%	$150.00	$157.50
Other/Misc. (receipts required)	Ashville Building Permit fee	5%	$387.00	$406.35
Other/Misc. (receipts required)	Start-up Training (MK)	5%	$1,500.00	$1,575.00
Other/Misc. (receipts required)	Start-up Training (Ozone Solutions)	5%	$2,800.00	$2,940.00
Other/Misc. (receipts required)	Ground Penetrating Radar (GPRS)	5%	$1,000.00	$1,050.00
Other/Misc. (receipts required)	Fire Exting/H&S Supplies/Signs	5%	$500.00	$525.00
	Total Subs / Vendors / Utilities			**$60,764.15**

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

Use this form to list hours where a Unit Rate is not available, NOT FOR ADDING HOURS TO UNITS
Detailed description of activities must be entered where hours are claimed

Other Plan /Report NOT Listed

	Description of Activities			
Project Manager:		$104.00		
PE/PG:		$120.00		
Staff Geologist/ Engineer:		$87.00		
Staff Scientist:		$81.00		
Draftsman:		$63.00		
Clerical:		$51.00		
		Other Plan Report		

Other Field Tasks NOT Listed

	Description of Activities			
Project Manager:		$104.00		
PE/PG:		$120.00		
Staff Geologist/ Engineer:	Ground-penetrating radar oversight	$87.00	3	$261.00
Staff Scientist:		$81.00		
Technician:		$63.00		
		Other Field Task		$261.00

APPENDIX N – COST PROPOSAL NO. 65 – FIRST QUARTER O&M AND EFFECTIVENESS MONITORING

Alabama Tank Trust Fund
Cost Proposal
Part I

I.1 Cost Proposal Information:

Cost Proposal Number:	Date of Cost Proposal (mm/dd/yy):
65 451601-OM1	9/5/2019
UST or AST Incident Number:	Facility I.D. Number:
UST14-04-05	12534-115-011417

I.2 Facility Information

Facility Name:	Former Martin's Texaco
Facility Address:	36950 US Highway 231 North Ashville, St. Clair County, Alabama

I.3 Owner Information:

Owner Name:	Ira Phillips, Inc.
Owner Address:	P.O. Box 799 Gadsden, AL 35902
Employer Tax Number (IRS):	63-0422062

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:	Walt Henley
Project Contact Phone #:	205-836-5650
Project Contact E-mail:	walt.henley@ppmco.com
Employer Tax Number (IRS):	72-1256279

Cost Proposal Number: 65

Facility Name: Former Martin's Texaco

I.5 Activity Information:

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

Activities/Other/Brief Summary of Activities:

Quarterly O&M of ozone sparge and SVE systems (2 visits per month); Quarterly effectiveness monitoring event (gauge 25 wells, sample 5 of the MWs and 5 RWs); disposal of purge water and knock-out tank water; report.

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
Sutherland Environmental Company, Inc.	Laboratory services
EPS of Vermont	Purge water and knock-out tank water disposal

Cost Proposal Number:	Facility Name:
65	Former Martin's Texaco

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:	Ira Phillips, Jr., President
Email address:	doublepop@gmail.com
Date:	

I.8 Cost Proposal- Contractor Signature:

2.Response Action Contractor Signature:	
Typed or Printed Name and Title:	Matthew J. Ebbert, P.G., Sr. Geologist
Date:	9/4/19

I.9 Trust Fund Obligation Information:

Estimated Total Cost of all Anticipated Response Actions (To be updated overtime):	$1,400,000.00
Total of Previously Approved Cost Proposals:	$1,071,433.57
Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal):	$1,089,183.47
Estimate Percent Completion of entire project to date:	78%

I.10 Cost Proposal Amount

Proposed Costs under this Cost Proposal:	**$17,749.90**	**Personnel**	**$8,189.00**
		Field Equipment	**$1,300.00**
Owners Required Contribution for UST Release($5,000): *Applicable for CP#1 Only*		**Mileage**	**$365.40**
		Per Diem	**$0.00**
		Drilling	**$0.00**
Owners Required Contribution for AST Release($10,000): *Applicable for CP#1 Only*		**Analytical**	**$896.50**
		Other	**$6,999.00**
Total of This Cost Proposal:	**$17,749.90**		

Cost Proposal Summary

CP Total	Facility I.D. #	CP #	Incident Number	Site Name
$17,749.90	12534-115-011417	65	UST14-04-05	Former Martin's Texaco

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

Scenarios	Unit $	Units	Quantity	Requested$
SEMR - Ozone, AS, SVE, Chemox, Biosparge - Reports				
1-12 wells, BTEX/MTBE/Naphthalene	$4,371	/report	1	$4,371.00
Total Report and Plan Costs				**$4,371.00**

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

Groundwater Sampling Set-up (2hrs tech time)	$126.00	/sow	1	$126.00
Purge/Development Water Handling (see Basis)	$94.50	/sow	1	$94.50
Gauging Well (no sampling)	$15.75	/well	15	$236.25
Groundwater Sampling and Gauging 2" Well	$63.00	/well	5	$315.00
Groundwater Sampling and Gauging 4" Well	$72.45	/well	5	$362.25
Ozone, biosparge, SVE, biovent and Air Sparge O&M 3 months	$1,928	/quarter	1	$1,928.00

Travel

Mileage Rate			$0.580	
Mileage (One way office to site)			45	
Number of round trips to site			7	$365.40
Technician(s)-travel time	$63	/hr	12	$756.00

Equipment and Equipment Kits

Sampling Expendables(gloves, ice, string, jars, foil, distilled water, paper towels,	$50	/sow	1	$50.00
Expendables O&M	$25	/day	6	$150.00
Groundwater Monitoring	$160	/day	1	$160.00
Bailers	$7	/bailer	10	$70.00
DPVE, SVE, AS, P&T O&M	$145	/day	6	$870.00
Postage / Shipping and Copying (plans reports, ADEM and owner)	$85	/sow	1	$85.00
Postage / Shipping (Sample Shipping)	$50	/samples	1	$50.00

Analytical Samples

	Method		Pass Through	Sample #	
BTEX/MTBE/Naph (water)	8260	$65 /sample	10%	10	$715.00
Air Samples (System Influent)		$100 /sample	10%	1	$110.00
Other	QA/QC	$65.00 /sample	10%	1	$71.50
Total Field Costs					**$6,514.90**

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

Total Drilling Costs	**$0.00**

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

	Pass Through	Quoted Amoun	Requested$
Phone Costs (telemetry)	10%	$390.00	$429.00

Cost Proposal Summary						
CP Total	Facility I.D. #	CP #	Incident Number	Site Name		
$17,749.90	12534-115-011417	65	UST14-04-05	Former Martin's Texaco		
Power Costs				10%	$5,400.00	$5,940.00
Water Treatment/Disposal	Purge water/knock tank water disposal			10%	$450.00	$495.00
			Total Subs / Vendors / Utilities			**$6,864.00**

APPENDIX O – COST PROPOSAL NO. 66 – SECOND QUARTER O&M AND EFFECTIVENESS MONITORING

Alabama Tank Trust Fund
Cost Proposal
Part I

I.1 Cost Proposal Information:

Cost Proposal Number:	Date of Cost Proposal (mm/dd/yy):
66 451601-OM2	9/5/2019
UST or AST Incident Number:	Facility I.D. Number:
UST14-04-05	12534-115-011417

I.2 Facility Information

Facility Name:	Former Martin's Texaco
Facility Address:	36950 US Highway 231 North Ashville, St. Clair County, Alabama

I.3 Owner Information:

Owner Name:	Ira Phillips, Inc.
Owner Address:	P.O. Box 799 Gadsden, AL 35902
Employer Tax Number (IRS):	63-0422062

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:	Walt Henley
Project Contact Phone #:	205-836-5650
Project Contact E-mail:	walt.henley@ppmco.com
Employer Tax Number (IRS):	72-1256279

Cost Proposal Number: 66

Facility Name: Former Martin's Texaco

I.5 Activity Information:

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

Activities/Other/Brief Summary of Activities:

Quarterly O&M of ozone sparge and SVE systems (2 visits per month); Quarterly effectiveness monitoring event (gauge 25 wells, sample 5 of the MWs and 5 RWs); disposal of purge water and knock-out tank water; report.

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
Sutherland Environmental Company, Inc.	Laboratory services
EPS of Vermont	Purge water and knock-out tank water disposal

Cost Proposal Number:	Facility Name:
66	Former Martin's Texaco

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:	Ira Phillips, Jr., President
Email address:	doublepop@gmail.com
Date:	

I.8 Cost Proposal- Contractor Signature:

2.Response Action Contractor Signature:	
Typed or Printed Name and Title:	Matthew J. Ebbert, P.G., Sr. Geologist
Date:	9/4/19

I.9 Trust Fund Obligation Information:

Estimated Total Cost of all Anticipated Response Actions (To be updated overtime):	$1,400,000.00
Total of Previously Approved Cost Proposals:	$1,089,183.47
Total Proposed Costs to Date (Approved Costs Plus Costs Proposed in this Cost Proposal):	$1,106,933.37
Estimate Percent Completion of entire project to date:	79%

I.10 Cost Proposal Amount

Proposed Costs under this Cost Proposal:	**$17,749.90**	**Personnel**	**$8,189.00**
		Field Equipment	**$1,300.00**
Owners Required Contribution for UST Release($5,000): *Applicable for CP#1 Only*		**Mileage**	**$365.40**
		Per Diem	**$0.00**
		Drilling	**$0.00**
Owners Required Contribution for AST Release($10,000): *Applicable for CP#1 Only*		**Analytical**	**$896.50**
		Other	**$6,999.00**
Total of This Cost Proposal:	**$17,749.90**		

Cost Proposal Summary

CP Total	Facility I.D. #	CP #	Incident Number	Site Name
$17,749.90	12534-115-011417	66	UST14-04-05	Former Martin's Texaco

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

Scenarios	Unit $	Units	Quantity	Requested$
SEMR - Ozone, AS, SVE, Chemox, Biosparge - Reports				
1-12 wells, BTEX/MTBE/Naphthalene	$4,371	/report	1	$4,371.00
Total Report and Plan Costs				**$4,371.00**

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

Groundwater Sampling Set-up (2hrs tech time)	$126.00	/sow	1	$126.00
Purge/Development Water Handling (see Basis)	$94.50	/sow	1	$94.50
Gauging Well (no sampling)	$15.75	/well	15	$236.25
Groundwater Sampling and Gauging 2" Well	$63.00	/well	5	$315.00
Groundwater Sampling and Gauging 4" Well	$72.45	/well	5	$362.25
Ozone, biosparge, SVE, biovent and Air Sparge O&M 3 months	$1,928	/quarter	1	$1,928.00

Travel

Mileage Rate			$0.580	
Mileage (One way office to site)			45	
Number of round trips to site			7	$365.40
Technician(s)-travel time	$63	/hr	12	$756.00

Equipment and Equipment Kits

Sampling Expendables(gloves, ice, string, jars, foil, distilled water, paper towels,	$50	/sow	1	$50.00
Expendables O&M	$25	/day	6	$150.00
Groundwater Monitoring	$160	/day	1	$160.00
Bailers	$7	/bailer	10	$70.00
DPVE, SVE, AS, P&T O&M	$145	/day	6	$870.00
Postage / Shipping and Copying (plans reports, ADEM and owner)	$85	/sow	1	$85.00
Postage / Shipping (Sample Shipping)	$50	/samples	1	$50.00

Analytical Samples

	Method		Pass Through	Sample #	
BTEX/MTBE/Naph (water)	8260	$65 /sample	10%	10	$715.00
Air Samples (System Influent)		$100 /sample	10%	1	$110.00
Other	QA/QC	$65.00 /sample	10%	1	$71.50
Total Field Costs					**$6,514.90**

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

Total Drilling Costs	**$0.00**

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

	Pass Through	Quoted Amoun	Requested$
Phone Costs (telemetry)	10%	$390.00	$429.00

Cost Proposal Summary

CP Total	Facility I.D. #	CP #	Incident Number	Site Name
$17,749.90	12534-115-011417	66	UST14-04-05	Former Martin's Texaco

Power Costs		10%	$5,400.00	$5,940.00
Water Treatment/Disposal	Purge water/knock tank water disposal	10%	$450.00	$495.00
	Total Subs / Vendors / Utilities			**$6,864.00**