1R – 1554

2014 GWMR

07 / 30 / 2014

July 30, 2014

NMOCD

1220 South St. Francis Dr.

Santa Fe, New Mexico 87505

Effective June 1, 2014 Legacy Reserves Operating LP took over operations of certain properties in the state of New Mexico from Celero Energy. Along with this acquisition Legacy Reserves Operating LP assumed seven sites that had existing case numbers, they are listed below.

Rock Queen Unit Tract Battery #11	1RP-1595
Rock Queen Saltwater Plant #1	1RP-1594
Rock Queen Unit Tract Battery #13	1RP-1614
Rock Queen Unit Tract Battery #33	1RP-1664
Rock Queen Unit Tract Battery #1	1RP-1554
Rock Queen Unit Tract Battery #7	1RP-1645
Drickey Queen Saltwater Plant #3	1RP-1648

As per the included studies, Legacy Reserves recommends all cases to be closed.

Sincerely,

Gregg Skelton

Operations Manager

Legacy Reserves Operating LP

Legacy Reserves
303 West Wall, Suite 1400 • Midland, Texas 79701 • P.O. Box 10848 • Midland, Texas 79702
OFFICE 432-689-5200 • FAX 432-689-5297

TETRA TECH

July 11, 2014

Mr. Glenn von Gonten
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87504

Re: Groundwater Aquifer Evaluation/Determination and Closure Request Report for the Legacy Reserves (Formerly Celero Energy II, LP), Rock Queen Unit Tract Battery #1, Located in Unit Letter B, Section 25, Township 13 South, Range 31 East, Chaves County, New Mexico (NMOCD 1RP#1554)

Mr. Von Gonten:

This report details the results of the Groundwater Aquifer Slug Test Evaluation for the Rock Queen Unit Tract Battery #1, located in Chaves County, New Mexico.

Additional Monitor Well Installation

Between April 4 and April 10, 2014, Tetra Tech was onsite to oversee the installation of three additional monitor wells (MW-8, MW-9, and MW-10) for delineation purposes. Each of the three monitor wells were installed with 2-inch PVC casing. The lithology of the newly installed wells was relatively consistent with limestone and sandstone encountered to approximately 20 feet below ground surface (bgs). From 20 feet to 130 feet is a fine to medium grain calcareous tan to brown sand. From 130 feet to terminus is a white to red clay. See Figures 1 and 2 for site locations and Appendix A for soil boring logs.

During the investigation, groundwater was encountered at depths of approximately 123 to 130 feet bgs. The monitor wells were extended to depths of 137, 157, and 125 feet bgs, respectively for MW-8, MW-9, and MW-10. Monitor wells MW-8 and MW-10 had 30 feet of 0.02" screen installed while MW-9 had 40 feet of 0.02" screen installed at the base of the well. From the top of the screens to the surface of the boring, the wells were completed with blank schedule 40 PVC casing. A sand filter pack, bentonite seal, and cement were installed in the annulus of the wells. See Figure 3 detailing monitor well locations and Appendix

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1910 North Big Spring, Midland,TX 79705
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B monitor well completion diagrams.

2014 Groundwater Gauging and Sampling Results

Tetra Tech was onsite March 27, 2014 to gauge all monitor wells. No PSH was measured in any of the monitor wells. Utilizing water level elevation calculations, a groundwater gradient map was generated for the sampling event with a hydraulic gradient to the southwest. Monitor well MW-10 was dry. Groundwater gradient map for the sampling event is included as Figure 4. Gauging data is summarized as Table 1.

On March 1, 2014, each of the monitor wells was sampled for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) utilizing Method SW8021B, chlorides and sulfates utilizing Method E 300.0, Total Dissolved Solids (TDS) utilizing Method SM2540C, and general chemistry. The samples were collected and submitted to Trace Analysis Inc. (Trace) of Midland, Texas. All samples collected and submitted were below the New Mexico Water Quality Control Commission (NMWQCC) standard of 0.01 milligrams per liter (mg/L) benzene. Chlorides for the sampling period ranged from 82.8 mg/L in monitor well MW-8 to 110,000 mg/L in monitor wells MW-1 and MW-7. Monitor wells MW-5 and MW-8 were the only wells with chlorides below the NMWQCC standard of 250 mg/L. The general chemistry and BTEX analyses are shown in Tables 2 and 3, respectively. Chloride concentration map for the sampling event is included as Figure 5. See Appendix C for Laboratory Analytical Reports.

Aquifer Evaluation/Determination

Between March 25 and April 2, 2014, Tetra Tech was onsite to perform slug tests on Monitor Wells MW-1 and MW-4. Due to low volumes at the site, a pump test was not feasible for performing aquifer characteristic testing on the underlying formation. In order to determine hydraulic conductivity (K) and Transmissivity values (T) for the underlying groundwater, an In-Situ Level Troll 700 Data Logger was placed in each of the tested wells along with a 3-foot slug consisting of 1 ½" PVC with sand packing. Upon collection of the data, the information was evaluated based upon the Bouwer-Rice Method.

Based on the collected data, monitor well MW-1 had a K value of 6.657E-5 meters per day (m/day) and a T value of 6.29E-4 m^2/day. Monitor well MW-4 had a K value of 4.688E-5 m/day and a T value of 2.608E-4 m^2/day. From *Groundwater Hydrology*, by David Keith Todd, the K values for both wells indicate characteristics of a tight clay/shale with extremely low Transmissivity. Based on this data, it appears the underlying groundwater is not a viable aquifer and will not render much water. As such, remediation of the underlying groundwater would be neither technically nor economically feasible. See

TETRA TECH

Appendix D for slug test results.

CONCLUSIONS AND RECOMMENDATIONS

Based on the low hydraulic conductivity and transmissivity of the groundwater bearing unit at the site presented in this report, coupled with the infeasibility of remediating the site due to the poor aquifer characteristics, Legacy respectfully requests that the NMOCD consider closure of the site based on deed recordation/restriction of the impacted area. Upon closure of the site all monitor/recovery wells located onsite will be plugged and abandoned (P&A) in accordance to New Mexico Office of the State Engineer (OSE). Upon completion of the P&A of the wells, a final report detailing the removal of the wells along with the drillers plugging reports will be submitted to the NMOCD for final closure.

If you have any questions or comments concerning the assessment or the activities performed at the Site, please call me at (432) 682-4559.

Respectfully submitted,
Tetra Tech, Inc.

Jeffrey Kindley, P.G.
Senior Environmental Geologist

Greg W. Pope, P.G.
Senior Project Manager

cc: Gregg Skelton – Legacy Reserves

FIGURES

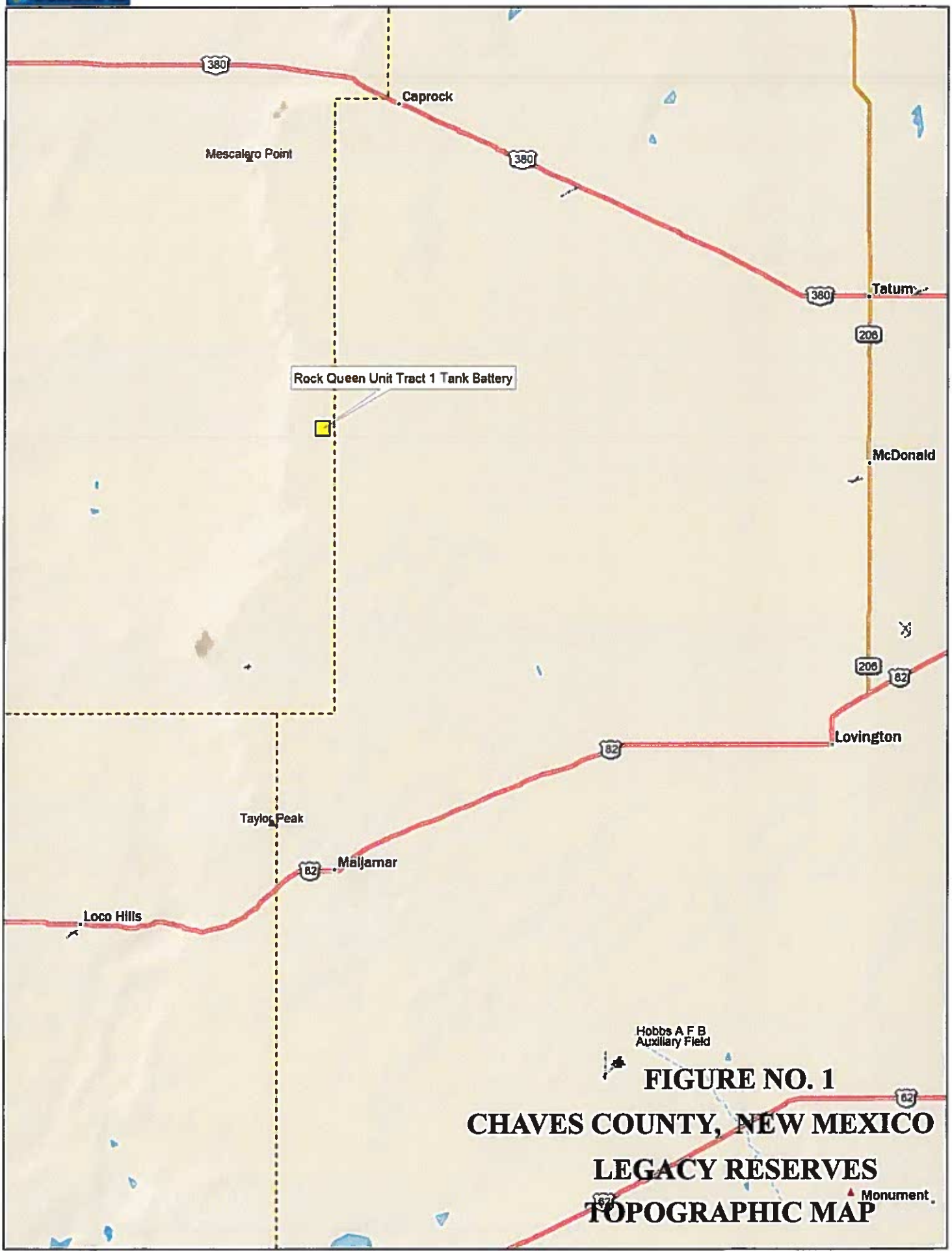


FIGURE NO. 1
CHAVES COUNTY, NEW MEXICO
LEGACY RESERVES
TOPOGRAPHIC MAP

TN

MN (7.7°E)

Scale 1 : 400,000

1" = 6.31 mi

Data Zoom 8-7

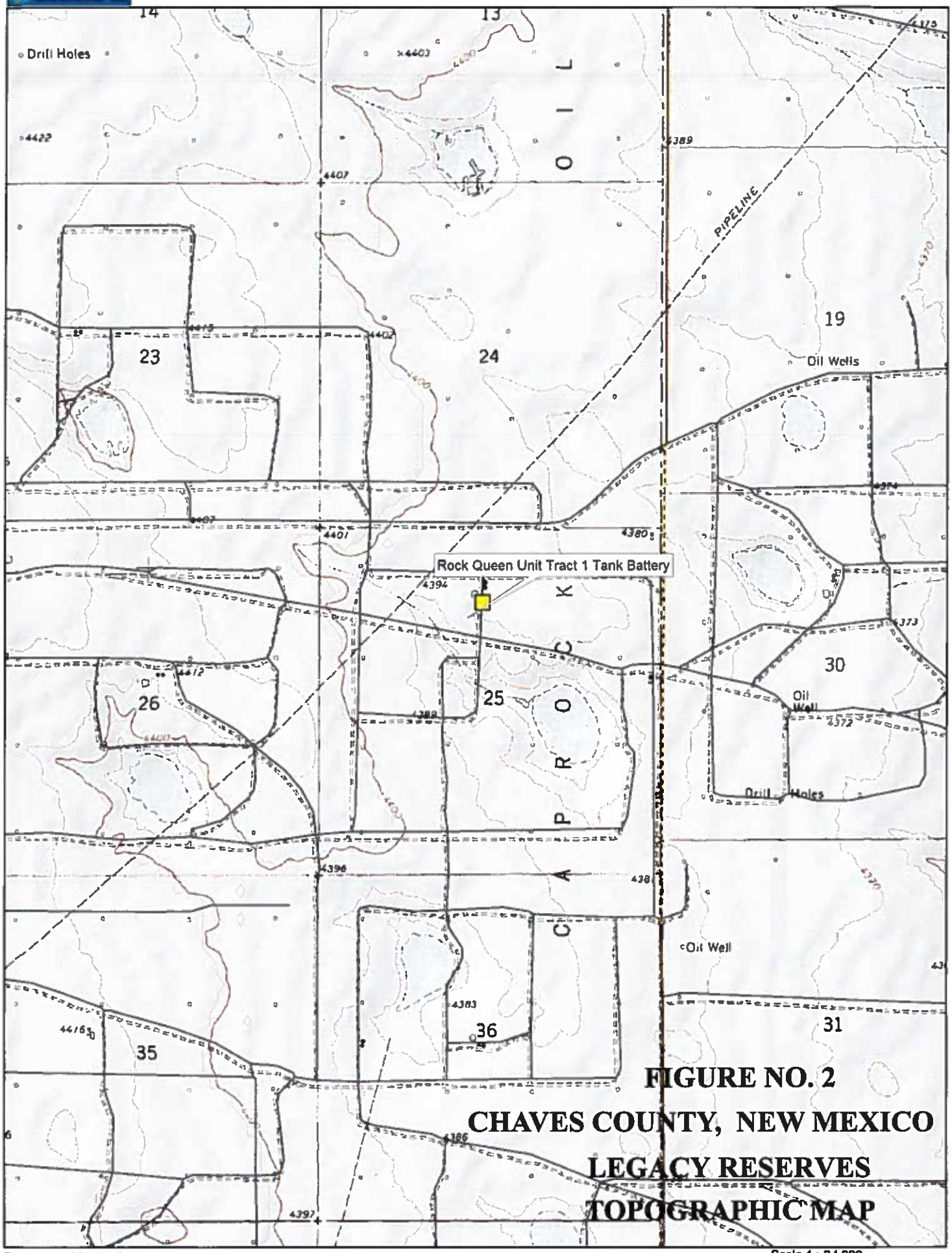


FIGURE NO. 2
CHAVES COUNTY, NEW MEXICO
LEGACY RESERVES
TOPOGRAPHIC MAP

TN

MN (7.7°E)

Scale 1 : 24,000

1" = 2,000.0 ft

Data Zoom 12-7

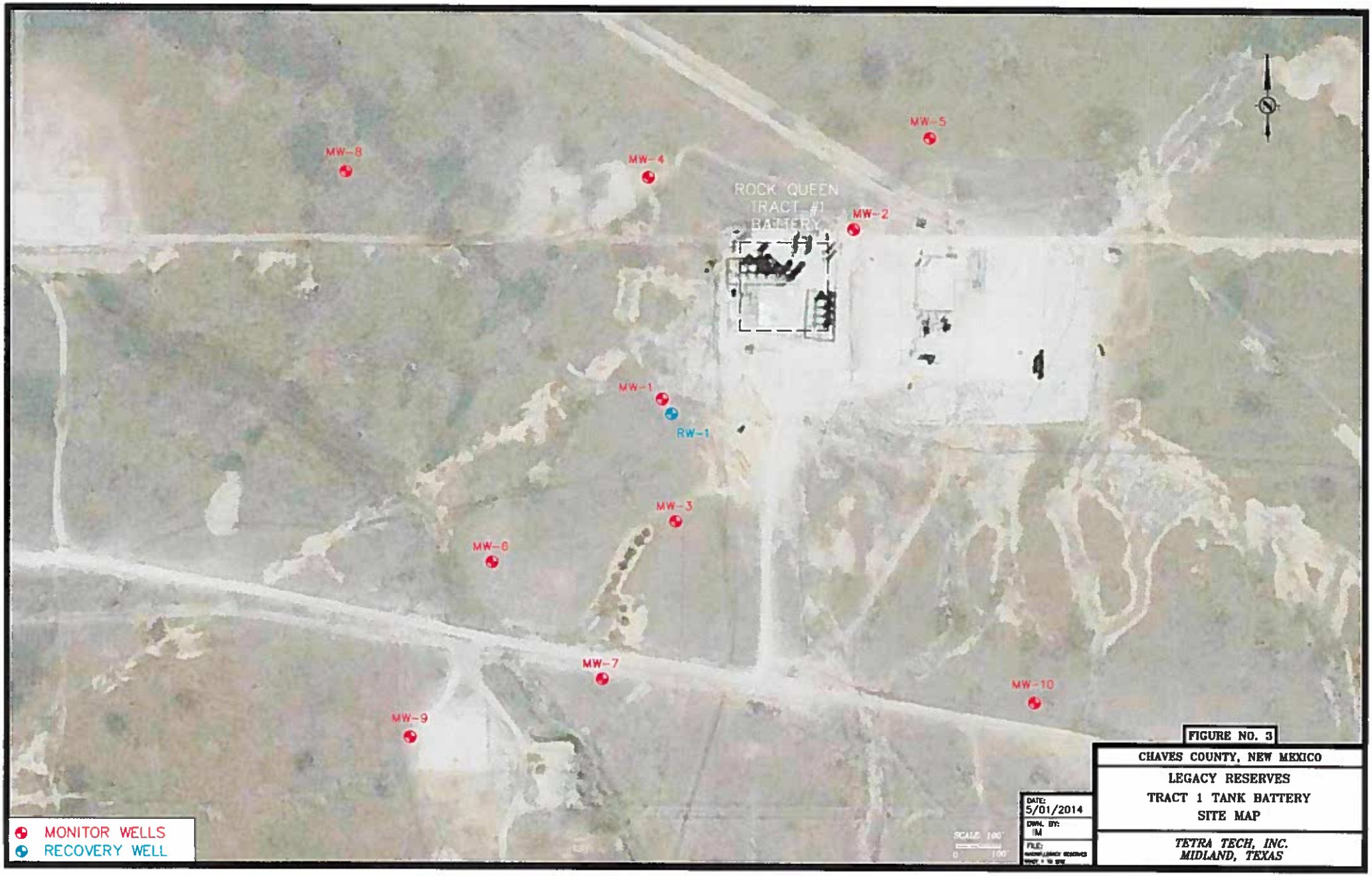


FIGURE NO. 3

CHAVES COUNTY, NEW MEXICO

LEGACY RESERVES

TRACT 1 TANK BATTERY

SITE MAP

TETRA TECH, INC.
MIDLAND, TEXAS

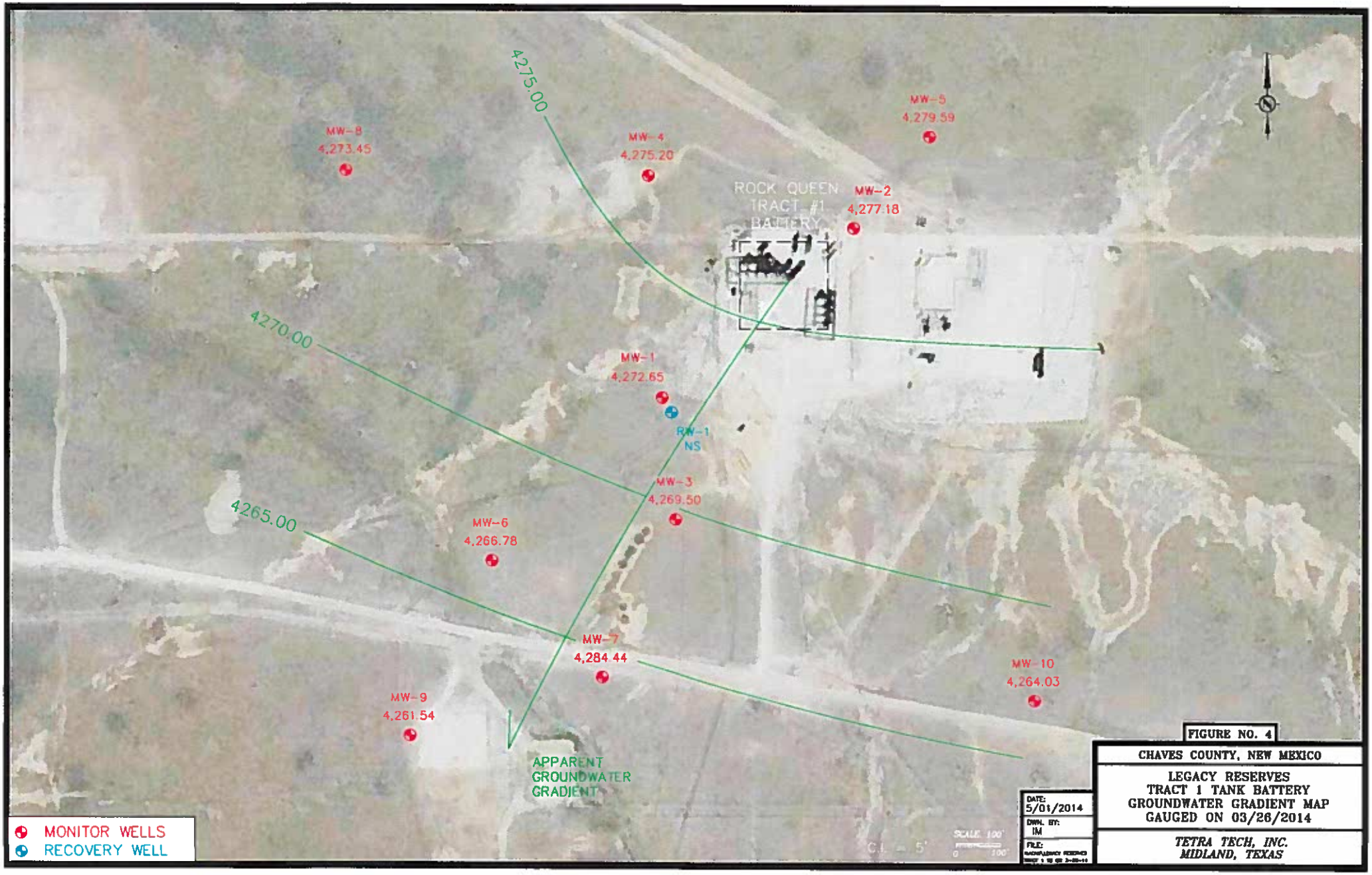


FIGURE NO. 4

CHAVES COUNTY, NEW MEXICO

LEGACY RESERVES
TRACT 1 TANK BATTERY
GROUNDWATER GRADIENT MAP
GAUGED ON 03/26/2014

TETRA TECH, INC.
MIDLAND, TEXAS

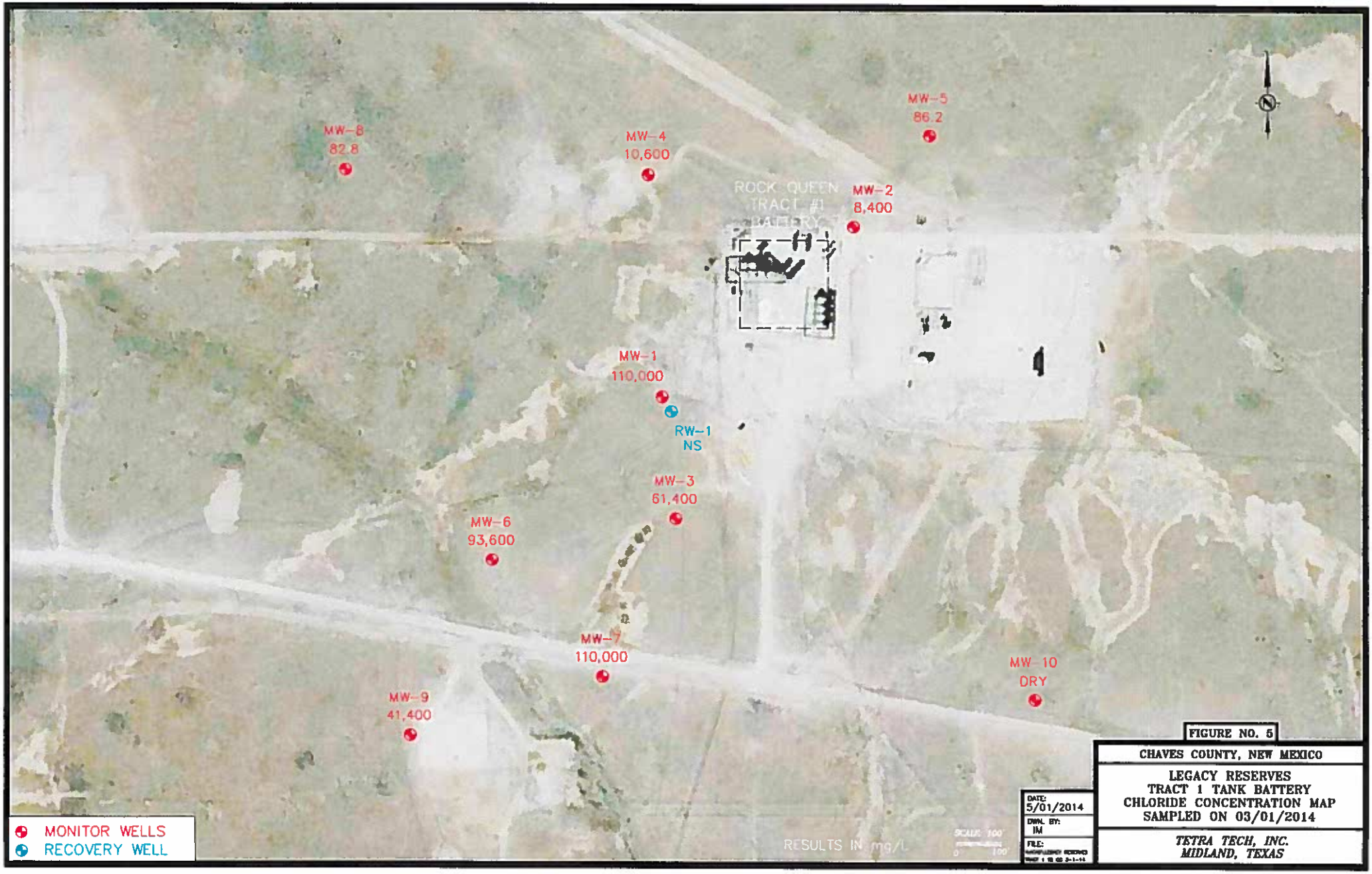


FIGURE NO. 5

CHAVES COUNTY, NEW MEXICO

LEGACY RESERVES
TRACT 1 TANK BATTERY
CHLORIDE CONCENTRATION MAP
SAMPLED ON 03/01/2014

TETRA TECH, INC.
MIDLAND, TEXAS

TABLES

Table 1
Legacy Reserves
Groundwater Gauging Data
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Gauged	Date Well Installation	TOC Elevation (ft)	Depth of Well (bgs in ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-1	05/25/07	05/24/07	4,393.50	152.80	102.80	4,290.70
	02/05/08				119.51	4,273.99
	12/28/09				120.26	4,273.24
	07/12/10				120.34	4,273.16
	10/11/10				120.43	4,273.07
	01/17/11				120.26	4,273.24
	04/11/11				120.31	4,273.19
	07/27/11				121.14	4,272.36
	10/24/11				120.58	4,272.92
	01/03/12				120.53	4,272.97
	04/09/12				120.66	4,272.84
	07/23/12				120.95	4,272.55
	10/23/12				120.54	4,272.96
	01/29/13				120.71	4,272.79
	04/22/13				120.80	4,272.70
	07/24/13				120.78	4,272.72
	10/30/13				120.74	4,272.76
	03/26/14				120.85	4,272.65
MW-2	06/01/07	05/30/07	4,397.33	139.50	94.78	4,302.55
	02/05/08				119.89	4,277.44
	12/28/09				119.87	4,277.46
	07/12/10				119.80	4,277.53
	10/11/10				119.77	4,277.56
	01/17/11				119.67	4,277.66
	04/11/11				119.66	4,277.67
	07/27/11				120.36	4,276.97
	10/24/11				119.76	4,277.57
	01/03/12				119.73	4,277.60
	04/09/12				119.84	4,277.49
	07/23/12				119.81	4,277.52
	10/23/12				121.23	4,276.10
	01/29/13				119.84	4,277.49
	04/22/13				120.07	4,277.26
	07/24/13				120.12	4,277.21
	10/30/13				120.05	4,277.28
	03/26/14				120.15	4,277.18

Table 1
Legacy Reserves
Groundwater Gauging Data
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Gauged	Date Well Installation	TOC Elevation (ft)	Depth of Well (bgs in ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-3	12/28/09	12/09/09	4,390.65	137.28	120.65	4,270.00
	07/12/10				120.34	4,270.31
	10/11/10				120.81	4,269.84
	01/17/11				120.74	4,269.91
	04/11/11				120.78	4,269.87
	07/27/11				121.58	4,269.07
	10/24/11				120.94	4,269.71
	01/03/12				120.94	4,269.71
	04/09/12				120.98	4,269.67
	07/23/12				120.90	4,269.75
	10/23/12				121.05	4,269.60
	01/29/13				121.08	4,269.57
	04/22/13				121.09	4,269.56
	07/24/13				121.10	4,269.55
	10/30/13				121.05	4,269.60
	03/26/14				121.15	4,269.50
MW-4	12/28/09	12/10/09	4,396.96	139.40	121.50	4,275.46
	07/12/10				121.46	4,275.50
	10/11/10				121.53	4,275.43
	01/17/11				121.53	4,275.43
	04/11/11				121.52	4,275.44
	07/27/11				122.54	4,274.42
	10/24/11				121.51	4,275.45
	01/03/12				121.55	4,275.41
	04/09/12				121.59	4,275.37
	07/23/12				121.55	4,275.41
	10/23/12				121.68	4,275.28
	01/29/13				123.63	4,273.33
	04/22/13				121.70	4,275.26
	07/24/13				121.71	4,275.25
	10/30/13				121.68	4,275.28
	03/26/14				121.76	4,275.20
MW-5	01/17/11	11/23/10	4,395.87	133.35	116.10	4,279.77
	04/11/11				116.11	4,279.76
	07/27/11				116.93	4,278.94
	10/24/11				116.21	4,279.66

Table 1
Legacy Reserves
Groundwater Gauging Data
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Gauged	Date Well Installation	TOC Elevation (ft)	Depth of Well (bgs in ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-5	01/03/12				116.11	4,279.76
	04/09/12				116.19	4,279.68
	07/23/12				116.12	4,279.75
	10/23/12				116.21	4,279.66
	01/29/13				116.16	4,279.71
	04/22/13				115.10	4,280.77
	07/24/13				115.16	4,280.71
	10/30/13				115.12	4,280.75
	03/26/14				116.28	4,279.59
MW-6	01/17/11	11/29/10	4,390.58	142.55	122.41	4,268.17
	04/11/11				122.47	4,268.11
	07/27/11				124.24	4,266.34
	10/24/11				123.78	4,266.80
	01/03/12				123.21	4,267.37
	04/09/12				123.57	4,267.01
	07/23/12				123.57	4,267.01
	10/23/12				123.65	4,266.93
	01/29/13				123.63	4,266.95
	04/22/13				123.68	4,266.90
	07/24/13				123.89	4,266.69
	10/30/13				123.80	4,266.78
	03/26/14				123.80	4,266.78
MW-7	01/17/11	11/23/10	4,388.41	139.00	123.50	4,264.91
	04/11/11				123.53	4,264.88
	07/27/11				124.51	4,263.90
	10/24/11				123.78	4,264.63
	01/03/12				123.38	4,265.03
	04/09/12				123.80	4,264.61
	07/23/12				123.82	4,264.59
	10/23/12				128.93	4,259.48
	01/29/13				128.87	4,259.54
	04/22/13				123.91	4,264.50
	07/24/13				123.88	4,264.53
	10/30/13				123.86	4,264.55
	03/26/14				123.97	4,264.44
MW-8	03/26/14	02/26/14	4,397.12		123.67	4,273.45

Table 1
Legacy Reserves
Groundwater Gauging Data
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Gauged	Date Well Installation	TOC Elevation (ft)	Depth of Well (bgs in ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)
MW-9	03/26/14	02/26/14	4,392.23		130.69	4,261.54
MW-10	03/26/14	02/26/14	4,385.91		121.88	4,264.03
RW-1	01/17/11	12/13/10	4,392.97	131.40	120.05	4,272.92
	04/11/11				120.07	4,272.90
	07/27/11				121.07	4,271.90
	10/24/11				120.33	4,272.64
	01/03/12				120.37	4,272.60
	04/09/12				Pumping	Pumping
	07/23/12				121.18	4,271.79
	10/23/12				126.75	4,266.22
	01/29/13				Pumping	Pumping
	04/22/13				Pumping	Pumping
	07/24/13				120.28	4,272.69
	10/30/13				120.25	4,272.72

Table 2

Legacy Reserves

Groundwater Analytical Results

Rock Queen Unit Tract 1 Tank Battery

Chaves County, New Mexico

Monitor Well	Date Sampled	Dissolved Calcium (mg/L)	Dissolved Magnesium (mg/L)	Dissolved Sodium (mg/L)	Dissolved Potassium (mg/L)	Hydroxide Alkalinity (mg/L)	Carbonate Alkalinity (mg/L)	Bicarbonate Alkalinity (mg/L)	Total Alkalinity (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	TDS (mg/L)	Hardness (mg/L)	pH
MW-1	05/29/07	2,170	3,320	75,500	1380.0	<1.00	<1.00	154	154	2,290	146,000	188,300	17,400	6.61
	12/28/09	2,520	4,370	64,600	2490.0	<1.00	<1.00	<4.00	<4.00	2,230	164,000	244,000	24,300	5.27
	07/12/10	-	-	-	-	-	-	-	-	1,720	49,900	98,000	-	-
	10/11/10	-	-	-	-	-	-	-	-	1,870	133,000	260,000	-	-
	01/24/11	-	-	-	-	-	-	-	-	2,560	144,000	258,000	-	-
	04/13/11	-	-	-	-	-	-	-	-	2,210	168,000	250,000	-	-
	07/28/11	-	-	-	-	-	-	-	-	2,210	141,000	231,000	-	-
	10/25/11	-	-	-	-	-	-	-	-	2,270	155,000	239,000	-	-
	01/05/12	-	-	-	-	-	-	-	-	2,160	150,000	205,000	-	-
	04/11/12	-	-	-	-	-	-	-	-	2,150	151,000	221,000	-	-
	07/24/12	-	-	-	-	-	-	-	-	-	123,000	-	-	-
	10/25/12	-	-	-	-	-	-	-	-	2,360	169,000	227,000	-	-
	01/30/13	-	-	-	-	-	-	-	-	1,890	132,000	217,000	-	-
	04/24/13	2,640	3,990	78,500	1,630	<20.0	<20.0	100	100	1,880	144,000	244,000	23,000	5.96
	07/24/13	2,090	2,830	73,100	1,450	<20.0	<20.0	100	100	<12,500	128,000	231,000	16,900	5.90
	10/30/13	2,120	2,750	56,400	1,150	<20.0	<20.0	123	123	395	136,000	197,000	16,600	6.46
	03/01/14	2,960	3,200	61,500	1,490	<20.0	<20.0	113	113	1,740	110,000	184,000	20,600	6.15
MW-2	08/05/08	-	-	-	-	-	-	-	-	-	5,510	-	-	-
	12/28/09	1,630	379	1,360	18.0	<1.00	<1.00	138	138	4.43	5,480	14,000	5,630	7.30
	07/12/10	-	-	-	-	-	-	-	-	47.80	5,930	14,100	-	-
	10/11/10	-	-	-	-	-	-	-	-	88.90	6,580	11,700	-	-
	01/24/11	-	-	-	-	-	-	-	-	108	7,310	26,800	-	-
	04/13/11	-	-	-	-	-	-	-	-	125	8,270	29,800	-	-
	07/28/11	-	-	-	-	-	-	-	-	135	9,870	25,300	-	-
	10/25/11	-	-	-	-	-	-	-	-	189	9,200	14,800	-	-
	01/05/12	-	-	-	-	-	-	-	-	149	9,050	36,100	-	-
	04/11/12	-	-	-	-	-	-	-	-	136	8,250	20,100	-	-
	07/24/12	-	-	-	-	-	-	-	-	-	9,110	-	-	-
	10/25/12	-	-	-	-	-	-	-	-	168	9,320	32,100	-	-
	01/30/13	-	-	-	-	-	-	-	-	161	8,330	21,400	-	-
	04/24/13	2,490	575	2,240	22.6	<20.0	<20.0	134	134	211	9,840	25,200	8,580	6.74
	07/24/13	1,800	525	2,640	35.0	<20.0	<20.0	127	127	<2500	9,400	18,500	6,660	6.65
	10/30/13	1,710	462	3,000	32.0	<20.0	<20.0	161	161	165	9,980	21,200	6,170	6.93
	03/01/14	2,520	550	2,660	33.2	<20.0	<20.0	131	131	165	8,400	17,300	8,550	6.74

Table 2
Legacy Reserves
Groundwater Analytical Results
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Sampled	Dissolved Calcium (mg/L)	Dissolved Magnesium (mg/L)	Dissolved Sodium (mg/L)	Dissolved Potassium (mg/L)	Hydroxide Alkalinity (mg/L)	Carbonate Alkalinity (mg/L)	Bicarbonate Alkalinity (mg/L)	Total Alkalinity (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	TDS (mg/L)	Hardness (mg/L)	pH
MW-3	12/28/09	2,120	804	12,000	146.0	<1.00	<1.00	106	106	661	22,400	40,700	8,600	6.77
	07/12/10	-	-	-	-	-	-	-	-	1,970	133,000	237,000	-	-
	10/11/10	-	-	-	-	-	-	-	-	1,630	57,300	110,000	-	-
	01/24/11	-	-	-	-	-	-	-	-	2,280	51,900	95,300	-	-
	04/13/11	-	-	-	-	-	-	-	-	1,990	57,800	103,000	-	-
	07/28/11	-	-	-	-	-	-	-	-	2,070	67,300	93,400	-	-
	10/25/11	-	-	-	-	-	-	-	-	2,000	60,700	110,000	-	-
	01/05/12	-	-	-	-	-	-	-	-	2,150	73,300	102,000	-	-
	04/11/12	-	-	-	-	-	-	-	-	2,110	71,600	104,000	-	-
	07/24/12	-	-	-	-	-	-	-	-	-	70,200	-	-	-
	10/25/12	-	-	-	-	-	-	-	-	2,290	71,700	110,000	-	-
	01/30/13	-	-	-	-	-	-	-	-	1,930	60,500	91,600	-	-
	04/24/13	4,780	2,420	32,100	432	<20.0	<20.0	100	100	1,780	60,000	118,000	21,900	6.41
	07/24/13	4,120	1,660	32,100	569	<20.0	<20.0	100	100	<12500	64,000	124,000	17,100	6.28
	10/30/13	4,630	2,410	30,600	459	<20.0	<20.0	131	131	2,040	81,900	121,000	21,500	6.55
	03/01/14	6,000	3,060	33,100	501	<20.0	<20.0	123	123	2,130	61,400	113,000	27,600	6.29
MW-4	12/28/09	1,660	349	1,020	14.1	<1.00	<1.00	99	99	148	5,070	9,900	5,580	7.51
	07/12/10	-	-	-	-	-	-	-	-	71.1	1,140	1,880	-	-
	10/11/10	-	-	-	-	-	-	-	-	238.0	16,500	43,800	-	-
	01/24/11	-	-	-	-	-	-	-	-	180.0	6,230	12,400	-	-
	04/13/11	-	-	-	-	-	-	-	-	193.0	7,870	18,500	-	-
	07/28/11	-	-	-	-	-	-	-	-	90.5	934	1,720	-	-
	10/25/11	-	-	-	-	-	-	-	-	442	23,700	48,300	-	-
	01/05/12	-	-	-	-	-	-	-	-	148	3,880	7,100	-	-
	04/11/12	-	-	-	-	-	-	-	-	180	7,020	12,000		
	07/24/12	-	-	-	-	-	-	-	-	-	3,860	-	-	-
	10/25/12	-	-	-	-	-	-	-	-	206	14,200	21,800	-	-
	01/30/13	-	-	-	-	-	-	-	-	215	7,960	12,600	-	-
	04/24/13	3,340	768	2,220	21.7	<20.0	<20.0	135	135	290	13,800	37,200	11,500	6.71
	07/24/13	6,770	1,150	4,030	135.0	<20.0	<20.0	148	148	<2500	23,900	49,200	21,600	6.58
	10/30/13	283	60.5	428	<10.0	<20.0	<20.0	143	143	93.7	933	66,000	956	6.75
	03/01/14	3,250	592	2,030	31.3	<20.0	<20.0	101	101	226	10,600	19,800	10,600	6.94

Table 2

Legacy Reserves

Groundwater Analytical Results

Rock Queen Unit Tract 1 Tank Battery

Chaves County, New Mexico

Monitor Well	Date Sampled	Dissolved Calcium (mg/L)	Dissolved Magnesium (mg/L)	Dissolved Sodium (mg/L)	Dissolved Potassium (mg/L)	Hydroxide Alkalinity (mg/L)	Carbonate Alkalinity (mg/L)	Bicarbonate Alkalinity (mg/L)	Total Alkalinity (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	TDS (mg/L)	Hardness (mg/L)	pH
MW-5	01/24/11	-	-	-	-	-	-	-	-	58.4	121	518	-	-
	04/13/11	-	-	-	-	-	-	-	-	62.7	126	458	-	-
	07/28/11	-	-	-	-	-	-	-	-	138	40.9	414	-	-
	10/25/11	-	-	-	-	-	-	-	-	136	128	896	-	-
	01/05/12	-	-	-	-	-	-	-	-	143	71.8	554	-	-
	04/11/12	-	-	-	-	-	-	-	-	132	64.5	556		
	07/24/12	-	-	-	-	-	-	-	-	-	72.6	-	-	-
	10/25/12	-	-	-	-	-	-	-	-	151	71.9	536	-	-
	01/30/13	-	-	-	-	-	-	-	-	142	72.6	528	-	-
	04/24/13	90.9	17.3	64.9	1.55	<20.0	<20.0	136	136	133	66.2	586	298	7.98
	07/24/13	68.5	9.9	60.4	2.95	<20.0	<20.0	161	161	132	65.7	510	212	8.07
	10/30/13	76.8	13.0	73.8	<10	<20.0	<20.0	139	139	146	70.3	714	245	8.01
	03/01/14	76.5	11.3	72.8	7.16	<20.0	<20.0	146	146	136	86.2	616	232	7.89
MW-6	01/24/11	-	-	-	-	-	-	-	-	2,850	88,900	161,000	-	-
	04/13/11	-	-	-	-	-	-	-	-	2,310	92,900	146,000	-	-
	07/28/11	-	-	-	-	-	-	-	-	2,680	101,000	160,000	-	-
	10/25/11	-	-	-	-	-	-	-	-	2,660	111,000	160,000	-	-
	01/05/12	-	-	-	-	-	-	-	-	2,600	124,000	164,000	-	-
	04/11/12	-	-	-	-	-	-	-	-	3,180	101,000	171,000		
	07/24/12	-	-	-	-	-	-	-	-	-	107,000	-	-	-
	10/25/12	-	-	-	-	-	-	-	-	2,660	119,000	170,000	-	-
	01/30/13	-	-	-	-	-	-	-	-	2,480	97,800	152,000	-	-
	04/24/13	4,540	3,310	57,500	708	<20.0	<20.0	118	118	2,300	98,800	169,000	25,000	6.13
	07/24/13	4,840	3,050	57,000	780	<20.0	<20.0	174	174	<12500	117,000	197,000	24,600	6.22
	10/30/13	3,420	2,660	50,700	803	<20.0	<20.0	175	175	2,430	126,000	161,000	19,500	6.35
	03/01/14	4,980	3,560	56,800	776	<20.0	<20.0	116	116	2,440	93,600	155,000	27,100	6.13

Table 2
Legacy Reserves
Groundwater Analytical Results
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Sampled	Dissolved Calcium (mg/L)	Dissolved Magnesium (mg/L)	Dissolved Sodium (mg/L)	Dissolved Potassium (mg/L)	Hydroxide Alkalinity (mg/L)	Carbonate Alkalinity (mg/L)	Bicarbonate Alkalinity (mg/L)	Total Alkalinity (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	TDS (mg/L)	Hardness (mg/L)	pH
MW-7	01/24/11	-	-	-	-	-	-	-	-	2,580	92,400	179,000	-	-
	04/13/11	-	-	-	-	-	-	-	-	2,330	102,000	177,000	-	-
	07/28/11	-	-	-	-	-	-	-	-	2,300	99,400	194,000	-	-
	10/25/11	-	-	-	-	-	-	-	-	2,370	99,400	170,000	-	-
	01/05/12	-	-	-	-	-	-	-	-	2,440	128,000	186,000	-	-
	04/11/12	-	-	-	-	-	-	-	-	5,980	203,000	186,000		
	07/24/12	-	-	-	-	-	-	-	-	-	120,000	-	-	-
	101/25/12	-	-	-	-	-	-	-	-	2,620	124,000	194,000	-	-
	01/30/13	-	-	-	-	-	-	-	-	2,280	111,000	179,000	-	-
	04/24/13	5,520	3,890	66,500	994	<20.0	<20.0	91.0	91.0	2,010	118,000	180,000	29,800	6.23
	07/24/13	4,900	3,250	58,700	968	<20.0	<20.0	187.0	187.0	<12500	127,000	213,000	25,600	6.26
	10/30/13	4,560	3,210	57,500	939	<20.0	<20.0	91.0	91.0	2,880	147,000	199,000	24,600	6.42
	03/01/14	5,980	4,020	58,900	996	<20.0	<20.0	85.0	85.0	2,380	110,000	183,000	31,500	6.16
MW-8	03/01/14	71.1	11.0	132	13.2	<20.0	<20.0	148	148	89.0	82.8	562	223	7.85
MW-9	03/01/14	6,650	2,180	16,900	136	<20.0	<20.0	221	221	849	41,400	65,300	25,600	6.60
RW-1	01/24/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	04/13/11	-	-	-	-	-	-	-	-	2,680	139,000	222,000	-	-
	07/28/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/25/11	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	01/05/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	04/11/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	05/21/12	3,510	4,130	96,600	2,230	<1.00	<1.00	201	201	2,410	199,000	237,000	25,800	-
	07/24/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/25/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	01/30/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	04/24/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	07/24/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	10/30/13	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	03/01/14	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

NS - Not sampled

(-) Not Analyzed

Table 3
Legacy Reserves
Groundwater Analytical Results
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Sampled	Benzene (mg/L)	Toluene (mg/L)	Ethyl-Benzene (mg/L)	Xylene (mg/L)	Total BTEX (mg/L)
MW-1	12/28/09	<0.001	<0.001	<0.001	<0.001	<0.001
	07/12/10	<0.001	<0.001	<0.001	<0.001	<0.001
	10/11/10	<0.001	<0.001	<0.001	<0.001	<0.001
	01/24/11	<0.001	<0.001	<0.001	<0.001	<0.001
	04/14/11	0.006	<0.001	<0.001	<0.001	0.006
	07/28/11	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/11	<0.001	<0.001	<0.001	0.0205	0.0205
	01/05/12	<0.001	<0.001	<0.001	<0.001	<0.001
	04/11/12	<0.0006	<0.0004	<0.0006	<0.0013	<0.0013
	07/24/12	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/12	<0.001	<0.001	<0.001	<0.001	<0.001
	01/30/13	<0.001	<0.001	<0.001	<0.001	<0.001
	04/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	07/24/13	<0.001	<0.001	<0.001	0.0221	0.0221
	10/30/13	<0.001	<0.001	<0.001	<0.001	<0.001
	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300
MW-2	12/28/09	<0.001	<0.001	<0.001	<0.001	<0.001
	07/12/10	<0.001	<0.001	<0.001	<0.001	<0.001
	10/11/10	<0.001	<0.001	<0.001	<0.001	<0.001
	01/24/11	<0.001	<0.001	<0.001	<0.001	<0.001
	04/14/11	<0.001	<0.001	<0.001	<0.001	<0.001
	07/28/11	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/11	<0.001	<0.001	<0.001	<0.001	<0.001
	01/05/12	<0.001	<0.001	<0.001	<0.001	<0.001
	04/11/12	<0.0006	<0.0004	<0.0006	<0.0013	<0.0013
	07/24/12	<0.001	<0.001	0.002	0.007	0.009
	10/25/12	<0.001	<0.001	0.002	0.007	0.009
	01/30/13	<0.001	<0.001	0.002	0.007	0.009
	04/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	07/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	10/30/13	<0.001	<0.001	<0.001	<0.003	<0.003
	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300
MW-3	12/28/09	<0.001	<0.001	<0.001	<0.001	<0.001
	07/12/10	<0.001	<0.001	<0.001	<0.001	<0.001
	10/11/10	<0.001	<0.001	<0.001	<0.001	<0.001
	01/24/11	<0.001	<0.001	<0.001	<0.001	<0.001
	04/14/11	<0.001	<0.001	<0.001	<0.001	<0.001
	07/28/11	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/11	<0.001	<0.001	<0.001	<0.001	<0.001
	01/05/12	<0.001	<0.001	<0.001	<0.001	<0.001
	04/11/12	<0.0006	<0.0004	<0.0006	<0.0013	<0.0013
	07/24/12	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/12	<0.001	<0.001	<0.001	<0.001	<0.001
	01/30/13	<0.001	<0.001	<0.001	<0.001	<0.001

Table 3
Legacy Reserves
Groundwater Analytical Results
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Sampled	Benzene (mg/L)	Toluene (mg/L)	Ethyl-Benzene (mg/L)	Xylene (mg/L)	Total BTEX (mg/L)
MW-3	04/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	07/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	10/30/13	<0.001	<0.001	<0.001	<0.003	<0.003
	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300
MW-4	12/28/09	<0.001	<0.001	<0.001	<0.001	<0.001
	07/12/10	<0.001	<0.001	<0.001	<0.001	<0.001
	10/11/10	<0.001	<0.001	<0.001	<0.001	<0.001
	01/24/11	<0.001	<0.001	<0.001	<0.001	<0.001
	04/14/11	<0.001	<0.001	<0.001	<0.001	<0.001
	07/28/11	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/11	<0.001	<0.001	<0.001	<0.001	<0.001
	01/05/12	<0.001	<0.001	<0.001	<0.001	<0.001
	04/11/12	<0.0006	<0.0004	<0.0006	<0.0013	<0.0013
	07/24/12	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/12	<0.001	<0.001	<0.001	<0.001	<0.001
	01/30/13	<0.001	<0.001	<0.001	<0.001	<0.001
	04/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	07/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	10/30/13	<0.001	<0.001	<0.001	<0.003	<0.003
	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300
MW-5	01/24/11	<0.001	<0.001	<0.001	<0.001	<0.001
	04/14/11	<0.001	<0.001	<0.001	<0.001	<0.001
	07/28/11	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/11	<0.001	<0.001	<0.001	<0.001	<0.001
	01/05/12	<0.001	<0.001	<0.001	<0.001	<0.001
	04/11/12	<0.0006	<0.0004	<0.0006	<0.0013	<0.0013
	07/24/12	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/12	<0.001	<0.001	<0.001	<0.001	<0.001
	01/30/13	<0.001	<0.001	<0.001	<0.001	<0.001
	04/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	07/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	10/30/13	<0.001	<0.001	<0.001	<0.003	<0.003
	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300
MW-6	01/24/11	<0.001	<0.001	<0.001	<0.001	<0.001
	04/14/11	0.0063	0.0062	<0.001	<0.001	0.0125
	07/28/11	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/11	<0.001	<0.001	<0.001	<0.001	<0.001
	01/05/12	<0.001	<0.001	<0.001	<0.001	<0.001
	04/11/12	0.0040	0.0040	<0.0006	<0.0013	0.0080
	07/24/12	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/12	<0.001	<0.001	<0.001	<0.001	<0.001
	01/30/13	<0.001	<0.001	<0.001	<0.001	<0.001
	04/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	07/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	10/30/13	<0.001	<0.001	<0.001	<0.001	<0.001
	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300

Table 3
Legacy Reserves
Groundwater Analytical Results
Rock Queen Unit Tract 1 Tank Battery
Chaves County, New Mexico

Monitor Well	Date Sampled	Benzene (mg/L)	Toluene (mg/L)	Ethyl-Benzene (mg/L)	Xylene (mg/L)	Total BTEX (mg/L)
MW-7	01/24/11	<0.001	<0.001	<0.001	<0.001	<0.001
	04/14/11	<0.001	<0.001	<0.001	<0.001	<0.001
	07/28/11	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/11	<0.001	<0.001	<0.001	<0.001	<0.001
	01/05/12	<0.001	<0.001	<0.001	<0.001	<0.001
	04/11/12	<0.0006	<0.0004	<0.0006	<0.0013	<0.0013
	07/24/12	<0.001	<0.001	<0.001	<0.001	<0.001
	10/25/12	<0.001	<0.001	<0.001	<0.001	<0.001
	01/30/13	<0.001	<0.001	<0.001	<0.001	<0.001
	04/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	07/24/13	<0.001	<0.001	<0.001	<0.001	<0.001
	10/30/13	<0.001	<0.001	<0.001	<0.001	<0.001
	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300
RW-1	01/24/11	NS	NS	NS	NS	NS
	04/14/11	0.0133	<0.001	<0.001	<0.001	0.0133
	07/28/11	NS	NS	NS	NS	NS
	10/25/11	NS	NS	NS	NS	NS
	01/05/12	NS	NS	NS	NS	NS
	04/11/12	NS	NS	NS	NS	NS
	07/24/12	NS	NS	NS	NS	NS
	10/25/12	NS	NS	NS	NS	NS
	01/30/13	NS	NS	NS	NS	NS
	04/24/13	NS	NS	NS	NS	NS
	07/24/13	NS	NS	NS	NS	NS
	10/30/13	NS	NS	NS	NS	NS
	03/01/14	NS	NS	NS	NS	NS
MW-8	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300
MW-9	03/01/14	<0.00100	<0.00100	<0.00100	<0.00300	<0.00300

NS - Not sampled

APPENDIX A
SOIL BORING LOGS

SAMPLE LOG

Boring/ Well MW-8
GPS
Project Number 114-6401627
Client Celero Energy II, LP
Site Name Rock Queen Unit Tract #1 Tank Battery
Site Location Chaves, New Mexico
Letter F, Section 25, Township 13 South, Range 31 East
Total Depth 137'
Date Installed 02/10/14

Depth (Ft)	OVM	Sample Description
5-6'	--	Caliche and sandstone (40%)
10-11'	--	Caliche and sandstone (40%)
15-16'	--	Caliche, light brown fine sand (30%), and sandstone (20%)
20-21'	--	Fine light brown sand and sandstone (10%)
25-26'	--	Light tan fine sand
30-31'	--	Light tan fine sand
35-36'	--	Light tan fine sand
40-41'	--	Light brown fine sand
45-46'	--	Light brown fine sand
50-51'	--	Light brown fine sand
55-56'	--	Light brown fine sand
60-61'	--	Brown fine sand
65-66'	--	Brown fine sand
70-71'	--	Brown fine sand
75-76'	--	Tan fine sand
80-81'	--	Tan fine sand
85-86'	--	Brown fine sand and sandstone (20%)
90-91'	--	Brown fine sand and sandstone (20%)
95-96'	--	Brown fine sand and sandstone (20%)
100-101'	--	Brown fine sand and sandstone (20%)
105-106'	--	Brown fine sand
110-111'	--	Brown fine sand
115-116'	--	Brown fine sand
120-121'	--	Brown fine sand

SAMPLE LOG

Boring/ Well MW-8
GPS
Project Number 114-6401627
Client Celero Energy II, LP
Site Name Rock Queen Unit Tract #1 Tank Battery
Site Location Chaves, New Mexico
Letter F, Section 25, Township 13 South, Range 31 East
Total Depth 137'
Date Installed 02/10/14

Depth (Ft)	OVM	Sample Description
125-126'	--	Brown fine sand
130-131'	--	Brown fine sand and white clay (10%)
135 - 137'	--	Brown fine sand, blue clay (10%) and red clay (40%)

Total Depth: 137'

SAMPLE LOG

Boring/Well MW-9
GPS
Project Number 114-6401627
Client Celero Energy II, LP
Site Name Rock Queen Unit Tract 1 Tan
Site Location Chaves, New Mexico
Letter C, Section 25, Township 13 South, Range 31 East
Total Depth 125
Date Installed 02/04/14

DEPTH (Ft)	OVM	SAMPLE DESCRIPTION
5-6	--	Hard limestone with chert
10-11	--	Hard limestone with chert
15-16	--	Hard limestone with chert
20-21	--	Hard limestone with chert
25-26	--	Calcareous sand - very fine grain
30-31	--	Calcareous sand - very fine grain
35-36	--	Calcareous sand - very fine grain
40-41	--	Calcareous sand - very fine grain
45-46	--	Calcareous sand - very fine grain
50-51	--	Tan fine to medium grain sand
55-56	--	Tan fine to medium grain sand
60-61	--	Tan fine to medium grain sand
65-66	--	Tan fine to medium grain sand
70-71	--	Tan fine to medium grain sand
75-76	--	Tan fine to medium grain sand
80-81	--	Tan fine to medium grain sand
85-86	--	Tan fine to medium grain sand
90-91	--	Tan fine to medium grain sand
95-96	--	Tan fine to medium grain sand
100-101	--	Tan fine to medium grain sand
105-106	--	Tan fine to medium grain sand
110-111	--	Tan fine to medium grain sand
115-116	--	Tan fine to medium grain sand
120-121	--	Tan fine to medium grain sand

SAMPLE LOG

Boring/Well MW-9
GPS
Project Number 114-6401627
Client Celero Energy II, LP
Site Name Rock Queen Unit Tract 1 Tan
Site Location Chaves, New Mexico
Letter C, Section 25, Township 13 South, Range 31 East
Total Depth 125
Date Installed 02/04/14

DEPTH (Ft)	OVM	SAMPLE DESCRIPTION
125-126	--	Tan fine to medium grain sand
130-131	--	Tan fine to medium grain sand
135-136	--	Tan fine to medium grain sand with gravel
140-141	--	Red tan clayey sand with gravel
145-146	--	Red tan clayey sand with gravel
150-151	--	Red tan clayey sand with gravel
155-157	--	Red Clay (red bed)

Total Depth: 157'

SAMPLE LOG

Boring/Well MW-10
GPS
Project Number 114-6401627
Client Celero Energy II, LP
Site Name Rock Queen Unit Tract 1 Tan
Site Location Chaves, New Mexico
Letter C, Section 25, Township 13 South, Range 31 East
Total Depth 125
Date Installed 02/04/14

DEPTH (Ft)	OVM	SAMPLE DESCRIPTION
5-6	--	Hard limestone with chert
10-11	--	Hard limestone with chert
15-16	--	Hard limestone with chert
20-21	--	Hard limestone with chert
25-26	--	Calcareous sand - very fine grain
30-31	--	Calcareous sand - very fine grain
35-36	--	Calcareous sand - very fine grain
40-41	--	Calcareous sand - very fine grain
45-46	--	Calcareous sand - very fine grain
50-51	--	Tan fine to medium grain sand
55-56	--	Tan fine to medium grain sand
60-61	--	Tan fine to medium grain sand
65-66	--	Tan fine to medium grain sand
70-71	--	Tan fine to medium grain sand
75-76	--	Tan fine to medium grain sand
80-81	--	Tan fine to medium grain sand
85-86	--	Tan fine to medium grain sand
90-91	--	Tan fine to medium grain sand
95-96	--	Tan fine to medium grain sand
100-101	--	Tan fine to medium grain sand
105-106	--	Tan fine to medium grain sand
110-111	--	Tan fine to medium grain sand
115-116	--	Tan fine to medium grain sand
120-121	--	Tan fine to medium grain sand

SAMPLE LOG

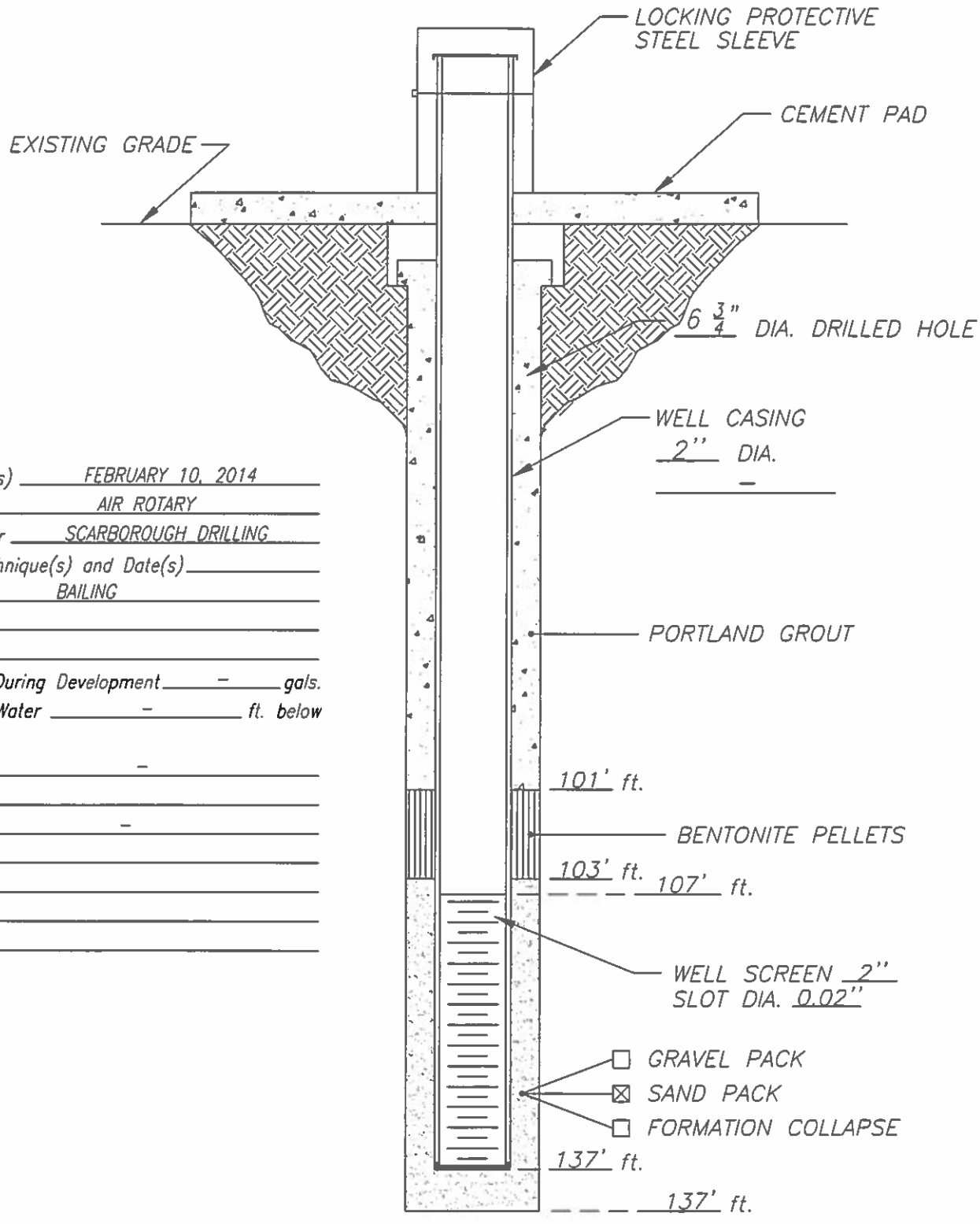
Boring/Well MW-10
GPS
Project Number 114-6401627
Client Celero Energy II, LP
Site Name Rock Queen Unit Tract 1 Tan
Site Location Chaves, New Mexico
Letter C, Section 25, Township 13 South, Range 31 East
Total Depth 125
Date Installed 02/04/14

DEPTH (Ft)	OVM	SAMPLE DESCRIPTION
123-125	--	Red clay (Redbed)

Total Depth: 125'

APPENDIX B
MONITOR WELL COMPLETION DIAGRAMS

WELL CONSTRUCTION LOG



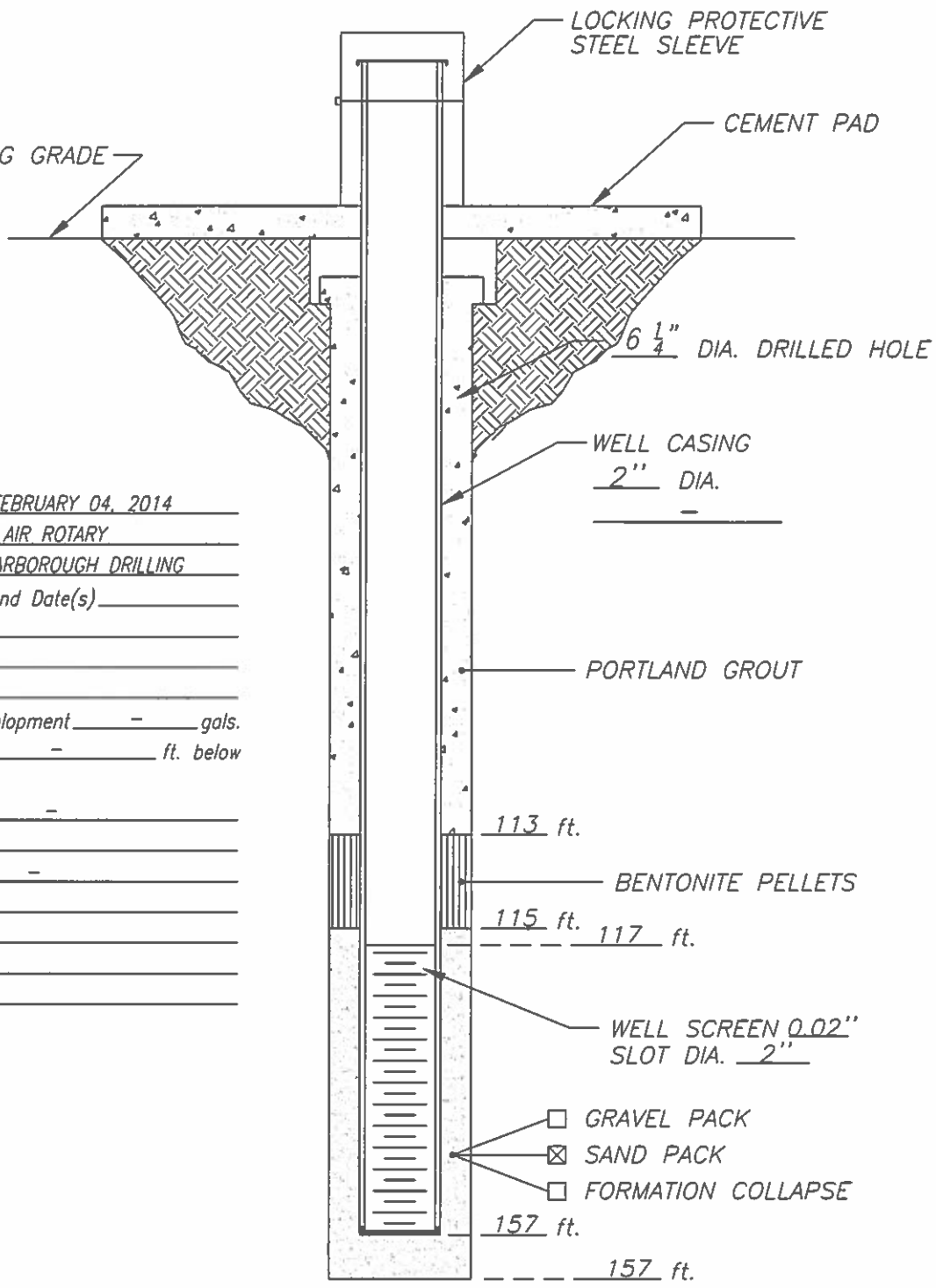
Installation Date(s) FEBRUARY 10, 2014
Drilling Method AIR ROTARY
Drilling Contractor SCARBOROUGH DRILLING
Development Technique(s) and Date(s) BAILING

Water Removed During Development – gals.
Static Depth to Water – ft. below Ground Level
Well Purpose –

Remarks –

DATE: 03/03/2014	CLIENT: CELERO ENERGY II, LLC	WELL NO.
TETRA TECH, INC. MIDLAND, TEXAS	PROJECT: ROCK QUEEN TRACT #1	MW-8
	LOCATION: CHAVES COUNTY, NEW MEXICO	
	114-6401627	

WELL CONSTRUCTION LOG



Installation Date(s) FEBRUARY 04, 2014
Drilling Method AIR ROTARY
Drilling Contractor SCARBOROUGH DRILLING
Development Technique(s) and Date(s) –

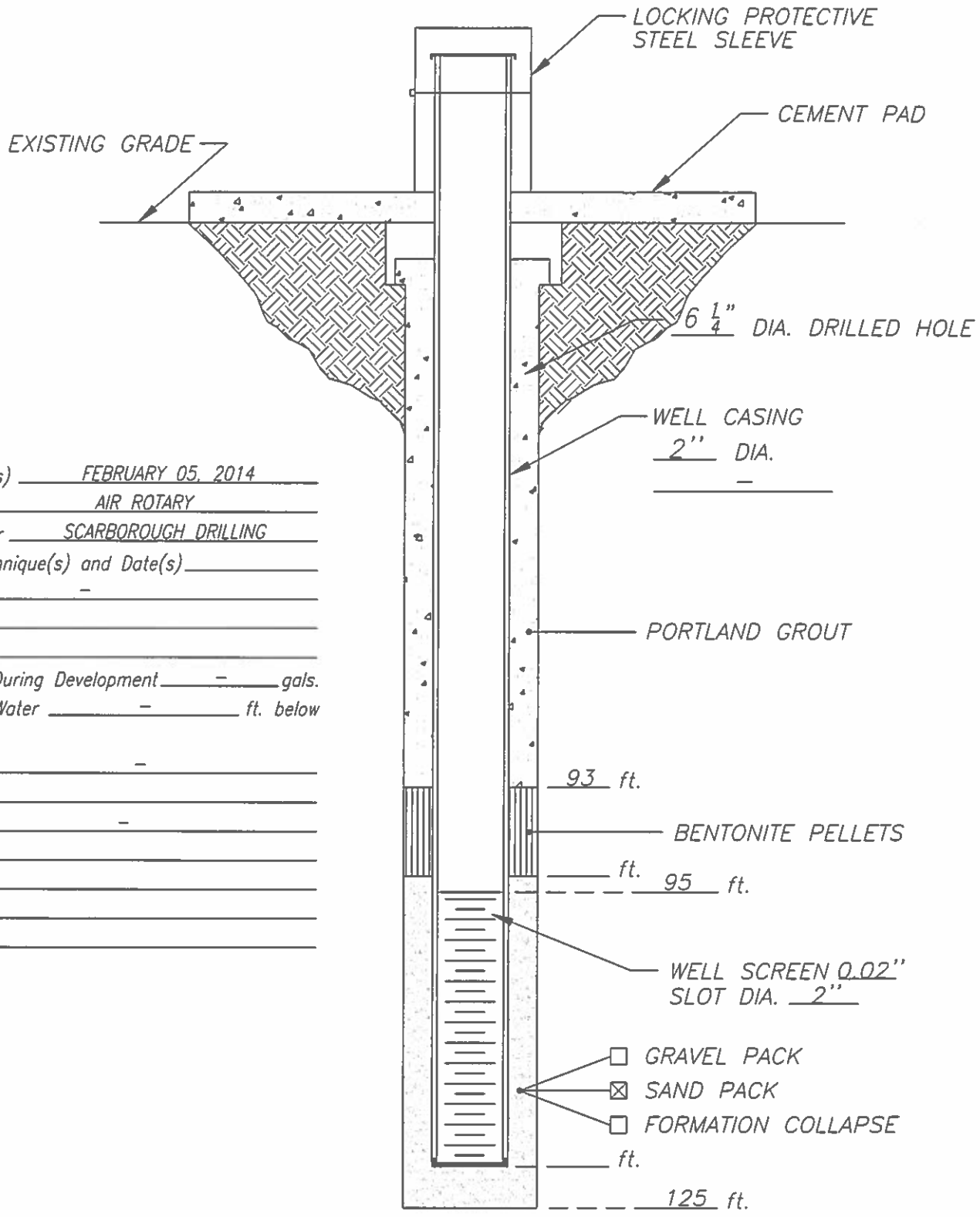
Water Removed During Development – gals.
Static Depth to Water – ft. below Ground Level
Well Purpose –

Remarks –

DATE: 02/11/2014	CLIENT: CELERO ENERGY II, LLC	WELL NO.
TETRA TECH, INC. MIDLAND, TEXAS	PROJECT: ROCK QUEEN TRACT 1	MW-9
	LOCATION: CHAVES COUNTY, NEW MEXICO	

114-6401627

WELL CONSTRUCTION LOG



Installation Date(s) FEBRUARY 05, 2014

Drilling Method AIR ROTARY

Drilling Contractor SCARBOROUGH DRILLING

Development Technique(s) and Date(s) –

Water Removed During Development – gals.

Static Depth to Water – ft. below Ground Level

Well Purpose –

Remarks –

DATE: 02/11/2014	CLIENT: CELERO ENERGY II, LLC	WELL NO.
TETRA TECH, INC. MIDLAND, TEXAS	PROJECT: ROCK QUEEN TRACT 1	MW-10
	LOCATION: CHAVES COUNTY, NEW MEXICO	

114-6401627

APPENDIX C
LABORATORY ANALYTICAL RESULTS

TRACEANALYSIS, INC.

6701 Aberdeen Avenue, Suite 9 Lubbock, Texas 79424 800-378-1296 806-794-1296 FAX 806-794-1298
200 East Sunset Road, Suite E El Paso, Texas 79922 915-585-3443 FAX 915-585-4944
5002 Basin Street, Suite A1 Midland, Texas 79703 432-689-6301 FAX 432-689-6313
(BioAquatic) 2501 Mayes Rd., Suite 100 Carrollton, Texas 75006 972-242-7750
E-Mail: lab@traceanalysis.com WEB: www.traceanalysis.com

Certifications

WBE HUB NCTRCA DBE NELAP DoD LELAP Kansas Oklahoma ISO 17025

Analytical and Quality Control Report

(Corrected Report)

Jeff Kindley
Tetra Tech
1910 N. Big Spring Street
Midland, TX, 79705

Report Date: May 9, 2013

Work Order: 13042614

Project Location: Challenger
Project Name: Celero/Rock Queen #1 TB
Project Number: 114-6401627

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
327392	MW-1	water	2013-04-24	10:30	2013-04-25
327393	MW-2	water	2013-04-24	10:25	2013-04-25
327394	MW-3	water	2013-04-24	10:45	2013-04-25
327395	MW-4	water	2013-04-24	11:05	2013-04-25
327396	MW-5	water	2013-04-24	11:30	2013-04-25
327397	MW-6	water	2013-04-24	10:35	2013-04-25
327398	MW-7	water	2013-04-24	10:55	2013-04-25

Report Corrections (Work Order 13042614)

- 5/9/13: J-flag report required.

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

Notes:

For inorganic analyses, the term MQL should actually read PQL.

Dr. Blair Leftwich, Director
Dr. Michael Abel, Project Manager

Report Contents

Case Narrative 6

Analytical Report 7
Sample 327392 (MW-1) . . . 7
Sample 327393 (MW-2) . . . 10
Sample 327394 (MW-3) . . . 13
Sample 327395 (MW-4) . . . 16
Sample 327396 (MW-5) . . . 19
Sample 327397 (MW-6) . . . 23
Sample 327398 (MW-7) . . . 26

Method Blanks 30
QC Batch 100878 - Method Blank (1) . . . 30
QC Batch 100911 - Method Blank (1) . . . 30
QC Batch 100979 - Method Blank (1) . . . 30
QC Batch 101120 - Method Blank (1) . . . 31
QC Batch 101120 - Method Blank (1) . . . 31
QC Batch 101120 - Method Blank (1) . . . 31
QC Batch 101120 - Method Blank (1) . . . 31
QC Batch 101123 - Method Blank (1) . . . 32
QC Batch 101123 - Method Blank (1) . . . 32
QC Batch 101124 - Method Blank (1) . . . 32
QC Batch 101124 - Method Blank (1) . . . 32
QC Batch 101126 - Method Blank (1) . . . 33
QC Batch 101126 - Method Blank (1) . . . 33
QC Batch 101151 - Method Blank (1) . . . 33
QC Batch 100878 - Duplicate (2) . . . 33
QC Batch 100883 - Duplicate (1) . . . 34
QC Batch 100884 - Duplicate (1) . . . 34
QC Batch 101151 - Duplicate (1) . . . 34

Laboratory Control Spikes 35
QC Batch 100878 - LCS (1) . . . 35
QC Batch 100878 - LCS (2) . . . 35
QC Batch 100911 - LCS (1) . . . 35
QC Batch 100979 - LCS (1) . . . 36
QC Batch 101120 - LCS (1) . . . 36
QC Batch 101120 - LCS (1) . . . 37
QC Batch 101120 - LCS (1) . . . 37
QC Batch 101120 - LCS (1) . . . 38
QC Batch 101123 - LCS (1) . . . 38
QC Batch 101123 - LCS (1) . . . 38
QC Batch 101124 - LCS (1) . . . 39
QC Batch 101124 - LCS (1) . . . 39
QC Batch 101126 - LCS (1) . . . 39
QC Batch 101126 - LCS (1) . . . 40
QC Batch 100911 - MS (1) . . . 40
QC Batch 100979 - MS (1) . . . 41
QC Batch 101120 - MS (1) . . . 41

QC Batch 101120 - MS (1) . . . 42
QC Batch 101120 - MS (1) . . . 42
QC Batch 101120 - MS (1) . . . 43
QC Batch 101123 - MS (1) . . . 43
QC Batch 101123 - MS (1) . . . 43
QC Batch 101124 - MS (1) . . . 44
QC Batch 101124 - MS (1) . . . 44
QC Batch 101126 - MS (1) . . . 44
QC Batch 101126 - MS (1) . . . 45

Calibration Standards **46**
QC Batch 100883 - ICV (1) . . . 46
QC Batch 100883 - CCV (1) . . . 46
QC Batch 100884 - ICV (1) . . . 46
QC Batch 100884 - CCV (1) . . . 46
QC Batch 100911 - CCV (1) . . . 46
QC Batch 100911 - CCV (2) . . . 47
QC Batch 100911 - CCV (3) . . . 47
QC Batch 100979 - CCV (1) . . . 47
QC Batch 100979 - CCV (2) . . . 48
QC Batch 100979 - CCV (3) . . . 48
QC Batch 100979 - CCV (4) . . . 48
QC Batch 100979 - CCV (5) . . . 48
QC Batch 101120 - ICV (1) . . . 49
QC Batch 101120 - ICV (1) . . . 49
QC Batch 101120 - ICV (1) . . . 49
QC Batch 101120 - ICV (1) . . . 49
QC Batch 101120 - CCV (1) . . . 50
QC Batch 101120 - CCV (1) . . . 50
QC Batch 101120 - CCV (1) . . . 50
QC Batch 101120 - CCV (1) . . . 50
QC Batch 101123 - CCV (1) . . . 50
QC Batch 101123 - CCV (1) . . . 51
QC Batch 101123 - CCV (2) . . . 51
QC Batch 101123 - CCV (2) . . . 51
QC Batch 101124 - CCV (1) . . . 51
QC Batch 101124 - CCV (1) . . . 52
QC Batch 101124 - CCV (2) . . . 52
QC Batch 101124 - CCV (2) . . . 52
QC Batch 101126 - CCV (1) . . . 52
QC Batch 101126 - CCV (1) . . . 52
QC Batch 101126 - CCV (2) . . . 53
QC Batch 101126 - CCV (2) . . . 53
QC Batch 101151 - ICV (1) . . . 53
QC Batch 101151 - CCV (1) . . . 53

Limits of Detection (LOD) **55**

Appendix **56**
Report Definitions . . . 56
Laboratory Certifications . . . 56
Standard Flags . . . 56

Result Comments 56
Attachments 57

Case Narrative

Samples for project Celero/Rock Queen #1 TB were received by TraceAnalysis, Inc. on 2013-04-25 and assigned to work order 13042614. Samples for work order 13042614 were received intact without headspace and at a temperature of 5.9 C.

Samples were analyzed for the following tests using their respective methods.

Test	Method	Prep Batch	Prep Date	QC Batch	Analysis Date
Alkalinity	SM 2320B	85729	2013-05-07 at 14:00	101151	2013-05-07 at 15:26
BTEX	S 8021B	85524	2013-04-30 at 12:53	100911	2013-04-30 at 12:54
BTEX	S 8021B	85587	2013-05-02 at 09:25	100979	2013-05-02 at 09:26
Ca, Dissolved	S 6010C	85570	2013-05-01 at 12:00	101120	2013-05-07 at 08:58
Chloride (IC)	E 300.0	85703	2013-05-03 at 14:00	101123	2013-05-03 at 15:07
Chloride (IC)	E 300.0	85704	2013-05-03 at 14:00	101124	2013-05-03 at 15:07
Chloride (IC)	E 300.0	85706	2013-05-06 at 14:00	101126	2013-05-06 at 15:55
Hardness	S 6010C	85570	2013-05-01 at 12:00	101120	2013-05-07 at 08:58
K, Dissolved	S 6010C	85570	2013-05-01 at 12:00	101120	2013-05-07 at 08:58
Mg, Dissolved	S 6010C	85570	2013-05-01 at 12:00	101120	2013-05-07 at 08:58
Na, Dissolved	S 6010C	85570	2013-05-01 at 12:00	101120	2013-05-07 at 08:58
pH	SM 4500-H+	85498	2013-04-26 at 16:03	100883	2013-04-26 at 17:06
pH	SM 4500-H+	85498	2013-04-26 at 16:03	100884	2013-04-26 at 17:08
SO4 (IC)	E 300.0	85703	2013-05-03 at 14:00	101123	2013-05-03 at 15:07
SO4 (IC)	E 300.0	85704	2013-05-03 at 14:00	101124	2013-05-03 at 15:07
SO4 (IC)	E 300.0	85706	2013-05-06 at 14:00	101126	2013-05-06 at 15:55
TDS	SM 2540C	85494	2013-04-26 at 11:39	100878	2013-04-27 at 15:41

Results for these samples are reported on a wet weight basis unless data package indicates otherwise.

A matrix spike (MS) and matrix spike duplicate (MSD) sample is chosen at random from each preparation batch. The MS and MSD will indicate if a site specific matrix problem is occurring, however, it may not pertain to the samples for work order 13042614 since the sample was chosen at random. Therefore, the validity of the analytical data reported has been determined by the laboratory control sample (LCS) and the method blank (MB). These quality control measures are performed with each preparation batch to ensure data integrity.

All other exceptions associated with this report have been footnoted on the appropriate analytical page to assist in general data comprehension. Please contact the laboratory directly if there are any questions regarding this project.

Analytical Report

Sample: 327392 - MW-1

Laboratory:	Lubbock				
Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	101151	Date Analyzed:	2013-05-07	Analyzed By:	LM
Prep Batch:	85729	Sample Preparation:	2013-05-07	Prepared By:	LM

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hydroxide Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Carbonate Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Bicarbonate Alkalinity		1	**100**	**100**	<1.00	mg/L as CaCo3	1	1.00	1	1
Total Alkalinity		1	**100**	**100**	<20.0	mg/L as CaCo3	1	20.0	20	20

Sample: 327392 - MW-1

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	100979	Date Analyzed:	2013-05-02	Analyzed By:	AH
Prep Batch:	85587	Sample Preparation:	2013-05-01	Prepared By:	AH

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Benzene	Q1,U	2	<0.000200	<0.00100	<0.000200	mg/L	1	0.000200	0.001	0.0002
Toluene	Q1,U	2	<0.000300	<0.00100	<0.000300	mg/L	1	0.000300	0.001	0.0003
Ethylbenzene	Q1,U	2	<0.000400	<0.00100	<0.000400	mg/L	1	0.000400	0.001	0.0004
Xylene	Q1,U	2	<0.00120	<0.00100	<0.00120	mg/L	1	0.00120	0.001	0.0012

Surrogate		F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)				0.0901	mg/L	1	0.100	90	70 - 130
4-Bromofluorobenzene (4-BFB)	1	Q4r		0.0376	mg/L	1	0.100	38	70 - 130

Sample: 327392 - MW-1

Laboratory:	Lubbock				
Analysis:	Ca, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Calcium		1	**2640**	**2640**	<4.41	mg/L	100	4.41	1	0.0441

Sample: 327392 - MW-1

Laboratory:	Lubbock				
Analysis:	Chloride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	101123	Date Analyzed:	2013-05-03	Analyzed By:	RL
Prep Batch:	85703	Sample Preparation:	2013-05-03	Prepared By:	RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Chloride		1	**144000**	**144000**	<845	mg/L	5000	845	2.5	0.169

Sample: 327392 - MW-1

Laboratory:	Lubbock				
Analysis:	Hardness	Analytical Method:	S 6010C	Prep Method:	N/A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hardness (by ICP)			**23000**	**23000**	0.00	mg eq CaCO3/L	1	0.00		

Sample: 327392 - MW-1

Laboratory:	Lubbock				
Analysis:	K, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Potassium		1	**1630**	**1630**	<4.43	mg/L	100	4.43	1	0.0443

Sample: 327392 - MW-1

Laboratory:	Lubbock				
Analysis:	Mg, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Magnesium		1	**3990**	**3990**	<2.96	mg/L	100	2.96	1	0.0296

Sample: 327392 - MW-1

Laboratory: Lubbock
Analysis: Na, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Sodium		1	**78500**	**78500**	<172	mg/L	1000	172	1	0.172

Sample: 327392 - MW-1

Laboratory: Midland
Analysis: pH | Analytical Method: SM 4500-H+ | Prep Method: N/A
QC Batch: 100883 | Date Analyzed: 2013-04-26 | Analyzed By: AR
Prep Batch: 85498 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	RL Result	Units	Dilution	RL
pH		2	5.96	s.u.	1	0

Sample: 327392 - MW-1

Laboratory: Lubbock
Analysis: SO4 (IC) | Analytical Method: E 300.0 | Prep Method: N/A
QC Batch: 101123 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85703 | Sample Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Sulfate	J	1	**1880**	<12500	<1120	mg/L	5000	1120	2.5	0.224

Sample: 327392 - MW-1

Laboratory: Midland
Analysis: TDS | Analytical Method: SM 2540C | Prep Method: N/A
QC Batch: 100878 | Date Analyzed: 2013-04-27 | Analyzed By: AR
Prep Batch: 85494 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Total Dissolved Solids		2	**244000**	**244000**	<975	mg/L	100	975	10	9.75

Sample: 327393 - MW-2

Laboratory: Lubbock
Analysis: Alkalinity | Analytical Method: SM 2320B | Prep Method: N/A
QC Batch: 101151 | Date Analyzed: 2013-05-07 | Analyzed By: LM
Prep Batch: 85729 | Sample Preparation: 2013-05-07 | Prepared By: LM

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hydroxide Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Carbonate Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Bicarbonate Alkalinity		1	**134**	**134**	<1.00	mg/L as CaCo3	1	1.00	1	1
Total Alkalinity		1	**134**	**134**	<20.0	mg/L as CaCo3	1	20.0	20	20

Sample: 327393 - MW-2

Laboratory: Midland
Analysis: BTEX | Analytical Method: S 8021B | Prep Method: S 5030B
QC Batch: 100911 | Date Analyzed: 2013-04-30 | Analyzed By: AH
Prep Batch: 85524 | Sample Preparation: 2013-04-29 | Prepared By: AH

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Benzene	Qr,Qe,U	2	<0.000200	<0.00100	<0.000200	mg/L	1	0.000200	0.001	0.0002
Toluene	Qr,Qe,U	2	<0.000300	<0.00100	<0.000300	mg/L	1	0.000300	0.001	0.0003
Ethylbenzene	Qr,Qe,U	2	<0.000400	<0.00100	<0.000400	mg/L	1	0.000400	0.001	0.0004
Xylene	Qr,Qe,U	2	<0.00120	<0.00100	<0.00120	mg/L	1	0.00120	0.001	0.0012

Surrogate	F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0844	mg/L	1	0.100	84	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0761	mg/L	1	0.100	76	70 - 130

Sample: 327393 - MW-2

Laboratory:	Lubbock				
Analysis:	Ca, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Calcium		1	**2490**	**2490**	<4.41	mg/L	100	4.41	1	0.0441

Sample: 327393 - MW-2

Laboratory:	Lubbock				
Analysis:	Chloride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	101124	Date Analyzed:	2013-05-03	Analyzed By:	RL
Prep Batch:	85704	Sample Preparation:	2013-05-03	Prepared By:	RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Chloride		1	**9840**	**9840**	<84.5	mg/L	500	84.5	2.5	0.169

Sample: 327393 - MW-2

Laboratory:	Lubbock				
Analysis:	Hardness	Analytical Method:	S 6010C	Prep Method:	N/A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hardness (by ICP)			**8580**	**8580**	0.00	mg eq CaCO3/L	1	0.00		

Sample: 327393 - MW-2

Laboratory:	Lubbock				
Analysis:	K, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

continued ...

sample 327393 continued ...

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Potassium		1	**22.6**	**22.6**	<0.443	mg/L	10	0.443	1	0.0443

Sample: 327393 - MW-2

Laboratory: Lubbock
Analysis: Mg, Dissolved — Analytical Method: S 6010C — Prep Method: S 3005A
QC Batch: 101120 — Date Analyzed: 2013-05-07 — Analyzed By: RR
Prep Batch: 85570 — Sample Preparation: 2013-05-01 — Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Magnesium		1	**575**	**575**	<0.296	mg/L	10	0.296	1	0.0296

Sample: 327393 - MW-2

Laboratory: Lubbock
Analysis: Na, Dissolved — Analytical Method: S 6010C — Prep Method: S 3005A
QC Batch: 101120 — Date Analyzed: 2013-05-07 — Analyzed By: RR
Prep Batch: 85570 — Sample Preparation: 2013-05-01 — Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Sodium		1	**2240**	**2240**	<17.2	mg/L	100	17.2	1	0.172

Sample: 327393 - MW-2

Laboratory: Midland
Analysis: pH — Analytical Method: SM 4500-H+ — Prep Method: N/A
QC Batch: 100883 — Date Analyzed: 2013-04-26 — Analyzed By: AR
Prep Batch: 85498 — Sample Preparation: 2013-04-26 — Prepared By: AR

Parameter	F	C	RL Result	Units	Dilution	RL
pH		2	6.74	s.u.	1	0

Sample: 327393 - MW-2

Laboratory:	Lubbock				
Analysis:	SO4 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	101124	Date Analyzed:	2013-05-03	Analyzed By:	RL
Prep Batch:	85704	Sample Preparation:	2013-05-03	Prepared By:	RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Sulfate	J	1	**211**	<1250	<112	mg/L	500	112	2.5	0.224

Sample: 327393 - MW-2

Laboratory:	Midland				
Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	100878	Date Analyzed:	2013-04-27	Analyzed By:	AR
Prep Batch:	85494	Sample Preparation:	2013-04-26	Prepared By:	AR

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Total Dissolved Solids		2	**25200**	**25200**	<488	mg/L	50	488	10	9.75

Sample: 327394 - MW-3

Laboratory:	Lubbock				
Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	101151	Date Analyzed:	2013-05-07	Analyzed By:	LM
Prep Batch:	85729	Sample Preparation:	2013-05-07	Prepared By:	LM

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hydroxide Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Carbonate Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Bicarbonate Alkalinity		1	**100**	**100**	<1.00	mg/L as CaCo3	1	1.00	1	1
Total Alkalinity		1	**100**	**100**	<20.0	mg/L as CaCo3	1	20.0	20	20

Sample: 327394 - MW-3

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	100979	Date Analyzed:	2013-05-02	Analyzed By:	AH
Prep Batch:	85587	Sample Preparation:	2013-05-01	Prepared By:	AH

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Benzene	Q, U	2	<0.000200	<0.00100	<0.000200	mg/L	1	0.000200	0.001	0.0002
Toluene	Q, U	2	<0.000300	<0.00100	<0.000300	mg/L	1	0.000300	0.001	0.0003
Ethylbenzene	Q, U	2	<0.000400	<0.00100	<0.000400	mg/L	1	0.000400	0.001	0.0004
Xylene	Q, U	2	<0.00120	<0.00100	<0.00120	mg/L	1	0.00120	0.001	0.0012

Surrogate	F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0827	mg/L	1	0.100	83	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0750	mg/L	1	0.100	75	70 - 130

Sample: 327394 - MW-3

Laboratory: Lubbock
Analysis: Ca, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Calcium		1	**4780**	**4780**	<4.41	mg/L	100	4.41	1	0.0441

Sample: 327394 - MW-3

Laboratory: Lubbock
Analysis: Chloride (IC) | Analytical Method: E 300.0 | Prep Method: N/A
QC Batch: 101124 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85704 | Sample Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Chloride		1	**60000**	**60000**	<845	mg/L	5000	845	2.5	0.169

Sample: 327394 - MW-3

Laboratory: Lubbock
Analysis: Hardness | Analytical Method: S 6010C | Prep Method: N/A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hardness (by ICP)			**21900**	**21900**	0.00	mg eq CaCO3/L	1	0.00		

Sample: 327394 - MW-3

Laboratory: Lubbock
Analysis: K, Dissolved — Analytical Method: S 6010C — Prep Method: S 3005A
QC Batch: 101120 — Date Analyzed: 2013-05-07 — Analyzed By: RR
Prep Batch: 85570 — Sample Preparation: 2013-05-01 — Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Potassium		1	**432**	**432**	<4.43	mg/L	100	4.43	1	0.0443

Sample: 327394 - MW-3

Laboratory: Lubbock
Analysis: Mg, Dissolved — Analytical Method: S 6010C — Prep Method: S 3005A
QC Batch: 101120 — Date Analyzed: 2013-05-07 — Analyzed By: RR
Prep Batch: 85570 — Sample Preparation: 2013-05-01 — Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Magnesium		1	**2420**	**2420**	<2.96	mg/L	100	2.96	1	0.0296

Sample: 327394 - MW-3

Laboratory: Lubbock
Analysis: Na, Dissolved — Analytical Method: S 6010C — Prep Method: S 3005A
QC Batch: 101120 — Date Analyzed: 2013-05-07 — Analyzed By: RR
Prep Batch: 85570 — Sample Preparation: 2013-05-01 — Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Sodium		1	**32100**	**32100**	<172	mg/L	1000	172	1	0.172

Sample: 327394 - MW-3

Laboratory: Midland
Analysis: pH — Analytical Method: SM 4500-H+ — Prep Method: N/A

QC Batch: 100883 | Date Analyzed: 2013-04-26 | Analyzed By: AR
Prep Batch: 85498 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	RL Result	Units	Dilution	RL
pH		2	6.41	s.u.	1	0

Sample: 327394 - MW-3

Laboratory: Lubbock
Analysis: SO4 (IC) | Analytical Method: E 300.0 | Prep Method: N/A
QC Batch: 101124 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85704 | Sample Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Sulfate	J	1	**1780**	<12500	<1120	mg/L	5000	1120	2.5	0.224

Sample: 327394 - MW-3

Laboratory: Midland
Analysis: TDS | Analytical Method: SM 2540C | Prep Method: N/A
QC Batch: 100878 | Date Analyzed: 2013-04-27 | Analyzed By: AR
Prep Batch: 85494 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Total Dissolved Solids		2	**118000**	**118000**	<975	mg/L	100	975	10	9.75

Sample: 327395 - MW-4

Laboratory: Lubbock
Analysis: Alkalinity | Analytical Method: SM 2320B | Prep Method: N/A
QC Batch: 101151 | Date Analyzed: 2013-05-07 | Analyzed By: LM
Prep Batch: 85729 | Sample Preparation: 2013-05-07 | Prepared By: LM

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hydroxide Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Carbonate Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Bicarbonate Alkalinity		1	**135**	**135**	<1.00	mg/L as CaCo3	1	1.00	1	1

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sample 327395 continued ...

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Total Alkalinity		1	**135**	**135**	<20.0	mg/L as CaCo3	1	20.0	20	20

Sample: 327395 - MW-4

Laboratory: Midland
Analysis: BTEX | Analytical Method: S 8021B | Prep Method: S 5030B
QC Batch: 100911 | Date Analyzed: 2013-04-30 | Analyzed By: AH
Prep Batch: 85524 | Sample Preparation: 2013-04-29 | Prepared By: AH

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Benzene	Q_F Q_S U	2	<0.000200	<0.00100	<0.000200	mg/L	1	0.000200	0.001	0.0002
Toluene	Q_F Q_S U	2	<0.000300	<0.00100	<0.000300	mg/L	1	0.000300	0.001	0.0003
Ethylbenzene	Q_F Q_S U	2	<0.000400	<0.00100	<0.000400	mg/L	1	0.000400	0.001	0.0004
Xylene	Q_F Q_S U	2	<0.00120	<0.00100	<0.00120	mg/L	1	0.00120	0.001	0.0012

Surrogate	F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0840	mg/L	1	0.100	84	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0754	mg/L	1	0.100	75	70 - 130

Sample: 327395 - MW-4

Laboratory: Lubbock
Analysis: Ca, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Calcium		1	**3340**	**3340**	<4.41	mg/L	100	4.41	1	0.0441

Sample: 327395 - MW-4

Laboratory: Lubbock
Analysis: Chloride (IC) | Analytical Method: E 300.0 | Prep Method: N/A
QC Batch: 101124 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85704 | Sample Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Chloride		1	**13800**	**13800**	<84.5	mg/L	500	84.5	2.5	0.169

Sample: 327395 - MW-4

Laboratory: Lubbock
Analysis: Hardness | Analytical Method: S 6010C | Prep Method: N/A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hardness (by ICP)			**11500**	**11500**	0.00	mg eq CaCO3/L	1	0.00		

Sample: 327395 - MW-4

Laboratory: Lubbock
Analysis: K, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Potassium		1	**21.7**	**21.7**	<0.443	mg/L	10	0.443	1	0.0443

Sample: 327395 - MW-4

Laboratory: Lubbock
Analysis: Mg, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Magnesium		1	**768**	**768**	<0.296	mg/L	10	0.296	1	0.0296

Sample: 327395 - MW-4

Laboratory: Lubbock
Analysis: Na, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Sodium		1	**2220**	**2220**	<17.2	mg/L	100	17.2	1	0.172

Sample: 327395 - MW-4

Laboratory: Midland
Analysis: pH | Analytical Method: SM 4500-H+ | Prep Method: N/A
QC Batch: 100884 | Date Analyzed: 2013-04-26 | Analyzed By: AR
Prep Batch: 85498 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	RL Result	Units	Dilution	RL
pH		2	6.71	s.u.	1	0

Sample: 327395 - MW-4

Laboratory: Lubbock
Analysis: SO4 (IC) | Analytical Method: E 300.0 | Prep Method: N/A
QC Batch: 101124 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85704 | Sample Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Sulfate	J	1	**290**	<1250	<112	mg/L	500	112	2.5	0.224

Sample: 327395 - MW-4

Laboratory: Midland
Analysis: TDS | Analytical Method: SM 2540C | Prep Method: N/A
QC Batch: 100878 | Date Analyzed: 2013-04-27 | Analyzed By: AR
Prep Batch: 85494 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Total Dissolved Solids		2	**37200**	**37200**	<975	mg/L	100	975	10	9.75

Sample: 327396 - MW-5

Laboratory:	Lubbock				
Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	101151	Date Analyzed:	2013-05-07	Analyzed By:	LM
Prep Batch:	85729	Sample Preparation:	2013-05-07	Prepared By:	LM

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hydroxide Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Carbonate Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Bicarbonate Alkalinity		1	**136**	**136**	<1.00	mg/L as CaCo3	1	1.00	1	1
Total Alkalinity		1	**136**	**136**	<20.0	mg/L as CaCo3	1	20.0	20	20

Sample: 327396 - MW-5

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	100911	Date Analyzed:	2013-04-30	Analyzed By:	AH
Prep Batch:	85524	Sample Preparation:	2013-04-29	Prepared By:	AH

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Benzene	Qr,Q*,U	2	<0.000200	<0.00100	<0.000200	mg/L	1	0.000200	0.001	0.0002
Toluene	Qr,Q*,U	2	<0.000300	<0.00100	<0.000300	mg/L	1	0.000300	0.001	0.0003
Ethylbenzene	Qr,Q*,U	2	<0.000400	<0.00100	<0.000400	mg/L	1	0.000400	0.001	0.0004
Xylene	Qr,Q*,U	2	<0.00120	<0.00100	<0.00120	mg/L	1	0.00120	0.001	0.0012

Surrogate	F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0852	mg/L	1	0.100	85	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0772	mg/L	1	0.100	77	70 - 130

Sample: 327396 - MW-5

Laboratory:	Lubbock				
Analysis:	Ca, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Calcium		1	**90.9**	**90.9**	<0.0441	mg/L	1	0.0441	1	0.0441

Sample: 327396 - MW-5

Laboratory:	Lubbock				
Analysis:	Chloride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	101124	Date Analyzed:	2013-05-03	Analyzed By:	RL
Prep Batch:	85704	Sample Preparation:	2013-05-03	Prepared By:	RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Chloride		1	**66.2**	**66.2**	<0.845	mg/L	5	0.845	2.5	0.169

Sample: 327396 - MW-5

Laboratory:	Lubbock				
Analysis:	Hardness	Analytical Method:	S 6010C	Prep Method:	N/A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hardness (by ICP)			**298**	**298**	0.00	mg eq CaCO3/L	1	0.00		

Sample: 327396 - MW-5

Laboratory:	Lubbock				
Analysis:	K, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Potassium		1	**1.55**	**1.55**	<0.0443	mg/L	1	0.0443	1	0.0443

Sample: 327396 - MW-5

Laboratory:	Lubbock				
Analysis:	Mg, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

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sample 327396 continued ...

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Magnesium		1	**17.3**	**17.3**	<0.0296	mg/L	1	0.0296	1	0.0296

Sample: 327396 - MW-5

Laboratory:	Lubbock				
Analysis:	Na, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Sodium		1	**64.9**	**64.9**	<0.172	mg/L	1	0.172	1	0.172

Sample: 327396 - MW-5

Laboratory:	Midland				
Analysis:	pH	Analytical Method:	SM 4500-H+	Prep Method:	N/A
QC Batch:	100884	Date Analyzed:	2013-04-26	Analyzed By:	AR
Prep Batch:	85498	Sample Preparation:	2013-04-26	Prepared By:	AR

Parameter	F	C	RL Result	Units	Dilution	RL
pH		2	7.98	s.u.	1	0

Sample: 327396 - MW-5

Laboratory:	Lubbock				
Analysis:	SO4 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	101124	Date Analyzed:	2013-05-03	Analyzed By:	RL
Prep Batch:	85704	Sample Preparation:	2013-05-03	Prepared By:	RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Sulfate		1	**133**	**133**	<1.12	mg/L	5	1.12	2.5	0.224

Sample: 327396 - MW-5

Laboratory: Midland
Analysis: TDS | Analytical Method: SM 2540C | Prep Method: N/A
QC Batch: 100878 | Date Analyzed: 2013-04-27 | Analyzed By: AR
Prep Batch: 85494 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Total Dissolved Solids		2	**586**	**586**	<19.5	mg/L	2	19.5	10	9.75

Sample: 327397 - MW-6

Laboratory: Lubbock
Analysis: Alkalinity | Analytical Method: SM 2320B | Prep Method: N/A
QC Batch: 101151 | Date Analyzed: 2013-05-07 | Analyzed By: LM
Prep Batch: 85729 | Sample Preparation: 2013-05-07 | Prepared By: LM

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hydroxide Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Carbonate Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Bicarbonate Alkalinity		1	**118**	**118**	<1.00	mg/L as CaCo3	1	1.00	1	1
Total Alkalinity		1	**118**	**118**	<20.0	mg/L as CaCo3	1	20.0	20	20

Sample: 327397 - MW-6

Laboratory: Midland
Analysis: BTEX | Analytical Method: S 8021B | Prep Method: S 5030B
QC Batch: 100979 | Date Analyzed: 2013-05-02 | Analyzed By: AH
Prep Batch: 85587 | Sample Preparation: 2013-05-01 | Prepared By: AH

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Benzene	Qs,U	2	<0.000200	<0.00100	<0.000200	mg/L	1	0.000200	0.001	0.0002
Toluene	Qs,U	2	<0.000300	<0.00100	<0.000300	mg/L	1	0.000300	0.001	0.0003
Ethylbenzene	Qs,U	2	<0.000400	<0.00100	<0.000400	mg/L	1	0.000400	0.001	0.0004
Xylene	Qs,U	2	<0.00120	<0.00100	<0.00120	mg/L	1	0.00120	0.001	0.0012

Surrogate	F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	Qsr	2	0.0693	mg/L	1	0.100	69	70 - 130
4-Bromofluorobenzene (4-BFB)	Qsr		0.0571	mg/L	1	0.100	57	70 - 130

Sample: 327397 - MW-6

Laboratory:	Lubbock				
Analysis:	Ca, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Calcium		1	**4540**	**4540**	<4.41	mg/L	100	4.41	1	0.0441

Sample: 327397 - MW-6

Laboratory:	Lubbock				
Analysis:	Chloride (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	101124	Date Analyzed:	2013-05-03	Analyzed By:	RL
Prep Batch:	85704	Sample Preparation:	2013-05-03	Prepared By:	RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Chloride		1	**98800**	**98800**	<845	mg/L	5000	845	2.5	0.169

Sample: 327397 - MW-6

Laboratory:	Lubbock				
Analysis:	Hardness	Analytical Method:	S 6010C	Prep Method:	N/A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hardness (by ICP)			**25000**	**25000**	0.00	mg eq CaCO3/L	1	0.00		

Sample: 327397 - MW-6

Laboratory:	Lubbock				
Analysis:	K, Dissolved	Analytical Method:	S 6010C	Prep Method:	S 3005A
QC Batch:	101120	Date Analyzed:	2013-05-07	Analyzed By:	RR
Prep Batch:	85570	Sample Preparation:	2013-05-01	Prepared By:	KV

continued ...

sample 327397 continued ...

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Potassium		1	**708**	**708**	<4.43	mg/L	100	4.43	1	0.0443

Sample: 327397 - MW-6

Laboratory: Lubbock
Analysis: Mg, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Magnesium		1	**3310**	**3310**	<2.96	mg/L	100	2.96	1	0.0296

Sample: 327397 - MW-6

Laboratory: Lubbock
Analysis: Na, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Sodium		1	**57500**	**57500**	<172	mg/L	1000	172	1	0.172

Sample: 327397 - MW-6

Laboratory: Midland
Analysis: pH | Analytical Method: SM 4500-H+ | Prep Method: N/A
QC Batch: 100884 | Date Analyzed: 2013-04-26 | Analyzed By: AR
Prep Batch: 85498 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	RL Result	Units	Dilution	RL
pH		2	6.13	s.u.	1	0

Sample: 327397 - MW-6

Laboratory:	Lubbock				
Analysis:	SO4 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	101124	Date Analyzed:	2013-05-03	Analyzed By:	RL
Prep Batch:	85704	Sample Preparation:	2013-05-03	Prepared By:	RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Sulfate	J	1	**2300**	<12500	<1120	mg/L	5000	1120	2.5	0.224

Sample: 327397 - MW-6

Laboratory:	Midland				
Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	100878	Date Analyzed:	2013-04-27	Analyzed By:	AR
Prep Batch:	85494	Sample Preparation:	2013-04-26	Prepared By:	AR

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Total Dissolved Solids		2	**169000**	**169000**	<975	mg/L	100	975	10	9.75

Sample: 327398 - MW-7

Laboratory:	Lubbock				
Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	101151	Date Analyzed:	2013-05-07	Analyzed By:	LM
Prep Batch:	85729	Sample Preparation:	2013-05-07	Prepared By:	LM

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hydroxide Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Carbonate Alkalinity	U	1	<1.00	<1.00	<1.00	mg/L as CaCo3	1	1.00	1	1
Bicarbonate Alkalinity		1	**91.0**	**91.0**	<1.00	mg/L as CaCo3	1	1.00	1	1
Total Alkalinity		1	**91.0**	**91.0**	<20.0	mg/L as CaCo3	1	20.0	20	20

Sample: 327398 - MW-7

Laboratory:	Midland				
Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	100979	Date Analyzed:	2013-05-02	Analyzed By:	AH
Prep Batch:	85587	Sample Preparation:	2013-05-01	Prepared By:	AH

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Benzene	Q#,U	2	<0.000200	<0.00100	<0.000200	mg/L	1	0.000200	0.001	0.0002
Toluene	Q#,U	2	<0.000300	<0.00100	<0.000300	mg/L	1	0.000300	0.001	0.0003
Ethylbenzene	Q#,U	2	<0.000400	<0.00100	<0.000400	mg/L	1	0.000400	0.001	0.0004
Xylene	Q#,U	2	<0.00120	<0.00100	<0.00120	mg/L	1	0.00120	0.001	0.0012

Surrogate	F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	3	Q#r	0.0671	mg/L	1	0.100	67	70 - 130
4-Bromofluorobenzene (4-BFB)		Q#r	0.0529	mg/L	1	0.100	53	70 - 130

Sample: 327398 - MW-7

Laboratory: Lubbock
Analysis: Ca, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Calcium		1	**5520**	**5520**	<4.41	mg/L	100	4.41	1	0.0441

Sample: 327398 - MW-7

Laboratory: Lubbock
Analysis: Chloride (IC) | Analytical Method: E 300.0 | Prep Method: N/A
QC Batch: 101126 | Date Analyzed: 2013-05-06 | Analyzed By: RL
Prep Batch: 85706 | Sample Preparation: 2013-05-06 | Prepared By: RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Chloride		1	**118000**	**118000**	<845	mg/L	5000	845	2.5	0.169

Sample: 327398 - MW-7

Laboratory: Lubbock
Analysis: Hardness | Analytical Method: S 6010C | Prep Method: N/A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Hardness (by ICP)			**29800**	**29800**	0.00	mg eq CaCO3/L	1	0.00		

Sample: 327398 - MW-7

Laboratory: Lubbock
Analysis: K, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Potassium		1	**994**	**994**	<4.43	mg/L	100	4.43	1	0.0443

Sample: 327398 - MW-7

Laboratory: Lubbock
Analysis: Mg, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Magnesium		1	**3890**	**3890**	<2.96	mg/L	100	2.96	1	0.0296

Sample: 327398 - MW-7

Laboratory: Lubbock
Analysis: Na, Dissolved | Analytical Method: S 6010C | Prep Method: S 3005A
QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | Sample Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Dissolved Sodium		1	**66500**	**66500**	<172	mg/L	1000	172	1	0.172

Sample: 327398 - MW-7

Laboratory: Midland
Analysis: pH | Analytical Method: SM 4500-H+ | Prep Method: N/A

QC Batch: 100884 | Date Analyzed: 2013-04-26 | Analyzed By: AR
Prep Batch: 85498 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	RL Result	Units	Dilution	RL
pH		2	6.23	s.u.	1	0

Sample: 327398 - MW-7

Laboratory: Lubbock
Analysis: SO4 (IC) | Analytical Method: E 300.0 | Prep Method: N/A
QC Batch: 101126 | Date Analyzed: 2013-05-06 | Analyzed By: RL
Prep Batch: 85706 | Sample Preparation: 2013-05-06 | Prepared By: RL

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Sulfate	J	1	**2010**	<12500	<1120	mg/L	5000	1120	2.5	0.224

Sample: 327398 - MW-7

Laboratory: Midland
Analysis: TDS | Analytical Method: SM 2540C | Prep Method: N/A
QC Batch: 100878 | Date Analyzed: 2013-04-27 | Analyzed By: AR
Prep Batch: 85494 | Sample Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	SDL Based Result	MQL Based Result	Method Blank Result	Units	Dilution	SDL	MQL (Unadjusted)	MDL (Unadjusted)
Total Dissolved Solids		2	**180000**	**180000**	<975	mg/L	100	975	10	9.75

Method Blanks

Method Blank (1)

QC Batch: 100878 | Date Analyzed: 2013-04-27 | Analyzed By: AR
Prep Batch: 85494 | QC Preparation: 2013-04-26 | Prepared By: AR

Parameter	F	C	Result	Units	Reporting Limits
Total Dissolved Solids		2	<9.75	mg/L	9.75

Method Blank (1)

QC Batch: 100911 | Date Analyzed: 2013-04-30 | Analyzed By: AH
Prep Batch: 85524 | QC Preparation: 2013-04-30 | Prepared By: AH

Parameter	F	C	Result	Units	Reporting Limits
Benzene		2	<0.000200	mg/L	0.0002
Toluene		2	<0.000300	mg/L	0.0003
Ethylbenzene		2	<0.000400	mg/L	0.0004
Xylene		2	<0.00120	mg/L	0.0012

Surrogate	F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0852	mg/L	1	0.100	85	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0773	mg/L	1	0.100	77	70 - 130

Method Blank (1)

QC Batch: 100979 | Date Analyzed: 2013-05-02 | Analyzed By: AH
Prep Batch: 85587 | QC Preparation: 2013-05-02 | Prepared By: AH

Parameter	F	C	Result	Units	Reporting Limits
Benzene		2	<0.000200	mg/L	0.0002
Toluene		2	<0.000300	mg/L	0.0003
Ethylbenzene		2	<0.000400	mg/L	0.0004
Xylene		2	<0.00120	mg/L	0.0012

Surrogate	F	C	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)			0.0988	mg/L	1	0.100	99	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0962	mg/L	1	0.100	96	70 - 130

Method Blank (1)

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	Result	Units	Reporting Limits
Dissolved Calcium		1	<0.0441	mg/L	0.0441

Method Blank (1)

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	Result	Units	Reporting Limits
Dissolved Potassium		1	<0.0443	mg/L	0.0443

Method Blank (1)

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	Result	Units	Reporting Limits
Dissolved Magnesium		1	<0.0296	mg/L	0.0296

Method Blank (1)

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Parameter	F	C	Result	Units	Reporting Limits
Dissolved Sodium		1	<0.172	mg/L	0.172

Method Blank (1)

QC Batch: 101123 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85703 | QC Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	Result	Units	Reporting Limits
Chloride		1	<0.169	mg/L	0.169

Method Blank (1)

QC Batch: 101123 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85703 | QC Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	Result	Units	Reporting Limits
Sulfate		1	<0.224	mg/L	0.224

Method Blank (1)

QC Batch: 101124 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85704 | QC Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	Result	Units	Reporting Limits
Chloride		1	0.223	mg/L	0.169

Method Blank (1)

QC Batch: 101124 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85704 | QC Preparation: 2013-05-03 | Prepared By: RL

Parameter	F	C	Result	Units	Reporting Limits
Sulfate		1	<0.224	mg/L	0.224

Method Blank (1)

QC Batch: 101126 | Date Analyzed: 2013-05-06 | Analyzed By: RL
Prep Batch: 85706 | QC Preparation: 2013-05-06 | Prepared By: RL

Parameter	F	C	Result	Units	Reporting Limits
Chloride		1	0.182	mg/L	0.169

Method Blank (1)

QC Batch: 101126 | Date Analyzed: 2013-05-06 | Analyzed By: RL
Prep Batch: 85706 | QC Preparation: 2013-05-06 | Prepared By: RL

Parameter	F	C	Result	Units	Reporting Limits
Sulfate		1	<0.224	mg/L	0.224

Method Blank (1)

QC Batch: 101151 | Date Analyzed: 2013-05-07 | Analyzed By: LM
Prep Batch: 85729 | QC Preparation: 2013-05-07 | Prepared By: LM

Parameter	F	C	Result	Units	Reporting Limits
Hydroxide Alkalinity		1	<1.00	mg/L as CaCo3	1
Carbonate Alkalinity		1	<1.00	mg/L as CaCo3	1
Bicarbonate Alkalinity		1	2.00	mg/L as CaCo3	1
Total Alkalinity		1	<20.0	mg/L as CaCo3	20

Duplicate (2) Duplicated Sample: 327401

QC Batch: 100878 | Date Analyzed: 2013-04-27 | Analyzed By: AR
Prep Batch: 85494 | QC Preparation: 2013-04-26 | Prepared By: AR

Param	F	C	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids		2	93100	98000	mg/L	100	5	10

Duplicate (1) Duplicated Sample: 327298

QC Batch: 100883 | Date Analyzed: 2013-04-26 | Analyzed By: AR
Prep Batch: 85498 | QC Preparation: 2013-04-26 | Prepared By: AR

Param	F	C	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH		2	5.85	5.78	s.u.	1	1	10

Duplicate (1) Duplicated Sample: 327401

QC Batch: 100884 | Date Analyzed: 2013-04-26 | Analyzed By: AR
Prep Batch: 85498 | QC Preparation: 2013-04-26 | Prepared By: AR

Param	F	C	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH		2	6.38	6.38	s.u.	1	0	10

Duplicate (1) Duplicated Sample: 327401

QC Batch: 101151 | Date Analyzed: 2013-05-07 | Analyzed By: LM
Prep Batch: 85729 | QC Preparation: 2013-05-07 | Prepared By: LM

Param	F	C	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity		1	<1.00	<1.00	mg/L as CaCo3	1	0	20
Carbonate Alkalinity		1	<1.00	<1.00	mg/L as CaCo3	1	0	20
Bicarbonate Alkalinity		1	131	132	mg/L as CaCo3	1	1	20
Total Alkalinity		1	131	132	mg/L as CaCo3	1	1	20

Laboratory Control Spikes

Laboratory Control Spike (LCS-1)

QC Batch: 100878
Prep Batch: 85494
Date Analyzed: 2013-04-27
QC Preparation: 2013-04-26
Analyzed By: AR
Prepared By: AR

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Total Dissolved Solids		2	1030	mg/L	1	1000	<9.75	103	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Total Dissolved Solids		2	1050	mg/L	1	1000	<9.75	105	90 - 110	2	10

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-2)

QC Batch: 100878
Prep Batch: 85494
Date Analyzed: 2013-04-27
QC Preparation: 2013-04-26
Analyzed By: AR
Prepared By: AR

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Total Dissolved Solids		2	987	mg/L	1	1000	<9.75	99	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Total Dissolved Solids		2	1010	mg/L	1	1000	<9.75	101	90 - 110	2	10

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 100911
Prep Batch: 85524
Date Analyzed: 2013-04-30
QC Preparation: 2013-04-30
Analyzed By: AH
Prepared By: AH

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		2	0.0958	mg/L	1	0.100	<0.000200	96	70 - 130

continued ...

control spikes continued ...

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Toluene		2	0.0938	mg/L	1	0.100	<0.000300	94	70 - 130
Ethylbenzene		2	0.0935	mg/L	1	0.100	<0.000400	94	70 - 130
Xylene		2	0.279	mg/L	1	0.300	<0.00120	93	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		2	0.0931	mg/L	1	0.100	<0.000200	93	70 - 130	3	20
Toluene		2	0.0916	mg/L	1	0.100	<0.000300	92	70 - 130	2	20
Ethylbenzene		2	0.0909	mg/L	1	0.100	<0.000400	91	70 - 130	3	20
Xylene		2	0.272	mg/L	1	0.300	<0.00120	91	70 - 130	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	F	C	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)			0.0855	0.0851	mg/L	1	0.100	86	85	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0787	0.0795	mg/L	1	0.100	79	80	70 - 130

Laboratory Control Spike (LCS-1)

QC Batch: 100979 | Date Analyzed: 2013-05-02 | Analyzed By: AH
Prep Batch: 85587 | QC Preparation: 2013-05-02 | Prepared By: AH

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene		2	0.0986	mg/L	1	0.100	<0.000200	99	70 - 130
Toluene		2	0.0969	mg/L	1	0.100	<0.000300	97	70 - 130
Ethylbenzene		2	0.0962	mg/L	1	0.100	<0.000400	96	70 - 130
Xylene		2	0.280	mg/L	1	0.300	<0.00120	93	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene		2	0.102	mg/L	1	0.100	<0.000200	102	70 - 130	3	20
Toluene		2	0.100	mg/L	1	0.100	<0.000300	100	70 - 130	3	20
Ethylbenzene		2	0.0990	mg/L	1	0.100	<0.000400	99	70 - 130	3	20
Xylene		2	0.287	mg/L	1	0.300	<0.00120	96	70 - 130	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	F	C	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)			0.0972	0.0977	mg/L	1	0.100	97	98	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0968	0.0976	mg/L	1	0.100	97	98	70 - 130

Laboratory Control Spike (LCS-1)

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Calcium		1	52.1	mg/L	1	50.0	<0.0441	104	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Calcium		1	51.8	mg/L	1	50.0	<0.0441	104	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Potassium		1	50.1	mg/L	1	50.0	<0.0443	100	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Potassium		1	48.1	mg/L	1	50.0	<0.0443	96	85 - 115	4	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Magnesium		1	49.8	mg/L	1	50.0	<0.0296	100	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Magnesium		1	49.9	mg/L	1	50.0	<0.0296	100	85 - 115	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Sodium		1	50.7	mg/L	1	50.0	<0.172	101	85 - 115

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Sodium		1	50.0	mg/L	1	50.0	<0.172	100	85 - 115	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101123 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85703 | QC Preparation: 2013-05-03 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride		1	24.2	mg/L	1	25.0	<0.169	97	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride		1	24.9	mg/L	1	25.0	<0.169	100	90 - 110	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101123 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85703 | QC Preparation: 2013-05-03 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Sulfate		1	24.6	mg/L	1	25.0	<0.224	98	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Sulfate		1	26.1	mg/L	1	25.0	<0.224	104	90 - 110	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101124 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85704 | QC Preparation: 2013-05-03 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride		1	24.4	mg/L	1	25.0	<0.169	98	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride		1	24.7	mg/L	1	25.0	<0.169	99	90 - 110	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101124 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85704 | QC Preparation: 2013-05-03 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Sulfate		1	25.3	mg/L	1	25.0	<0.224	101	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Sulfate		1	25.2	mg/L	1	25.0	<0.224	101	90 - 110	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101126 | Date Analyzed: 2013-05-06 | Analyzed By: RL
Prep Batch: 85706 | QC Preparation: 2013-05-06 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride		1	24.9	mg/L	1	25.0	<0.169	100	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride		1	24.8	mg/L	1	25.0	<0.169	99	90 - 110	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1)

QC Batch: 101126 | Date Analyzed: 2013-05-06 | Analyzed By: RL
Prep Batch: 85706 | QC Preparation: 2013-05-06 | Prepared By: RL

Param	F	C	LCS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Sulfate		1	26.2	mg/L	1	25.0	<0.224	105	90 - 110

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Sulfate		1	25.7	mg/L	1	25.0	<0.224	103	90 - 110	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327126

QC Batch: 100911 | Date Analyzed: 2013-04-30 | Analyzed By: AH
Prep Batch: 85524 | QC Preparation: 2013-04-30 | Prepared By: AH

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	Q-	2	0.00590	mg/L	1	0.100	<0.000200	6	70 - 130
Toluene	Q-	2	0.0216	mg/L	1	0.100	<0.000300	22	70 - 130
Ethylbenzene	Q-	2	0.00700	mg/L	1	0.100	<0.000400	7	70 - 130
Xylene	Q-	2	0.0338	mg/L	1	0.300	<0.00120	11	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene [4]	Qr,Q-	2	0.00950	mg/L	1	0.100	<0.000200	10	70 - 130	47	20
Toluene	Qr,Q-	2	0.0346	mg/L	1	0.100	<0.000300	35	70 - 130	46	20
Ethylbenzene	Qr,Q-	2	0.0109	mg/L	1	0.100	<0.000400	11	70 - 130	44	20

continued ...

matrix spikes continued ...

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Xylene	Qr,Q•	2	0.0506	mg/L	1	0.300	<0.00120	17	70 - 130	40	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	F	C	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)			0.0898	0.0899	mg/L	1	0.1	90	90	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0787	0.0785	mg/L	1	0.1	79	78	70 - 130

Matrix Spike (MS-1) Spiked Sample: 327406

QC Batch: 100979 | Date Analyzed: 2013-05-02 | Analyzed By: AH
Prep Batch: 85587 | QC Preparation: 2013-05-02 | Prepared By: AH

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Benzene	Q•	2	0.179	mg/L	1	0.100	<0.000200	179	70 - 130
Toluene	Q•	2	0.174	mg/L	1	0.100	<0.000300	174	70 - 130
Ethylbenzene	Q•	2	0.171	mg/L	1	0.100	<0.000400	171	70 - 130
Xylene	Q•	2	0.495	mg/L	1	0.300	<0.00120	165	70 - 130

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Benzene	Q•	2	0.147	mg/L	1	0.100	<0.000200	147	70 - 130	20	20
Toluene	Q•	2	0.143	mg/L	1	0.100	<0.000300	143	70 - 130	20	20
Ethylbenzene	Q•	2	0.140	mg/L	1	0.100	<0.000400	140	70 - 130	20	20
Xylene	Q•	2	0.405	mg/L	1	0.300	<0.00120	135	70 - 130	20	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	F	C	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)			0.0974	0.0968	mg/L	1	0.1	97	97	70 - 130
4-Bromofluorobenzene (4-BFB)			0.0981	0.0960	mg/L	1	0.1	98	96	70 - 130

Matrix Spike (MS-1) Spiked Sample: 327393

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

continued ...

matrix spikes continued ...

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Calcium		1	2940	mg/L	1	500	2490	90	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Calcium		1	2970	mg/L	1	500	2490	96	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327393

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Potassium		1	539	mg/L	1	500	22.6	103	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Potassium		1	535	mg/L	1	500	22.6	102	75 - 125	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327393

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Magnesium		1	1020	mg/L	1	500	575	89	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Magnesium		1	1050	mg/L	1	500	575	95	75 - 125	3	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327393

QC Batch: 101120 | Date Analyzed: 2013-05-07 | Analyzed By: RR
Prep Batch: 85570 | QC Preparation: 2013-05-01 | Prepared By: KV

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Dissolved Sodium		1	2750	mg/L	1	500	2240	102	75 - 125

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Dissolved Sodium		1	2740	mg/L	1	500	2240	100	75 - 125	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327303

QC Batch: 101123 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85703 | QC Preparation: 2013-05-03 | Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride		1	6180	mg/L	100	2500	3570	104	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride		1	6550	mg/L	100	2500	3570	119	80 - 120	6	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327303

QC Batch: 101123 | Date Analyzed: 2013-05-03 | Analyzed By: RL
Prep Batch: 85703 | QC Preparation: 2013-05-03 | Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Sulfate		1	2750	mg/L	100	2500	172	103	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Sulfate		1	2710	mg/L	100	2500	172	102	80 - 120	2	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327396

QC Batch: 101124 Date Analyzed: 2013-05-03 Analyzed By: RL
Prep Batch: 85704 QC Preparation: 2013-05-03 Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride		1	205	mg/L	5	125	66.2	111	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride		1	204	mg/L	5	125	66.2	110	80 - 120	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327396

QC Batch: 101124 Date Analyzed: 2013-05-03 Analyzed By: RL
Prep Batch: 85704 QC Preparation: 2013-05-03 Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Sulfate		1	282	mg/L	5	125	133	119	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Sulfate		1	281	mg/L	5	125	133	118	80 - 120	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327406

QC Batch: 101126 Date Analyzed: 2013-05-06 Analyzed By: RL
Prep Batch: 85706 QC Preparation: 2013-05-06 Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Chloride		1	231	mg/L	5	125	89.8	113	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Chloride		1	231	mg/L	5	125	89.8	113	80 - 120	0	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) Spiked Sample: 327406

QC Batch: 101126 | Date Analyzed: 2013-05-06 | Analyzed By: RL
Prep Batch: 85706 | QC Preparation: 2013-05-06 | Prepared By: RL

Param	F	C	MS Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit
Sulfate		1	252	mg/L	5	125	109	114	80 - 120

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Param	F	C	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	Rec. Limit	RPD	RPD Limit
Sulfate		1	254	mg/L	5	125	109	116	80 - 120	1	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Calibration Standards

Standard (ICV-1)

QC Batch: 100883 | Date Analyzed: 2013-04-26 | Analyzed By: AR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		2	s.u.	7.00	7.03	100	98 - 102	2013-04-26

Standard (CCV-1)

QC Batch: 100883 | Date Analyzed: 2013-04-26 | Analyzed By: AR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		2	s.u.	7.00	7.08	101	98 - 102	2013-04-26

Standard (ICV-1)

QC Batch: 100884 | Date Analyzed: 2013-04-26 | Analyzed By: AR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		2	s.u.	7.00	7.08	101	98 - 102	2013-04-26

Standard (CCV-1)

QC Batch: 100884 | Date Analyzed: 2013-04-26 | Analyzed By: AR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		2	s.u.	7.00	7.09	101	98 - 102	2013-04-26

Standard (CCV-1)

QC Batch: 100911 | Date Analyzed: 2013-04-30 | Analyzed By: AH

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2	mg/L	0.100	0.0872	87	80 - 120	2013-04-30
Toluene		2	mg/L	0.100	0.0855	86	80 - 120	2013-04-30
Ethylbenzene		2	mg/L	0.100	0.0850	85	80 - 120	2013-04-30
Xylene		2	mg/L	0.300	0.253	84	80 - 120	2013-04-30

Standard (CCV-2)

QC Batch: 100911 | Date Analyzed: 2013-04-30 | Analyzed By: AH

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2	mg/L	0.100	0.0953	95	80 - 120	2013-04-30
Toluene		2	mg/L	0.100	0.0930	93	80 - 120	2013-04-30
Ethylbenzene		2	mg/L	0.100	0.0928	93	80 - 120	2013-04-30
Xylene		2	mg/L	0.300	0.276	92	80 - 120	2013-04-30

Standard (CCV-3)

QC Batch: 100911 | Date Analyzed: 2013-04-30 | Analyzed By: AH

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2	mg/L	0.100	0.0962	96	80 - 120	2013-04-30
Toluene		2	mg/L	0.100	0.0945	94	80 - 120	2013-04-30
Ethylbenzene		2	mg/L	0.100	0.0941	94	80 - 120	2013-04-30
Xylene		2	mg/L	0.300	0.280	93	80 - 120	2013-04-30

Standard (CCV-1)

QC Batch: 100979 | Date Analyzed: 2013-05-02 | Analyzed By: AH

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2	mg/L	0.100	0.0943	94	80 - 120	2013-05-02

continued ...

standard continued ...

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Toluene		2	mg/L	0.100	0.0918	92	80 - 120	2013-05-02
Ethylbenzene		2	mg/L	0.100	0.0901	90	80 - 120	2013-05-02
Xylene		2	mg/L	0.300	0.261	87	80 - 120	2013-05-02

Standard (CCV-2)

QC Batch: 100979 Date Analyzed: 2013-05-02 Analyzed By: AH

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2	mg/L	0.100	0.100	100	80 - 120	2013-05-02
Toluene		2	mg/L	0.100	0.0981	98	80 - 120	2013-05-02
Ethylbenzene		2	mg/L	0.100	0.0966	97	80 - 120	2013-05-02
Xylene		2	mg/L	0.300	0.280	93	80 - 120	2013-05-02

Standard (CCV-3)

QC Batch: 100979 Date Analyzed: 2013-05-02 Analyzed By: AH

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2	mg/L	0.100	0.0993	99	80 - 120	2013-05-02
Toluene		2	mg/L	0.100	0.0969	97	80 - 120	2013-05-02
Ethylbenzene		2	mg/L	0.100	0.0953	95	80 - 120	2013-05-02
Xylene		2	mg/L	0.300	0.276	92	80 - 120	2013-05-02

Standard (CCV-4)

QC Batch: 100979 Date Analyzed: 2013-05-02 Analyzed By: AH

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2	mg/L	0.100	0.101	101	80 - 120	2013-05-02
Toluene		2	mg/L	0.100	0.0994	99	80 - 120	2013-05-02
Ethylbenzene		2	mg/L	0.100	0.0985	98	80 - 120	2013-05-02
Xylene		2	mg/L	0.300	0.286	95	80 - 120	2013-05-02

Standard (CCV-5)

QC Batch: 100979 Date Analyzed: 2013-05-02 Analyzed By: AH

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		2	mg/L	0.100	0.102	102	80 - 120	2013-05-02
Toluene		2	mg/L	0.100	0.101	101	80 - 120	2013-05-02
Ethylbenzene		2	mg/L	0.100	0.0997	100	80 - 120	2013-05-02
Xylene		2	mg/L	0.300	0.289	96	80 - 120	2013-05-02

Standard (ICV-1)

QC Batch: 101120 Date Analyzed: 2013-05-07 Analyzed By: RR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		1	mg/L	51.0	52.1	102	90 - 110	2013-05-07

Standard (ICV-1)

QC Batch: 101120 Date Analyzed: 2013-05-07 Analyzed By: RR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Potassium		1	mg/L	55.0	55.7	101	90 - 110	2013-05-07

Standard (ICV-1)

QC Batch: 101120 Date Analyzed: 2013-05-07 Analyzed By: RR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Magnesium		1	mg/L	51.0	51.3	100	90 - 110	2013-05-07

Standard (ICV-1)

QC Batch: 101120 Date Analyzed: 2013-05-07 Analyzed By: RR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Sodium		1	mg/L	51.0	51.8	102	90 - 110	2013-05-07

Standard (CCV-1)

QC Batch: 101120 Date Analyzed: 2013-05-07 Analyzed By: RR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		1	mg/L	51.0	53.8	105	90 - 110	2013-05-07

Standard (CCV-1)

QC Batch: 101120 Date Analyzed: 2013-05-07 Analyzed By: RR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Potassium		1	mg/L	55.0	57.1	104	90 - 110	2013-05-07

Standard (CCV-1)

QC Batch: 101120 Date Analyzed: 2013-05-07 Analyzed By: RR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Magnesium		1	mg/L	51.0	52.6	103	90 - 110	2013-05-07

Standard (CCV-1)

QC Batch: 101120 Date Analyzed: 2013-05-07 Analyzed By: RR

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Sodium		1	mg/L	51.0	53.1	104	90 - 110	2013-05-07

Standard (CCV-1)

QC Batch: 101123 Date Analyzed: 2013-05-03 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		1	mg/L	25.0	23.9	96	90 - 110	2013-05-03

Standard (CCV-1)

QC Batch: 101123 Date Analyzed: 2013-05-03 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Sulfate		1	mg/L	25.0	24.5	98	90 - 110	2013-05-03

Standard (CCV-2)

QC Batch: 101123 Date Analyzed: 2013-05-03 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		1	mg/L	25.0	24.6	98	90 - 110	2013-05-03

Standard (CCV-2)

QC Batch: 101123 Date Analyzed: 2013-05-03 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Sulfate		1	mg/L	25.0	25.9	104	90 - 110	2013-05-03

Standard (CCV-1)

QC Batch: 101124 Date Analyzed: 2013-05-03 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		1	mg/L	25.0	24.6	98	90 - 110	2013-05-03

Standard (CCV-1)

QC Batch: 101124 Date Analyzed: 2013-05-03 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Sulfate		1	mg/L	25.0	25.9	104	90 - 110	2013-05-03

Standard (CCV-2)

QC Batch: 101124 Date Analyzed: 2013-05-03 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		1	mg/L	25.0	24.5	98	90 - 110	2013-05-03

Standard (CCV-2)

QC Batch: 101124 Date Analyzed: 2013-05-03 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Sulfate		1	mg/L	25.0	25.1	100	90 - 110	2013-05-03

Standard (CCV-1)

QC Batch: 101126 Date Analyzed: 2013-05-06 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		1	mg/L	25.0	24.8	99	90 - 110	2013-05-06

Standard (CCV-1)

QC Batch: 101126 Date Analyzed: 2013-05-06 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Sulfate		1	mg/L	25.0	25.9	104	90 - 110	2013-05-06

Standard (CCV-2)

QC Batch: 101126 Date Analyzed: 2013-05-06 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		1	mg/L	25.0	24.7	99	90 - 110	2013-05-06

Standard (CCV-2)

QC Batch: 101126 Date Analyzed: 2013-05-06 Analyzed By: RL

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Sulfate		1	mg/L	25.0	25.7	103	90 - 110	2013-05-06

Standard (ICV-1)

QC Batch: 101151 Date Analyzed: 2013-05-07 Analyzed By: LM

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		1	mg/L as CaCo3	0.00	<20.0		-	2013-05-07
Carbonate Alkalinity		1	mg/L as CaCo3	0.00	228		-	2013-05-07
Bicarbonate Alkalinity		1	mg/L as CaCo3	0.00	<20.0		-	2013-05-07
Total Alkalinity		1	mg/L as CaCo3	250	230	92	90 - 110	2013-05-07

Standard (CCV-1)

QC Batch: 101151 Date Analyzed: 2013-05-07 Analyzed By: LM

Param	F	C	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		1	mg/L as CaCo3	0.00	<20.0		-	2013-05-07
Carbonate Alkalinity		1	mg/L as CaCo3	0.00	226		-	2013-05-07
Bicarbonate Alkalinity		1	mg/L as CaCo3	0.00	<20.0		-	2013-05-07
Total Alkalinity		1	mg/L as CaCo3	250	239	96	90 - 110	2013-05-07

Limits of Detection (LOD)

Test	Method	Matrix	Instrument	Analyte	Spike Amount	Pass
Alkalinity	SM 2320B	water	N/A	Hydroxide Alkalinity	0.00	-
Alkalinity	SM 2320B	water	N/A	Carbonate Alkalinity	0.00	-
Alkalinity	SM 2320B	water	N/A	Bicarbonate Alkalinity	0.00	-
Alkalinity	SM 2320B	water	N/A	Total Alkalinity	0.00	-
BTEX	S 8021B	water	BTEX-2	Benzene	0.00100	Pass
BTEX	S 8021B	water	BTEX-2	Toluene	0.00100	Pass
BTEX	S 8021B	water	BTEX-2	Ethylbenzene	0.00100	Pass
BTEX	S 8021B	water	BTEX-2	Xylene	0.00100	Pass
Ca, Dissolved	S 6010C	water	PE 8300	Dissolved Calcium	0.250	Pass
Chloride (IC)	E 300.0	water	Dionex IC	Chloride	0.400	Pass
Hardness	S 6010C	water	PE 8300	Hardness (by ICP)	0.00	-
K, Dissolved	S 6010C	water	PE 8300	Dissolved Potassium	0.250	Pass
Mg, Dissolved	S 6010C	water	PE 8300	Dissolved Magnesium	0.200	Pass
Na, Dissolved	S 6010C	water	PE 8300	Dissolved Sodium	0.250	Pass
pH	SM 4500-H+	water	pH Meter	pH	0.00	-
SO4 (IC)	E 300.0	water	Dionex IC	Sulfate	0.600	Pass
TDS	SM 2540C	water	N/A	Total Dissolved Solids	0.00	-

Appendix

Report Definitions

Name	Definition
MDL	Method Detection Limit
MQL	Minimum Quantitation Limit
SDL	Sample Detection Limit

Laboratory Certifications

C	Certifying Authority	Certification Number	Laboratory Location
-	NCTRCA	WFWB384444Y0909	TraceAnalysis
-	DBE	VN 20657	TraceAnalysis
-	HUB	1752439743100-86536	TraceAnalysis
-	WBE	237019	TraceAnalysis
1	NELAP	T104704219-13-9	Lubbock
2	NELAP	T104704392-12-4	Midland

Standard Flags

F	Description
B	Analyte detected in the corresponding method blank above the method detection limit
H	Analyzed out of hold time
J	Estimated concentration
Jb	The analyte is positively identified and the value is approximated between the SDL and MQL. Sample contains less then ten times the concentration found in the method blank. The result should be considered non-detect to the SDL.
Je	Estimated concentration exceeding calibration range.
MI1	Split peak or shoulder peak
MI2	Instrument software did not integrate
MI3	Instrument software misidentified the peak
MI4	Instrument software integrated improperly
MI5	Baseline correction
Qc	Calibration check outside of laboratory limits.
Qr	RPD outside of laboratory limits
Qs	Spike recovery outside of laboratory limits.
Qsr	Surrogate recovery outside of laboratory limits.
U	The analyte is not detected above the SDL

Result Comments

1 Sample confirmed by reanalysis, surrogates failed due to matrix effect.
2 Sample confirmed by reanalysis, surrogates failed due to matrix effect.

3 Sample confirmed by reanalysis, surrogates failed due to matrix effect.
4 RPD for LCS/LCSD is within limits.

Attachments

The scanned attachments will follow this page.
Please note, each attachment may consist of more than one page.

1307 2617

Analysis Request of Chain of Custody Record

PAGE: 1 OF: 1

TETRA TECH
1910 N. Big Spring St.
Midland, Texas 79705
(432) 682-4559 • Fax (432) 682-3946

ANALYSIS REQUEST
(Circle or Specify Method No.)

CLIENT NAME: Celero

SITE MANAGER: Jeff Kindley

PROJECT NO.: 114-6401627

PROJECT NAME: Celero / Rock Queen #1 TB

LAB I.D. NUMBER	DATE 2013	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8021B	TPH 8015 MOD. TX1005 (Ext. to C35)	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Vr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Major Anions/Cations, pH, TDS si/plate	pH, TDS
327392	4-24-13	1030	U		G	MW-1	4	N	X		ICE		X												X			X	pH, TDS
327393		1025				MW-2																							
327394		1045				MW-3																							
327395		1105				MW-4																							
327396		1130				MW-5																							
327397		1035				MW-6																							
327398		1055				MW-7																							

RELINQUISHED BY: (Signature) Date: 4-25-13 Time: 1645 RECEIVED BY: (Signature) Date: 4/30/13 Time: 1645

SAMPLED BY: (Print & Initial) RC/KD Date: 4-25-13 Time: 1645

RELINQUISHED BY: (Signature) Date: 4-25 Time: 15:30 RECEIVED BY: (Signature) Date: Time:

SAMPLE SHIPPED BY: (Circle) FEDEX BUS HAND DELIVERED UPS AIRBILL #: OTHER:

RELINQUISHED BY: (Signature) Date: Time: RECEIVED BY: (Signature) Date: Time:

RECEIVING LABORATORY: Trace
ADDRESS:
CITY: Midland STATE: ZIP:
CONTACT: PHONE:
RECEIVED BY: (Signature) Brenda Ward
DATE: 4/30/13 TIME: 9:05

TETRA TECH CONTACT PERSON: Jeff Kindley

Results by:

RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED: 5-9°

REMARKS: LS ZP896047

Please fill out all copies - Laboratory retains Yellow copy - Return Orginal copy to Tetra Tech - Project Manager retains Pink copy - Accounting receives Gold copy.

Midland - BTEX, pH + TDS
Lubbock - all other tests

Cation-Anion Balance Sheet

DATE: 5/8/2013

Sample #	Calcium ppm	Magnesium ppm	Sodium ppm	Potassium ppm	Alkalinity ppm	Sulfate ppm	Chloride ppm	Nitrate-N ppm	Fluoride ppm	Bromide ppm	TDS ppm	EC µMHOs/cm
327392	2640	3990	78500	1630	100.00	1880	144000				244200	
327393	2490	575	2240	22.6	134.00	211	9840				25200	
327394	4780	2420	32100	432	100.00	1780	60000				118500	
327395	3340	768	2220	21.7	135.00	290	13800				37200	
327396	90.9	17.3	64.9	1.55	136.00	133	66.2				586	
327397	4540	3310	57500	708	118.00	2300	98800				168800	
327398	5520	3890	66500	994	91.00	2010	118000				180300	

Sample #	Calcium in meq/L	Magnesium in meq/L	Sodium in meq/L	Potassium in meq/L	Alkalinity in meq/L	Sulfate in meq/L	Chloride in meq/L	Nitrate-N in meq/L	Fluoride in meq/L	Bromide in meq/L	Total Cations in meq/L	Total Anions in meq/L	% Difference*
327392	131.74	328.34	3414.75	41.70	2.00	39.14	4062.24	0.00	0.00	0.00	3916.52	4103.38	2.329992864
327393	124.25	47.32	97.44	0.58	2.68	4.39	277.59	0.00	0.00	0.00	269.59	284.66	2.719655466
327394	238.52	199.14	1396.35	11.05	2.00	37.06	1692.60	0.00	0.00	0.00	1845.06	1731.66	3.170632156
327395	166.67	63.20	96.57	0.56	2.70	6.04	389.30	0.00	0.00	0.00	326.99	398.04	9.799101358
327396	4.54	1.42	2.82	0.04	2.72	2.77	1.87	0.00	0.00	0.00	8.82	7.36	9.059732659
327397	226.55	272.38	2501.25	18.11	2.36	47.89	2787.15	0.00	0.00	0.00	3018.29	2837.39	3.089180476
327398	275.45	320.11	2892.75	25.43	1.82	41.85	3328.78	0.00	0.00	0.00	3513.73	3372.45	2.051709412

	EC/Cation	EC/Anion				
327392	391651.85	410338.16	range	0	to	0
327393	26958.5858	28465.942	range	0	to	0
327394	184506.436	173165.96	range	0	to	0
327395	32698.9806	39803.58	range	0	to	0
327396	882.2326	735.6562	range	0	to	0
327397	301828.654	283739.4	range	0	to	0
327398	351373.262	337244.82	range	0	to	0

TDS/EC	TDS/Cat		TDS/Anion	
#DIV/0!	0.62		0.60	needs to be 0.55-0.77
#DIV/0!	0.93		0.89	needs to be 0.55-0.77
#DIV/0!	0.64		0.68	needs to be 0.55-0.77
#DIV/0!	1.14		0.93	needs to be 0.55-0.77
#DIV/0!	0.66		0.80	needs to be 0.55-0.77
#DIV/0!	0.56		0.59	needs to be 0.55-0.77
#DIV/0!	0.51		0.53	needs to be 0.55-0.77

1507267

Analysis Request of Chain of Custody Record

PAGE: 1 OF: 1

TETRA TECH
1910 N. Big Spring St.
Midland, Texas 79705
(432) 682-4559 • Fax (432) 682-3946

ANALYSIS REQUEST
(Circle or Specify Method No.)

CLIENT NAME: Celero
SITE MANAGER: Jeff Kindley
PROJECT NO.: 114-6401627
PROJECT NAME: Celero / Rock Queen #1 TB

LAB I.D. NUMBER	DATE 2013	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	HCL	HNO3	ICE	NONE	(BTEX 8021B)	TPH 8015 MOD. TX1005 (Ext. to C35)	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Vr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	(Chloride)	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Major Anions/Cations, pH, (TDS) si/alpks	pH TDS Cl SO4 Alk	SARs, metals
327392	4-24-13	1030	W		X	MW-1	4	N	X		✓		X												X				X	•	•
327393	↓	1025	↓		↓	MW-2	↓	↓	↓		↓		↓												↓				↓	•	•
327394	↓	1045	↓		↓	MW-3	↓	↓	↓		↓		↓												↓				↓	•	•
327395	↓	1105	↓		↓	MW-4	↓	↓	↓		↓		↓												↓				↓	•	•
327396	↓	1130	↓		↓	MW-5	↓	↓	↓		↓		↓												↓				↓	•	•
327397	↓	1035	↓		↓	MW-6	↓	↓	↓		↓		↓												↓				↓	•	•
327398	↓	1055	↓		↓	MW-7	↓	↓	↓		↓		↓												↓				↓	•	•

RELINQUISHED BY: (Signature) [signature] Date: 4-25-13 Time: 1645
RECEIVED BY: (Signature) [signature] Date: 4/25/13 Time: 16:45
RELINQUISHED BY: (Signature) [signature] Date: 4-25 Time: 1530
RECEIVED BY: (Signature) Date: Time:
RELINQUISHED BY: (Signature) Date: Time:
RECEIVED BY: (Signature) Date: Time:

SAMPLED BY: (Print & Initial) RR / RD Date: 4-25-13 Time: 1645
SAMPLE SHIPPED BY: (Circle) FEDEX BUS (HAND DELIVERED) UPS
AIRBILL #:
OTHER:

RECEIVING LABORATORY: Trace
ADDRESS:
CITY: midland STATE: ZIP:
CONTACT: PHONE:
RECEIVED BY: (Signature) Brenda Ward
DATE: 4/30/13 TIME: 9:05

TETRA TECH CONTACT PERSON: Jeff Kindley
Results by:
RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED: 5.9°
REMARKS: LS ZP896047

Please fill out all copies - Laboratory retains Yellow copy - Return Orginal copy to Tetra Tech - Project Manager retains Pink copy - Accounting receives Gold copy.

Midland - BTEX, pH + TDS
Lubbock - All other tests

APPENDIX D
SLUG TEST DATA

Data Set: H:\WinSitu Data\Celero Caprock Slug Test Data\Exported Data\RQ Tract 1 MW-1\Tract 1 MW-1 SLUG
Date: 04/28/14
Time: 13:50:15

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-6401627
Location: Tract 1
Test Date: 2014-04-02
Test Well: MW-1

AQUIFER DATA

Saturated Thickness: 31. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-1

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.397 ft
Static Water Column Height: 30.15 ft
Casing Radius: 0.083 ft
Well Radius: 0.281 ft
Well Skin Radius: 1. ft
Screen Length: 30.15 ft
Total Well Penetration Depth: 30.15 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.1569 ft
Gravel Pack Porosity: 0.3

No. of Observations: 66

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
60.	28.39	2100.	28.46
180.	28.79	2160.	28.46
240.	28.72	2220.	28.46
300.	28.69	2280.	28.44
360.	28.66	2340.	28.45
420.	28.63	2400.	28.46
480.	28.62	2460.	28.46
540.	28.6	2520.	28.45
600.	28.58	2580.	28.44
660.	28.59	2640.	28.45
720.	28.54	2700.	28.44
780.	28.53	2760.	28.44
840.	28.55	2820.	28.45
900.	28.51	2880.	28.45
960.	28.51	2940.	28.45
1020.	28.5	3000.	28.45
1080.	28.51	3060.	28.45
1140.	28.49	3120.	28.43
1200.	28.48	3180.	28.45
1260.	28.5	3240.	28.46
1320.	28.47	3300.	28.44
1380.	28.49	3360.	28.44
1440.	28.48	3420.	28.45
1500.	28.46	3480.	28.45
1560.	28.48	3540.	28.45
1620.	28.46	3600.	28.46
1680.	28.46	3660.	28.47
1740.	28.46	3720.	28.46
1800.	28.46	3780.	28.44

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1860.	28.45	3840.	28.45
1920.	28.45	3900.	28.46
1980.	28.46	3960.	28.46
2040.	28.47	4020.	28.45

SOLUTION

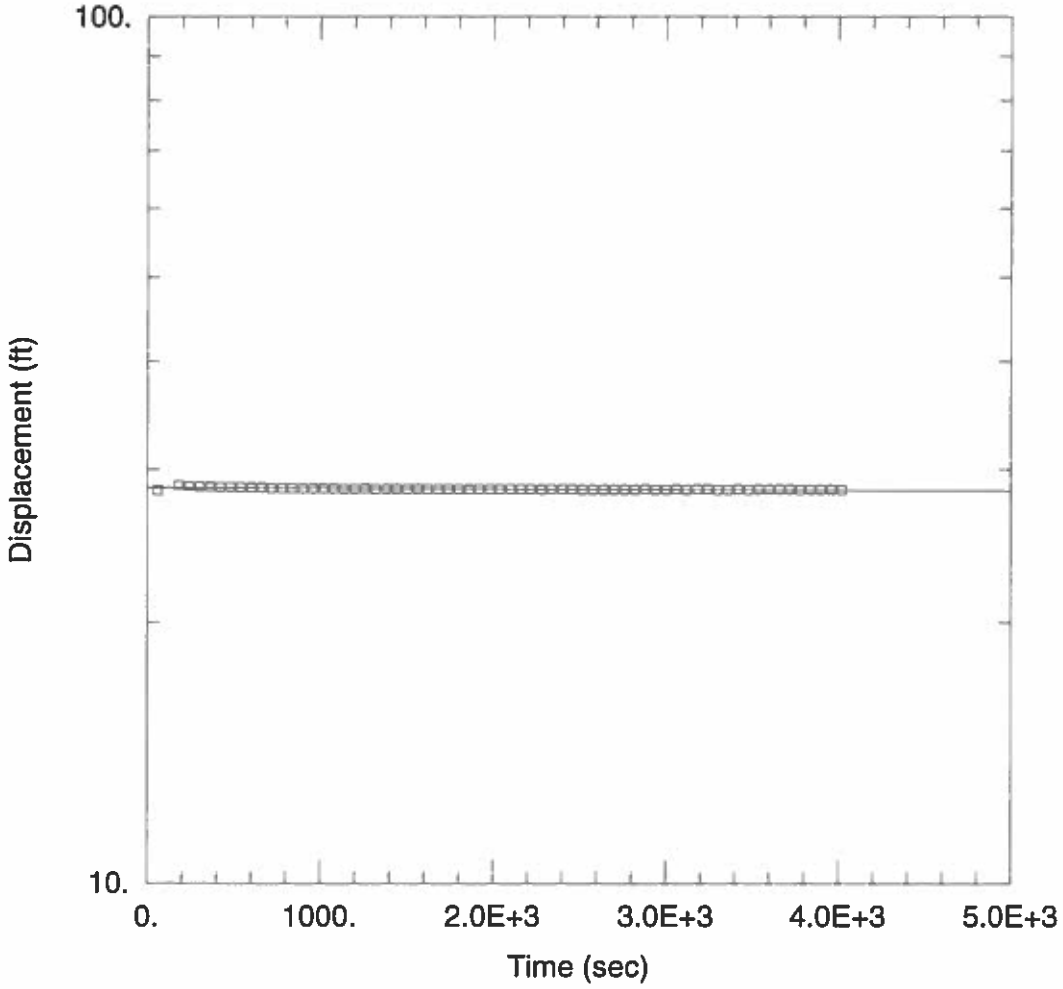
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.5

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	6.657E-5	m/day
y0	28.58	ft

K = 7.705E-8 cm/sec
T = K*b = 0.000629 m²/day (7.28E-5 sq. cm/sec)



WELL TEST ANALYSIS

Data Set: H:\...\Tract 1 MW-1 SLUGIN.aqt
Date: 04/28/14 Time: 13:50:31

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-6401627
Location: Tract 1
Test Well: MW-1
Test Date: 2014-04-02

AQUIFER DATA

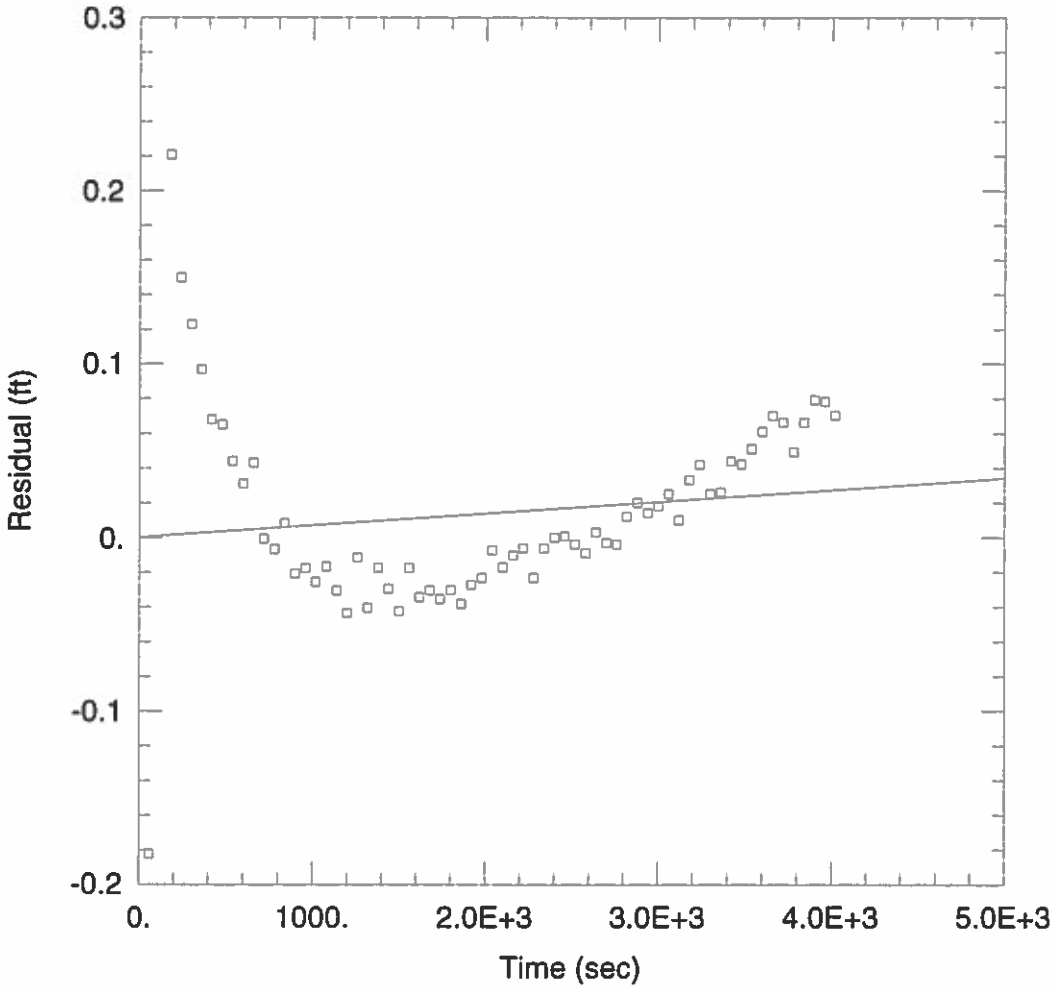
Saturated Thickness: 31. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1)

Initial Displacement: 0.397 ft
Total Well Penetration Depth: 30.15 ft
Casing Radius: 0.083 ft
Static Water Column Height: 30.15 ft
Screen Length: 30.15 ft
Well Radius: 0.281 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 6.657E-5 m/day y0 = 28.58 ft



WELL TEST ANALYSIS

Data Set: H:\...\Tract 1 MW-1 SLUGIN.aqt
Date: 04/28/14 Time: 13:50:39

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-6401627
Location: Tract 1
Test Well: MW-1
Test Date: 2014-04-02

AQUIFER DATA

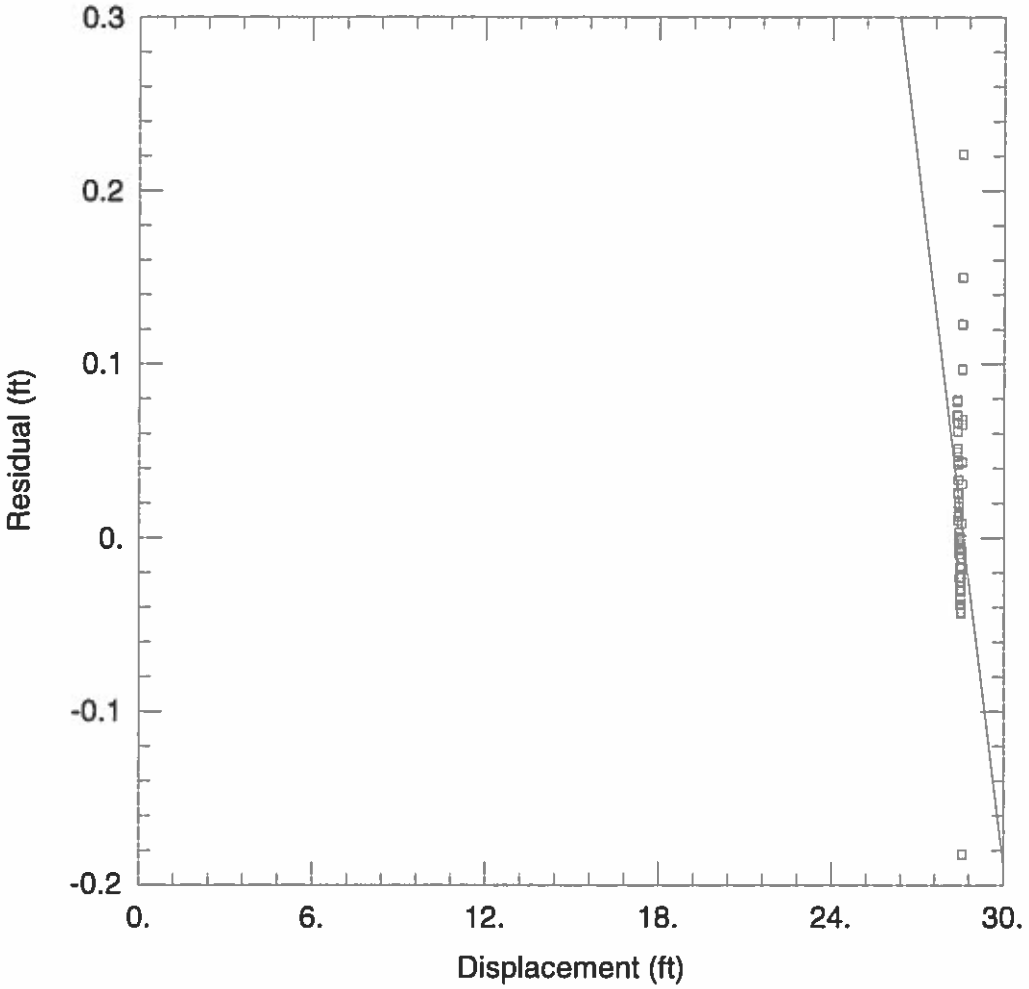
Saturated Thickness: 31. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1)

Initial Displacement: 0.397 ft
Total Well Penetration Depth: 30.15 ft
Casing Radius: 0.083 ft
Static Water Column Height: 30.15 ft
Screen Length: 30.15 ft
Well Radius: 0.281 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0. m/day y0 = 0. ft



WELL TEST ANALYSIS

Data Set: H:\...\Tract 1 MW-1 SLUGIN.aqt
Date: 04/28/14 Time: 13:50:46

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-6401627
Location: Tract 1
Test Well: MW-1
Test Date: 2014-04-02

AQUIFER DATA

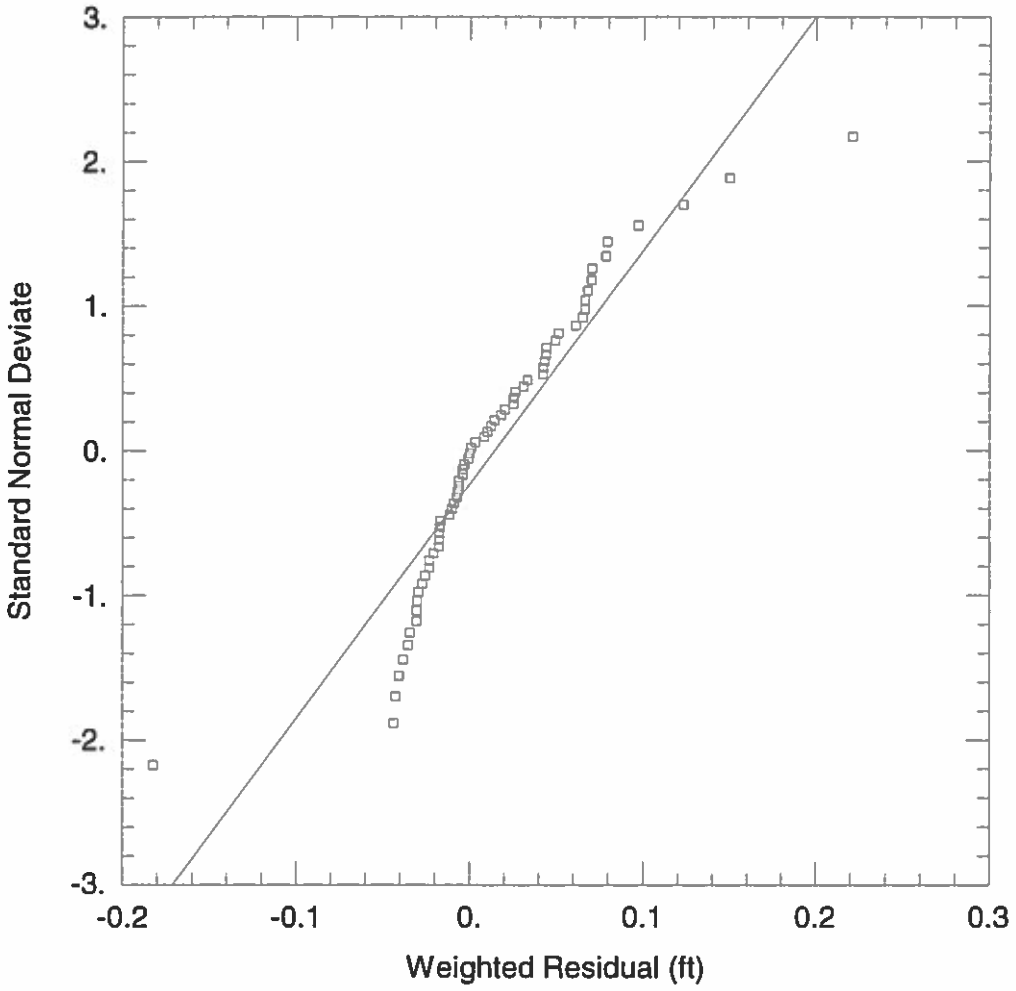
Saturated Thickness: 31. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1)

Initial Displacement: 0.397 ft
Total Well Penetration Depth: 30.15 ft
Casing Radius: 0.083 ft
Static Water Column Height: 30.15 ft
Screen Length: 30.15 ft
Well Radius: 0.281 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0. m/day y0 = 0. ft



WELL TEST ANALYSIS

Data Set: H:\...\Tract 1 MW-1 SLUGIN.aqt
Date: 04/28/14 Time: 13:50:53

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-6401627
Location: Tract 1
Test Well: MW-1
Test Date: 2014-04-02

AQUIFER DATA

Saturated Thickness: 31. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1)

Initial Displacement: 0.397 ft
Total Well Penetration Depth: 30.15 ft
Casing Radius: 0.083 ft
Static Water Column Height: 30.15 ft
Screen Length: 30.15 ft
Well Radius: 0.281 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0. m/day y0 = 0. ft

Data Set: H:\WinSitu Data\Celero Caprock Slug Test Data\Exported Data\RQ Tract 1 MW-4\RQTract1MW-4slugi
Title: Falling-Head Slug Test
Date: 04/28/14
Time: 13:54:18

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-640
Location: RQTract1
Test Date: 03/28/14
Test Well: mW-4Slugin

AQUIFER DATA

Saturated Thickness: 18.25 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: New Well

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.592 ft
Static Water Column Height: 14.91 ft
Casing Radius: 0.083 ft
Well Radius: 0.2188 ft
Well Skin Radius: 1. ft
Screen Length: 18.25 ft
Total Well Penetration Depth: 18.25 ft

No. of Observations: 60

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
60.	14.91	1860.1	15.03
120.	14.91	1920.2	15.02
180.	14.98	1980.	15.02
240.	15.5	2040.1	15.03
300.	15.48	2100.	15.02
360.	15.44	2160.	15.01
420.	15.42	2220.	15.01
480.	15.4	2280.	15.01
540.	15.38	2340.	15.01
600.	15.36	2400.	14.99
660.	15.34	2460.	15.01
720.	15.31	2520.	14.99
780.	15.27	2580.	14.99
840.	15.22	2640.	15.
900.	15.19	2700.	14.98
960.	15.18	2760.	15.
1020.	15.15	2820.	14.99
1080.	15.13	2880.	14.98
1140.	15.12	2940.	15.
1200.	15.13	3000.	14.99
1260.	15.1	3060.	14.99
1320.	15.08	3120.	14.98
1380.	15.08	3180.	14.98
1440.	15.07	3240.	14.99
1500.	15.06	3300.	14.98
1560.	15.05	3360.	14.99
1620.	15.04	3420.	14.98
1680.	15.04	3480.	14.99
1740.	15.03	3540.	14.99
1800.	15.04	3600.	14.99

SOLUTION

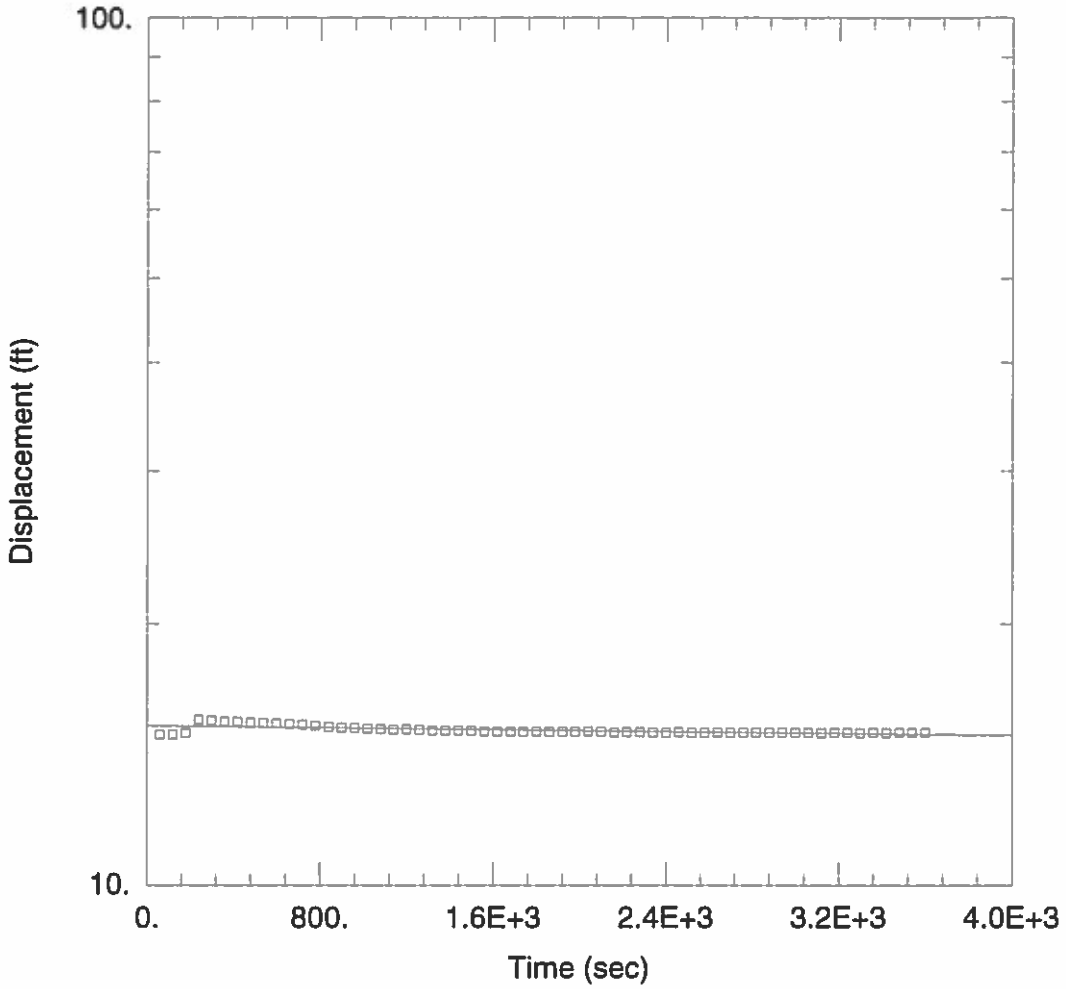
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.4

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	4.688E-5	m/day
y0	15.27	ft

K = 5.426E-8 cm/sec
T = K*b = 0.0002608 m²/day (3.018E-5 sq. cm/sec)



FALLING-HEAD SLUG TEST

Data Set: H:\...\RQTract1MW-4slugin.aqt
Date: 04/28/14 Time: 13:52:52

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-640
Location: RQTract1
Test Well: mW-4Slugin
Test Date: 03/28/14

AQUIFER DATA

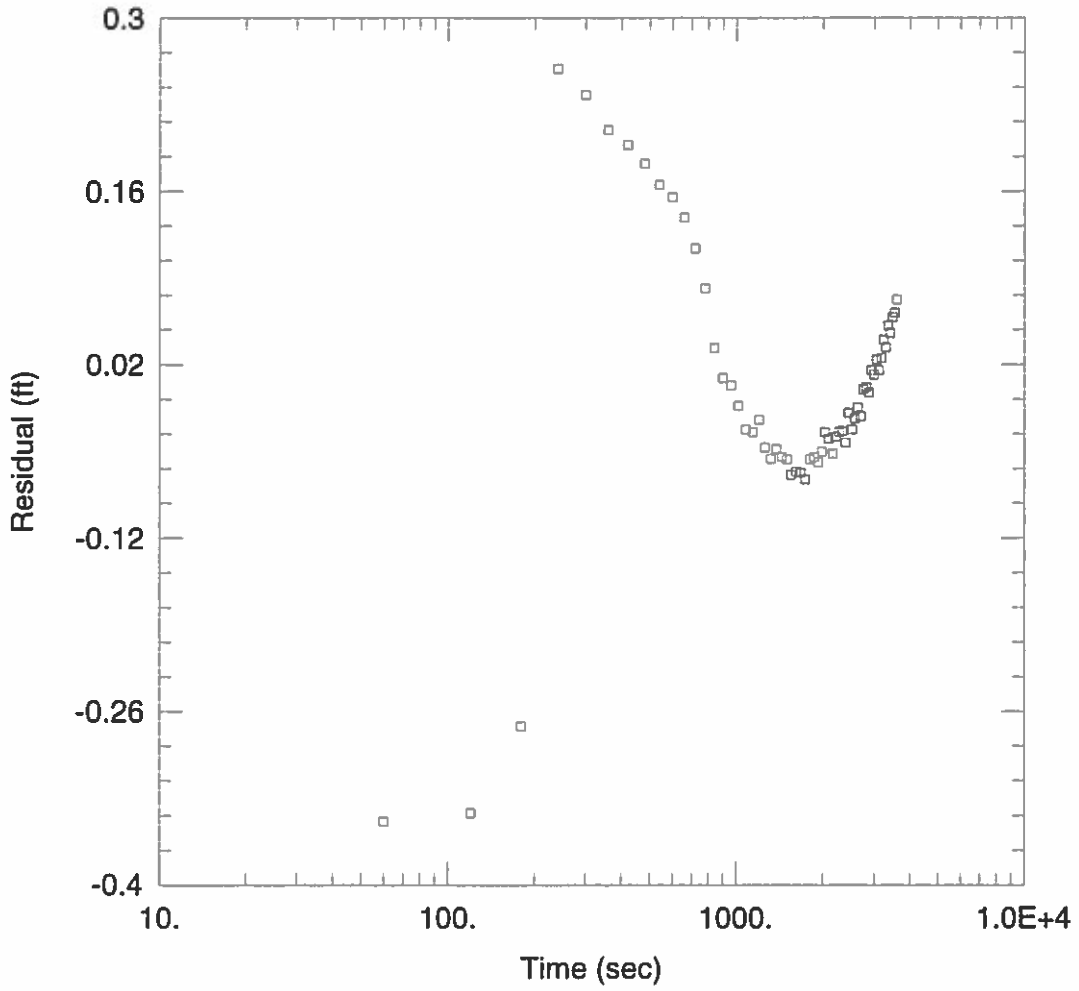
Saturated Thickness: 18.25 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 0.592 ft
Total Well Penetration Depth: 18.25 ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.91 ft
Screen Length: 18.25 ft
Well Radius: 0.2188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.688E-5 m/day
y0 = 15.27 ft



FALLING-HEAD SLUG TEST

Data Set: H:\...\RQTract1MW-4slugin.aqt
Date: 04/28/14 Time: 13:53:01

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-640
Location: RQTract1
Test Well: mW-4Slugin
Test Date: 03/28/14

AQUIFER DATA

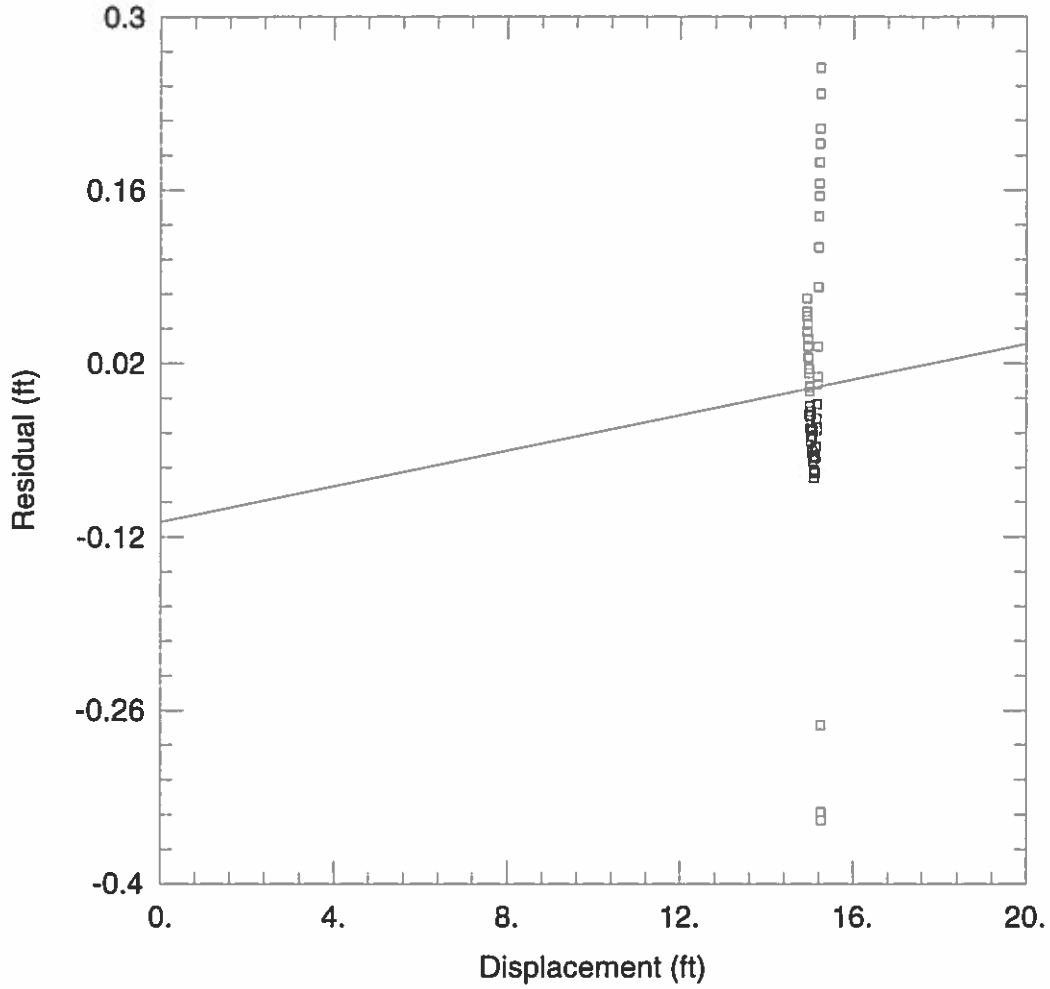
Saturated Thickness: 18.25 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 0.592 ft
Total Well Penetration Depth: 18.25 ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.91 ft
Screen Length: 18.25 ft
Well Radius: 0.2188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0. m/day
y0 = 0. ft



FALLING-HEAD SLUG TEST

Data Set: H:\...\RQTract1MW-4slugin.aqt
Date: 04/28/14 Time: 13:53:09

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-640
Location: RQTract1
Test Well: mW-4Slugin
Test Date: 03/28/14

AQUIFER DATA

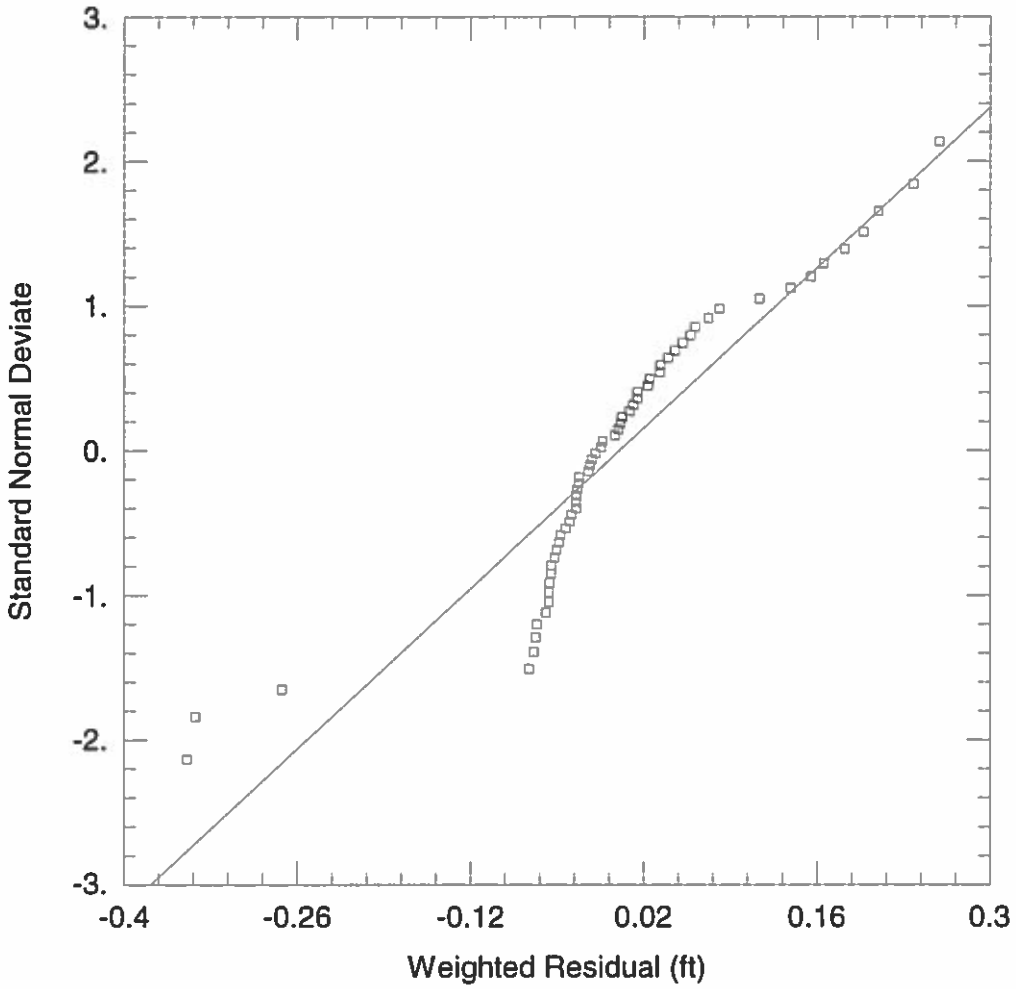
Saturated Thickness: 18.25 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 0.592 ft
Total Well Penetration Depth: 18.25 ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.91 ft
Screen Length: 18.25 ft
Well Radius: 0.2188 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0. m/day
y0 = 0. ft



FALLING-HEAD SLUG TEST

Data Set: H:\...\RQTract1MW-4slugin.aqt
Date: 04/28/14 Time: 13:53:15

PROJECT INFORMATION

Company: Tetra Tech
Client: Celero
Project: 114-640
Location: RQTract1
Test Well: mW-4Slugin
Test Date: 03/28/14

AQUIFER DATA

Saturated Thickness: 18.25 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 0.592 ft
Total Well Penetration Depth: 18.25 ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.91 ft
Screen Length: 18.25 ft
Well Radius: 0.2188 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0. m/day y0 = 0. ft