3R – 431

2014 AGWMR

04 / 16 / 2015

John F. (Rick) Greiner, CPG, P.G.
ConocoPhillips Company
Risk Management & Remediation
Program Manager/Director Corp.
Waste Management Program
600 N. Dairy Ashford, MA 1004
Houston, TX 77079
Phone: 281-293-3264
E-mail: Rick.Greiner@conocophillips.com

ConocoPhillips

Mr. Glenn von Gonten
New Mexico Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

April 16, 2015

Re: NMOCD Case No. 3RP-431, 2014 Annual Groundwater Monitoring Report

Dear Mr. von Gonten:

Enclosed is the 2014 Annual Groundwater Monitoring Report for the Howell K No. 1 site. This report, prepared by Conestoga-Rovers & Associates (CRA), contains the results of groundwater monitoring and remediation activities conducted during September and November, 2014, respectively, at the referenced site.

Please let me know if you have any questions.

Sincerely,

Rick Greiner

Enc

CONESTOGA-ROVERS & ASSOCIATES

www.CRAworld.com

2014 Annual Groundwater Monitoring Report

ConocoPhillips Howell K No. 1
San Juan County, New Mexico
API# 30-045-09313
NMOCD# 3RP-431

Prepared for: ConocoPhillips Company

Conestoga-Rovers & Associates
6121 Indian School Road, NE Suite 200
Albuquerque, New Mexico 87110

April 2015 • 074928 • Report No. 6

Partners in Sustainability

Table of Contents

List of Figures
(Following Text)

List of Tables
(Following Text)

List of Appendices

Section 1.0 Introduction

This report details the results of annual groundwater monitoring activities and remediation events conducted by Conestoga-Rovers & Associates, Inc. (CRA) during 2014 at the ConocoPhillips Company (ConocoPhillips) Howell K No. 1 site (Site). The Site is located on Bureau of Land Management (BLM) land, approximately ½ mile southeast of Navajo Lake State Park and 10 miles east of Aztec in Unit Letter K, Section 21, Township 30N, Range 8W of San Juan County, New Mexico. Geographical coordinates for the Site are 36º 47' 40.34" North, 107º 41' 4.70" West. The Site consists of a natural gas well and associated equipment and installations. The location and general features of the Site are shown on **Figures 1** and **2**, respectively.

1.1 Background

The environmental investigation at the Site began in August 2005 with the excavation of approximately 4,000 cubic yards of hydrocarbon impacted soil from an area southwest of the Howell K No. 1 wellhead. The hydrocarbon impacted soil was discovered in the area during below grade tank removal activities. The final dimensions of the excavation were 70 feet by 50 feet by 36 feet deep. Groundwater was encountered at a depth of approximately 34 feet below ground surface (bgs). Once this extent had been reached, the excavation was stopped due to the inability of the equipment to operate safely; however, the limits of the hydrocarbon impact had not been delineated. The excavation was backfilled with clean soil. In March 2006, one groundwater monitoring well (MW-1) was installed by Envirotech in the area of the backfilled excavation. The location of this monitoring well is shown on **Figure 2**.

A transition in Site consulting responsibilities resulted in a gap in continuous groundwater monitoring in 2006. Tetra Tech began sampling groundwater at the Site in November 2007 using MW-1 and continued to do so until August of 2008, when 3 additional monitoring wells were installed at the Site by WDC Exploration and Wells of Peralta, NM under Tetra Tech supervision. The additional wells were installed in response to a request by the New Mexico Oil Conservation Division (NMOCD) for Site characterization and enhanced laboratory analyses. This request was communicated to Tetra Tech during an April 2008 meeting conducted in Santa Fe, New Mexico with Glenn von Gonten, NMOCD Environmental Bureau Hydrologist.

Groundwater monitoring well MW-2 was installed up-gradient of MW-1 and monitoring wells MW-3 and MW-4 were installed down-gradient of MW-1 (**Figure 2**).

A generalized geologic cross section was compiled using subsurface data collected from each boring location during installation of monitoring wells MW-2, MW-3 and MW-4. Monitoring wells MW-2 and MW-4 are represented on the cross section which is presented in **Figure 3**.

October 2008 marked the first quarterly groundwater monitoring event to include all 4 monitoring wells for groundwater monitoring at the Site. BTEX analysis was discontinued following the December 2010 sampling event which represented eight consecutive quarters of BTEX constituents being below laboratory detection limits in samples from all Site monitoring wells. Analysis for dissolved iron, dissolved manganese, sulfate, and fluoride were continued quarterly through October 2011. Sampling for these constituents is currently conducted on an annual basis.

On June 15, 2011, Site consulting responsibilities were transferred from Tetra Tech to CRA of Albuquerque, NM.

Due to settling of soil around the area of monitoring well MW-1 and resulting damage to the subsurface screen, it was properly plugged and abandoned and a replacement well, MW-1R, was installed during August of 2013 under CRA supervision.

A summary of the Howell K No. 1 site history can be seen in **Table 1**.

Section 2.0 Groundwater Monitoring Summary, Methodology, and Analytical Results

2.1 Groundwater Monitoring Summary

Annual groundwater sampling was conducted by CRA on September 17, 2013. This represents the second annual monitoring event since quarterly monitoring was discontinued. The groundwater sampling event included samples from monitoring wells MW-1R, MW-2, MW-3, and MW-4. Groundwater levels were measured using an oil/water interface probe prior to sampling and can be found in **Table 2**. Groundwater elevations for Site monitoring wells are calculated from top of casing elevations, which were derived from survey data collected by Tetra Tech on August 14, 2008. The top of casing elevation survey for MW-1R was performed by CRA on January 8, 2015. Based on September 2014 groundwater elevation data, groundwater flow direction continues to be mostly to the west. A groundwater potentiometric surface map is presented as **Figure 4**.

Additional groundwater sampling was conducted at the Site on December 17, 2014 to assess the effectiveness of the pH adjustment that was performed in November 2014. These events will be discussed in Section 3.0.

2.2 Groundwater Monitoring Methodology

Prior to sample collection, monitoring wells MW-1R, MW-2, MW-3, and MW-4 were purged of at least three casing volumes of water. A 1.5-inch, polyethylene, dedicated bailer was used to purge and to collect the groundwater samples. Field parameters of pH, conductivity, dissolved oxygen, temperature, and oxidation/reduction potential were measured periodically during purging and recorded. Field parameters are summarized on **Table 3**. The purge water generated during the event was disposed of in the on-Site produced water tank. The 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, KS. All groundwater samples collected were analyzed for dissolved iron, dissolved manganese, and dissolved sodium by EPA Method 6010, and fluoride and sulfate by EPA method 300.0.

2.3 Groundwater Monitoring Analytical Results

The New Mexico Water Quality Control Commission (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. Above-standard results of the September 2014 annual sampling event are discussed below:

- Dissolved Manganese
  - The NMWQCC groundwater quality standard for dissolved manganese is 0.2 mg/L. Groundwater samples collected from monitoring wells MW-1R and MW-4 were found to contain dissolved manganese at concentrations of 2.2 mg/L and 16.2 mg/L, respectively.

- Sulfate
  - The NMWQCC groundwater quality standard for sulfate is 600 mg/L. Groundwater samples collected from monitoring wells MW-1R, MW-2, MW-3 and MW-4 were found to contain sulfate at concentrations of 1,860 mg/L, 1,610 mg/L, 1,840 mg/L, and 3,080 mg/L, respectively.

- Fluoride
  - The NMWQCC domestic water supply groundwater quality standard for fluoride is 1.6 mg/L. The groundwater sample collected from monitoring well MW-4 exceeded this standard with a concentration of 1.8 mg/L.

Table 4 summarizes the analytical results from groundwater sampling completed during September of 2014. The corresponding laboratory analytical report, including quality control summaries, can be found in **Appendix A**.

Section 3.0 pH Adjustment

3.1 pH Adjustment Summary

On October 1, 2013, a groundwater sample was collected from monitoring well MW-1R and sent to CRA's Innovative Technology Group (ITG) for the purpose of conducting a metals treatability study. ITG determined that pH adjustment would be the most cost-effective method for dissolved metals remediation. On November 13th and 14th 2014, CRA injected approximately 3,200 gallons of a dilute sodium hydroxide solution primarily into MW-1R and MW-4. Generally, 11 gallons of a 25% solution of sodium hydroxide was mixed with 1,600 gallons of potable water and injected in batches, using a 300 gallon tote, into each well.

3.2 Post-pH Adjustment Groundwater Monitoring

On December 17, 2014 and February 11, 2015, groundwater samples were collected from monitoring wells MW-1R, MW-3, and MW-4 in order to assess the effectiveness of the pH adjustments. Samples were analyzed for dissolved iron, total iron, dissolved manganese, total manganese, and dissolved sodium. Total iron and total manganese were added to the analysis regimen at the recommendation of ITG and will be compared to future analytical results in order to assess the extent of metals precipitation that is occurring. Sampling for dissolved sodium was required by Mr. Jim Griswold of the NMOCD in order to monitor the dissipation of injected sodium in the groundwater. A summary of the results and the corresponding laboratory analytical reports can be found in **Table 3** and **Appendix A**, respectively.

Standard CRA groundwater monitoring methodology (Section 2.2) was utilized for these sampling events. Field parameters collected from all monitoring wells indicated elevated pH levels ranging from 10.79 to 11.26 during the December 2014 event. Pre-pH adjustment measurements of pH (Setember 23, 2014) were, on average, 7.28 in MW-1R; 6.98 in MW-3; and

6.87 in MW-4. During the February 2015 event, field parameters indicated elevated pH levels in MW-4 only (11.35).

Analytical results indicate concentrations of dissolved iron and dissolved manganese below the NMWQCC standards in all sampled monitoring wells.

September 2014 pre-pH adjustment groundwater sample results indicated dissolved manganese exceeded the NMWQCC standard of 0.2 mg/L in MW-1R and MW-4 with concentrations of 2.2 mg/L and 16.2 mg/L, respectively. During the December 2014 post pH adjustment sampling event, MW-1R, MW-3, and MW-4 all returned analytical results for dissolved manganese below the laboratory detection limit of 0.005 mg/L. During the February 2015 sampling event, 3 months post injection, MW-1R, MW-3, and MW-4 returned analytical results of 0.028 mg/L, 0.12 mg/L, and less than 0.005 mg/L, respectively, for dissolved manganese. Dissolved iron was last detected at concentrations above the NMWQCC standard in 2013 in Site wells MW-1 and MW-4. Post injection samples indicate concentrations at or just above the laboratory detection limit for dissolved iron in these wells.

Section 4.0 Conclusions and Recommendations

This Site has been added to those in the San Juan Basin that are sampled quarterly and data from the March 18, 2015 event have, at this writing, become available. Therefore, the analytical results of the 1st quarterly 2015 groundwater monitoring event, though not discussed above, are discussed in this Section of the report. Results from the recent sampling event have also been incorporated into tables included in the appendix of this report.

A review of this recent data by CRA's ITG indicates that substantial removal of dissolved iron and manganese were observed immediately after the injection event that included wells MW-1R, MW-3 and MW-4. The rebound in concentrations observed in wells MW-1R and MW-3 is likely due to advection of impacted groundwater from upgradient based on the relatively rapid decrease in pH. The ITG recommends extending the treatment area by injecting a larger volume into each well, or by multiple small injections into the wells. This will eventually treat the impacted groundwater that is moving into the treatment area.

CRA recommends a second pH adjustment injection event be completed in Site wells to treat additional dissolved manganese impacted groundwater at the Site. The ITG will use current data to recalculate dosages for an additional injection event.

Fluoride concentrations have been detected at concentrations above the NMWQCC standard of 1.6 mg/L in groundwater of MW-4 and occur at elevated concentrations in upgradient well

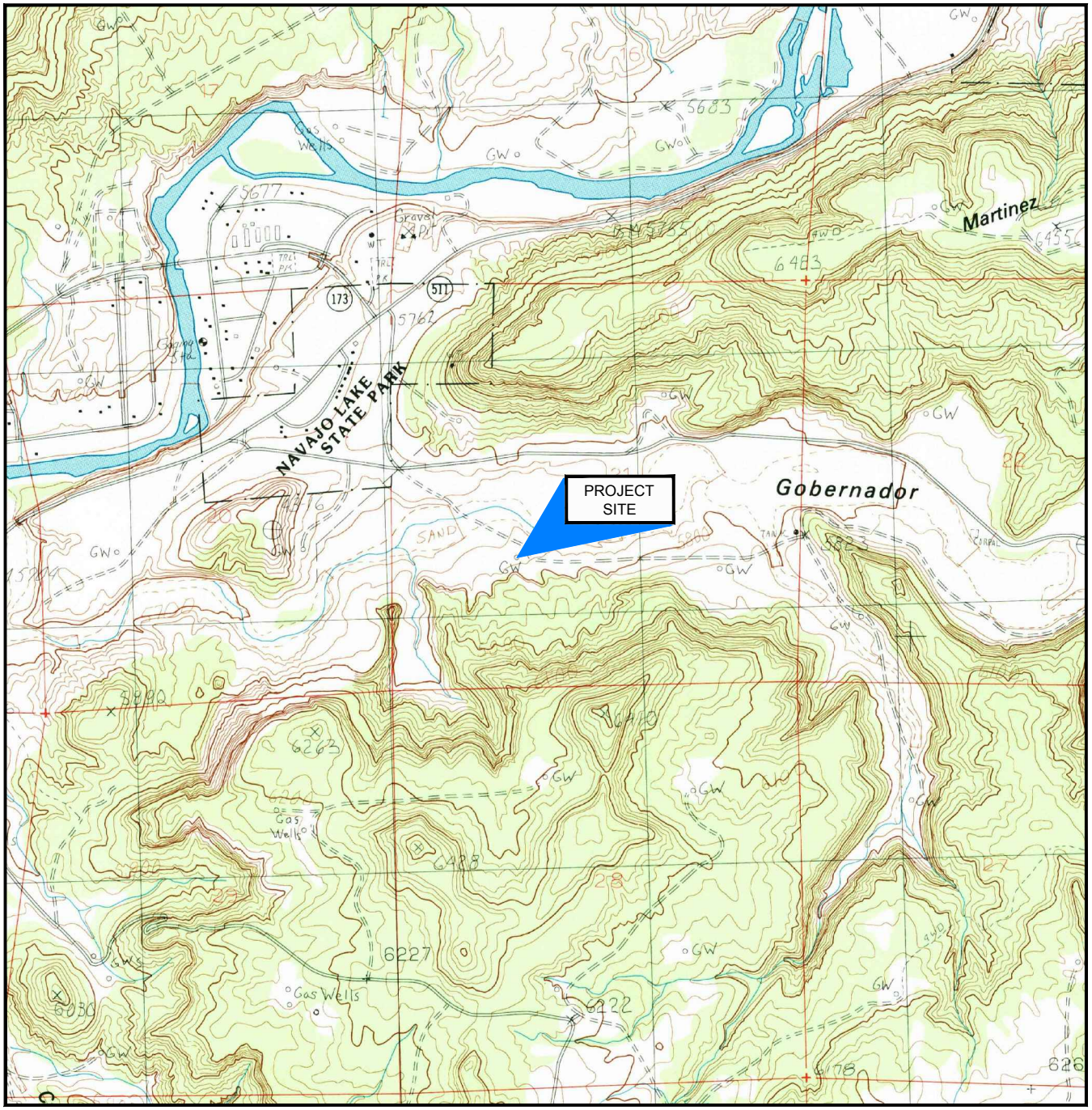
MW-2. Fluoride is known to be a naturally occurring mineral that is found in most water sources, according to the NMED in a Drinking Water Bureau Publication (http://www.nmenv.state.nm.us/dwb/contaminants/Fluoride.htm). The EPA also has concluded in several case studies[1] that the occurrence of fluoride does not appear to be related to oil and gas activity. CRA therefore recommends the elimination of fluoride as an analyzed constituent for this site.

CRA recommends the continuation of quarterly groundwater monitoring at the Site to monitor the effects of pH adjustment. Site monitoring wells MW-1, MW-2, MW-3, and MW-4 will be analyzed for fluoride, sulfate, dissolved iron and manganese, total iron and manganese, and dissolved sodium. The next quarterly monitoring event will occur in June 2015.

Following this sampling event, the monitoring data will be evaluated and the need for additional injection events and/or adjustment to sampling schedule will be assessed.

A remediation site closure petition will be submitted to the NMOCD when eight consecutive quarters of below standard concentrations of Site contaminants of concern has been documented.

Figures



SOURCE: USGS 7.5 MINUTE QUAD
"ARCHULETA, NEW MEXICO"

N

0 1000 2000ft

Figure 1

SITE VICINITY MAP
HOWELL K No. 1, NATURAL GAS WELL SITE
UNIT K. SECTION 21, T30N-R8W, SAN JUAN COUNTY, N.M.
ConocoPhillips Company

CRA

074928-95(006)GN-DL004_TOPO JAN 16/2015

ConocoPhillips high resolution aerial imagery 2008.

Figure 2

SITE PLAN
HOWELL K No. 1 NATURAL GAS WELL SITE
UNIT LETTER K, SECTION 21, T30N-R8W, SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

CRA

074928-95(006)GN-DL001_SD_TOREVILLE JAN 16/2015

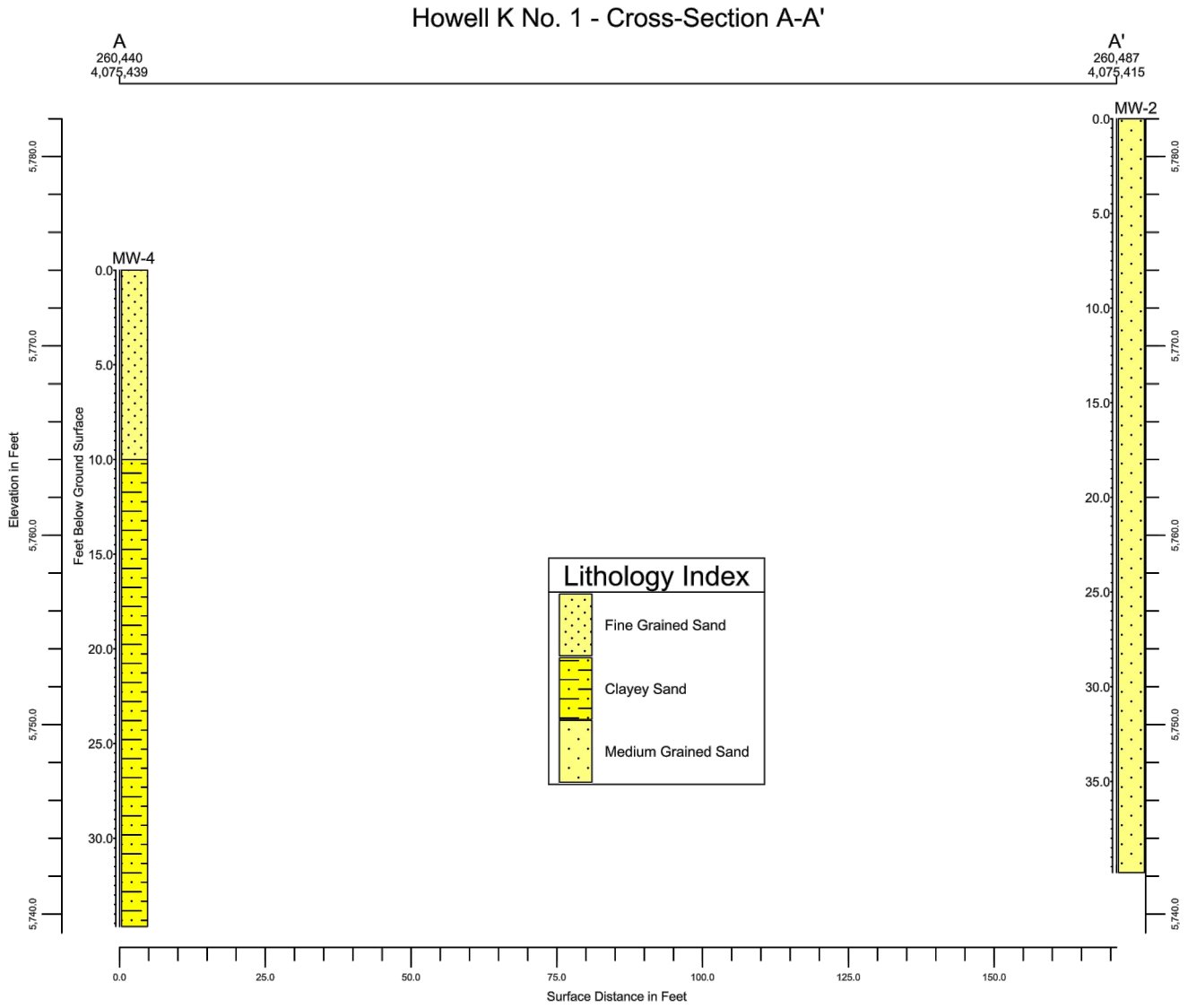
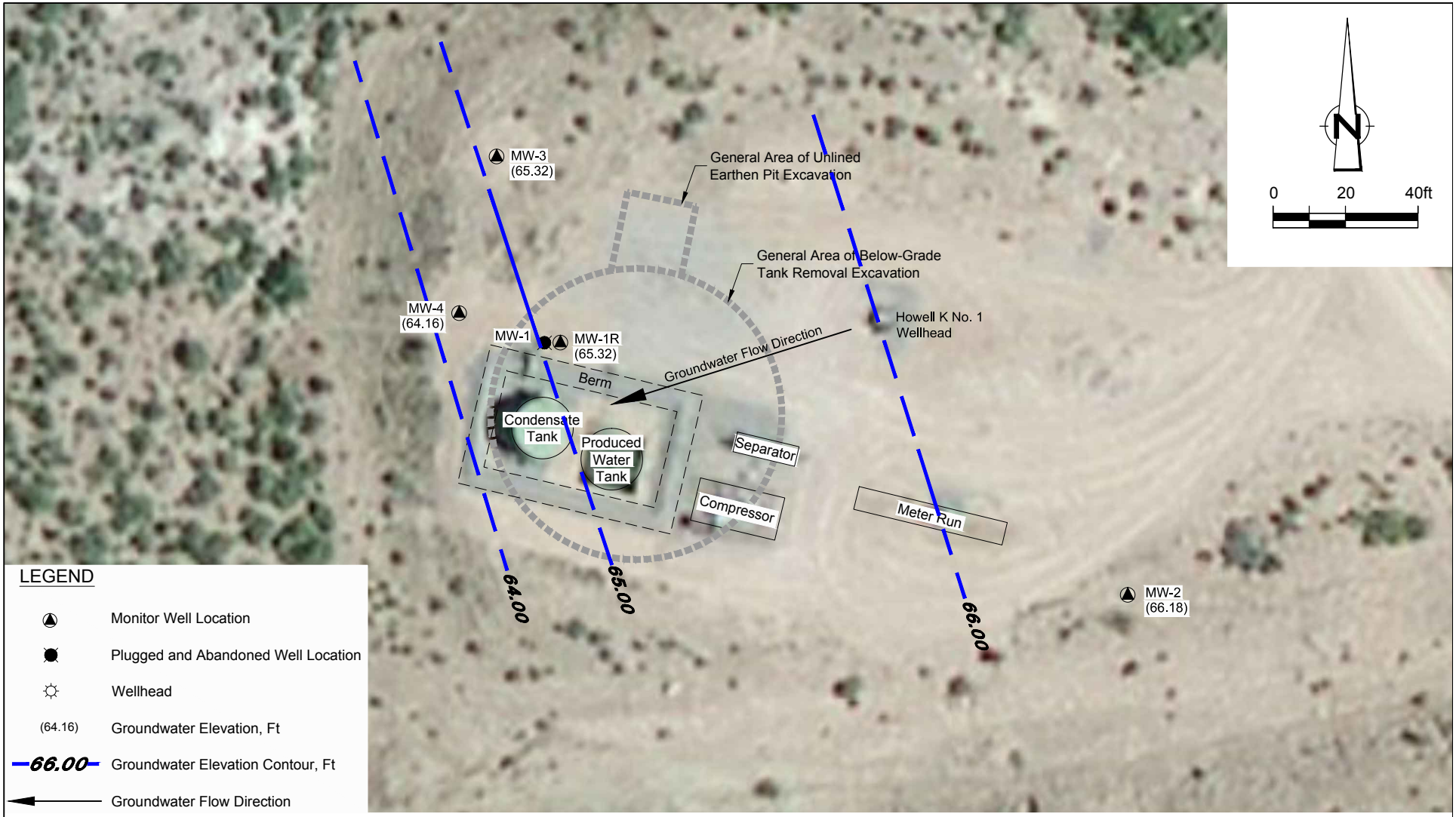


Figure 3

GEOLOGICAL CROSS SECTION
HOWELL K No. 1 NATURAL GAS WELL SITE
UNIT LETTER K, SECTION 21, T30N-R8W, SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

074928-95(006)GN-DL002_XSEC JAN 16/2015



ConocoPhillips high resolution aerial imagery 2008.

Figure 4

SEPTEMBER 2014 GROUNDWATER POTENTIOMETRIC SURFACE MAP
HOWELL K NO. 1 NATURAL GAS WELL SITE
UNIT LETTER K, SECTION 21, T30N-R8W, SAN JUAN COUNTY, NEW MEXICO
ConocoPhillips Company

074928-95(006)GN-DL003_GW JAN 16/2015

Tables

TABLE 1

SITE HISTORY TIMELINE
CONOCOPHILLIPS COMPANY
SAN JUAN COUNTY, NEW MEXICO
HOWELL K NO. 1

Date/Time Period	*Event/Action*	*Description/Comments*
July 26, through August 18, 2005	Initial Site assessment	Environmental investigation began with the excavation of approximately 4000 cubic yards of impacted soil from an area southwest of the Howell K No.1 well head. Impacted soils were discovered during the removal activities of a below grade tank. Dimensions of the excavation were approximately 70 feet long by 50 feet wide by 36 feet deep. Groundwater was encountered at approximately 34 feet and soils were still impacted at 36 feet deep, the point at which excavation machinery was stopped at the practical limit for safe operation. The total vertical extent of hydrocarbon impacts were not completely delineated. Soil was treated with approximately 600 gallons of potassium permanganate solution. The excavation area was backfilled with clean soil.
March 10, 2006	Groundwater monitor well installation	One ground water monitor well, MW-1, was installed in the area of the backfilled excavation by Envirotech.
March 31, 2006	Site transfer	ConocoPhillips Company completed acquisition of Burlington Resources.
March and June 2007	Groundwater monitoring not performed	After the acquisition of Burlington Resources by ConocoPhillips, consulting responsibilities were transferred from Lode Star LLC of Farmington New Mexico to Tetra Tech of Albuquerque.
November 9, 2007 through March 19, 2008	Groundwater monitoring	Tetra Tech began sampling the Howell K No. 1 site quarterly in November 2007. Groundwater was sampled from MW-1 and was analyzed for BTEX constituents. No constituents were detected at levels that exceeded the NMWQCC standards.
April 1, 2008	Additional monitoring requested by OCD	Oil Conservation Division of NM Energy, Minerals, and Resources Dept. indicates additional investigation and sampling is necessary for closure consideration during a meeting with Glenn Von Gonten.
July 23, 2008	Groundwater monitoring postponed	Groundwater monitoring of MW-1 was postponed after it was found that there was an obstruction caused by settling and shifting of the MW-1 casing. It was determined that the obstruction could be avoided by using a smaller bailer to collect samples. Sampling was postponed and was set to follow upcoming monitor well installation so that proper sampling materials could be used.
August 13 and 14, 2008	Groundwater monitor well installation and groundwater monitoring	Three additional groundwater monitor wells (MW-2, MW-3 and MW-4) were installed by WDC and overseen by Tetra Tech. MW-2 was installed upgradient of MW-1. Both MW-3 and MW-4 were installed downgradient of MW-1. All wells were developed by purging approximately 80 gallons of water using a surge block and a purge pump. A sample was collected from MW-1 on August 14th. A 1/2-inch disposable bailer was used to avoid an obstruction in MW-1. The sample was analyzed for BTEX constituents. All constituents were below NMWQCC standards.
October 24, 2008	Groundwater monitoring	Third quarter 2008 groundwater monitoring was completed and was the first quarter of sampling to include all four monitor wells on site. A baseline analytical suite was completed including major ions, total metals, semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs) including BTEX, diesel range organics, and gasoline range organics. All BTEX constituents were below NMWQCC standards. All four wells were above the standard for sulfate.
January 30, 2009	4th quarter 2008 groundwater monitoring	Tetra Tech conducted fourth quarter 2008 groundwater monitoring at the site for BTEX constituents in all four monitor wells. All wells were below NMWQCC standards for BTEX .
September 25,2009	2009 annual groundwater monitoring	Tetra Tech conducted 2009 annual groundwater monitoring of MW-2, MW-3 and MW-4 for BTEX, dissoved iron, dissolved manganese, sulfate, and fluoride. All three wells were below NMWQCC standards for BTEX. All three wells were above standard for sulfate. Dissolved manganese was above standard in MW-3 and MW-4 and flouride was above standard in MW-4. Dissolved metals analyses conducted for the first time since standards are based on dissolved metals testing. OCD concurred, allowing total metals testing to be discontinued.

TABLE 1

SITE HISTORY TIMELINE
CONOCOPHILLIPS COMPANY
SAN JUAN COUNTY, NEW MEXICO
HOWELL K NO. 1

Date/Time Period	*Event/Action*	*Description/Comments*
October 18, 2009	Groundwater monitoring	Tetra Tech conducted 2009 annual groundwater monitoring of MW-1 for BTEX, dissoved iron, dissolved manganese, sulfate, and fluoride. MW-1 was below NMWQCC standards for BTEX. Sulfate, dissolved manganese and dissolved iron were above standards in MW-1.
December 15, 2010	Groundwater monitoring	Tetra Tech conducted quarterly groundwater monitoring at the site for BTEX, dissolved iron, dissolved manganese, sulfate and flouride. All four monitor wells were below NMWQCC standards for BTEX . All four monitor wells were above the standard for sulfate. MW-1, MW-3 and MW-4 were above standard for dissolved manganese and MW-1 and MW-3 were also above the standard for dissolved iron.
March 30, 2010	Groundwater monitoring	Tetra Tech conducted quarterly groundwater monitoring at the site for BTEX, dissolved iron, dissolved manganese, and sulfate. All four monitor wells were below NMWQCC standards for BTEX. All four monitor wells were above the standard for sulfate. MW-1, MW-3 and MW-4 were also above the standard for dissolved manganese.
June 8, 2010	Groundwater monitoring	Tetra Tech conducted quarterly groundwater monitoring at the site for BTEX, dissolved iron, dissolved manganese, and sulfate. All four monitor wells were below NMWQCC standards for BTEX. All four monitor wells were above the standard for sulfate. MW-1, MW-3 and MW-4 were above the standard for dissolved manganese. MW-1 was also above the standard for dissolved iron.
September 23,2010	Groundwater monitoring	Tetra Tech conducted quarterly groundwater monitoring at the site for BTEX, dissolved iron, dissolved manganese, fluoride and sulfate. All four monitor wells were below NMWQCC standards for BTEX. All four monitor wells were above the standard for sulfate. MW-1, MW-3 and MW-4 were above the standard for dissolved manganese . MW-1 was also above standard for dissolved iron.
December 15,2010	Groundwater monitoring	Tetra Tech conducted quarterly groundwater monitoring at the site for BTEX, dissolved iron, dissolved manganese, fluoride and sulfate. MW-3 was observed to be dry during this monitoring event, which was likely due to an interface probe malfunction. MW-1, MW-2 and MW-4 were sampled. All three sampled monitor wells are below NMWQCC standards for BTEX . MW-1 and MW-4 were above the the standards for sulfate, dissolved manganese, and dissolved iron. Monitor well MW-4 was also found to be above the the
March 15, 2011	Groundwater monitoring	First quarter of groundwater monitoring with BTEX analysis discontinued due to eight consecutive quarters of data below the standards being reached; MW-1, MW-2, MW-3, and MW-4 were sampled and analyzed for dissolved iron, dissolved manganese, fluoride and sulfate.
June 15, 2011	Transfer of site consulting responsibilities	On June 15, 2011, site consulting responsibilities were transferred from Tetra Tech of Albuquerque, NM to Conestoga-Rovers & Associates (CRA) of Albuquerque, NM.
June 23, 2011	Groundwater monitoring	MW-1, MW-2, MW-3, and MW-4 were sampled and analyzed for dissolved iron, dissolved manganese, fluoride and sulfate.
October 11 and 12, 2011	Groundwater monitoring	MW-1, MW-2, MW-3, and MW-4 were sampled and analyzed for dissolved iron, dissolved manganese, fluoride and sulfate.
October 3, 2012	Groundwater monitoring	MW-1, MW-2, MW-3, and MW-4 were sampled and analyzed for dissolved iron, dissolved manganese, fluoride and sulfate.
July 19,2013	Plugging & Abandoning and Well Installation	National EWP, with CRA oversight, plugged and abandoned MW-1 and drilled and installed MW-1R.
September 17, 2013	Groundwater monitoring	MW-1R, MW-2, MW-3, and MW-4 were sampled and analyzed for dissolved iron, dissolved manganese, fluoride and sulfate.
October 1, 2013	Groundwater monitoring	MW-1R sampled and analyzed for metals treatability study.
September 23, 2014	Groundwater monitoring	MW-1R, MW-2, MW-3, and MW-4 were sampled and analyzed for dissolved iron, dissolved manganese, dissolved sodium, fluoride and sulfate.
November 13-14, 2014	pH adjustment	A dilute sodium hydroxide solution was injected into MW-1R, MW-3, and MW-4.
December 17, 2014	Groundwater monitoring	A post-injection round of groundwater sampling was conducted. MW-1R, MW-3, and MW-4 groundwater was sampled and analyzed for iron, dissolved iron, manganese, dissolved manganese, and dissolved sodium.
February 17, 2015	Groundwater monitoring	A post-injection round of groundwater sampling was conducted. MW-1R, MW-3, and MW-4 groundwater was sampled and analyzed for iron, dissolved iron, manganese, dissolved manganese, and dissolved sodium.
March 18, 2015	Groundwater monitoring	MW-1R, MW-2, MW-3, and MW-4 were sampled and analyzed for dissolved iron and manganese, total iron and manganese and dissolved sodium.

TABLE 2

MONITORING WELL SPECIFICATIONS AND GROUNDWATER ELEVATIONS
CONOCOPHILLIPS COMPANY
HOWELL K No. 1
SAN JUAN COUNTY, NEW MEXICO

Well ID	*Total Depth (ft bgs)*	*Elevation* (ft) (TOC)*	*Screen Interval (ft below TOC)*	*Date Measured*	*Depth to Groundwater (ft below TOC)*	*Relative Water Level*
MW-1	37.47	97.84	21 - 36	3/22/2006	28.54	69.30
				6/21/2006	29.15	68.69
				10/19/2006	27.83	70.01
				12/12/2006	28.22	69.62
				3/1/2007	NM	NM
				6/1/2007	NM	NM
				11/9/2007	29.03	68.81
				1/15/2008	28.34	69.50
				3/19/2008	NM	NM
				7/23/2008	28.46	69.38
				10/24/2008	29.91	67.93
				1/30/2009	28.37	69.47
				9/25/2009	29.95	67.89
				10/18/2009	29.97	67.87
				12/15/2009	29.51	--(1)
				3/30/2010	28.18	--(1)
				6/8/2010	28.38	--(1)
				9/23/2010	29.51	--(1)
				12/15/2010	28.82	--(1)
				3/15/2011	28.51	--(1)
				6/24/2011	28.92	--(1)
				10/11/2011	30.43	--(1)
				10/3/2012	31.39	--(1)
				7/19/2013	Well Plugged and Abandoned	
MW-1R	43.89	96.69	22 - 42	9/17/2013	30.83	65.86
				9/23/2014	31.37	65.32
				12/17/2014	30.61	66.08
				2/11/2015	30.33	66.36
				3/18/2015	30.15	66.54
MW-2	39.81	95.28	21 - 36	10/24/2008	25.74	69.54
				1/30/2009	24.74	70.54
				9/25/2009	26.48	68.80
				12/15/2009	25.97	69.31
				3/30/2010	24.67	70.61
				6/8/2010	24.84	70.44
				9/23/2010	26.38	68.90
				12/15/2010	25.68	69.60
				3/15/2011	25.05	70.23
				6/24/2011	26.70	68.58
				10/11/2011	27.10	68.18
				10/3/2012	27.99	67.29
				9/17/2013	28.53	66.75
				9/23/2014	29.10	66.18
				12/17/2014	28.52	66.76
				2/11/2015	28.18	67.10
				3/18/2015	27.97	67.31

TABLE 2

MONITORING WELL SPECIFICATIONS AND GROUNDWATER ELEVATIONS
CONOCOPHILLIPS COMPANY
HOWELL K No. 1
SAN JUAN COUNTY, NEW MEXICO

Well ID	*Total Depth (ft bgs)*	*Elevation* (ft) (TOC)*	*Screen Interval (ft below TOC)*	*Date Measured*	*Depth to Groundwater (ft below TOC)*	*Relative Water Level*
MW-3	37.47	95.44	19 - 34	10/24/2008	26.95	68.49
				1/30/2009	25.92	69.52
				9/25/2009	27.57	67.87
				12/15/2009	27.05	68.39
				3/30/2010	25.79	69.65
				6/8/2010	26.02	69.42
				9/23/2010	27.35	68.09
				12/15/2010	DRY	--
				3/15/2011	26.19	69.25
				6/24/2011	26.70	68.74
				10/11/2011	28.15	67.29
				10/3/2012	29.02	66.42
				9/17/2013	29.58	65.86
				9/23/2014	30.12	65.32
				12/17/2014	29.47	65.97
				2/11/2015	29.16	66.28
				3/18/2015	28.95	66.49
MW-4	34.66	95.36	17 - 32	10/24/2008	NM	NM
				1/30/2009	26.00	69.36
				9/25/2009	27.64	67.72
				12/15/2009	27.14	68.22
				3/30/2010	25.87	69.49
				6/8/2010	26.09	69.27
				9/23/2010	27.31	68.05
				12/15/2010	26.75	68.61
				3/15/2011	26.26	69.10
				6/24/2011	26.76	68.60
				10/11/2011	28.20	67.16
				10/3/2012	29.06	66.30
				9/17/2013	29.62	65.74
				9/23/2014	31.20	64.16
				12/17/2014	29.50	65.86
				2/11/2015	29.22	66.14
				3/18/2015	29.01	66.35

Notes:
*Casing elevations are based on an arbitrary 100 ft relative surface elevation set at the gas well head
ft = Feet
bgs = below ground surface
TOC = Top of casing
NM = Not measured
(1) Groundwater elevations can not be calculated accurately due to continual upward shifting of the PVC casing (see text of section 2.1, Monitoring Summary, of this report for more information).

TABLE 3

FIELD PARAMETERS SUMMARY
CONOCOPHILLIPS COMPANY
HOWELL K No. 1
SAN JUAN COUNTY, NEW MEXICO

Well ID	Sample Date	Temperature (°C)	pH	TDS (g/L)	Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	Volume (gallons)
MW-1R	9/23/2014	16.60	7.39	2.30	3510	11.52	87.0	2.75
	9/23/2014	16.10	7.15	2.30	3560	10.42	48.0	3.00
	12/17/2014	14.47	11.13	2.88	4425	3.57	-129.0	5.50
	12/17/2014	15.00	11.21	2.84	4373	2.64	-126.4	6.00
	12/17/2014	15.10	11.26	2.86	4396	2.53	-1246.4	6.50
	2/11/2015	15.54	7.01	5.66	8709	2.33	-53.0	2.25
	3/18/2015	15.75	7.93	2.10	3.27	--	-26.0	6.50
MW-2	9/23/2014	15.20	7.26	1.90	3040	11.90	79.0	4.00
	9/23/2014	14.60	7.15	1.90	2990	11.00	81.0	4.50
	9/23/2014	14.60	7.11	1.90	2990	10.21	83.0	5.00
	3/18/2015	14.80	7.32	1.90	3	--	77.0	5.75
MW-3	9/23/2014	15.80	6.94	2.90	4570	8.49	-67.0	2.50
	9/23/2014	15.50	6.99	2.70	4150	8.51	-58.0	3.00
	9/23/2014	15.40	7.02	2.30	3530	8.48	-35.0	3.25
	12/17/2014	14.34	11.63	3.12	4802	18.32	-42.2	3.00
	12/17/2014	14.64	11.20	3.03	4649	4.78	-55.0	3.50
	12/17/2014	14.72	10.79	3.02	4642	3.55	-57.9	4.00
	2/11/2015	14.85	5.42	5.89	9068	3.51	-29.9	2.50
	2/11/2015	14.97	5.56	5.89	9068	2.57	-51.4	3.00
	2/11/2015	14.94	5.61	5.89	9055	2.70	-55.4	3.50
	3/18/2015	15.20	7.66	2.20	3	--	0.0	3.75
MW-4	9/23/2014	16.50	6.92	4.00	6370	12.17	-47.0	0.50
	9/23/2014	15.70	6.85	3.90	6250	11.07	-55.0	1.00
	9/23/2014	15.40	6.83	3.90	6230	10.01	-66.0	1.75
	12/17/2014	14.46	11.12	5.18	7969	6.16	-89.9	1.50
	12/17/2014	14.99	11.25	5.26	8088	2.02	-106.9	2.00
	12/17/2014	14.98	11.25	5.26	8096	1.50	-116.2	2.50
	2/11/2015	15.29	11.17	11.17	17194	4.16	-65.4	1.50
	2/11/2015	15.25	11.41	11.41	17562	2.59	-84.6	2.00
	2/11/2015	15.22	11.47	11.47	17644	2.08	-94.2	2.50
	3/18/2015	15.25	9.52	3.80	603	--	-73.0	2.67

Notes:
TDS = total dissolved solids
DO = dissolved oxygen
ORP = oxidation-reduction potential

TABLE 4

GROUNDWATER LABORATORY ANALYTICAL RESULTS SUMMARY
CONOCOPHILLIPS COMPANY
HOWELL K No. 1
SAN JUAN COUNTY, NM

Well ID	Sample ID	Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Iron (dissolved) (mg/L)	Manganese (dissolved) (mg/L)	Iron (total) (mg/L)	Manganese (total) (mg/L)	Dissolved Sodium (mg/L)
NMWQCC Groundwater Quality Standards			**0.01**	**0.75**	**0.75**	**0.62**	**1.6**	**600**	**1**	**0.2**	NE	NE	NE
MW-1	MW-1	3/22/2006	ND	ND	0.001	0.002	--	--	--	--	--	--	--
	MW-1	6/21/2006	0.0014	0.0014	ND	0.0106	--	--	--	--	--	--	--
	MW-1	10/19/2006	ND	ND	ND	0.0011	--	--	--	--	--	--	--
	MW-1	12/12/2006	ND	0.0005	0.0004	0.0021	--	--	--	--	--	--	--
	MW-1	11/9/2007	< 0.0005	< 0.0007	< 0.0008	< 0.0009	--	--	--	--	--	--	--
	MW-1	1/15/2008	< 0.0005	< 0.0007	< 0.0008	< 0.0008	--	--	--	--	--	--	--
	MW-1	3/19/2008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	--	--	--	--	--	--
	MW-1	8/14/2008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	--	--	--	--	--	--
	MW-1	10/24/2008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 2.0	**2390**	--	--	--	--	--
	MW-1	1/30/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	--	--	--	--	--	--
	MW-1	10/18/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.88	**3840**	**2.24**	**17.40**	--	--	--
	MW-1	12/15/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 50	**3290**	**1.70**	**16.50**	--	--	--
	MW-1	3/30/2010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	**2950**	0.87	**14.90**	--	--	--
	MW-1	6/8/2010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	**2570**	**11.20**	**14.70**	--	--	--
	MW-1	9/23/2010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.5	**2740**	**4.43**	**13.4**	--	--	--
	MW-1	12/15/2010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.5	**2230**	**9.72**	**11.1**	--	--	--
	MW-1	3/15/2011	--	--	--	--	0.654	**2360**	**20**	**11.4**	--	--	--
	GW-74928-062311-PG-04	6/23/2011	--	--	--	--	< 0.50	**2970**	< 0.1	**10.7**	--	--	--
	GW-074928-101211-CM-006	10/12/2011	--	--	--	--	0.28	**2940**	< 0.05	**9.6**	--	--	--
	GW-074928-100312-CM-MW-1	10/3/2012	--	--	--	--	0.56	**3280**	**16.7**	**6.1**	--	--	--
MW-1R	GW-074928-091713-CM-MW-1R	9/17/2013	--	--	--	--	1.1	**5100**	**2.8**	**3.8**	--	--	--
	GW-074928-092314-CB-MW-1R	9/23/2014	--	--	--	--	0.89	**1860**	0.18	**2.2**	--	--	259
	--	11/13/2014	pH ADJUSTMENT EVENT										
	GW-074928-121414-CM-MW-1R	12/17/2014	--	--	--	--	--	--	< 0.05	< 0.005	53.2	1.8	702
	GW-074928-021115-CK-MW-1R	2/11/2015	--	--	--	--	--	--	< 0.05	0.028	28.5	1.1	426
	GW-074928-031815-CMMW1R	3/18/2015	--	--	--	--	--	--	0.052	0.19	6.56	0.378	349
MW-2	MW-2	10/24/2008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 2	**1480**	--	--	--	--	--
	MW-2	1/30/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	--	--	--	--	--	--
	MW-2	9/25/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	1.09	**1700**	< 0.02	< 0.005	--	--	--
	MW-2	12/15/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 100	**1570**	< 0.02	< 0.005	--	--	--
	MW-2	3/30/2010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	**1410**	< 0.02	0.14	--	--	--
	MW-2	6/8/2010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	**1460**	0.0544	0.00930	--	--	--
	MW-2	9/23/2010	< 0.001	< 0.001	< 0.001	< 0.001	< 0.5	**1760**	< 0.02	< 0.005	--	--	--
	MW-2	12/15/2010	< 0.001	< 0.001	< 0.001	< 0.001	1.01	**1890**	< 0.02	< 0.005	--	--	--
	MW-2	3/15/2011	--	--	--	--	1.21	**1680**	< 0.02	0.0096	--	--	--
	GW-74928-062311-PG-01	6/23/2011	--	--	--	--	1.3	**1990**	< 0.1	< 0.015	--	--	--
	GW-074928-101211-CM-007	10/12/2011	--	--	--	--	0.93	**1680**	0.873	0.0297	--	--	--
	GW-074928-100312-CM-MW-2	10/3/2012	--	--	--	--	1.1	**1850**	< 0.05	0.0055	--	--	--
	GW-074928-091713-CM-MW-2	9/17/2013	--	--	--	--	1.1	**2420**	< 0.05	< 0.005	--	--	--
	GW-074928-092314-CB-MW-2	9/23/2014	--	--	--	--	0.95	**1610**	< 0.05	< 0.005	--	--	156
	GW-074928-031815-CMMW2	3/18/2015	--	--	--	--	--	--	0.050	0.028	25	0.518	153
MW-3	MW-3	10/24/2008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 2	**1480**	--	--	--	--	--
	MW-3	1/30/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	--	--	--	--	--	--
	MW-3	9/25/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	1.00	**1840**	< 0.02	**0.38**	--	--	--
	MW-3	12/15/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 50	**2500**	**1.35**	**0.32**	--	--	--
	MW-3	3/30/2010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	**1890**	< 0.02	**0.43**	--	--	--
	MW-3	6/8/2010	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	**1630**	0.0573	**0.383**	--	--	--
	MW-3	9/23/2010	< 0.001	< 0.001	< 0.001	< 0.001	0.751	**1960**	< 0.02	**0.35**	--	--	--
	MW-3	3/15/2011	--	--	--	--	1.11	**1890**	< 0.02	**0.572**	--	--	--
	GW-74928-062311-PG-02	6/23/2011	--	--	--	--	1.2	**2190**	< 0.1	**0.846**	--	--	--
	GW-074928-101211-CM-008	10/12/2011	--	--	--	--	0.81	**1980**	< 0.05	**0.254**	--	--	--
	GW-074928-100312-CM-MW-3	10/3/2012	--	--	--	--	0.95	**2080**	< 0.05	**0.25**	--	--	--
	GW-074928-091713-CM-MW-3	9/17/2013	--	--	--	--	0.91	**2740**	< 0.05	**0.32**	--	--	--
	GW-074928-092313-CB-MW-3	9/23/2014	--	--	--	--	0.75	**1840**	< 0.05	0.036	--	--	260
	--	11/13/2014	pH ADJUSTMENT EVENT										
	GW-074928-121714-CM-MW-3	12/17/2014	--	--	--	--	--	--	< 0.05	< 0.005	73.0	4.3	496
	GW-074928-021115-CK-MW-3	2/11/2015	--	--	--	--	--	--	< 0.05	0.12	133.0	7.07	274
	GW-074928-031815-CMMW3	3/18/2015	--	--	--	--	--	--	0.13	**0.21**	48	2.75	263
MW-4	MW-4	10/24/2008	< 0.0005	< 0.0005	< 0.0005	< 0.0005	**2.43**	**3400**	--	--	--	--	--
	MW-4	1/30/2009	< 0.0005	< 0.0005	< 0.0005	< 0.0005	--	--	--	--	--	--	--
	MW-4	9/25/2009	< 0.001	< 0.001	< 0.001	< 0.001	**2.47**	**3860**	< 0.02	**7.80**	--	--	--
	MW-4	12/15/2009	< 0.001	< 0.001	< 0.001	< 0.001	< 50	**4540**	0.03	**7.40**	--	--	--
	MW-4	3/30/2010	< 0.001	< 0.001	< 0.001	< 0.001	--	**3970**	< 0.02	**7.83**	--	--	--
	MW-4	6/8/2010	< 0.001	< 0.001	< 0.001	< 0.001	--	**3490**	0.0607	**7.97**	--	--	--
	MW-4	9/23/2010	< 0.001	< 0.001	< 0.001	< 0.001	**1.81**	**3750**	< 0.02	**9.73**	--	--	--
	MW-4	12/15/2010	0.0011	< 0.001	< 0.001	< 0.001	**2.47**	**4310**	0.223	**8.64**	--	--	--
	MW-4	3/15/2011	--	--	--	--	**2.76**	**3990**	0.522	**11**	--	--	--
	GW-74928-062311-PG-03	6/23/2011	--	--	--	--	**2.4**	**4400**	0.492	**11.1**	--	--	--
	GW-074928-101211-CM-005	10/12/2011	--	--	--	--	**1.9**	**4120**	**2.75**	**15.6**	--	--	--
	GW-074928-100312-CM-MW-4	10/3/2012	--	--	--	--	**2.1**	**4280**	**2.0**	**18.0**	--	--	--
	GW-074928-100312-CM-DUP	10/3/2012	--	--	--	--	**--**	**--**	**2.2**	**18.4**	--	--	--
	GW-074928-091713-CM-MW-4	9/17/2013	--	--	--	--	**2.2**	**4040**	**1.1**	**15.6**	--	--	--
	GW-074928-091713-CM-DUP	9/17/2013	--	--	--	--	--	--	**1.2**	**16.7**	--	--	--
	GW-074928-092314-CB-MW-4	9/23/2014	--	--	--	--	**1.8**	**3080**	0.58	**16.2**	--	--	709
	--	*11/13/2014*	*pH ADJUSTMENT EVENT*										
	GW-074928-121714-CM-MW-4	*12/17/2014*	--	--	--	--	--	--	*0.073*	*< 0.005*	*7.1*	*0.28*	*1150*
	GW-074928-121714-CM-DUP	*12/17/2014*	--	--	--	--	--	--	*< 0.05*	*< 0.005*	--	--	*1180*
	GW-074928-021115-CK-MW-4	*2/11/2015*	--	--	--	--	--	--	*< 0.05*	*< 0.005*	*1.54*	*0.739*	*1140*
	GW-074928-031815-CMMW4	*3/18/2015*	--	--	--	--	--	--	*< 0.05*	*0.011*	*7.3*	*0.326*	*960*

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
-- = not analyzed
ND = not detected
NE = Not Established

Appendix A

Groundwater Laboratory Analytical Reports

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

October 21, 2014

Christine Mathews
CRA
6121 Indian School Rd NE
Suite 200
Albuquerque, NM 87110

RE: Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Dear Christine Mathews:
Enclosed are the analytical results for sample(s) received by the laboratory on September 24, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

REVISED - sample ID 60178712001

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

Sincerely,

Alice Flanagan
alice.flanagan@pacelabs.com
Project Manager

Enclosures

cc: Angela Bown, COP Conestoga-Rovers & Associa
Angela Bown, Conestoga Rovers & Associates
Chris Fetters, COP Conestoga-Rovers & Associa
Jeff Walker, COP Conestoga-Rovers & Associa

REPORT OF LABORATORY ANALYSIS

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

CERTIFICATIONS

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60178712001	**GW-074928-092314-CB-MW-1R**	Water	09/23/14 15:05	09/24/14 08:35
60178712002	**GW-074928-092314-CB-MW-2**	Water	09/23/14 14:45	09/24/14 08:35
60178712003	**GW-074928-092314-CB-MW-3**	Water	09/23/14 14:35	09/24/14 08:35
60178712004	**GW-074928-092314-CB-MW-4**	Water	09/23/14 14:10	09/24/14 08:35

REPORT OF LABORATORY ANALYSIS

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

SAMPLE ANALYTE COUNT

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60178712001	**GW-074928-092314-CB-MW-1R**	EPA 6010	TDS	3
		EPA 300.0	OL	2
60178712002	**GW-074928-092314-CB-MW-2**	EPA 6010	TDS	3
		EPA 300.0	OL	2
60178712003	**GW-074928-092314-CB-MW-3**	EPA 6010	TDS	3
		EPA 300.0	OL	2
60178712004	**GW-074928-092314-CB-MW-4**	EPA 6010	TDS	3
		EPA 300.0	OL	2

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

PROJECT NARRATIVE

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Method: **EPA 6010**
Description: 6010 MET ICP, Dissolved
Client: CRA Conoco New Mexico
Date: October 21, 2014

General Information:
4 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

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: MPRP/29159

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60178712001

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

- MS (Lab ID: 1452841)
  - Sodium, Dissolved
- MSD (Lab ID: 1452842)
  - Sodium, Dissolved

Additional Comments:

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

PROJECT NARRATIVE

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: CRA Conoco New Mexico
Date: October 21, 2014

General Information:
4 samples were analyzed for EPA 300.0. All samples were received in acceptable condition with any exceptions noted below.

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.

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.

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

ANALYTICAL RESULTS

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Sample: GW-074928-092314-CB-MW-1R **Lab ID: 60178712001** Collected: 09/23/14 15:05 Received: 09/24/14 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							
Iron, Dissolved	**0.18**	mg/L	0.050	1	10/02/14 16:40	10/03/14 15:13	7439-89-6	
Manganese, Dissolved	**2.2**	mg/L	0.0050	1	10/02/14 16:40	10/03/14 15:13	7439-96-5	
Sodium, Dissolved	**259**	mg/L	0.50	1	10/02/14 16:40	10/03/14 15:13	7440-23-5	M1
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**0.89**	mg/L	0.20	1		10/02/14 18:39	16984-48-8	
Sulfate	**1860**	mg/L	500	500		10/03/14 13:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Sample: GW-074928-092314-CB-MW-2 **Lab ID: 60178712002** Collected: 09/23/14 14:45 Received: 09/24/14 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							
Iron, Dissolved	ND	mg/L	0.050	1	10/02/14 16:40	10/03/14 15:21	7439-89-6	
Manganese, Dissolved	ND	mg/L	0.0050	1	10/02/14 16:40	10/03/14 15:21	7439-96-5	
Sodium, Dissolved	**156**	mg/L	0.50	1	10/02/14 16:40	10/03/14 15:21	7440-23-5	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**0.95**	mg/L	0.20	1		10/02/14 19:21	16984-48-8	
Sulfate	**1610**	mg/L	200	200		10/03/14 13:37	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Sample: GW-074928-092314-CB-MW-3 **Lab ID: 60178712003** Collected: 09/23/14 14:35 Received: 09/24/14 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							
Iron, Dissolved	ND	mg/L	0.050	1	10/02/14 16:40	10/03/14 15:23	7439-89-6	
Manganese, Dissolved	**0.036**	mg/L	0.0050	1	10/02/14 16:40	10/03/14 15:23	7439-96-5	
Sodium, Dissolved	**260**	mg/L	0.50	1	10/02/14 16:40	10/03/14 15:23	7440-23-5	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**0.75**	mg/L	0.20	1		10/02/14 19:35	16984-48-8	
Sulfate	**1840**	mg/L	200	200		10/03/14 13:52	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Sample: GW-074928-092314-CB-MW-4 **Lab ID: 60178712004** Collected: 09/23/14 14:10 Received: 09/24/14 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							
Iron, Dissolved	**0.58**	mg/L	0.050	1	10/02/14 16:40	10/03/14 15:26	7439-89-6	
Manganese, Dissolved	**16.2**	mg/L	0.0050	1	10/02/14 16:40	10/03/14 15:26	7439-96-5	
Sodium, Dissolved	**709**	mg/L	1.0	2	10/02/14 16:40	10/03/14 15:58	7440-23-5	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Fluoride	**1.8**	mg/L	0.20	1		10/02/14 19:50	16984-48-8	
Sulfate	**3080**	mg/L	500	500		10/03/14 14:08	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

QC Batch: MPRP/29159 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60178712001, 60178712002, 60178712003, 60178712004

METHOD BLANK: 1452839 Matrix: Water
Associated Lab Samples: 60178712001, 60178712002, 60178712003, 60178712004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	mg/L	ND	0.050	10/03/14 15:09	
Manganese, Dissolved	mg/L	ND	0.0050	10/03/14 15:09	
Sodium, Dissolved	mg/L	ND	0.50	10/03/14 15:09	

LABORATORY CONTROL SAMPLE: 1452840

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	mg/L	10	10.1	101	80-120	
Manganese, Dissolved	mg/L	1	0.95	95	80-120	
Sodium, Dissolved	mg/L	10	9.5	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1452841 1452842

Parameter	Units	60178712001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	mg/L	0.18	10	10	10.2	10.3	100	101	75-125	2	20	
Manganese, Dissolved	mg/L	2.2	1	1	3.2	3.3	101	106	75-125	2	20	
Sodium, Dissolved	mg/L	259	10	10	284	281	258	220	75-125	1	20	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

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

QUALITY CONTROL DATA

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

QC Batch: WETA/31201 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60178712001, 60178712002, 60178712003, 60178712004

METHOD BLANK: 1452653 Matrix: Water
Associated Lab Samples: 60178712001, 60178712002, 60178712003, 60178712004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	ND	0.20	10/02/14 15:34	

METHOD BLANK: 1454631 Matrix: Water
Associated Lab Samples: 60178712001, 60178712002, 60178712003, 60178712004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	10/03/14 10:01	

LABORATORY CONTROL SAMPLE: 1452654

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.3	92	90-110	

LABORATORY CONTROL SAMPLE: 1454632

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1452655 1452656

Parameter	Units	60178693008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	ND	1250	1250	1190	1270	95	102	80-120	7	15	
Sulfate	mg/L	2640	2500	2500	5150	5150	100	101	80-120	0	15	

MATRIX SPIKE SAMPLE: 1452657

Parameter	Units	60178711001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	ND	25	26.4	101	80-120	
Sulfate	mg/L	155	50	207	103	80-120	

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

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

QUALIFIERS

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

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 (8270 listed analyte) decomposes to Azobenzene.

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.

ANALYTE QUALIFIERS

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074928 Howell K No. 1
Pace Project No.: 60178712

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60178712001	**GW-074928-092314-CB-MW-1R**	EPA 3010	MPRP/29159	EPA 6010	ICP/21937
60178712002	**GW-074928-092314-CB-MW-2**	EPA 3010	MPRP/29159	EPA 6010	ICP/21937
60178712003	**GW-074928-092314-CB-MW-3**	EPA 3010	MPRP/29159	EPA 6010	ICP/21937
60178712004	**GW-074928-092314-CB-MW-4**	EPA 3010	MPRP/29159	EPA 6010	ICP/21937
60178712001	**GW-074928-092314-CB-MW-1R**	EPA 300.0	WETA/31201		
60178712002	**GW-074928-092314-CB-MW-2**	EPA 300.0	WETA/31201		
60178712003	**GW-074928-092314-CB-MW-3**	EPA 300.0	WETA/31201		
60178712004	**GW-074928-092314-CB-MW-4**	EPA 300.0	WETA/31201		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60178712

60178712

Client Name: CRA COP

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 6113 5270 1269 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: T-239 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1.4

Temperature should be above freezing to 6°C

Date and initials of person examining contents: JB 9/24

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐Yes ☑No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start: 1125	Start:
End: 1135	End:
Temp:	Temp:

Project Manager Review: KAF Date: 9/24/14

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of

Section A Required Client Information:

Company:	CRA COP NM
Address:	6121 Indian School Rd NE, Ste 200
	Albequerque, NM 87110
Email To:	cmathews@craworld.com
Phone: (505)884-0672	Fax: (505)884-4932
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	Christine Mathews
Copy To:	Jeff Walker, Angela Bown
Purchase Order No.:	
Project Name:	Howell K No. 1
Project Number:	74928

Section C Invoice Information:

Attention:	Angela Bown
Company Name:	CRA
Address:	9033 Meridian Way West Chester, OH
Pace Quote Reference:	
Pace Project Manager:	Alice Flanagan
Pace Profile #:	7801, 15

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: NM

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

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 COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	300.0 Sulfate, Fluoride	6010Dissolved Fe,Mn,Na	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GW-074928-092314-CB-MW-1	WT	G	—	—	9-23-14	1605		3	X		X							X	X	(2) BP4N BP3F		60178712 001
2	GW-074928-092314-CB-MW-2	WT	G	—	—	9-23-14	1445		3	X		X							X	X			002
3	GW-074928-092314-CB-MW-3	WT	G	—	—	9-23-14	1436		3	X		X							X	X			003
4	GW-074928-092314-CB-MW-4	WT	G	—	—	9-23-14	1410		3	X		X							X	X			004
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Metals were field filtered	Abbie Brown/CRA	9-23-14	1700		9/24	0835	1.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Abbie Brown
SIGNATURE of SAMPLER: Abbie Brown DATE Signed (MM/DD/YY): 9-23-14

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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

January 05, 2015

Christine Mathews
CRA
6121 Indian School Rd NE
Suite 200
Albuquerque, NM 87110

RE: Project: 074928 Howell K No 1
Pace Project No.: 60184937

Dear Christine Mathews:
Enclosed are the analytical results for sample(s) received by the laboratory on December 18, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI 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 Flanagan
alice.flanagan@pacelabs.com
Project Manager

Enclosures

cc: Angela Bown, COP Conestoga-Rovers & Associa
Angela Bown, Conestoga Rovers & Associates
Chris Fetters, COP Conestoga-Rovers & Associa
Jeff Walker, COP Conestoga-Rovers & Associa

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

CERTIFICATIONS

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
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

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

SAMPLE SUMMARY

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60184937001	**GW-074928-121714-CM-MW-1**	Water	12/17/14 12:00	12/18/14 09:00
60184937002	**GW-074928-121714-CM-MW-3**	Water	12/17/14 11:30	12/18/14 09:00
60184937003	**GW-074928-121714-CM-MW-4**	Water	12/17/14 12:00	12/18/14 09:00
60184937004	**GW-074928-121714-CM-dup**	Water	12/17/14 00:00	12/18/14 09:00

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

SAMPLE ANALYTE COUNT

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60184937001	**GW-074928-121714-CM-MW-1**	EPA 6010	SMW	2
		EPA 6010	SMW	3
60184937002	**GW-074928-121714-CM-MW-3**	EPA 6010	SMW	2
		EPA 6010	SMW	3
60184937003	**GW-074928-121714-CM-MW-4**	EPA 6010	SMW	2
		EPA 6010	SMW	3
60184937004	**GW-074928-121714-CM-dup**	EPA 6010	SMW	3

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

PROJECT NARRATIVE

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Method: **EPA 6010**
Description: 6010 MET ICP
Client: CRA Conoco New Mexico
Date: January 05, 2015

General Information:
3 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

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:

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

PROJECT NARRATIVE

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Method: **EPA 6010**
Description: 6010 MET ICP, Dissolved
Client: CRA Conoco New Mexico
Date: January 05, 2015

General Information:
4 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

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: MPRP/30285

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60184723003

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

- MS (Lab ID: 1499116)
  - Sodium, Dissolved
- MSD (Lab ID: 1499117)
  - Sodium, Dissolved

Additional Comments:

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

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

ANALYTICAL RESULTS

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Sample: GW-074928-121714-CM-MW-1 **Lab ID: 60184937001** Collected: 12/17/14 12:00 Received: 12/18/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**53.2**	mg/L	0.050	1	12/23/14 10:30	12/29/14 15:11	7439-89-6	
Manganese	**1.8**	mg/L	0.0050	1	12/23/14 10:30	12/26/14 12:12	7439-96-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	mg/L	0.050	1	12/23/09 05:00	12/26/14 11:14	7439-89-6	
Manganese, Dissolved	ND	mg/L	0.0050	1	12/23/09 05:00	12/26/14 11:14	7439-96-5	
Sodium, Dissolved	**702**	mg/L	5.0	10	12/23/09 05:00	12/26/14 11:44	7440-23-5	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Sample: GW-074928-121714-CM-MW-3 **Lab ID: 60184937002** Collected: 12/17/14 11:30 Received: 12/18/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**73.0**	mg/L	0.050	1	12/23/14 10:30	12/29/14 15:14	7439-89-6	
Manganese	**4.3**	mg/L	0.0050	1	12/23/14 10:30	12/26/14 12:16	7439-96-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	mg/L	0.050	1	12/23/09 05:00	12/26/14 11:16	7439-89-6	
Manganese, Dissolved	ND	mg/L	0.0050	1	12/23/09 05:00	12/26/14 11:16	7439-96-5	
Sodium, Dissolved	**496000**	ug/L	500	1	12/23/09 05:00	12/26/14 11:16	7440-23-5	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Sample: GW-074928-121714-CM-MW-4 **Lab ID: 60184937003** Collected: 12/17/14 12:00 Received: 12/18/14 09:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**7.1**	mg/L	0.050	1	12/23/14 10:30	12/29/14 15:18	7439-89-6	
Manganese	**0.28**	mg/L	0.0050	1	12/23/14 10:30	12/26/14 12:20	7439-96-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	**0.073**	mg/L	0.050	1	12/23/09 05:00	12/26/14 11:23	7439-89-6	
Manganese, Dissolved	ND	mg/L	0.0050	1	12/23/09 05:00	12/26/14 11:23	7439-96-5	
Sodium, Dissolved	**1150000**	ug/L	10000	20	12/23/09 05:00	12/26/14 11:51	7440-23-5	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Sample: GW-074928-121714-CM-dup **Lab ID: 60184937004** Collected: 12/17/14 00:00 Received: 12/18/14 09:00 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							
Iron, Dissolved	ND	mg/L	0.050	1	12/23/09 05:00	12/26/14 11:25	7439-89-6	
Manganese, Dissolved	ND	mg/L	0.0050	1	12/23/09 05:00	12/26/14 11:25	7439-96-5	
Sodium, Dissolved	**1180**	mg/L	10.0	20	12/23/09 05:00	12/26/14 11:54	7440-23-5	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 074928 Howell K No 1
Pace Project No.: 60184937

QC Batch: MPRP/30289 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60184937001, 60184937002, 60184937003

METHOD BLANK: 1499234 Matrix: Water
Associated Lab Samples: 60184937001, 60184937002, 60184937003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron	mg/L	ND	0.050	12/29/14 14:57	
Manganese	mg/L	ND	0.0050	12/26/14 11:18	

LABORATORY CONTROL SAMPLE: 1499235

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	mg/L	10	10.1	101	80-120	
Manganese	mg/L	1	1.0	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1499236 1499237

Parameter	Units	60185031002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	mg/L	460 ug/L	10	10	10.5	10.6	100	101	75-125	1	20	
Manganese	mg/L	75.1 ug/L	1	1	1.1	1.1	98	100	75-125	2	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

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

QUALITY CONTROL DATA

Project: 074928 Howell K No 1
Pace Project No.: 60184937

QC Batch: MPRP/30285 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60184937001, 60184937002, 60184937003, 60184937004

METHOD BLANK: 1499114 Matrix: Water
Associated Lab Samples: 60184937001, 60184937002, 60184937003, 60184937004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	mg/L	ND	0.050	12/26/14 10:29	
Manganese, Dissolved	mg/L	ND	0.0050	12/26/14 10:29	
Sodium, Dissolved	mg/L	ND	0.50	12/26/14 10:29	

LABORATORY CONTROL SAMPLE: 1499115

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	mg/L	10	10.3	103	80-120	
Manganese, Dissolved	mg/L	1	1.0	103	80-120	
Sodium, Dissolved	mg/L	10	10	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1499116 1499117

Parameter	Units	60184723003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	mg/L	65.9 ug/L	10	10	10.0	9.9	100	98	75-125	2	20	
Manganese, Dissolved	mg/L	1490 ug/L	1	1	2.5	2.5	98	97	75-125	1	20	
Sodium, Dissolved	mg/L	557000 ug/L	10	10	575	574	182	172	75-125	0	20	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

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

QUALIFIERS

Project: 074928 Howell K No 1
Pace Project No.: 60184937

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

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 (8270 listed analyte) decomposes to Azobenzene.

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.

ANALYTE QUALIFIERS

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074928 Howell K No 1
Pace Project No.: 60184937

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60184937001	**GW-074928-121714-CM-MW-1**	EPA 3010	MPRP/30289	EPA 6010	ICP/22646
60184937002	**GW-074928-121714-CM-MW-3**	EPA 3010	MPRP/30289	EPA 6010	ICP/22646
60184937003	**GW-074928-121714-CM-MW-4**	EPA 3010	MPRP/30289	EPA 6010	ICP/22646
60184937001	**GW-074928-121714-CM-MW-1**	EPA 3010	MPRP/30285	EPA 6010	ICP/22641
60184937002	**GW-074928-121714-CM-MW-3**	EPA 3010	MPRP/30285	EPA 6010	ICP/22641
60184937003	**GW-074928-121714-CM-MW-4**	EPA 3010	MPRP/30285	EPA 6010	ICP/22641
60184937004	**GW-074928-121714-CM-dup**	EPA 3010	MPRP/30285	EPA 6010	ICP/22641

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60184937

60184937

Client Name: CRA COP

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 6262 7064 4770 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 Peel

Thermometer Used: T-239 / T-194 **Type of Ice:** (Wet) Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 4.5

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

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☒Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☒Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☒Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	6.
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	7.
Sufficient volume:	☒Yes ☐No ☐N/A	8.
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	9.
Containers intact:	☒Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☒N/A	11.
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	12.
Sample labels match COC:	☒Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WS		13.
All containers needing preservation have been checked.	☒Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☒Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐Yes ☒No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☒N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☒N/A	17. List State:

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

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

Start: 1155	Start:
End: 1200	End:
Temp:	Temp:

Project Manager Review: AAF Date: 12/18/14

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: of

Section A Required Client Information:

Company:	CRA COP NM
Address:	6121 Indian School Rd NE, Ste 200
	Albequerque, NM 87110
Email To:	cmathews@craworld.com
Phone: (505)884-0672	Fax: (505)884-4932
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	Christine Mathews
Copy To:	Jeff Walker, Angela Bown
Purchase Order No.:	4071734
Project Name:	Howell K No. 1
Project Number:	74928

Section C Invoice Information:

Attention:	Angela Bown
Company Name:	CRA
Address:	9033 Meridian Way West Chester, OH
Pace Quote Reference:	
Pace Project Manager:	Alice Flanagan
Pace Profile #:	780[illegible], 15

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: NM

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	300.0 Sulfate, Fluoride	6010Dissolved Fe,Mn,Na	Total Metals Fe, Mn, Na	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	GW·074928·121714·CM·MW-1	WT	G			12/17/14	1200		2			X							X	X	X		001
2	GW·074928·121714·CM·MW-3	WT	G			12/17/14	1130		2			X							X	X	X		002
3	GW·074928·121714·CM·MW-4	WT	G			12/17/14	1200		2			X							X	X	X		003
4	GW·074928·121714·CM·dup	WT	G			12/17/14	—		1			X							X				004
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

BP3N 2-10 BP3F 2-10 — 12/18

6018493 7

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Containers for dissolved metals have been field filtered.	Cassie Brown CRA	12/17/14	1500	Pace	12/18	0900	4.5	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Cassie Brown

SIGNATURE of SAMPLER: Cassie Brown DATE Signed (MM/DD/YY): 12/17/14

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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

February 24, 2015

Christine Mathews
CRA
6121 Indian School Rd NE
Suite 200
Albuquerque, NM 87110

RE: Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Dear Christine Mathews:
Enclosed are the analytical results for sample(s) received by the laboratory on February 13, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI 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 Flanagan
alice.flanagan@pacelabs.com
Project Manager

Enclosures

cc: Angela Bown, COP Conestoga-Rovers & Associa
Angela Bown, Conestoga Rovers & Associates
Chris Fetters, COP Conestoga-Rovers & Associa
Jeff Walker, COP Conestoga-Rovers & Associa

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

CERTIFICATIONS

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Kansas Certification IDs
9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 13-012-0
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

REPORT OF LABORATORY ANALYSIS

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

SAMPLE SUMMARY

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60188032001	**GW-074928-021115-CK-MW-1R**	Water	02/11/15 13:00	02/13/15 08:40
60188032002	**GW-074928-021115-CK-MW-3**	Water	02/11/15 13:20	02/13/15 08:40
60188032003	**GW-074928-021115-CK-MW-4**	Water	02/11/15 13:40	02/13/15 08:40

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

SAMPLE ANALYTE COUNT

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60188032001	**GW-074928-021115-CK-MW-1R**	EPA 6010	NDJ	2
		EPA 6010	JGP	3
60188032002	**GW-074928-021115-CK-MW-3**	EPA 6010	NDJ	2
		EPA 6010	JGP	3
60188032003	**GW-074928-021115-CK-MW-4**	EPA 6010	NDJ	2
		EPA 6010	JGP	3

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

PROJECT NARRATIVE

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Method: **EPA 6010**
Description: 6010 MET ICP
Client: CRA Conoco New Mexico
Date: February 24, 2015

General Information:
3 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

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:

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

PROJECT NARRATIVE

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Method: **EPA 6010**
Description: 6010 MET ICP, Dissolved
Client: CRA Conoco New Mexico
Date: February 24, 2015

General Information:
3 samples were analyzed for EPA 6010. All samples were received in acceptable condition with any exceptions noted below.

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: MPRP/30857

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 60188032001

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

- MS (Lab ID: 1524640)
  - Sodium, Dissolved
- MSD (Lab ID: 1524641)
  - Sodium, Dissolved

Additional Comments:

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

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

ANALYTICAL RESULTS

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Sample: GW-074928-021115-CK-MW-1R **Lab ID: 60188032001** Collected: 02/11/15 13:00 Received: 02/13/15 08:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**28500**	ug/L	50.0	1	02/23/15 10:00	02/23/15 15:41	7439-89-6	
Manganese	**1100**	ug/L	5.0	1	02/23/15 10:00	02/23/15 15:41	7439-96-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	mg/L	0.050	1	02/24/15 09:30	02/24/15 15:12	7439-89-6	
Manganese, Dissolved	**0.028**	mg/L	0.0050	1	02/24/15 09:30	02/24/15 15:12	7439-96-5	
Sodium, Dissolved	**426**	mg/L	0.50	1	02/24/15 09:30	02/24/15 15:12	7440-23-5	M1

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Sample: GW-074928-021115-CK-MW-3 **Lab ID: 60188032002** Collected: 02/11/15 13:20 Received: 02/13/15 08:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**133000**	ug/L	50.0	1	02/23/15 10:00	02/23/15 15:43	7439-89-6	
Manganese	**7070**	ug/L	5.0	1	02/23/15 10:00	02/23/15 15:43	7439-96-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	mg/L	0.050	1	02/24/15 09:30	02/24/15 15:22	7439-89-6	
Manganese, Dissolved	**0.12**	mg/L	0.0050	1	02/24/15 09:30	02/24/15 15:22	7439-96-5	
Sodium, Dissolved	**274**	mg/L	0.50	1	02/24/15 09:30	02/24/15 15:22	7440-23-5	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Sample: GW-074928-021115-CK-MW-4 **Lab ID: 60188032003** Collected: 02/11/15 13:40 Received: 02/13/15 08:40 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**1540**	ug/L	50.0	1	02/23/15 10:00	02/23/15 15:46	7439-89-6	
Manganese	**73.9**	ug/L	5.0	1	02/23/15 10:00	02/23/15 15:46	7439-96-5	
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	mg/L	0.050	1	02/24/15 09:30	02/24/15 15:26	7439-89-6	
Manganese, Dissolved	ND	mg/L	0.0050	1	02/24/15 09:30	02/24/15 15:26	7439-96-5	
Sodium, Dissolved	**1140**	mg/L	5.0	10	02/24/15 09:30	02/24/15 15:37	7440-23-5	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

QC Batch: MPRP/30841 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 60188032001, 60188032002, 60188032003

METHOD BLANK: 1524334 Matrix: Water
Associated Lab Samples: 60188032001, 60188032002, 60188032003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron	ug/L	ND	50.0	02/23/15 15:08	
Manganese	ug/L	ND	5.0	02/23/15 15:08	

LABORATORY CONTROL SAMPLE: 1524335

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	9850	98	90-111	
Manganese	ug/L	1000	997	100	91-108	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524336 1524337

Parameter	Units	60187932001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	1060	10000	10000	10700	10600	97	96	75-125	1	20	
Manganese	ug/L	24.2	1000	1000	1000	991	98	97	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

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

QUALITY CONTROL DATA

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

QC Batch: MPRP/30857 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60188032001, 60188032002, 60188032003

METHOD BLANK: 1524638 Matrix: Water
Associated Lab Samples: 60188032001, 60188032002, 60188032003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	mg/L	ND	0.050	02/24/15 15:05	
Manganese, Dissolved	mg/L	ND	0.0050	02/24/15 15:05	
Sodium, Dissolved	mg/L	ND	0.50	02/24/15 15:05	

LABORATORY CONTROL SAMPLE: 1524639

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	mg/L	10	9.8	98	80-120	
Manganese, Dissolved	mg/L	1	1.0	101	80-120	
Sodium, Dissolved	mg/L	10	10.1	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1524640 1524641

Parameter	Units	60188032001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	mg/L	ND	10	10	9.6	9.7	96	97	75-125	1	20	
Manganese, Dissolved	mg/L	0.028	1	1	1.0	1.0	99	100	75-125	1	20	
Sodium, Dissolved	mg/L	426	10	10	416	423	-101	-31	75-125	2	20	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

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

QUALIFIERS

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

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 (8270 listed analyte) decomposes to Azobenzene.

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.

ANALYTE QUALIFIERS

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

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074928 Howell K No. 1
Pace Project No.: 60188032

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60188032001	**GW-074928-021115-CK-MW-1R**	EPA 3010	MPRP/30841	EPA 6010	ICP/23005
60188032002	**GW-074928-021115-CK-MW-3**	EPA 3010	MPRP/30841	EPA 6010	ICP/23005
60188032003	**GW-074928-021115-CK-MW-4**	EPA 3010	MPRP/30841	EPA 6010	ICP/23005
60188032001	**GW-074928-021115-CK-MW-1R**	EPA 3010	MPRP/30857	EPA 6010	ICP/23014
60188032002	**GW-074928-021115-CK-MW-3**	EPA 3010	MPRP/30857	EPA 6010	ICP/23014
60188032003	**GW-074928-021115-CK-MW-4**	EPA 3010	MPRP/30857	EPA 6010	ICP/23014

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO#: 60188032

60188032

Client Name: CRA Co P NM

Optional
Proj Due Date:
Proj Name:

Courier: Fed Ex ☒ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ Other ☐

Tracking #: 6262 7066 7049 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 ☑ zip lc

Thermometer Used: T-239 / T-194 **Type of Ice:** Wet Blue None ☐ Samples received on ice, cooling process has begun.
(circle one)

Cooler Temperature: 1.1

Temperature should be above freezing to 6°C

Date and initials of person examining contents: pv 2/13/15 pv 2/13/15

Chain of Custody present:	☑Yes ☐No ☐N/A	1.
Chain of Custody filled out:	☑Yes ☐No ☐N/A	2.
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	3.
Sampler name & signature on COC:	☑Yes ☐No ☐N/A	4.
Samples arrived within holding time:	☑Yes ☐No ☐N/A	5.
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	7.
Sufficient volume:	☑Yes ☐No ☐N/A	8.
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	9.
Containers intact:	☑Yes ☐No ☐N/A	10.
Unpreserved 5035A soils frozen w/in 48hrs?	☐Yes ☐No ☑N/A	11.
Filtered volume received for dissolved tests? pv 2/13/15 (2)	☑Yes ☐No ~~☐N/A~~	12.
Sample labels match COC:	☑Yes ☐No ☐N/A	
Includes date/time/ID/analyses Matrix: WT		13.
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	14.
Exceptions: VOA, coliform, TOC, O&G, WI-DRO (water), Phenolics	☐Yes ☑No	Initial when completed / Lot # of added preservative
Trip Blank present:	☐Yes ☐No ☑N/A	
Pace Trip Blank lot # (if purchased):		15.
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	16.
Project sampled in USDA Regulated Area:	☐Yes ☐No ☑N/A	17. List State:

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AAF Date: 02/13/15

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

Start: 1205	Start:
End: 1209	End:
Temp:	Temp:

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: 1 of 1

Section A Required Client Information:

Company:	CRA COP NM
Address:	6121 Indian School Rd NE, Ste 200
	Albequerque, NM 87110
Email To:	cmathews@craworld.com
Phone: (505)884-0672	Fax: (505)884-4932
Requested Due Date/TAT:	

Section B Required Project Information:

Report To:	Christine Mathews
Copy To:	Jeff Walker, Angela Bown
Purchase Order No.:	4071734
Project Name:	Howell K No. 1
Project Number:	74928

Section C Invoice Information:

Attention:	Angela Bown
Company Name:	CRA
Address:	9033 Meridian Way West Chester, OH
Pace Quote Reference:	
Pace Project Manager:	Alice Flanagan
Pace Profile #:	7801, 15

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: NM

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	300.0 Sulfate, Fluoride	6010 Dissolved Fe,Mn,Na	Dissolved Fe	Dissolved Mn	Dissolved Na	Total Fe	Total Mn					Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																													60188032
1	GW-074928-021115-CK-MW-1R	WT	G			2/11/15	1300		2			2									X	X	X	X	X	IBP3N 1.5		IBP3F 1.5		★ DISSOLVED METALS 001
2	GW-074928-021115-CK-MW-3	WT	G			2/11/15	1320		2			2									X	X	X	X	X					SAMPLES WERE 002
3	GW-074928-021115-CK-MW-4	WT	G			2/11/15	1340		2			2									X	X	X	X	X					FIELD FILTERED ★ 003
4																														
5																														★ LABELS DID NOT
6																														HAVE DISSOLVED
7																														Na, BUT PLEASE
8																														TEST FOR IT ★
9																														
10																														
11																														
12																														

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	CRA	2/12/15	1300	FEDEX	2/13/15	0840	1.1	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: CALE KAMACK

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY): 2/12/15

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

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.08, 12-Oct-2007