COMPREHENSIVE SITE ASSESSMENT REPORT ADDENDUM 1

JT Parsons Cabinet Company

420 Parsons Drive
Osceola, Arkansas

Revision 0

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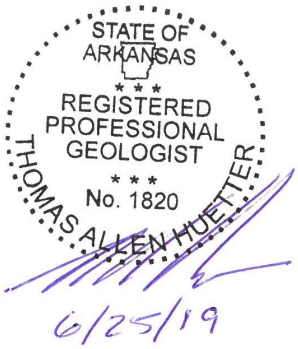

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Acronyms and Abbreviations

ADEQ	Arkansas Department of Environmental Quality
AMSL	Above mean sea level
AMWE	Arkansas Municipal Waste-to-Energy
APC&EC	Arkansas Pollution Control and Ecology Commission
bgs	Below ground surface
CSA	Comprehensive Site Assessment
DO	Dissolved oxygen
DRO	Diesel range organics
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
FID	Flame ionization detector
FTN	FTN Associates
GPR	Ground penetrating radar
GPRS	Ground Penetrating Radar Systems, Inc.
GRO	Gasoline range organics
Harbor	Harbor Environmental and Safety
HASP	Health and Safety Plan
IDW	Investigation-derived waste
LDPE	Low-density polyethylene
MCL	Maximum Contaminant Level
MEK	Methyl ethyl ketone
MS/MSD	Matrix spike and matrix spike duplicate
NTU	Nephelometric turbidity unit
ORP	Oxidation-reduction potential
Parsons	JT Parsons Cabinet Company
PCE	Tetrachloroethylene (Perchloroethylene)
PG	Professional Geologist
PRP	Potentially Responsible Party
PVC	Polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Project Plan
RATFA	Remedial Action Trust Fund Act
RCRA	Resource Conservation and Recovery Act
RPD	Relative percent difference
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SPL	State Priority List
SSL	Soil Screening Level
SVOCs	Semi-volatile organic compounds
TCE	Trichloroethene
TPH	Total petroleum hydrocarbons
USGS	United States Geological Survey
UST	Underground storage tank
VOCs	Volatile organic compounds

1.0 Introduction

Harbor Environmental and Safety (Harbor) was retained by the Arkansas Department of Environmental Quality (ADEQ) to conduct a Comprehensive Site Assessment (CSA) of the former JT Parsons Cabinet Company (Parsons) site in Osceola, Mississippi County, Arkansas. The Parsons site includes a former furniture manufacturing facility that operated from the early 1970s until the late 1990s. Chemicals used at the facility reportedly included paints, lacquers, sealers, stains, and various organic compounds, including chlorinated solvents.

Initial CSA field activities were conducted during the weeks of December 17, 2018 and January 7, 2019, in accordance with the ADEQ-approved Sampling and Analysis Plan (SAP, Harbor, November 2018). In general, the CSA involved the collection of "worst-case" soil samples from 16 soil borings, installation of six monitoring wells, collection of groundwater samples from the wells, and a ground penetrating radar (GPR) survey in the vicinity of a potential underground storage tank (UST) identified during a previous investigation. The CSA results were reported to the ADEQ in the Comprehensive Site Assessment Report (Harbor, February 2019).

Based on the CSA results, ADEQ requested installation and sampling of one additional monitoring well at the facility, generally downgradient from existing well MW-2. Harbor conducted the additional field activities on May 15 and 16, 2019. This Addendum 1 to the CSA Report generally includes:

- Project background, site information, and summary of initial CSA results (Section 2.0);
- Description of additional site assessment activities (Section 3.0);
- Results from the recent investigation (Section 4.0);
- Comparison of sampling results to applicable risk-based screening standards (Section 5.0); and
- Summary and conclusions to the additional investigation (Section 6.0).

1.1 Responsible Agency

The CSA was conducted on behalf of ADEQ and in accordance with Arkansas Pollution Control and Ecology Commission (APC&EC) Regulation 23.

1.2 Project Organization

Persons involved in implementing the CSA, along with their roles and responsibilities, are identified in Table 1-1 below:

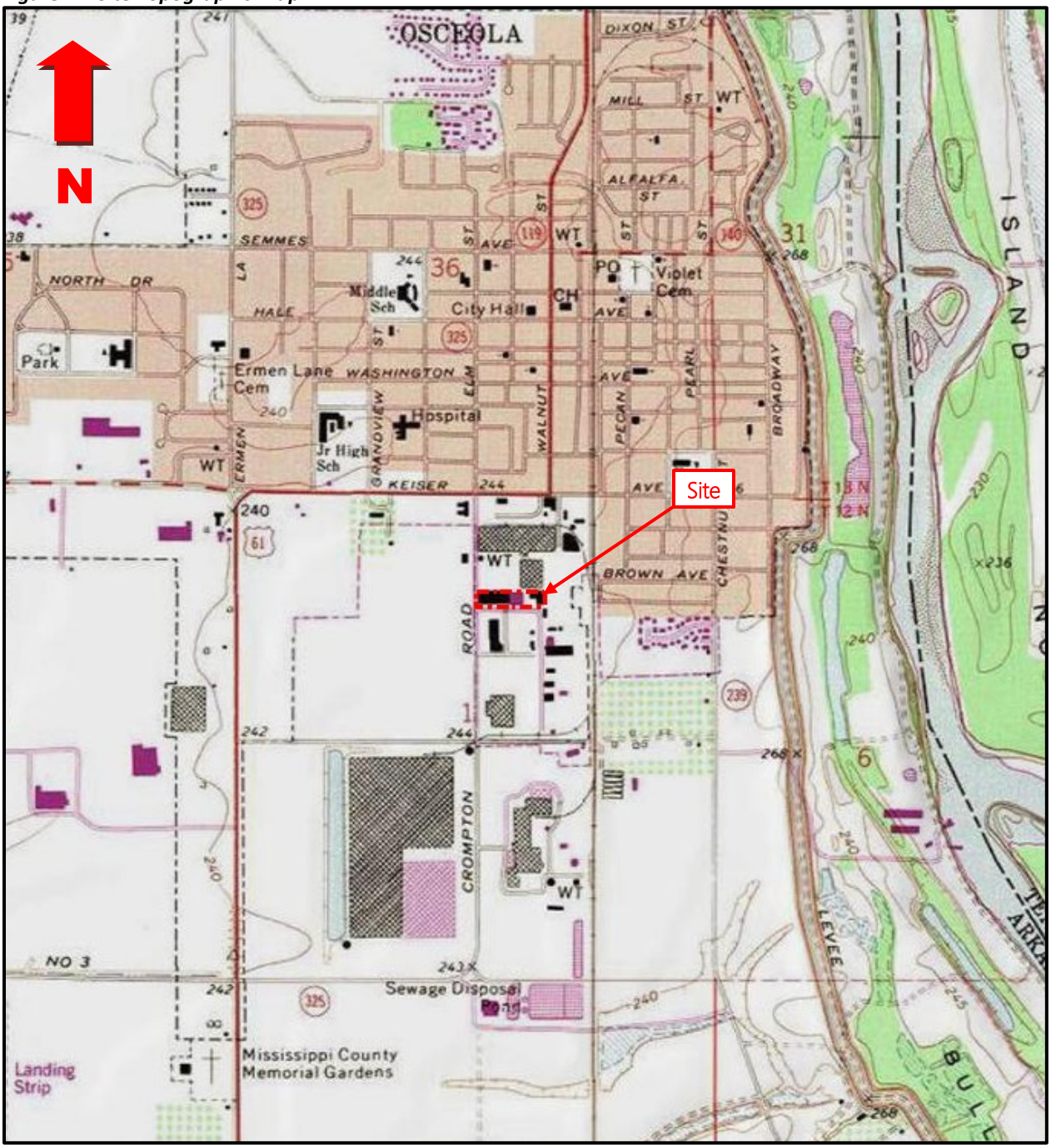
Table 1-1 – Key Project Personnel Contact Information and Responsibilities

Title/Responsibility	Name	Phone Number/Email Address
ADEQ Project Manager/Geologist	Candice Brock	501-682-0846 brock@adeq.state.ar.us
ADEQ CERCLA/Brownfield Project Coordinator	Katie Kreps	501-682-0872 krepsk@adeq.state.ar.us
ADEQ Brownfield Project Administrator	Terry Sligh	501-682-0867 sligh@adeq.state.ar.us
Harbor Project Manager	Thomas Huetter, PG	501-663-8800 thuetter@harborenv.com
Harbor Quality Assurance Officer (QAO)	Leslie Davis	501-663-8800 ldavis@harborenv.com
Harbor Field Team Leader	Michael Lybrand, PG	501-580-3189 mlybrand@harborenv.com
Pace Analytical Laboratory Project Manager	Christopher McCord	615-773-3281 cmccord@pacenational.com

2.0 General Information and Project Background

The Parsons project site is located at 420 Parsons Drive in Osceola, Mississippi County, Arkansas. The facility location is further described as an approximately 4.2-acre tract in Section 1, Township 12 North, Range 10 West. Figure 1 is a copy of the United States Geological Survey (USGS) topographic map showing the site location.

Figure 1 – Site Topographic Map



Source: USGS, Osceola Quadrangle, 1994

The project site is located in an industrial area on the south side of Osceola and is currently owned by the City of Osceola. Undeveloped areas in the vicinity consist of pastureland and farmland. A scrap metal recycler is located directly adjacent to the east. Review of the USGS 7.5-minute topographic map of the area (Osceola, AR, 1994), indicates that topography at the site and surrounding areas is generally flat with an approximate elevation of 240 feet above mean sea level (amsl). The Mississippi River is located approximately one mile east of the project site.

2.1 Geologic and Hydrogeologic Setting

The site is located within the Mississippi Embayment physiographic province. According to the Geologic Map of Arkansas (Haley et al., 1993), the site and surrounding areas are underlain by Quaternary-age stream overbank alluvium and alluvium, which generally consists of "alluvial sediments of present streams and include gravels, sands, silts, clays, and mixtures of any and all of these" (Stratigraphic Summary of Arkansas, 2004) deposited by the Mississippi River.

These deposits also comprise the Mississippi River Valley Alluvial Aquifer, which underlies the area and contains the uppermost occurrence of groundwater. Based on general characteristics of the alluvial aquifer, groundwater below the general area is likely unconfined and contained within the pore spaces of the underlying sediments (Groundwater Atlas of the United States, Segment 5 – Arkansas, Louisiana, Mississippi, 1998). Due to its close proximity to the Mississippi River, groundwater flow below the site is likely influenced by the river. Aquifer well yields and water quality are highly variable. The aquifer is used mainly for agricultural and industrial purposes, rather than domestic or municipal water supply.

2.2 Site Background and Previous Investigations

Review of a Phase I Environmental Site Assessment (ESA) conducted by FTN Associates (FTN) in September 2014, indicates that the site was in use as a furniture manufacturing facility (sewing machine cabinets) from the early 1970s until the late-1990s. Chemicals in use at the facility included paints, lacquers, sealers, and stains, along with acetone, ethylbenzene, methyl ethyl ketone (MEK), methyl isobutyl ketone, naphthalene, tetrachloroethene (PCE), toluene, trichloroethene (TCE), and xylene. An air permit was issued to the facility by ADEQ for volatile air emissions but was voided in 2000. Parsons discontinued use of the facility around this same time. The FTN report also suggested the potential presence of an underground storage tank (UST) on the site. Additionally, the report also indicated that several offsite adjacent facilities could have adversely impacted the site.

Review of the State Priority List (SPL) summary indicates that a citizen complaint was submitted to ADEQ in 2003 regarding the storage of flammable materials in a portion of the building on the site, which was being used by Arkansas Municipal Waste-to-Energy (AMWE). A subsequent investigation by ADEQ confirmed that AMWE was illegally storing containers of both hazardous and non-hazardous materials in the building. Approximately 20,000 containers of wastes were noted during the ADEQ investigation. Leaking containers and spills were also observed and noted by ADEQ. These materials were intended for incineration by AMWE. Between 2003 and 2010, the

majority of these materials were removed by the potentially responsible party (PRP) for appropriate disposal. The site was placed on the Arkansas Remedial Action Trust Act (RATFA) SPL in 2005 as a result of ongoing cleanup associated with the former AMWE operations. The remaining materials were removed from the AMWE storage location in 2012. The AMWE warehouse site has been recommended for removal from the SPL.

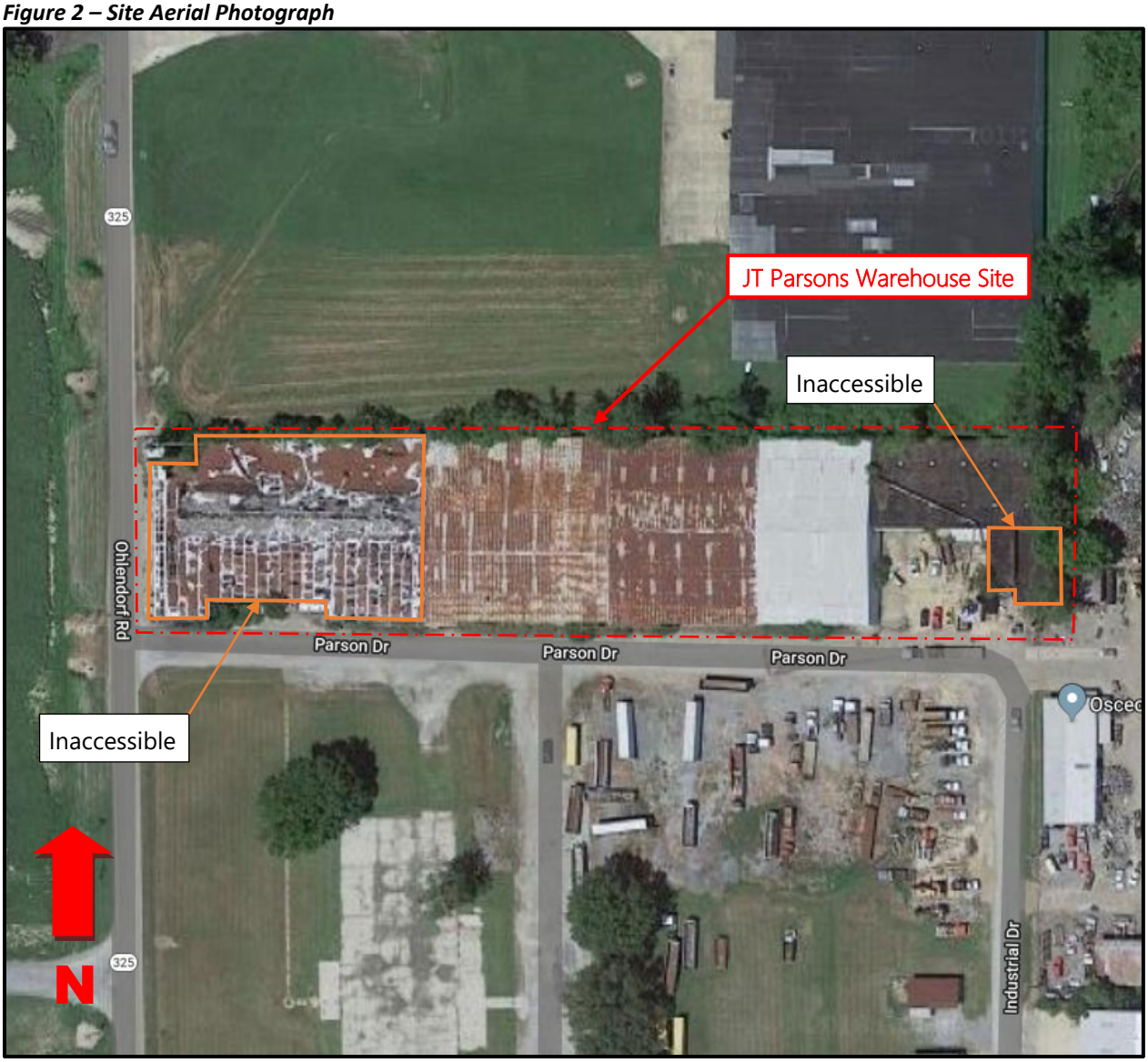
2.3 Current Site Conditions

The warehouse building on the project site is currently vacant and in generally poor condition. The westernmost portion (approximately one-third) of the building contains the original warehouse, which is constructed of masonry wall, slab-on-grade, with wood and steel-truss roof joists covered by a metal roof. Much of the roof has deteriorated, which has resulted in several collapsed areas and generally poor structural integrity. Access to this portion of the building is via a locked glass entry door. The west side of the building parallels Ohlendorf Road. There is a paved area between the road and the building. One unlabeled 55-gallon drum was observed within this portion of the building. It appeared to be empty and upside down, and had vegetation growing on top of it.

The easternmost two-thirds of the building is newer and in fairly good condition. This portion of the building is steel frame, steel clad, slab-on-grade, with a metal roof that is largely intact. A loading dock with two bays is located along the southern side of the building. The loading dock slab slopes down and is currently flooded up to approximately two feet in depth. A third overhead access door at grade level is also located along the southern side of the building; however, the door is off the tracks and cannot be opened. Abundant vegetation was also observed along the southern side of the building, which is lacking building access. A paved exterior area is located on the eastern side of the building. An access door to the building is located in this area, which allowed access to the building interior. The southeasternmost portion of the building (east of the open paved area) contains another flooded loading dock, and an additional area with a collapsed roof.

The northern property line parallels the northern side of the building and is heavily vegetated. No building access was observed along the northern side of the building. Access to this area would be via the adjacent property to the north. Figure 2 below is an aerial photograph that shows the building and immediately surrounding areas.

Figure 2 – Site Aerial Photograph



Source: Google Maps, downloaded 9/18/2018
Note: Areas outlined in orange are inaccessible due to overhead roof damage

2.4 Summary of Initial CSA Results

Initial CSA field activities were conducted by Harbor during the weeks of December 17, 2018 and January 7, 2019, and results were reported in the Comprehensive Site Assessment Report (Harbor, February 2019). A total of 32 soil samples were collected from 16 soil borings (B-1 through B-16) for analysis of VOCs, SVOCs, TPH-DRO, TPH-GRO, and RCRA metals. Two soil samples were collected from each boring, the surface interval and the "worst-case" interval based on field screening results. A summary of the CSA results is included in Appendix A.

Six of the borings were converted to permanent water wells (MW-1 through MW-6). The wells were developed and groundwater samples were collected for analysis of the same parameter set

listed above. Boring and well locations are illustrated on Figure 2. Soil sampling results are summarized in Appendix A. The table includes EPA's risk-based Regional Screening Levels (RSLs, November 2018) for comparison purposes. These include both residential and industrial screening levels for surface soils, along with EPA Maximum Containment Level (MCL)-based Protective of Groundwater screening levels. Groundwater results are also included in Appendix A. EPA's MCLs for drinking water (or EPA Tap Water screening levels) were included in the table for comparison purposes (EPA, November 2018). Any detections above the applicable RSLs are listed in **bold**.

In addition to the environmental sampling, A GPR survey was conducted in the vicinity of the potential UST identified during a previous Phase I ESA at the site. A summary of the general CSA findings is included below.

- Lithology at the site consisted of mostly clays near the surface (to roughly four feet) underlain by mostly fine to very-fine grained sands. Groundwater was encountered at depths of three to five feet bgs and static groundwater levels generally rose to within one foot of surface, indicating a semi-confined or confined water bearing zone below the site.

- Groundwater mounding existed below the onsite building, with flow patterns radiating primarily to the south-southeast and north-northwest. The regional groundwater flow direction is likely eastward, toward the Mississippi River.

- One or more soil sample results for arsenic, barium, and lead exceeded respective SSLs. Based on background concentrations of these metals for the region, the SSL exceedances were likely due to naturally occurring metals in the soils.

- Benzo(a)pyrene was detected in the 0- to 4-foot soil sample from boring B-15 at a concentration of 0.11 mg/kg, slightly above the residential SSL (0.142 mg/kg). Surface exposure exists at this locale.

- The MCL for arsenic (0.010 mg/L) was exceeded in five of the six groundwater samples; however, these exceedances may be related to naturally occurring levels of arsenic in groundwater or elevated turbidity levels. The TPH-DRO result for MW-3 (0.109 mg/L) and the PCE result for MW-2 (0.0505 mg/L) exceeded the respective MCLs.

- The GPR survey did not identify the suspect UST identified during the previous Phase I ESA. Three below ground utilities, potentially abandoned piping associated with former UST, were identified and marked.

3.0 Additional CSA Activities

All investigative activities were conducted in accordance with Harbor's Additional Scope of Work (April 12, 2019), approved by the ADEQ on April 29, 2019. The following sections detail tasks completed during the additional CSA project. Site photographs are included in Appendix B and referenced below.

3.1 Monitoring Well Installation

One additional monitoring well, MW-7, was installed hydraulically downgradient from well MW-2 to better identify the potential extent of onsite groundwater contamination. The well location is shown on Figure 3. The monitoring well was installed by Pollution Management Inc., an Arkansas-licensed driller, using a track-mounted Geoprobe 7822DT (see Photo 1, Appendix B). The well was generally installed in the same manner as existing wells MW-1 through MW-6. A concrete corer was used to create a 10-inch void within the six-inch thick concrete pad for well installation (Photos 2 and 3). Continuous soil sampling was initially conducted using five-foot stainless-steel sampling tubes equipped with Macro-Core clear PVC liners. An Arkansas-licensed Professional Geologist evaluated the soils and recorded the borehole lithology on a boring log (see Appendix C). Headspace field screening or soil sampling for laboratory analysis was not conducted during this investigation.

Following direct push sampling, hollow-stem augers (eight-inch diameter) were used to create the borehole for well installation at a total depth of approximately 16 feet bgs, similar to the existing monitoring wells. The well consisted of two-inch diameter schedule 40 polyvinyl chloride (PVC) with a ten-foot 0.010-inch slotted screen and end cap. The filter pack consisted of 20/40 silica sand placed to a level two feet above the screened interval. A two-foot (minimum) bentonite seal was placed above the filter pack to seal the well from potential surface contamination. The bentonite was allowed to set overnight prior to well development and sampling. The new well was completed at the surface with a flush-mount well cover (see Photo 4). "As-built" well specifications are illustrated on the boring log in Appendix C.

3.2 Well Development

New monitoring well MW-7 was developed using the surge block method with submersible pump to remove particulates from the well and filter pack media. Prior to purging an electronic water level indicator was used to measure the static groundwater level and total well depth. Water levels from all other onsite wells were recorded to evaluate groundwater flow patterns (see Section 4.2).

Well development continued until groundwater was free of particulates (turbidity below 10 NTU) or constant. A total of approximately 105 gallons of groundwater were purged from well MW-7 during development. The groundwater was placed in 55-gallon drums for proper waste profiling and disposal (see Section 4.5).

3.3 Groundwater Sampling

Following well development, a groundwater sample was collected from MW-7 for laboratory analysis. The well was purged and sampled with a peristaltic pump utilizing EPA's *Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures* (Puls and Barcelona, April 1996). Dedicated low-density polyethylene (LDPE) tubing was gently lowered into the well to a point within the top of the screened interval. The LDPE discharge tubing was connected to a flow-through cell to enable measurement of field parameters via YSI Model 556 multi-parameter instrument. Field parameters measured included dissolved oxygen (DO), oxidation-reduction potential (ORP), pH, specific conductance, temperature, and turbidity (see Groundwater Sampling Record, Appendix D).

The MW-7 groundwater sample was collected in laboratory-supplied containers once the groundwater in the well had stabilized, minimal drawdown had occurred, and turbidity was less than 10 NTU (or constant). The VOC samples were collected such that zero-headspace existed within the sample vials. The containers were properly labeled, placed on ice in an ice chest, and shipped under proper chain-of-custody (via Federal Express) to Pace Analytical of Mt. Juliet, Tennessee for laboratory analyses (see below).

3.4 Laboratory Analysis

The MW-7 groundwater sample was analyzed for total RCRA metals (EPA Method 6010B/7470A) and VOCs (EPA Method 8260B). Other parameters (similar to initial CSA) were not proposed based on groundwater results for nearby, upgradient well MW-2. Pace Analytical's laboratory analytical data sheets are provided in Appendix E, and MW-7 sampling results are discussed in Section 4.3.

3.5 Quality Assurance/Quality Control

QA/QC procedures and data quality objectives were in accordance with the project SAP. Field QC samples included a blind duplicate sample (BD), matrix spike/matrix spike duplicate (MS/MSD) sample (prepared in the lab), and trip blank (remained with sample containers throughout handling and shipping). A rinsate sample was not proposed, as new LDPE tubing was used for well development and groundwater sampling. Laboratory QA/QC analyses included method blank samples, laboratory control samples, matrix spike samples, and surrogate recoveries. Harbor conducted an independent QA/QC data review to evaluate the validity of the results generated during the investigation. QA/QC results are discussed in Section 4.4.

3.6 Professional Surveying

Harbor surveyed new monitoring well MW-7 utilizing an Arkansas-Licensed surveyor. Onsite benchmarks established during initial CSA activities were used for measuring geodetic (latitude/longitude) coordinates for the new well. The top of casing elevation for the well was tied to mean sea level datum to enable determination of groundwater flow patterns (Section 4.2).

3.7 Other Field Procedures

Other field procedures, including drill rig decontamination, sample identification, sample labeling and sealing, sample chain-of-custody, sample packaging and shipping, equipment calibration, field documentation, and data validation, were conducted in accordance with the project SAP.

4.0 Additional CSA Results

4.1 Geology/Hydrogeology

Lithology for the MW-7 boring consisted of mostly clays within the upper 10 feet and then primarily fine- to very fine-grained sands to total depth of 15 feet. Groundwater was encountered at a depth of roughly four feet bgs then rose to less than 1.5 feet bgs, confirming that the uppermost water-bearing zone below the site is confined or semi-confined. The MW-7 boring log is presented in Appendix C.

4.2 Groundwater Flow Patterns

Static groundwater levels for all seven monitoring wells were measured during the additional CSA activities to evaluate groundwater flow patterns below the site. Each well cap was removed to allow water level equilibration, and an electronic water level indicator was then used to measure the static groundwater level for each well. Measurements were made from the surveyed reference mark on top of the well casing. The water level measurements were subtracted from well casing elevations to determine static groundwater level elevations for each well. A summary of the monitoring well and groundwater measurements is included below in Table 4-1.

Table 4-1 – Summary of Well and Groundwater Measurement Data

Well No.	Well Depth (feet bgs)	Screened Interval (feet bgs)	Top of Casing Elevation (feet amsl)	Depth to Static Water Level (feet TOC)	Static Water Level Elevation (feet amsl)
MW-1	15.4	5.0 – 15.0	242.68	0.60	242.08
MW-2	15.5	5.1 – 15.1	242.36	0.98	241.38
MW-3	16.6	6.2 – 16.2	246.23	4.66	241.57
MW-4	15.9	5.5 – 15.5	241.72	1.04	240.68
MW-5	16.4	6.0 – 16.0	246.45	6.22	240.23
MW-6	16.0	5.6 – 15.6	242.33	0.66	241.67
MW-7	15.1	4.9 – 14.9	241.98	1.00	240.98

Notes:
bgs = Below ground surface.
amsl = Above mean sea level.
TOC = Top of well casing.
Water levels measured on May 16, 2019.
See Figure 4 for well locations and potentiometric surface map for the site.

Overall, the static groundwater levels at the Parsons site were similar to those recorded during the January 2019 groundwater sampling event. The static groundwater elevation data were used to generate a potentiometric surface map for the site (see Figure 4). As shown on the figure, groundwater flow patterns below the site were generally southward and westward. These patterns are similar to those from the January 2019 event. Groundwater mounding may exist below the onsite buildings, skewing local groundwater flow patterns. The regional groundwater flow

direction is likely eastward, toward the nearby Mississippi River. The groundwater gradient across the site (east/west) is considered relatively low (approximately 0.0026), similar to surrounding topography.

4.3 Groundwater Sampling Results

The MW-7 groundwater sampling results are summarized below in Table 4-2. EPA's MCLs for drinking water were included in the table for comparison purposes. EPA tap water screening levels (EPA, November 2018) were used for those parameters for which an MCL has not been established. All results are listed in milligrams per liter (mg/L).

As shown in Table 4-2, arsenic was detected in the MW-7 groundwater sample at a concentration of 0.0462 mg/L. No other metals were detected in the sample. Five VOCs were detected in the groundwater sample, including cis-1,2-dichloroethene (0.180 mg/L), trans-1,2-dichloroethene (0.00129 mg/L), PCE (0.0109 mg/L), TCE (0.00649 mg/L), and vinyl chloride (0.00955 mg/L). With the exception of trans-1,2-dichloroethene, all of the detected constituents exceeded their respective screening levels. Laboratory analytical data sheets are provided in Appendix D, and a discussion of parameter concentrations with respect to applicable groundwater screening levels is included in Section 5.0.

Table 4-2 – MW-7 Groundwater Sampling Results

Analyte	Concentration (mg/L)	MCL (mg/L)
Arsenic	**0.0462**	**0.010**
Barium	0.198	**2.0**
Cadmium	<0.00200	**0.005**
Total Chromium	<0.0100	**0.10**
Lead	<0.00500	**0.015**
Selenium	<0.0100	**0.050**
Silver	<0.00500	**0.094***
Mercury	<0.000200	**0.002**
VOCs		
cis-1,2-Dichloroethene	**0.180**	**0.070**
trans-1,2-Dichloroethene	0.00129	**0.10**
Tetrachloroethene (PCE)	**0.0109**	**0.005**
Trichloroethene (TCE)	**0.00649**	**0.005**
Vinyl Chloride	**0.00955**	**0.002**

Notes:
mg/L = Milligrams per liter.
MCL = EPA Maximum Contaminant Level for drinking water.
VOCs = Volatile Organic Compounds.
Only those VOCs detected are listed in table.
*MCL not available for parameter; EPA Tap Water screening level used.
See Figure 3 for monitoring well locations.
Results listed in **bold** exceed respective screening level for groundwater.

4.4 QA/QC Review

An analytical data review summary for the Parsons laboratory data is provided in Appendix F. The summary contains results of the field and laboratory QC samples and a discussion of the applicable QA/QC criteria. In general, the review indicated adequate laboratory precision. The data generated during the additional Parsons CSA activities were determined to be satisfactory and usable as reported.

4.5 Investigative-Derived Wastes

Investigative-derived wastes (IDW) generated during the additional CSA activities included soil cuttings, plastic sampling sleeves, well development groundwater, purged groundwater (from sampling), and expendables (e.g., nitrile gloves, plastic sheeting, plastic tubing). The IDW was segregated and containerized in 55-gallon drums. A paint pen was used to mark the contents (e.g., soil cuttings, groundwater, well number) and generation date for each drum, and "Non-Hazardous Waste" labels were placed on the drums (see Photo 5, Appendix B). All drums were staged under roof inside the warehouse building along with the drums from initial CSA activities.

Based on the laboratory results the wastes will be properly disposed as a "Non-Hazardous Waste" at an appropriately permitted facility. Documentation of disposal (e.g., waste manifests, disposal records) will be submitted to the ADEQ as supplemental information to the CSA Report.

5.0 Comparison of CSA Results to Screening Levels

The metal arsenic was detected in the MW-7 groundwater sample at a concentration of 0.0462 mg/L, which exceeded the respective MCL of 0.010 mg/L (see Table 4-2). The MW-7 result was similar to those detected in onsite wells during the initial CSA groundwater sampling event. Five of the six arsenic concentrations from the previous event exceeded the MCL. As previously concluded, the arsenic levels in groundwater at the Parsons site are likely related to naturally-occurring levels of arsenic in groundwater.

As shown in Table 4-2, four of the five VOC detections in the MW-7 sample exceeded the respective MCLs, including the compounds cis-1,2-dichloroethene (0.180 mg/L), PCE (0.0109 mg/L), TCE (0.00649 mg/L), and vinyl chloride (0.00955 mg/L). Overall, the VOC impact in well MW-7 was more extensive than the impact previously exhibited by nearby well MW-2, located immediately upgradient (see Figure 4). The data indicate that elevated levels of VOCs in groundwater have the potential to migrate offsite, south of the Parsons site.

6.0 CSA Summary/Conclusions

Harbor conducted additional CSA field activities at the former Parsons facility on May 15 and 16, 2019. The work involved installation and sampling of an additional monitoring well (MW-7) at the site, in accordance with Harbor's Additional Scope of Work (April 12, 2019), approved by the ADEQ. The MW-7 groundwater sample was analyzed for VOCs and metals, based on previous results from monitoring well MW-2, located immediately upgradient from the new well. Well MW-7 was surveyed, and static water levels were obtained from all existing wells to evaluate groundwater flow patterns below the site. A summary of findings from the additional CSA activities is included below.

- Groundwater flow patterns below the site, generally southward and westward, may have been influenced by local mounding below the onsite buildings. The regional groundwater flow direction is likely eastward, toward the Mississippi River.

- The MW-7 arsenic result (0.0462 mg/L) exceeded the respective MCL for arsenic (0.010 mg/L); however, the elevated arsenic levels in groundwater below the site may be naturally occurring.

- Four VOC detections in the MW-7 groundwater sample exceeded the respective MCLs, including cis-1,2-dichloroethene (0.180 mg/L), PCE (0.0109 mg/L), TCE (0.00649 mg/L), and vinyl chloride (0.00955 mg/L). Overall, the VOC impact in well MW-7 was more extensive than the impact previously exhibited by upgradient well MW-2. The data indicate that elevated levels of VOCs in groundwater have the potential to migrate offsite, south of the Parsons site. Further investigative work on the adjacent tract would be required to delineate the lateral extent of VOC impact in groundwater.

7.0 References

The following references were used in preparation of this Comprehensive Site Assessment Report:

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Figures

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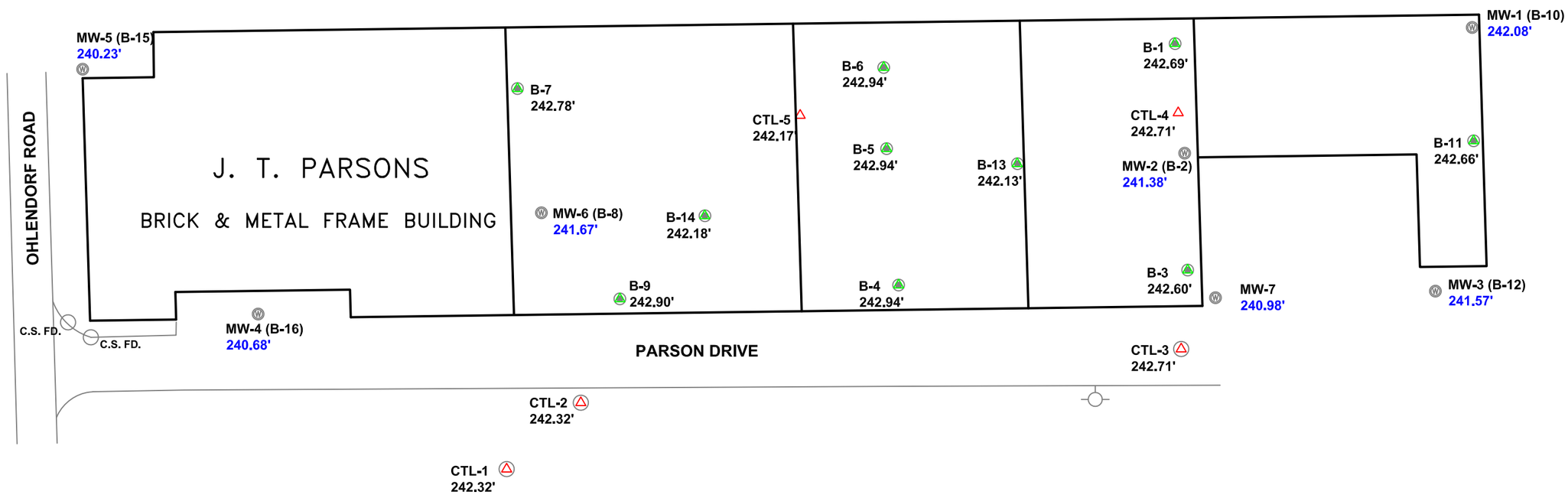


LEGEND

- *MONITORING WELL (WITH GROUND WATER ELEVATION)*
- *SOIL BORING*
- *CONTROL POINT*
- *FIRE HYDRANT*

REGISTERED
STATE OF ARKANSAS
NO. 1203
SIGNATURE
JOHNNY R. TWEEDLE
PROFESSIONAL LAND SURVEYOR

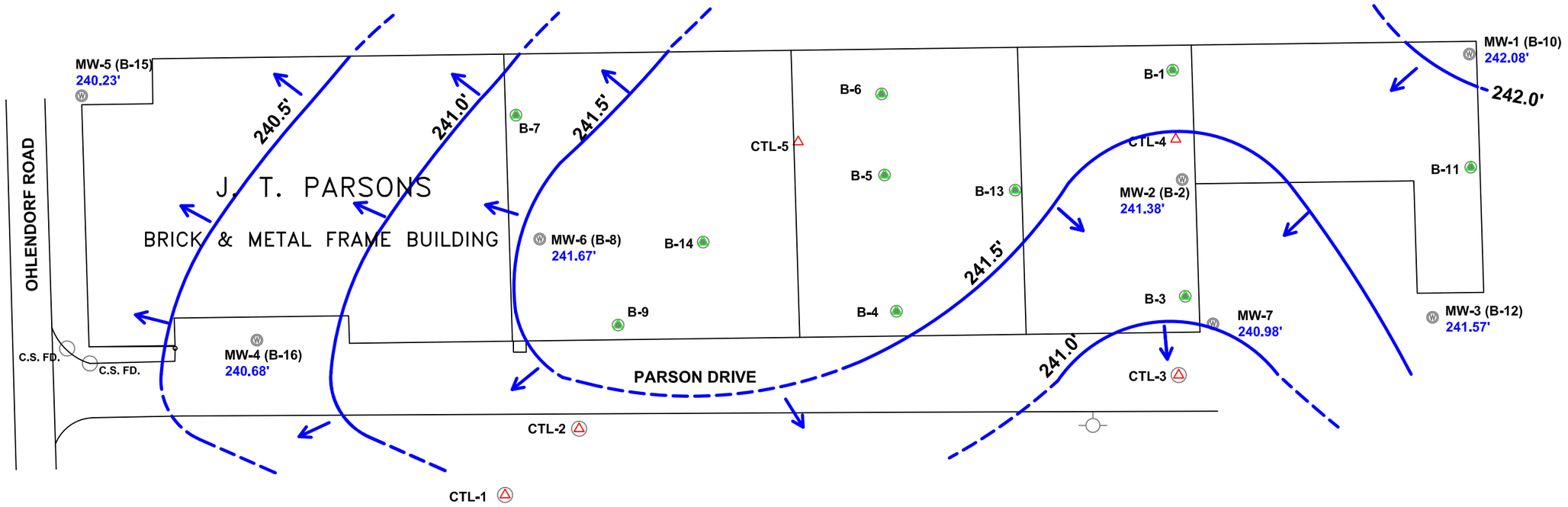
Harbor
5800 Evergreen Drive
Little Rock, AR 72205
Ph (501)663-8800
Fax (501)588-0123
www.harborenv.com

ADEQ
J. T. PARSONS SITE
OSCEOLA, ARKANSAS
POTENTIOMETRIC SURFACE MAP (05-16-19)

NO	REVISION DESCRIPTION	DATE
1	ADDED MW-7	6-05-19

Drawn By: DLF/JRT
Date: 2-7-19
Scale: 1"=60'

FIG. 3



LEGEND

- MONITORING WELL (WITH GROUND WATER ELEVATION)
- SOIL BORING
- CONTROL POINT
- FIRE HYDRANT
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

REGISTERED
STATE OF ARKANSAS
NO. 1203
SIGNATURE
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ADEQ
J. T. PARSONS SITE
OSCEOLA, ARKANSAS
POTENTIOMETRIC SURFACE MAP (05-16-19)

NO	REVISION DESCRIPTION	DATE
1	ADDED MW-7	5-27-19

Drawn By: DLF/JRT
Date: 2-7-19
Scale: 1"=60'

FIG. 4

Appendix A

Summary of Initial CSA Results

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Table 5-1 – Soil Sampling Results

Analyte	Sample Concentration (mg/kg)								Soil Screening Levels (mg/kg)		
	B-1		B-2		B-3		B-4		Residential Soils	Industrial Soils	Protective of Groundwater
	0-1 ft.	4-6 ft.	4-6 ft.	6-8 ft.	0-4 ft.	4-6 ft.	0-4 ft.	4-6 ft.			
Arsenic	**4.11**	**3.91**	**3.29**	**5.42**	**3.79**	**2.15**	**4.78**	**3.79**	**0.68**	**3.0**	**0.29**
Barium	**126**	**113**	**94.4**	**117**	**124**	**94.9**	**130**	**125**	**15,000**	**220,000**	**82**
Cadmium	<0.500	<0.500	<0.500	<0.500	0.509	<0.500	<0.500	<0.500	**71**	**980**	**0.38**
Total Chromium	11.9	10.8	10.5	9.91	11.6	8.97	11.5	10.3	**120,000**	**1,800,000**	**180,000**
Lead	7.45	6.67	9.17	6.04	8.18	5.49	7.61	6.39	**400**	**800**	**14**
Selenium	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**390**	**5,800**	**0.26**
Silver	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**390**	**5,800**	**0.80**
Mercury	0.0207	<0.0200	<0.0200	<0.0200	0.0214	<0.0200	0.024	<0.0200	**11**	**46**	**0.10**
TPH-DRO	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	**110**	**600**	**0.023**
TPH-GRO	<0.100	<2.50	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	**82**	**420**	**0.017**
VOCs											
cis-1,2-Dichloroethene	ND	ND	0.00357	0.00297	ND	**0.0667**	ND	ND	**160**	**2,300**	**0.021**
Tetrachloroethene (PCE)	**0.00934**	ND	**0.0249**	ND	ND	ND	ND	ND	**24**	**100**	**0.0023**
Trichloroethene (TCE)	ND	0.0011	**0.00365**	ND	ND	ND	ND	ND	**0.94**	**6.0**	**0.0018**
SVOCs	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--

Notes:

mg/kg = Milligrams per kilogram.

TPH = Total Petroleum Hydrocarbons; DRO = Diesel-Range Organics; GRO = Gasoline-Range Organics.

VOCs = Volatile Organic Compounds; SVOCs = Semi-Volatile Organic Compounds.

ND = All compounds in scan reported as non-detect (see Appendix F for detection limits).

Chromium (III) RSLs used for Residential and Industrial soil screening levels.

Aromatic High screening levels used for DRO; Aromatic Low screening levels used for GRO.

For Protective of Groundwater, MCL-based screening levels used where available; otherwise, Risk-Based screening levels used.

See Figure 3 for boring locations.

Results listed in **bold** exceed one or more screening levels.

Table 5-1 – Soil Sampling Results (Cont.)

Analyte	Sample Concentration (mg/kg)								Soil Screening Levels (mg/kg)		
	B-5		B-6		B-7		B-8		Residential Soils	Industrial Soils	Protective of Groundwater
	0-4 ft.	10-12 ft.	0-4 ft.	6-8 ft.	0-4 ft.	6-8 ft.	0-4 ft.	6-8 ft.			
Arsenic	**3.03**	**2.45**	**4.72**	**3.11**	**5.98**	**5.15**	**9.42**	**4.52**	**0.68**	**3.0**	**0.29**
Barium	**94.7**	**132**	**137**	**108**	**94.3**	**104**	**129**	**121**	**15,000**	**220,000**	**82**
Cadmium	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	**71**	**980**	**0.38**
Total Chromium	9.38	8.97	14.5	9.49	10.2	9.07	12.2	10.9	**120,000**	**1,800,000**	**180,000**
Lead	5.84	5.22	9.26	5.90	7.34	5.42	8.02	6.52	**400**	**800**	**14**
Selenium	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**390**	**5,800**	**0.26**
Silver	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**390**	**5,800**	**0.80**
Mercury	<0.0200	<0.0200	0.0203	<0.0200	0.0251	<0.0200	0.0280	<0.0200	**11**	**46**	**0.10**
TPH-DRO	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	**110**	**600**	**0.023**
TPH-GRO	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	**82**	**420**	**0.017**
VOCs Tetrachloroethene (PCE)	ND	ND	**0.0159**	**0.00309**	ND	ND	ND	ND	**24**	**100**	**0.0023**
SVOCs	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--

Table 5-1 – Soil Sampling Results (Cont.)

Analyte	Sample Concentration (mg/kg)								Soil Screening Levels (mg/kg)		
	B-9		B-10		B-11		B-12		Residential Soils	Industrial Soils	Protective of Groundwater
	0-4 ft.	4-5 ft.	0-4 ft.	6-8 ft.	0-4 ft.	4-6 ft.	4-6 ft.	10-12 ft.			
Arsenic	**4.42**	**2.74**	**3.73**	**2.74**	**5.36**	**2.86**	**12**	<2.00	**0.68**	**3.0**	**0.29**
Barium	**124**	**105**	**102**	**118**	**154**	**111**	**142**	**137**	**15,000**	**220,000**	**82**
Cadmium	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	**71**	**980**	**0.38**
Total Chromium	13	9.14	12.4	9.66	13.0	11.7	17.3	11.5	**120,000**	**1,800,000**	**180,000**
Lead	8.71	5.26	**16.7**	6.01	13.8	8.19	10.8	7.43	**400**	**800**	**14**
Selenium	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**390**	**5,800**	**0.26**
Silver	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**390**	**5,800**	**0.80**
Mercury	0.0239	<0.0200	0.0603	0.0215	0.0251	0.0524	0.0265	0.0212	**11**	**46**	**0.10**
TPH-DRO	<4.00	<4.00	**27.5**	<4.00	<16.0	<4.00	<4.00	<4.00	**110**	**600**	**0.023**
TPH-GRO	<0.100	<0.100	<0.100	<0.119	<0.100	<0.100	<0.100	<0.100	**82**	**420**	**0.017**
VOCs Acetone	0.0301	ND	ND	ND	ND	ND	ND	ND	**61,000**	**670,000**	**2.9**
SVOCs	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--

Table 5-1 – Soil Sampling Results (Cont.)

Analyte	Sample Concentration (mg/kg)								Soil Screening Levels (mg/kg)		
	B-13		B-14		B-15		B-16		Residential Soils	Industrial Soils	Protective of Groundwater
	0-4 ft.	4-6 ft.	0-4 ft.	6-8 ft.	0-4 ft.	4-6 ft.	0-4 ft.	4-6 ft.			
Arsenic	**2.8**	**2.62**	**2.37**	<2.00	<2.00	<2.00	**6.2**	**2.15**	**0.68**	**3.0**	**0.29**
Barium	**116**	**125**	**122**	**126**	**98.9**	**105**	**139**	**110**	**15,000**	**220,000**	**82**
Cadmium	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	**71**	**980**	**0.38**
Total Chromium	11.4	10.6	11.7	11.5	9.27	9.99	14.8	11.1	**120,000**	**1,800,000**	**180,000**
Lead	6.98	6.21	7.12	6.63	12.4	6.07	10.3	6.58	**400**	**800**	**14**
Selenium	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	**390**	**5,800**	**0.26**
Silver	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	**390**	**5,800**	**0.80**
Mercury	0.0205	<0.0200	0.0261	0.0237	0.0255	0.0217	0.0297	0.0231	**11**	**46**	**0.10**
TPH-DRO	<4.00	<4.00	<4.00	<4.00	<4.00	<4.00	<16.0	<4.00	**110**	**600**	**0.023**
TPH-GRO	<0.100	<0.100	<0.100	<0.132	<0.100	<0.100	<0.100	<0.100	**82**	**420**	**0.017**
VOCs											
Acetone	ND	ND	0.0315	ND	ND	ND	ND	ND	**61,000**	**670,000**	**2.9**
SVOCs											
Benzo(a)anthracene	ND	ND	ND	ND	**0.112**	ND	ND	ND	**1.1**	**21**	**0.011**
Benzo(b)fluoranthene	ND	ND	ND	ND	**0.311**	ND	ND	ND	**1.1**	**21**	**0.30**
Benzo(k)fluoranthene	ND	ND	ND	ND	0.0994	ND	ND	ND	**11**	**210**	**2.9**
Benzo(g,h,i)perylene	ND	ND	ND	ND	0.0791	ND	ND	ND	--	--	--
Benzo(a)pyrene	ND	ND	ND	ND	**0.142**	ND	ND	ND	**0.11**	**2.1**	**0.24**
Chrysene	ND	ND	ND	ND	0.105	ND	ND	ND	**110**	**2,100**	**9.0**
Fluoranthene	ND	ND	ND	ND	0.163	ND	ND	ND	**2,400**	**30,000**	**89**
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	0.0773	ND	ND	ND	**1.1**	**21**	**0.98**
Phenanthrene	ND	ND	ND	ND	0.0875	ND	ND	ND	--	--	--
Bis(2-ethylhexyl)phthalate	ND	ND	ND	ND	**2.23**	ND	ND	ND	**39**	**160**	**1.4**
Pyrene	ND	ND	ND	ND	0.137	ND	ND	ND	**1,800**	**23,000**	**13**

Table 2 – CSA Groundwater Sampling Results

Analyte	Sample Concentration (mg/L)						MCL (mg/L)
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	
Arsenic	**0.0107**	<0.0100	**0.0312**	**0.0398**	**0.0155**	**0.0842**	**0.010**
Barium	0.336	0.166	0.242	0.247	0.546	0.216	**2.0**
Cadmium	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	**0.005**
Total Chromium	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	**0.10**
Lead	0.00808	<0.00500	<0.00500	0.00577	0.00518	0.0102	**0.015**
Selenium	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	**0.050**
Silver	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	**0.094***
Mercury	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	**0.002**
TPH-DRO	<0.100	<0.100	**0.109**	<0.100	<0.100	<0.100	**0.0055***
TPH-GRO	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	**0.033***
VOCs							
cis-1,2-Dichloroethene	0.0238	0.00533	ND	0.00235	ND	ND	**0.070**
Tetrachloroethene (PCE)	ND	**0.0505**	ND	ND	ND	ND	**0.005**
Trichloroethene (TCE)	ND	0.00489	ND	ND	ND	ND	**0.005**
SVOCs							
Phenol	0.0109	ND	ND	ND	ND	ND	**5.8***

Notes:

mg/L = Milligrams per liter.
MCL = EPA Maximum Contaminant Level for drinking water.
TPH = Total Petroleum Hydrocarbons; DRO = Diesel-Range Organics; GRO = Gasoline-Range Organics.
VOCs = Volatile Organic Compounds; SVOCs = Semi-Volatile Organic Compounds.
ND = All compounds in scan reported as non-detect (see Appendix F for detection limits).
*MCL not available for parameter; EPA Tap Water screening level used.
Aromatic High screening levels used for DRO; Aromatic Low screening levels used for GRO.
See Figure 3 for monitoring well locations.
Results listed in **bold** exceed one or more screening levels.

Appendix B

Site Photographs

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Photo 1. Track-mounted Geoprobe unit used for installation of new monitoring well MW-7.

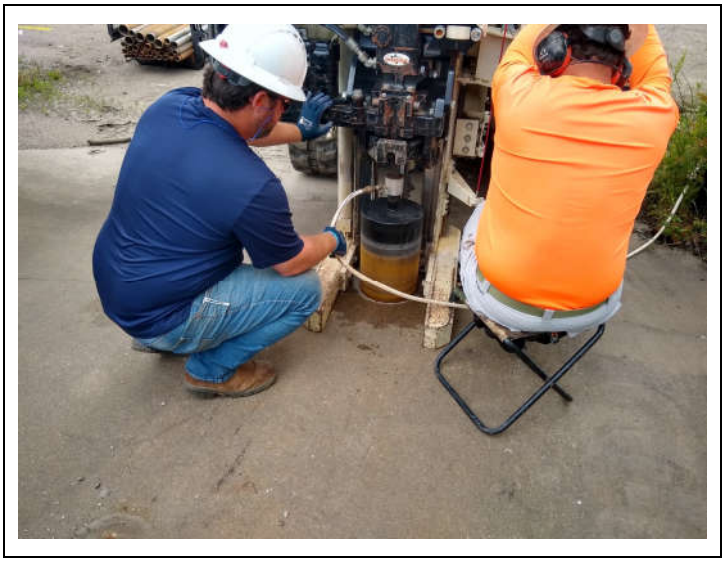

Photo 2. Crew coring through concrete at MW-7 location.

Photo 3. Concrete core removed from MW-7 location.

Photo 4. Flush-mount surface completion, MW-7.

Photo 5. IDW drums labeled and staged inside building.

Appendix C

Boring Log and Monitoring Well Specifications

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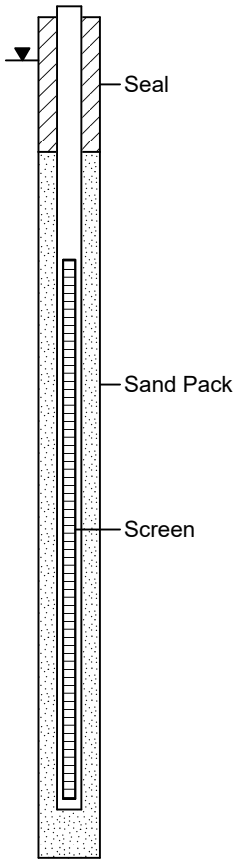
LOG OF BORING MW-7

J.T. Parsons Investigation
Osceola, Arkansas

Date Started	: 5/15/19	Northing Coord.	:
Date Completed	: 5/16/19	Easting Coord.	:
Hole Diameter	: 2.25 in./8.0 inch	Drilling Company	: PMI
Drilling Method	: Geoprobe/Hollow-stem	Logged By	: M. Lybrand, P.G.
Sampling Method	: 5-ft. SS Sampler	Company	: Harbor Environmental

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	FID (ppm)	REMARKS
0	CL		6-in. concrete at surface, then dark gray SILTY CLAY, damp, med. stiffness.	NA	Water level 5-16-19.
5			Dark gray SANDY CLAY, wet, soft.		
			w/ some CLAYEY SAND.		
10	SC		Dark gray fine- to v. fine-grained CLAYEY SAND, wet, firm, w/ some SANDY CLAY.		
15					Probe used for soil sampling to 15.0 feet, then hollow-stem auger used to 16.0 feet for installation of well MW-7. Well consisted of 2-inch PVC w/ 10-foot slotted well screen. 20/40 silica sand added around well screen to depth of two feet above screen, then hydrated bentonite seal (2+ feet) to near ground surface. Flush-mount manhole completion set at surface.
20					
25					

Well: MW-2
Elev.: 241.98 (TOC)



Appendix D

Groundwater Sampling Record

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Harbor

Groundwater Sampling Record

Site Name:	J.T. Parsons - Osceola, AR	Well ID:	MW-7	Date:	5-16-19
Well Diameter:	2"	Well Depth:	15.1'	Screened Interval From:	4.9 to: 14.9
Initial Depth to Water:	1.80	Volume in Well:	NA		
Sampling Method:	Low-Flow	Pump Type:	Peristaltic	Tubing Type:	Teflon
Tubing Diameter:	0.25"				

Time	Volume Purged (gallons)	Cumulative Volume Purged (gallons)	Purge Rate (mL/min)	Depth to Water (feet)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	Oxidation-Reduction Potential (mV)	pH (Standard Units)	Temperature (°C)	Turbidity (NTU)	Odor/ Color
0955	- Start purging (following well development).										
1010				1.72	2.24	452	-52	6.92	19.80	14.7	
1020				1.61	2.29	450	-53	6.92	19.80	13.1	
1025				1.65	2.08	439	-56	6.90	19.78	12.7	
1030				1.65	2.04	415	-51	6.88	19.80	11.4	
1035				1.65	2.02	414	-51	6.88	19.80	8.1	
1040	~3.0	~3.0	252 (Ave.)	1.65	2.01	413	-52	6.87	19.79	6.2	Clear.
* All depth measurements are from top of casing (TOC).											

Sampling Data

Sample ID:	MW-7	Date:	5-16-19	Time:	1045	Sampler(s):	M. Lybrand
Laboratory Analysis:	RCRA Metals / VOCs			# Bottles:	8 total	Preservative:	
Comments:	Tubing set within top of screened interval. Duplicate (BD) collected.						

Notes: Stabilization criteria for range of variation of last three consecutive readings – pH: ± 0.2 units; Temperature: ± 0.2 °C; Specific Conductance: ± 5%; Dissolved Oxygen: ± 0.2 mg/L or ± 10% (whichever is greater); Turbidity: all readings < 20 NTU; optionally ± 5 NTU or ± 10% (whichever is greater)

Appendix E

Laboratory Analytical Data Sheets

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Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

May 28, 2019

Harbor Env. & Safety - Little Rock, AR

Sample Delivery Group:	L1100081
Samples Received:	05/17/2019
Project Number:	PARSONS
Description:	Osceola PH II

Report To: Tom Huetter
5800 Evergreen Drive
Little Rock, AR 72205

Entire Report Reviewed By:

Chris McCord
Project Manager

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MW-7 L1100081-01 GW

Collected by: Mike S. Lybrand
Collected date/time: 05/16/19 10:45
Received date/time: 05/17/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Mercury by Method 7470A	WG1283576	1	05/20/19 12:44	05/20/19 18:08	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1283220	1	05/23/19 11:14	05/24/19 16:38	TRB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1284347	1	05/21/19 18:27	05/21/19 18:27	ACG	Mt. Juliet, TN

BD L1100081-02 GW

Collected by: Mike S. Lybrand
Collected date/time: 05/16/19 00:00
Received date/time: 05/17/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Mercury by Method 7470A	WG1283576	1	05/20/19 12:44	05/20/19 18:10	TCT	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1283220	1	05/23/19 11:14	05/24/19 16:40	TRB	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1284347	1	05/21/19 18:47	05/21/19 18:47	ACG	Mt. Juliet, TN

TRIP BLANK L1100081-03 GW

Collected by: Mike S. Lybrand
Collected date/time: 05/16/19 00:00
Received date/time: 05/17/19 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1284347	1	05/21/19 15:48	05/21/19 15:48	ACG	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris McCord
Project Manager

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	05/20/2019 18:08	WG1283576

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Arsenic	0.0462		0.0100	1	05/24/2019 16:38	WG1283220
Barium	0.198		0.00500	1	05/24/2019 16:38	WG1283220
Cadmium	ND		0.00200	1	05/24/2019 16:38	WG1283220
Chromium	ND		0.0100	1	05/24/2019 16:38	WG1283220
Lead	ND		0.00500	1	05/24/2019 16:38	WG1283220
Selenium	ND		0.0100	1	05/24/2019 16:38	WG1283220
Silver	ND		0.00500	1	05/24/2019 16:38	WG1283220

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		0.0500	1	05/21/2019 18:27	WG1284347
Acrolein	ND	J4	0.0500	1	05/21/2019 18:27	WG1284347
Acrylonitrile	ND		0.0100	1	05/21/2019 18:27	WG1284347
Benzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
Bromobenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
Bromodichloromethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
Bromoform	ND		0.00100	1	05/21/2019 18:27	WG1284347
Bromomethane	ND		0.00500	1	05/21/2019 18:27	WG1284347
n-Butylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
sec-Butylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
tert-Butylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
Carbon tetrachloride	ND		0.00100	1	05/21/2019 18:27	WG1284347
Chlorobenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
Chlorodibromomethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
Chloroethane	ND		0.00500	1	05/21/2019 18:27	WG1284347
Chloroform	ND		0.00500	1	05/21/2019 18:27	WG1284347
Chloromethane	ND		0.00250	1	05/21/2019 18:27	WG1284347
2-Chlorotoluene	ND		0.00100	1	05/21/2019 18:27	WG1284347
4-Chlorotoluene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	05/21/2019 18:27	WG1284347
1,2-Dibromoethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
Dibromomethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,2-Dichlorobenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,3-Dichlorobenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,4-Dichlorobenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
Dichlorodifluoromethane	ND		0.00500	1	05/21/2019 18:27	WG1284347
1,1-Dichloroethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,2-Dichloroethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,1-Dichloroethene	ND		0.00100	1	05/21/2019 18:27	WG1284347
cis-1,2-Dichloroethene	0.180		0.00100	1	05/21/2019 18:27	WG1284347
trans-1,2-Dichloroethene	0.00129		0.00100	1	05/21/2019 18:27	WG1284347
1,2-Dichloropropane	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,1-Dichloropropene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,3-Dichloropropane	ND		0.00100	1	05/21/2019 18:27	WG1284347
cis-1,3-Dichloropropene	ND		0.00100	1	05/21/2019 18:27	WG1284347
trans-1,3-Dichloropropene	ND		0.00100	1	05/21/2019 18:27	WG1284347
2,2-Dichloropropane	ND		0.00100	1	05/21/2019 18:27	WG1284347
Di-isopropyl ether	ND		0.00100	1	05/21/2019 18:27	WG1284347
Ethylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hexachloro-1,3-butadiene	ND	J4	0.00100	1	05/21/2019 18:27	WG1284347
Isopropylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
p-Isopropyltoluene	ND		0.00100	1	05/21/2019 18:27	WG1284347
2-Butanone (MEK)	ND		0.0100	1	05/21/2019 18:27	WG1284347
Methylene Chloride	ND		0.00500	1	05/21/2019 18:27	WG1284347
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	05/21/2019 18:27	WG1284347
Methyl tert-butyl ether	ND		0.00100	1	05/21/2019 18:27	WG1284347
Naphthalene	ND		0.00500	1	05/21/2019 18:27	WG1284347
n-Propylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
Styrene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,1,1,2-Tetrachloroethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,1,2,2-Tetrachloroethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,1,2-Trichlorotrifluoroethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
Tetrachloroethene	0.0109		0.00100	1	05/21/2019 18:27	WG1284347
Toluene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,2,3-Trichlorobenzene	ND	J4	0.00100	1	05/21/2019 18:27	WG1284347
1,2,4-Trichlorobenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,1,1-Trichloroethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,1,2-Trichloroethane	ND		0.00100	1	05/21/2019 18:27	WG1284347
Trichloroethene	0.00649		0.00100	1	05/21/2019 18:27	WG1284347
Trichlorofluoromethane	ND		0.00500	1	05/21/2019 18:27	WG1284347
1,2,3-Trichloropropane	ND		0.00250	1	05/21/2019 18:27	WG1284347
1,2,4-Trimethylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,2,3-Trimethylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
1,3,5-Trimethylbenzene	ND		0.00100	1	05/21/2019 18:27	WG1284347
Vinyl chloride	0.00955		0.00100	1	05/21/2019 18:27	WG1284347
Xylenes, Total	ND		0.00300	1	05/21/2019 18:27	WG1284347
(S) Toluene-d8	*95.2*		*80.0-120*		*05/21/2019 18:27*	WG1284347
(S) 4-Bromofluorobenzene	*95.3*		*77.0-126*		*05/21/2019 18:27*	WG1284347
(S) 1,2-Dichloroethane-d4	*93.4*		*70.0-130*		*05/21/2019 18:27*	WG1284347

Mercury by Method 7470A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Mercury	ND		0.000200	1	05/20/2019 18:10	WG1283576

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Arsenic	0.0462		0.0100	1	05/24/2019 16:40	WG1283220
Barium	0.198		0.00500	1	05/24/2019 16:40	WG1283220
Cadmium	ND		0.00200	1	05/24/2019 16:40	WG1283220
Chromium	ND		0.0100	1	05/24/2019 16:40	WG1283220
Lead	ND		0.00500	1	05/24/2019 16:40	WG1283220
Selenium	ND		0.0100	1	05/24/2019 16:40	WG1283220
Silver	ND		0.00500	1	05/24/2019 16:40	WG1283220

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		0.0500	1	05/21/2019 18:47	WG1284347
Acrolein	ND	J4	0.0500	1	05/21/2019 18:47	WG1284347
Acrylonitrile	ND		0.0100	1	05/21/2019 18:47	WG1284347
Benzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
Bromobenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
Bromodichloromethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
Bromoform	ND		0.00100	1	05/21/2019 18:47	WG1284347
Bromomethane	ND		0.00500	1	05/21/2019 18:47	WG1284347
n-Butylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
sec-Butylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
tert-Butylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
Carbon tetrachloride	ND		0.00100	1	05/21/2019 18:47	WG1284347
Chlorobenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
Chlorodibromomethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
Chloroethane	ND		0.00500	1	05/21/2019 18:47	WG1284347
Chloroform	ND		0.00500	1	05/21/2019 18:47	WG1284347
Chloromethane	ND		0.00250	1	05/21/2019 18:47	WG1284347
2-Chlorotoluene	ND		0.00100	1	05/21/2019 18:47	WG1284347
4-Chlorotoluene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	05/21/2019 18:47	WG1284347
1,2-Dibromoethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
Dibromomethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,2-Dichlorobenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,3-Dichlorobenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,4-Dichlorobenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
Dichlorodifluoromethane	ND		0.00500	1	05/21/2019 18:47	WG1284347
1,1-Dichloroethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,2-Dichloroethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,1-Dichloroethene	ND		0.00100	1	05/21/2019 18:47	WG1284347
cis-1,2-Dichloroethene	0.172		0.00100	1	05/21/2019 18:47	WG1284347
trans-1,2-Dichloroethene	0.00142		0.00100	1	05/21/2019 18:47	WG1284347
1,2-Dichloropropane	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,1-Dichloropropene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,3-Dichloropropane	ND		0.00100	1	05/21/2019 18:47	WG1284347
cis-1,3-Dichloropropene	ND		0.00100	1	05/21/2019 18:47	WG1284347
trans-1,3-Dichloropropene	ND		0.00100	1	05/21/2019 18:47	WG1284347
2,2-Dichloropropane	ND		0.00100	1	05/21/2019 18:47	WG1284347
Di-isopropyl ether	ND		0.00100	1	05/21/2019 18:47	WG1284347
Ethylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Hexachloro-1,3-butadiene	ND	J4	0.00100	1	05/21/2019 18:47	WG1284347
Isopropylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
p-Isopropyltoluene	ND		0.00100	1	05/21/2019 18:47	WG1284347
2-Butanone (MEK)	ND		0.0100	1	05/21/2019 18:47	WG1284347
Methylene Chloride	ND		0.00500	1	05/21/2019 18:47	WG1284347
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	05/21/2019 18:47	WG1284347
Methyl tert-butyl ether	ND		0.00100	1	05/21/2019 18:47	WG1284347
Naphthalene	ND		0.00500	1	05/21/2019 18:47	WG1284347
n-Propylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
Styrene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,1,1,2-Tetrachloroethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,1,2,2-Tetrachloroethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,1,2-Trichlorotrifluoroethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
Tetrachloroethene	0.0110		0.00100	1	05/21/2019 18:47	WG1284347
Toluene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,2,3-Trichlorobenzene	ND	J4	0.00100	1	05/21/2019 18:47	WG1284347
1,2,4-Trichlorobenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,1,1-Trichloroethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,1,2-Trichloroethane	ND		0.00100	1	05/21/2019 18:47	WG1284347
Trichloroethene	0.00636		0.00100	1	05/21/2019 18:47	WG1284347
Trichlorofluoromethane	ND		0.00500	1	05/21/2019 18:47	WG1284347
1,2,3-Trichloropropane	ND		0.00250	1	05/21/2019 18:47	WG1284347
1,2,4-Trimethylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,2,3-Trimethylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
1,3,5-Trimethylbenzene	ND		0.00100	1	05/21/2019 18:47	WG1284347
Vinyl chloride	0.00870		0.00100	1	05/21/2019 18:47	WG1284347
Xylenes, Total	ND		0.00300	1	05/21/2019 18:47	WG1284347
(S) Toluene-d8	*93.5*		*80.0-120*		*05/21/2019 18:47*	WG1284347
(S) 4-Bromofluorobenzene	*97.9*		*77.0-126*		*05/21/2019 18:47*	WG1284347
(S) 1,2-Dichloroethane-d4	*104*		*70.0-130*		*05/21/2019 18:47*	WG1284347

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Acetone	ND		0.0500	1	05/21/2019 15:48	WG1284347
Acrolein	ND	J4	0.0500	1	05/21/2019 15:48	WG1284347
Acrylonitrile	ND		0.0100	1	05/21/2019 15:48	WG1284347
Benzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Bromobenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Bromodichloromethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
Bromoform	ND		0.00100	1	05/21/2019 15:48	WG1284347
Bromomethane	ND		0.00500	1	05/21/2019 15:48	WG1284347
n-Butylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
sec-Butylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
tert-Butylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Carbon tetrachloride	ND		0.00100	1	05/21/2019 15:48	WG1284347
Chlorobenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Chlorodibromomethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
Chloroethane	ND		0.00500	1	05/21/2019 15:48	WG1284347
Chloroform	ND		0.00500	1	05/21/2019 15:48	WG1284347
Chloromethane	ND		0.00250	1	05/21/2019 15:48	WG1284347
2-Chlorotoluene	ND		0.00100	1	05/21/2019 15:48	WG1284347
4-Chlorotoluene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	05/21/2019 15:48	WG1284347
1,2-Dibromoethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
Dibromomethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,2-Dichlorobenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,3-Dichlorobenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,4-Dichlorobenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Dichlorodifluoromethane	ND		0.00500	1	05/21/2019 15:48	WG1284347
1,1-Dichloroethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,2-Dichloroethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,1-Dichloroethene	ND		0.00100	1	05/21/2019 15:48	WG1284347
cis-1,2-Dichloroethene	ND		0.00100	1	05/21/2019 15:48	WG1284347
trans-1,2-Dichloroethene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,2-Dichloropropane	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,1-Dichloropropene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,3-Dichloropropane	ND		0.00100	1	05/21/2019 15:48	WG1284347
cis-1,3-Dichloropropene	ND		0.00100	1	05/21/2019 15:48	WG1284347
trans-1,3-Dichloropropene	ND		0.00100	1	05/21/2019 15:48	WG1284347
2,2-Dichloropropane	ND		0.00100	1	05/21/2019 15:48	WG1284347
Di-isopropyl ether	ND		0.00100	1	05/21/2019 15:48	WG1284347
Ethylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Hexachloro-1,3-butadiene	ND	J4	0.00100	1	05/21/2019 15:48	WG1284347
Isopropylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
p-Isopropyltoluene	ND		0.00100	1	05/21/2019 15:48	WG1284347
2-Butanone (MEK)	ND		0.0100	1	05/21/2019 15:48	WG1284347
Methylene Chloride	ND		0.00500	1	05/21/2019 15:48	WG1284347
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	05/21/2019 15:48	WG1284347
Methyl tert-butyl ether	ND		0.00100	1	05/21/2019 15:48	WG1284347
Naphthalene	ND		0.00500	1	05/21/2019 15:48	WG1284347
n-Propylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Styrene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,1,1,2-Tetrachloroethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,1,2,2-Tetrachloroethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,1,2-Trichlorotrifluoroethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
Tetrachloroethene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Toluene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,2,3-Trichlorobenzene	ND	J4	0.00100	1	05/21/2019 15:48	WG1284347
1,2,4-Trichlorobenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
1,1,1-Trichloroethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,1,2-Trichloroethane	ND		0.00100	1	05/21/2019 15:48	WG1284347
Trichloroethene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Trichlorofluoromethane	ND		0.00500	1	05/21/2019 15:48	WG1284347
1,2,3-Trichloropropane	ND		0.00250	1	05/21/2019 15:48	WG1284347
1,2,4-Trimethylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,2,3-Trimethylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
1,3,5-Trimethylbenzene	ND		0.00100	1	05/21/2019 15:48	WG1284347
Vinyl chloride	ND		0.00100	1	05/21/2019 15:48	WG1284347
Xylenes, Total	ND		0.00300	1	05/21/2019 15:48	WG1284347
(S) Toluene-d8	*89.1*		*80.0-120*		*05/21/2019 15:48*	WG1284347
(S) 4-Bromofluorobenzene	*94.9*		*77.0-126*		*05/21/2019 15:48*	WG1284347
(S) 1,2-Dichloroethane-d4	*103*		*70.0-130*		*05/21/2019 15:48*	WG1284347

Method Blank (MB)

(MB) R3413030-1 05/20/19 17:39

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Mercury	U		0.0000490	0.000200

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3413030-2 05/20/19 17:41 • (LCSD) R3413030-3 05/20/19 17:48

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Mercury	0.00300	0.00314	0.00323	105	108	80.0-120			2.93	20

L1100029-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1100029-05 05/20/19 17:51 • (MS) R3413030-4 05/20/19 17:53 • (MSD) R3413030-5 05/20/19 17:56

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Mercury	0.00300	ND	0.00325	0.00329	108	110	1	75.0-125			1.27	20

Method Blank (MB)

(MB) R3414874-1 05/24/19 15:35

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Arsenic	U		0.00650	0.0100
Barium	U		0.00170	0.00500
Cadmium	U		0.000700	0.00200
Chromium	U		0.00140	0.0100
Lead	0.00294	J	0.00190	0.00500
Selenium	U		0.00740	0.0100
Silver	U		0.00280	0.00500

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3414874-2 05/24/19 15:37 • (LCSD) R3414874-3 05/24/19 15:39

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Arsenic	1.00	0.944	0.929	94.4	92.9	80.0-120			1.56	20
Barium	1.00	0.972	0.974	97.2	97.4	80.0-120			0.212	20
Cadmium	1.00	0.936	0.935	93.6	93.5	80.0-120			0.168	20
Chromium	1.00	0.935	0.931	93.5	93.1	80.0-120			0.505	20
Lead	1.00	0.966	0.953	96.6	95.3	80.0-120			1.33	20
Selenium	1.00	0.953	0.939	95.3	93.9	80.0-120			1.50	20
Silver	0.200	0.179	0.176	89.4	88.2	80.0-120			1.29	20

L1099865-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1099865-01 05/24/19 15:42 • (MS) R3414874-5 05/24/19 15:47 • (MSD) R3414874-6 05/24/19 15:49

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Arsenic	1.00	ND	0.945	0.946	94.5	94.6	1	75.0-125			0.173	20
Barium	1.00	0.0689	1.02	1.05	95.4	98.2	1	75.0-125			2.72	20
Cadmium	1.00	ND	0.928	0.945	92.8	94.5	1	75.0-125			1.80	20
Chromium	1.00	ND	0.922	0.933	92.0	93.0	1	75.0-125			1.16	20
Lead	1.00	0.0710	1.02	1.03	95.2	96.0	1	75.0-125			0.777	20
Selenium	1.00	ND	0.948	0.955	94.8	95.5	1	75.0-125			0.691	20
Silver	0.200	ND	0.175	0.179	87.6	89.4	1	75.0-125			2.01	20

Method Blank (MB)

(MB) R3414181-3 05/21/19 11:04

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0100	0.0500
Acrolein	U		0.00887	0.0500
Acrylonitrile	U		0.00187	0.0100
Benzene	U		0.000331	0.00100
Bromobenzene	U		0.000352	0.00100
Bromodichloromethane	U		0.000380	0.00100
Bromoform	U		0.000469	0.00100
Bromomethane	U		0.000866	0.00500
n-Butylbenzene	U		0.000361	0.00100
sec-Butylbenzene	U		0.000365	0.00100
tert-Butylbenzene	U		0.000399	0.00100
Carbon tetrachloride	U		0.000379	0.00100
Chlorobenzene	U		0.000348	0.00100
Chlorodibromomethane	U		0.000327	0.00100
Chloroethane	U		0.000453	0.00500
Chloroform	U		0.000324	0.00500
Chloromethane	U		0.000276	0.00250
2-Chlorotoluene	U		0.000375	0.00100
4-Chlorotoluene	U		0.000351	0.00100
1,2-Dibromo-3-Chloropropane	U		0.00133	0.00500
1,2-Dibromoethane	U		0.000381	0.00100
Dibromomethane	U		0.000346	0.00100
1,2-Dichlorobenzene	U		0.000349	0.00100
1,3-Dichlorobenzene	U		0.000220	0.00100
1,4-Dichlorobenzene	U		0.000274	0.00100
Dichlorodifluoromethane	U		0.000551	0.00500
1,1-Dichloroethane	U		0.000259	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
1,1-Dichloroethene	U		0.000398	0.00100
cis-1,2-Dichloroethene	U		0.000260	0.00100
trans-1,2-Dichloroethene	U		0.000396	0.00100
1,2-Dichloropropane	U		0.000306	0.00100
1,1-Dichloropropene	U		0.000352	0.00100
1,3-Dichloropropane	U		0.000366	0.00100
cis-1,3-Dichloropropene	U		0.000418	0.00100
trans-1,3-Dichloropropene	U		0.000419	0.00100
2,2-Dichloropropane	U		0.000321	0.00100
Di-isopropyl ether	U		0.000320	0.00100
Ethylbenzene	U		0.000384	0.00100
Hexachloro-1,3-butadiene	0.000607	J	0.000256	0.00100

Method Blank (MB)

(MB) R3414181-3 05/21/19 11:04

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Isopropylbenzene	U		0.000326	0.00100
p-Isopropyltoluene	U		0.000350	0.00100
2-Butanone (MEK)	U		0.00393	0.0100
Methylene Chloride	U		0.00100	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.00214	0.0100
Methyl tert-butyl ether	U		0.000367	0.00100
Naphthalene	U		0.00100	0.00500
n-Propylbenzene	U		0.000349	0.00100
Styrene	U		0.000307	0.00100
1,1,1,2-Tetrachloroethane	U		0.000385	0.00100
1,1,2,2-Tetrachloroethane	U		0.000130	0.00100
Tetrachloroethene	U		0.000372	0.00100
Toluene	U		0.000412	0.00100
1,1,2-Trichlorotrifluoroethane	U		0.000303	0.00100
1,2,3-Trichlorobenzene	0.000428	J	0.000230	0.00100
1,2,4-Trichlorobenzene	U		0.000355	0.00100
1,1,1-Trichloroethane	U		0.000319	0.00100
1,1,2-Trichloroethane	U		0.000383	0.00100
Trichloroethene	U		0.000398	0.00100
Trichlorofluoromethane	U		0.00120	0.00500
1,2,3-Trichloropropane	U		0.000807	0.00250
1,2,3-Trimethylbenzene	U		0.000321	0.00100
1,2,4-Trimethylbenzene	U		0.000373	0.00100
1,3,5-Trimethylbenzene	U		0.000387	0.00100
Vinyl chloride	U		0.000259	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	*92.0*			*80.0-120*
(S) 4-Bromofluorobenzene	*98.4*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*106*			*70.0-130*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3414181-1 05/21/19 10:05 • (LCSD) R3414181-2 05/21/19 10:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	0.125	0.0831	0.0991	66.5	79.3	19.0-160			17.5	27
Acrolein	0.125	0.211	0.219	169	176	10.0-160	J4	J4	3.71	26
Acrylonitrile	0.125	0.110	0.116	87.9	93.1	55.0-149			5.76	20
Benzene	0.0250	0.0266	0.0282	106	113	70.0-123			6.01	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3414181-1 05/21/19 10:05 • (LCSD) R3414181-2 05/21/19 10:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromobenzene	0.0250	0.0276	0.0270	110	108	73.0-121			2.03	20
Bromodichloromethane	0.0250	0.0248	0.0258	99.2	103	75.0-120			3.81	20
Bromoform	0.0250	0.0217	0.0230	86.7	92.0	68.0-132			5.90	20
Bromomethane	0.0250	0.0256	0.0247	102	98.8	10.0-160			3.46	25
n-Butylbenzene	0.0250	0.0250	0.0255	100	102	73.0-125			1.84	20
sec-Butylbenzene	0.0250	0.0266	0.0260	106	104	75.0-125			2.34	20
tert-Butylbenzene	0.0250	0.0280	0.0275	112	110	76.0-124			1.56	20
Carbon tetrachloride	0.0250	0.0285	0.0304	114	121	68.0-126			6.43	20
Chlorobenzene	0.0250	0.0246	0.0247	98.5	99.0	80.0-121			0.513	20
Chlorodibromomethane	0.0250	0.0239	0.0250	95.8	100	77.0-125			4.35	20
Chloroethane	0.0250	0.0241	0.0247	96.4	98.6	47.0-150			2.26	20
Chloroform	0.0250	0.0256	0.0265	102	106	73.0-120			3.79	20
Chloromethane	0.0250	0.0176	0.0178	70.6	71.0	41.0-142			0.612	20
2-Chlorotoluene	0.0250	0.0255	0.0256	102	102	76.0-123			0.409	20
4-Chlorotoluene	0.0250	0.0254	0.0254	101	102	75.0-122			0.0548	20
1,2-Dibromo-3-Chloropropane	0.0250	0.0193	0.0212	77.1	85.0	58.0-134			9.77	20
1,2-Dibromoethane	0.0250	0.0251	0.0254	100	102	80.0-122			1.30	20
Dibromomethane	0.0250	0.0246	0.0265	98.4	106	80.0-120			7.46	20
1,2-Dichlorobenzene	0.0250	0.0263	0.0264	105	106	79.0-121			0.526	20
1,3-Dichlorobenzene	0.0250	0.0272	0.0273	109	109	79.0-120			0.327	20
1,4-Dichlorobenzene	0.0250	0.0259	0.0254	103	102	79.0-120			1.92	20
Dichlorodifluoromethane	0.0250	0.0280	0.0282	112	113	51.0-149			0.586	20
1,1-Dichloroethane	0.0250	0.0244	0.0257	97.7	103	70.0-126			4.90	20
1,2-Dichloroethane	0.0250	0.0268	0.0277	107	111	70.0-128			3.35	20
1,1-Dichloroethene	0.0250	0.0273	0.0272	109	109	71.0-124			0.403	20
cis-1,2-Dichloroethene	0.0250	0.0271	0.0286	108	115	73.0-120			5.73	20
trans-1,2-Dichloroethene	0.0250	0.0275	0.0277	110	111	73.0-120			0.817	20
1,2-Dichloropropane	0.0250	0.0246	0.0244	98.6	97.7	77.0-125			0.912	20
1,1-Dichloropropene	0.0250	0.0259	0.0267	104	107	74.0-126			2.99	20
1,3-Dichloropropane	0.0250	0.0224	0.0224	89.6	89.7	80.0-120			0.130	20
cis-1,3-Dichloropropene	0.0250	0.0255	0.0280	102	112	80.0-123			9.18	20
trans-1,3-Dichloropropene	0.0250	0.0257	0.0255	103	102	78.0-124			0.995	20
2,2-Dichloropropane	0.0250	0.0273	0.0278	109	111	58.0-130			1.98	20
Di-isopropyl ether	0.0250	0.0217	0.0226	86.9	90.5	58.0-138			4.12	20
Ethylbenzene	0.0250	0.0259	0.0256	104	102	79.0-123			1.23	20
Hexachloro-1,3-butadiene	0.0250	0.0136	0.0130	54.6	51.8	54.0-138		J4	5.16	20
Isopropylbenzene	0.0250	0.0252	0.0253	101	101	76.0-127			0.284	20
p-Isopropyltoluene	0.0250	0.0267	0.0266	107	106	76.0-125			0.205	20
2-Butanone (MEK)	0.125	0.102	0.108	81.3	86.1	44.0-160			5.77	20
Methylene Chloride	0.0250	0.0236	0.0248	94.6	99.3	67.0-120			4.90	20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3414181-1 05/21/19 10:05 • (LCSD) R3414181-2 05/21/19 10:25

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
4-Methyl-2-pentanone (MIBK)	0.125	0.105	0.105	84.2	84.0	68.0-142			0.236	20
Methyl tert-butyl ether	0.0250	0.0270	0.0286	108	114	68.0-125			5.59	20
Naphthalene	0.0250	0.0151	0.0159	60.2	63.7	54.0-135			5.62	20
n-Propylbenzene	0.0250	0.0255	0.0251	102	100	77.0-124			1.69	20
Styrene	0.0250	0.0231	0.0237	92.3	94.7	73.0-130			2.63	20
1,1,1,2-Tetrachloroethane	0.0250	0.0245	0.0257	97.9	103	75.0-125			4.91	20
1,1,2,2-Tetrachloroethane	0.0250	0.0271	0.0272	108	109	65.0-130			0.290	20
Tetrachloroethene	0.0250	0.0251	0.0253	100	101	72.0-132			0.807	20
Toluene	0.0250	0.0228	0.0225	91.0	89.9	79.0-120			1.29	20
1,1,2-Trichlorotrifluoroethane	0.0250	0.0272	0.0284	109	114	69.0-132			4.24	20
1,2,3-Trichlorobenzene	0.0250	0.0111	0.0126	44.5	50.4	50.0-138	J4		12.4	20
1,2,4-Trichlorobenzene	0.0250	0.0147	0.0153	58.9	61.3	57.0-137			3.85	20
1,1,1-Trichloroethane	0.0250	0.0253	0.0247	101	98.9	73.0-124			2.16	20
1,1,2-Trichloroethane	0.0250	0.0240	0.0245	95.8	97.9	80.0-120			2.14	20
Trichloroethene	0.0250	0.0263	0.0271	105	108	78.0-124			3.02	20
Trichlorofluoromethane	0.0250	0.0239	0.0255	95.7	102	59.0-147			6.21	20
1,2,3-Trichloropropane	0.0250	0.0285	0.0283	114	113	73.0-130			0.487	20
1,2,3-Trimethylbenzene	0.0250	0.0248	0.0245	99.2	98.1	77.0-120			1.12	20
1,2,4-Trimethylbenzene	0.0250	0.0264	0.0265	106	106	76.0-121			0.252	20
1,3,5-Trimethylbenzene	0.0250	0.0275	0.0276	110	111	76.0-122			0.517	20
Vinyl chloride	0.0250	0.0236	0.0249	94.6	99.7	67.0-131			5.31	20
Xylenes, Total	0.0750	0.0711	0.0718	94.8	95.7	79.0-123			0.980	20
(S) Toluene-d8				*91.1*	*94.8*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*99.3*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*100*	*104*	*70.0-130*				

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J4	The associated batch QC was outside the established quality control range for accuracy.

Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.
* Not all certifications held by the laboratory are applicable to the results reported in the attached report.
* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO00356
Kentucky [1 6]	90010	South Carolina	84004
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana [1]	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas [5]	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

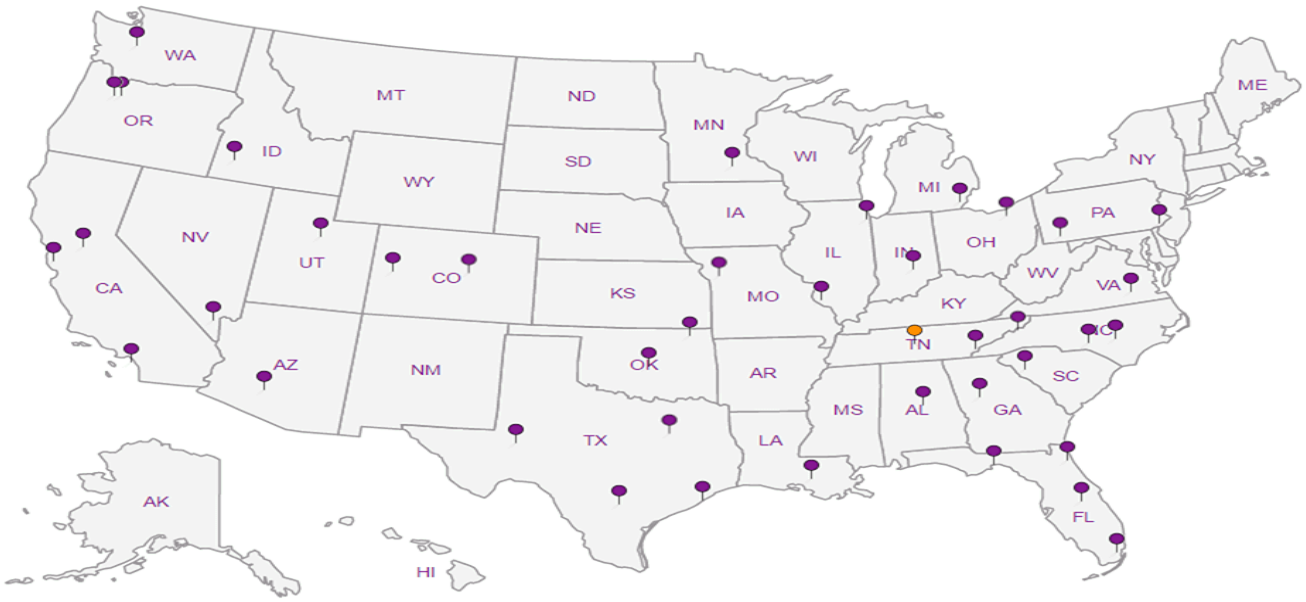
Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Harbor Env. & Safety - Little Rock, AR

5800 Evergreen Drive
Little Rock, AR 72205

Billing Information:
Accounts Payable
5800 Evergreen Drive
Little Rock, AR 72205

Report to: Tom Huetter

Email To: thuetter@harborenv.com

Project Description: Osceola PH II

City/State Collected: Osceola, AR

Phone: 501-663-8800
Fax:

Client Project # Parsons

Lab Project # HARBORLRAR-OSCEOLA

Collected by (print): Mike Lybrand

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ✓

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed: Normal

Pres Chk: SC

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	MRCRA8 250mlHDPE-HNO3	V8260 40mlAmb-HCl	V8260-TripBlank 40mlAmb-HCl-Blk							Remarks	Sample # (lab only)
MW-7	Grab	GW	—	5-16-19	1045	4	X	X									01
BD	Grab	GW	—	5-16-19	—	4	X	X									02
		GW				4	X	X								MS	
TRIP BLANK	Grab	GW	—	—	—	1			X								03

Chain of Custody Page ___ of ___

Pace Analytical®
National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L # 1100081

Table #

Acctnum: HARBORLRAR
Template: T150374
Prelogin: P709127
TSR: 526 - Chris McCord
PB: TB 5-13-19

Shipped Via: FedEX Ground

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other_____

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS X FedEx __ Courier __ _____

Tracking # 1023 1351 3545

Sample Receipt Checklist
COC Seal Present/Intact: __NP ✓Y __N
COC Signed/Accurate: ✓Y __N
Bottles arrive intact: ✓Y __N
Correct bottles used: ✓Y __N
Sufficient volume sent: ✓Y __N
If Applicable
VOA Zero Headspace: A __N
Preservation Correct/Checked: ✓Y __N

RAD SCREEN: <0.5 mR/hr

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Mike Lybrand	5-16-19	1530			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: A3BF °C 2.3±0=2.3 Bottles Received: 8	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 5/17/19 Time: 0845	Hold: / Conditions NCF / OK

Appendix F

QA/QC Data Review Summary

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QA/QC DATA REVIEW SUMMARY
ADDITIONAL COMPREHENSIVE SITE ASSESSMENT
JT PARSONS CABINET COMPANY – OSCEOLA, ARKANSAS

1.0 Introduction

Harbor Environmental and Safety (Harbor) has completed a quality assurance/quality control (QA/QC) data review of the laboratory report associated with additional Comprehensive Site Assessment (CSA) activities at the former JT Parsons Cabinet Company (Parsons) facility in Osceola, Arkansas. Additional field activities were conducted on May 15 and 16, 2019. One groundwater sample and two QC samples (one blind duplicate and one trip blank) were shipped overnight via Federal Express to Pace Analytical (Pace) of Mount Juliet, Tennessee for laboratory analyses. A summary of the samples collected along with laboratory analyses is included below in Table F-1 below.

Table F-1 – Summary of Samples Collected and Analyzed

Sample Delivery Group	Sample Type/Count	General Analyses
L110081	Groundwater – 1 Quality Control – 2	RCRA Metals – EPA Method 6010B/7470A Volatile Organic Compounds – EPA Method 8260B

Data evaluation for samples collected at the Parsons site included the following parameters: sample preservation, sample holding times, blank sample analysis, spike sample recoveries, matrix spike sample results, duplicate precision, and surrogate recoveries. These QA/QC criteria are discussed in the following sections. Laboratory analytical data sheets are included in Appendix E.

2.0 Sample Preservation

All samples were collected within laboratory-supplied containers using the proper chemical preservatives (nitric acid for metals, hydrochloric acid for VOCs). The samples were sealed in ice chests, secured with custody seals, and shipped overnight via Federal Express to Pace for laboratory analyses. The sample ice chest was received at a temperature of 2.3° C, below the recommended temperature of 4.0° C.

3.0 Sample Holding Times

All laboratory receipt dates were considered and noted in combination with sample collection dates and sample extraction and/or analysis dates. All analyses were conducted within the proper holding times.

4.0 Blank Sample Analysis

Blanks assist in determining the existence and magnitude of any contamination resulting from field or laboratory conditions. One trip blank sample was delivered to the laboratory for analysis of VOCs. The trip blank, prepared by Pace, remained in the sample ice chest along with the investigative sample during handling and shipping. All compounds in the trip blank sample were reported as non-detect.

Laboratory method blanks were analyzed by Pace during sample analyses. The metal lead (Method 6010B) and compounds hexachloro-1,3-butadiene and 1,2,3-trichlorobenzene (Method 8260B) were detected at trace concentrations (flagged with "J") in the associated method blanks. The "J" flag indicates the parameter concentrations were below the reported detection limit (RDL) but above the method detection limit (MDL); therefore, the method blank results should be considered estimated. These three parameters were not detected in the investigative sample; thus, no action was taken. All other method blank results were non-detect.

5.0 Spike Sample Recoveries

Spike recoveries were evaluated through laboratory control samples (LCS) and LCS duplicates (LCSD) and provided information needed to assess the accuracy of the analytical method (reagents, instruments, human error, etc.). USEPA methods require the addition of known amounts of "spike compounds" or compounds that are not likely to be found in the actual samples. If spike percent recoveries (%Rs) are close to the known concentrations as defined within the limits set by the laboratory, the reported target compound concentrations are assumed to be accurate.

Some LCS and/or LCSD recoveries associated with Method 8260B analysis (VOCs) were outside the established QC range for accuracy (flagged with "J4"). The flagged compounds included acrolein, hexachloro-1,3-butadiene and 1,2,3-trichlorobenzene. Although these compounds were not detected in investigative sample MW-7, the associated results should be considered estimated.

6.0 Matrix Spike Sample Results

Matrix spikes (MS) and matrix spike duplicates (MSD) were generated to provide information about the effect of each sample matrix on the sample preparation procedures and the measurement methodology. All MS/MSD results were within QC limits.

7.0 Duplicate Precision

Precision was evaluated through duplicate sample analyses, including laboratory duplicates and field duplicates. Laboratory duplicate determinations are used to demonstrate acceptable method precision by the laboratory at the time of analysis. All laboratory duplicate results were within the acceptable criteria.

One field duplicate (labeled "BD") was collected during the groundwater sampling event. The blind duplicate was collected from MW-7 along with the investigative sample. Field duplicates measure both field and laboratory precision; therefore, field duplicate results may have more variability than laboratory duplicates. Neither EPA Region 4 nor ADEQ have a published QC limit for the RPD between field duplicate and investigative samples; however, recent EPA Region 1 guidance (June 2018) establishes RPD limits of 30 percent for aqueous samples. These Region 1 values are non-binding for this project but serve as a useful point of reference for evaluating the field duplicate data in the absence of other applicable guidance.

As summarized below in Table F-2, RPD values between sample duplicate results and corresponding investigative sample results ranged from 0.0 percent up to 9.6 percent, where applicable. All RPD values were below the project QC goal of 30 percent, indicating adequate precision.

Table F-2 – Duplicate Sample Results

Investigative Sample No.	Parameter	Concentration (mg/L)	Duplicate Sample No.	Concentration (mg/L)	RPD (%)
MW-7	Metals:		BD		
	Arsenic	**0.0462**		**0.0462**	0.0
	Barium	**0.198**		**0.198**	0.0
	Cadmium	<0.00200		<0.00200	--
	Total Chromium	<0.0100		<0.0100	--
	Lead	<0.00500		<0.00500	--
	Selenium	<0.0100		<0.0100	--
	Silver	<0.00500		<0.00500	--
	Mercury	<0.000200		<0.000200	--
	VOCs:				
	cis-1,2-Dichloroethene	**0.180**		**0.172**	4.5
	trans-1,2-Dichloroethene	**0.00129**		**0.00142**	9.6
	Tetrachloroethene (PCE)	**0.0109**		**0.0110**	0.9
	Trichloroethene (TCE)	**0.00649**		**0.00636**	2.0
	Vinyl Chloride	**0.00955**		**0.00870**	9.3

Notes:
mg/L = milligrams per liter (mg/L).
RPD = relative percent difference = [Sample Conc. – Duplicate Conc.]/Average Conc. * 100.
VOCs = volatile organic compounds
Only individual VOCs are listed in table.

8.0 Surrogate Recoveries

Sample aliquots spiked with surrogates, compounds that are similar in character to target analytes but not normally found in the environment, were analyzed along with the investigative samples. All surrogate recoveries were within the laboratory's QC limits.

9.0 Data Completeness

Completeness is defined as the percentage of measurements made that are judged to be valid. In consideration of the QC flags discussed above, all analytical measurements were judged to be valid and none of the project data were rejected. The overall data quality of the analytical work performed as part of the additional CSA activities at the former Parsons facility was satisfactory and considered acceptable for future use.

10.0 References

The following reference was used in preparation of this QA/QC Data Review Summary.

- *Environmental Data Review Supplement for Region 1 – Data Review Elements and Superfund Specific Guidance/Procedures*. June 2018. EPA Region 1. Boston, Massachusetts.