Second Groundwater Monitoring and LNAPL Recovery Report

Shamrock #63

3624 Cerrillos Road, Santa Fe, New Mexico

Facility #29206, Release ID #4509

Prepared for **New Mexico Environment Department**
Santa Fe, New Mexico

April 10, 2018

Daniel B. Stephens & Associates, Inc.

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Second Groundwater Monitoring and LNAPL Recovery Report Shamrock #63

3624 Cerrillos Road, Santa Fe, New Mexico

Facility #29206, Release ID #4509, WPID #17887

On behalf of Polk Oil Company, responsible party (RP) for the Shamrock #63 (the site), Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this second quarterly groundwater monitoring report. The report has been prepared in accordance with the New Mexico Petroleum Storage Tank Regulations and work plan identification (WPID) #17887. All field activities were conducted in accordance with DBS&A standard operating procedures, the New Mexico Environment Department (NMED) Underground Storage Tank Bureau *Guidelines for Corrective Action* (Guidelines) (NMED, 2000), and the approved work plan.

1. Introduction and Background

The site is located at 3624 Cerrillos Road in Santa Fe, New Mexico (Figure 1) and is currently occupied by a used car dealership. A Best Western hotel and an abandoned strip mall are located on adjacent parcels. Fuel is no longer being stored or dispensed at the site. A map showing site features and well locations is provided in Figure 2.

1.1 Site History

Historical aerial photographs indicate that prior to 1958 the site was occupied by a bulk fueling facility with six aboveground storage tanks (ASTs) and four dispenser islands. Between 1979 and 1988, the parcel was subdivided, the ASTs and dispenser Islands were removed, and the Shamrock #63 station was constructed on the eastern portion of the original bulk fueling plant property. A hotel was constructed on the western portion of the former bulk fueling facility in 1991.

The underground storage tank (UST) system was removed from the site on April 19, 2006. Basin Engineering, Inc. (Basin) conducted a minimum site assessment (MSA) and additional

investigations in 2006 and 2007. Results of soil sampling revealed minor impacts to soil in the northwest corner of the former UST nest and near the diesel fuel dispensing island. Two soil borings were advanced in the area of the former UST nest in December 2006 and soil samples were collected. The samples showed impacts to soil at depths of up to 75 feet below ground surface (ft bgs). The first five monitor wells (MW-1 through MW-5, Figure 2) were installed on-site between 2007 and 2011 (Basin, 2014).

In May 2014, Basin personnel installed three new on-site groundwater monitor wells (MW-6 through MW-8) (Figure 2) and completed a semiannual groundwater monitoring event. Results of groundwater monitoring completed after well installation showed light nonaqueous-phase liquid (LNAPL) to be present in newly installed monitor well MW-6 at thicknesses up to 1.52 feet. This was the first observed occurrence of LNAPL at the site. Analytical results from groundwater samples collected from the other site wells showed numerous contaminants of concern (COCs) to be present at concentrations above New Mexico Groundwater Quality Control Commission (NMWQCC) and New Mexico Environmental improvement Board (NMEIB) standards.

DBS&A completed groundwater monitoring in September 2014, with broadly similar results, and installed six new monitor wells in March 2015 (MW-9 through MW-14) (Figure 2). Since well installation, LNAPL has been found to also be present in new monitor wells MW-9 (up to 0.99 foot) and MW-10 (up to 5.31 feet). Dissolved-phase contamination above applicable standards was present in groundwater samples collected from new monitor wells MW-11 and MW-14. In 2015 DBS&A also completed quarterly groundwater monitoring, monthly LNAPL recovery events, and an indoor air screening survey of structures (DBS&A, 2015a, 2015b). Groundwater monitoring results indicated that the extents of LNAPL and dissolved-phase contamination were not delineated to the west of new monitor wells MW-10 and MW-11 or to the east of new monitor well MW-14.

DBS&A submitted a work plan to the NMED petroleum Storage Tank Bureau (PSTB) to perform additional site investigation in 2016. The work plan was approved on June 26, 2017 under WPID #17887 (NMED, 2017) and authorized the installation of additional wells to delineate the extent of LNAPL and dissolved-phase contamination at the site, as well as continued groundwater monitoring and soil vapor extraction (SVE) pilot testing. New groundwater monitor

wells were installed between October 4 and October 10, 2017 (DBS&A, 2017). Following the installation of the new wells, SVE pilot testing was conducted (DBS&A, 2018b).

DBS&A completed a groundwater monitoring event in October 2017. As in previous monitoring events completed in 2015, LNAPL accumulations were noted in wells MW-6, MW-9, and MW-10. One or more dissolved-phase COCs were detected at concentrations exceeding the applicable standards in groundwater samples collected from wells MW-1, MW-2, MW-3, MW-5, MW-7, MW-8, MW-11, and MW-14 (DBS&A, 2018a). This report documents groundwater monitoring and LNAPL recovery activities conducted at the site between January 23 and January 26, 2018.

1.2 Site Hydrogeology

The geology underlying the site consists of a veneer of unconsolidated alluvial sediments underlain by the Pleistocene/Pliocene-age Ancha Formation. The Ancha Formation deposits comprise heterogeneous alluvial materials, composed of predominantly silty or clayey sand with varying amounts of gravel. The contact between the surficial alluvial martial and the underlying sediments of the Ancha Formation is typically not discernable in borehole cuttings.

Groundwater at the site occurs under unconfined conditions and is encountered at depths ranging between 76 and 84 ft bgs. The groundwater flow direction under the site is locally variable but has generally been to the southeast with a typical gradient on the order of 0.008 foot per foot (ft/ft).

1.3 Contaminants of Concern

Field observations and laboratory analytical results indicate that soil and groundwater at the site have been impacted by both diesel and gasoline releases from the former site facilities. COCs at the site include LNAPL, as well as dissolved-phase petroleum hydrocarbons—including benzene, toluene, ethylbenzene, total xylenes (BTEX), methyl tertiary-butyl ether (MTBE), and naphthalenes—and the fuel additives 1,2-dichloroethane (EDC) and 1,2-dibromoethane (EDB).

Initial soil borings and well installations completed following the removal of the USTs from the site indicated soil contamination extending from near the ground surface to the water table in the vicinity of well MW-1. Subsequent investigations conducted in 2014 and 2015 indicated soil contamination extending from near the ground surface to the water table at wells MW-6 and MW-9, near the former bulk plant fuel dispensers. Contamination from these source areas spread out at depth, impacting deeper soils in the vicinity of wells MW-5, MW-7, MW-10, and MW-11.

LNAPL accumulations have has consistently been observed in site wells MW-6, MW-9, and MW-10 at thicknesses up to 5.31 feet; LNAPL has not been observed in other site wells. A dissolved-phase contaminant plume extends a significant distance from known source areas and LNAPL accumulations. Benzene and other COCs have been detected in groundwater at concentrations exceeding the NMWQCC standards across a large area of the site.

1.4 Remediation System Operations and Performance

A remediation system has not been installed or operated at the site.

2. Scope of Work

The scope of work for this groundwater monitoring event included gauging fluid levels and collecting groundwater samples for laboratory analysis from 16 site wells. Also included in the scope of work was LNAPL recovery at any wells where a measureable LNAPL thickness was observed. Groundwater samples were analyzed for volatile organic compounds, including BTEX, MTBE, EDB, EDC, and polycyclic aromatic hydrocarbons (PAHs [naphthalene plus methyl naphthalenes)] using U.S. Environmental Protection Agency (EPA) method 8260B (full list).

2.1 Quarter Highlights

The following groundwater monitoring activities were completed during this reporting period:

- Located and gauged fluid levels in 19 site wells January 23, 2018

- Sampled 16 site monitor wells for laboratory analysis — January 23 through 25, 2018
- LNAPL Recovery from wells MW-6, MW-9, and MW-10 — January 26, 2018
- Prepared the groundwater monitoring report — February 2018

All monitoring activities were conducted in accordance with the approved work plan, including collecting 16 groundwater samples for laboratory analysis. Measureable LNAPL thicknesses were observed in 3 wells (MW-6, MW-9, and MW-10).

2.2 Monitoring Activities

DBS&A personnel performed second groundwater monitoring and LNAPL recovery activities from January 23 through January 26, 2018.

2.2.1 Groundwater Monitoring

On January 23, 2018 DBS&A personnel gauged fluid levels in the 19 site monitor wells using an electronic interface probe. LNAPL was detected in wells MW-6, MW-9, and MW-10 at thicknesses of 1.05 feet, 0.93 feet, and 1.38 feet, respectively. Table 1 provides a summary of fluid level measurements and groundwater elevations from this and previous monitoring events. Groundwater elevation data from the current monitoring event were used to prepare a potentiometric surface map (Figure 3).

DBS&A personnel collected groundwater samples for laboratory analysis from a total of 16 monitor wells on January 23 through 25, 2018. DBS&A personnel followed standard operating procedures and the Guidelines during the collection of all groundwater samples. Appendix A outlines the sampling protocol. Field notes recorded during monitoring activities are included as Appendix B. Groundwater samples were analyzed for the constituents specified in the scope of work. All laboratory analyses were performed by Hall Environmental Analysis Laboratory (HEAL) in Albuquerque, New Mexico. The complete laboratory analytical report, including chain of custody documentation, is provided in Appendix C.

2.2.2 LNAPL Recovery

On January 26, 2018 LNAPL recovery was conducted following the groundwater monitoring activities, and approximately 1.21, 1.05, and 1.09 gallons of LNAPL were removed from wells MW-6, MW 9, and MW-10, respectively. A total of approximately 41.4 gallons of LNAPL have been recovered at the site since recovery activities began in November 2014 (Table 2).

3. Results

A summary of groundwater analytical organic chemistry data from this and previous monitoring events is provided in Table 3. Figure 4 shows the distribution of LNAPL and dissolved-phase petroleum hydrocarbons during the second monitoring event.

3.1 Containment of Release

Monitor well MW-6 has contained measureable LNAPL since initial monitoring in May 2014 at thicknesses up to 1.52 feet; the LNAPL thickness during the current monitoring event was 1.05 feet (Table 2). LNAPL was also observed in wells MW-9 and MW-10 at thicknesses of 0.93 foot and 1.38 feet, respectively. To date, measureable LNAPL thicknesses have not been detected in any of the other site monitor wells. The extent of LNAPL in groundwater is delineated to the east by wells MW-5 and MW-7, to the south by wells MW-11 and MW-16, and to the west by well MW-17, but it remains undefined upgradient to the north of wells MW-6, MW-9, and MW-10.

One or more dissolved-phase COCs were detected at concentrations exceeding the applicable standards in groundwater samples collected from wells MW-1, MW-2, MW-3, MW-5, MW-7, MW-8, MW-11, and MW-14 through MW-18 (Table 3). Benzene is the COC present in groundwater at actionable concentrations across the largest areal extent at the site (Figure 5). Other constituents are present in actionable concentrations across smaller areas coincident with the benzene distribution. In particular, MTBE concentrations appear to be limited to the vicinity of the former Shamrock #63 station and areas to the east but are not detected in wells to the west of the site.

The extent of the dissolved-phase contaminant plume is partially delineated in the downgradient direction by wells MW-4, MW-12, MW-13, and MW-19 (Figures 4, 5). Solute concentrations decrease markedly at wells distal to known source areas and LNAPL accumulations. However, actionable concentrations are noted in wells MW-8, MW-15, and MW-18, and the plume remains poorly delineated in the vicinity of these wells (Figure 4). Elevated COC concentrations are also noted at upgradient well MW-17. The extent of dissolved-phase contamination also remains unbounded upgradient of the site to the north under the Cerrillos Road corridor.

3.2 Trends or Changes in Site Conditions

Since the last monitoring event in October 2017, groundwater levels decreased in site wells by an average of 0.11 foot. Decreases ranged from no change in well MW-15 to 0.16 foot in well MW-1 (Table 1). In wells where LNAPL is present, the depth to water has been corrected for comparison. A graph showing changes in groundwater elevations in site monitor wells over time is provided in Figure 6. The direction of groundwater flow varies beneath the site, but overall is generally to the southeast at an average gradient of approximately 0.008 ft/ft (Figure 3), similar to the previous monitoring event. LNAPL continued to be present in wells MW-6, MW-9, and MW-10. A summary of LNAPL recovery data from site wells is provided in Table 2.

During this monitoring event, groundwater samples were collected from 16 of the 19 site monitor wells. Table 3 presents a summary of analytical organic chemistry data from this and previous groundwater monitoring events conducted at the site. Time-series graphs showing changes in benzene and MTBE concentrations in selected site wells are presented in Figures 7 and 8, respectively. The following significant changes in groundwater quality conditions were observed since the previous groundwater monitoring event in October 2017:

- MW-1: COC concentrations decreased slightly or remained unchanged since the previous monitoring event. Benzene, total xylenes, MTBE, EDB, EDC, and PAH concentrations remain above their respective NMWQCC and NMEIB standards. BTEX constituents and MTBE concentrations detected in groundwater samples from this well have fluctuated over time, but are generally below the historical highs observed in 2008 and 2009. EDB, EDC, and PAH concentrations remain near historical highs.

- MW-2: COC concentrations generally changed little since the previous monitoring event. The benzene concentration decreased slightly from 780 to 690 micrograms per liter (µg/L), while the MTBE concentration increased from 1,400 to 1,700 µg/L and is now at a historical high. Concentrations of other BTEX constituents and PAHs remained below NMWQCC standards and/or the laboratory reporting limits. EDB was previously detected at a concentration of 0.109 µg/L in 2015, above the NMWQC standard, but is currently below the laboratory reporting limit of 5.0 µg/L. Benzene, MTBE, and EDC concentrations continue to exceed their respective NMWQCC and NMEIB standards. Concentrations of BTEX constituents and PAHs have fluctuated significantly between monitoring events but have decreased overall since the well was first sampled in May 2008. MTBE and EDC concentrations have generally increased over time.

- MW-3: COC concentrations generally changed little since the previous monitoring event. Benzene, MTBE, and EDC concentrations continue to exceed their respective NMWQCC and NMEIB standards. Other COC concentrations remained below laboratory reporting limits and/or NMWQCC standards. Benzene concentrations have decreased since 2008 and 2009, while MTBE and EDC concentrations have shown increasing trends.

- MW-4: All COC concentrations remained below laboratory reporting limits. COC concentrations in this well have decreased markedly since monitoring began in 2008.

- MW-5: Overall, COC concentrations changed only slightly since the previous monitoring event. Concentrations of BTEX constituents and PAHs increased slightly, while EDB and EDC concentrations decreased slightly since the previous monitoring event. Although below historical highs, benzene, toluene, total xylenes, EDB, EDC, and PAH concentrations continue to significantly exceed their respective standards. The MTBE concentration remained below the laboratory reporting limit.

- MW-6: Measurable LNAPL has been present in this well during each monitoring or LNAPL recovery event at thicknesses up to 1.52 feet. The LNAPL thickness increased slightly from 1.02 to 1.05 feet since the last monitoring event. To date, approximately 20.55 gallons of LNAPL have been recovered from this well (Table 2).

- MW-7: COC concentrations have generally changed little since the previous monitoring event. Concentrations of benzene, toluene, total xylenes, EDC, EDB, and PAHs have decreased somewhat from historical highs but remain well above applicable groundwater quality standards. Although the MTBE concentration was unchanged from the previous sampling event, it remains above the NMEIB standard and a general increasing trend has been noted.

- MW-8: The benzene concentration decreased slightly from 21 to 19 µg/L and remains slightly above the NMWQCC standard. All other COC concentrations remained below the laboratory reporting limits and/or applicable groundwater quality standards.

- MW-9: Since the well was installed in March 2015, it has continuously contained LNAPL at thicknesses up to 1.07 feet. Since the previous monitoring event, the LNAPL thickness decreased from 1.07 feet to 0.93 feet. To date, approximately 4.82 gallons of LNAPL have been recovered from this well (Table 2).

- MW-10: Since the well was installed in March 2015, it has continuously contained LNAPL at thicknesses up to 5.31 feet. Since the previous monitoring event, the LNAPL thickness decreased sharply from 4.52 feet to 1.38 feet. To date, approximately 16.03 gallons of LNAPL have been recovered from this well (Table 2).

- MW-11: COC concentrations generally changed little from the previous monitoring event and have remained below the historical highs recorded following well installation in 2015. Benzene, EDC, EDB, and PAH concentrations remained significantly above their respective groundwater quality standards during this sampling event. Other COC concentrations remained below applicable groundwater quality standards and/or laboratory reporting limits.

- MW-12: All COC concentrations remained below the laboratory reporting limits or the applicable groundwater quality standards.

- MW-13: All COC concentrations remained below the laboratory reporting limits or the applicable groundwater quality standards.

- MW-14: COC concentrations generally changed little since the previous monitoring event; most constituent concentrations decreased slightly, while EDB increased from 9.1 to 9.5 µg/L. Benzene, EDB, and EDC concentrations continue to exceed NMWQCC standards. All other COC concentrations remained below applicable groundwater quality standards.

- MW-15: The benzene concentration decreased slightly from 22 to 21 µg/L and continues to exceed the NMWQCC standard. All other COC concentrations remained below applicable groundwater quality standards or laboratory reporting limits.

- MW-16: The benzene concentration increased significantly from 21 to 88 µg/L and continues to exceed the NMWQCC standard. The EDC concentration increased from 3.6 to 10 µg/L and is now equal to the NMWQCC standard. All other COC concentrations remained below applicable groundwater quality standards or laboratory reporting limits.

- MW-17: Significant concentration increases were noted for benzene (740 to 2,300 µg/L), toluene (2,300 to 4,100 µg/L), total xylenes (2,100 to 3,300 µg/L), EDC (170 to 660 µg/L), and PAHs (411 to 580 µg/L); concentrations of these constituents continue to exceed NMWQCC standards. All other COC concentrations remained below applicable groundwater quality standards or laboratory reporting limits.

- MW-18: The benzene concentration increased from 33 to 51 µg/L, and the EDC concentration increased from 45 to 53 µg/L; concentrations of these constituents continue to exceed their respective NMWQCC standards. All other COC concentrations remained below applicable groundwater quality standards or laboratory reporting limits.

- MW-19: All COC concentrations remained below the laboratory reporting limits.

4. Conclusions and Recommendations

Based on the results of the monitoring events summarized in this report, DBS&A offers the following conclusions regarding conditions at the site:

- LNAPL accumulations at the water table continue to be persistent in the vicinity of the former pump islands located to the west of the site on a parcel now occupied by the Best Western hotel. The extent of LNAPL remains undefined to the north under Cerrillos Road.

- The highest concentrations of dissolved-phase COCs in groundwater are centered on-site near the former Shamrock #63 UST nest and in the vicinity of the LNAPL plume. The dissolved-phase plume is partially delineated in the downgradient direction by the existing monitoring well network, but remains unbounded upgradient under the Cerrillos road corridor and in the vicinity of wells MW-15, MW-8, and MW-18. Decreasing solute concentrations at these distal wells indicate that the dissolved-phase contaminant plume likely does not extend a significant distance beyond the current well network.

- Some clear historical trends are evident, including generally decreasing concentrations of BTEX constituent concentrations in wells MW-1, MW-2, MW-3, MW-4, MW-5, and MW-7, and increasing MTBE concentrations in wells MW-2, MW-3, and MW-7. Wells MW-9 through MW-19 do not currently have enough associated water quality data to establish long-term trends.

- LNAPL or highly elevated solute concentrations do not appear to extend under the Best Western hotel or other occupied structures on the site and adjacent parcels.

- The distribution of MTBE in site wells suggests two separate releases associated with the Shamrock #63 station and the previous bulk plant dispensers, respectively.

Based on assessment of the monitoring network, historical data, and current site conditions, DBS&A also offers the following additional recommendations:

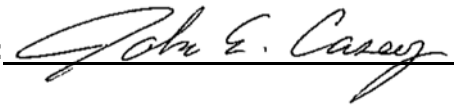
- LNAPL recovery and groundwater monitoring should continue at the site due to the presence of LNAPL in monitor wells MW-6, MW-9, and MW-10 and dissolved-phase contaminant concentrations above the respective NMWQCC and NMEIB standards in monitor wells MW-1, MW-2, MW-3, MW-5, MW-7, MW-8, MW-11, and MW-14 through MW-18.

- Monitoring results indicate that the dissolved-phase contaminant plume is not fully delineated to the east of well MW-15, southeast of well MW-8, and to the west of wells MW-17 and MW-18. Although solute concentrations at these wells are significantly lower than near known release areas and LNAPL accumulations, benzene concentrations remain above applicable standards.

- In support of future remedial design, a bail-down and recovery test should be conducted at site wells containing LNAPL.

Statement of Familiarity

I, the undersigned, am personally familiar with the information submitted in this report and the attached documents and attest that it is true and complete.

Signature: 

Authorized Representative: John Casey, P.E.

Affiliation: Daniel B. Stephens & Associates, Inc.

Title: Senior Engineer

Date: April 10, 2018

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Figures

Image source: ESRI ArcGIS Online and data partners, including imagery from agencies supplied via the Content Sharing Program.

N

0 250 500
Feet

SHAMROCK #63
3624 CERRILLOS ROAD
SANTA FE, NEW MEXICO

Area Map

Daniel B. Stephens & Associates, Inc.
2/8/2016
JN BE14.0012

Figure 1

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N

0 40 80

Feet

Explanation

- Monitor well
- Property line
- Sanitary sewer
- Buried electric/telecom

Source: 1. USGS imagery of the Santa Fe metropolitan area.
2. Fuel dispenser and AST locations detemined in consultation with NMED-PSTB.

SHAMROCK #63
3624 CERRILLOS ROAD
SANTA FE, NEW MEXICO

Site Map

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4/6/2018
JN BE14.0012

Figure 2

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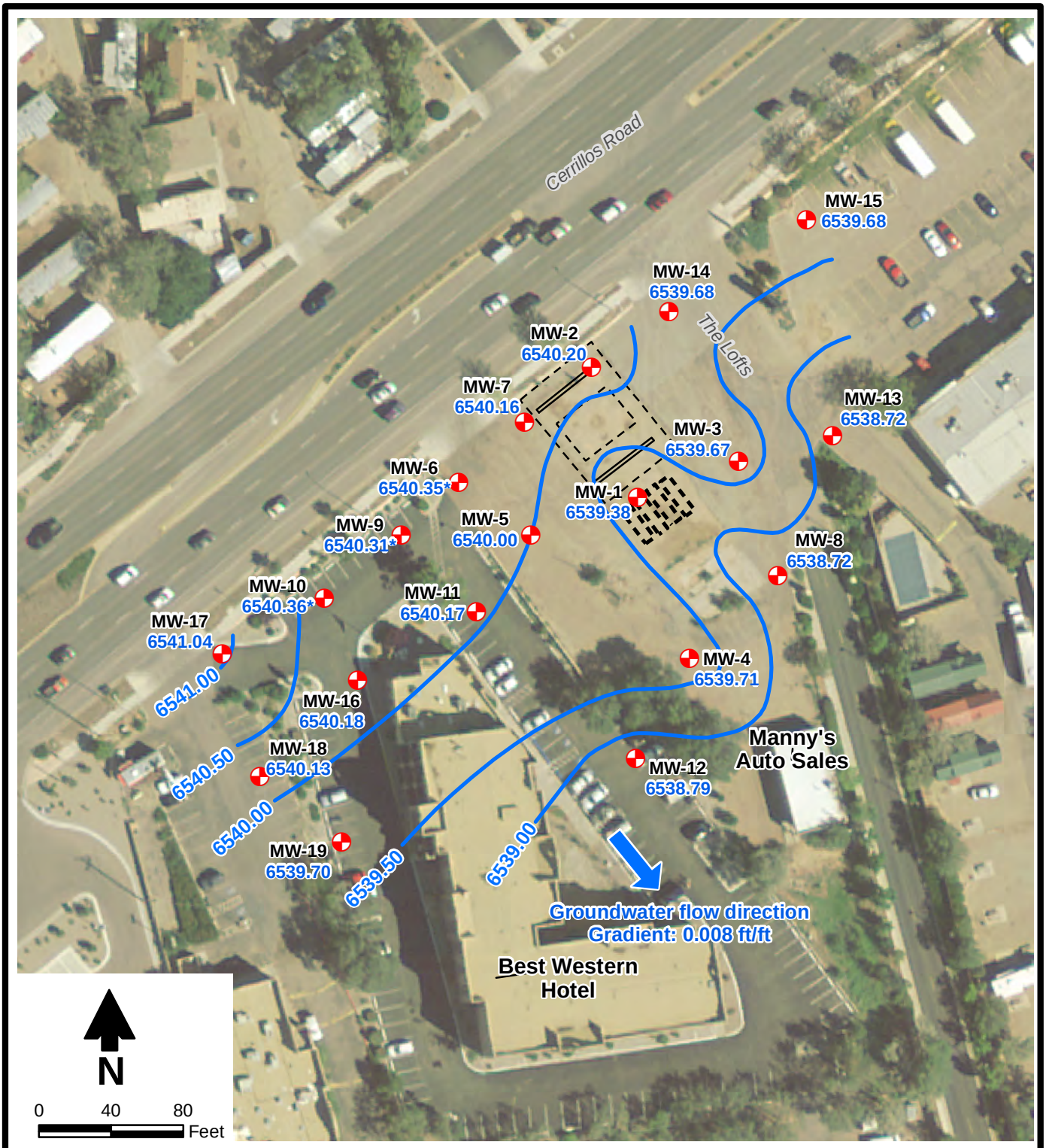

Source: 1. USGS imagery of the Santa Fe metropolitan area.
2. Fuel dispenser and AST locations detemined in consultation with NMED-PSTB.

Explanation

- Monitor well
- Potentiometric surface elevation contour (ft msl)
- **MW-1** Monitor well designation
- **6539.38** Potentiometric surface elevation (ft msl)
- **6540.35*** Potentiometric surface elevation corrected for LNAPL thickness

SHAMROCK #63
3624 CERRILLOS ROAD
SANTA FE, NEW MEXICO

Potentiometric Surface Elevations
January 23, 2018

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4/5/2018 JN BE14.0012

Figure 3

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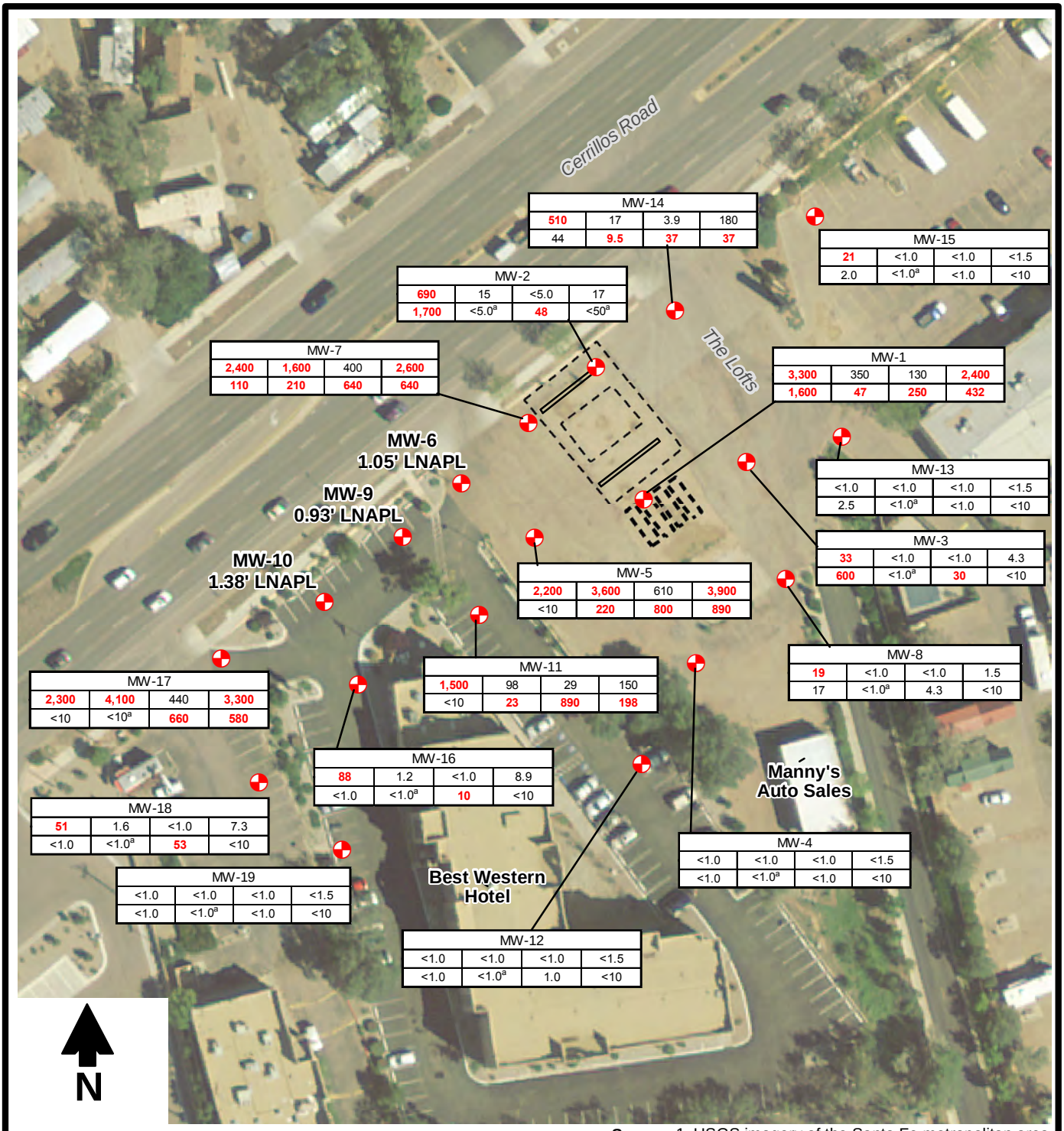

Source: 1. USGS imagery of the Santa Fe metropolitan area.
2. Fuel dispenser and AST locations detemined in consultation with NMED-PSTB.

Explanation

- Monitor well

Location Designation			
Benzene	Toluene	Ethylbenzene	Total Xylenes
MTBE	EDB	EDC	PAHs

Notes:
1. All Concentrations reported in micrograms per liter (µg/L).
2. **Bold** indicates concentrations that exceed applicable standards.
3. [a] Laboratory reporting limit is equal to or greater than the NMWQCC standard.

SHAMROCK #63
3624 CERRILLOS ROAD
SANTA FE, NEW MEXICO

Distribution of Dissolved-Phase contaminants
January 23 through 25, 2018

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4/6/2018
JN BE14.0012

Figure 4

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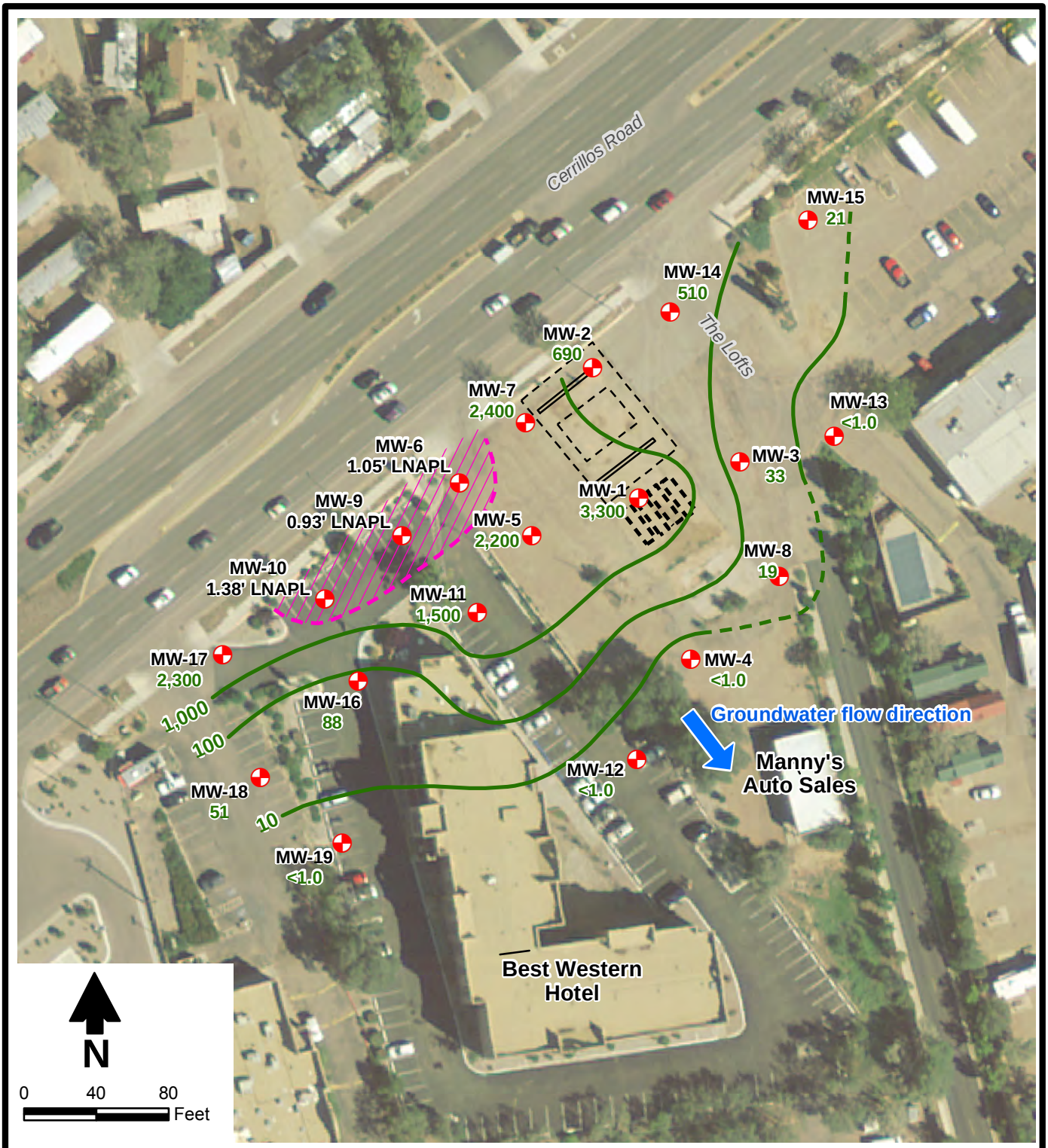

Source: 1. USGS imagery of the Santa Fe metropolitan area.
2. Fuel dispenser and AST locations detemined in consultation with NMED-PSTB.

Explanation

- Monitor well
- Benzene isoconcentration contour (µg/L) (dashed where inferred)
- Approximate extent of LNAPL
- LNAPL

MW-1 Monitor well designation
3,300 Benzene concentration (µg/L)

SHAMROCK #63
3624 CERRILLOS ROAD
SANTA FE, NEW MEXICO

Benzene Isoconcentration Map
January 23 through 25, 2018

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4/6/2018
JN BE14.0012
Figure 5

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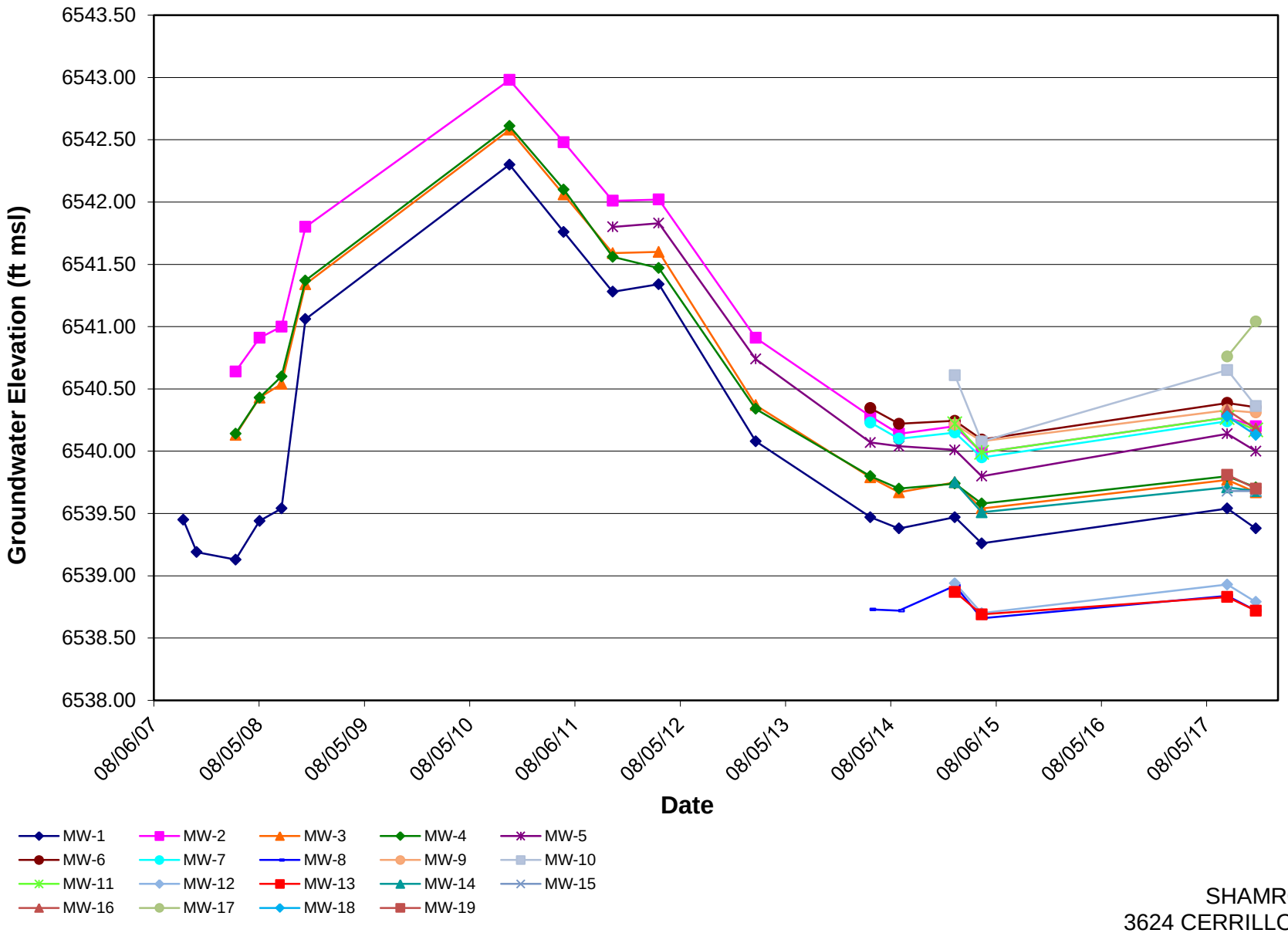

SHAMROCK #63
3624 CERRILLOS ROAD
SANTA FE, NEW MEXICO

Time-Series Graph
Groundwater Elevations

Figure 6

Daniel B. Stephens & Associates, Inc.

4/10/18

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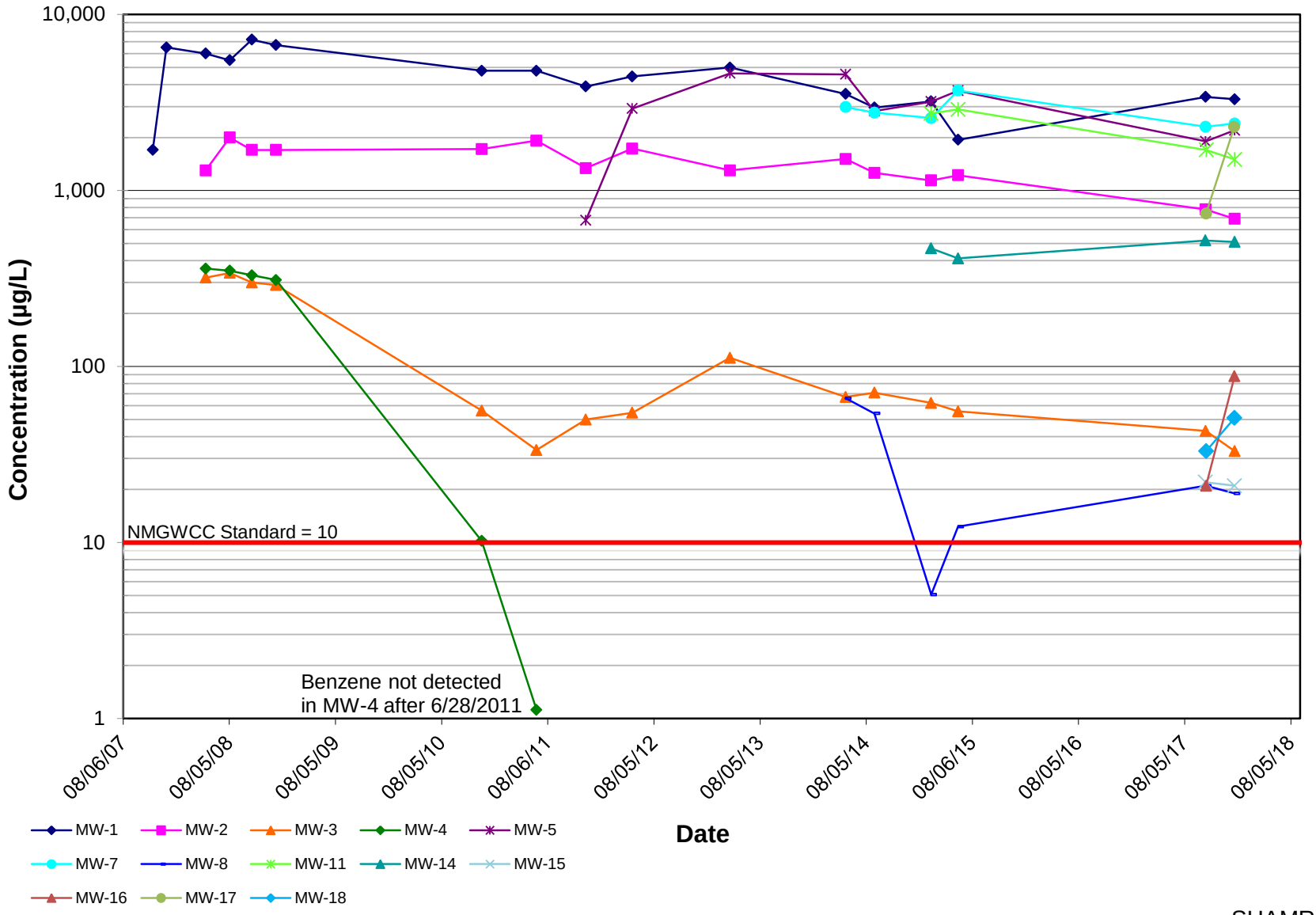

SHAMROCK #63
3624 CERRILLOS ROAD
SANTA FE, NEW MEXICO

Time-Series Graph
Benzene Concentrations

Figure 7

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4/10/18

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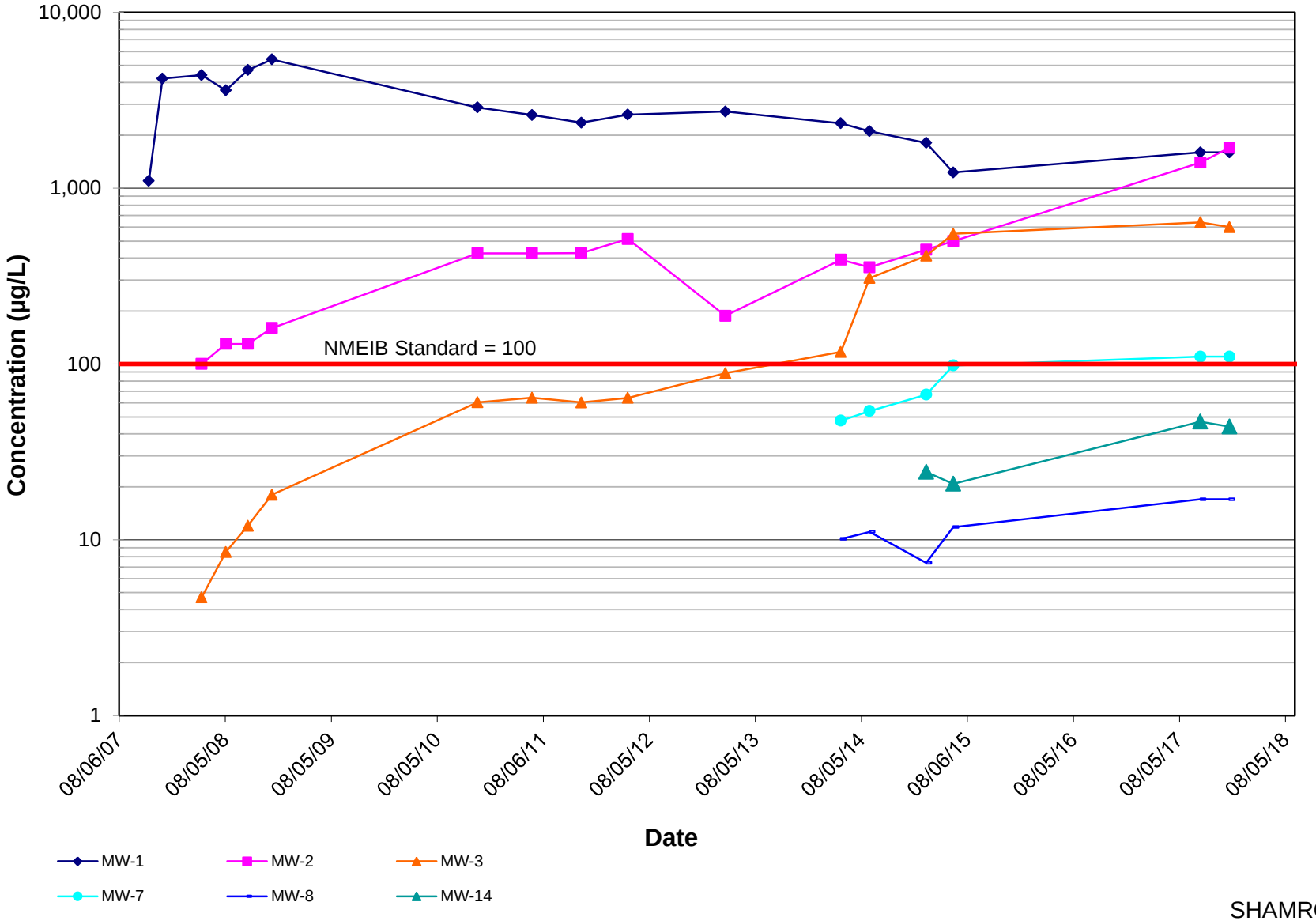

SHAMROCK #63
3624 CERRILLOS ROAD
SANTA FE, NEW MEXICO

Time-Series Graph
MTBE Concentrations

Figure 8

Daniel B. Stephens & Associates, Inc.

4/10/18

Tables

Table 1. Summary of Historical Fluid Levels and Field Parameters Data
Shamrock #63, Santa Fe, New Mexico

Well ID	TOC Elevation (ft msl)	Date WL Measured	Depth to Water (ft bgs)	Depth to LNAPL (ft bgs)	Groundwater Elevation (ft msl) [a]	pH	Specific Conductance (mS/cm)	Total Dissolved Solids (mg/L)	ORP (mV)	Dissolved Oxygen (mg/L)	Temperature (°F)
MW-1	6619.21	11/16/07	79.76	—	6539.45	7.47	1.402	911	NM	1.43	60.8
		01/02/08	80.02	—	6539.19	7.88	1.776	1,154	NM	1.28	57.2
		05/16/08	80.08	—	6539.13	7.16	1.993	1,296	NM	1.74	60.4
		08/07/08	79.77	—	6539.44	7.08	1.840	1,196	NM	0.81	65.4
		10/22/08	79.67	—	6539.54	7.17	1.883	1,224	NM	1.27	59.3
	6620.47	01/13/09	79.41	—	6541.06	7.16	1.961	1,275	NM	1.91	58.9
		12/22/10	78.17	—	6542.30	7.81	1.567	1,018	NM	2.28	59.9
		06/28/11	78.71	—	6541.76	7.85	3.463	2,251	NM	0.92	62.2
		12/15/11	79.19	—	6541.28	7.25	1.451	943	NM	1.17	56.0
		05/23/12	79.13	—	6541.34	7.15	1.229	144	NM	1.03	63.9
		04/24/13	80.39	—	6540.08	7.18	1.550	1,245	NM	0.60	60.3
	6620.48	05/27/14	81.01	—	6539.47	6.87	0.773	NM	NM	2.52	62.5
		09/03/14	81.10	—	6539.38	7.59	1.448	NM	-103.8	1.20	61.5
		03/16/15	81.01	—	6539.47	6.76	1.373	NM	-35.9	0.85	59.5
		06/17/15	81.22	—	6539.26	7.01	1.067	NM	-57.8	3.10	62.1
	6620.56	10/16/17	81.02	—	6539.54	7.09	1.267	NM	-60.1	0.50	61.3
		01/23/18	81.18	—	6539.38	6.99	1.338	-77.4	NM	0.52	61.9
MW-2	6621.53	05/16/08	80.89	—	6540.64	7.50	0.838	545	NM	1.17	59.4
		08/07/08	80.62	—	6540.91	7.15	0.735	476	NM	0.77	66.2
		10/22/08	80.53	—	6541.00	7.20	0.670	436	NM	1.38	60.8
	6622.11	01/13/09	80.31	—	6541.80	7.38	0.643	417	NM	2.09	53.7
		12/22/10	79.13	—	6542.98	7.92	0.781	507	NM	2.21	59.4
		06/28/11	79.63	—	6542.48	7.94	1.814	1,179	NM	0.89	62.3
		12/15/11	80.10	—	6542.01	7.26	0.741	482	NM	1.25	55.6
		05/23/12	80.09	—	6542.02	7.33	1.772	1,119	NM	0.96	64.3

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Shamrock #63, Santa Fe, New Mexico

Well ID	TOC Elevation (ft msl)	Date WL Measured	Depth to Water (ft bgs)	Depth to LNAPL (ft bgs)	Groundwater Elevation (ft msl) [a]	pH	Specific Conductance (mS/cm)	Total Dissolved Solids (mg/L)	ORP (mV)	Dissolved Oxygen (mg/L)	Temperature (°F)
MW-2 (cont.)	6622.11 (cont.)	04/24/13	81.20	—	6540.91	7.16	0.734	575	NM	0.91	61.1
		05/27/14	81.83	—	6540.28	7.10	0.776	NM	NM	2.99	62.1
		09/03/14	81.97	—	6540.14	7.61	0.790	NM	-96.1	1.53	60.8
		03/16/15	81.91	—	6540.20	6.88	0.653	NM	-37.7	0.73	60.4
		06/17/15	82.12	—	6539.99	7.08	0.696	NM	-86.7	2.26	64.0
	6622.18	10/16/17	81.91	—	6540.27	7.21	0.687	NM	-74.4	0.88	61.2
		01/23/18	81.98	—	6540.20	7.09	0.733	NM	-94.9	0.48	59.8
MW-3	6620.37	05/16/08	80.24	—	6540.13	7.84	0.741	483	NM	1.62	58.5
		08/07/08	79.94	—	6540.43	7.56	0.439	286	NM	0.60	64.8
		10/22/08	79.83	—	6540.54	7.46	0.590	384	NM	1.11	61.3
	6620.94	01/13/09	79.60	—	6541.34	7.55	0.501	328	NM	1.78	58.7
		12/22/10	78.36	—	6542.58	8.02	0.745	485	NM	2.40	58.5
		06/28/11	78.88	—	6542.06	7.81	1.720	1,118	NM	0.71	61.9
		12/15/11	79.35	—	6541.59	7.36	0.714	465	NM	0.75	56.0
		05/23/12	79.34	—	6541.60	7.19	1.611	1,047	NM	0.70	64.9
		04/24/13	80.57	—	6540.37	7.17	0.758	424	NM	0.92	63.1
		05/27/14	81.15	—	6539.79	6.87	0.773	NM	NM	2.73	63.3
		09/03/14	81.27	—	6539.67	7.49	0.891	NM	-64.6	2.25	60.9
		03/16/15	81.19	—	6539.75	6.76	0.738	NM	-35.4	0.66	60.5
		06/17/15	81.40	—	6539.54	7.07	0.876	NM	-70.3	1.89	63.1
	6621.02	10/16/17	81.25	—	6539.77	7.15	0.910	NM	-48.6	0.65	60.9
		01/23/18	81.35	—	6539.67	7.12	0.938	NM	-83.6	1.22	60.6
MW-4	6618.94	05/16/08	78.80	—	6540.14	8.37	1.456	945	NM	1.60	58.1
		08/07/08	78.51	—	6540.43	7.36	1.534	997	NM	1.23	64.3

Table 1. Summary of Historical Fluid Levels and Field Parameters Data
Shamrock #63, Santa Fe, New Mexico

Well ID	TOC Elevation (ft msl)	Date WL Measured	Depth to Water (ft bgs)	Depth to LNAPL (ft bgs)	Groundwater Elevation (ft msl) [a]	pH	Specific Conductance (mS/cm)	Total Dissolved Solids (mg/L)	ORP (mV)	Dissolved Oxygen (mg/L)	Temperature (°F)
MW-4 (cont.)	6618.94	10/22/08	78.34	—	6540.60	7.25	1.583	1,029	NM	1.65	61.8
	6619.53	01/13/09	78.16	—	6541.37	7.26	1.520	988	NM	1.90	58.3
	6619.53	12/22/10	76.92	—	6542.61	7.96	1.541	1,002	NM	1.91	58.9
		06/28/11	77.43	—	6542.10	7.68	3.415	2,220	NM	1.34	62.5
		12/15/11	77.97	—	6541.56	7.57	1.485	965	NM	1.22	55.9
		05/23/12	78.06	—	6541.47	7.14	3.011	1,958	NM	1.39	63.6
		04/24/13	79.19	—	6540.34	7.27	1.318	1,010	NM	1.36	61.3
		05/27/14	79.73	—	6539.80	6.66	1.133	NM	NM	2.37	61.5
		09/03/14	79.83	—	6539.70	7.03	1.218	NM	NM	2.23	62.3
		03/16/15	79.79	—	6539.74	7.06	1.098	NM	-52.9	1.46	60.5
		06/17/15	79.95	—	6539.58	7.16	1.113	NM	-48.6	2.80	63.2
	6619.59	10/16/17	79.79	—	6539.80	7.41	0.926	NM	-75.3	1.13	62.5
		01/23/18	79.88	—	6539.71	7.24	0.922	NM	-58.8	1.98	59.0
MW-5	6620.95	12/15/11	79.15	—	6541.80	7.58	0.560	364	NM	1.00	57.8
		05/23/12	79.12	—	6541.83	7.42	1.018	662	NM	0.31	64.0
		04/24/13	80.21	—	6540.74	7.35	0.437	522	NM	2.01	62.4
	6620.97	05/27/14	80.90	—	6540.07	6.95	0.715	NM	NM	1.56	61.8
		09/03/14	80.93	—	6540.04	7.28	0.813	NM	-111.4	0.97	63.1
		03/16/15	80.96	—	6540.01	6.91	0.705	NM	-29.5	0.76	60.1
		06/17/15	81.17	—	6539.80	7.21	0.644	NM	-105.5	1.65	63.5
	6621.05	10/16/17	80.91	—	6540.14	7.53	0.616	NM	-97.6	0.83	61.8
		01/23/18	81.05	—	6540.00	7.51	0.620	NM	-132.1	1.67	60.3
MW-6	6621.73	05/27/14	82.09	81.26	6540.35	NM					
		09/03/14	82.70	81.30	6540.22	NM					

Table 1. Summary of Historical Fluid Levels and Field Parameters Data
Shamrock #63, Santa Fe, New Mexico

Well ID	TOC Elevation (ft msl)	Date WL Measured	Depth to Water (ft bgs)	Depth to LNAPL (ft bgs)	Groundwater Elevation (ft msl) [a]	pH	Specific Conductance (mS/cm)	Total Dissolved Solids (mg/L)	ORP (mV)	Dissolved Oxygen (mg/L)	Temperature (°F)
MW-6 (cont.)	6621.73	03/16/15	82.37	81.33	6540.24	NM					
		06/17/15	82.81	81.43	6540.09	NM					
	6621.81	10/16/17	82.29	81.27	6540.39	NM					
		01/23/18	82.35	81.30	6540.35	NM					
MW-7	6622.46	05/27/14	82.23	—	6540.23	7.30	0.510	NM	NM	2.61	61.9
		09/03/14	82.36	—	6540.10	7.82	0.464	NM	-78.6	1.27	62.8
		03/16/15	82.31	—	6540.15	6.96	0.446	NM	-35.6	0.91	60.1
		06/17/15	82.51	—	6539.95	7.24	0.450	NM	-70.6	3.53	63.1
	6622.54	10/16/17	82.30	—	6540.24	7.08	0.441	NM	-66.5	0.61	61.4
		01/23/18	82.38	—	6540.16	6.97	0.491	NM	-95.6	1.88	60.6
MW-8	6619.98	05/27/14	81.25	—	6538.73	6.45	0.984	NM	NM	1.75	61.7
		09/03/14	81.26	—	6538.72	6.55	0.905	NM	10.7	2.06	62.4
		03/16/15	81.06	—	6538.92	6.90	0.910	NM	-36.9	1.35	60.3
		06/17/15	81.32	—	6538.66	6.95	0.943	NM	-30.5	2.67	61.8
	6620.06	10/16/17	81.22	—	6538.84	6.97	1.019	NM	-20.1	0.71	61.2
		01/23/18	81.34	—	6538.72	6.89	1.054	NM	-5.9	1.77	58.6
MW-9	6619.49	03/16/15	79.65	79.21	6540.21	NM					
		06/17/15 [b]	79.62 [b]	79.37	6540.08	NM					
	6619.55	10/16/17	80.13	79.06	6540.33	NM					
		01/23/18	80.03	79.10	6540.31	NM					
MW-10	6618.39	03/16/15	82.43	76.96	6540.61	NM					
		06/17/15	79.29	78.14	6540.08	NM					
	6618.42	10/16/17	81.61	77.09	6540.65	NM					
		01/23/18	79.23	77.85	6540.36	NM					

Table 1. Summary of Historical Fluid Levels and Field Parameters Data
Shamrock #63, Santa Fe, New Mexico

Well ID	TOC Elevation (ft msl)	Date WL Measured	Depth to Water (ft bgs)	Depth to LNAPL (ft bgs)	Groundwater Elevation (ft msl) [a]	pH	Specific Conductance (mS/cm)	Total Dissolved Solids (mg/L)	ORP (mV)	Dissolved Oxygen (mg/L)	Temperature (°F)
MW-11	6617.89	03/16/15	77.67	—	6540.22	6.90	1.634	NM	-22.1	0.99	60.4
		06/17/15	77.90	—	6539.99	6.91	1.792	NM	84.3	1.40	63.4
	6617.96	10/16/17	77.69	—	6540.27	7.11	1.733	NM	-79.8	0.86	62.1
		01/23/18	77.79	—	6540.17	6.96	1.621	NM	-120.9	3.33	60.9
MW-12	6615.09	03/16/15	76.15	—	6538.94	7.42	0.946	NM	-18.1	2.70	59.1
		06/17/15	76.39	—	6538.70	7.20	0.950	NM	92.7	2.67	62.4
	6615.13	10/16/17	76.20	—	6538.93	7.23	0.846	NM	43.6	0.74	61.6
		01/23/18	76.34	—	6538.79	7.29	0.911	NM	96.1	1.43	60.8
MW-13	6619.75	03/16/15	80.88	—	6538.87	6.72	2.169	NM	-28.4	1.21	59.6
		06/17/15	81.06	—	6538.69	6.89	2.766	NM	4.9	2.30	61.6
	6619.80	10/16/17	80.97	—	6538.83	7.04	3.391	NM	68.6	0.79	60.6
		01/23/18	81.08	—	6538.72	6.92	3.559	NM	56.9	2.07	59.7
MW-14	6623.61	03/16/15	83.86	—	6539.75	6.98	0.749	NM	-40.1	1.74	60.4
		06/17/15	84.10	—	6539.51	7.06	0.756	NM	32.5	1.52	63.2
	6623.69	10/16/17	83.98	—	6539.71	7.17	0.793	NM	-7.3	0.62	69.8
		01/23/18	84.01	—	6539.68	7.05	0.819	NM	-26.9	0.64	61.2
MW-15	6623.48	10/16/17	83.80	—	6539.68	7.38	1.039	NM	-306.9	0.85	62.1
		01/23/18	83.80	—	6539.68	7.33	0.803	NM	-110.5	0.69	59.7
MW-16	6616.71	10/16/17	76.38	—	6540.33	7.51	0.835	NM	-38.1	0.91	62.3
		01/23/18	76.53	—	6540.18	7.09	1.276	NM	-73.7	0.88	63.2
MW-17	6619.43	10/16/17	78.67	—	6540.76	8.90	0.326	NM	-134.2	2.02	63.3
		01/23/18	78.39	—	6541.04	7.43	0.557	NM	-134.4	1.97	60.3
MW-18	6616.76	10/16/17	76.48	—	6540.28	7.68	0.536	NM	-43.4	0.80	61.4
		01/23/18	76.63	—	6540.13	7.55	0.579	NM	-106.4	0.61	61.1

Table 1. Summary of Historical Fluid Levels and Field Parameters Data
Shamrock #63, Santa Fe, New Mexico

Well ID	TOC Elevation (ft msl)	Date WL Measured	Depth to Water (ft bgs)	Depth to LNAPL (ft bgs)	Groundwater Elevation (ft msl) [a]	pH	Specific Conductance (mS/cm)	Total Dissolved Solids (mg/L)	ORP (mV)	Dissolved Oxygen (mg/L)	Temperature (°F)
MW-19	6615.94	10/16/17	76.13	—	6539.81	7.44	0.663	NM	-64.8	2.02	62.5
		01/23/18	76.24	—	6539.70	7.37	0.740	NM	-54.2	1.01	60.6

Note: Data prior to September 2014 reported by Basin Engineering, Inc. (Basin, 2014).

[a] Groundwater elevation (GWE) corrected for LNAPL thickness using the following equation:
GWE = TOC Elevation - (DTW - [LNAPL thickness x 0.85]).

[b] LNAPL thickness and depth to water corrected based on recovery in first bailer.

ft msl = Feet above mean sea level
ft bgs = Feet below ground surface
mS/cm = Millisiemens per centimeter
ORP = Oxidation-reduction potential
mV = Millivolt
mg/L = Milligrams per liter
°F = Degrees Fahrenheit
LNAPL = Light nonaqueous-phase liquid
NM = Not measured

Table 2. Summary of LNAPL Recovery from Site Wells
Shamrock # 63, Santa Fe, New Mexico

Well ID	Date	Initial Depth to Water [a] (ft btoc)	Initial Depth to LNAPL (ft btoc)	Initial LNAPL Thickness (feet)	Corrected Depth to Water [b] (ft btoc)	Total Volume of Fluids Removed (gallons)	Volume of LNAPL Removed (gallons)	Cumulative Volume of LNAPL Removed (gallons)	Final Thickness of LNAPL (feet)
MW-6	05/27/14	82.09	81.26	0.83	81.38	3.50	0.50	0.50	<0.01
	09/03/14	82.70	81.30	1.40	81.51	6.00	0.85	1.35	<0.01
	11/17/14	82.80	81.28	1.52	81.51	2.98	1.42	2.77	0.20
	12/12/14	82.55	81.24	1.31	81.44	3.22	1.41	4.18	0.18
	01/19/15	82.45	81.20	1.25	81.39	3.10	1.47	5.65	0.19
	02/16/15	82.42	81.21	1.21	81.39	3.22	1.68	7.33	0.21
	03/08/15	82.36	81.25	1.11	81.42	3.12	1.70	9.03	0.10
	03/17/15	82.37	81.33	1.04	81.53	3.38	1.66	10.69	0.28
	05/15/15	82.65	81.37	1.28	81.56	3.64	1.47	12.16	0.33
	06/01/15	82.49	81.42	1.07	81.58	1.57	0.91	13.07	0.29
	06/17/15	82.81	81.43	1.38	81.64	4.76	1.06	14.13	0.33
	07/01/15	82.65	81.46	1.19	81.64	3.59	1.36	15.49	0.22
	07/15/15	82.84	81.49	1.35	81.69	4.35	1.25	16.74	0.15
	07/29/15	82.98	81.50	1.48	81.72	3.88	1.47	18.21	0.20
	10/19/17	82.29	81.27	1.02	81.42	1.49	1.13	19.34	0.20
	01/26/18	82.35	81.30	1.05	81.46	2.69	1.21	20.55	0.02
MW-9	04/10/15	80.19	79.20	0.99	79.35	2.35	0.92	0.92	0.05
	05/15/15	80.02	79.25	0.77	79.37	3.78	0.65	1.57	0.13
	06/01/15	79.54	79.36	0.18	79.39	1.08	0.25	1.82	0.00
	06/17/15 [c]	79.62	79.37	0.25	79.41	1.37	0.26	2.08	0.00
	07/01/15	80.04	79.38	0.66	79.48	1.54	0.21	2.29	0.00
	07/15/15	80.01	79.50	0.51	79.58	2.20	0.11	2.40	<0.01
	07/29/15	80.17	79.49	0.68	79.59	1.76	0.23	2.63	0.00
	10/19/17	80.13	79.06	1.07	79.22	1.68	1.14	3.77	0.15
	01/26/18	80.03	79.10	0.93	79.24	2.42	1.05	4.82	0.05

Table 2. Summary of LNAPL Recovery from Site Wells
Shamrock # 63, Santa Fe, New Mexico

Well ID	Date	Initial Depth to Water [a] (ft btoc)	Initial Depth to LNAPL (ft btoc)	Initial LNAPL Thickness (feet)	Corrected Depth to Water [b] (ft btoc)	Total Volume of Fluids Removed (gallons)	Volume of LNAPL Removed (gallons)	Cumulative Volume of LNAPL Removed (gallons)	Final Thickness of LNAPL (feet)
MW-10	04/10/15	82.35	77.04	5.31	77.84	6.01	4.62	4.62	0.35
	05/15/15	81.61	77.33	4.28	77.97	4.86	3.60	8.22	0.34
	06/01/15	78.90	78.00	0.90	78.14	2.61	1.01	9.23	0.12
	06/17/15	79.29	78.14	1.15	78.31	5.79	0.81	10.04	0.01
	07/01/15	78.93	78.28	0.65	78.38	2.43	0.36	10.40	0.00
	07/15/15	78.97	78.28	0.69	78.38	3.94	0.38	10.78	0.01
	07/29/15	79.00	78.33	0.67	78.43	2.86	0.38	11.16	0.00
	10/19/17	81.61	77.09	4.52	77.77	4.93	3.78	14.94	0.20
	01/26/18	79.23	77.85	1.38	78.06	2.24	1.09	16.03	0.04

[a] Depth to water (DTW) before correction for LNAPL thickness.

[b] DTW corrected for LNAPL thickness using the following equation: DTW = DTW - (LNAPL thickness x 0.85).

[c] Initial LNAPL thickness and depth to water calculated from thickness observed in first bailer

LNAPL = Light nonaqueous-phase liquid

ft btoc = Feet below top of casing

Table 3. Summary of Groundwater Analytical Organic Chemistry Data
Shamrock #63, Santa Fe, New Mexico

Well Name	Date Sampled	Concentration (µg/L) [a]							
		Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	EDB	EDC	PAHs
NMWQCC Standard [b]		*10*	*750*	*750*	*620*	*100* [c]	*0.1*	*10*	*30*
MW-1	11/16/07	**1,700**	260	85	**1,000**	**1,100**	<10 [d]	**41**	**131**
	01/02/08	**6,500**	640	150	**2,800**	**4,200**	**23**	**110**	**222**
	05/16/08	**6,000**	660	200	**3,200**	**4,400**	**28**	**160**	**285**
	08/07/08	**5,500**	**830**	180	**3,600**	**3,600**	**48**	**210**	**280**
	10/22/08	**7,200**	**820**	230	**3,700**	**4,700**	**29**	**150**	**410**
	01/13/09	**6,700**	**890**	220	**3,400**	**5,400**	**22**	**120**	**360**
	12/22/10	**4,790**	380	232	**3,600**	**2,880**	**13.9**	<1.0	**362.8**
	06/28/11	**4,790**	330	177	**3,340**	**2,610**	**12.2**	<1.0	**353**
	12/15/11	**3,900**	262	147	**2,400**	**2,360**	<0.02 [e]	<1.0	**257.5**
	05/23/12	**4,450**	417	143	**2,790**	**2,620**	**12.9**	<1.0	**226.5**
	04/24/13	**5,000**	439	122	**2,900**	**2,730**	**27.5** [e]	**146**	**165**
	05/27/14	**3,540**	276	74.1	**1,740**	**2,340**	**25**	**166**	**299**
	09/03/14	**2,960**	333	82.4	**1,850**	**2,110**	**26.3**	**161**	**248.9**
	03/17/15	**3,210**	380	58.9	**1,850**	**1,810**	**36.5** [e]	**315**	**322.1**
	06/18/15	**1,940**	134	23.7	**749**	**1,230**	**18.1** [e]	**141**	**193.6**
	10/17/17	**3,400**	390	140	**2,400**	**1,600**	**52**	**270**	**466**
	01/25/18	**3,300**	350	130	**2,400**	**1,600**	**47**	**250**	**432**
MW-2	05/16/08	**1,300**	430	180	**1,200**	**100**	<10 [d]	**20**	**32**
	08/07/08	**2,000**	180	140	**1,100**	**130**	<5.0 [d]	**22**	16.7
	10/22/08	**1,700**	140	140	**940**	**130**	<5.0 [d]	**21**	20.0
	01/13/09	**1,700**	130	91	**810**	**160**	<5.0 [d]	**22**	10
	12/22/10	**1,720**	74.3	5.99	240	**426**	<1.0 [d]	<1.0	**94.5**
	06/28/11	**1,920**	84.1	4.68	280	**426**	<1.0 [d]	<1.0	**68.1**
	12/15/11	**1,340**	53.1	4.04	167	**427**	<0.02 [e]	<1.0	**37.4**

Table 3. Summary of Groundwater Analytical Organic Chemistry Data
Shamrock #63, Santa Fe, New Mexico

Well Name	Date Sampled	Concentration (µg/L) [a]							
		Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	EDB	EDC	PAHs
NMWQCC Standard [b]		*10*	*750*	*750*	*620*	*100* [c]	*0.1*	*10*	*30*
MW-2 (cont.)	05/23/12	**1,730**	57.6	5.00	194	**514**	<1.0 [d]	<1.0	19.3
	04/24/13	**1,300**	47.6	2.48	182	**188**	**0.248** [e]	**17.9**	15.4
	05/27/14	**1,510**	30.3	1.86	104	**392**	<1.0 [d]	**20.7**	<25.0
	09/03/14	**1,260**	40.9	5.96	144	**355**	<1.0 [d]	<1.0	**151.3**
	03/17/15	**1,140**	30.7	2.10	91.9	**447**	**0.133** [e]	**69.6**	**33.22**
	06/18/15	**1,220**	32.3	<5.00	102	**500**	**0.109** [e]	**54.1**	<35.0 [d]
	10/17/17	**780**	15	<5.0	22	**1,400**	<5.0 [d]	**43**	<50 [d]
	01/25/18	**690**	15	<5.0	17	**1,700**	<5.0 [d]	**48**	<50 [d]
MW-3	05/16/08	**320**	7.4	ND	23	4.7	<1.0 [d]	ND	6.6
	08/07/08	**340**	12	ND	24	8.5	<1.0 [d]	1.0	ND
	10/22/08	**300**	14	ND	28	12	<1.0 [d]	1.1	ND
	01/13/09	**290**	8.1	ND	23	18	<1.0 [d]	1.2	ND
	12/22/10	**56.1**	2.12	<1.0	9.35	60.5	<1.0 [d]	<1.0	<25.0
	06/28/11	**33.5**	1.04	<1.0	5.71	64.2	<1.0 [d]	<1.0	<25.0
	12/15/11	**49.9**	1.31	<1.0	6.45	60.4	<0.02 [e]	<1.0	<25.0
	05/23/12	**54.6**	1.13	<1.0	7.25	64.1	<1.0 [d]	<1.0	<25.0
	04/24/13	**112.0**	2.3	<1.0	13.3	88.5	<0.0199 [e]	2.45	<25.0
	05/27/14	**67.1**	1.02	<1.0	7.31	**117**	<1.0 [d]	4.76	<25.0
	09/03/14	**71**	<1.0	<1.0	7.08	**308**	<1.0 [d]	**20.4**	<15.0
	03/17/15	**62.1**	<1.0	<1.0	7.83	**413**	<0.0201 [e]	**28.4**	1.26
	06/18/15	**55.6**	<1.00	<1.00	6.41	**550**	<0.0202 [e]	**25.4**	<15.0
	10/17/17	**43**	<1.0	<1.0	5.6	**640**	<1.0 [d]	**28**	<10
	01/25/18	**33**	<1.0	<1.0	4.3	**600**	<1.0 [d]	**30**	<10
MW-4	05/16/08	**360**	1.2	ND	28	5.7	<1.0 [d]	**11**	**39.4**

Table 3. Summary of Groundwater Analytical Organic Chemistry Data
Shamrock #63, Santa Fe, New Mexico

Well Name	Date Sampled	Concentration (µg/L) [a]							
		Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	EDB	EDC	PAHs
NMWQCC Standard [b]		*10*	*750*	*750*	*620*	*100* [c]	*0.1*	*10*	*30*
MW-4 (cont.)	08/07/08	**350**	1.9	ND	42	6.2	<1.0 [d]	**17**	9.4
	10/22/08	**330**	2.7	ND	52	6.5	<1.0 [d]	**19**	9.9
	01/13/09	**310**	1.3	ND	37	7.5	<1.0 [d]	**20**	ND
	12/22/10	**10.2**	<1.0	<1.0	<3.0	5.31	<1.0 [d]	**13.2**	<25
	06/28/11	1.12	<1.00	<1.00	<3.00	3.90	<1.0 [d]	7.15	<25.0
	12/15/11	<1.0	<1.0	<1.0	<3.0	18.6	<0.02 [e]	6.62	<25
	05/23/12	<1.0	<1.0	<1.0	<3.0	1.81	<1.0 [d]	3.27	<25
	04/24/13	<1.0	<1.0	<1.0	<3.0	1.31	<0.0199 [e]	3.09	<25
	05/27/14	<1.0	<1.0	<1.0	<3.0	<1.0	<1.0 [d]	<1.0	<25
	09/03/14	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0 [d]	1.12	<15
	03/17/15	<1.0	<1.0	<1.0	<2.0	<1.0	<0.0200 [e]	1.32	0.165
	06/18/15	<1.00	<1.00	<1.00	<3.00	<1.00	0.0534 [e]	1.32	<15.0
	10/18/17	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0 [d]	<2.0	<20
	01/24/18	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0 [d]	<1.0	<10
MW-5	12/15/11	**678**	**2,520**	**1,560**	**10,700**	<1.0	<0.02 [e]	<1.0	**7,170**
	05/23/12	**2,920**	**4,090**	**934**	**4,940**	<10	**198**	<10 [d]	**1,376**
	04/24/13	**4,630**	**5,690**	**1,140**	**7,060**	<10	**561** [e]	**1,250**	**1,446**
	05/27/14	**4,570**	**6,590**	**1,740**	**7,910**	3.17	**489**	**1,480**	**2,860**
	09/03/14	**2,830**	**4,620**	**771**	**6,010**	2.24	**345**	**1,350**	**1,155**
	03/17/15	**3,200**	**4,890**	745	**5,730**	<1.0	**711** [e]	**1,800**	**913**
	06/18/15	**3,690**	**4,980**	**803**	**6,410**	<25.0	**231** [e]	**1,480**	**1,333**
	10/17/17	**1,900**	**2,900**	480	**3,600**	<5.0	**240**	**920**	**860**
	01/25/18	**2,200**	**3,600**	610	**3,900**	<10	**220**	**800**	**890**
MW-6	05/27/14	Not sampled, 0.83' LNAPL present							

Table 3. Summary of Groundwater Analytical Organic Chemistry Data
Shamrock #63, Santa Fe, New Mexico

Well Name	Date Sampled	Concentration (µg/L) [a]							
		Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	EDB	EDC	PAHs
NMWQCC Standard [b]		*10*	*750*	*750*	*620*	*100* [c]	*0.1*	*10*	*30*
MW-6 (cont.)	09/03/14	Not sampled, 1.40' LNAPL present							
	03/16/15	Not sampled, 1.04' LNAPL present							
	06/17/15	Not sampled, 1.38' LNAPL present							
	10/16/17	Not sampled, 1.02' LNAPL present							
	01/23/18	Not sampled, 1.05' LNAPL present							
MW-7	05/27/14	**2,980**	**3,350**	740	**5,030**	47.6	**130**	**610**	**1,743**
	09/03/14	**2,770**	**3,000**	589	**4,470**	54	**151**	**612**	**371**
	03/17/15	**2,580**	**2,790**	660	**4,270**	66.9	**256** [e]	**799**	**1,364**
	06/18/15	**3,700**	**2,400**	635	**3,520**	98.1	**173** [e]	**714**	**1,296**
	10/17/17	**2,300**	**1,800**	400	**2,700**	**110**	**210**	**790**	**620**
	01/25/18	**2,400**	**1,600**	400	**2,600**	**110**	**210**	**640**	**640**
MW-8	05/27/14	**66**	1.62	<1.0	10	10.1	<1.0 [d]	5.45	<25
	09/03/14	**54.1**	1.31	<1.0	5.94	11.1	<1.0 [d]	<1.0	<15
	03/17/15	5.06	<1.0	<1.0	<2.0	7.38	<0.0201 [e]	3.24	**31**
	06/18/15	**12.3**	<1.00	<1.00	<3.00	11.8	<0.0204 [e]	4.96	<15.0
	10/17/17	**21**	<1.0	<1.0	1.6	17	<1.0 [d]	5.0	<10
	01/24/18	**19**	<1.0	<1.0	1.5	17	<1.0 [d]	4.3	<10
MW-9	03/16/15	Not sampled, 0.44' LNAPL present							
	06/18/15	Not sampled, 0.25' LNAPL present [f]							
	10/16/17	Not sampled, 1.07' LNAPL present							
	01/23/18	Not sampled, 0.93' LNAPL present							
MW-10	03/16/15	Not sampled, 5.47' LNAPL present							
	06/18/15	Not sampled, 1.15' LNAPL present							
	10/16/17	Not sampled, 4.52' LNAPL present							

Table 3. Summary of Groundwater Analytical Organic Chemistry Data
Shamrock #63, Santa Fe, New Mexico

Well Name	Date Sampled	Concentration (µg/L) [a]							
		Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	EDB	EDC	PAHs
NMWQCC Standard [b]		*10*	*750*	*750*	*620*	*100* [c]	*0.1*	*10*	*30*
MW-10 (cont.)	01/23/18	Not sampled, 1.38' LNAPL present							
MW-11	03/17/15	**2,740**	**1,170**	126	**1,760**	<1.0	**304** [e]	**3,130**	**505**
	06/18/15	**2,890**	**1,000**	99.4	**1,440**	<5.00	**167** [e]	**2,080**	**316.5**
	10/19/17	**1,700**	73	32	130	<1.0	**21**	**1,000**	**226**
	01/25/18	**1,500**	98	29	150	<10	**23**	**890**	**198**
MW-12	03/17/15	<1.0	<1.0	<1.0	<2.0	<1.0	0.0287 [e]	2.46	15.7
	06/18/15	<1.00	<1.00	<1.00	<3.00	<1.00	<0.0204 [e]	1.74	<15.0
	10/18/17	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0 [d]	1.1	<10
	01/24/18	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0 [d]	1.0	<10
MW-13	03/17/15	5.71	<1.0	<1.0	<2.0	5.24	<0.0205 [e]	<1.0	2.61
	06/18/15	5.01	<1.00	<1.00	<3.00	7.84	<0.0204 [e]	<1.00	<15.0
	10/17/17	6.1	<1.0	<1.0	<1.5	3.4	<1.0 [d]	<1.0	<10
	01/24/18	<1.0	<1.0	<1.0	<1.5	2.5	<1.0 [d]	<1.0	<10
MW-14	03/17/15	**469**	26.5	4.81	201	24.3	**20.0** [e]	**70.8**	**42.4**
	06/18/15	**411**	22.0	5.44	143	20.8	**7.76** [e]	**30.2**	<35.0 [d]
	10/16/17	**520**	21	4.5	190	47	**9.1**	**38**	**40**
	01/25/18	**510**	17	3.9	180	44	**9.5**	**37**	**37**
MW-15	10/16/17	**22**	<1.0	<1.0	<1.5	<1.0	<1.0 [d]	<1.0	<10
	01/24/18	**21**	<1.0	<1.0	<1.5	2.0	<1.0 [d]	<1.0	<10
MW-16	10/18/17	**21**	<1.0	<1.0	1.6	<1.0	<1.0 [d]	3.6	<10
	01/24/18	**88**	1.2	<1.0	8.9	<1.0	<1.0 [d]	**10**	<10
MW-17	10/18/17	**740**	**2,300**	320	**2,100**	<10	<10 [d]	**170**	**411**
	01/23/18	**2,300**	**4,100**	440	**3,300**	<10	<10 [d]	**660**	**580**

Table 3. Summary of Groundwater Analytical Organic Chemistry Data
Shamrock #63, Santa Fe, New Mexico

Well Name	Date Sampled	Concentration (µg/L) [a]							
		Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	EDB	EDC	PAHs
NMWQCC Standard [b]		*10*	*750*	*750*	*620*	*100 [c]*	*0.1*	*10*	*30*
MW-18	10/18/17	**33**	<1.0	<1.0	3.4	<1.0	<1.0 [d]	**45**	<10
	01/24/18	**51**	1.6	<1.0	7.3	<1.0	<1.0 [d]	**53**	<10
MW-19	10/18/17	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0 [d]	<1.0	<10
	01/23/18	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0 [d]	<1.0	<10

Bold indicates values that exceed applicable standards.

Data prior to September 2014 reported by Basin Engineering, Inc. (Basin, 2014).

[a] Samples analyzed in accordance with EPA method 8260B, unless otherwise noted.

[b] New Mexico Water Quality Control Commission standard, unless otherwise noted.

[c] MTBE standard is set by the New Mexico Environmental Improvement Board.

[d] Laboratory reporting limit is equal to or greater than the NMWQCC standard.

[e] Analyzed in accordance with EPA method 504.1 for EDB

[f] LNAPL thickness estimated based on recovery in first bailer

µg/L = Micrograms per liter
MTBE = Methyl tertiary-butyl ether
EDB = 1,2-Dibromoethane
EDC = 1,2-Dichloroethane
PAHs = Polycyclic aromatic hydrocarbons
NMWQCC = New Mexico Water Quality Control Commission
LNAPL= Light nonaqueous-phase liquid

Appendix A

Sampling Protocol

Appendix A. Sampling Protocol

Fluid Level and Parameter Measurements

Prior to collection of groundwater samples, a Solinst interface probe will be used to determine depths to water and light nonaqueous-phase liquid (LNAPL), if present. Water level data will be used to construct a site potentiometric surface map. A YSI 556 MPS meter will be used to measure dissolved oxygen (DO), oxidation-reduction potential (ORP), specific conductivity, pH, and temperature. Field parameters will be measured at intervals of no less than once per casing volume during purging of a well for sampling.

Groundwater Monitor Well Sampling

To ensure a fresh flow of groundwater into the well bore, a minimum of three casing volumes will be removed from each well prior to sampling. If a well is purged dry, it will be sampled when the well has recharged. Wells will be purged and sampled using dedicated, disposable, polyethylene bailers. To minimize volatilization and ensure sample integrity, dedicated, disposable, polyethylene bottom-emptying devices will be used to transfer groundwater samples from the bailers to the appropriate sample containers.

Samples analyzed for volatile organic analytes (VOAs) will be collected in 40-milliliter (mL) glass vials containing hydrochloric acid or mercuric chloride preservative and capped with Teflon septa caps. VOA containers will be filled in a manner that prevents headspace in the vials. Samples analyzed for dissolved iron, lead, and manganese will be field-filtered with 0.45-micron disposable filters, collected in 250-mL plastic containers, and preserved with nitric acid to a pH of less than 2. Samples analyzed for nitrate and sulfate will be collected in 500-mL plastic containers containing no preservative.

Immediately after collection, the sample containers will be placed on ice in an insulated cooler for delivery to the laboratory for analyses. Groundwater samples will be accompanied by full chain of custody documentation at all times.

Appendix B

Field Notes

1/23/18 D. Fisher

1015 Onsite. Weather is Cold (~30°F), Windy, Sunny. Prepare for GW Monitoring. Gauge Site Wells. See Form For Details.

1340 Calibrate YSI 556 MPS. See Form For Details.

1415 Begin GW Monitoring @ MW-19. See Forms For Details.

1515 GW Sampling Complete For the Day.

1530 Offsite.

1/23/18

1/24/18 D. Fisher

0850 Onsite Weather is Cold (~28°F), Breezy, Sunny. Calibrate YSI 556. See Form For Details.

0925 Resume GW Sampling @ MW-12. See Forms For Details.

1645 GW Sampling Complete For Today. Offsite

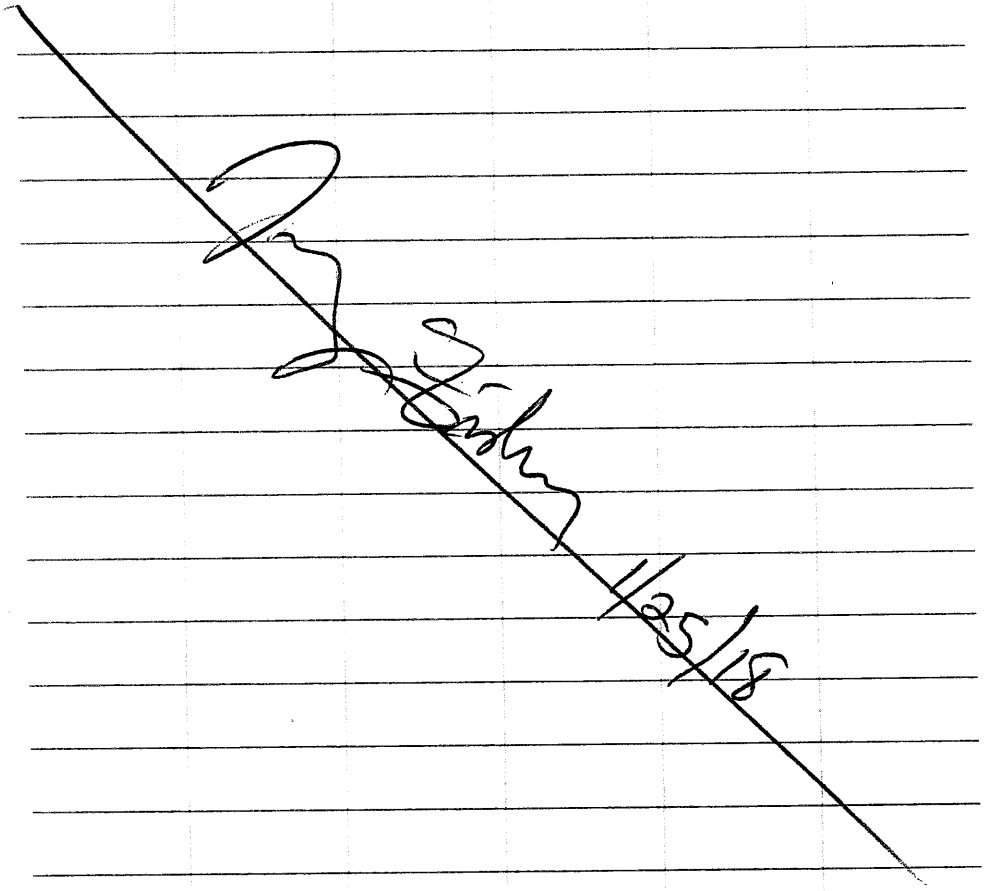
1/24/18

1/25/18 JJFISHER

0845 ONSITE. WEATHER IS COLD (~33°F), CLEAR, SUNNY. CALIBRATE YSI 556 MPS. SEE FORM FOR DETAILS.

0920 RESUME GW MONITORING @ MW-3. SEE FORMS FOR DETAILS.

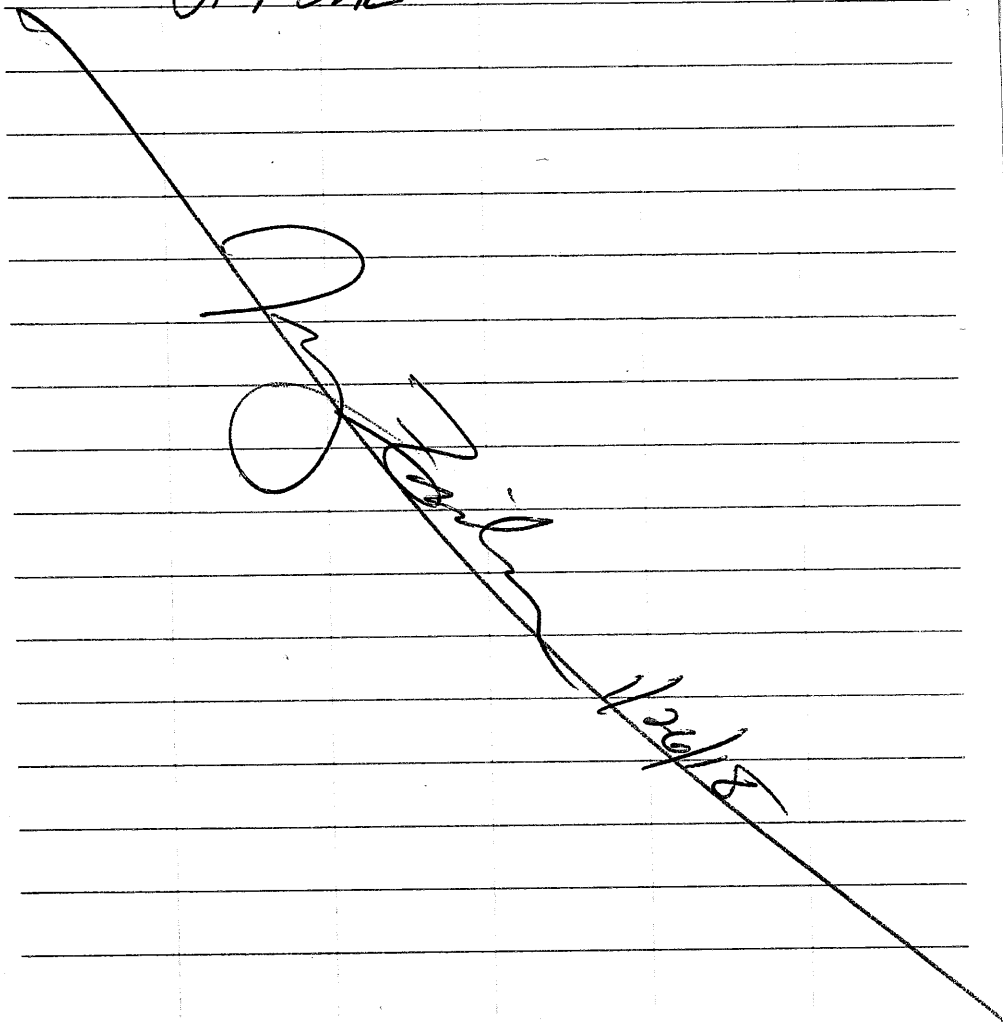
1715 GW MONITORING COMPLETE. OFFSITE



1/26/18 J.FISHER

1030 ONSITE - WEATHER IS COOL (~43°F), SL, WINDY, SUNNY. BEGIN NAPL RECOVERY @ MW-6. SEE FORMS FOR DETAILS.

1500 NAPL RECOVERY COMPLETE. OFFSITE



Daniel B. Stephens & Associates, Inc.

GROUNDWATER ELEVATION DATA SHEET

Project Name: SHAMROCK #63 Sampler: J. FISHER

Project #: BE14.0012.00 Sample Date: 1/23/18

Project Manager: JOHN CASEY Sheet # 1 of 2

Well ID	Depth to NAPL	Depth to Water	Total Depth	Comments: (well dia., sampled, condition)
MW-19	—	76.24	96.38	
MW-12	—	76.34	91.20	
MW-4	—	79.88	86.70	
MW-13	—	81.08	93.48	
MW-8	—	81.34	87.79	
MW-16	—	76.53	90.81	
MW-15	—	83.80	94.65	
MW-18	—	76.63	90.04	
MW-3	—	81.35	88.14	
MW-2	—	~~81.35~~ 81.98	88.61	
MW-14	—	84.01	92.80	
MW-1	—	81.18	91.52	
MW-5		81.05	87.49	
~~MW-7~~ MW-7		82.38	88.90	
~~MW-11~~ MW-11		77.79	94.16	

Comments:

Daniel B. Stephens & Associates, Inc.

GROUNDWATER ELEVATION DATA SHEET

Project Name: _____ Sampler: _____

Project #: _____ Sample Date: _____

Project Manager: _____ Sheet # _____ of _____

Well ID	Depth to NAPL	Depth to Water	Total Depth	Comments: (well dia., sampled, condition)
MW-17	—	78.39	90.12	
MW-6	81.30	82.35	—	1.05'
MW-9	79.10	80.03	—	0.93'
MW-10	77.85	79.23	—	1.38

Comments:

_____

_____

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: Shamrock #63
Project #: BC14.0012
Project Manager: John Casey

Sampler: J. Fisher
Sample Date: 1/23/18
Sample Time: 1515

Well #: MW-19

Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 76.24 (feet btoc)
Total Depth of Well: 96.38 (feet)

Height of Water Column: 10.14 (feet)
Casing Volume: 1.62 (gal)
Purge Volume: 4.87 (gal)
Purge Method: Disposable Poly Bailer

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.12	16.05	635	-33.0	0.92	Clear
1	7.32	16.06	663	-47.9	0.83	Clear
2	7.38	16.03	688	-64.4	0.88	Sl Turbid
3	7.37	15.87	740	-54.2	1.01	Sl Turbid

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: Clear, No Odor

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: Shamrock #63
Project #: BC14.0012.00
Project Manager: John Casey

Sampler: J. Fisher
Sample Date: 1/24/16
Sample Time: 1015

Well #: MW-12
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 76.34 (feet btoc)
Total Depth of Well: 91.20 (feet)

Height of Water Column: 14.86 (feet)
Casing Volume: 2.37 (gal)
Purge Volume: 7.13 (gal)
Purge Method: Disposable Poly Bailer

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.10	15.39	845	145.9	3.20	CLEAR
1	7.23	15.97	943	148.8	1.48	TURBID
2	7.25	16.05	929	96.1	1.43	TURBID
3	7.29	15.99	911			TURBID

Sample Description: 3-VOA (H_2SO_4)

Physical Observations: TURBID, PALE BROWN, NO ODOR

Analytical Method(s): ~~8260B~~

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: Shamrock #63
Project #: BC14.0012.00
Project Manager: John Casey

Sampler: J. Fisher
Sample Date: 1/24/18
Sample Time: 1100

Well #: MW-4
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 79.88 (feet btoc)
Total Depth of Well: 86.70 (feet)

Height of Water Column: 6.83 (feet)
Casing Volume: 1.09 (gal)
Purge Volume: 3.28 (gal)
Purge Method: Disposable Poly Bailer

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.26	15.26	904	22.6	0.36	Clear
1	7.24	15.00	922	-58.8	1.98	Sl Turbid
2		Dry @ ~ 1.8 Gallons				
3						

Sample Description: 3-VOA (HCl)

Physical Observations: Sl Turbid, Lt Brown, No Odor

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SHAMROCK #63
Project #: BE14.0012.00
Project Manager: JOHN CASEY

Sampler: J. FISHER
Sample Date: 1/24/18
Sample Time: 1155

Well #: MW-13
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 81.08 (feet btoc)
Total Depth of Well: 93.48 (feet)

Height of Water Column: 12.40 (feet)
Casing Volume: 1.98 (gal)
Purge Volume: 5.95 (gal)
Purge Method: DISPOSABLE POLY BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	6.89	14.74	3489	15.1	2.06	CLEAR
1	6.92	15.40	3559	56.9	2.07	TURBID
2		DRY @ ~ 3.5 GALLONS				
3						

Sample Description: 3-VOA (H_2SO_4)

Physical Observations: SL TURBID, ~~TAN~~ LT BROWN, NO ODOR

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SHAMROCK #63
Project #: BC14,0012-00
Project Manager: JOHN GISCH

Sampler: J. FISHER
Sample Date: 1/24/18
Sample Time: 1330

Well #: MW-8
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 81.34 (feet btoc)
Total Depth of Well: 87.79 (feet)

Height of Water Column: 6.45 (feet)
Casing Volume: 1.03 (gal)
Purge Volume: 3.10 (gal)
Purge Method: DISPOSABLE POLY BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	6.87	14.85	1092	-14.8	1.51	CLEAR
1	6.89	15.31	1079	-38.2	0.91	TURBID
2	6.92	14.96	1030	-33.3	1.26	TURBID
3	6.89	14.79	1054	-5.9	1.07	TURBID

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: TURBID, SLIGHT ODOR

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: Shamrock #63
Project #: BE14.0012.00
Project Manager: John Casey

Sampler: J. Fisher
Sample Date: 1/25/18
Sample Time: 1495

Well #: MW-16
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 76.53 (feet btoc)
Total Depth of Well: 90.81 (feet)

Height of Water Column: 14.28 (feet)
Casing Volume: 2.28 (gal)
Purge Volume: 6.85 (gal)
Purge Method: Disposable Poly Bailer

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.19	16.48	846	80.7	1.00	CLEAR
1	7.22	17.41	933	-93.1	1.04	TURBID
2	7.17	17.39	1140	-79.8	1.06	TURBID
3	7.09	17.31	1276	-73.7	0.88	TURBID

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: V. Turbid, Dk Brown, No odor

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SHAMROCK #63
Project #: BE14.0012.00
Project Manager: JOHN CASEY

Sampler: J FISHER
Sample Date: 1/24/18
Sample Time: 1540

Well #: MW-15
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 83.80 (feet btoc)
Total Depth of Well: 94.65 (feet)

Height of Water Column: 10.55 (feet)
Casing Volume: 1.69 (gal)
Purge Volume: 5.06 (gal)
Purge Method: DISPOSABLE POLY BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.24	15.80	535	-83.7	0.96	CLEAR
1	7.38	15.52	633	-116.4	0.84	TURBID
2	7.38	15.30	734	-123.4	0.62	TURBID
3	7.33	15.41	803	-110.5	0.69	TURBID

Sample Description: 3-VOA (HCl)

Physical Observations: TURBID, DK BROWN, NO ODOR

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SITAMROCK #63
Project #: BC14.0012.00
Project Manager: JOHN CASEY

Sampler: J. FIGUEROA
Sample Date: 1/24/18
Sample Time: 1630

Well #: MW-18
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 76.63 (feet btoc)
Total Depth of Well: 90.04 (feet)

Height of Water Column: 13.41 (feet)
Casing Volume: 2.15 (gal)
Purge Volume: 6.44 (gal)
Purge Method: DISPOSABLE POLY BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.40	16.21	443	-95.5	0.69	CLEAR
1	7.58	16.12	570	-110.1	0.65	TURBID
2	7.57	16.10	571	-114.4	0.61	TURBID
3	7.55	16.14	579	-106.4	0.61	TURBID

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: TURBID, DK BROWN No ODOR

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SUNNYROCK #63
Project #: BC14.0012.00
Project Manager: JOHN CASEY

Sampler: J. FISHER
Sample Date: 1/25/18
Sample Time: 1010

Well #: MW-3
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 81.35 (feet btoc)
Total Depth of Well: 88.14 (feet)

Height of Water Column: 6.79 (feet)
Casing Volume: 1.09 (gal)
Purge Volume: 3.26 (gal)
Purge Method: DISPOSABLE POLY BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	6.89	16.05	746	-51.9	1.27	CLEAR
1	~~7.06~~	16.40	866	-85.5	1.31	TURBID
2	7.10	16.08	918	-87.5	1.25	TURBID
3	7.12	15.89	938	-83.6	1.22	TURBID

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: TURBID, BROWN, NO ODOR

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: Shamrock #63
Project #: BE14.0012.00
Project Manager: John Casey

Sampler: J. Fisher
Sample Date: 1/25/18
Sample Time: 1055

Well #: MW-2
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 81.98 (feet btoc)
Total Depth of Well: 88.61 (feet)

Height of Water Column: 6.63 (feet)
Casing Volume: 1.06 (gal)
Purge Volume: 3.18 (gal)
Purge Method: Disposable Poly Bailer

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.05	15.59	726	-85.2	0.75	CLEAR
1	7.07	15.54	730	-98.0	0.57	TURBID
2	7.08	15.44	732	-99.7	0.50	TURBID
3	7.09	15.42	733	-94.9	0.48	TURBID

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: Turbid, Dk Brown, HC Odor

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SHAMROCK #63
Project #: BE14.0012.00
Project Manager: JOHN CASEY

Sampler: J. FISHER
Sample Date: 1/25/18
Sample Time: 1145

Well #: MW-14
Well Diameter: 2 (inches)
Depth to NAPL: _____ (feet btoc)
Depth to Water: 84.01 (feet btoc)
Total Depth of Well: 92.80 (feet)

Height of Water Column: 8.79 (feet)
Casing Volume: 1.41 (gal)
Purge Volume: 4.22 (gal)
Purge Method: DISPOSABLE POLY BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.05	16.02	840	-39.4	0.61	CLEAR
1	7.04	16.88	837	-26.6	0.47	TURBID
2	7.04	15.97	831	-25.6	0.50	TURBID
3	7.05	16.29	819	-26.9	0.64	TURBID

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: TURBID, BROWN, HC ODOR

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: Simmrock #63
Project #: BG14.002.00
Project Manager: John Cisco

Sampler: ~~HJS~~ J. Fisher
Sample Date: 1/25/18
Sample Time: 1240

Well #: MW-1
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 81.18 (feet btoc)
Total Depth of Well: 91.52 (feet)

Height of Water Column: 10.34 (feet)
Casing Volume: 1.65 (gal)
Purge Volume: 4.96 (gal)
Purge Method: Disposable Bailer

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	6.94	16.92	1437	-59.7	0.61	Clear
1	~~7.00~~	16.13	1373	-75.1	0.57	Turbid
2	7.02	15.81	1330	-77.6	0.53	Turbid
3	~~6.99~~	16.59	1338	-77.4	0.52	Turbid

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: Turbid, Pale Brown, HC Odor

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: Shamrock #63
Project #: BE14.0012.00
Project Manager: John Casey

Sampler: J. Fisher
Sample Date: 1/25/18
Sample Time: 1420

Well #: MW-5
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 81.05 (feet btoc)
Total Depth of Well: 87.49 (feet)

Height of Water Column: 6.45 (feet)
Casing Volume: 1.03 (gal)
Purge Volume: 3.10 (gal)
Purge Method: Disposable Poly Bailer

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.46	16.35	617	-99.5	3.07	Clear
1	7.46	16.16	622	-116.3	2.81	Turbid
2	7.51	16.09	619	-135.5	1.61	Turbid
3	7.51	15.71	620	-132.1	1.67	Turbid

Sample Description: 3-VOA (H_2Cl_2)

Physical Observations: Turbid, Dk Brown, HC Odor, SL Non Sheen

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SHAMROCK #63
Project #: BE14.0012.00
Project Manager: JOHN CASEY

Sampler: J. FISHER
Sample Date: 1/25/18
Sample Time: 1500

Well #: MW-7
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 82.38 (feet btoc)
Total Depth of Well: 88.90 (feet)

Height of Water Column: 6.52 (feet)
Casing Volume: 1.04 (gal)
Purge Volume: 3.13 (gal)
Purge Method: DISPOSABLE POLY BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	6.97	15.91	491	-95.6	1.88	CLEAR
1		NAPL SHEEN				
2						
3						

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations:

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SHAMROCK #63
Project #: BE14.0012.00
Project Manager: JOHN CASEY

Sampler: J. FISHER
Sample Date: 1/25/18
Sample Time: 1605

Well #: MW-11
Well Diameter: 2 (inches)
Depth to NAPL: — (feet btoc)
Depth to Water: 77.79 (feet btoc)
Total Depth of Well: 94.16 (feet)

Height of Water Column: 16.37 (feet)
Casing Volume: 2.62 (gal)
Purge Volume: 7.86 (gal)
Purge Method: DISPOSABLE POWER BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	6.99	16.02	1394	-107.8	3.44	CLEAR
1	6.95	16.07	1586	-119.1	3.57	V. TURBID
2	6.96	16.05	1621	-120.9	3.33	V. TURBID
3		SL. NAPL SHEEN				

Sample Description: 3-VOA (HCl)

Physical Observations: V. TURBID, DK GRAY, SL NAPL SHEEN, STRONG ODOR

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

GROUNDWATER MONITORING DATA SHEET

Project Name: SHAMROCK #63
Project #: B614.0012.00
Project Manager: JOHN CASEY

Sampler: J FISHER
Sample Date: 1/25/18
Sample Time: 1710

Well #: MW-17
Well Diameter: 2 (inches)
Depth to NAPL: - (feet btoc)
Depth to Water: 78.39 (feet btoc)
Total Depth of Well: 90.12 (feet)

Height of Water Column: 11.73 (feet)
Casing Volume: 1.88 (gal)
Purge Volume: 5.63 (gal)
Purge Method: DISPOSABLE POLY BAILER

Note:
One casing volume (SCH 40 PVC): 2.0" ID casing = 0.16 gal/ft; 4.0" = 0.65 gal/ft; 6.0" = 1.47 gal/ft

Groundwater Parameters:

Casing Volume	pH	Temp (°F)	Conductivity (µS/cm)	ORP (mv)	D.O. (mg/L)	Turbidity ~~(NTU)~~
Initial	7.22	15.84	544	-135.5	2.77	CLEAR
1	7.43	15.70	557	-134.4	1.97	CLEAR
2		NMPL	SHEEN			
3		DRY @ ~ 3.7 GALLONS				

Sample Description: 3-VOA ($HgCl_2$)

Physical Observations: TURBID, DK GRAY, SL NMPL SHEEN, STRONG ODOR

Analytical Method(s): 8260B

Daniel B. Stephens & Associates, Inc.

NAPL RECOVERY DATA SHEET

Project Name: SHAMROCK #63
Project #: BE14.0012.00
Project Manager: JOHN CISLY
Well #: MW-6
Initial Depth to NAPL: 81.30 (feet btoc)
Initial Depth to Water: 82.35 (feet btoc)
Initial NAPL Thickness: 1.05 (feet)

Sampler: J. FISHER
Date: 1/26/18
Time: 1105
Well Diameter: 2 (inches)
Bailer Diameter: 1.5 (inches)
Start Time: 1110
End Time: 1210

Note:
Bailer volume (SCH 40 PVC): 1.5" ID bailer = 0.09 gal/ft; 3.0" = 0.37 gal/ft

Bailer #	NAPL Thickness in Bailer (feet)	Water Thickness in Bailer (feet)	Remarks / Time
1	0.68	0.22	1110
2	0.59	1.71	
3	0.88	0.38	
4	0.68	0.97	
5	0.37	1.25	
6	0.60	0.57	
7	0.38	0.75	
8	0.41	0.75	
9	0.36	0.78	
10	0.28	0.79	
11	0.45	0.26	
12	0.43	0.18	
13	0.41	0.17	
14	0.34	0.21	
15	0.31	0.22	

Bailer #	NAPL Thickness in Bailer (feet)	Water Thickness in Bailer (feet)	Remarks / Time
16	0.35	0.21	
17	0.37	0.35	
18	0.26	0.41	
19	0.31	0.38	
20	0.23	0.43	
21	0.35	0.24	
22	0.27	0.18	
23	0.30	0.16	
24	0.28	0.17	
25	0.24	0.23	
26	0.24	0.21	
27	0.24	0.18	
28	0.25	0.20	
29	0.23	0.21	
30	0.22	0.21	

CONTINUED ON BACK

Totals:

NAPL Thickness: ~~1.21~~ 13.49 (feet)
Volume of NAPL: 1.21 (gal)
Final Depth to Water: 81.74 (feet btoc)

Water Thickness: ~~1.48~~ 16.44 (feet)
Volume of Water: 1.48 (gal)
Final Depth to NAPL: 81.49 (feet btoc)

	NAPL	H2O	
31	0.18	0.26	
32	0.20	0.28	
33	0.20	0.27	
34	0.19	0.23	
35	0.22	0.23	
36	0.18	0.28	
37	0.20	0.18	
38	0.18	0.27	
39	0.17	0.30	
40	0.15	0.30	
41	0.13	0.18	
42	0.16	0.28	
43	0.02	0.40	1210

Daniel B. Stephens & Associates, Inc.

NAPL RECOVERY DATA SHEET

Project Name: SIMMONS #63
Project #: BE14.0012n.00
Project Manager: JOHN GISLER
Well #: MW-9
Initial Depth to NAPL: 79.10 (feet btoc)
Initial Depth to Water: 80.03 (feet btoc)
Initial NAPL Thickness: 0.93 (feet)

Sampler: J. FISHER
Date: 1/26/18
Time: 1225
Well Diameter: 2 (inches)
Bailer Diameter: 1.5 (inches)
Start Time: 1230
End Time: 1330

Note:
Bailer volume (SCH 40 PVC): 1.5" ID bailer = 0.09 gal/ft; 3.0" = 0.37 gal/ft

Bailer #	NAPL Thickness in Bailer (feet)	Water Thickness in Bailer (feet)	Remarks / Time
1	0.42	1.59	1230
2	0.57	0.31	
3	0.66	0.18	
4	0.60	0.28	
5	0.36	0.43	
6	0.46	0.36	
7	0.51	0.35	
8	0.48	0.14	
9	0.43	0.41	
10	0.43	0.25	
11	0.38	0.29	
12	0.38	0.28	
13	0.30	0.36	
14	0.34	0.35	
15	0.33	0.34	

Bailer #	NAPL Thickness in Bailer (feet)	Water Thickness in Bailer (feet)	Remarks / Time
16	0.29	0.37	
17	0.28	0.38	
18	0.21	0.43	
19	0.23	0.42	
20	0.27	0.40	
21	0.19	0.39	
22	0.15	0.35	
23	0.17	0.43	
24	0.20	0.42	
25	0.14	0.42	
26	0.22	0.31	
27	0.20	0.37	
28	0.21	0.40	
29	0.12	0.44	
30	0.19	0.38	

CONTINUED ON BACK

Totals:

NAPL Thickness: 11.62 (feet)
Volume of NAPL: 1.05 (gal)
Final Depth to Water: 79.43 (feet btoc)

Water Thickness: 15.23 (feet)
Volume of Water: 1.37 (gal)
Final Depth to NAPL: 79.23 (feet btoc)

	NAPL	H2O	
31	0.18	0.42	
32	0.18	0.43	
33	0.02	0.24	
34	0.15	0.18	
35	0.16	0.18	
36	0.15	0.18	
37	0.17	0.04	
38	0.13	0.23	
39	0.18	0.19	
40	0.14	0.10	
41	0.11	0.20	
42	0.15	0.14	
43	0.13	0.21	
44	0.05	0.26	1330

Daniel B. Stephens & Associates, Inc.

NAPL RECOVERY DATA SHEET

Project Name: SHAMROCK #63
Project #: BE17.0012.00
Project Manager: JOHN CRAIG
Well #: MW-10
Initial Depth to NAPL: 77.85 (feet btoc)
Initial Depth to Water: 79.23 (feet btoc)
Initial NAPL Thickness: 1.38 (feet)

Sampler: J. FISHER
Date: 1/26/18
Time: 1340
Well Diameter: 2 (inches)
Bailer Diameter: 1½ (inches)
Start Time: 1345
End Time: 1445

Note:
Bailer volume (SCH 40 PVC): 1.5" ID bailer = 0.09 gal/ft; 3.0" = 0.37 gal/ft

Bailer #	NAPL Thickness in Bailer (feet)	Water Thickness in Bailer (feet)	Remarks / Time
1	1.12	1.02	1345
2	1.10	0.35	
3	1.04	0.41	
4	0.92	0.27	
5	0.42	0.46	
6	0.74	0.38	
7	0.63	0.40	
8	0.59	0.31	
9	0.59	0.33	
10	0.49	0.37	
11	0.44	0.40	
12	0.39	0.42	
13	0.35	0.45	
14	0.30	0.24	
15	0.18	0.23	

Bailer #	NAPL Thickness in Bailer (feet)	Water Thickness in Bailer (feet)	Remarks / Time
16	0.26	0.33	
17	0.25	0.36	
18	0.13	0.33	
19	0.16	0.30	
20	0.19	0.16	
21	0.20	0.16	
22	0.15	0.21	
23	0.16	0.24	
24	0.14	0.21	
25	0.12	0.23	
26	0.13	0.27	
27	0.11	0.26	
28	0.09	0.30	
29	0.09	0.27	
30	0.07	0.25	

CONTINUED ON BACK

Totals:

NAPL Thickness: 12.15 (feet)
Volume of NAPL: 1.09 (gal)
Final Depth to Water: 78.23 (feet btoc)

Water Thickness: 12.75 (feet)
Volume of Water: 1.15 (gal)
Final Depth to NAPL: 78.19 (feet btoc)

31	0.07	0.28	
32	0.08	0.26	
33	0.06	0.23	
34	0.05	0.28	
35	0.07	0.25	
36	0.07	0.29	
37	0.06	0.33	
38	0.04	0.28	
39	0.06	0.30	
40	0.04	0.33	1445

Appendix C

Laboratory Report

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

February 02, 2018

John Casey

Daniel B. Stephens & Assoc.
6020 Academy NE Suite 100
Albuquerque, NM 87109
TEL: (505) 822-9400
FAX (505) 822-8877

RE: Shamrock 63 OrderNo.: 1801C80

Dear John Casey:

Hall Environmental Analysis Laboratory received 17 sample(s) on 1/26/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-19
Project: Shamrock 63 **Collection Date:** 1/23/2018 3:15:00 PM
Lab ID: 1801C80-001 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Toluene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Naphthalene	ND	2.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Acetone	ND	10		µg/L	1	1/30/2018 5:05:01 PM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Bromoform	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Bromomethane	ND	3.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
2-Butanone	ND	10		µg/L	1	1/30/2018 5:05:01 PM	W48792
Carbon disulfide	ND	10		µg/L	1	1/30/2018 5:05:01 PM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Chloroethane	ND	2.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Chloroform	2.9	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Chloromethane	ND	3.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/30/2018 5:05:01 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-19
Project: Shamrock 63 **Collection Date:** 1/23/2018 3:15:00 PM
Lab ID: 1801C80-001 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
2-Hexanone	ND	10		µg/L	1	1/30/2018 5:05:01 PM	W48792
Isopropylbenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/30/2018 5:05:01 PM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
n-Propylbenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Styrene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/30/2018 5:05:01 PM	W48792
Xylenes, Total	ND	1.5		µg/L	1	1/30/2018 5:05:01 PM	W48792
Surr: 1,2-Dichloroethane-d4	106	70-130		%Rec	1	1/30/2018 5:05:01 PM	W48792
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	1/30/2018 5:05:01 PM	W48792
Surr: Dibromofluoromethane	103	70-130		%Rec	1	1/30/2018 5:05:01 PM	W48792
Surr: Toluene-d8	93.8	70-130		%Rec	1	1/30/2018 5:05:01 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-12
Project: Shamrock 63 **Collection Date:** 1/24/2018 10:15:00 AM
Lab ID: 1801C80-002 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Toluene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2-Dichloroethane (EDC)	1.0	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Naphthalene	ND	2.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Acetone	ND	10		µg/L	1	1/30/2018 6:32:23 PM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Bromoform	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Bromomethane	ND	3.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
2-Butanone	ND	10		µg/L	1	1/30/2018 6:32:23 PM	W48792
Carbon disulfide	ND	10		µg/L	1	1/30/2018 6:32:23 PM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Chloroethane	ND	2.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Chloroform	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Chloromethane	ND	3.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/30/2018 6:32:23 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-12
Project: Shamrock 63 **Collection Date:** 1/24/2018 10:15:00 AM
Lab ID: 1801C80-002 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
2-Hexanone	ND	10		µg/L	1	1/30/2018 6:32:23 PM	W48792
Isopropylbenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/30/2018 6:32:23 PM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
n-Propylbenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Styrene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/30/2018 6:32:23 PM	W48792
Xylenes, Total	ND	1.5		µg/L	1	1/30/2018 6:32:23 PM	W48792
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	1	1/30/2018 6:32:23 PM	W48792
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	1/30/2018 6:32:23 PM	W48792
Surr: Dibromofluoromethane	101	70-130		%Rec	1	1/30/2018 6:32:23 PM	W48792
Surr: Toluene-d8	98.4	70-130		%Rec	1	1/30/2018 6:32:23 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-4
Project: Shamrock 63 **Collection Date:** 1/24/2018 11:00:00 AM
Lab ID: 1801C80-003 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Toluene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Naphthalene	ND	2.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Acetone	ND	10		µg/L	1	1/30/2018 7:01:49 PM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Bromoform	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Bromomethane	ND	3.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
2-Butanone	ND	10		µg/L	1	1/30/2018 7:01:49 PM	W48792
Carbon disulfide	ND	10		µg/L	1	1/30/2018 7:01:49 PM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Chloroethane	ND	2.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Chloroform	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Chloromethane	ND	3.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/30/2018 7:01:49 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-4
Project: Shamrock 63 **Collection Date:** 1/24/2018 11:00:00 AM
Lab ID: 1801C80-003 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
2-Hexanone	ND	10		µg/L	1	1/30/2018 7:01:49 PM	W48792
Isopropylbenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/30/2018 7:01:49 PM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
n-Propylbenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Styrene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/30/2018 7:01:49 PM	W48792
Xylenes, Total	ND	1.5		µg/L	1	1/30/2018 7:01:49 PM	W48792
Surr: 1,2-Dichloroethane-d4	106	70-130		%Rec	1	1/30/2018 7:01:49 PM	W48792
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	1/30/2018 7:01:49 PM	W48792
Surr: Dibromofluoromethane	102	70-130		%Rec	1	1/30/2018 7:01:49 PM	W48792
Surr: Toluene-d8	96.8	70-130		%Rec	1	1/30/2018 7:01:49 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-13
Project: Shamrock 63 **Collection Date:** 1/24/2018 11:55:00 AM
Lab ID: 1801C80-004 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Toluene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Methyl tert-butyl ether (MTBE)	2.5	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Naphthalene	ND	2.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Acetone	ND	10		µg/L	1	1/30/2018 7:31:16 PM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Bromoform	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Bromomethane	ND	3.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
2-Butanone	ND	10		µg/L	1	1/30/2018 7:31:16 PM	W48792
Carbon disulfide	ND	10		µg/L	1	1/30/2018 7:31:16 PM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Chloroethane	ND	2.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Chloroform	1.5	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Chloromethane	ND	3.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/30/2018 7:31:16 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-13
Project: Shamrock 63 **Collection Date:** 1/24/2018 11:55:00 AM
Lab ID: 1801C80-004 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
2-Hexanone	ND	10		µg/L	1	1/30/2018 7:31:16 PM	W48792
Isopropylbenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/30/2018 7:31:16 PM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
n-Propylbenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Styrene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/30/2018 7:31:16 PM	W48792
Xylenes, Total	ND	1.5		µg/L	1	1/30/2018 7:31:16 PM	W48792
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	1	1/30/2018 7:31:16 PM	W48792
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	1/30/2018 7:31:16 PM	W48792
Surr: Dibromofluoromethane	99.5	70-130		%Rec	1	1/30/2018 7:31:16 PM	W48792
Surr: Toluene-d8	98.6	70-130		%Rec	1	1/30/2018 7:31:16 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-8
Project: Shamrock 63 **Collection Date:** 1/24/2018 1:30:00 PM
Lab ID: 1801C80-005 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	19	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Toluene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Methyl tert-butyl ether (MTBE)	17	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2-Dichloroethane (EDC)	4.3	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Naphthalene	ND	2.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Acetone	ND	10		µg/L	1	1/30/2018 8:00:43 PM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Bromoform	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Bromomethane	ND	3.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
2-Butanone	ND	10		µg/L	1	1/30/2018 8:00:43 PM	W48792
Carbon disulfide	ND	10		µg/L	1	1/30/2018 8:00:43 PM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Chloroethane	ND	2.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Chloroform	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Chloromethane	ND	3.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/30/2018 8:00:43 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-8
Project: Shamrock 63 **Collection Date:** 1/24/2018 1:30:00 PM
Lab ID: 1801C80-005 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
2-Hexanone	ND	10		µg/L	1	1/30/2018 8:00:43 PM	W48792
Isopropylbenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/30/2018 8:00:43 PM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
n-Propylbenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Styrene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/30/2018 8:00:43 PM	W48792
Xylenes, Total	1.5	1.5		µg/L	1	1/30/2018 8:00:43 PM	W48792
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	1	1/30/2018 8:00:43 PM	W48792
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	1	1/30/2018 8:00:43 PM	W48792
Surr: Dibromofluoromethane	103	70-130		%Rec	1	1/30/2018 8:00:43 PM	W48792
Surr: Toluene-d8	101	70-130		%Rec	1	1/30/2018 8:00:43 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-16
Project: Shamrock 63 **Collection Date:** 1/24/2018 2:45:00 PM
Lab ID: 1801C80-006 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	88	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Toluene	1.2	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2-Dichloroethane (EDC)	10	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Naphthalene	ND	2.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Acetone	ND	10		µg/L	1	1/30/2018 8:30:04 PM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Bromoform	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Bromomethane	ND	3.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
2-Butanone	ND	10		µg/L	1	1/30/2018 8:30:04 PM	W48792
Carbon disulfide	ND	10		µg/L	1	1/30/2018 8:30:04 PM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Chloroethane	ND	2.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Chloroform	3.8	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Chloromethane	ND	3.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/30/2018 8:30:04 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-16
Project: Shamrock 63 **Collection Date:** 1/24/2018 2:45:00 PM
Lab ID: 1801C80-006 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
2-Hexanone	ND	10		µg/L	1	1/30/2018 8:30:04 PM	W48792
Isopropylbenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/30/2018 8:30:04 PM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
n-Propylbenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Styrene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/30/2018 8:30:04 PM	W48792
Xylenes, Total	8.9	1.5		µg/L	1	1/30/2018 8:30:04 PM	W48792
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	1	1/30/2018 8:30:04 PM	W48792
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	1	1/30/2018 8:30:04 PM	W48792
Surr: Dibromofluoromethane	98.3	70-130		%Rec	1	1/30/2018 8:30:04 PM	W48792
Surr: Toluene-d8	104	70-130		%Rec	1	1/30/2018 8:30:04 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-15
Project: Shamrock 63 **Collection Date:** 1/24/2018 3:40:00 PM
Lab ID: 1801C80-007 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	21	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Toluene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Methyl tert-butyl ether (MTBE)	2.0	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Naphthalene	ND	2.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Acetone	ND	10		µg/L	1	1/30/2018 8:58:58 PM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Bromoform	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Bromomethane	ND	3.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
2-Butanone	ND	10		µg/L	1	1/30/2018 8:58:58 PM	W48792
Carbon disulfide	ND	10		µg/L	1	1/30/2018 8:58:58 PM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Chloroethane	ND	2.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Chloroform	1.1	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Chloromethane	ND	3.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/30/2018 8:58:58 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-15
Project: Shamrock 63 **Collection Date:** 1/24/2018 3:40:00 PM
Lab ID: 1801C80-007 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
2-Hexanone	ND	10		µg/L	1	1/30/2018 8:58:58 PM	W48792
Isopropylbenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/30/2018 8:58:58 PM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
n-Propylbenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Styrene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/30/2018 8:58:58 PM	W48792
Xylenes, Total	ND	1.5		µg/L	1	1/30/2018 8:58:58 PM	W48792
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	1	1/30/2018 8:58:58 PM	W48792
Surr: 4-Bromofluorobenzene	106	70-130		%Rec	1	1/30/2018 8:58:58 PM	W48792
Surr: Dibromofluoromethane	103	70-130		%Rec	1	1/30/2018 8:58:58 PM	W48792
Surr: Toluene-d8	102	70-130		%Rec	1	1/30/2018 8:58:58 PM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-18
Project: Shamrock 63 **Collection Date:** 1/24/2018 4:30:00 PM
Lab ID: 1801C80-008 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	51	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Toluene	1.6	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2,4-Trimethylbenzene	2.4	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,3,5-Trimethylbenzene	1.8	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2-Dichloroethane (EDC)	53	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Naphthalene	ND	2.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Acetone	ND	10		µg/L	1	1/31/2018 12:23:43 AM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Bromoform	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Bromomethane	ND	3.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
2-Butanone	ND	10		µg/L	1	1/31/2018 12:23:43 AM	W48792
Carbon disulfide	ND	10		µg/L	1	1/31/2018 12:23:43 AM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Chloroethane	ND	2.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Chloroform	1.7	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Chloromethane	ND	3.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2-Dichloropropane	4.5	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/31/2018 12:23:43 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-18
Project: Shamrock 63 **Collection Date:** 1/24/2018 4:30:00 PM
Lab ID: 1801C80-008 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
2-Hexanone	ND	10		µg/L	1	1/31/2018 12:23:43 AM	W48792
Isopropylbenzene	2.0	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/31/2018 12:23:43 AM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
n-Propylbenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Styrene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/31/2018 12:23:43 AM	W48792
Xylenes, Total	7.3	1.5		µg/L	1	1/31/2018 12:23:43 AM	W48792
Surr: 1,2-Dichloroethane-d4	99.5	70-130		%Rec	1	1/31/2018 12:23:43 AM	W48792
Surr: 4-Bromofluorobenzene	106	70-130		%Rec	1	1/31/2018 12:23:43 AM	W48792
Surr: Dibromofluoromethane	96.9	70-130		%Rec	1	1/31/2018 12:23:43 AM	W48792
Surr: Toluene-d8	98.2	70-130		%Rec	1	1/31/2018 12:23:43 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-3
Project: Shamrock 63 **Collection Date:** 1/25/2018 10:10:00 AM
Lab ID: 1801C80-009 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	33	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Toluene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Ethylbenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Methyl tert-butyl ether (MTBE)	600	10		µg/L	10	1/31/2018 12:52:58 AM	W48792
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,2-Dichloroethane (EDC)	30	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Naphthalene	ND	2.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1-Methylnaphthalene	ND	4.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
2-Methylnaphthalene	ND	4.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Acetone	ND	10		µg/L	1	1/31/2018 1:21:44 AM	W48792
Bromobenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Bromodichloromethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Bromoform	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Bromomethane	ND	3.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
2-Butanone	ND	10		µg/L	1	1/31/2018 1:21:44 AM	W48792
Carbon disulfide	ND	10		µg/L	1	1/31/2018 1:21:44 AM	W48792
Carbon Tetrachloride	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Chlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Chloroethane	ND	2.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Chloroform	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Chloromethane	ND	3.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
2-Chlorotoluene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
4-Chlorotoluene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
cis-1,2-DCE	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Dibromochloromethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Dibromomethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,1-Dichloroethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,1-Dichloroethene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,2-Dichloropropane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,3-Dichloropropane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
2,2-Dichloropropane	ND	2.0		µg/L	1	1/31/2018 1:21:44 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-3
Project: Shamrock 63 **Collection Date:** 1/25/2018 10:10:00 AM
Lab ID: 1801C80-009 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Hexachlorobutadiene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
2-Hexanone	ND	10		µg/L	1	1/31/2018 1:21:44 AM	W48792
Isopropylbenzene	5.7	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
4-Isopropyltoluene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
4-Methyl-2-pentanone	ND	10		µg/L	1	1/31/2018 1:21:44 AM	W48792
Methylene Chloride	ND	3.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
n-Butylbenzene	ND	3.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
n-Propylbenzene	1.4	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
sec-Butylbenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Styrene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
tert-Butylbenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
trans-1,2-DCE	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Trichlorofluoromethane	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Vinyl chloride	ND	1.0		µg/L	1	1/31/2018 1:21:44 AM	W48792
Xylenes, Total	4.3	1.5		µg/L	1	1/31/2018 1:21:44 AM	W48792
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	1	1/31/2018 1:21:44 AM	W48792
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	1/31/2018 1:21:44 AM	W48792
Surr: Dibromofluoromethane	98.2	70-130		%Rec	1	1/31/2018 1:21:44 AM	W48792
Surr: Toluene-d8	103	70-130		%Rec	1	1/31/2018 1:21:44 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-2
Project: Shamrock 63 **Collection Date:** 1/25/2018 10:55:00 AM
Lab ID: 1801C80-010 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	690	50		µg/L	50	1/31/2018 1:50:57 AM	W48792
Toluene	15	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Ethylbenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Methyl tert-butyl ether (MTBE)	1700	50		µg/L	50	1/31/2018 1:50:57 AM	W48792
1,2,4-Trimethylbenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,3,5-Trimethylbenzene	8.9	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,2-Dichloroethane (EDC)	48	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Naphthalene	ND	10		µg/L	5	1/31/2018 2:20:10 AM	W48792
1-Methylnaphthalene	ND	20		µg/L	5	1/31/2018 2:20:10 AM	W48792
2-Methylnaphthalene	ND	20		µg/L	5	1/31/2018 2:20:10 AM	W48792
Acetone	ND	50		µg/L	5	1/31/2018 2:20:10 AM	W48792
Bromobenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Bromodichloromethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Bromoform	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Bromomethane	ND	15		µg/L	5	1/31/2018 2:20:10 AM	W48792
2-Butanone	ND	50		µg/L	5	1/31/2018 2:20:10 AM	W48792
Carbon disulfide	ND	50		µg/L	5	1/31/2018 2:20:10 AM	W48792
Carbon Tetrachloride	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Chlorobenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Chloroethane	ND	10		µg/L	5	1/31/2018 2:20:10 AM	W48792
Chloroform	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Chloromethane	ND	15		µg/L	5	1/31/2018 2:20:10 AM	W48792
2-Chlorotoluene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
4-Chlorotoluene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
cis-1,2-DCE	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
cis-1,3-Dichloropropene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,2-Dibromo-3-chloropropane	ND	10		µg/L	5	1/31/2018 2:20:10 AM	W48792
Dibromochloromethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Dibromomethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,2-Dichlorobenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,3-Dichlorobenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,4-Dichlorobenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Dichlorodifluoromethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,1-Dichloroethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,1-Dichloroethene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,2-Dichloropropane	5.1	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,3-Dichloropropane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
2,2-Dichloropropane	ND	10		µg/L	5	1/31/2018 2:20:10 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-2
Project: Shamrock 63 **Collection Date:** 1/25/2018 10:55:00 AM
Lab ID: 1801C80-010 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Hexachlorobutadiene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
2-Hexanone	ND	50		µg/L	5	1/31/2018 2:20:10 AM	W48792
Isopropylbenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
4-Isopropyltoluene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
4-Methyl-2-pentanone	ND	50		µg/L	5	1/31/2018 2:20:10 AM	W48792
Methylene Chloride	ND	15		µg/L	5	1/31/2018 2:20:10 AM	W48792
n-Butylbenzene	ND	15		µg/L	5	1/31/2018 2:20:10 AM	W48792
n-Propylbenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
sec-Butylbenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Styrene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
tert-Butylbenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,1,1,2-Tetrachloroethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,1,2,2-Tetrachloroethane	ND	10		µg/L	5	1/31/2018 2:20:10 AM	W48792
Tetrachloroethene (PCE)	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
trans-1,2-DCE	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
trans-1,3-Dichloropropene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,2,3-Trichlorobenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,2,4-Trichlorobenzene	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,1,1-Trichloroethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,1,2-Trichloroethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Trichloroethene (TCE)	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Trichlorofluoromethane	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
1,2,3-Trichloropropane	ND	10		µg/L	5	1/31/2018 2:20:10 AM	W48792
Vinyl chloride	ND	5.0		µg/L	5	1/31/2018 2:20:10 AM	W48792
Xylenes, Total	17	7.5		µg/L	5	1/31/2018 2:20:10 AM	W48792
Surr: 1,2-Dichloroethane-d4	102	70-130		%Rec	5	1/31/2018 2:20:10 AM	W48792
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	5	1/31/2018 2:20:10 AM	W48792
Surr: Dibromofluoromethane	98.5	70-130		%Rec	5	1/31/2018 2:20:10 AM	W48792
Surr: Toluene-d8	99.5	70-130		%Rec	5	1/31/2018 2:20:10 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-14
Project: Shamrock 63 **Collection Date:** 1/25/2018 11:45:00 AM
Lab ID: 1801C80-011 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	510	20		µg/L	20	1/31/2018 2:49:01 AM	W48792
Toluene	17	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Ethylbenzene	3.9	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Methyl tert-butyl ether (MTBE)	44	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2,4-Trimethylbenzene	41	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,3,5-Trimethylbenzene	23	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2-Dichloroethane (EDC)	37	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2-Dibromoethane (EDB)	9.5	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Naphthalene	25	4.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1-Methylnaphthalene	ND	8.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
2-Methylnaphthalene	12	8.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Acetone	ND	20		µg/L	2	1/31/2018 3:18:16 AM	W48792
Bromobenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Bromodichloromethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Bromoform	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Bromomethane	ND	6.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
2-Butanone	ND	20		µg/L	2	1/31/2018 3:18:16 AM	W48792
Carbon disulfide	ND	20		µg/L	2	1/31/2018 3:18:16 AM	W48792
Carbon Tetrachloride	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Chlorobenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Chloroethane	ND	4.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Chloroform	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Chloromethane	ND	6.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
2-Chlorotoluene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
4-Chlorotoluene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
cis-1,2-DCE	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
cis-1,3-Dichloropropene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2-Dibromo-3-chloropropane	ND	4.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Dibromochloromethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Dibromomethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2-Dichlorobenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,3-Dichlorobenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,4-Dichlorobenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Dichlorodifluoromethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,1-Dichloroethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,1-Dichloroethene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2-Dichloropropane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,3-Dichloropropane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
2,2-Dichloropropane	ND	4.0		µg/L	2	1/31/2018 3:18:16 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-14
Project: Shamrock 63 **Collection Date:** 1/25/2018 11:45:00 AM
Lab ID: 1801C80-011 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Hexachlorobutadiene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
2-Hexanone	ND	20		µg/L	2	1/31/2018 3:18:16 AM	W48792
Isopropylbenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
4-Isopropyltoluene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
4-Methyl-2-pentanone	ND	20		µg/L	2	1/31/2018 3:18:16 AM	W48792
Methylene Chloride	ND	6.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
n-Butylbenzene	ND	6.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
n-Propylbenzene	3.0	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
sec-Butylbenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Styrene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
tert-Butylbenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,1,1,2-Tetrachloroethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,1,2,2-Tetrachloroethane	ND	4.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Tetrachloroethene (PCE)	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
trans-1,2-DCE	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
trans-1,3-Dichloropropene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2,3-Trichlorobenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2,4-Trichlorobenzene	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,1,1-Trichloroethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,1,2-Trichloroethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Trichloroethene (TCE)	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Trichlorofluoromethane	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
1,2,3-Trichloropropane	ND	4.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Vinyl chloride	ND	2.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Xylenes, Total	180	3.0		µg/L	2	1/31/2018 3:18:16 AM	W48792
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	2	1/31/2018 3:18:16 AM	W48792
Surr: 4-Bromofluorobenzene	106	70-130		%Rec	2	1/31/2018 3:18:16 AM	W48792
Surr: Dibromofluoromethane	101	70-130		%Rec	2	1/31/2018 3:18:16 AM	W48792
Surr: Toluene-d8	98.8	70-130		%Rec	2	1/31/2018 3:18:16 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-1
Project: Shamrock 63 **Collection Date:** 1/25/2018 12:40:00 PM
Lab ID: 1801C80-012 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	3300	100		µg/L	100	1/31/2018 3:47:28 AM	W48792
Toluene	350	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Ethylbenzene	130	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Methyl tert-butyl ether (MTBE)	1600	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2,4-Trimethylbenzene	490	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,3,5-Trimethylbenzene	170	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2-Dichloroethane (EDC)	250	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2-Dibromoethane (EDB)	47	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Naphthalene	230	20		µg/L	10	1/31/2018 4:16:36 AM	W48792
1-Methylnaphthalene	72	40		µg/L	10	1/31/2018 4:16:36 AM	W48792
2-Methylnaphthalene	130	40		µg/L	10	1/31/2018 4:16:36 AM	W48792
Acetone	300	100		µg/L	10	1/31/2018 4:16:36 AM	W48792
Bromobenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Bromodichloromethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Bromoform	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Bromomethane	ND	30		µg/L	10	1/31/2018 4:16:36 AM	W48792
2-Butanone	ND	100		µg/L	10	1/31/2018 4:16:36 AM	W48792
Carbon disulfide	ND	100		µg/L	10	1/31/2018 4:16:36 AM	W48792
Carbon Tetrachloride	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Chlorobenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Chloroethane	ND	20		µg/L	10	1/31/2018 4:16:36 AM	W48792
Chloroform	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Chloromethane	ND	30		µg/L	10	1/31/2018 4:16:36 AM	W48792
2-Chlorotoluene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
4-Chlorotoluene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
cis-1,2-DCE	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
cis-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2-Dibromo-3-chloropropane	ND	20		µg/L	10	1/31/2018 4:16:36 AM	W48792
Dibromochloromethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Dibromomethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,3-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,4-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Dichlorodifluoromethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,1-Dichloroethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,1-Dichloroethene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2-Dichloropropane	16	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,3-Dichloropropane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
2,2-Dichloropropane	ND	20		µg/L	10	1/31/2018 4:16:36 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-1
Project: Shamrock 63 **Collection Date:** 1/25/2018 12:40:00 PM
Lab ID: 1801C80-012 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Hexachlorobutadiene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
2-Hexanone	ND	100		µg/L	10	1/31/2018 4:16:36 AM	W48792
Isopropylbenzene	14	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
4-Isopropyltoluene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
4-Methyl-2-pentanone	110	100		µg/L	10	1/31/2018 4:16:36 AM	W48792
Methylene Chloride	ND	30		µg/L	10	1/31/2018 4:16:36 AM	W48792
n-Butylbenzene	ND	30		µg/L	10	1/31/2018 4:16:36 AM	W48792
n-Propylbenzene	35	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
sec-Butylbenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Styrene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
tert-Butylbenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,1,1,2-Tetrachloroethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,1,2,2-Tetrachloroethane	ND	20		µg/L	10	1/31/2018 4:16:36 AM	W48792
Tetrachloroethene (PCE)	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
trans-1,2-DCE	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
trans-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2,3-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2,4-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,1,1-Trichloroethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,1,2-Trichloroethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Trichloroethene (TCE)	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Trichlorofluoromethane	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
1,2,3-Trichloropropane	ND	20		µg/L	10	1/31/2018 4:16:36 AM	W48792
Vinyl chloride	ND	10		µg/L	10	1/31/2018 4:16:36 AM	W48792
Xylenes, Total	2400	15		µg/L	10	1/31/2018 4:16:36 AM	W48792
Surr: 1,2-Dichloroethane-d4	107	70-130		%Rec	10	1/31/2018 4:16:36 AM	W48792
Surr: 4-Bromofluorobenzene	103	70-130		%Rec	10	1/31/2018 4:16:36 AM	W48792
Surr: Dibromofluoromethane	100	70-130		%Rec	10	1/31/2018 4:16:36 AM	W48792
Surr: Toluene-d8	99.1	70-130		%Rec	10	1/31/2018 4:16:36 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-5
Project: Shamrock 63 **Collection Date:** 1/25/2018 2:20:00 PM
Lab ID: 1801C80-013 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	2200	100		µg/L	100	1/31/2018 4:45:37 AM	W48792
Toluene	3600	100		µg/L	100	1/31/2018 4:45:37 AM	W48792
Ethylbenzene	610	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2,4-Trimethylbenzene	1100	100		µg/L	100	1/31/2018 4:45:37 AM	W48792
1,3,5-Trimethylbenzene	330	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2-Dichloroethane (EDC)	800	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2-Dibromoethane (EDB)	220	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Naphthalene	470	20		µg/L	10	1/31/2018 5:14:35 AM	W48792
1-Methylnaphthalene	140	40		µg/L	10	1/31/2018 5:14:35 AM	W48792
2-Methylnaphthalene	280	40		µg/L	10	1/31/2018 5:14:35 AM	W48792
Acetone	ND	100		µg/L	10	1/31/2018 5:14:35 AM	W48792
Bromobenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Bromodichloromethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Bromoform	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Bromomethane	ND	30		µg/L	10	1/31/2018 5:14:35 AM	W48792
2-Butanone	ND	100		µg/L	10	1/31/2018 5:14:35 AM	W48792
Carbon disulfide	ND	100		µg/L	10	1/31/2018 5:14:35 AM	W48792
Carbon Tetrachloride	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Chlorobenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Chloroethane	ND	20		µg/L	10	1/31/2018 5:14:35 AM	W48792
Chloroform	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Chloromethane	ND	30		µg/L	10	1/31/2018 5:14:35 AM	W48792
2-Chlorotoluene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
4-Chlorotoluene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
cis-1,2-DCE	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
cis-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2-Dibromo-3-chloropropane	ND	20		µg/L	10	1/31/2018 5:14:35 AM	W48792
Dibromochloromethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Dibromomethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,3-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,4-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Dichlorodifluoromethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,1-Dichloroethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,1-Dichloroethene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2-Dichloropropane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,3-Dichloropropane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
2,2-Dichloropropane	ND	20		µg/L	10	1/31/2018 5:14:35 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-5
Project: Shamrock 63 **Collection Date:** 1/25/2018 2:20:00 PM
Lab ID: 1801C80-013 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Hexachlorobutadiene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
2-Hexanone	ND	100		µg/L	10	1/31/2018 5:14:35 AM	W48792
Isopropylbenzene	24	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
4-Isopropyltoluene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
4-Methyl-2-pentanone	ND	100		µg/L	10	1/31/2018 5:14:35 AM	W48792
Methylene Chloride	ND	30		µg/L	10	1/31/2018 5:14:35 AM	W48792
n-Butylbenzene	ND	30		µg/L	10	1/31/2018 5:14:35 AM	W48792
n-Propylbenzene	86	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
sec-Butylbenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Styrene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
tert-Butylbenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,1,1,2-Tetrachloroethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,1,2,2-Tetrachloroethane	ND	20		µg/L	10	1/31/2018 5:14:35 AM	W48792
Tetrachloroethene (PCE)	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
trans-1,2-DCE	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
trans-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2,3-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2,4-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,1,1-Trichloroethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,1,2-Trichloroethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Trichloroethene (TCE)	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Trichlorofluoromethane	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
1,2,3-Trichloropropane	ND	20		µg/L	10	1/31/2018 5:14:35 AM	W48792
Vinyl chloride	ND	10		µg/L	10	1/31/2018 5:14:35 AM	W48792
Xylenes, Total	3900	150		µg/L	100	1/31/2018 4:45:37 AM	W48792
Surr: 1,2-Dichloroethane-d4	109	70-130		%Rec	10	1/31/2018 5:14:35 AM	W48792
Surr: 4-Bromofluorobenzene	108	70-130		%Rec	10	1/31/2018 5:14:35 AM	W48792
Surr: Dibromofluoromethane	100	70-130		%Rec	10	1/31/2018 5:14:35 AM	W48792
Surr: Toluene-d8	102	70-130		%Rec	10	1/31/2018 5:14:35 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-7
Project: Shamrock 63 **Collection Date:** 1/25/2018 3:00:00 PM
Lab ID: 1801C80-014 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	2400	100		µg/L	100	1/31/2018 5:43:33 AM	W48792
Toluene	1600	100		µg/L	100	1/31/2018 5:43:33 AM	W48792
Ethylbenzene	400	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Methyl tert-butyl ether (MTBE)	110	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2,4-Trimethylbenzene	480	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,3,5-Trimethylbenzene	130	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2-Dichloroethane (EDC)	640	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2-Dibromoethane (EDB)	210	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Naphthalene	250	20		µg/L	10	1/31/2018 6:12:29 AM	W48792
1-Methylnaphthalene	160	40		µg/L	10	1/31/2018 6:12:29 AM	W48792
2-Methylnaphthalene	230	40		µg/L	10	1/31/2018 6:12:29 AM	W48792
Acetone	ND	100		µg/L	10	1/31/2018 6:12:29 AM	W48792
Bromobenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Bromodichloromethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Bromoform	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Bromomethane	ND	30		µg/L	10	1/31/2018 6:12:29 AM	W48792
2-Butanone	ND	100		µg/L	10	1/31/2018 6:12:29 AM	W48792
Carbon disulfide	ND	100		µg/L	10	1/31/2018 6:12:29 AM	W48792
Carbon Tetrachloride	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Chlorobenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Chloroethane	ND	20		µg/L	10	1/31/2018 6:12:29 AM	W48792
Chloroform	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Chloromethane	ND	30		µg/L	10	1/31/2018 6:12:29 AM	W48792
2-Chlorotoluene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
4-Chlorotoluene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
cis-1,2-DCE	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
cis-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2-Dibromo-3-chloropropane	ND	20		µg/L	10	1/31/2018 6:12:29 AM	W48792
Dibromochloromethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Dibromomethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,3-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,4-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Dichlorodifluoromethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,1-Dichloroethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,1-Dichloroethene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2-Dichloropropane	19	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,3-Dichloropropane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
2,2-Dichloropropane	ND	20		µg/L	10	1/31/2018 6:12:29 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-7
Project: Shamrock 63 **Collection Date:** 1/25/2018 3:00:00 PM
Lab ID: 1801C80-014 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Hexachlorobutadiene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
2-Hexanone	ND	100		µg/L	10	1/31/2018 6:12:29 AM	W48792
Isopropylbenzene	12	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
4-Isopropyltoluene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
4-Methyl-2-pentanone	ND	100		µg/L	10	1/31/2018 6:12:29 AM	W48792
Methylene Chloride	ND	30		µg/L	10	1/31/2018 6:12:29 AM	W48792
n-Butylbenzene	ND	30		µg/L	10	1/31/2018 6:12:29 AM	W48792
n-Propylbenzene	41	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
sec-Butylbenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Styrene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
tert-Butylbenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,1,1,2-Tetrachloroethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,1,2,2-Tetrachloroethane	ND	20		µg/L	10	1/31/2018 6:12:29 AM	W48792
Tetrachloroethene (PCE)	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
trans-1,2-DCE	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
trans-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2,3-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2,4-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,1,1-Trichloroethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,1,2-Trichloroethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Trichloroethene (TCE)	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Trichlorofluoromethane	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
1,2,3-Trichloropropane	ND	20		µg/L	10	1/31/2018 6:12:29 AM	W48792
Vinyl chloride	ND	10		µg/L	10	1/31/2018 6:12:29 AM	W48792
Xylenes, Total	2600	15		µg/L	10	1/31/2018 6:12:29 AM	W48792
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	10	1/31/2018 6:12:29 AM	W48792
Surr: 4-Bromofluorobenzene	106	70-130		%Rec	10	1/31/2018 6:12:29 AM	W48792
Surr: Dibromofluoromethane	99.4	70-130		%Rec	10	1/31/2018 6:12:29 AM	W48792
Surr: Toluene-d8	99.2	70-130		%Rec	10	1/31/2018 6:12:29 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-11
Project: Shamrock 63 **Collection Date:** 1/25/2018 4:05:00 PM
Lab ID: 1801C80-015 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	1500	100		µg/L	100	1/31/2018 6:41:17 AM	W48792
Toluene	98	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Ethylbenzene	29	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2,4-Trimethylbenzene	83	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,3,5-Trimethylbenzene	50	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2-Dichloroethane (EDC)	890	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2-Dibromoethane (EDB)	23	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Naphthalene	100	20		µg/L	10	1/31/2018 7:10:08 AM	W48792
1-Methylnaphthalene	47	40		µg/L	10	1/31/2018 7:10:08 AM	W48792
2-Methylnaphthalene	51	40		µg/L	10	1/31/2018 7:10:08 AM	W48792
Acetone	ND	100		µg/L	10	1/31/2018 7:10:08 AM	W48792
Bromobenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Bromodichloromethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Bromoform	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Bromomethane	ND	30		µg/L	10	1/31/2018 7:10:08 AM	W48792
2-Butanone	ND	100		µg/L	10	1/31/2018 7:10:08 AM	W48792
Carbon disulfide	ND	100		µg/L	10	1/31/2018 7:10:08 AM	W48792
Carbon Tetrachloride	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Chlorobenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Chloroethane	ND	20		µg/L	10	1/31/2018 7:10:08 AM	W48792
Chloroform	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Chloromethane	ND	30		µg/L	10	1/31/2018 7:10:08 AM	W48792
2-Chlorotoluene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
4-Chlorotoluene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
cis-1,2-DCE	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
cis-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2-Dibromo-3-chloropropane	ND	20		µg/L	10	1/31/2018 7:10:08 AM	W48792
Dibromochloromethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Dibromomethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,3-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,4-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Dichlorodifluoromethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,1-Dichloroethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,1-Dichloroethene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2-Dichloropropane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,3-Dichloropropane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
2,2-Dichloropropane	ND	20		µg/L	10	1/31/2018 7:10:08 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-11
Project: Shamrock 63 **Collection Date:** 1/25/2018 4:05:00 PM
Lab ID: 1801C80-015 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Hexachlorobutadiene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
2-Hexanone	ND	100		µg/L	10	1/31/2018 7:10:08 AM	W48792
Isopropylbenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
4-Isopropyltoluene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
4-Methyl-2-pentanone	ND	100		µg/L	10	1/31/2018 7:10:08 AM	W48792
Methylene Chloride	ND	30		µg/L	10	1/31/2018 7:10:08 AM	W48792
n-Butylbenzene	ND	30		µg/L	10	1/31/2018 7:10:08 AM	W48792
n-Propylbenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
sec-Butylbenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Styrene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
tert-Butylbenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,1,1,2-Tetrachloroethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,1,2,2-Tetrachloroethane	ND	20		µg/L	10	1/31/2018 7:10:08 AM	W48792
Tetrachloroethene (PCE)	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
trans-1,2-DCE	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
trans-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2,3-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2,4-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,1,1-Trichloroethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,1,2-Trichloroethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Trichloroethene (TCE)	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Trichlorofluoromethane	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
1,2,3-Trichloropropane	ND	20		µg/L	10	1/31/2018 7:10:08 AM	W48792
Vinyl chloride	ND	10		µg/L	10	1/31/2018 7:10:08 AM	W48792
Xylenes, Total	150	15		µg/L	10	1/31/2018 7:10:08 AM	W48792
Surr: 1,2-Dichloroethane-d4	96.1	70-130		%Rec	10	1/31/2018 7:10:08 AM	W48792
Surr: 4-Bromofluorobenzene	109	70-130		%Rec	10	1/31/2018 7:10:08 AM	W48792
Surr: Dibromofluoromethane	95.1	70-130		%Rec	10	1/31/2018 7:10:08 AM	W48792
Surr: Toluene-d8	100	70-130		%Rec	10	1/31/2018 7:10:08 AM	W48792

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-17
Project: Shamrock 63 **Collection Date:** 1/25/2018 5:10:00 PM
Lab ID: 1801C80-016 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	2300	100		µg/L	100	1/31/2018 1:45:47 PM	W48821
Toluene	4100	100		µg/L	100	1/31/2018 1:45:47 PM	W48821
Ethylbenzene	440	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2,4-Trimethylbenzene	580	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,3,5-Trimethylbenzene	170	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2-Dichloroethane (EDC)	660	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2-Dibromoethane (EDB)	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Naphthalene	290	20		µg/L	10	1/31/2018 2:15:19 PM	W48821
1-Methylnaphthalene	110	40		µg/L	10	1/31/2018 2:15:19 PM	W48821
2-Methylnaphthalene	180	40		µg/L	10	1/31/2018 2:15:19 PM	W48821
Acetone	ND	100		µg/L	10	1/31/2018 2:15:19 PM	W48821
Bromobenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Bromodichloromethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Bromoform	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Bromomethane	ND	30		µg/L	10	1/31/2018 2:15:19 PM	W48821
2-Butanone	ND	100		µg/L	10	1/31/2018 2:15:19 PM	W48821
Carbon disulfide	ND	100		µg/L	10	1/31/2018 2:15:19 PM	W48821
Carbon Tetrachloride	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Chlorobenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Chloroethane	ND	20		µg/L	10	1/31/2018 2:15:19 PM	W48821
Chloroform	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Chloromethane	ND	30		µg/L	10	1/31/2018 2:15:19 PM	W48821
2-Chlorotoluene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
4-Chlorotoluene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
cis-1,2-DCE	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
cis-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2-Dibromo-3-chloropropane	ND	20		µg/L	10	1/31/2018 2:15:19 PM	W48821
Dibromochloromethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Dibromomethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,3-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,4-Dichlorobenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Dichlorodifluoromethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,1-Dichloroethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,1-Dichloroethene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2-Dichloropropane	19	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,3-Dichloropropane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
2,2-Dichloropropane	ND	20		µg/L	10	1/31/2018 2:15:19 PM	W48821

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** MW-17
Project: Shamrock 63 **Collection Date:** 1/25/2018 5:10:00 PM
Lab ID: 1801C80-016 **Matrix:** AQUEOUS **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Hexachlorobutadiene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
2-Hexanone	ND	100		µg/L	10	1/31/2018 2:15:19 PM	W48821
Isopropylbenzene	12	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
4-Isopropyltoluene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
4-Methyl-2-pentanone	ND	100		µg/L	10	1/31/2018 2:15:19 PM	W48821
Methylene Chloride	ND	30		µg/L	10	1/31/2018 2:15:19 PM	W48821
n-Butylbenzene	ND	30		µg/L	10	1/31/2018 2:15:19 PM	W48821
n-Propylbenzene	41	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
sec-Butylbenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Styrene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
tert-Butylbenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,1,1,2-Tetrachloroethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,1,2,2-Tetrachloroethane	ND	20		µg/L	10	1/31/2018 2:15:19 PM	W48821
Tetrachloroethene (PCE)	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
trans-1,2-DCE	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
trans-1,3-Dichloropropene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2,3-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2,4-Trichlorobenzene	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,1,1-Trichloroethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,1,2-Trichloroethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Trichloroethene (TCE)	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Trichlorofluoromethane	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
1,2,3-Trichloropropane	ND	20		µg/L	10	1/31/2018 2:15:19 PM	W48821
Vinyl chloride	ND	10		µg/L	10	1/31/2018 2:15:19 PM	W48821
Xylenes, Total	3300	150		µg/L	100	1/31/2018 1:45:47 PM	W48821
Surr: 1,2-Dichloroethane-d4	103	70-130		%Rec	10	1/31/2018 2:15:19 PM	W48821
Surr: 4-Bromofluorobenzene	105	70-130		%Rec	10	1/31/2018 2:15:19 PM	W48821
Surr: Dibromofluoromethane	102	70-130		%Rec	10	1/31/2018 2:15:19 PM	W48821
Surr: Toluene-d8	101	70-130		%Rec	10	1/31/2018 2:15:19 PM	W48821

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Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
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PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** Trip Blank
Project: Shamrock 63 **Collection Date:**
Lab ID: 1801C80-017 **Matrix:** TRIP BLANK **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
Benzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Toluene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Ethylbenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Naphthalene	ND	2.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1-Methylnaphthalene	ND	4.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
2-Methylnaphthalene	ND	4.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Acetone	ND	10		µg/L	1	1/31/2018 1:16:12 PM	W48821
Bromobenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Bromodichloromethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Bromoform	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Bromomethane	ND	3.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
2-Butanone	ND	10		µg/L	1	1/31/2018 1:16:12 PM	W48821
Carbon disulfide	ND	10		µg/L	1	1/31/2018 1:16:12 PM	W48821
Carbon Tetrachloride	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Chlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Chloroethane	ND	2.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Chloroform	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Chloromethane	ND	3.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
2-Chlorotoluene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
4-Chlorotoluene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
cis-1,2-DCE	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Dibromochloromethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Dibromomethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,3-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,4-Dichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Dichlorodifluoromethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,1-Dichloroethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,1-Dichloroethene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2-Dichloropropane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,3-Dichloropropane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
2,2-Dichloropropane	ND	2.0		µg/L	1	1/31/2018 1:16:12 PM	W48821

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Qualifiers:

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D	Sample Diluted Due to Matrix	E	Value above quantitation range
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ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Daniel B. Stephens & Assoc. **Client Sample ID:** Trip Blank
Project: Shamrock 63 **Collection Date:**
Lab ID: 1801C80-017 **Matrix:** TRIP BLANK **Received Date:** 1/26/2018 9:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **DJF**	
1,1-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Hexachlorobutadiene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
2-Hexanone	ND	10		µg/L	1	1/31/2018 1:16:12 PM	W48821
Isopropylbenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
4-Isopropyltoluene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
4-Methyl-2-pentanone	ND	10		µg/L	1	1/31/2018 1:16:12 PM	W48821
Methylene Chloride	ND	3.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
n-Butylbenzene	ND	3.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
n-Propylbenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
sec-Butylbenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Styrene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
tert-Butylbenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
trans-1,2-DCE	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,1,1-Trichloroethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,1,2-Trichloroethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Trichloroethene (TCE)	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Trichlorofluoromethane	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
1,2,3-Trichloropropane	ND	2.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Vinyl chloride	ND	1.0		µg/L	1	1/31/2018 1:16:12 PM	W48821
Xylenes, Total	ND	1.5		µg/L	1	1/31/2018 1:16:12 PM	W48821
Surr: 1,2-Dichloroethane-d4	102	70-130		%Rec	1	1/31/2018 1:16:12 PM	W48821
Surr: 4-Bromofluorobenzene	104	70-130		%Rec	1	1/31/2018 1:16:12 PM	W48821
Surr: Dibromofluoromethane	101	70-130		%Rec	1	1/31/2018 1:16:12 PM	W48821
Surr: Toluene-d8	96.0	70-130		%Rec	1	1/31/2018 1:16:12 PM	W48821

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Qualifiers:

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ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1801C80**

02-Feb-18

Client: Daniel B. Stephens & Assoc.

Project: Shamrock 63

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **W48792**	RunNo: **48792**
Prep Date:	Analysis Date: **1/30/2018**	SeqNo: **1570116** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								

Qualifiers:

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ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1801C80**

02-Feb-18

Client: Daniel B. Stephens & Assoc.

Project: Shamrock 63

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **W48792**	RunNo: **48792**
Prep Date:	Analysis Date: **1/30/2018**	SeqNo: **1570116** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.3		10.00		93.1	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		110	70	130			
Surr: Dibromofluoromethane	9.5		10.00		94.5	70	130			
Surr: Toluene-d8	10		10.00		101	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **W48792**	RunNo: **48792**
Prep Date:	Analysis Date: **1/30/2018**	SeqNo: **1570117** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	106	70	130			
Toluene	20	1.0	20.00	0	101	70	130			
Chlorobenzene	20	1.0	20.00	0	99.2	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1801C80**

02-Feb-18

Client: Daniel B. Stephens & Assoc.

Project: Shamrock 63

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **W48792**	RunNo: **48792**
Prep Date:	Analysis Date: **1/30/2018**	SeqNo: **1570117** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	22	1.0	20.00	0	110	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	95.5	70	130			
Surr: 1,2-Dichloroethane-d4	9.7		10.00		96.7	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		108	70	130			
Surr: Dibromofluoromethane	9.7		10.00		97.2	70	130			
Surr: Toluene-d8	9.6		10.00		96.5	70	130			

Sample ID **1801c80-001a ms**	SampType: **MS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **MW-19**	Batch ID: **W48792**	RunNo: **48792**
Prep Date:	Analysis Date: **1/30/2018**	SeqNo: **1570121** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0.6410	108	70	130			
Toluene	19	1.0	20.00	0	96.9	70	130			
Chlorobenzene	19	1.0	20.00	0	97.5	70	130			
1,1-Dichloroethene	23	1.0	20.00	0	113	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	92.9	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		104	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		103	70	130			
Surr: Dibromofluoromethane	10		10.00		101	70	130			
Surr: Toluene-d8	9.8		10.00		98.3	70	130			

Sample ID **1801c80-001a msd**	SampType: **MSD**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **MW-19**	Batch ID: **W48792**	RunNo: **48792**
Prep Date:	Analysis Date: **1/30/2018**	SeqNo: **1570122** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	22	1.0	20.00	0.6410	106	70	130	1.92	20	
Toluene	19	1.0	20.00	0	94.4	70	130	2.64	20	
Chlorobenzene	19	1.0	20.00	0	95.6	70	130	1.97	20	
1,1-Dichloroethene	22	1.0	20.00	0	108	70	130	4.75	20	
Trichloroethene (TCE)	18	1.0	20.00	0	91.7	70	130	1.28	20	
Surr: 1,2-Dichloroethane-d4	11		10.00		107	70	130	0	0	
Surr: 4-Bromofluorobenzene	11		10.00		107	70	130	0	0	
Surr: Dibromofluoromethane	10		10.00		102	70	130	0	0	
Surr: Toluene-d8	10		10.00		101	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1801C80**

02-Feb-18

Client: Daniel B. Stephens & Assoc.

Project: Shamrock 63

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **W48821**	RunNo: **48821**
Prep Date:	Analysis Date: **1/31/2018**	SeqNo: **1570890** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1801C80**

02-Feb-18

Client: Daniel B. Stephens & Assoc.

Project: Shamrock 63

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **W48821**	RunNo: **48821**
Prep Date:	Analysis Date: **1/31/2018**	SeqNo: **1570890** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.6		10.00		96.0	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		106	70	130			
Surr: Dibromofluoromethane	9.7		10.00		97.4	70	130			
Surr: Toluene-d8	10		10.00		102	70	130			

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **W48821**	RunNo: **48821**
Prep Date:	Analysis Date: **1/31/2018**	SeqNo: **1570911** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	105	70	130			
Toluene	21	1.0	20.00	0	104	70	130			
Chlorobenzene	21	1.0	20.00	0	103	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1801C80**

02-Feb-18

Client: Daniel B. Stephens & Assoc.

Project: Shamrock 63

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **W48821**	RunNo: **48821**
Prep Date:	Analysis Date: **1/31/2018**	SeqNo: **1570911** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloroethene	21	1.0	20.00	0	107	70	130			
Trichloroethene (TCE)	19	1.0	20.00	0	95.1	70	130			
Surr: 1,2-Dichloroethane-d4	10		10.00		101	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	9.9		10.00		99.4	70	130			
Surr: Toluene-d8	10		10.00		100	70	130			

Sample ID **1801c80-016a ms**	SampType: **MS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **MW-17**	Batch ID: **W48821**	RunNo: **48821**
Prep Date:	Analysis Date: **1/31/2018**	SeqNo: **1570914** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	2300	10	200.0	2250	46.6	70	130			ES
Toluene	4100	10	200.0	4028	59.6	70	130			ES
Chlorobenzene	200	10	200.0	1.800	97.5	70	130			
1,1-Dichloroethene	200	10	200.0	0	100	70	130			
Trichloroethene (TCE)	180	10	200.0	0	90.8	70	130			
Surr: 1,2-Dichloroethane-d4	100		100.0		102	70	130			
Surr: 4-Bromofluorobenzene	110		100.0		106	70	130			
Surr: Dibromofluoromethane	100		100.0		99.5	70	130			
Surr: Toluene-d8	100		100.0		102	70	130			

Sample ID **1801c80-016a msd**	SampType: **MSD**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **MW-17**	Batch ID: **W48821**	RunNo: **48821**
Prep Date:	Analysis Date: **1/31/2018**	SeqNo: **1570915** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	2400	10	200.0	2250	58.5	70	130	1.01	20	ES
Toluene	4000	10	200.0	4028	-4.15	70	130	3.12	20	ES
Chlorobenzene	200	10	200.0	1.800	98.4	70	130	0.902	20	
1,1-Dichloroethene	200	10	200.0	0	102	70	130	2.14	20	
Trichloroethene (TCE)	180	10	200.0	0	91.1	70	130	0.269	20	
Surr: 1,2-Dichloroethane-d4	110		100.0		106	70	130	0	0	
Surr: 4-Bromofluorobenzene	110		100.0		107	70	130	0	0	
Surr: Dibromofluoromethane	100		100.0		101	70	130	0	0	
Surr: Toluene-d8	100		100.0		101	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
1901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: DBS | Work Order Number: 1801C80 | RcptNo: 1

Received By: Erin Melendrez 1/26/2018 9:40:00 AM

Completed By: Dennis Suazo 1/26/2018 12:21:04 PM

Reviewed By: ENM 1/26/18

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	5.3	Good	Not Present			

Chain-of-Custody Record

Client: DBS&A

Mailing Address: 6020 Academy NE Suite 100
Albuquerque, NM 87109

Phone #: 505-822-9400

email or Fax#: jcasey@dbstephens.com

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Shamrock #63

Project #: BE14.0012.00.05.04

Project Manager: John Casey

Sampler: J. Fisher

On Ice: ☒ Yes ☐ No

Sample Temperature: 5.4 - 0.1 (CF) = 5.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1801C80
1/23/18	1515	GW	MW-19	3-VOA	$HgCl_2$	001
1/24/18	1015	GW	MW-12			002
	1100		MW-4			003
	1155		MW-13			004
	1330		MW-8			005
	1445		MW-16			006
	1540		MW-15			007
	1630		MW-18			008
1/25/18	1010		MW-3			009
	1055		MW-2			010
	1145		MW-14			011
	1240		MW-1			012

Analysis Request

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (B310 or 8270 SIMS)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Air Bubbles (Y or N)
									X		
									X		
									X		
									X		
									X		
									X		
									X		
									X		
									X		
									X		
									X		
									X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/26/18	0940			1/26/18	0940
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report

Chain-of-Custody Record

Client: DB Stephens

Mailing Address: 6020 Academy NE Suite 100
Albuquerque, NM 87109

Phone #: 505-822-9400

email or Fax#: jcasey@dbstephens.com

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Symrock #63

Project #: BE14.0012.00.05.04

Project Manager: John Casey

Sampler: J. Fisher

On Ice: ☒ Yes ☐ No

Sample Temperature: 5.4 - 0.1 (CF) = 5.3

HEAL No. 1801C80

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Air Bubbles (Y or N)
1/25/18	1420	GW	MW-5	3-40A	$HgCl_2$	013										X		
	1500	GW	MW-7			014										X		
	1625	GW	MW-11			015										X		
	1710	GW	MW-17			016										X		
			Trip Blank	2-VOA	$HgCl_2$	017										X		

Date:	Time:	Relinquished by:	Received by:	Date	Time
1/26/18	0940			1/26/18	0940
Date:	Time:	Relinquished by:	Received by:	Date	Time

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request