

3R - 431

2012 AGWMR

02/19/2013



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Reference No. 074925, 074927, 074928
074929, 074932, 074934
075038

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

Dear Mr. von Gonten:

Re: Groundwater Monitoring Reports - 2012

Enclosed, please find a copy of the reports listed below compiled by Conestoga-Rovers and Associates, Inc.

- ✓ 3R434 1. Farmington B Com No. 1E Annual Groundwater Monitoring Report - September 2012
- ✓ 3R434 2. Faye Burdette No. 1 Annual Groundwater Monitoring Report - September 2012
- ✓ 3R469 3. Hampton No. 4M Annual Groundwater Monitoring Report - September 2012
- ✓ 3R431 4. Howell K No. 1 Annual Groundwater Monitoring Report - September 2012
- ✓ 3R471 5. Johnston Federal No. 4 Metering Station Annual Groundwater Monitoring Report - September 2012
- ✓ 3R426 6. San Juan 27-5 No. 34A Annual Groundwater Monitoring Report - September 2012
- 3R428 7. Sategna No. 2E Quarterly Groundwater Monitoring Report - September 2012

If you have any questions or require additional information, please contact me at (505) 884-0672 or keblanchard@craworld.com.

Sincerely,
CONESTOGA-ROVERS & ASSOCIATES

Kelly E. Blanchard

Kelly E. Blanchard
Project Manager

JP/cjg/1
Encl.

cc: Brandon Powell, NMOCD
Terry Lauck, ConocoPhillips (electronic only)

2013 FEB 20 AM 19
 PROJECT 1000

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OCTOBER 2012 ANNUAL GROUNDWATER MONITORING REPORT

CONOCOPHILLIPS HOWELL K No. 1
SAN JUAN COUNTY, NEW MEXICO
API# 30-045-09313
NMOCD# 3R-431

Prepared For:

CONOCOPHILLIPS COMPANY

Risk Management and Remediation

420 South Keeler Avenue

Bartlesville, OK, 74004

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DECEMBER 2012
REF. NO. 074928-95(4)

Prepared by:
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1.0 INTRODUCTION

This report details the results of the annual groundwater monitoring event conducted by Conestoga-Rovers & Associates, Inc. (CRA) on October 3, 2012 at the ConocoPhillips Company (ConocoPhillips) Howell K No. 1 site, located on 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 (Site). Geographical coordinates for the Site are 36° 47' 40.34" North, 107° 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 soils were 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 monitor well (MW-1) was installed by Envirotech in the general area of the backfilled excavation. The location of this well is shown on **Figure 2**.

Due to the transition of Site consulting responsibilities from Lode Star LLC of Farmington, NM, to Tetra Tech, Inc. (Tetra Tech) following the acquisition of Burlington Resources by ConocoPhillips in March 2006, groundwater monitoring was not performed at the Site in March or June 2007. Tetra Tech began sampling groundwater at the Howell K No. 1 site in November 2007 using MW-1 and continued to do so until August of 2008, when 3 additional monitor 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 Monitor Well MW-2 was installed upgradient of MW-1 and Monitor Wells MW-3

and MW-4 were installed downgradient of MW-1 (Figure 2). A generalized geologic cross section was compiled using subsurface data collected from each boring location during installation of Monitor Wells MW-2, MW-3 and MW-4. Monitor 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 monitor wells for analysis 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 monitor 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. A summary of the Howell K No. 1 site history can be seen in Table 1.

2.0 GROUNDWATER MONITORING SUMMARY, METHODOLOGY, AND ANALYTICAL RESULTS

2.1 GROUNDWATER MONITORING SUMMARY

Annual groundwater sampling was conducted by CRA on October 3, 2012. This represents the first annual monitoring event since quarterly monitoring was discontinued. The groundwater sampling event included samples from Monitor Wells MW-1, 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; however, groundwater elevations for MW-1 cannot be calculated due to the damaged PVC well casing. The damage to MW-1 seems to be located at approximately 25 feet below ground surface and is likely due to the proximity of MW-1 to the 2005, below-grade tank removal excavation and the subsequent settling of the fill material in this area. Groundwater elevations for the other monitor wells are calculated from top of casing elevations, which were derived from survey data collected by Tetra Tech on August 14, 2008. Based on September 2012 groundwater elevation data, groundwater flow direction continues to be to the west. A groundwater potentiometric surface map is presented in Figure 4.

2.2 GROUNDWATER MONITORING METHODOLOGY

Prior to sampling, Monitor Wells MW-2, MW-3, and MW-4 were purged of at least three casing volumes of water. A 1.5-inch clear, polyethylene, dedicated bailer was used to purge and to collect the groundwater samples from MW-2, MW-3 and MW-4. As the result of shifted casing in Monitor Well MW-1, a 0.5-inch clear, polyethylene, dedicated bailer was used to purge and to collect the groundwater samples in this well. Slightly less than two casing volumes were purged from MW-1 during the 2012 sampling event. 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 with chain-of-custody documentation to Pace Analytical Services, Inc. of Lenexa, KS. All groundwater samples collected were analyzed for dissolved iron and dissolved manganese 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. Exceedences of NMWQCC groundwater quality standards in Site monitor wells are discussed below.

- **Dissolved Iron**
 - The NMWQCC groundwater quality standard for dissolved iron is 1.0 mg/L. The groundwater samples collected in October 2012 from Monitor Wells MW-1 and MW-4 were found to contain dissolved iron at concentrations of 16.7 mg/L and 2.0 mg/L, respectively.
- **Dissolved Manganese**
 - The NMWQCC groundwater quality standard for dissolved manganese is 0.2 mg/L. Groundwater samples collected in October 2012 from Monitor Wells MW-1, MW-3 and MW-4 were found to contain dissolved manganese at concentrations of 6.1 mg/L, 0.25 mg/L, and 18.0 mg/L, respectively.
- **Sulfate**
 - The NMWQCC groundwater quality standard for sulfate is 600 mg/L. Groundwater samples collected in October 2012 from Monitor Wells MW-1, MW-2, MW-3 and MW-4 were found to contain sulfate at concentrations of 3,280 mg/L, 1,850 mg/L, 2,080 mg/L, and 4,280 mg/L, respectively.
- **Fluoride**
 - The NMWQCC domestic water supply groundwater quality standard for fluoride is 1.6 mg/L. Groundwater sample collected in October 2012 from Monitor Well MW-4 exceeded this standard with a concentration of 2.1 mg/L.

Table 3 summarizes the analytical results from groundwater sampling completed during October 2012. Groundwater sampling field forms detailing

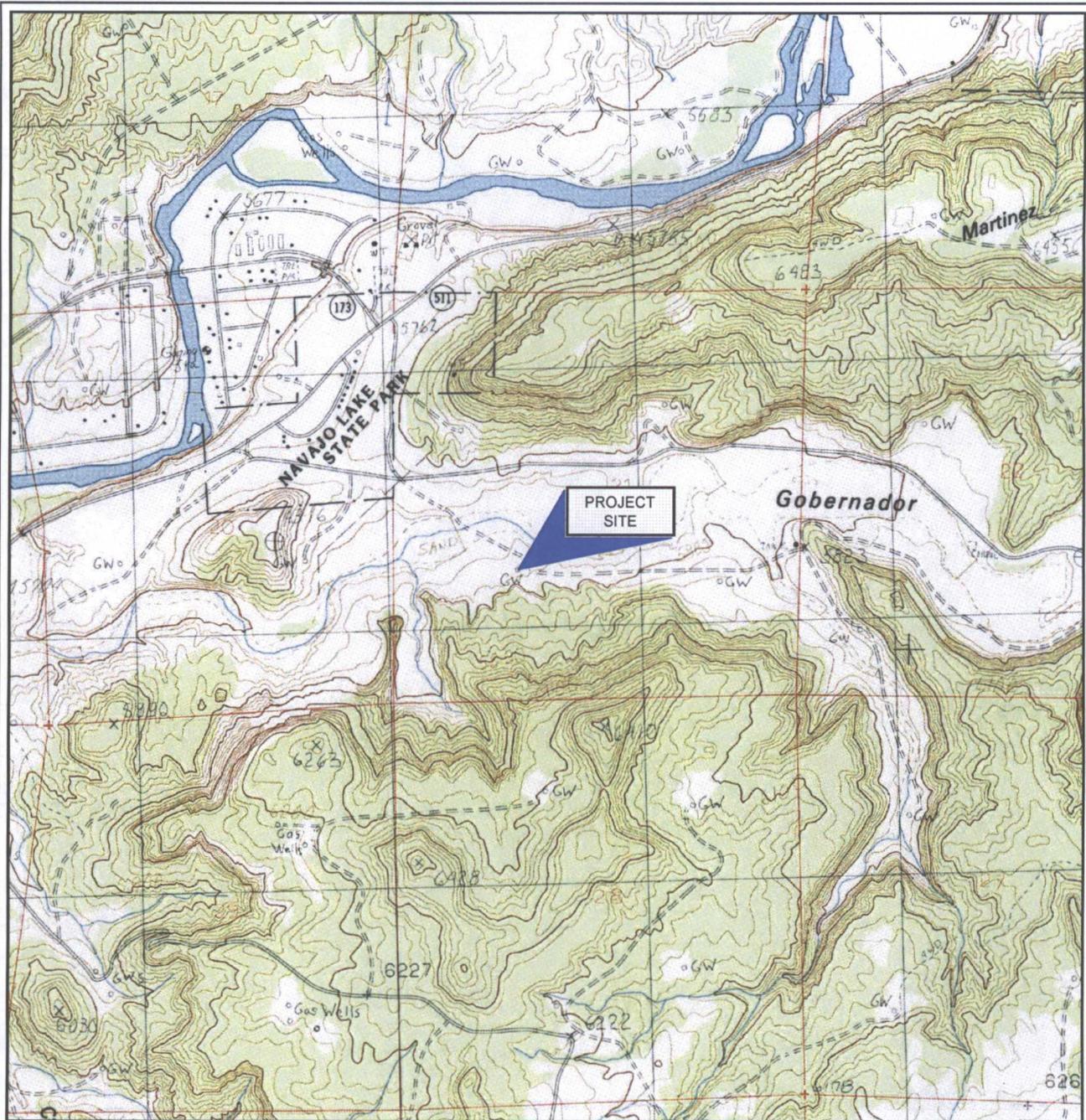
collected field parameters can be found in **Appendix A** and the corresponding laboratory analytical report, including quality control summaries, can be found in **Appendix B**.

3.0 CONCLUSIONS AND RECOMMENDATIONS

BTEX analysis at the Site was discontinued following the December 2010 sampling event; however, CRA recommends continued monitoring of fluoride, sulfate, dissolved manganese, and dissolved iron on an annual basis until concentrations of these groundwater quality parameters are below NMWQCC standards, appear stable, or reach regional background levels, at which time quarterly monitoring will resume. Once eight consecutive quarters of compliance are achieved, remediation Site closure will be requested. The next sampling event is scheduled for September 2012.

As a result of a November 2012 meeting conducted in Santa Fe, New Mexico with Glenn Von Gonten, NMOCD Environmental Bureau Hydrologist, CRA proposes the reinstallation of MW-1 and installation of an additional downgradient monitor well for the purpose of monitoring potential migration of dissolved metals from the Site.

FIGURES



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

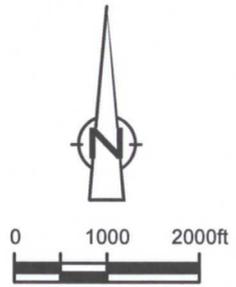
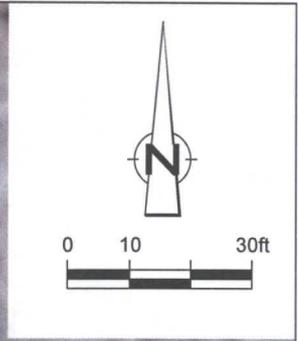
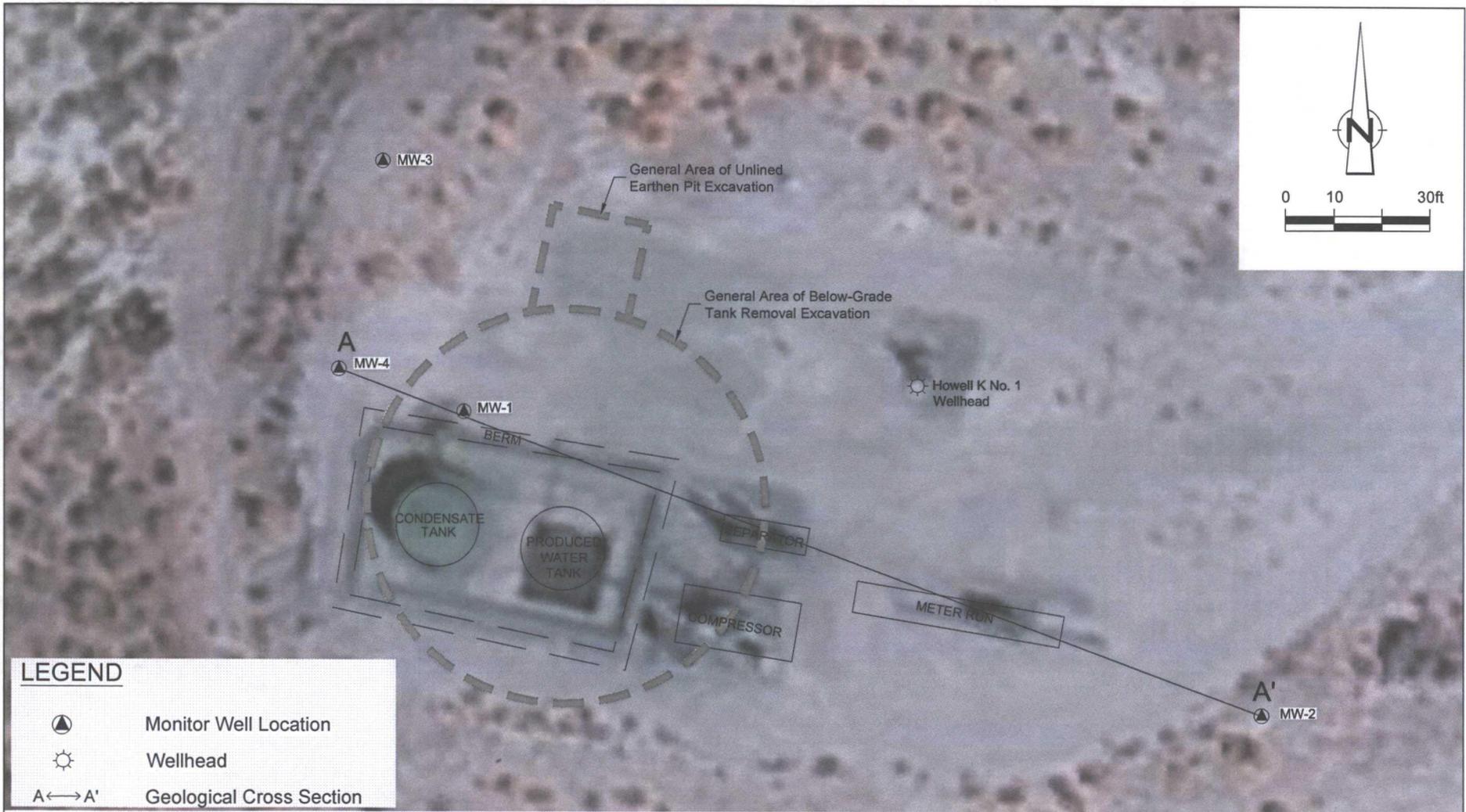


Figure 1

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





LEGEND

	Monitor Well Location
	Wellhead
A ← → A'	Geological Cross Section

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



Howell K No. 1 - Cross-Section A-A'

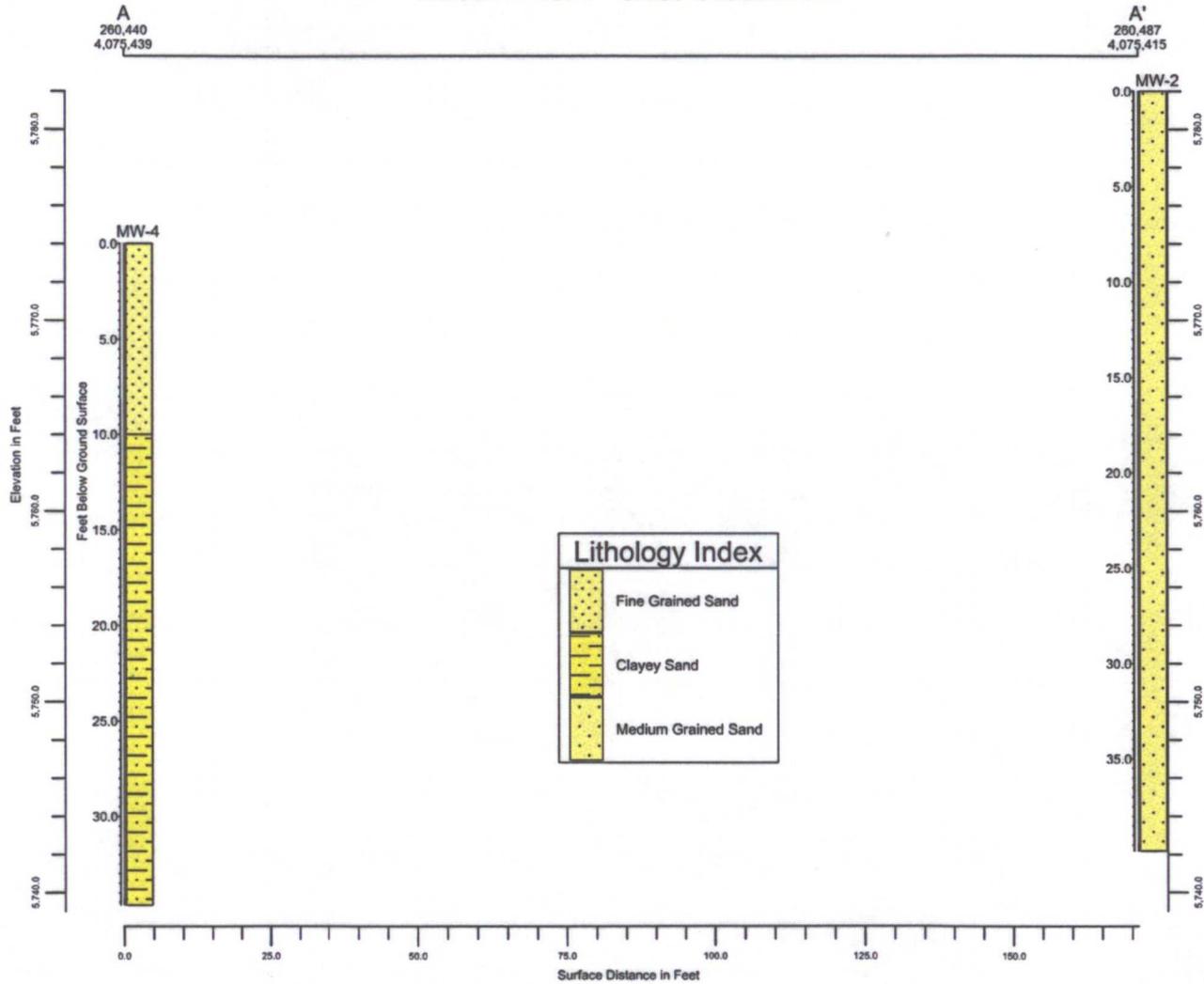


Figure 3

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





LEGEND

-  Monitor Well Location
-  Wellhead
- (66.45) Groundwater Elevation, Ft
-  Groundwater Elevation Contour, Ft
-  Groundwater Flow Direction

Figure 4

SEPTEMBER 2012 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



TABLES

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

<i>Date/Time Period</i>	<i>Event/Action</i>	<i>Description/Comments</i>
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 600 total 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 center 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. Due to the transition, first and second quarter sampling of 2007 was not performed.
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 Conten.
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 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, dissolved 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 fluoride 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.

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

<i>Date/Time Period</i>	<i>Event/Action</i>	<i>Description/Comments</i>
October 18, 2009	Groundwater monitoring	Tetra Tech conducted 2009 annual groundwater monitoring of MW-1 for BTEX, dissolved iron, dissolved manganese, sulfate, and fluoride. MW-1 was below NMWQCC standards for BTEX. Sulfate, dissolved manganese and dissolved iron were above standard 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 fluoride. All four monitor wells are 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 standards for sulfate, dissolved manganese, and dissolved iron. Monitor well MW-4 was also found to be above the standard for fluoride.
March 15, 2011	Groundwater monitoring	First quarter of groundwater monitoring with BTEX analysis discontinued; 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	Second quarter of groundwater monitoring with BTEX analysis discontinued; 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	Third quarter of groundwater monitoring with BTEX analysis discontinued; 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.

TABLE 2
 MONITOR WELL SPECIFICATIONS AND GROUNDWATER ELEVATIONS
 CONOCOPHILLIPS COMPANY
 HOWELL K No. 1
 SAN JUAN COUNTY, NM

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)				
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				

TABLE 2
 MONITOR WELL SPECIFICATIONS AND GROUNDWATER ELEVATIONS
 CONOCOPHILLIPS COMPANY
 HOWELL K No. 1
 SAN JUAN COUNTY, NM

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
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

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

TABLE 3
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)
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-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	
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	
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	
NMWQCC Groundwater Quality Standards			0.01	0.75	0.75	0.62	1.6	600	1	0.2

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

APPENDIX A

OCTOBER 2012 ANNUAL GROUNDWATER SAMPLING FIELD FORMS

WELL SAMPLING FIELD INFORMATION FORM

TE/PROJECT NAME: Hawell K-1 JOB# 074928
 SAMPLE ID: GW-074928-100312-01-mw-1 WELL# MW-1

PURGE DATE (MM/DD/YY) 10-3-12 SAMPLE DATE (MM/DD/YY) 10-3-12 WELL PURGING INFORMATION
 SAMPLE TIME (24 HOUR) 1350/1405 WATER VOL. IN CASING (GALLONS) 0.818 ACTUAL VOL. PURGED (GALLONS) 1.5

PURGING AND SAMPLING EQUIPMENT
 PURGING EQUIPMENT.....DEDICATED Y N (CIRCLE ONE)
 SAMPLING EQUIPMENT.....DEDICATED Y N (CIRCLE ONE)

PURGING DEVICE:	<input checked="" type="checkbox"/> A - SUBMERSIBLE PUMP	<input type="checkbox"/> D - GAS LIFT PUMP	<input type="checkbox"/> G - BAILER	X=	_____
SAMPLING DEVICE:	<input checked="" type="checkbox"/> B - PERISTALTIC PUMP	<input type="checkbox"/> E - PURGE PUMP	<input type="checkbox"/> H - WATERRA®	X=	_____
	<input type="checkbox"/> C - BLADDER PUMP	<input type="checkbox"/> F - DIPPER BOTTLE	<input type="checkbox"/> X - OTHER	X=	_____
PURGING MATERIAL:	<input checked="" type="checkbox"/> A - TEFLON	<input type="checkbox"/> D - PVC	X=	_____	_____
SAMPLING MATERIAL:	<input type="checkbox"/> B - STAINLESS STEEL	<input type="checkbox"/> E - POLYETHYLENE	X=	_____	_____
	<input checked="" type="checkbox"/> C - POLYPROPYLENE	<input type="checkbox"/> X - OTHER	X=	_____	_____
PURGE TUBING:	<input checked="" type="checkbox"/> A - TEFLON	<input type="checkbox"/> D - POLYPROPYLENE	<input type="checkbox"/> G - COMBINATION	X=	_____
SAMPLING TUBING:	<input type="checkbox"/> B - TYGON	<input type="checkbox"/> E - POLYETHYLENE	<input type="checkbox"/> TEFLON/POLYPROPYLENE	X=	_____
	<input checked="" type="checkbox"/> C - ROPE	<input type="checkbox"/> F - SILICONE	<input type="checkbox"/> X - OTHER	X=	_____

FILTERING DEVICES 0.45 A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM 45 micron for metal boron

FIELD MEASUREMENTS

DEPTH TO WATER 31.39 (feet) WELL ELEVATION 97.84 (feet)
 WELL DEPTH 36.50 (feet) GROUNDWATER ELEVATION _____ (feet)

TEMPERATURE	pH	TDS	CONDUCTIVITY	ORP	VOLUME
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)

SAMPLE APPEARANCE: cloudy ODOR: bio COLOR: orange & black particulate
 WEATHER CONDITIONS: TEMPERATURE: 80° WINDY Y N PRECIPITATION Y N (IF Y TYPE) _____
 SPECIFIC COMMENTS: No parameters collected

0.818 x 3 = 2.45

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CWA PROTOCOLS
 DATE 10/3/12 PRINT Christine Matthews SIGNATURE [Signature]

WELL SAMPLING FIELD INFORMATION FORM

ITE/PROJECT NAME: Howell K-1 **JOB#** 074928
SAMPLE ID: GW-074928-100312-01-MW-2 **WELL#** MW-2

WELL PURGING INFORMATION

10-03-12 10-03-12 1330 1.82 5.5
PURGE DATE (MM DD YY) SAMPLE DATE (MM DD YY) SAMPLE TIME (24 HOUR) WATER VOL. IN CASING (GALLONS) ACTUAL VOL. PURGED (GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.....DEDICATED N (CIRCLE ONE) SAMPLING EQUIPMENT.....DEDICATED N (CIRCLE ONE)

PURGING DEVICE	<input checked="" type="checkbox"/>	A - SUBMERSIBLE PUMP	D - GAS LIFT PUMP	G - BAILEY	X = _____
SAMPLING DEVICE	<input checked="" type="checkbox"/>	B - PERISTALTIC PUMP	E - PURGE PUMP	H - WATERRA®	PURGING DEVICE OTHER (SPECIFY)
		C - BLADDER PUMP	F - DIPPER BOTTLE	X - OTHER	X = _____
PURGING MATERIAL	<input checked="" type="checkbox"/>	A - TEFLON	D - PVC		X = _____
SAMPLING MATERIAL	<input checked="" type="checkbox"/>	B - STAINLESS STEEL	E - POLYETHYLENE		PURGING MATERIAL OTHER (SPECIFY)
		C - POLYPROPYLENE	X - OTHER		X = _____
PURGE TUBING	<input checked="" type="checkbox"/>	A - TEFLON	D - POLYPROPYLENE	G - COMBINATION	X = _____
SAMPLING TUBING	<input checked="" type="checkbox"/>	B - TYGON	E - POLYETHYLENE	TEFLON/POLYPROPYLENE	PURGE TUBING OTHER (SPECIFY)
		C - ROPE	F - SILICONE	X - OTHER	X = _____
FILTERING DEVICES 0.45	<input checked="" type="checkbox"/>	A - IN-LINE DISPOSABLE	B - PRESSURE	C - VACUUM	<u>45 micron for metals only</u>

FIELD MEASUREMENTS

DEPTH TO WATER 27.99 (feet) WELL ELEVATION 95.28 (feet)
 WELL DEPTH 39.36 (feet) GROUNDWATER ELEVATION 67.29 (feet)

TEMPERATURE	pH	TDS	CONDUCTIVITY	ORP	VOLUME
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)

FIELD COMMENTS

SAMPLE APPEARANCE: silty ODOR: none COLOR: brown SHEEN Y/N? N
 WEATHER CONDITIONS: TEMPERATURE 80° WINDY Y/N? N PRECIPITATION Y/N (IF Y TYPE) _____
 SPECIFIC COMMENTS: No parameters collected

1.82 x 3 = 5.46

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS
 DATE 10/3/12 PRINT Christine Matthews SIGNATURE [Signature]

WELL SAMPLING FIELD INFORMATION FORM

TE/PROJECT NAME: Howell K-1 JOB# 074928
 SAMPLE ID: GW-074928-100312 CM- MW-3 WELL# MW-3

WELL PURGING INFORMATION

10-3-12 PURGE DATE (MM DD YY) 10-3-12 SAMPLE DATE (MM DD YY) 1350 SAMPLE TIME (24 HOUR) 1.23 WATER VOL. IN CASING (GALLONS) 3.75 ACTUAL VOL. PURGED (GALLONS)

PURGING EQUIPMENT.....DEDICATED Y N (CIRCLE ONE) SAMPLING EQUIPMENT.....DEDICATED Y N (CIRCLE ONE)

PURGING DEVICE	<input checked="" type="checkbox"/> G	A - SUBMERSIBLE PUMP	<input type="checkbox"/> D	D - GAS LIFT PUMP	<input type="checkbox"/> G	G - BAILER	X = _____
SAMPLING DEVICE	<input checked="" type="checkbox"/> G	B - PERISTALTIC PUMP	<input type="checkbox"/> E	E - PURGE PUMP	<input type="checkbox"/> H	H - WATERRA®	PURGING DEVICE OTHER (SPECIFY) _____
		C - BLADDER PUMP	<input type="checkbox"/> F	F - DIPPER BOTTLE	<input type="checkbox"/> X	X - OTHER	X = _____
PURGING MATERIAL	<input checked="" type="checkbox"/> E	A - TEFLON	<input type="checkbox"/> D	D - PVC	X = _____		
SAMPLING MATERIAL	<input checked="" type="checkbox"/> E	B - STAINLESS STEEL	<input type="checkbox"/> E	E - POLYETHYLENE	PURGING MATERIAL OTHER (SPECIFY) _____		
		C - POLYPROPYLENE	<input type="checkbox"/> X	X - OTHER	X = _____		
PURGE TUBING	<input checked="" type="checkbox"/> C	A - TEFLON	<input type="checkbox"/> D	D - POLYPROPYLENE	<input type="checkbox"/> G	G - COMBINATION	X = _____
SAMPLING TUBING	<input checked="" type="checkbox"/> C	B - TYGON	<input type="checkbox"/> E	E - POLYETHYLENE	TEFLON/POLYPROPYLENE		PURGE TUBING OTHER (SPECIFY) _____
		C - ROPE	<input type="checkbox"/> F	F - SILICONE	<input type="checkbox"/> X	X - OTHER	X = _____
FILTERING DEVICES 0.45:	<input checked="" type="checkbox"/> A	A - IN-LINE DISPOSABLE	<input type="checkbox"/> B	B - PRESSURE	<input type="checkbox"/> C	C - VACUUM	<u>45 micron for metals only</u>

FIELD MEASUREMENTS

DEPTH TO WATER	<u>29.02</u>	(feet)	WELL ELEVATION	<u>95.44</u>	(feet)
WELL DEPTH	<u>36.73</u>	(feet)	GROUNDWATER ELEVATION	<u>66.42</u>	(feet)

TEMPERATURE	pH	TDS	CONDUCTIVITY	ORP	VOLUME
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)
_____ (°C)	_____ (std)	_____ (g/L)	_____ (µS/cm)	_____ (mV)	_____ (gal)

FIELD COMMENTS

SAMPLE APPEARANCE: silty ODOR: none COLOR: brown SHEEN Y/N Y
 WEATHER CONDITIONS: TEMPERATURE 80° WINDY Y/N Y PRECIPITATION Y/N (IF Y, TYPE) _____
 SPECIFIC COMMENTS: No parameters collected

1.23 x 3 = 3.70

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS:

DATE 10/3/12 PRINT Christine Matthews SIGNATURE [Signature]

WELL SAMPLING FIELD INFORMATION FORM

ITE/PROJECT NAME: Howell K-1 JOB# 074928
 SAMPLE ID: GW-074928-100312-CM-MW-4 WELL# MW-4

WELL PURGING INFORMATION

PURGE DATE (MM DD YY): 10-3-12 SAMPLE DATE (MM DD YY): 10-3-12 SAMPLE TIME (24 HOUR): 1425 WATER VOL. IN CASING (GALLONS): 0.834 ACTUAL VOL. PURGED (GALLONS): 2.5

PURGING EQUIPMENT.....DEDICATED N (CIRCLE ONE) SAMPLING EQUIPMENT.....DEDICATED N (CIRCLE ONE)

PURGING DEVICE	<input checked="" type="checkbox"/>	A - SUBMERSIBLE PUMP	D - GAS LIFT PUMP	G - BAILER	X= _____
SAMPLING DEVICE	<input checked="" type="checkbox"/>	B - PERISTALTIC PUMP	E - PURGE PUMP	H - WATERA@	PURGING DEVICE OTHER (SPECIFY) _____
		C - BLADDER PUMP	F - DIPPER BOTTLE	X - OTHER	X= _____
PURGING MATERIAL	<input checked="" type="checkbox"/>	A - TEFLON	D - PVC	X= _____	PURGING MATERIAL OTHER (SPECIFY) _____
SAMPLING MATERIAL	<input checked="" type="checkbox"/>	B - STAINLESS STEEL	E - POLYETHYLENE	X= _____	SAMPLING MATERIAL OTHER (SPECIFY) _____
		C - POLYPROPYLENE	X - OTHER	X= _____	SAMPLING MATERIAL OTHER (SPECIFY) _____
PURGE TUBING	<input checked="" type="checkbox"/>	A - TEFLON	D - POLYPROPYLENE	G - COMBINATION	X= _____
SAMPLING TUBING	<input checked="" type="checkbox"/>	B - TYGON	E - POLYETHYLENE	TEFLON/POLYPROPYLENE	PURGE TUBING OTHER (SPECIFY) _____
		C - ROPE	F - SILICONE	X - OTHER	X= _____
FILTERING DEVICES 0.45	<input checked="" type="checkbox"/>	A - IN-LINE DISPOSABLE	B - PRESSURE	C - VACUUM	<u>45 micron for metals only</u>

FIELD MEASUREMENTS

DEPTH TO WATER	<u>29.06</u>	(feet)	WELL ELEVATION	<u>95.36</u>	(feet)
WELL DEPTH	<u>34.27</u>	(feet)	GROUNDWATER ELEVATION	<u>66.30</u>	(feet)

TEMPERATURE	pH	TDS	CONDUCTIVITY	ORP	VOLUME
____ (°C)	____ (std)	____ (g/L)	____ (µS/cm)	____ (mV)	____ (gal)
____ (°C)	____ (std)	____ (g/L)	____ (µS/cm)	____ (mV)	____ (gal)
____ (°C)	____ (std)	____ (g/L)	____ (µS/cm)	____ (mV)	____ (gal)
____ (°C)	____ (std)	____ (g/L)	____ (µS/cm)	____ (mV)	____ (gal)
____ (°C)	____ (std)	____ (g/L)	____ (µS/cm)	____ (mV)	____ (gal)

FIELD COMMENTS

SAMPLE APPEARANCE: _____ ODOR: _____ COLOR: _____ SHEEN Y/N _____
 WEATHER CONDITIONS: TEMPERATURE _____ WINDY Y/N _____ PRECIPITATION Y/N (IF Y, TYPE) _____
 SPECIFIC COMMENTS: No parameters collected
0.834 x 3 = 2.5
Collect Dup for metals only @ 1430

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS
 DATE: 10/3/12 PRINT: Christine Matthews SIGNATURE: [Signature]

APPENDIX B

OCTOBER 2012 ANNUAL GROUNDWATER LABORATORY ANALYTICAL REPORT



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

October 18, 2012

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

RE: Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Dear Christine Matthews:

Enclosed are the analytical results for sample(s) received by the laboratory on October 05, 2012. 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: Kelly Blanchard, COP Conestoga-Rovers & Associa
Angela Bown, COP Conestoga-Rovers & Associa
Cassie Brown, COP Conestoga-Rovers & Associa



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
A2LA Certification #: 2456.01
Arkansas Certification #: 12-019-0
Illinois Certification #: 002885
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116

Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-12-3
Utah Certification #: KS000212012-2

REPORT OF LABORATORY ANALYSIS

Page 2 of 15

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SAMPLE SUMMARY

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60130637001	GW-074928-100312-CM-MW-2	Water	10/03/12 13:30	10/05/12 08:30
60130637002	GW-074928-100312-CM-MW-3	Water	10/03/12 13:50	10/05/12 08:30
60130637003	GW-074928-100312-CM-MW-1	Water	10/03/12 14:05	10/05/12 08:30
60130637004	GW-074928-100312-CM-MW-4	Water	10/03/12 14:25	10/05/12 08:30
60130637005	GW-074928-100312-CM-DUP	Water	10/03/12 14:30	10/05/12 08:30

REPORT OF LABORATORY ANALYSIS



SAMPLE ANALYTE COUNT

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60130637001	GW-074928-100312-CM-MW-2	EPA 6010 EPA 300.0	JGP AJM	2 2
60130637002	GW-074928-100312-CM-MW-3	EPA 6010 EPA 300.0	JGP AJM	2 2
60130637003	GW-074928-100312-CM-MW-1	EPA 6010 EPA 300.0	JGP AJM	2 2
60130637004	GW-074928-100312-CM-MW-4	EPA 6010 EPA 300.0	JGP AJM	2 2
60130637005	GW-074928-100312-CM-DUP	EPA 6010	JGP	2

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Method: EPA 6010
Description: 6010 MET ICP, Dissolved
Client: COP Conestoga-Rovers & Associates, Inc. NM
Date: October 18, 2012

General Information:

5 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 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:

REPORT OF LABORATORY ANALYSIS

Page 5 of 15

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PROJECT NARRATIVE

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Method: EPA 300.0
Description: 300.0 IC Anions 28 Days
Client: COP Conestoga-Rovers & Associates, Inc. NM
Date: October 18, 2012

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 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.

ANALYTICAL RESULTS

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Sample: **GW-074928-100312-CM-MW-2** Lab ID: **60130637001** Collected: 10/03/12 13:30 Received: 10/05/12 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	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	0.017	1	10/10/12 12:25	10/11/12 18:36	7439-89-6	
Manganese, Dissolved	0.0055	mg/L	0.0050	0.00060	1	10/10/12 12:25	10/11/12 18:36	7439-96-5	
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Fluoride	1.1	mg/L	0.20	0.011	1		10/15/12 11:41	16984-48-8	
Sulfate	1850	mg/L	200	24.0	200		10/15/12 11:59	14808-79-8	

ANALYTICAL RESULTS

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Sample: **GW-074928-100312-CM-MW-3** Lab ID: **60130637002** Collected: 10/03/12 13:50 Received: 10/05/12 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	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	0.017	1	10/10/12 12:25	10/11/12 18:45	7439-89-6	
Manganese, Dissolved	0.25	mg/L	0.0050	0.00060	1	10/10/12 12:25	10/11/12 18:45	7439-96-5	
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Fluoride	0.95	mg/L	0.20	0.011	1		10/15/12 14:07	16984-48-8	
Sulfate	2080	mg/L	200	24.0	200		10/15/12 14:25	14808-79-8	

ANALYTICAL RESULTS

Project: 074928 HOWELL K NO 1

Pace Project No.: 60130637

Sample: **GW-074928-100312-CM-MW-1** Lab ID: **60130637003** Collected: 10/03/12 14:05 Received: 10/05/12 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved		Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	16.7	mg/L	0.050	0.017	1	10/10/12 12:25	10/11/12 18:47	7439-89-6	
Manganese, Dissolved	6.1	mg/L	0.0050	0.00060	1	10/10/12 12:25	10/11/12 18:47	7439-96-5	
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Fluoride	0.56	mg/L	0.20	0.011	1		10/15/12 14:43	16984-48-8	
Sulfate	3280	mg/L	200	24.0	200		10/15/12 15:01	14808-79-8	



ANALYTICAL RESULTS

Project: 074928 HOWELL K NO 1
 Pace Project No.: 60130637

Sample: **GW-074928-100312-CM-MW-4** Lab ID: **60130637004** Collected: 10/03/12 14:25 Received: 10/05/12 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved		Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	2.0	mg/L	0.050	0.017	1	10/10/12 12:25	10/11/12 18:49	7439-89-6	
Manganese, Dissolved	18.0	mg/L	0.0050	0.00060	1	10/10/12 12:25	10/11/12 18:49	7439-96-5	
300.0 IC Anions 28 Days		Analytical Method: EPA 300.0							
Fluoride	2.1	mg/L	0.20	0.011	1		10/15/12 15:20	16984-48-8	
Sulfate	4280	mg/L	500	60.0	500		10/15/12 21:42	14808-79-8	



ANALYTICAL RESULTS

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Sample: **GW-074928-100312-CM-DUP** Lab ID: **60130637005** Collected: 10/03/12 14:30 Received: 10/05/12 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved Analytical Method: EPA 6010 Preparation Method: EPA 3010									
Iron, Dissolved	2.2	mg/L	0.050	0.017	1	10/10/12 12:25	10/11/12 18:51	7439-89-6	
Manganese, Dissolved	18.4	mg/L	0.0050	0.00060	1	10/10/12 12:25	10/11/12 18:51	7439-96-5	

QUALITY CONTROL DATA

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

QC Batch: MPRP/19894 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60130637001, 60130637002, 60130637003, 60130637004, 60130637005

METHOD BLANK: 1076621 Matrix: Water
Associated Lab Samples: 60130637001, 60130637002, 60130637003, 60130637004, 60130637005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	mg/L	ND	0.050	10/11/12 18:18	
Manganese, Dissolved	mg/L	ND	0.0050	10/11/12 18:18	

LABORATORY CONTROL SAMPLE: 1076622

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	mg/L	10	9.2	92	80-120	
Manganese, Dissolved	mg/L	1	0.99	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1076623 1076624

Parameter	Units	60130622001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
Iron, Dissolved	mg/L	9350	10	10	18.6	18.2	92	88	75-125	2	20	
Manganese, Dissolved	mg/L	600	1	1	1.6	1.5	96	94	75-125	1	20	

QUALITY CONTROL DATA

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

QC Batch: WETA/22056 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60130637001, 60130637002, 60130637003, 60130637004

METHOD BLANK: 1079557 Matrix: Water
Associated Lab Samples: 60130637001, 60130637002, 60130637003, 60130637004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	ND	0.20	10/15/12 11:05	
Sulfate	mg/L	ND	1.0	10/15/12 11:05	

LABORATORY CONTROL SAMPLE: 1079558

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1079559 1079560

Parameter	Units	60130637001 Result	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Qual
			Spike Conc.	MS Spike Conc.	MSD Spike Conc.	MS Result					
Fluoride	mg/L	1.1	2.5	2.5	3.5	3.5	97	96	75-110	1	10
Sulfate	mg/L	1850	1000	1000	2710	2710	86	86	61-119	0	10

MATRIX SPIKE SAMPLE: 1079561

Parameter	Units	60130829001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L		0.66	2.5	3.2	75-110	
Sulfate	mg/L		5.6	5	10.4	61-119	

QUALIFIERS

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

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.

PRL - Pace Reporting 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.



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074928 HOWELL K NO 1
Pace Project No.: 60130637

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60130637001	GW-074928-100312-CM-MW-2	EPA 3010	MPRP/19894	EPA 6010	ICP/16356
60130637002	GW-074928-100312-CM-MW-3	EPA 3010	MPRP/19894	EPA 6010	ICP/16356
60130637003	GW-074928-100312-CM-MW-1	EPA 3010	MPRP/19894	EPA 6010	ICP/16356
60130637004	GW-074928-100312-CM-MW-4	EPA 3010	MPRP/19894	EPA 6010	ICP/16356
60130637005	GW-074928-100312-CM-DUP	EPA 3010	MPRP/19894	EPA 6010	ICP/16356
60130637001	GW-074928-100312-CM-MW-2	EPA 300.0	WETA/22056		
60130637002	GW-074928-100312-CM-MW-3	EPA 300.0	WETA/22056		
60130637003	GW-074928-100312-CM-MW-1	EPA 300.0	WETA/22056		
60130637004	GW-074928-100312-CM-MW-4	EPA 300.0	WETA/22056		



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		Section B Required Project Information		Section C Invoice Information	
Company: COP.CRA.NM		Report To: Christine Mathews		Attention: COP epayables	
Address: 6121 Indian School Rd NE, Ste 200 Albuquerque, NM: 87110		Copy To: Kelly Blanchard, Angela Bown		Company Name:	
Email To: cmathews@croworld.com		Purchase Order No.:		Address:	
Phone: (505)884-0672 Fax: (505)884-4932		Project Name: Howell K No. 1		Pace Quote Reference:	
Requested Due Date/TAT:		Project Number: 74928		Pace Project Manager: Alice Flanagan	
				Pace Profile #: 5514, 15	
				REGULATORY AGENCY	
				<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER	
				Site Location: NM	
				STATE: NM	

ITEM #	Section D Required Client Information	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	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives						Analysis Test (Y/N)	Requested Analysis Filtered (Y/N)		Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.		
					COMPOSITE GRAB		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃		Methanol	Other			6010 Dissolved Fe & Mn	300.0 Sulfate, Fluoride
					DATE	TIME	DATE	TIME															
1	GW-074928-100312-CM-MW-2				10.03.12	1330				X	X					X	X	18P32.15	18P36	01			
2	GW-074928-100312-CM-MW-3				10.03.12	1350				X	X					X	X			02			
3	GW-074928-100312-CM-MW-1				10.03.12	1405				X	X					X	X			03			
4	GW-074928-100312-CM-MW-4				10.03.12	1425				X	X					X	X			04			
5	GW-074928-100312-CM-DUP				10.03.12	1430				X	X					X	X			05			
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	<i>Christine Mathews</i> / CRA	10.04.12	1700	E Brockett	10.15	0830	2-3	Y	Y	Y

Pace Package 16 of 17

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on file (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER: Christine Mathews					
SIGNATURE of SAMPLER: <i>Christine Mathews</i>					
DATE Signed (MM/DD/YY): 10-04-12					



Sample Condition Upon Receipt – ESI Tech Specs

Client Name: COP - CRA NM

Project #: 00130637

Courier: Fed Ex UPS USPS Client Commercial Pace Other

Optional
Proj Due Date: <u>10/19</u>
Proj Name:

Tracking #: 8001 8200 4846 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 gplc

Thermometer Used: T-91 / T-194 Type of Ice: Wet Blue None Samples received on ice, cooling process has begun. (circle one)

Cooler Temperature: 2-3

Date and initials of person examining contents: <u>10/15/12</u>

Temperature should be above freezing to 6°C

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

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

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: [Signature] Date: 10/12/12

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start: <u>1235</u>	Start:
End: <u>1240</u>	End:
Temp:	Temp:

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the NCDENR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers).