2017 Annual Groundwater Monitoring Report

Randleman No. 1
San Juan County, New Mexico
API# 30-045-10698
NMOCD# 3R-340

Hilcorp Energy Company

GHD | 6121 Indian School Rd NE Suite 200 Albuquerque NM 87110 USA

11145983| Report No 1 | January 15, 2018

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1. Introduction

This Annual Groundwater Monitoring Report presents groundwater data collected during the 2017 reporting period by GHD Services, Inc. (GHD) on behalf of Hilcorp Energy Company (Hilcorp) at the Randleman No. 1 site (hereafter referred to as the "Site"). The Site is located on private land north of Aztec, New Mexico, in Section 13, Township 31N, Range 11W, of San Juan County, New Mexico. A Site location map and detail map are included as Figures 1 and 2, respectively.

1.1 Background

In April 1997, an unlined surface impoundment was discovered to have been impacted by petroleum hydrocarbons. On April 29, 1997, excavation of the soil beneath the impoundment began. A total of 613 cubic yards of hydrocarbon-impacted soil were removed and land farmed at the nearby Randleman No. 3 site. Three monitoring wells were installed at the Site on May 14, 1997, and quarterly groundwater monitoring was conducted through March 1998. Evaluation of groundwater monitoring results led to another excavation in April 1998. In total, 2,220 cubic yards of hydrocarbon-impacted soil were excavated to address residual soil contamination extending to the south of the original excavated area. Quarterly groundwater monitoring was continued through September 2000. After four consecutive quarters of groundwater monitoring results below New Mexico Water Quality Control Commission (NMWQCC) groundwater quality standards for benzene, toluene, ethylbenzene, and total xylenes (BTEX), Williams Environmental Services (Williams) requested that the New Mexico Oil Conservation Division (NMOCD) grant closure status for the Site. In June 2002, the NMOCD granted closure for the Site, provided Williams plug and abandon all Site groundwater monitoring wells according to NMOCD standards. The Williams groundwater monitoring wells were indeed plugged and abandoned. The historical excavation area and historical groundwater monitoring wells are displayed in Figure 2.

On February 23, 2009, a release of approximately 60 barrels of condensate occurred as a result of a hole in an on Site production tank. Envirotech Inc. of Farmington, NM (Envirotech) excavated an area of approximately 42 foot by 51 foot by 7 foot deep on February 26, 2009. Seven composite soil samples were collected during excavation activities and were field analyzed for total petroleum hydrocarbons (TPH) using EPA Method 418.1. TPH results ranged from 8 to 1,080 parts per million (ppm) in the walls of the excavation. Additionally, samples were field analyzed for organic vapors using a photoionization detector and heated headspace techniques. Organic vapor concentrations ranged from 6.8 ppm to 898 ppm.

Because TPH and organic vapor levels were found to be above NMOCD action levels, the excavation was continued on February 27, 2009. The total area of excavation measured 81 ft x 43 ft x 20 ft deep. The excavation area is depicted in Figure 2a.

On March 2, 2009, groundwater was found seeping into the southeast corner of the excavation at a depth of approximately 20 feet below ground surface (bgs). A vacuum truck was utilized to recover groundwater from the excavation. After removal of accumulated groundwater, Envirotech obtained a soil sample from the southeast corner of the excavation at a depth of 20 feet bgs. TPH and organic vapor results were found to be above NMOCD action levels. During field analysis of the soil sample,

groundwater continued to seep into the excavation. Groundwater was again removed from the excavation, and additional excavation was performed to obtain a soil sample below NMOCD action levels. A groundwater sample was collected and submitted for laboratory analysis of volatile organic compounds by EPA Method 8260B. The groundwater sample was found to contain benzene, total xylenes and total naphthalene above NMWQCC groundwater quality standards. Soon after the groundwater sample was taken, the excavation sidewalls collapsed, making further water removal via the vacuum truck impossible.

A total of 611 cubic yards of soil were removed from the Site and were transported to an NMOCD permitted facility. Clean fill was obtained from the landowner to backfill the excavation. Envirotech recommended the installation of groundwater monitoring wells at the Site under NMOCD guidelines.

Tetra Tech, Inc. (Tetra Tech) installed four groundwater monitoring wells at the Site, MW-1 through MW-4, between June 9 and 10, 2009. A generalized geologic cross section was produced using soil boring data collected during monitoring well installation (Figure 3).

Tetra Tech began conducting groundwater monitoring events at the Site on June 12, 2009. Hydrocarbon absorbent socks were placed in monitoring wells MW-2 and MW-3 on June 18, 2009 due to a light non aqueous phase liquid (LNAPL) sheen being observed intermittently in purge water during groundwater sampling. The socks were removed during the March 2010 sampling event. Since the removal of the socks, LNAPL has not been detected in MW-2 or in MW-3. Soil and groundwater samples were collected from the Kiffen Canyon Wash in October 2009 and analyzed for benzene, toluene, ethylbenzene and total xylenes (BTEX) to assess potential off Site migration of hydrocarbon. BTEX constituents were found to be below NMWQCC standards in both the soil and groundwater collected from Kiffen Canyon Wash.

Site consulting responsibilities were transferred from Tetra Tech to GHD Services, Inc. (formerly CRA) On June 15, 2011. GHD has continued quarterly groundwater monitoring since that time.

A new monitoring well, MW-5, was installed between May 23 and 25, 2013, at the Randleman 01A/01M gas well site, approximately 2000 feet north of the Site (Figure 2b). MW-5 was installed to monitor groundwater quality in the up gradient direction. An October 30, 2014 meeting between GHD, COP and the NMOCD resulted in the agreement that MW-5 cannot be considered a viable up-gradient well due to its distance from the Randleman No. 1 Site. Monitor well MW-5 was removed from the groundwater sampling schedule beginning in December 2014 and it was abandoned on September 13, 2016. GHD installed monitor well MW-6 on September 13, 2016 to replace monitor well MW-5. MW-6 was installed approximately 225 feet to the north of the Site (Figure 2a).The historical timeline for the Site is presented in Table 1.

2. Groundwater Monitoring Methodology and Analytical Results

2.1 Groundwater Monitoring Summary

Quarterly groundwater monitoring events were conducted on March 8, June 14, September 27, and December 5, 2017 that included monitoring wells MW-1, MW-2, MW-3, MW-4 and MW-6.

Prior to collection of groundwater samples from monitoring wells MW-1, MW-2, MW-3, MW-4, and MW-6, depth to groundwater in each well was measured using an oil/water interface probe (Table 2). Groundwater potentiometric surface maps compiled utilizing 2017 quarterly monitoring measurements are presented as Figures 4, 5, 6, and 7. Groundwater flow measured in 2017at the Site varies from south-southeast to nearly due south and is consistent with historical data.

2.2 Groundwater Monitoring Methodology

During groundwater monitoring events, Site monitoring wells were purged of at least three casing volumes of groundwater using a 1.5-inch diameter, polyethylene, and dedicated bailer. Groundwater parameters including pH, temperature, conductivity and oxidation-reduction potential, were collected during purging using a multi-parameter meter. Field results were recorded and are summarized on Table 3.

Groundwater samples were placed in laboratory prepared bottles, packed on ice, and shipped under chain of custody documentation to Pace Analytical Services, Inc. of Lenexa, Kansas. Groundwater samples were analyzed for BTEX by EPA Method 8260; sulfate and chloride by EPA Method E300.0; total dissolved solids (TDS) by EPA Method 2540C; and dissolved manganese by EPA Method 6010. Analytical results are summarized in Table 4.

2.3 Groundwater Monitoring Analytical Results

The NMWQCC mandates that groundwater quality in New Mexico be protected, and has issued groundwater quality standards in Title 20, Chapter 6, Part 2, Section 3103 of the New Mexico Administrative Code (20.6.2.3103 NMAC). Groundwater quality standards have been set for the protection of human health, domestic water supply, and irrigation use. Exceedances of NMWQCC groundwater quality standards in Site monitoring wells are discussed below.

Chloride

- The NMWQCC domestic water supply groundwater quality standard for chloride is 250 mg/L. Chloride concentrations at monitor wells MW-4 and MW-6 ranged from 2470 mg/L to 3500 mg/L and were above the NMWQCC standard during all quarterly sampling events in 2017. Concentrations at all other site wells were below the standard during 2017.

Dissolved Manganese

- The NMWQCC domestic water supply groundwater quality standard for dissolved manganese is 0.2 mg/L. Samples collected from all Site monitor wells except MW-1 contained concentrations of dissolved manganese that exceeded the NMWQCC standard during the 2017 reporting period. Concentrations from MW-1 were below NMWQCC standard during 2017.

Sulfate

- The NMWQCC domestic water supply groundwater quality standard for sulfate is 600 mg/L. Groundwater samples collected from all Site monitoring wells exceeded the NMWQCC standard during the 2017 reporting period.

Total Dissolved Solids

- The NMWQCC groundwater quality standard for TDS is 1,000 mg/L. Groundwater samples collected from all Site monitoring wells exceeded the NMWQCC standard for TDS during the 2017reporting period. Concentrations at up gradient monitor well MW-6 exceeded 10,000 mg/L during the September and December monitoring events.

The corresponding laboratory analytical reports, including quality control summaries, are included as Appendix A.

3. Conclusions and Recommendations

Concentrations of BTEX constituents have been below NMWQCC standards at monitor well MW-3, the last Site well to detect hydrocarbons in groundwater, for 11 consecutive quarters. BTEX constituents have been below the standards in MW-1, MW-2, and MW-4 for eight or more consecutive quarters and have not been detected in MW-6 when sampled.

Inorganic constituents including TDS, dissolved manganese, sulfate and chloride continue to occur at concentrations above standards in all Site monitoring wells, including, and most notably at upgradient well MW-6. Concentrations of TDS at MW-6 were above 10,000 mg/L in September and December. The NMOCD District III hydrologist reviewed Site data in spring 2017 and in a March 28, 2017 email communication to then Site producer, ConocoPhillips, indicated this site looked ready for closure. The 2017 Site groundwater data further supports this assertion and Hilcorp therefore requests no further action with respect to groundwater monitoring be granted for this Site.

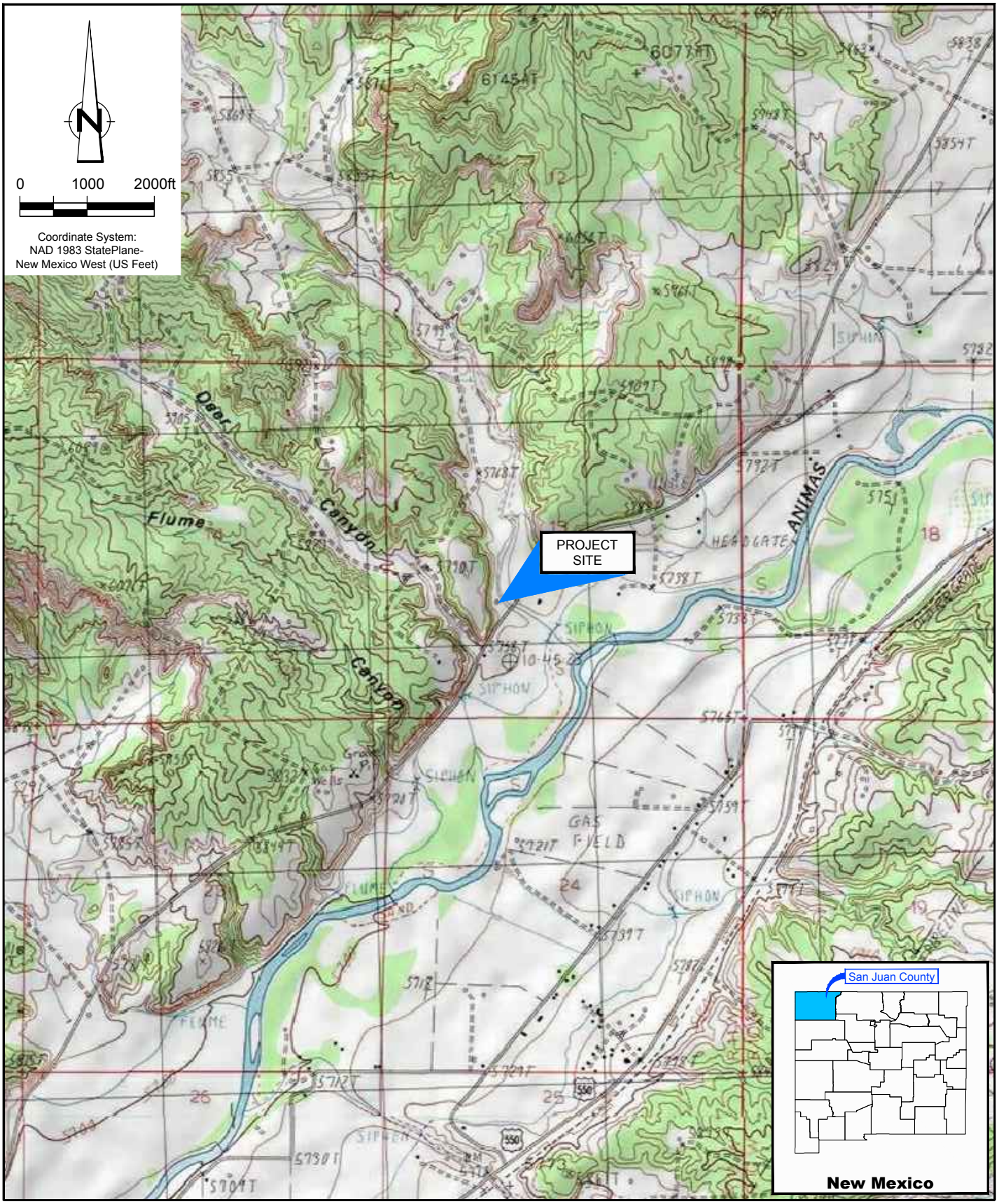
Respectfully Submitted,

GHD

Jeff Walker
Sr. Project Manager

Bernie Bockisch
Albuquerque Operations Manager

Figures



Source: USGS 7.5 Minute Quad "Cedar Hill, New Mexico"

Lat/Long: 36.8960° North, 107.9455° West

HILCORP ENERGY COMPANY
SECTION 13, T31-R11W, SAN JUAN COUNTY, NEW MEXICO
RANDLEMAN No. 1 NATURAL GAS WELL SITE

11145983-00

Jan 5, 2018

SITE LOCATION MAP

Figure 1

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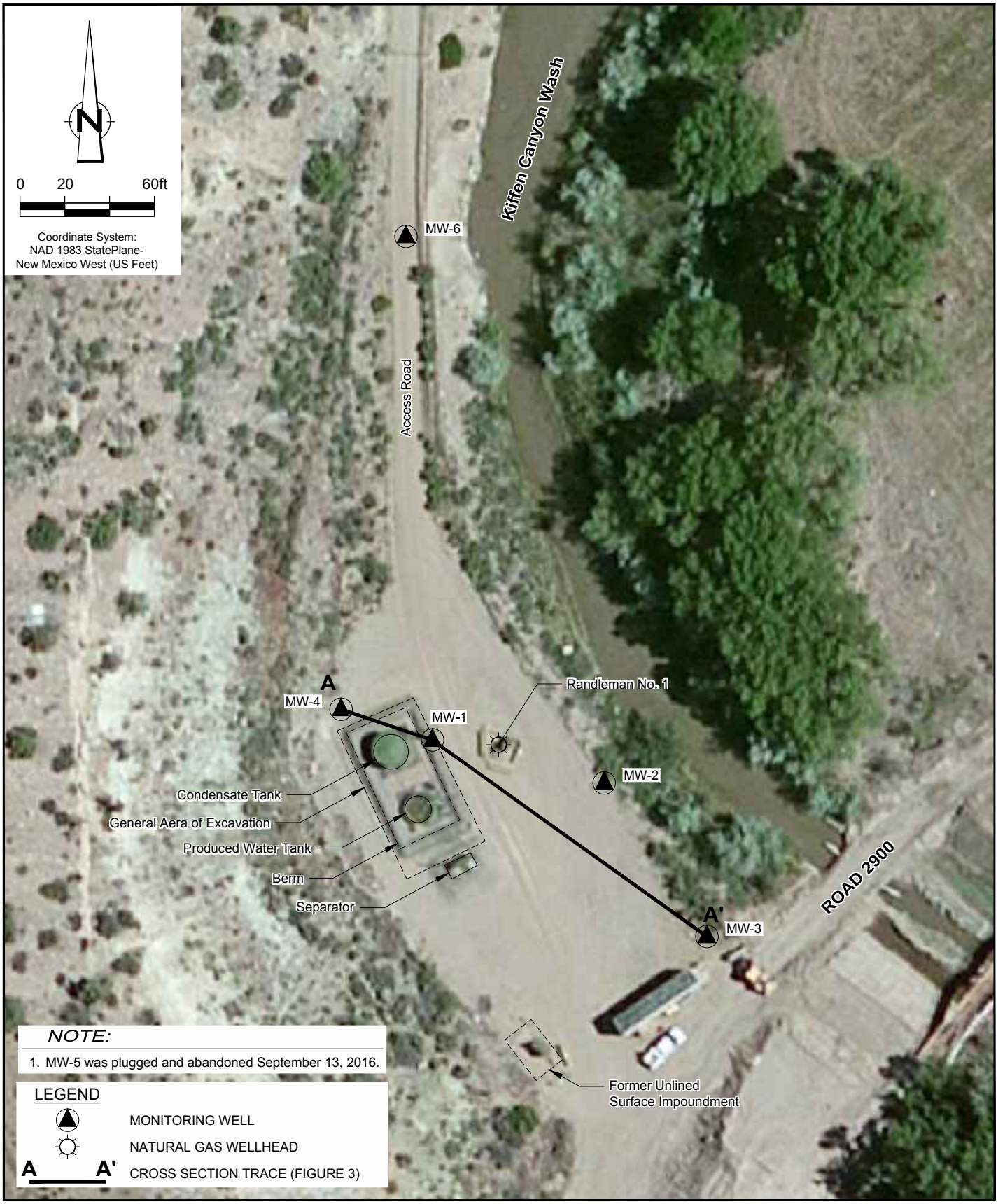

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RANDLEMAN No. 1 NATURAL GAS WELL SITE

11145983-00

Jan 11, 2018

SITE PLAN

FIGURE 2

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RANDLEMAN No. 1 NATURAL GAS WELL SITE

11145983-00

Jan 5, 2018

SITE PLAN- MW-5 LOCATION

FIGURE 2a

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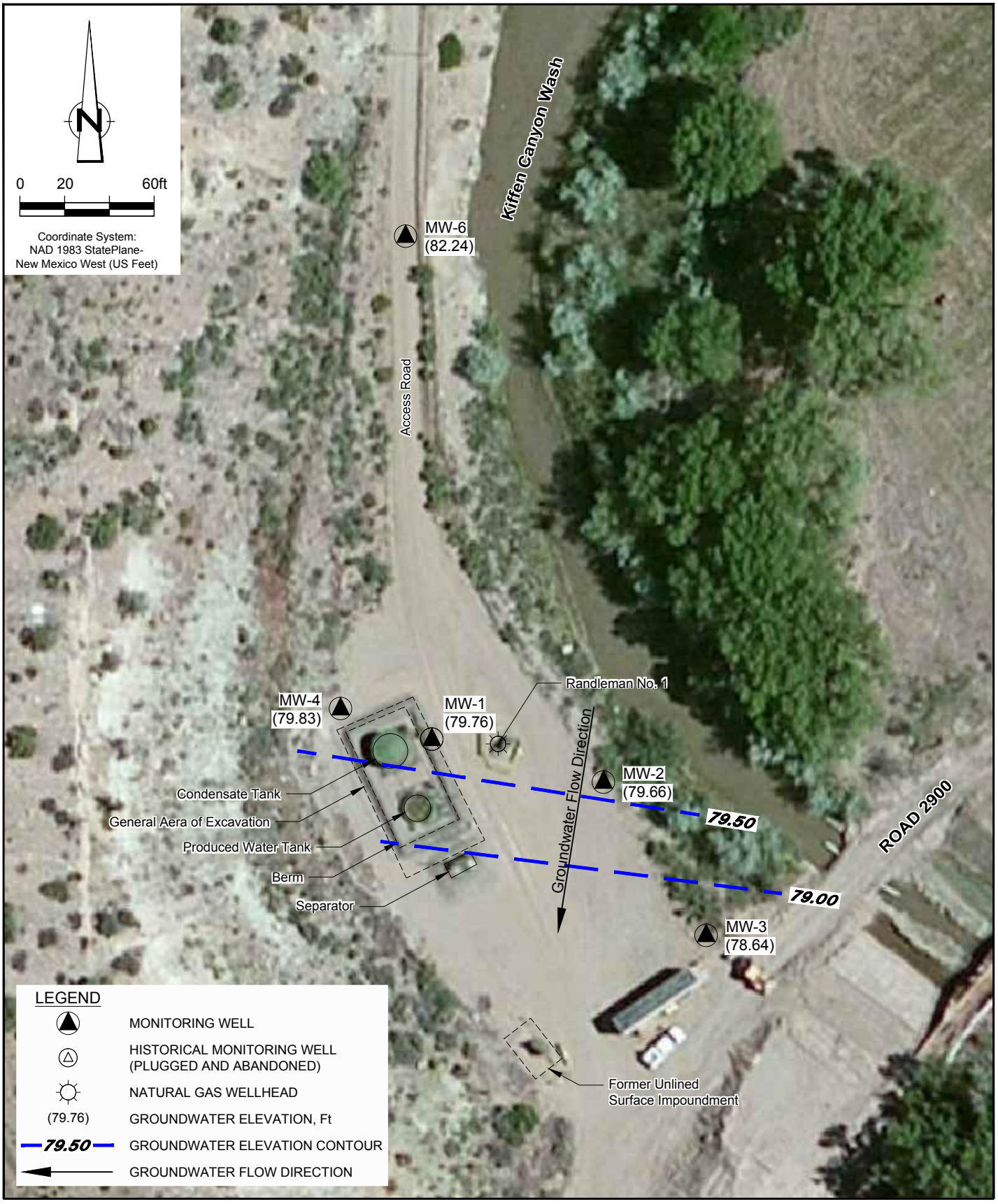

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RANDLEMAN No. 1 NATURAL GAS WELL SITE

11145983-00

Jan 5, 2018

MARCH 2017
GROUNDWATER POTENTIOMETRIC SURFACE MAP

FIGURE 4

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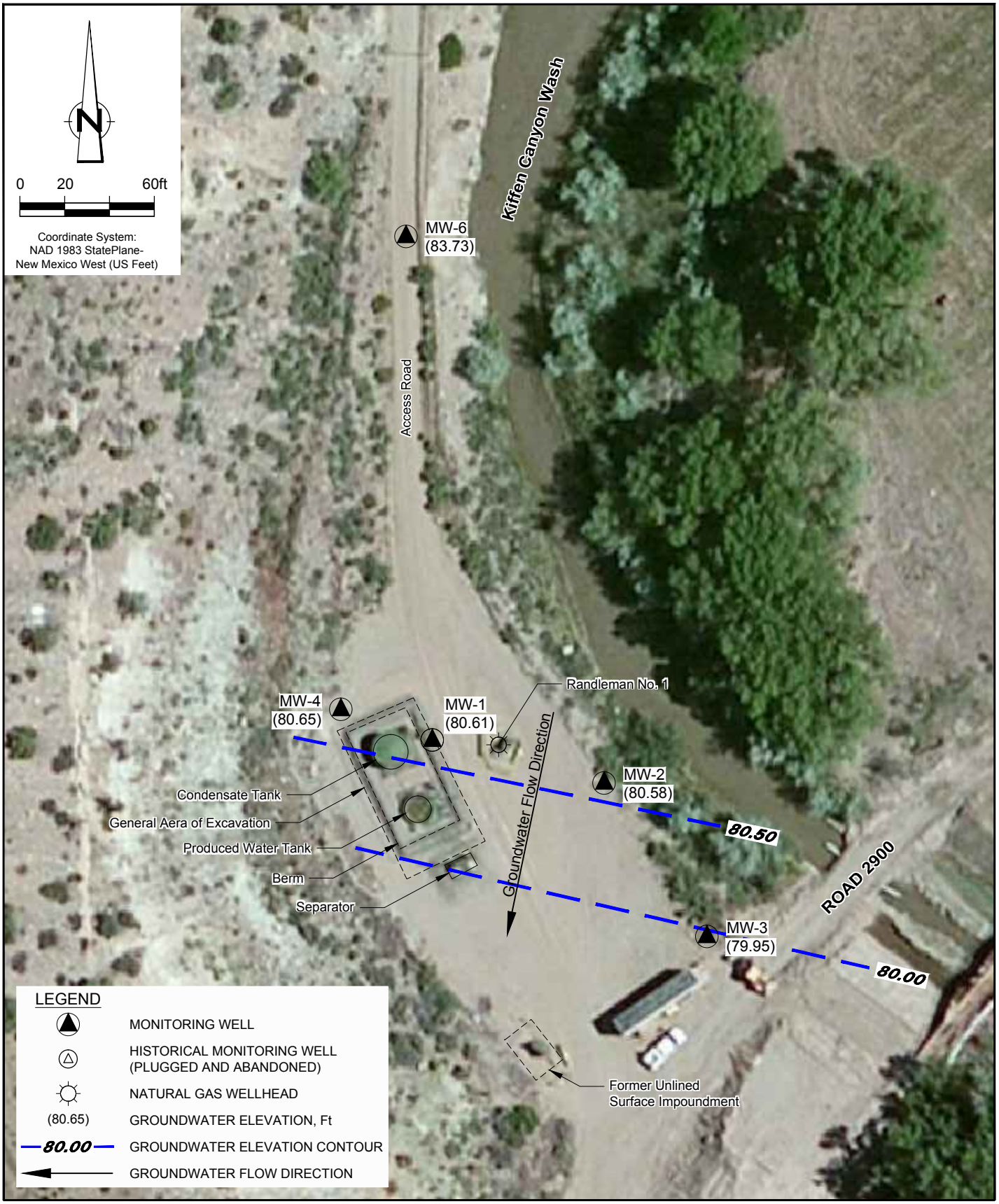

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RANDLEMAN No. 1 NATURAL GAS WELL SITE

11145983-00

Jan 11, 2018

JUNE 2017
GROUNDWATER POTENTIOMETRIC SURFACE MAP

FIGURE 5

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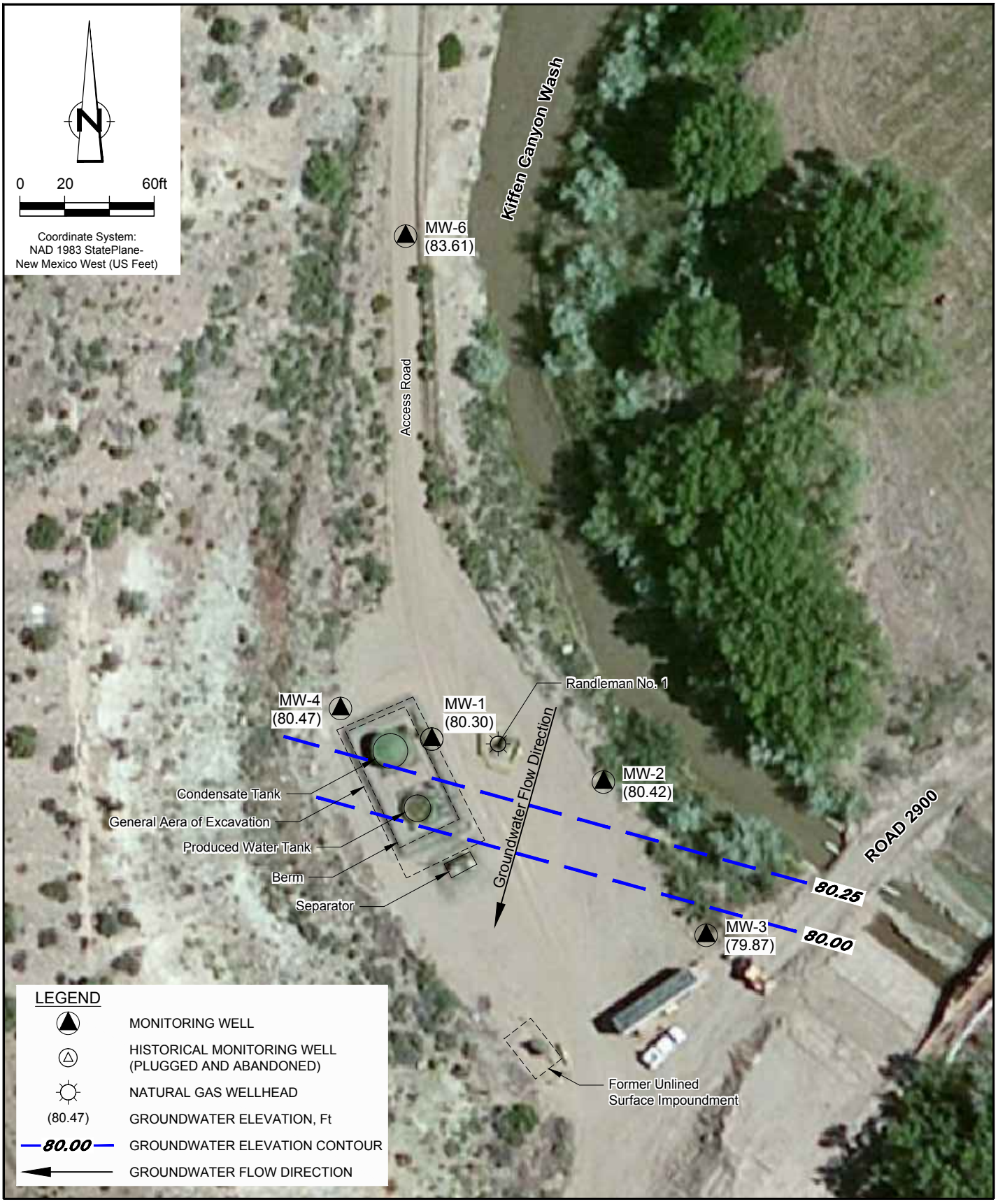

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RANDLEMAN No. 1 NATURAL GAS WELL SITE

11145983-00

Jan 11, 2018

SEPTEMBER 2017
GROUNDWATER POTENTIOMETRIC SURFACE MAP

FIGURE 6

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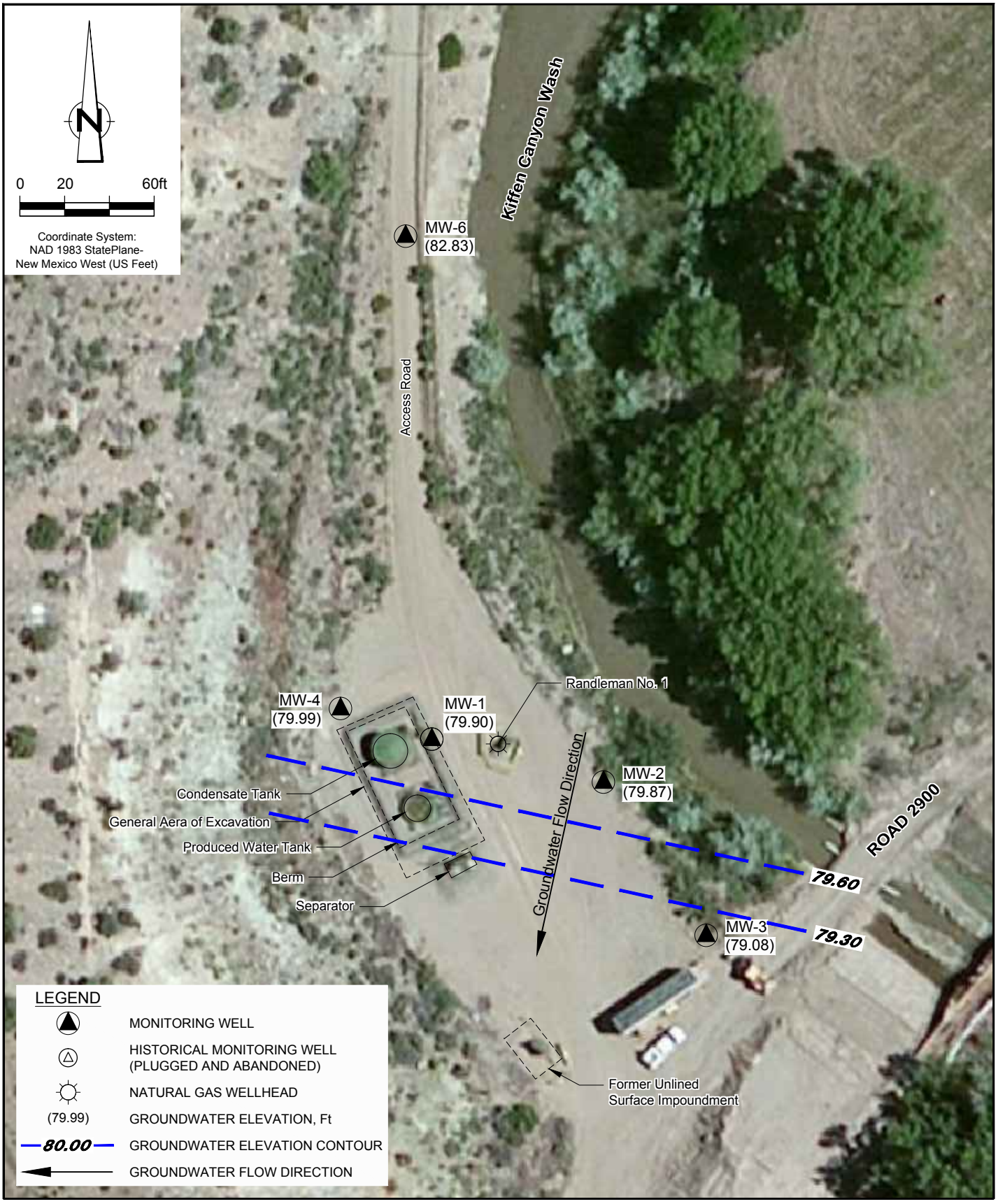

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Jan 11, 2018

DECEMBER 2017
GROUNDWATER POTENTIOMETRIC SURFACE MAP

FIGURE 7

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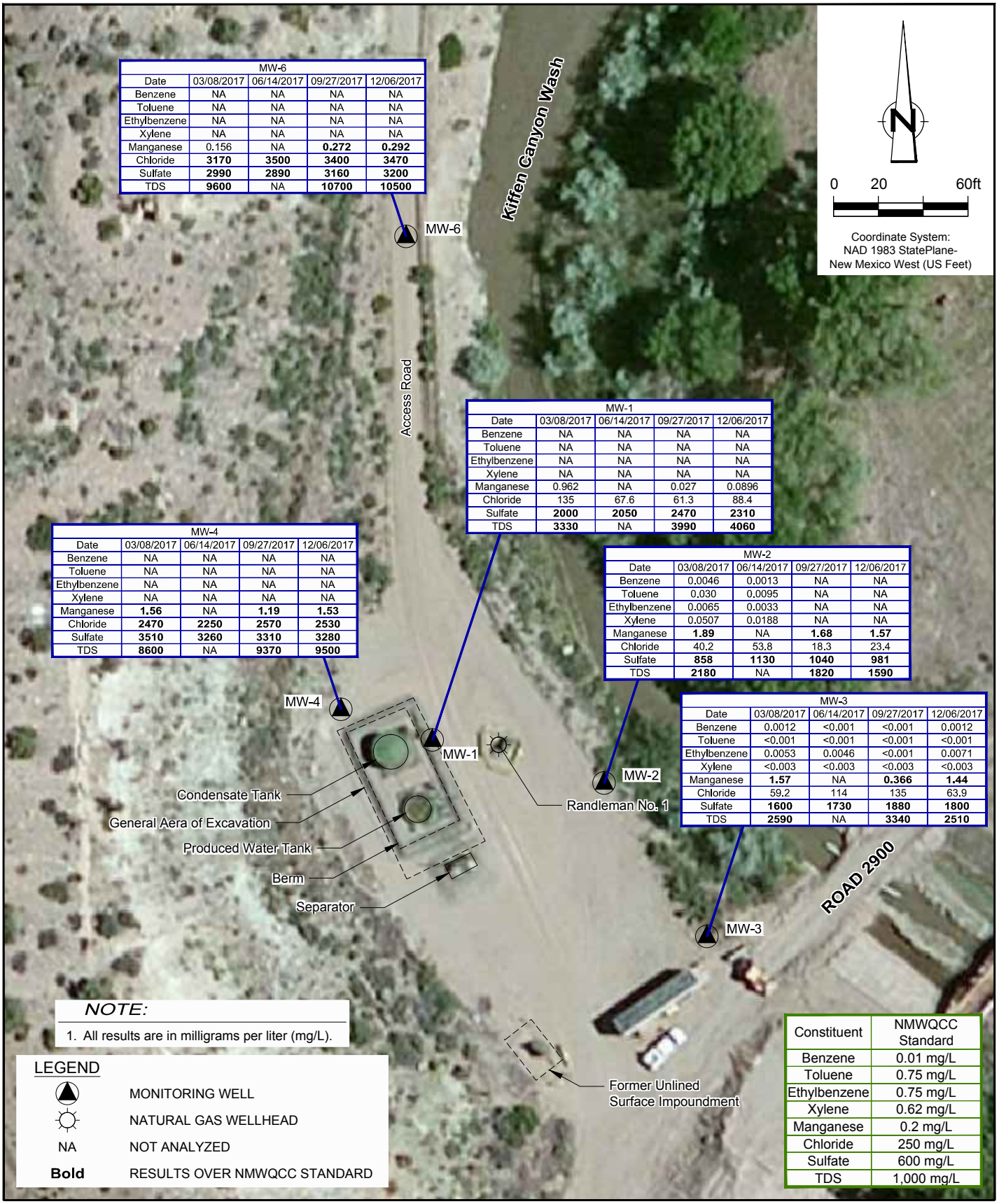

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HILCORP ENERGY COMPANY
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RANDLEMAN No. 1 NATURAL GAS WELL SITE

11145983-00

Jan 12, 2018

2017 GROUNDWATER CONCENTRATION MAP

FIGURE 8

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Tables

Table 1

Site History Timeline
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Date/Time Period	*Event/Action*	*Description/Comments*
September 20, 1951	Well spudded	Well spudded by Southern Union Gas Company.
August 1, 1952	Transfer of ownership	Well acquired by Aztec Oil and Gas Company.
December 1, 1976	Transfer of ownership	Southland Royalty Company acquired Aztec Oil and Gas Company.
November 22, 1985	Transfer of ownership	Southland Royalty Company acquired by Burlington Resources.
April 1, 1997	Discovery of impacted soil	An unlined surface impoundment was discovered to have been impacted by petroleum hydrocarbons.
April 29, 1997	Excavation of impacted soil	Excavation of the soil beneath the impoundment began; once complete, a total of 613 cubic yards of hydrocarbon impacted soil were removed and landfarmed at the nearby Randleman #3 site.
May 14, 1997	Installation of monitor wells	Three groundwater monitor wells were installed at the Site. Groundwater monitoring was initiated on a quarterly basis through March 1998.
April 1, 1998	Excavation of impacted soil	Evaluation of groundwater monitoring results initiated another excavation of 2,220 cubic yards of hydrocarbon impacted soil “to address residual soil contamination extending to the south of the original excavated area” (Williams, 2002).
February 1, 2002	Closure requested	Quarterly groundwater monitoring was continued through September 2000, and after 4 consecutive quarters of groundwater quality monitoring results below New Mexico Water Quality Control Commission (NMWQCC) groundwater quality standards for benzene, toluene, ethylbenzene, and total xylenes (BTEX), Williams Environmental Services (Williams) requested that the New Mexico Oil Conservation Division (OCD) grant closure status for the Site.
June 1, 2002	Closure granted by NMOCD	OCD granted closure for the Site, provided that Williams plug and abandon all Site groundwater monitoring wells according to OCD standards (NMEMNRD, 2002). The historical excavation area and historical groundwater monitor wells are displayed in Figure 2.
March 31, 2006	Transfer of ownership	ConocoPhillips Company acquired Burlington Resources and all assets.
February 23, 2009	Release from condensate tank	Approximately 60 barrels of condensate were found to have spilled from a hole located on the back side of an on-Site condensate tank into the bermed area. The spilled fluids remained in the berm and none of the condensate was recovered. Form C-141 stated that the spill impacted the soil on the ground surface around the tank, that the production tank was to be removed, and the affected soils were to be excavated.
February 26, 2009	Excavation and site assessment	Envirotech Inc. of Farmington, NM (Envirotech) performed the soil excavation and collected soil samples for analysis. The area of release was excavated to approximately 42 feet by 51 feet by 7 feet deep. 7 composite soil samples were collected from the excavation and were analyzed for total petroleum hydrocarbons (TPH) using EPA Method 418.1. Additionally, organic vapors were measured using a Photoionization Detector (PID). TPH results ranged from 8 parts per million (ppm) in the north wall sample to 1,080 ppm in the south wall sample. The OCD recommended action level for TPH at the Site was determined to be 100 ppm. Organic vapor concentrations ranged from 6.8 ppm from the north wall sample, to 898 ppm in the south wall sample. Due to high levels of TPH and organic vapors, the excavation was continued on February 27, 2009.
February 27, 2009	Further excavation and site assessment	Envirotech continued the excavation and sampling activities. Samples collected from the north, west, and east ends of the excavation on February 26, 2009 were found to be below OCD action levels for TPH, the focus of the excavation on February 27, 2009 was the south wall, the southeast wall, and the bottom of the southeast corner. The final excavation measured 81 feet by 43 feet by 20 feet deep (total depth is given for the deepest part of the excavation; other areas determined to be below OCD action levels went to approximately 8 feet bgs). Eight soil samples were collected and analyzed in the field for TPH and organic vapors. Excavation continued until all samples were found to be below 100 ppm for both TPH and organic vapors.
March 2, 2009	Further excavation and site assessment	Groundwater began to seep into the southeast corner of the excavation at 20 feet bgs. A vacuum truck was contracted to remove groundwater from the excavation. After removal of groundwater, a soil sample from the southeast corner of the excavation was collected. TPH and organic vapor results were found to be above OCD action levels. More water was then removed from the excavation, and additional soil removal was performed. A groundwater sample was collected from the area where water continued to seep into the excavation, and was analyzed for volatile organic compounds by EPA Method 8260. The groundwater sample was found to contain benzene, total xylenes and total naphthalenes above New Mexico Water Quality Control Commission (NMWQCC) groundwater quality standards. Once this sample had been obtained, the excavation caved in, making further water removal impossible (Envirotech, 2009). A total of 611 cubic yards of soil were romoved from the Site. Clean fill was used to backfill the excavation.

Table 1

Site History Timeline
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Date/Time Period	*Event/Action*	*Description/Comments*
June 9 through 11, 2009	Installation of monitor wells	Tetra Tech installs four groundwater monitor wells at the Site; MW-1, MW-2, MW-3 and MW-4.
June 12, 2009	Groundwater monitoring	Tetra Tech conducts the first groundwater monitoring event at the Site.
June 17, 2009	Depth to water measurements	Depth to water measurements were taken by Tetra Tech in Site monitor wells to determine if hydrocarbons were accumulating in the water column. Hydrocarbon sheen was detected in MW-2 and MW-3.
June 18, 2009	Absorbent socks placed in wells	Hydrocarbon-absorbent socks were placed in monitor wells MW-2 and MW-3 by Tetra Tech.
September 23, 2009	Groundwater monitoring	Second quarterly groundwater monitoring event at the Site conducted by Tetra Tech.
October 1, 2009	Site assessment	Tetra Tech on Site to hand auger one boring near the Kiffen Canyon Wash, which is located downgradient and east of the Site. Groundwater and soil samples collected from boring. No BTEX impacts were found.
December 16, 2009	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by Tetra Tech.
April 1, 2010	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by Tetra Tech.
June 9, 2010	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by Tetra Tech.
September 20, 2010	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by Tetra Tech. Lock and cap were observed missing from MW-4. The ground surface near MW-3 shifted, resulting in the well casing sticking out of the completion. The PVC casing was cut and the site was resurveyed by Tetra Tech.
December 17, 2010	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by Tetra Tech.
March 16, 2011	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by Tetra Tech.
June 15, 2011	Transfer of Site consulting responsibilities	Site consulting responsibilities transferred from Tetra Tech of Albuquerque, NM to CRA of Albuquerque, NM.
June 22, 2011	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
September 27, 2011	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
December 13, 2011	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
March 8, 2012	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
June 6, 2012	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
September 20, 2012	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
December 12, 2012	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
March 27, 2013	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
May 23, 2013	Installation of monitor well	National Exploration, Wells, & Pumps installs an upgradient groundwater monitoring well, MW-5.
June 19, 2013	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
September 12, 2013	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
October 1, 2013	Groundwater monitoring	Supplemental metals treatability sampling from MW-3
December 12, 2013	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
March 20, 2014	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
June 18, 2014	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
September 18, 2014	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
December 18, 2014	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
March 18, 2015	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by CRA.
June 2015	--	No sampling occurred due to other work being performed at the Site.
September 16, 2015	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
December 2, 2015	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
March 30, 2016	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
June 22, 2016	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
September 8, 2016	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
September 13, 2016	Plug and abandon and installation of well	Plug and abandon MW-5; install upgradient monitoring well MW-6.
December 1, 2016	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
March 8, 2017	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
April 13, 2017	Sale of San Juan Asset to Hilcorp Energy	Site sold as part of ConocoPhillips sale of San Juan Asset to Hilcorp Energy Company.
June 14, 2017	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
September 27, 2017	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.
December 5, 2017	Groundwater monitoring	Quarterly groundwater monitoring event at the Site conducted by GHD.

Table 2
Monitoring Well Specifications and Groundwater Elevations
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Well ID	Total Depth (ft below TOC)	Top of Casing Elevation*	Screen Interval (ft bgs)	Date Measured	Depth to Groundwater (ft below TOC)	Relative Water Level (ft)
MW-1	25.5	95.19	9 - 24	6/12/2009	13.98	81.21
				6/14/2009	13.96	81.23
				9/23/2009	13.97	81.22
				12/16/2009	14.30	80.89
				4/1/2010	14.39	80.80
				6/9/2010	13.99	81.20
		94.9		9/20/2010	14.54	80.36
				12/17/2010	14.40	80.50
				3/16/2011	14.78	80.12
				6/22/2011	13.65	81.25
				9/27/2011	13.59	81.31
				12/13/2011	14.01	80.89
				3/8/2012	14.49	80.41
				6/6/2012	13.62	81.28
				9/20/2012	14.22	80.68
				12/12/2012	14.55	80.35
				3/27/2013	14.54	80.36
				6/19/2013	14.33	80.57
				9/12/2013	14.63	80.27
				12/12/2013	14.67	80.23
				3/20/2014	15.09	79.81
				6/18/2014	14.15	80.75
				9/18/2014	13.84	81.06
				12/18/2014	14.58	80.32
				3/18/2015	14.96	79.94
				9/16/2015	14.06	80.84
				12/2/2015	14.40	80.50
				3/30/2016	14.98	79.92
				6/22/2016	13.86	81.04
				9/8/2016	14.66	80.24
				12/1/2016	14.81	80.09
				3/8/2017	15.14	79.76
				6/14/2017	14.29	80.61
				9/27/2017	14.60	80.30
				12/5/2017	15.00	79.90
MW-2	23.8	96.79	8.9 - 23.8	6/12/2009	15.57	81.22
				6/14/2009	15.63	81.16
				9/23/2009	15.67	81.12
				12/16/2009	16.41	80.38
				4/1/2010	16.75	80.04
				6/9/2010	15.71	81.08
		96.51		9/20/2010	16.28	80.23
				12/17/2010	16.67	79.84
				3/16/2011	16.52	79.99
				6/22/2011	15.32	81.19
				9/27/2011	15.29	81.22
				12/13/2011	15.81	80.70
				3/8/2012	16.21	80.30
				6/6/2012	15.25	81.26
				9/20/2012	15.97	80.54
				12/12/2012	16.30	80.21
				3/27/2013	16.34	80.17
				6/19/2013	16.05	80.46
				9/12/2013	16.27	80.24
				12/12/2013	16.40	80.11
				3/20/2014	16.83	79.68
				6/18/2014	15.84	80.67
				9/18/2014	15.48	81.03
				12/18/2014	16.31	80.20
				3/18/2015	16.67	79.84
				9/16/2015	15.70	80.81
				12/2/2015	16.07	80.44
				3/30/2016	16.68	79.83
				6/22/2016	15.48	81.03
				9/8/2016	16.32	80.19
				12/1/2016	16.58	79.93
				3/8/2017	16.85	79.66
				6/14/2017	15.93	80.58
				9/27/2017	16.09	80.42
				12/5/2017	16.64	79.87

Table 2
Monitoring Well Specifications and Groundwater Elevations
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Well ID	Total Depth (ft below TOC)	Top of Casing Elevation*	Screen Interval (ft bgs)	Date Measured	Depth to Groundwater (ft below TOC)	Relative Water Level (ft)
MW-3	22	96.31	6.5 - 21.5	6/12/2009	16.00	80.31
				6/14/2009	15.97	80.34
				9/23/2009	15.78	80.53
				12/16/2009	16.77	79.54
				4/1/2010	16.79	79.52
				6/9/2010	15.89	80.42
		96.07		9/20/2010	16.95	79.12
				12/17/2010	17.95	78.12
				3/16/2011	17.36	78.71
				6/22/2011	15.54	80.53
				9/27/2011	15.27	80.80
				12/13/2011	16.04	80.03
				3/8/2012	16.96	79.11
				6/6/2012	15.52	80.55
				9/20/2012	16.10	79.97
				12/12/2012	16.63	79.44
				3/27/2013	17.23	78.84
				6/19/2013	16.52	79.55
				9/12/2013	16.64	79.43
				12/12/2013	16.93	79.14
				3/20/2014	17.69	78.38
				6/18/2014	16.17	79.90
				9/18/2014	15.59	80.48
				12/18/2014	16.74	79.33
				3/18/2015	17.44	78.63
				9/16/2015	15.79	80.28
				12/2/2015	16.28	79.79
				3/30/2016	17.41	78.66
				6/22/2016	15.71	80.36
				9/8/2016	16.37	79.70
				12/1/2016	16.66	79.41
				3/8/2017	17.43	78.64
				6/14/2017	16.12	79.95
				9/27/2017	16.20	79.87
				12/5/2017	16.99	79.08
MW-4	29.5	98.83	11 - 26	6/12/2009	17.68	81.15
				6/14/2009	17.52	81.31
				9/23/2009	17.56	81.27
				12/16/2009	17.86	80.97
				4/1/2010	17.94	80.89
				6/9/2010	17.57	81.26
		98.54		9/20/2010	18.06	80.48
				12/17/2010	16.14	82.40
				3/16/2011	18.27	80.27
				6/22/2011	17.23	81.31
				9/27/2011	17.19	81.35
				12/13/2011	17.61	80.93
				3/8/2012	18.02	80.52
				6/6/2012	17.21	81.33
				9/20/2012	17.80	80.74
				12/12/2012	18.09	80.45
				3/27/2013	18.03	80.51
				6/19/2013	17.93	80.61
				9/12/2013	18.12	80.42
				12/12/2013	18.15	80.39
				3/20/2014	18.52	80.02
				6/18/2014	17.70	80.84
				9/18/2014	17.41	81.13
				12/18/2014	18.10	80.44
				3/18/2015	18.44	80.10
				9/16/2015	17.66	80.88
				12/2/2015	17.99	80.55
				3/30/2016	18.52	80.02
				6/22/2016	17.49	81.05
				9/8/2016	18.25	80.29
				12/1/2016	18.38	80.16
				3/8/2017	18.71	79.83
				6/14/2017	17.89	80.65
				9/27/2017	18.07	80.47
				12/5/2017	18.55	79.99
MW-5	59.23	--	--	6/19/2013	18.13	--
				9/12/2013	19.53	--
				12/12/2013	21.44	--
				3/20/2014	22.8	--
				6/18/2014	19.98	--
				9/18/2014	19.8	--
				Well to no longer be gauged and sampled.		
MW-6	40	100.09	25-40	09/26/2016	16.71	83.38
				12/01/2016	13.29	86.80
				3/8/2017	18.66	82.24
				6/14/2017	16.36	83.73
				9/27/2017	16.48	83.61
				12/5/2017	17.26	82.83

Notes:
ft = Feet
TOC = Top of casing
bgs = below ground surface
* Elevation relative to an arbitrary data point of 100 feet; resurveyed during 9/20/10 sampling event

Table 3

Field Parameters Summary
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Well ID	Sample Date	Temperature (°C)	pH	TDS (mg/L)	Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	Volume (gallons)
MW-1	03/18/2015	13.30	6.91	2.00	3060	--	-3.0	4.25
	09/16/2015	15.40	6.88	2.443	3757	3.12	-88.3	4.50
	12/02/2015	14.75	7.20	2.680	4130	3.89	79.2	4.50
	03/30/2016	13.79	7.08	2.400	3780	7.35	145.0	4.25
	06/22/2016	12.90	7.12	--	3850	3.20	-91.7	4.75
	09/08/2016	14.63	7.61	2.266	3484	6.01	-125.6	4.50
	12/01/2016	14.44	7.34	--	2199	3.12	-72.7	4.50
	03/08/2017	12.01	7.24	3.094	4759	2.46	-176.1	4.50
	06/14/2017	12.00	7.25	2.631	4050	2.99	-108.1	4.50
	09/27/2017	13.63	7.25	--	4029	--	--	--
	12/5/2017	13.39	7.23	2.82	4336	1.99	-193.8	4.00
MW-2	03/18/2015	12.00	7.32	1.60	2530	--	-276.0	4.75
	09/16/2015	13.31	7.25	1.515	2331	1.92	-242.0	5.25
	12/02/2015	13.36	7.73	1.572	2420	2.45	-238.8	5.00
	03/30/2016	12.72	7.92	1.900	3040	4.96	-290.0	4.75
	06/22/2016	11.70	7.37	--	2490	1.36	-180.9	5.50
	09/08/2016	12.31	7.89	1.308	2012	8.28	-247.3	5.00
	12/01/2016	13.12	7.58	--	1926	2.42	-256.6	5.00
	03/08/2017	10.81	7.59	1.863	2866	1.91	-301.9	5.00
	06/14/2017	10.52	7.41	1.500	2306	2.79	-236.6	5.00
	09/27/2017	12.08	7.83	--	1688	--	--	--
	12/5/2017	12.28	7.29	1.249	1920	1.33	-285.4	4.75
MW-3	03/18/2015	12.30	7.13	1.90	2990	--	-268.0	3.50
	09/16/2015	13.59	7.07	2.259	3474	10.58	-131.1	3.50
	12/02/2015	13.52	7.24	2.225	3423	4.07	-147.2	2.50
	03/30/2016	12.28	7.72	2.000	3190	7.31	-286.0	2.00
	06/22/2016	11.80	6.90	--	3430	3.27	-136.9	4.25
	09/08/2016	13.33	7.81	1.923	2959	7.36	-129.0	4.00
	12/01/2016	13.52	7.31	--	2888	2.91	-186.2	4.00
	03/08/2017	11.14	7.25	2.264	3483	1.77	-296.2	3.50
	06/14/2017	No Parameters Collected Due to Insufficient Volume						
	09/27/2017	12.51	7.43	--	3290	--	--	--
	12/5/2017	10.25	7.4	1.983	3057	2.32	-253.7	3.00
MW-4	03/18/2015	14.40	7.57	8.00	12800	--	-19.0	4.75
	9/16/20015	15.21	7.20	8.155	12543	2.81	-71.8	5.25
	12/02/2015	14.31	7.14	8.962	13789	3.05	64.0	5.00
	03/30/2016	14.64	7.89	8.000	14	6.02	-201.0	4.75
	06/22/2016	13.60	7.15	--	12	2.91	-64.2	5.25
	09/08/2016	14.04	8.06	7.776	11962	2.72	-118.7	5.00
	12/01/2016	14.55	7.63	--	12040	2.02	-129.3	5.00
	03/08/2017	12.78	7.57	8.864	13638	3.33	-138.4	3.50
	6/14/2017	12.52	7.47	8.190	12600	3.91	-186.1	5.00
	09/27/2017	13.52	7.53	--	11133	--	--	--
	12/5/2017	13.25	7.73	8.153	12143	1.46	-187.7	4.75
MW-6	12/01/2016	No Parameters Collected Due to Insufficient Volume						
	03/08/2017	13.42	8.08	10.730	16510	1.25	-252.5	5.00
	06/14/2017	12.84	7.99	9.432	14510	2.98	-177.2	11.50
	09/27/2017	12.83	7.67	--	12511	--	--	--
	12/5/2017	12.47	8.09	9.393	14452	2.68	-250.2	3.75

Notes:
TDS = total dissolved solids
DO = dissolved oxygen
ORP = oxidation-reduction potential
-- = Data not collected
°C = degrees Centigrade
mg/L = milligrams per liter
µS/cm = micro Siemens per centimeter
mV = millivolts

Table 4

Groundwater Analytical Results Summary
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Well ID	Sample ID	Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Naphthalene (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Total dissolved solids (TDS) (mg/L)
NMWQCC Groundwater Quality Standards				***0.01***	***0.75***	***0.75***	***0.62***	***0.03***	***1***	***0.2***	***250***	***600***	***1000***
MW-1	MW-1	6/14/2009	(orig)	0.0051	0.0076	< 0.005	0.0097	< 0.005	**--**	**--**	119	**1690**	--
	MW-1	9/23/2009	(orig)	**0.018**	0.0054	0.0013	0.0116	< 0.001	< 0.02	0.17	80.5	**1640**	**2880**
	MW-1	12/16/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	0.108	127	**1960**	**3140**
	MW-1	4/1/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	0.0849	72.3	**1440**	**2850**
	MW-1	6/9/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	0.114	83.8	**1450**	**3340**
	MW-1	9/20/2010	(orig)	0.0053	< 0.001	< 0.001	< 0.001	--	--	**0.207**	84.9	**1710**	**4070**
	MW-1	12/17/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	0.131	93.5	**2100**	**4340**
	MW-1	3/16/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	0.102	120	**1690**	**3230**
	GW-74933-062211-PG-04	6/22/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	< 0.015	95.7	**2060**	**3120**
	GW-074933-092711-CM-009	9/27/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0988	107	**2240**	**3420**
	GW-074933-121311-CB-MW-1	12/13/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.518**	113	**2600**	**4050**
	GW-074933-121311-CB-MW-DUP	12/13/2011	(Duplicate)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	--	--	--	--
	GW-074933-3812-CB-MW-1	3/8/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.23**	99	**2230**	**3590**
	GW-074933-3812-CB-DUP	3/8/2012	(Duplicate)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	--	--	--	--
	GW-074933-060612-CB-MW-1	6/6/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0175	122	**1780**	**3250**
	GW-074933-092012-JP-MW-1	9/20/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0177	79.2	--	**3260**
	GW-074933-121212-CM-MW-1	12/12/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0227	99.1	**1850**	**3100**
	GW-074933-032713-JK-MW1	3/27/2013	(orig)	0.008	0.0051	0.0508	0.0856	--	--	**1.27**	**829**	**1940**	**4240**
	GW-074933-032713-JK-DUP	3/27/2013	(Duplicate)	0.008	0.0047	0.0493	0.078	--	--	--	--	--	--
	GW-074933-061913-JK-MW1	6/19/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	< 0.005	73.6	**1400**	--
	GW-074933-091213-CM-MW-1	9/12/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0315	133	**1590**	**3870**
	GW-074933-121213-CM-MW-1	12/12/2013	(orig)	< 0.001	< 0.001	0.001	< 0.003	--	--	0.0065	77.8	**1470**	**2370**
	GW-074933-032014-CK-MW-1	3/20/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.14	112	**1520**	**2650**
	GW-074933-032014-CK-DUP	3/20/2014	(Duplicate)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	--	--	--	--
	GW-074933-061814-CK-MW-1	6/18/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0064	84.1	**1590**	**2760**
	GW-074933-061814-CK-DUP	6/18/2014	(Duplicate)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	--	--	--	--
	GW-074933-091814-CB-MW-1	9/18/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0188	92.5	**1690**	**3020**
	GW-074933-091814-CB-DUP	9/18/2014	(Duplicate)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	--	--	--	--
	GW-074933-121814-CM-MW-1	12/18/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	< 0.005	84.2	**1660**	**2690**
	GW-074933-031815-CM-MW-1	3/18/2015	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0153	85.3	**1340**	**2480**
	GW-074933-091615-CK-MW-1	9/16/2015	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	< 0.005	127	**1840**	**2920**
	GW-074933-12215-CB-MW-1	12/2/2015	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	< 0.005	84	**1750**	**3340**
	GW-074933-033016-CM-MW-1	3/30/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0083	90.5	**1900**	**2830**
	GW-074933-062116-SP-MW-1	6/22/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.0114	67.9	**2050**	**13200**
	GW-074933-062116-SP-MW-1	9/8/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.113	68.6	**2100**	**2990**
	GW-074933-120116-JK-MW-1	12/1/2016	(orig)	--	--	--	--	--	--	0.0364	47.9	**950**	**1590**
	GW-074933-030817-CN-MW-1	3/8/2017	(orig)	--	--	--	--	--	--	**0.962**	135	**2000**	**3330**
	WT-074933-061417-CN-MW-1	06/14/2017	(orig)	--	--	--	--	--	--	--	67.6	**2050**	--
	GW-11145983-092717-SP-MW-1	09/27/2017	(orig)	--	--	--	--	--	--	0.027	61.3	**2470**	**3990**
	GW-11145983-120517-SP-MW-1	12/05/2017	(orig)	--	--	--	--	--	--	0.0896	88.4	**2310**	**4060**

Table 4

Groundwater Analytical Results Summary
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Well ID	Sample ID	Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Naphthalene (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Total dissolved solids (TDS) (mg/L)
NMWQCC Groundwater Quality Standards				***0.01***	***0.75***	***0.75***	***0.62***	***0.03***	***1***	***0.2***	***250***	***600***	***1000***
MW-2	MW-2	6/14/2009	(orig)	0.0094	**1.1**	0.18	**2.28**	0.021	**--**	**--**	40.1	**1360**	--
	MW-2	9/23/2009	(orig)	0.0077	< 0.001	0.11	**0.72**	0.016	0.0239	**6.82**	39.4	**1390**	**2480**
	MW-2	12/16/2009	(orig)	**0.02**	0.0079	0.24	**0.7778**	--	--	**5.26**	63.3	**1510**	**2390**
	MW-2	4/1/2010	(orig)	0.009	0.027	0.18	0.547	--	--	**4.1**	56.5	**1170**	**2460**
	MW-2	6/9/2010	(orig)	0.0038	0.0093	0.099	0.2656	--	--	**3.24**	48.7	**1280**	**2590**
	MW-2	9/20/2010	(orig)	0.005	0.0076	0.061	0.1365	--	--	**2.7**	48.7	**1390**	**2440**
	MW-2	12/17/2010	(orig)	0.0068	0.019	0.071	0.1177	--	--	**2.28**	38.3	**1520**	**2760**
	MW-2	3/16/2011	(orig)	0.0088	0.093	0.083	0.259	--	--	**2.94**	66.7	**1470**	**2680**
	GW-74933-062211-PG-03	6/22/2011	(orig)	0.0013	0.0036	0.0058	0.018	--	--	**2.59**	39.8	**1730**	**2510**
	GW-074933-092711-CM-008	9/27/2011	(orig)	0.0076	0.0091	0.0104	0.0316	--	--	**1.92**	34.4	**1330**	**2070**
	GW-074933-092711-CM-010	9/27/2011	(Duplicate)	0.0075	0.0093	0.0104	0.0314	--	--	--	--	--	--
	GW-074933-121311-CB-MW-2	12/13/2011	(orig)	0.009	0.0476	0.0144	0.07	--	--	**2.08**	36.9	**1150**	**2170**
	GW-074933-3812-CB-MW-2	3/8/2012	(orig)	**0.0107**	0.0959	0.0232	0.149	--	--	**2.01**	66	**1380**	**2500**
	GW-074933-060612-CB-MW-2	6/6/2012	(orig)	0.0054	0.0404	0.0139	0.0797	--	--	**2.12**	76.9	**1640**	**2560**
	GW-074933-060612-CB-DUP	6/6/2012	(Duplicate)	0.0066	0.0405	0.0135	0.0728	--	--	--	--	--	--
	GW-074933-092012-JP-MW-2	9/20/2012	(orig)	0.0063	0.0329	0.012	0.0612	--	--	**1.8**	32.7	--	**2150**
	GW-074933-092012-JP-DUP	9/20/2012	(Duplicate)	0.0066	0.0338	0.01	0.0623	--	--	**--**	--	--	**--**
	GW-074933-121212-CM-MW-2	12/12/2012	(orig)	**0.0106**	0.067	0.0147	0.0991	--	--	**1.22**	40.3	**1160**	**2040**
	GW-074933-121212-CM-DUP	12/12/2012	(Duplicate)	**0.0103**	0.0662	0.0156	0.0984	--	--	--	--	--	--
	GW-074933-032713-JK-MW2	3/27/2013	(orig)	**0.0215**	0.0171	0.0263	0.11	--	--	**1.06**	70	**1150**	**2050**
	GW-074933-061913-JK-MW2	6/19/2013	(orig)	**0.0318**	0.104	0.0696	0.41	--	--	**1.19**	63.7	**1000**	--
	GW-074933-061913-JK-DUP	6/19/2013	(Duplicate)	**0.032**	0.0986	0.0625	0.4	--	--	--	--	--	--
	GW-074933-091213-CM-MW-2	9/12/2013	(orig)	0.0043	0.0429	0.0118	0.0747	--	--	**2.2**	32.4	**1390**	**2210**
	GW-074933-091213-CM-DUP	9/12/2013	(Duplicate)	0.0032	0.0303	0.0084	0.0529	--	--	--	--	--	--
	GW-074933-121213-CM-MW-2	12/12/2013	(orig)	0.0084	0.109	0.0181	0.14	--	--	**1.39**	46.6	**1220**	**2080**
	GW-074933-121213-CM-DUP	12/12/2013	(Duplicate)	0.0073	0.108	0.0177	0.138	--	--	--	--	--	--
	GW-074933-032014-CK-MW-2	3/20/2014	(orig)	0.0066	0.046	0.0108	0.0885	--	--	**1.54**	45.7	**1280**	**2240**
	GW-074933-061814-CK-MW-2	6/18/2014	(orig)	0.0038	0.0197	0.008	0.0451	--	--	**2.2**	46.3	**1300**	**2130**
	GW-074933-091814-CB-MW-2	9/18/2014	(orig)	<0.001	<0.001	<0.001	<0.003	--	--	**2.22**	23.8	**1200**	**2240**
	GW-074933-121814-CM-MW-2	12/18/2014	(orig)	0.0051	0.117	0.0142	0.0842	--	--	**1.37**	37	**1100**	**1740**
	GW-074933-031815-CM-MW-2	3/18/2015	(orig)	0.0045	0.0415	0.0207	0.138	--	--	**1.54**	32.4	**1100**	**2140**
	GW-074933-091615-CK-MW-2	9/16/2015	(orig)	0.002	0.002	0.0019	0.007	--	--	**2.17**	18.3	**1210**	**1880**
	GW-074933-091615-CK-DUP	9/16/2015	(Duplicate)	0.0035	0.0036	0.0037	0.0137	--	--	--	--	--	--
	GW-074933-12215-CB-MW-2	12/2/2015	(orig)	0.0038	0.0127	0.0036	0.023	--	--	**1.56**	26.8	**983**	**1870**
	GW-074933-033016-CM-MW-2	3/30/2016	(orig)	0.005	0.0557	0.0089	0.08	--	--	**2.5**	96.9	**1510**	**2490**
	GW-074933-033016-CM-DUP	3/30/2016	(Duplicate)	0.005	0.0543	0.0087	0.0774	--	--	**--**	--	**--**	**--**
	GW-074933-062116-SP-MW-2	6/22/2016	(orig)	0.0015	0.003	0.0013	0.0074	--	--	**2.26**	84.9	**1320**	**2130**
	GW-074933-062116-SP-DUP	6/22/2016	(Duplicate)	0.0023	0.0083	0.0034	0.0204	--	--	**--**	--	**--**	**--**
	GW-074933-090816-SP-MW-2	9/8/2016	(orig)	0.0023	0.0018	0.0011	0.0054	--	--	**1.67**	23.4	**1320**	**1870**
	GW-074933-090816-SP-DUP	9/8/2016	(Duplicate)	0.0023	0.002	0.0013	0.0055	--	--	**--**	--	**--**	**--**
	GW-074933-120116-JK-MW-2	12/1/2016	(orig)	0.0066	0.0324	0.0092	0.0626	--	--	**1.04**	29.9	**983**	**1690**
	GW-074933-030817-CN-MW-2	3/8/2017	(orig)	0.0046	0.030	0.0065	0.0507	--	--	**1.89**	40.2	**858**	**2180**
	WT-074933-061417-CN-MW-2	6/14/2017	(orig)	0.0013	0.0095	0.0033	0.0188	--	--	--	53.8	**1130**	**--**
	GW-11145983-092717-SP-MW-2	09/27/2017	(orig)	--	--	--	--	--	--	**1.68**	18.3	**1040**	**1820**
	GW-11145983-120517-SP-MW-2	12/05/2017	(orig)	--	--	--	--	--	--	**1.57**	23.4	**981**	**1590**

Table 4

Groundwater Analytical Results Summary
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Well ID	Sample ID	Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Naphthalene (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Total dissolved solids (TDS) (mg/L)
NMWQCC Groundwater Quality Standards				***0.01***	***0.75***	***0.75***	***0.62***	***0.03***	***1***	***0.2***	***250***	***600***	***1000***
MW-3	MW-3	6/14/2009	(orig)	0.01	**1.4**	0.49	**4.05**	**0.036**	--	--	40.3	**1510**	--
	MW-3 duplicate	6/14/2009	(Duplicate)	0.01	**1.4**	0.54	**4.3**	--	--	--	--	--	--
	MW-3	9/23/2009	(orig)	**0.013**	0.0085	0.089	0.32	0.0039	0.0486	**1.11**	64.5	**1500**	**2720**
	MW-3	12/16/2009	(orig)	**0.018**	0.017	0.096	0.28	--	--	**0.932**	99.1	**1920**	**2560**
	MW-3	4/1/2010	(orig)	**0.018**	0.076	0.19	0.59	--	--	**1.04**	5.34	**796**	**1650**
	MW-3	6/9/2010	(orig)	**0.012**	0.02	0.024	0.069	--	--	0.193	30.8	**989**	**2200**
	MW-3	9/20/2010	(orig)	0.009	0.011	0.079	0.142	--	--	**0.818**	49.9	493	**2840**
	MW-3	12/17/2010	(orig)	0.004	0.0034	0.048	0.071	--	--	**0.41**	64.8	**1760**	**2590**
	MW-3	3/16/2011	(orig)	0.0077	0.028	0.22	0.44	--	--	**1.63**	63.4	**1180**	**2500**
	GW-74933-062211-PG-01	6/22/2011	(orig)	0.0024	0.0203	0.0502	0.098	--	--	**0.906**	92.2	**1780**	**3270**
	GW-74933-062211-PG-02	6/22/2011	(Duplicate)	0.0026	0.0224	0.0548	0.107	--	--	--	--	--	--
	GW-074933-092711-CM-007	9/27/2011	(orig)	< 0.001	< 0.001	0.0034	0.0043	--	--	**0.842**	**272**	**2130**	**2940**
	GW-074933-121311-CB-MW-3	12/13/2011	(orig)	0.00079 J	0.00053 J	0.0042	0.0042	--	--	**0.747**	82.7	**1840**	**2810**
	GW-074933-3812-CB-MW-3	3/8/2012	(orig)	**0.016**	0.032	0.143	0.226	--	--	**1.76**	63.4	**1460**	**2730**
	GW-074933-060612-CB-MW-3	6/6/2012	(orig)	< 0.001	0.0038	0.0273	0.0267	--	--	**0.5**	88.8	**2100**	**3000**
	GW-074933-092012-JP-MW-3	9/20/2012	(orig)	0.0038	< 0.001	0.0428	0.0288	--	--	**0.578**	105	--	**2990**
	GW-074933-121212-CM-MW-3	12/12/2012	(orig)	**0.0137**	0.0132	0.0442	0.0613	--	--	**0.509**	72.1	**1550**	**2650**
	GW-074933-032713-JK-MW3	3/27/2013	(orig)	< 0.001	< 0.001	0.14	0.168	--	--	**1.81**	52.7	**1530**	**2500**
	GW-074933-061913-JK-MW3	6/19/2013	(orig)	< 0.001	< 0.001	0.0534	0.048	--	--	**1.66**	81.6	**1240**	**--**
	GW-074933-091213-CM-MW-3	9/12/2013	(orig)	0.0036	< 0.001	0.0403	0.0485	--	--	**0.989**	87.2	**920**	**2120**
	GW-074933-121213-CM-MW-3	12/12/2013	(orig)	0.0056	0.0131	0.0583	0.0761	--	--	**1.2**	57.8	**1290**	**2080**
	GW-074933-032014-CK-MW-3	3/20/2014	(orig)	0.0059	0.0152	0.0257	0.125	--	--	**2.17**	55.7	**1350**	**2520**
	GW-074933-061814-CK-MW-3	6/18/2014	(orig)	0.0021	0.008	0.0355	0.122	--	--	**3.28**	109	**1540**	**2810**
	GW-074933-091814-CB-MW-3	9/18/2014	(orig)	< 0.001	< 0.001	0.0173	0.0106	--	--	**1.84**	92	**1540**	**3660**
	GW-074933-121848-CK-MW-3	12/18/2014	(orig)	**0.0121**	0.0173	0.0109	0.0316	--	--	**2.61**	66.6	**751**	**3100**
	GW-074933-121814-CM-DUP	12/18/2014	(Duplicate)	**0.0106**	0.0152	0.0097	0.0274	--	--	--	--	--	--
	GW-074933-031815-CM-MW-3	3/18/2015	(orig)	0.0086	0.0122	0.01	0.0274	--	--	**1.8**	59.3	**1380**	**2460**
	GW-074933-031815-CM-DUP	3/18/2015	(Duplicate)	0.0091	0.0135	0.011	0.03	--	--	--	--	--	--
	GW-074933-091615-CK-MW-3	9/16/2015	(orig)	0.0014	< 0.001	0.0098	< 0.003			**0.897**	114	**1560**	**2520**
	GW-074933-12215-CB-MW-3	12/2/2015	(orig)	< 0.001	< 0.001	0.0013	< 0.003	--	--	**0.99**	60.9	**1580**	**2640**
	GW-074933-12215-CB-DUP	12/2/2015	(Duplicate)	< 0.001	< 0.001	0.0011	< 0.003	--	--	--	--	--	--
	GW-074933-033016-CM-MW-3	3/30/2016	(orig)	0.0012	0.0016	0.0265	0.0124	--	--	**1.24**	59.7	**1500**	**2430**
	GW-074933-062116-SP-MW-3	6/22/2016	(orig)	< 0.001	< 0.001	0.0016	< 0.003	--	--	**0.718**	120	**1800**	**2920**
	GW-074933-090816-SP-MW-3	9/8/2016	(orig)	< 0.001	< 0.001	0.0036	< 0.003	--	--	**0.512**	118	**1810**	**2790**
	GW-074933-120116-JK-MW-3	12/1/2016	(orig)	0.001	< 0.001	0.0064	< 0.003	--	--	**0.476**	79.9	**1600**	**2710**
	GW-074933-030817-CN-MW-3	3/8/2017	(orig)	0.0012	< 0.001	0.0053	< 0.003	--	--	**1.57**	59.2	**1600**	**2590**
	WT-074933-061417-CN-MW-3	6/14/2017	(orig)	< 0.001	< 0.001	0.0046	< 0.003	--	--	--	114	**1730**	**--**
	GW-11145983-092717-SP-MW-3	09/27/2017	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.366**	135	**1880**	**3340**
	GW-11145983-120517-SP-MW-3	12/05/2017	(orig)	0.0012	<0.001	0.0071	< 0.003	--	--	**1.44**	63.9	**1800**	**2510**

Table 4

Groundwater Analytical Results Summary
Hilcorp Energy Company
Randleman No. 1
San Juan County, New Mexico

Well ID	Sample ID	Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Naphthalene (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Total dissolved solids (TDS) (mg/L)
NMWQCC Groundwater Quality Standards				*0.01*	*0.75*	*0.75*	*0.62*	*0.03*	*1*	*0.2*	*250*	*600*	*1000*
MW-4	MW-4	6/14/2009	(orig)	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	--	--	**2310**	**4190**	--
	MW-4	9/23/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.0308	**2.73**	**2130**	**3320**	**8600**
	MW-4	12/16/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	**1.8**	**3430**	**4110**	**9600**
	MW-4	4/1/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	**1.52**	**2350**	**3110**	**8560**
	MW-4	6/9/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	**1.06**	**2190**	**2710**	**4720**
	MW-4	9/20/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	**1.24**	**2640**	**3260**	**9550**
	MW-4	12/17/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	**1.68**	**2350**	**3570**	**9400**
	MW-4	3/16/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	--	--	**1.82**	**2310**	**3300**	**8440**
	GW-74933-062211-PG-05	6/22/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.61**	**2150**	**4050**	**8760**
	GW-074933-092711-CM-006	9/27/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.31**	**2350**	**3650**	**8270**
	GW-074933-121311-CB-MW-4	12/13/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.82**	**2240**	**1530**	**7850**
	GW-074933-3812-CB-MW-4	3/8/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	0.106	**2610**	**3250**	**8700**
	GW-074933-060612-CB-MW-4	6/6/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.29**	**2520**	**3740**	**8270**
	GW-074933-092012-JP-MW-4	9/20/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.32**	**2420**	--	**7590**
	GW-074933-121212-CM-MW-4	12/12/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.51**	**2460**	**3250**	**8830**
	GW-074933-032713-JK-MW4	3/27/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.46**	**2270**	**3180**	**8320**
	GW-074933-061913-JK-MW4	6/19/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.44**	**2000**	**2790**	--
	GW-074933-091213-CM-MW-4	9/12/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.18**	**2520**	**3080**	**6570**
	GW-074933-121213-CM-MW-4	12/12/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.61**	**2570**	**3320**	**8430**
	GW-074933-032014-CK-MW-4	3/20/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.34**	**2470**	**3420**	**8600**
	GW-074933-061814-CK-MW-4	6/18/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.32**	**2470**	**3010**	**8300**
	GW-074933-091814-CB-MW-4	9/18/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.89**	**1890**	**2950**	**8820**
	GW-074933-121814-CM-MW-4	12/18/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.45**	**2510**	**3480**	**8440**
	GW-074933-031518-CM-MW-4	3/18/2015	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.32**	**2400**	**3170**	**9220**
	GW-074933-091615-CK-MW-4	9/16/20015	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.44**	**2000**	**3370**	**7300**
	GW-074933-12215-CB-MW-4	12/2/2015	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.17**	**2390**	**3090**	**10800**
	GW-074933-033016-CM-MW-4	3/30/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.33**	**2390**	**3350**	**9400**
	GW-074933-062116-SP-MW-4	6/22/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.26**	**1990**	**3790**	**8600**
	GW-074933-090816-SP-MW-4	9/8/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.928**	**2670**	**3550**	**9200**
	GW-074933-120116-JK-MW-4	12/1/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**1.48**	**2420**	**3310**	**8100**
	GW-074933-030817-CN-MW-4	3/8/2017	(orig)	--	--	--	--	--	--	**1.56**	**2470**	**3510**	**8600**
	WT-074933-061417-CN-MW-4	06/14/2017	(orig)	--	--	--	--	--	--	--	**2550**	**3260**	**--**
	GW-11145983-092717-SP-MW-4	09/27/2017	(orig)	--	--	--	--	--	--	**1.19**	**2570**	**3310**	**9370**
	GW-11145983-120517-SP-MW-4	12/05/2017	(orig)	--	--	--	--	--	--	**1.53**	**2530**	**3280**	**9500**
MW-5	GW-074933-061913-JK-MW5	6/19/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.255**	**3900**	**1550**	--
	GW-074933-091213-CM-MW-5	9/12/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.245**	**4040**	**1630**	**10800**
	GW-074933-121213-CM-MW-5	12/12/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.232**	**4130**	**1870**	**8250**
	GW-074933-032014-CK-MW-5	3/20/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.244**	**4050**	**1630**	**9530**
	GW-074933-061814-CK-MW-5	6/18/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.204**	**3690**	**1580**	**9820**
	GW-074933-091814-CB-MW-5	9/18/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.214**	**3840**	**1540**	**17900**
		9/13/2016	MW-5 PLUGGED AND ABANDONED										
MW-6	GW-074933-120116-JK-MW-6	9/26/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.349**	**3440**	**3250**	--
	GW-074933-120116-JK-MW-6	12/1/2016	(orig)	< 0.001	< 0.001	< 0.001	< 0.003	--	--	**0.291**	**3300**	**3040**	**9800**
	GW-074933-030817-CN-MW-6	3/8/2017	(orig)	--	--	--	--	--	--	0.156	**3170**	**2990**	**9600**
	WT-074933-061417-CN-MW-6	6/14/2017	(orig)	--	--	--	--	--	--	**--**	**3500**	**2890**	**--**
	GW-11145983-092717-SP-MW-6	09/27/2017	(orig)	--	--	--	--	--	--	**0.272**	**3400**	**3160**	**10700**
	GW-11145983-120517-SP-MW-6	12/05/2017	(orig)	--	--	--	--	--	--	**0.292**	**3470**	**3200**	**10500**

Notes:
MW = monitoring well
NMWQCC = New Mexico Water Quality Control Commission
Constituents in **BOLD** are in excess of NMWQCC groundwater quality standards
mg/L = milligrams per liter (parts per million)
< 1.0 = Below laboratory detection limit of 1.0 mg/L

Appendices

Appendix A
Groundwater Laboratory Analytical Reports

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

March 22, 2017

Christine Mathews
GHD Services, Inc.
6212 Indian School Rd. NE St2
Albuquerque, NM 87110

RE: Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Dear Christine Mathews:
Enclosed are the analytical results for sample(s) received by the laboratory on March 10, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alice Spiller

Alice Spiller
alice.spiller@pacelabs.com
(913)563-1409
Project Manager

Enclosures

cc: Angela Bown, GHD Services, Inc,
Jeffrey Walker, GHD Services, Inc

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60239528001	**GW-074933-030817-CN-MW-1**	Water	03/08/17 13:53	03/10/17 09:10
60239528002	**GW-074933-030817-CN-MW-2**	Water	03/08/17 13:32	03/10/17 09:10
60239528003	**GW-074933-030817-CN-MW-3**	Water	03/08/17 13:46	03/10/17 09:10
60239528004	**GW-074933-030817-CN-MW-4**	Water	03/08/17 14:00	03/10/17 09:10
60239528005	**GW-074933-030817-CN-MW-6**	Water	03/08/17 14:05	03/10/17 09:10

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SAMPLE ANALYTE COUNT

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60239528001	**GW-074933-030817-CN-MW-1**	EPA 6010	ZBM	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60239528002	**GW-074933-030817-CN-MW-2**	EPA 6010	ZBM	1	PASI-K
		EPA 8260	EAG	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60239528003	**GW-074933-030817-CN-MW-3**	EPA 6010	ZBM	1	PASI-K
		EPA 8260	EAG	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60239528004	**GW-074933-030817-CN-MW-4**	EPA 6010	SMW	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60239528005	**GW-074933-030817-CN-MW-6**	EPA 6010	SMW	1	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	2	PASI-K

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PROJECT NARRATIVE

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Method: **EPA 6010**
Description: 6010 MET ICP, Dissolved
Client: GHD Services_COP NM
Date: March 22, 2017

General Information:
5 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Method: **EPA 8260**
Description: 8260 MSV UST, Water
Client: GHD Services_COP NM
Date: March 22, 2017

General Information:
2 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 468679

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60239539004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1918552)
  - Benzene
  - Ethylbenzene
  - Toluene
- MSD (Lab ID: 1918553)
  - Benzene
  - Ethylbenzene
  - Toluene

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: GHD Services_COP NM
Date: March 22, 2017

General Information:
5 samples were analyzed for SM 2540C. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: GHD Services_COP NM
Date: March 22, 2017

General Information:
5 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Sample: GW-074933-030817-CN-MW-1 **Lab ID: 60239528001** Collected: 03/08/17 13:53 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**962**	ug/L	5.0	1	03/14/17 13:00	03/15/17 14:26	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**3330**	mg/L	5.0	1		03/14/17 11:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**135**	mg/L	10.0	10		03/19/17 16:07	16887-00-6	
Sulfate	**2000**	mg/L	200	200		03/19/17 16:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Sample: GW-074933-030817-CN-MW-2 **Lab ID: 60239528002** Collected: 03/08/17 13:32 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1890**	ug/L	5.0	1	03/14/17 13:00	03/15/17 14:36	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**4.6**	ug/L	1.0	1		03/15/17 06:13	71-43-2	
Ethylbenzene	**6.5**	ug/L	1.0	1		03/15/17 06:13	100-41-4	
Toluene	**30.0**	ug/L	1.0	1		03/15/17 06:13	108-88-3	
Xylene (Total)	**50.7**	ug/L	3.0	1		03/15/17 06:13	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-108	1		03/15/17 06:13	2037-26-5	
4-Bromofluorobenzene (S)	101	%	80-113	1		03/15/17 06:13	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	80-114	1		03/15/17 06:13	17060-07-0	
Preservation pH	**1.0**		1.0	1		03/15/17 06:13		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2180**	mg/L	5.0	1		03/14/17 11:18		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**40.2**	mg/L	5.0	5		03/19/17 16:36	16887-00-6	
Sulfate	**858**	mg/L	100	100		03/19/17 16:50	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Sample: GW-074933-030817-CN-MW-3 **Lab ID: 60239528003** Collected: 03/08/17 13:46 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1570**	ug/L	5.0	1	03/14/17 13:00	03/15/17 14:38	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**1.2**	ug/L	1.0	1		03/15/17 06:27	71-43-2	
Ethylbenzene	**5.3**	ug/L	1.0	1		03/15/17 06:27	100-41-4	
Toluene	ND	ug/L	1.0	1		03/15/17 06:27	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/15/17 06:27	1330-20-7	
Surrogates								
Toluene-d8 (S)	100	%	80-108	1		03/15/17 06:27	2037-26-5	
4-Bromofluorobenzene (S)	101	%	80-113	1		03/15/17 06:27	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	80-114	1		03/15/17 06:27	17060-07-0	
Preservation pH	**1.0**		1.0	1		03/15/17 06:27		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2590**	mg/L	5.0	1		03/14/17 11:18		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**59.2**	mg/L	5.0	5		03/19/17 17:33	16887-00-6	
Sulfate	**1600**	mg/L	200	200		03/19/17 17:48	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Sample: GW-074933-030817-CN-MW-4 **Lab ID: 60239528004** Collected: 03/08/17 14:00 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1560**	ug/L	50.0	10	03/14/17 13:00	03/20/17 14:04	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**8600**	mg/L	5.0	1		03/14/17 11:20		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**2470**	mg/L	200	200		03/19/17 18:02	16887-00-6	
Sulfate	**3510**	mg/L	200	200		03/19/17 18:02	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Sample: GW-074933-030817-CN-MW-6 **Lab ID: 60239528005** Collected: 03/08/17 14:05 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**156**	ug/L	15.0	3	03/14/17 13:00	03/20/17 14:06	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**9600**	mg/L	5.0	1		03/14/17 11:20		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**3170**	mg/L	500	500		03/19/17 18:31	16887-00-6	
Sulfate	**2990**	mg/L	500	500		03/19/17 18:31	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

QC Batch: 468661 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60239528001, 60239528002, 60239528003, 60239528004, 60239528005

METHOD BLANK: 1918472 Matrix: Water
Associated Lab Samples: 60239528001, 60239528002, 60239528003, 60239528004, 60239528005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	03/15/17 14:22	

LABORATORY CONTROL SAMPLE: 1918473

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	993	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1918474 1918475

Parameter	Units	60239528001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	ug/L	962	1000	1000	2010	2090	104	113	75-125	4	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

QC Batch: 468679 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60239528002, 60239528003

METHOD BLANK: 1918550 Matrix: Water
Associated Lab Samples: 60239528002, 60239528003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	03/15/17 03:40	
Ethylbenzene	ug/L	ND	1.0	03/15/17 03:40	
Toluene	ug/L	ND	1.0	03/15/17 03:40	
Xylene (Total)	ug/L	ND	3.0	03/15/17 03:40	
1,2-Dichloroethane-d4 (S)	%	97	80-114	03/15/17 03:40	
4-Bromofluorobenzene (S)	%	101	80-113	03/15/17 03:40	
Toluene-d8 (S)	%	99	80-108	03/15/17 03:40	

LABORATORY CONTROL SAMPLE: 1918551

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	20.2	101	82-115	
Ethylbenzene	ug/L	20	19.6	98	83-112	
Toluene	ug/L	20	19.5	98	78-113	
Xylene (Total)	ug/L	60	59.0	98	83-114	
1,2-Dichloroethane-d4 (S)	%			94	80-114	
4-Bromofluorobenzene (S)	%			100	80-113	
Toluene-d8 (S)	%			98	80-108	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1918552 1918553

Parameter	Units	60239539004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	ND	20	20	ND	ND	0	0	55-145		18	M1
Ethylbenzene	ug/L	ND	20	20	ND	ND	0	0	45-152		11	M1
Toluene	ug/L	ND	20	20	.2J	.19J	0	0	52-144		12	M1
Xylene (Total)	ug/L	ND	60	60	ND	ND	0	0	54-146		12	MS
1,2-Dichloroethane-d4 (S)	%						95	97	80-114			
4-Bromofluorobenzene (S)	%						101	101	80-113			
Toluene-d8 (S)	%						100	99	80-108			
Preservation pH		1.0			1.0	1.0				0		

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

QC Batch: 468641 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60239528001, 60239528002, 60239528003, 60239528004, 60239528005

METHOD BLANK: 1918378 Matrix: Water
Associated Lab Samples: 60239528001, 60239528002, 60239528003, 60239528004, 60239528005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	03/14/17 11:13	

LABORATORY CONTROL SAMPLE: 1918379

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	965	96	80-120	

SAMPLE DUPLICATE: 1918380

Parameter	Units	60239429001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	314	312	1	10	

SAMPLE DUPLICATE: 1918381

Parameter	Units	60239431001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	330	340	3	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

QC Batch: 469326 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60239528001, 60239528002, 60239528003, 60239528004, 60239528005

METHOD BLANK: 1921504 Matrix: Water
Associated Lab Samples: 60239528001, 60239528002, 60239528003, 60239528004, 60239528005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	03/19/17 09:31	
Sulfate	mg/L	ND	1.0	03/19/17 09:31	

LABORATORY CONTROL SAMPLE: 1921505

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	95	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1921506 1921507

Parameter	Units	60239510002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	468	250	250	749	744	112	110	80-120	1	15	

MATRIX SPIKE SAMPLE: 1921508

Parameter	Units	60239510003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	435	250	706	109	80-120	

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QUALIFIERS

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
MS	Analyte recovery in the matrix spike was outside QC limits for one or more of the constituent analytes used in the calculated result.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074933 COP Randleman No1
Pace Project No.: 60239528

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60239528001	**GW-074933-030817-CN-MW-1**	EPA 3010	468661	EPA 6010	468741
60239528002	**GW-074933-030817-CN-MW-2**	EPA 3010	468661	EPA 6010	468741
60239528003	**GW-074933-030817-CN-MW-3**	EPA 3010	468661	EPA 6010	468741
60239528004	**GW-074933-030817-CN-MW-4**	EPA 3010	468661	EPA 6010	468741
60239528005	**GW-074933-030817-CN-MW-6**	EPA 3010	468661	EPA 6010	468741
60239528002	**GW-074933-030817-CN-MW-2**	EPA 8260	468679		
60239528003	**GW-074933-030817-CN-MW-3**	EPA 8260	468679		
60239528001	**GW-074933-030817-CN-MW-1**	SM 2540C	468641		
60239528002	**GW-074933-030817-CN-MW-2**	SM 2540C	468641		
60239528003	**GW-074933-030817-CN-MW-3**	SM 2540C	468641		
60239528004	**GW-074933-030817-CN-MW-4**	SM 2540C	468641		
60239528005	**GW-074933-030817-CN-MW-6**	SM 2540C	468641		
60239528001	**GW-074933-030817-CN-MW-1**	EPA 300.0	469326		
60239528002	**GW-074933-030817-CN-MW-2**	EPA 300.0	469326		
60239528003	**GW-074933-030817-CN-MW-3**	EPA 300.0	469326		
60239528004	**GW-074933-030817-CN-MW-4**	EPA 300.0	469326		
60239528005	**GW-074933-030817-CN-MW-6**	EPA 300.0	469326		

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Sample Condition Upon Receipt

WO# : 60239528

60239528

Client Name: GHD Services

Courier: FedEx ☑ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

Tracking #: 7044 6660 1675 Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☑ Zplc

Thermometer Used: CF +1.5 T-266 / CF +0.9 T-239 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** 1.9 **Corr. Factor** CF +1.5 CF +0.9 **Corrected** _____

Date and initials of person examining contents: 3/10/17

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☑Yes ☐No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	
Cyanide water sample checks: ☐ N/A Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☑No ☐Yes ☑No	
Trip Blank present:	☐Yes ☑No ☐N/A	
Headspace in VOA vials (>6mm):	☐Yes ☑No ☐N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Alice Date: 03/13/17

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GHD Services_COP NM	Report To:	Christine Mathews	Attention:	
Address:	6212 Indian School Rd. NE St2	Copy To:		Company Name:	
	Albuquerque, NM 87110			Address:	
Email:	christine.mathews@ghd.com	Purchase Order #:		Pace Quote:	
Phone:	505-884-0672 Fax:	Project Name:	074933 COP Randleman No1	Pace Project Manager:	alice.spiller@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	8644, line 4

Regulatory Agency	State / Location
	NM

SAMPLE ID
One Character per box.
(A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 BTEX	Sulfate, Chloride by 300.0	Dissolved Mn-field filtered	Total Dissolved Solids	Residual Chlorine (Y/N)	00239528
1	GW-074933-030817-CN-MW-1	WT	G	3-8-17	1353				2											✓	✓	✓		BP24, BP3F15	001
2	GW-074933-030817-CN-MW-2	WT	G	3-8-17	1332				5										✓	✓	✓	✓		30494	002
3	GW-074933-030817-CN-MW-3	WT	G	3-8-17	1346				5										✓	✓	✓	✓		↓	003
4	GW-074933-030817-CN-MW-4	WT	G	3-8-17	1400				2											✓	✓	✓			004
5	GW-074933-030817-CN-MW-6	WT	G	3-8-17	1405				2											✓	✓	✓			005
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Charles Nelligh	3-9-17	1500	E Brackett / Pace	3/10/17	0910	1.9	Y	Y	Y

SAMPLER NAME AND SIGNATURE					
PRINT Name of SAMPLER:	Charles Nelligh		TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
SIGNATURE of SAMPLER:	Charles Nelligh	DATE Signed: 3-9-17				

Pace Analytical Services, LLC
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(913)599-5665

June 29, 2017

Christine Mathews
GHD Services, Inc.
6212 Indian School Rd. NE St2
Albuquerque, NM 87110

RE: Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Dear Christine Mathews:
Enclosed are the analytical results for sample(s) received by the laboratory on June 17, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alice Spiller

Alice Spiller
alice.spiller@pacelabs.com
(913)563-1409
Project Manager

Enclosures

cc: Angela Bown, GHD Services, Inc,
Jeffrey Walker, GHD Services, Inc

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CERTIFICATIONS

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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SAMPLE SUMMARY

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60246767001	**WT-074933-061417-CN-MW-1**	Water	06/14/17 10:15	06/17/17 08:30
60246767002	**WT-074933-061417-CN-MW-2**	Water	06/14/17 09:50	06/17/17 08:30
60246767003	**WT-074933-061417-CN-MW-3**	Water	06/14/17 10:35	06/17/17 08:30
60246767004	**WT-074933-061417-CN-MW-4**	Water	06/14/17 10:30	06/17/17 08:30
60246767005	**WT-074933-061417-CN-MW-6**	Water	06/14/17 11:15	06/17/17 08:30
60246767006	**TRIP BLANK**	Water	06/14/17 09:50	06/17/17 08:30

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60246767001	**WT-074933-061417-CN-MW-1**	EPA 6010	SMW	4	PASI-K
		SM 2320B	JSS	1	PASI-K
		EPA 300.0	RAD	2	PASI-K
60246767002	**WT-074933-061417-CN-MW-2**	EPA 6010	SMW	4	PASI-K
		EPA 8260	EAG	8	PASI-K
		SM 2320B	JSS	1	PASI-K
		EPA 300.0	RAD	2	PASI-K
60246767003	**WT-074933-061417-CN-MW-3**	EPA 6010	SMW	4	PASI-K
		EPA 8260	EAG	8	PASI-K
		SM 2320B	JSS	1	PASI-K
		EPA 300.0	RAD	2	PASI-K
60246767004	**WT-074933-061417-CN-MW-4**	EPA 6010	SMW	4	PASI-K
		SM 2320B	JSS	1	PASI-K
		EPA 300.0	RAD	2	PASI-K
60246767005	**WT-074933-061417-CN-MW-6**	EPA 6010	SMW	4	PASI-K
		SM 2320B	JSS	1	PASI-K
		EPA 300.0	RAD	2	PASI-K

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PROJECT NARRATIVE

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Method: **EPA 6010**
Description: 6010 MET ICP
Client: GHD Services_COP NM
Date: June 29, 2017

General Information:
5 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 482379

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60246767001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1975932)
  - Calcium
- MSD (Lab ID: 1975933)
  - Sodium

Additional Comments:

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PROJECT NARRATIVE

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Method: **EPA 8260**
Description: 8260 MSV UST, Water
Client: GHD Services_COP NM
Date: June 29, 2017

General Information:
2 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Method: **SM 2320B**
Description: 2320B Alkalinity
Client: GHD Services_COP NM
Date: June 29, 2017

General Information:
5 samples were analyzed for SM 2320B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: GHD Services_COP NM
Date: June 29, 2017

General Information:
5 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Sample: WT-074933-061417-CN-MW-1 **Lab ID: 60246767001** Collected: 06/14/17 10:15 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Calcium	**475000**	ug/L	100	1	06/23/17 17:10	06/26/17 10:03	7440-70-2	M1
Magnesium	**24500**	ug/L	50.0	1	06/23/17 17:10	06/26/17 10:03	7439-95-4	
Potassium	**4140**	ug/L	500	1	06/23/17 17:10	06/26/17 10:03	7440-09-7	
Sodium	**506000**	ug/L	2500	5	06/23/17 17:10	06/26/17 10:28	7440-23-5	M1
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**321**	mg/L	20.0	1		06/21/17 10:20		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**67.6**	mg/L	10.0	10		06/20/17 11:40	16887-00-6	
Sulfate	**2050**	mg/L	200	200		06/20/17 12:27	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Sample: WT-074933-061417-CN-MW-2 **Lab ID: 60246767002** Collected: 06/14/17 09:50 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Calcium	**400000**	ug/L	100	1	06/23/17 17:10	06/26/17 10:13	7440-70-2	
Magnesium	**12400**	ug/L	50.0	1	06/23/17 17:10	06/26/17 10:13	7439-95-4	
Potassium	**3260**	ug/L	500	1	06/23/17 17:10	06/26/17 10:13	7440-09-7	
Sodium	**172000**	ug/L	500	1	06/23/17 17:10	06/26/17 10:13	7440-23-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**1.3**	ug/L	1.0	1		06/28/17 12:21	71-43-2	
Ethylbenzene	**3.3**	ug/L	1.0	1		06/28/17 12:21	100-41-4	
Toluene	**9.5**	ug/L	1.0	1		06/28/17 12:21	108-88-3	
Xylene (Total)	**18.8**	ug/L	3.0	1		06/28/17 12:21	1330-20-7	
Surrogates								
Toluene-d8 (S)	105	%	80-108	1		06/28/17 12:21	2037-26-5	
4-Bromofluorobenzene (S)	106	%	80-113	1		06/28/17 12:21	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	80-114	1		06/28/17 12:21	17060-07-0	
Preservation pH	**1.0**		1.0	1		06/28/17 12:21		
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**213**	mg/L	20.0	1		06/21/17 10:29		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**53.8**	mg/L	5.0	5		06/20/17 13:13	16887-00-6	
Sulfate	**1130**	mg/L	100	100		06/20/17 13:28	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Sample: WT-074933-061417-CN-MW-3 **Lab ID: 60246767003** Collected: 06/14/17 10:35 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Calcium	**570000**	ug/L	100	1	06/23/17 17:10	06/26/17 10:15	7440-70-2	
Magnesium	**26300**	ug/L	50.0	1	06/23/17 17:10	06/26/17 10:15	7439-95-4	
Potassium	**2740**	ug/L	500	1	06/23/17 17:10	06/26/17 10:15	7440-09-7	
Sodium	**337000**	ug/L	500	1	06/23/17 17:10	06/26/17 10:15	7440-23-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		06/28/17 12:35	71-43-2	
Ethylbenzene	**4.6**	ug/L	1.0	1		06/28/17 12:35	100-41-4	
Toluene	ND	ug/L	1.0	1		06/28/17 12:35	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		06/28/17 12:35	1330-20-7	
Surrogates								
Toluene-d8 (S)	103	%	80-108	1		06/28/17 12:35	2037-26-5	
4-Bromofluorobenzene (S)	107	%	80-113	1		06/28/17 12:35	460-00-4	
1,2-Dichloroethane-d4 (S)	101	%	80-114	1		06/28/17 12:35	17060-07-0	
Preservation pH	**1.0**		1.0	1		06/28/17 12:35		
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**358**	mg/L	20.0	1		06/21/17 10:35		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**114**	mg/L	10.0	10		06/21/17 12:21	16887-00-6	
Sulfate	**1730**	mg/L	100	100		06/20/17 13:44	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Sample: WT-074933-061417-CN-MW-4 **Lab ID: 60246767004** Collected: 06/14/17 10:30 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Calcium	**362000**	ug/L	100	1	06/23/17 17:10	06/26/17 10:18	7440-70-2	
Magnesium	**20600**	ug/L	50.0	1	06/23/17 17:10	06/26/17 10:18	7439-95-4	
Potassium	**7300**	ug/L	500	1	06/23/17 17:10	06/26/17 10:18	7440-09-7	
Sodium	**2780000**	ug/L	25000	50	06/23/17 17:10	06/26/17 10:37	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**124**	mg/L	20.0	1		06/21/17 10:40		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**2550**	mg/L	200	200		06/20/17 14:45	16887-00-6	
Sulfate	**3260**	mg/L	200	200		06/20/17 14:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Sample: WT-074933-061417-CN-MW-6 **Lab ID: 60246767005** Collected: 06/14/17 11:15 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Calcium	**273000**	ug/L	500	5	06/23/17 17:10	06/26/17 10:21	7440-70-2	
Magnesium	**13100**	ug/L	250	5	06/23/17 17:10	06/26/17 10:21	7439-95-4	
Potassium	**11900**	ug/L	2500	5	06/23/17 17:10	06/26/17 10:21	7440-09-7	
Sodium	**3310000**	ug/L	25000	50	06/23/17 17:10	06/26/17 10:39	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**97.6**	mg/L	20.0	1		06/21/17 10:44		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**3500**	mg/L	250	250		06/20/17 15:01	16887-00-6	
Sulfate	**2890**	mg/L	250	250		06/20/17 15:01	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

QC Batch: 482379 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60246767001, 60246767002, 60246767003, 60246767004, 60246767005

METHOD BLANK: 1975930 Matrix: Water
Associated Lab Samples: 60246767001, 60246767002, 60246767003, 60246767004, 60246767005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Calcium	ug/L	ND	100	06/26/17 09:59	
Magnesium	ug/L	ND	50.0	06/26/17 09:59	
Potassium	ug/L	ND	500	06/26/17 09:59	
Sodium	ug/L	ND	500	06/26/17 09:59	

LABORATORY CONTROL SAMPLE: 1975931

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10000	100	80-120	
Magnesium	ug/L	10000	9960	100	80-120	
Potassium	ug/L	10000	9880	99	80-120	
Sodium	ug/L	10000	10000	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1975932 1975933

Parameter	Units	60246767001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	475000	10000	10000	464000	484000	-112	85	75-125	4	20	M1
Magnesium	ug/L	24500	10000	10000	32300	33500	79	90	75-125	4	20	
Potassium	ug/L	4140	10000	10000	13600	14400	94	102	75-125	6	20	
Sodium	ug/L	506000	10000	10000	519000	524000	125	175	75-125	1	20	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

QC Batch: 483045
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60246767002, 60246767003

METHOD BLANK: 1978727 Matrix: Water
Associated Lab Samples: 60246767002, 60246767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	06/28/17 11:33	
Ethylbenzene	ug/L	ND	1.0	06/28/17 11:33	
Toluene	ug/L	ND	1.0	06/28/17 11:33	
Xylene (Total)	ug/L	ND	3.0	06/28/17 11:33	
1,2-Dichloroethane-d4 (S)	%	100	80-114	06/28/17 11:33	
4-Bromofluorobenzene (S)	%	105	80-113	06/28/17 11:33	
Toluene-d8 (S)	%	103	80-108	06/28/17 11:33	

LABORATORY CONTROL SAMPLE: 1978728

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	17.3	86	82-115	
Ethylbenzene	ug/L	20	17.4	87	83-112	
Toluene	ug/L	20	17.7	89	78-113	
Xylene (Total)	ug/L	60	53.5	89	83-114	
1,2-Dichloroethane-d4 (S)	%			99	80-114	
4-Bromofluorobenzene (S)	%			99	80-113	
Toluene-d8 (S)	%			105	80-108	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1978729 1978730

Parameter	Units	60246708015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	ND	20	20	18.1	19.2	90	96	55-145	6	18	
Ethylbenzene	ug/L	ND	20	20	19.1	20.0	96	100	45-152	5	11	
Toluene	ug/L	ND	20	20	19.0	20.1	94	100	52-144	5	12	
Xylene (Total)	ug/L	ND	60	60	56.6	59.9	94	100	54-146	6	12	
1,2-Dichloroethane-d4 (S)	%						97	98	80-114			
4-Bromofluorobenzene (S)	%						96	97	80-113			
Toluene-d8 (S)	%						104	103	80-108			
Preservation pH		1.0			1.0	1.0				0		

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

QC Batch: 481922 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60246767001, 60246767002, 60246767003, 60246767004, 60246767005

METHOD BLANK: 1974038 Matrix: Water
Associated Lab Samples: 60246767001, 60246767002, 60246767003, 60246767004, 60246767005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	20.0	06/21/17 09:24	

LABORATORY CONTROL SAMPLE: 1974039

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	481	96	90-110	

SAMPLE DUPLICATE: 1974040

Parameter	Units	60246555001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	84.6	82.4	3	10	

SAMPLE DUPLICATE: 1974041

Parameter	Units	60246767001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	321	307	5	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

QC Batch: 481714 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60246767001, 60246767002, 60246767003, 60246767004, 60246767005

METHOD BLANK: 1973391 Matrix: Water
Associated Lab Samples: 60246767001, 60246767002, 60246767003, 60246767004, 60246767005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	06/20/17 08:39	
Sulfate	mg/L	ND	1.0	06/20/17 08:39	

LABORATORY CONTROL SAMPLE: 1973392

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	102	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1973393 1973394

Parameter	Units	60246767001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	67.6	50	50	122	122	108	108	80-120	0	15	
Sulfate	mg/L	2050	1000	1000	3050	3050	99	100	80-120	0	15	

MATRIX SPIKE SAMPLE: 1973395

Parameter	Units	60246591004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	3070	1250	4500	115	80-120	
Sulfate	mg/L	3850	1250	5120	101	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

QC Batch: 481959
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60246767003

METHOD BLANK: 1974118
Matrix: Water
Associated Lab Samples: 60246767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	06/21/17 08:25	

LABORATORY CONTROL SAMPLE: 1974119

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	99	90-110	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074933 COP RANDLEMAN NO1
Pace Project No.: 60246767

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60246767001	**WT-074933-061417-CN-MW-1**	EPA 3010	482379	EPA 6010	482485
60246767002	**WT-074933-061417-CN-MW-2**	EPA 3010	482379	EPA 6010	482485
60246767003	**WT-074933-061417-CN-MW-3**	EPA 3010	482379	EPA 6010	482485
60246767004	**WT-074933-061417-CN-MW-4**	EPA 3010	482379	EPA 6010	482485
60246767005	**WT-074933-061417-CN-MW-6**	EPA 3010	482379	EPA 6010	482485
60246767002	**WT-074933-061417-CN-MW-2**	EPA 8260	483045		
60246767003	**WT-074933-061417-CN-MW-3**	EPA 8260	483045		
60246767001	**WT-074933-061417-CN-MW-1**	SM 2320B	481922		
60246767002	**WT-074933-061417-CN-MW-2**	SM 2320B	481922		
60246767003	**WT-074933-061417-CN-MW-3**	SM 2320B	481922		
60246767004	**WT-074933-061417-CN-MW-4**	SM 2320B	481922		
60246767005	**WT-074933-061417-CN-MW-6**	SM 2320B	481922		
60246767001	**WT-074933-061417-CN-MW-1**	EPA 300.0	481714		
60246767002	**WT-074933-061417-CN-MW-2**	EPA 300.0	481714		
60246767003	**WT-074933-061417-CN-MW-3**	EPA 300.0	481714		
60246767003	**WT-074933-061417-CN-MW-3**	EPA 300.0	481959		
60246767004	**WT-074933-061417-CN-MW-4**	EPA 300.0	481714		
60246767005	**WT-074933-061417-CN-MW-6**	EPA 300.0	481714		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60246767

60246767

Client Name: GHD_COP NM

Courier: FedEx ☒ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

Tracking #: 7869 0826 1730 Pace Shipping Label Used? Yes ☐ No ☐

Custody Seal on Cooler/Box Present: Yes ☒ No ☐ Seals intact: Yes ☒ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☒ Foam ☐ None ☐ Other ☐

Thermometer Used: CF +2.9 T-266 / CF +0.2 T-239 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 2.8 **Corr. Factor** CF +2.9 CF +0.2 **Corrected** 3.0

Date and initials of person examining contents: JB 6/17

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☒Yes ☐No ☐N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	
Cyanide water sample checks: ☒N/A Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☒Yes ☒No JB 6/17 ☐N/A	
Headspace in VOA vials (>6mm):	☐Yes ☒No ☐N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Alice Date: 6/19/17

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 0948	Start:
End: 0955	End:
Temp:	Temp:

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GHD Services_COP NM	Report To:	Christine Mathews	Attention:	
Address:	6212 Indian School Rd, NE St2	Copy To:		Company Name:	
Albuquerque, NM 87110				Address:	
Email:	christine.mathews@ghd.com	Purchase Order #:		Pace Quote:	
Phone:	505-884-0672 Fax:	Project Name:	074933 COP Randleman No1	Pace Project Manager:	alice.spiller@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	8544, line 4

Regulatory Agency	
State / Location	NM

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 BTEX	Sulfate, Chloride	Dissolved Mn-field filtered	Alkalinity	TDS	Total Metals Ca,Mg,Na,K	Residual Chlorine (Y/N)	60246767
1	WT-074933-061417-GW-MW-1			6-14-17	1015				3	2		1														
2	WT-074933-061417-GW-MW-2			061417	0960				6	2		1	3						X						(3) DGAH		
3	WT-074933-061417-GW-MW-3			061417	1035				6	2		1	3						X								
4	WT-074933-061417-GW-MW-4			061417	1030				3	2		1														
5	WT-074933-061417-GW-MW-6			061417	1115				3	2		1														
6																										
7																										
8																										
9																										
10																										
11																										
12																										

BP2N BP3N BP3S BP3F

(3) DGAH

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Charles Deligh	6-16-17	1600		6/17/17	0830	3.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE			TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Charles Deligh					
SIGNATURE of SAMPLER:		DATE Signed:				

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

October 10, 2017

Jeff Walker
GHD Services
6121 indian School Rd
Ste 200
Albuquerque, NM 87110

RE: Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Dear Jeff Walker:
Enclosed are the analytical results for sample(s) received by the laboratory on September 29, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alice Spiller

Alice Spiller
alice.spiller@pacelabs.com
(913)563-1409
Project Manager

Enclosures

cc: Angela Bown, GHD Services
Christine Mathews, GHD Services

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CERTIFICATIONS

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

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SAMPLE SUMMARY

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60254380001	**GW-11145983-092717-SP-MW-1**	Water	09/27/17 12:39	09/29/17 08:35
60254380002	**GW-11145983-092717-SP-MW-2**	Water	09/27/17 12:25	09/29/17 08:35
60254380003	**GW-11145983-092717-SP-MW-3**	Water	09/27/17 12:30	09/29/17 08:35
60254380004	**GW-11145983-092717-SP-MW-4**	Water	09/27/17 13:00	09/29/17 08:35
60254380005	**GW-11145983-092717-SP-MW-6**	Water	09/27/17 13:18	09/29/17 08:35
60254380006	**TB**	Water	09/27/17 12:39	09/29/17 08:35

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60254380001	**GW-11145983-092717-SP-MW-1**	EPA 6010	TDS	1	PASI-K
		SM 2540C	JSS	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60254380002	**GW-11145983-092717-SP-MW-2**	EPA 6010	TDS	1	PASI-K
		SM 2540C	JSS	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60254380003	**GW-11145983-092717-SP-MW-3**	EPA 6010	TDS	1	PASI-K
		EPA 8260	EAG	8	PASI-K
		SM 2540C	JSS	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60254380004	**GW-11145983-092717-SP-MW-4**	EPA 6010	TDS	1	PASI-K
		SM 2540C	JSS	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60254380005	**GW-11145983-092717-SP-MW-6**	EPA 6010	TDS	1	PASI-K
		SM 2540C	JSS	1	PASI-K
		EPA 300.0	OL	2	PASI-K

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Sample: GW-11145983-092717-SP-MW-1 **Lab ID: 60254380001** Collected: 09/27/17 12:39 Received: 09/29/17 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**27.0**	ug/L	5.0	1	10/06/17 16:14	10/09/17 13:42	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**3990**	mg/L	5.0	1		10/04/17 15:20		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**61.3**	mg/L	5.0	5		10/08/17 23:28	16887-00-6	
Sulfate	**2470**	mg/L	200	200		10/08/17 22:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Sample: GW-11145983-092717-SP-MW-2 **Lab ID: 60254380002** Collected: 09/27/17 12:25 Received: 09/29/17 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1680**	ug/L	5.0	1	10/06/17 16:14	10/09/17 13:45	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1820**	mg/L	5.0	1		10/04/17 15:21		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**18.3**	mg/L	2.0	2		10/08/17 23:43	16887-00-6	
Sulfate	**1040**	mg/L	100	100		10/08/17 23:57	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Sample: GW-11145983-092717-SP-MW-3 **Lab ID: 60254380003** Collected: 09/27/17 12:30 Received: 09/29/17 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**366**	ug/L	5.0	1	10/06/17 16:14	10/09/17 13:48	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		10/05/17 06:53	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		10/05/17 06:53	100-41-4	
Toluene	ND	ug/L	1.0	1		10/05/17 06:53	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		10/05/17 06:53	1330-20-7	
Surrogates								
Toluene-d8 (S)	103	%	80-108	1		10/05/17 06:53	2037-26-5	
4-Bromofluorobenzene (S)	98	%	80-113	1		10/05/17 06:53	460-00-4	
1,2-Dichloroethane-d4 (S)	102	%	80-114	1		10/05/17 06:53	17060-07-0	
Preservation pH	**1.0**		1.0	1		10/05/17 06:53		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**3340**	mg/L	5.0	1		10/04/17 15:21		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**135**	mg/L	10.0	10		10/09/17 00:12	16887-00-6	
Sulfate	**1880**	mg/L	200	200		10/09/17 00:26	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Sample: GW-11145983-092717-SP-MW-4 **Lab ID: 60254380004** Collected: 09/27/17 13:00 Received: 09/29/17 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1190**	ug/L	5.0	1	10/06/17 16:14	10/09/17 13:50	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**9370**	mg/L	5.0	1		10/04/17 15:22		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**2570**	mg/L	200	200		10/09/17 00:41	16887-00-6	
Sulfate	**3310**	mg/L	200	200		10/09/17 00:41	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Sample: GW-11145983-092717-SP-MW-6 **Lab ID: 60254380005** Collected: 09/27/17 13:18 Received: 09/29/17 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**272**	ug/L	5.0	1	10/06/17 16:14	10/09/17 13:53	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**10700**	mg/L	5.0	1		10/04/17 15:22		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**3400**	mg/L	500	500		10/09/17 01:10	16887-00-6	
Sulfate	**3160**	mg/L	500	500		10/09/17 01:10	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

QC Batch: 497371 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60254380001, 60254380002, 60254380003, 60254380004, 60254380005

METHOD BLANK: 2034591 Matrix: Water
Associated Lab Samples: 60254380001, 60254380002, 60254380003, 60254380004, 60254380005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	10/09/17 13:12	

LABORATORY CONTROL SAMPLE: 2034592

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	965	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2034593 2034594

Parameter	Units	60254351007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	ug/L	262	1000	1000	1220	1210	96	95	75-125	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

QC Batch: 497196
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60254380003

METHOD BLANK: 2033965
Matrix: Water
Associated Lab Samples: 60254380003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	10/05/17 05:57	
Ethylbenzene	ug/L	ND	1.0	10/05/17 05:57	
Toluene	ug/L	ND	1.0	10/05/17 05:57	
Xylene (Total)	ug/L	ND	3.0	10/05/17 05:57	
1,2-Dichloroethane-d4 (S)	%	97	80-114	10/05/17 05:57	
4-Bromofluorobenzene (S)	%	97	80-113	10/05/17 05:57	
Toluene-d8 (S)	%	103	80-108	10/05/17 05:57	

LABORATORY CONTROL SAMPLE: 2033966

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	17.3	87	82-115	
Ethylbenzene	ug/L	20	19.2	96	83-112	
Toluene	ug/L	20	19.2	96	78-113	
Xylene (Total)	ug/L	60	58.1	97	83-114	
1,2-Dichloroethane-d4 (S)	%			97	80-114	
4-Bromofluorobenzene (S)	%			94	80-113	
Toluene-d8 (S)	%			105	80-108	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

QC Batch: 497100 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60254380001, 60254380002, 60254380003, 60254380004, 60254380005

METHOD BLANK: 2033615 Matrix: Water
Associated Lab Samples: 60254380001, 60254380002, 60254380003, 60254380004, 60254380005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	10/04/17 15:19	

LABORATORY CONTROL SAMPLE: 2033616

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	996	100	80-120	

SAMPLE DUPLICATE: 2033617

Parameter	Units	60254380001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	3990	4060	2	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

QC Batch: 497695 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60254380001, 60254380002, 60254380003, 60254380004, 60254380005

METHOD BLANK: 2036420 Matrix: Water
Associated Lab Samples: 60254380001, 60254380002, 60254380003, 60254380004, 60254380005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	10/08/17 21:03	
Sulfate	mg/L	ND	1.0	10/08/17 21:03	

LABORATORY CONTROL SAMPLE: 2036421

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	93	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2036422 2036423

Parameter	Units	60254337002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	ND	500	500	506	499	92	90	80-120	2	15	
Sulfate	mg/L	1150	500	500	1850	1900	139	150	80-120	3	15	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

BATCH QUALIFIERS

Batch: 497196

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11145983 RANDLEMAN
Pace Project No.: 60254380

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60254380001	**GW-11145983-092717-SP-MW-1**	EPA 3010	497371	EPA 6010	497774
60254380002	**GW-11145983-092717-SP-MW-2**	EPA 3010	497371	EPA 6010	497774
60254380003	**GW-11145983-092717-SP-MW-3**	EPA 3010	497371	EPA 6010	497774
60254380004	**GW-11145983-092717-SP-MW-4**	EPA 3010	497371	EPA 6010	497774
60254380005	**GW-11145983-092717-SP-MW-6**	EPA 3010	497371	EPA 6010	497774
60254380003	**GW-11145983-092717-SP-MW-3**	EPA 8260	497196		
60254380001	**GW-11145983-092717-SP-MW-1**	SM 2540C	497100		
60254380002	**GW-11145983-092717-SP-MW-2**	SM 2540C	497100		
60254380003	**GW-11145983-092717-SP-MW-3**	SM 2540C	497100		
60254380004	**GW-11145983-092717-SP-MW-4**	SM 2540C	497100		
60254380005	**GW-11145983-092717-SP-MW-6**	SM 2540C	497100		
60254380001	**GW-11145983-092717-SP-MW-1**	EPA 300.0	497695		
60254380002	**GW-11145983-092717-SP-MW-2**	EPA 300.0	497695		
60254380003	**GW-11145983-092717-SP-MW-3**	EPA 300.0	497695		
60254380004	**GW-11145983-092717-SP-MW-4**	EPA 300.0	497695		
60254380005	**GW-11145983-092717-SP-MW-6**	EPA 300.0	497695		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60254380

60254380

Client Name: GHD Services

Courier: FedEx ☑ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

Tracking #: 7875 9032 2324 Pace Shipping Label Used? Yes ☑ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☑ Foam ☐ None ☐ Other ☐

Thermometer Used: (CF 0.0) T-266 / (CF +0.3) T-239 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 4.7 **Corr. Factor** CF 0.0 CF +0.3 **Corrected** 4.7

RH 9/29/17
Date and initials of person examining contents:

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	
Cyanide water sample checks: ☑N/A Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No ☐Yes ☐No	
Trip Blank present:	☑Yes ☐No ☐N/A	2 (DG9H)
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	AFS

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Alice Date: 10/03/17

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GHD Services, New Mexico	Report To:	Jeff Walker	Attention:	
Address:	6121 indian School Rd	Copy To:		Company Name:	
	Albuquerque, NM 87110			Address:	
Email:	jeff.walker@ghd.com	Purchase Order #:		Pace Quote:	
Phone:	505-884-0672 Fax:	Project Name:	11145983 Randleman	Pace Project Manager:	alice.spiller@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	10540, line 1

Regulatory Agency

State / Location: NM

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 BTEX	300.0 Sulfate,Chloride, TDS	Dissolved Mn-field filtered	Residual Chlorine (Y/N)	60254380
1	GW-11145983-092717-SP-MW-1	WT	G	1239	9-27-17				2			X										1	BP3N, BP2U	001
2	GW-11145983-092717-SP-MW-2			1225	9-27-17				2			X											—	002
3	GW-11145983-092717-SP-MW-3			1230	9-27-17				5			X	X						X				BP3N, BP2U, 3(DG9H)	003
4	GW-11145983-092717-SP-MW-4			1300	9-27-17				2			X											BP3N, BP2U	004
5	GW-11145983-092717-SP-MW-6			1318	9-27-17				2			X											—	005
																							TB-2(DG9H)	006
6																								
7																								
8																								
9																								
10																								
11																								
12																								

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
		9-28-17	1105	Pace	9-29-17	0835	4.7	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Steven Perez

SIGNATURE of SAMPLER: Steven Perez DATE Signed: 9/28/17

TEMP in C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

December 19, 2017

Jeff Walker
GHD Services
6121 indian School Rd
Ste 200
Albuquerque, NM 87110

RE: Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Dear Jeff Walker:
Enclosed are the analytical results for sample(s) received by the laboratory on December 08, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Colleen Clyne
colleen.clyne@pacelabs.com
1(913)563-1406
Project Manager

Enclosures

cc: Angela Bown, GHD Services
Christine Mathews, GHD Services

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
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CERTIFICATIONS

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 17-016-0
Illinois Certification #: 200030
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

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SAMPLE SUMMARY

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60259885001	**GW-11145983-120517-SP-MW-1**	Water	12/05/17 16:52	12/08/17 09:40
60259885002	**GW-11145983-120517-SP-MW-2**	Water	12/05/17 16:25	12/08/17 09:40
60259885003	**GW-11145983-120517-SP-MW-3**	Water	12/05/17 16:45	12/08/17 09:40
60259885004	**GW-11145983-120517-SP-MW-4**	Water	12/05/17 17:22	12/08/17 09:10
60259885005	**GW-11145983-120517-SP-MW-6**	Water	12/05/17 18:00	12/08/17 09:10
60259885007	**TRIP BLANK**	Water	12/05/17 16:25	12/08/17 09:10

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60259885001	**GW-11145983-120517-SP-MW-1**	EPA 6010	JGP	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60259885002	**GW-11145983-120517-SP-MW-2**	EPA 6010	JGP	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60259885003	**GW-11145983-120517-SP-MW-3**	EPA 6010	JGP	1	PASI-K
		EPA 8260	JTK	8	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60259885004	**GW-11145983-120517-SP-MW-4**	EPA 6010	JGP	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60259885005	**GW-11145983-120517-SP-MW-6**	EPA 6010	JGP	1	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	2	PASI-K
60259885007	**TRIP BLANK**	EPA 8260	JTK	8	PASI-K

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Sample: GW-11145983-120517-SP-MW-1 **Lab ID: 60259885001** Collected: 12/05/17 16:52 Received: 12/08/17 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**89.6**	ug/L	5.0	1	12/13/17 10:38	12/15/17 14:59	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**4060**	mg/L	5.0	1		12/12/17 14:29		D6
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**88.4**	mg/L	10.0	10		12/17/17 13:48	16887-00-6	
Sulfate	**2310**	mg/L	200	200		12/19/17 10:14	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Sample: GW-11145983-120517-SP-MW-2 **Lab ID: 60259885002** Collected: 12/05/17 16:25 Received: 12/08/17 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1570**	ug/L	5.0	1	12/13/17 10:38	12/15/17 15:03	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1590**	mg/L	5.0	1		12/12/17 14:30		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**23.4**	mg/L	2.0	2		12/17/17 14:16	16887-00-6	
Sulfate	**981**	mg/L	50.0	50		12/17/17 14:31	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Sample: GW-11145983-120517-SP-MW-3 **Lab ID: 60259885003** Collected: 12/05/17 16:45 Received: 12/08/17 09:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1440**	ug/L	5.0	1	12/13/17 10:38	12/15/17 15:07	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**1.2**	ug/L	1.0	1		12/14/17 00:26	71-43-2	
Ethylbenzene	**7.1**	ug/L	1.0	1		12/14/17 00:26	100-41-4	
Toluene	ND	ug/L	1.0	1		12/14/17 00:26	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/14/17 00:26	1330-20-7	
Surrogates								
Toluene-d8 (S)	101	%	80-108	1		12/14/17 00:26	2037-26-5	
4-Bromofluorobenzene (S)	104	%	80-113	1		12/14/17 00:26	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	80-114	1		12/14/17 00:26	17060-07-0	
Preservation pH	**1.0**		1.0	1		12/14/17 00:26		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2510**	mg/L	5.0	1		12/12/17 14:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**63.9**	mg/L	5.0	5		12/17/17 15:14	16887-00-6	
Sulfate	**1800**	mg/L	100	100		12/19/17 10:28	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Sample: GW-11145983-120517-SP-MW-4 **Lab ID: 60259885004** Collected: 12/05/17 17:22 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1530**	ug/L	5.0	1	12/13/17 10:38	12/15/17 15:11	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**9500**	mg/L	5.0	1		12/12/17 14:31		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**2530**	mg/L	200	200		12/17/17 15:43	16887-00-6	
Sulfate	**3280**	mg/L	200	200		12/17/17 15:43	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Sample: GW-11145983-120517-SP-MW-6 **Lab ID: 60259885005** Collected: 12/05/17 18:00 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**292**	ug/L	25.0	5	12/13/17 10:38	12/15/17 16:17	7439-96-5	
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**10500**	mg/L	5.0	1		12/12/17 14:32		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Chloride	**3470**	mg/L	500	500		12/17/17 15:57	16887-00-6	
Sulfate	**3200**	mg/L	500	500		12/17/17 15:57	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Sample: TRIP BLANK **Lab ID: 60259885007** Collected: 12/05/17 16:25 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		12/14/17 00:41	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		12/14/17 00:41	100-41-4	
Toluene	ND	ug/L	1.0	1		12/14/17 00:41	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/14/17 00:41	1330-20-7	
Surrogates								
Toluene-d8 (S)	102	%	80-108	1		12/14/17 00:41	2037-26-5	
4-Bromofluorobenzene (S)	107	%	80-113	1		12/14/17 00:41	460-00-4	
1,2-Dichloroethane-d4 (S)	97	%	80-114	1		12/14/17 00:41	17060-07-0	
Preservation pH	**1.0**		1.0	1		12/14/17 00:41		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

QC Batch: 507062 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60259885001, 60259885002, 60259885003, 60259885004, 60259885005

METHOD BLANK: 2077296 Matrix: Water
Associated Lab Samples: 60259885001, 60259885002, 60259885003, 60259885004, 60259885005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	12/15/17 14:52	

LABORATORY CONTROL SAMPLE: 2077297

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	1110	111	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2077298 2077299

Parameter	Units	60259711014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	ug/L	7.7	2000	1000	2150	1080	107	107	75-125	66	20	R1

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QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

QC Batch: 507212 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60259885003, 60259885007

METHOD BLANK: 2077907 Matrix: Water
Associated Lab Samples: 60259885003, 60259885007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	12/13/17 23:56	
Ethylbenzene	ug/L	ND	1.0	12/13/17 23:56	
Toluene	ug/L	ND	1.0	12/13/17 23:56	
Xylene (Total)	ug/L	ND	3.0	12/13/17 23:56	
1,2-Dichloroethane-d4 (S)	%	97	80-114	12/13/17 23:56	
4-Bromofluorobenzene (S)	%	108	80-113	12/13/17 23:56	
Toluene-d8 (S)	%	101	80-108	12/13/17 23:56	

LABORATORY CONTROL SAMPLE: 2077908

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	21.8	109	82-115	
Ethylbenzene	ug/L	20	21.4	107	83-112	
Toluene	ug/L	20	22.1	111	78-113	
Xylene (Total)	ug/L	60	65.4	109	83-114	
1,2-Dichloroethane-d4 (S)	%			94	80-114	
4-Bromofluorobenzene (S)	%			105	80-113	
Toluene-d8 (S)	%			102	80-108	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

QC Batch: 506965 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60259885001, 60259885002, 60259885003, 60259885004, 60259885005

METHOD BLANK: 2076908 Matrix: Water
Associated Lab Samples: 60259885001, 60259885002, 60259885003, 60259885004, 60259885005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	12/12/17 14:28	

LABORATORY CONTROL SAMPLE: 2076909

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	995	100	80-120	

SAMPLE DUPLICATE: 2076910

Parameter	Units	60259885001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	4060	3630	11	10	D6

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QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

QC Batch: 507612 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60259885001, 60259885002, 60259885003, 60259885004, 60259885005

METHOD BLANK: 2079842 Matrix: Water
Associated Lab Samples: 60259885001, 60259885002, 60259885003, 60259885004, 60259885005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloride	mg/L	ND	1.0	12/17/17 09:16	
Sulfate	mg/L	ND	1.0	12/17/17 09:16	

LABORATORY CONTROL SAMPLE: 2079843

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Sulfate	mg/L	5	5.4	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2079844 2079845

Parameter	Units	60259777001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L		25	25	22.7	21.7	58	55	80-120	4	15	M1
Sulfate	mg/L	47.1	25	25	73.8	73.4	107	105	80-120	1	15	

MATRIX SPIKE SAMPLE: 2079846

Parameter	Units	60259839001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	124	250	339	86	80-120	
Sulfate	mg/L	321	250	592	108	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

QC Batch: 507832 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60259885001, 60259885003

METHOD BLANK: 2080939 Matrix: Water
Associated Lab Samples: 60259885001, 60259885003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	12/19/17 07:53	

LABORATORY CONTROL SAMPLE: 2080940

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.3	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2080941 2080942

Parameter	Units	60259839004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	993	500	500	1640	1550	130	111	80-120	6	15	M1

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

BATCH QUALIFIERS

Batch: 507212

[M5]	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11145983 RANDLEMAN
Pace Project No.: 60259885

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60259885001	**GW-11145983-120517-SP-MW-1**	EPA 3010	507062	EPA 6010	507117
60259885002	**GW-11145983-120517-SP-MW-2**	EPA 3010	507062	EPA 6010	507117
60259885003	**GW-11145983-120517-SP-MW-3**	EPA 3010	507062	EPA 6010	507117
60259885004	**GW-11145983-120517-SP-MW-4**	EPA 3010	507062	EPA 6010	507117
60259885005	**GW-11145983-120517-SP-MW-6**	EPA 3010	507062	EPA 6010	507117
60259885003	**GW-11145983-120517-SP-MW-3**	EPA 8260	507212		
60259885007	**TRIP BLANK**	EPA 8260	507212		
60259885001	**GW-11145983-120517-SP-MW-1**	SM 2540C	506965		
60259885002	**GW-11145983-120517-SP-MW-2**	SM 2540C	506965		
60259885003	**GW-11145983-120517-SP-MW-3**	SM 2540C	506965		
60259885004	**GW-11145983-120517-SP-MW-4**	SM 2540C	506965		
60259885005	**GW-11145983-120517-SP-MW-6**	SM 2540C	506965		
60259885001	**GW-11145983-120517-SP-MW-1**	EPA 300.0	507612		
60259885001	**GW-11145983-120517-SP-MW-1**	EPA 300.0	507832		
60259885002	**GW-11145983-120517-SP-MW-2**	EPA 300.0	507612		
60259885003	**GW-11145983-120517-SP-MW-3**	EPA 300.0	507612		
60259885003	**GW-11145983-120517-SP-MW-3**	EPA 300.0	507832		
60259885004	**GW-11145983-120517-SP-MW-4**	EPA 300.0	507612		
60259885005	**GW-11145983-120517-SP-MW-6**	EPA 300.0	507612		

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Sample Condition Upon Receipt

WO# : 60259885

60259885

Client Name: GHD NM

Courier: FedEx ☒ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

Tracking #: 7888 1801 3527 Pace Shipping Label Used? Yes ☐ No ☐

Custody Seal on Cooler/Box Present: Yes ☒ No ☐ Seals intact: Yes ☒ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☒ Other ☐ CK

Thermometer Used: CF 0.0 T-266 / CF +0.2 T-239 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** 2.4 **Corr. Factor** (CF 0.0) CF +0.2 **Corrected** 2.4

Date and initials of person examining contents: JB 12/8/17

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	Extra sample not on COC
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	ID: GW-1145983-120517-SP-DUP - SPL
Samples arrived within holding time:	☒Yes ☐No ☐N/A	collected 12/5/17 (3) DGAH
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☒Yes ☐No ☐N/A	
Sample labels match COC: Date / time / ID / analyses	☐Yes ☐No ☒N/A	
Samples contain multiple phases? Matrix: WT	☒Yes ☐No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	
Cyanide water sample checks: ☒ N/A Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No ☐Yes ☐No	
Trip Blank present:	☒Yes ☐No ☐N/A	
Headspace in VOA vials (>6mm):	☐Yes ☒No ☐N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

Client Notification/ Resolution: Copy COC to Client? Y / (N) Field Data Required? Y / (N)

Person Contacted: Date/Time:

Comments/ Resolution: Notified client of extra sample. CDC 12/11/17

Project Manager Review: CMC Date: 12/12/17

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GHD Services, New Mexico	Report To:	Jeff Walker	Attention:	
Address:	6121 indian School Rd	Copy To:		Company Name:	
	Albuquerque, NM 87110			Address:	
Email:	jeff.walker@ghd.com	Purchase Order #:		Pace Quote:	
Phone:	505-884-0672 Fax	Project Name:	11145983 Randleman	Pace Project Manager:	alice.spiller@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	10540, line 1

Regulatory Agency	
State / Location	NM

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 BTEX	300.0 Sulfate,Chloride, TDS	Dissolved Mn-field filtered	Residual Chlorine (Y/N)	6025985
1	GW-11145983-120517-SP-MW-1	WT	G	12/5/17	1652			WT	2	X		X								X	X		BP2N BP3F 2-5	001
2	GW-11145983-120517-SP-MW-2				1625				2	X		X								X	X			002
3	GW-11145983-120517-SP-MW-3				1645					X		X	X						X	X	X		(3) DGAH	003
4	GW-11145983-120517-SP-MW-4				1722				2	X		X								X	X			004
5	GW-11145983-120517-SP-MW-6				1800				2	X		X								X	X		(2) DGAH TB	005 ~~006~~ 007
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Steven Perez	12/7/17	14:35		12/8/17	0910	2.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Steven Perez

SIGNATURE of SAMPLER: Steven Perez DATE Signed: 12/7/17

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)