GW - 029

AGWMR

2010

GW029

2009 Groundwater Monitoring Report Buckeye Vacuum Unit, Lea County, New Mexico

NMOCD Discharge Permit: GW-029

Section: 1 Township: 18 South Range: 34 East

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September 2010

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

Table of Contents

1.0	SITE BACKGROUND1
	SITE LOCATION AND BACKGROUND
	REGIONAL SETTING
1.3	SITE GEOLOGIC/HYDROGEOLOGIC SETTING
1.4	ENVIRONMENTAL/REMEDIATION HISTORY
2.0	ASSESSMENT SCOPE OF WORK
2.1	MONITORING WELL GAUGING
2.2	GROUNDWATER GRADIENT AND CONTOURS
2.3	GROUNDWATER REMEDIATION AND WASTE MANAGEMENT
3.0	GROUNDWATER SAMPLING PROTOCOL AND ANALYSIS
	GROUNDWATER MONITORING WELL SAMPLING PROTOCOL
	SAMPLE HANDLING AND ANALYSIS
	GROUNDWATER ANALYTICAL RESULTS
3.3.	
3.3.	
3.3.	
3.3.	4 OCTOBER 2009 SAMPLING EVENT
4.0	QUALITY ASSURANCE/QUALITY CONTROL
	DUPLICATE SAMPLES
	HOLDING TIME LIMITS
4.3	LABORATORY QA/QC
	OVERVIEW, CONCLUSIONS, AND RECOMMENDATIONS
	PROJECT OVERVIEW10
	CONCLUSIONS
5.3	RECOMMENDATIONS
6.0	STATEMENT OF LIMITATIONS
7.0	REFERENCES

LIST OF FIGURES

Figure 1	Site Location Map
Figure 2	Site Plan
Figure 3	Potentiometric Groundwater Surface Map: April 2009
Figure 4	Potentiometric Groundwater Surface Map: October 2009
Figure 5	Isopleth Map of Chloride Concentrations in Groundwater: April 2009

i

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

Table of Contents

- Figure 6 Isopleth Map of Chloride Concentrations in Groundwater: October 2009
- Figure 7 TW-9 Chloride Concentration Trend
- Figure 8 TW-10 Chloride Concentration Trend
- Figure 9 TW-11 Chloride Concentration Trend
- Figure 10 TW-13 Chloride Concentration Trend
- Figure 11 TW-14 Chloride Concentration Trend
- Figure 12 TW-15 Chloride Concentration Trend
- Figure 13 TW-17 Chloride Concentration Trend
- Figure 14 TW-19 Chloride Concentration Trend
- Figure 15 TW-20 Chloride Concentration Trend
- Figure 16 TW-23 Chloride Concentration Trend
- Figure 17 RW-2 Chloride Concentration Trend
- Figure 18 RW-3 Chloride Concentration Trend
- Figure 19 Isopleth Map of Chloride Concentrations in Groundwater: February 2004

LIST OF TABLES

- Table 1
 Summary of Historical Groundwater Elevations
- Table 2Summary of Historical Analytical Results

LIST OF APPENDICES

- Appendix A Groundwater Monitoring Data Sheets
- Appendix B Laboratory Analytical Reports

ii

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

SITE BACKGROUND

1.0 SITE BACKGROUND

1.1 SITE LOCATION AND BACKGROUND

The Buckeye Vacuum Field Unit (Site) is located immediately south of County Road 57 within the location of a Targa compressor station. The Site legal description is (SW/4, SE/4), Section 1, Township 18 South, Range 34 East, Lea County, New Mexico. The Site was originally owned and operated by Texaco Exploration and Production Inc. (Texaco) and operated as the Texaco Buckeye Gas Plant. A Site Location Map is presented on Figure 1. The Site is registered with the New Mexico Oil Conservation Division under Discharge Permit GW-029.

1.2 REGIONAL SETTING

The Site is located in the vicinity of active oil fields and ranch land. A Site Plan is presented on Figure 2.

1.3 SITE GEOLOGIC/HYDROGEOLOGIC SETTING

The site rests on the Pliocene Ogallala Formation. The Ogallala is generally comprised of heterogeneous deposits of clay, silt, sand and gravel. The Ogallala Formation varies in thickness from approximately 100 to 200 feet. The surface consists mainly of thin eolian sands (Holocene) overlying fractured caliche (Holocene and Pleistocene).

Regional groundwater at the Site is reportedly contained within the High Plains/Ogallala aquifer system. The High Plains/Ogallala aquifer underlies approximately 174,000 square miles in parts of eight states: Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. The aquifer is unconfined and is recharged by water infiltrating from above. Limited recharge occurs from precipitation and stream outflow. The aquifer's saturated zone is up to 1,400 feet thick but aquifer dimensions vary along its length. It is always relatively shallow with the water table typically less than 100 feet below ground surface (bgs).

Generally, the saturated thickness of the Ogallala Formation ranges from a few feet to more than 525 feet. Ogallala groundwater is generally fresh, containing between 300 and 1,000 milligrams per liter (mg/L) of total dissolved solids of which calcium, magnesium, and bicarbonate are the principal constituents. Some hydraulic continuity occurs between the Ogallala Formation and the underlying Cretaceous, Triassic, and Permian formations in many areas of the High Plains.

1.4 ENVIRONMENTAL/REMEDIATION HISTORY

In 1989, a total of 23 monitoring wells (TW-1 through TW-23) were installed at the Site to determine the source and delineate the extent of chloride concentrations in groundwater. Two extraction wells (RW-1 and RW-2) were also installed and continuously pumped to remediate groundwater at the Site. A casing leak in a production well located on the property (VG SAU

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

SITE BACKGROUND

#58) was determined to be the source of elevated chloride concentrations. The production well was repaired in 1990 and plugged and abandoned in 2000.

Groundwater monitoring activities of all monitoring wells and the two extraction wells were conducted from 1990 through 1998. Thirteen monitoring wells were plugged and abandoned in 1999. Subsequent to the 1999 plugging event, nine monitoring wells were sampled on a quarterly basis. Monitoring well TW-23 was sampled on a monthly basis. As directed by the NMOCD, six monitoring wells and the two extraction wells were sampled on a semi-annual basis during 2000 and 2001 and monitoring well TW-23 was sampled quarterly. Pumping from extraction wells RW-1 and RW-2 ceased in 2001 and a third extraction well (RW-3), located in the vicinity of monitoring well TW-23, was installed in 2001. Groundwater recovery from extraction well RW-3 was initiated shortly after installation.

Following a sampling schedule directed by the NMOCD, groundwater monitoring activities continued at the Site during 2002. Chevron submitted a Groundwater Monitoring Summary and Closure Report to the NMOCD on December 20, 2002 requesting closure. Site closure was denied by the NMOCD in a letter dated March 19, 2003, and groundwater monitoring activities continued as directed.

Chevron conducted groundwater monitoring activities at the Site during 2003 and submitted an Annual Groundwater Monitoring Report, dated May 10, 2004, to the NMOCD. Based on the contents of that report, CEMC proposed a reduced sampling schedule, with seven monitoring wells (TW-10, TW-11, TW-13, TW-14, TW-17, TW-19, and TW-20) to be sampled for chloride and total dissolved solids (TDS) semi-annually, and three monitoring wells (TW-9, TW-15, and TW-23) to be sampled on a quarterly basis. The reduced sampling schedule was approved by NMOCD on September 30, 2004 and followed from 2005 through 2008.

Following the 2004 sampling schedule, groundwater samples were collected from three monitoring wells (TW-9, TW-15, and TW-23) in January and July 2009. Twelve monitoring and extraction wells (TW-9 TW-10, TW-11, TW-13, TW-14, TW-15, TW-17, TW-19, TW-20, TW-23, RW-2 and RW-3) were sampled in April and October 2009. The results are included in this report.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

ASSESSMENT SCOPE OF WORK

2.0 ASSESSMENT SCOPE OF WORK

The primary objectives of the groundwater gauging activities at the Site are to:

- Monitor groundwater elevations;
- Determine borehole annular volume to calculate purge volumes;
- Provide data to determine hydraulic gradient; and
- Utilize these data to compare to historical data for assessment of historical groundwater trends.

2.1 MONITORING WELL GAUGING

Monitoring wells were gauged with a dual-electrode open circuit water level indicator during each groundwater monitoring event. Depth to groundwater and total depth of well measurements were collected and entered onto field data sheets. Data from each event was utilized to calculate groundwater elevation contours, which were then employed to determine an apparent groundwater gradient and direction of flow.

2.2 GROUNDWATER GRADIENT AND CONTOURS

Data collected during the April 2009 event indicated the groundwater elevation ranged from approximately 3,858.25 (TW-20) to approximately 3,860.01 (TW-17) feet above mean sea level (MSL) across the Site. The groundwater flow direction is toward the northeast with an average hydraulic gradient of approximately 0.0023 vertical feet per horizontal foot (ft/ft). A potentiometric groundwater surface map depicting groundwater elevation conditions in April 2009 is presented on Figure 3. Groundwater elevation data collected from monitoring wells located on the adjacent Buckeye Compressor Station property to the north were used to assist in the generation of the potentiometric surface.

Data collected during the October 2009 event indicated the groundwater elevation ranged from approximately 3,857.43 (TW-20) to approximately 3,859.50 (TW-17) feet above MSL across the Site. The groundwater flow direction is toward the northeast with an average hydraulic gradient of approximately 0.0026 vertical feet per horizontal foot (ft/ft). A potentiometric groundwater surface map depicting groundwater elevation conditions in October 2009 is presented on Figure 4. Groundwater elevation data collected from monitoring wells located on the adjacent Buckeye Compressor Station property to the north were again used to assist in the generation of the potentiometric surface.

Based on data collected throughout the reporting period, the Site appears to have maintained a consistent groundwater flow direction and relatively consistent gradient and distribution. Groundwater elevations have fallen an average of 1.2 feet across the site since 2003. A Historical Summary of Groundwater Gauging Results is presented in Table 1 and copies of Groundwater Monitoring Data Sheets for each event are presented as Appendix A.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

ASSESSMENT SCOPE OF WORK

2.3 GROUNDWATER REMEDIATION AND WASTE MANAGEMENT

Groundwater is currently pumped from extraction well RW-3 on an alternating pumping (six hours on) and recovery (48 hours off) schedule to flush residual chloride from the capillary zone in the vicinity of VG SAU #58. The extracted groundwater is used as non-contact cooling water at the Chevron Buckeye CO₂ Plant, located north of the site, across County Road 57.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

GROUNDWATER SAMPLING PROTOCOL AND ANALYSIS

3.0 GROUNDWATER SAMPLING PROTOCOL AND ANALYSIS

The primary objectives of the groundwater monitoring activities at the Site are:

- To collect groundwater samples to assess groundwater conditions at the Site; and
- To monitor migration of the chloride concentrations in groundwater.

The primary constituents of concern at the Site are chloride and TDS. As per the Annual Groundwater Monitoring Report of April 25, 2005, Chevron will continue to sampling the ten monitoring wells until chloride concentrations have been remediated to below the New Mexico Water Quality Control Commission (NMWQCC) standards for a minimum of four consecutive quarters or four consecutive longer term sampling events.

Quarterly groundwater samples were collected on January 19, April 13-14, July 6, and October 1, 2009 from monitoring wells TW-9, TW-15, and TW-23. Semi-annual sampling of all the monitoring wells was conducted on April 13-14 and October 1.

3.1 GROUNDWATER MONITORING WELL SAMPLING PROTOCOL

Following groundwater gauging, low-flow sampling techniques were used to sample each monitoring well. The wells were purged and sampled using a Grundfos Redi-Flo pump and disposable polyethylene tubing. The tubing was lowered into the well to the midpoint of the well screen. Once the tubing was placed at the correct elevation in the well, the initial water level was measured and recorded before purging began. The pump was started at its lowest speed setting and speed was slowly increased until discharge occurred. The water level and pumping rate were monitored and recorded every three to five minutes (or as appropriate) during purging.

During well purging, indicator field parameters (pH, oxidation-reduction potential [ORP], conductivity, temperature, and dissolved oxygen [DO]) were measured using a multi-meter with flow-through-cell, and recorded approximately every three to five minutes. Purging was considered complete and sampling began when all the indicator field parameters stabilized or three well volumes were removed. Stabilization was considered to be achieved when three consecutive readings, taken at three to five minute intervals, were within the following limits:

- DO (10%)
- Conductivity (3%)
- Temperature (3%)
- pH (± 0.1 unit)
- ORP (± 10 millivolts)

Depth to water was measured immediately prior to sample collection. Water samples for laboratory analyses were collected before water passed through the flow-through-cell. All sample containers were filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

GROUNDWATER SAMPLING PROTOCOL AND ANALYSIS

Groundwater field measurements were recorded on the Groundwater Monitoring Data Sheets included in Appendix A.

3.2 SAMPLE HANDLING AND ANALYSIS

Following collection, water samples were labeled, logged on a laboratory chain of custody, and placed on ice in an insulated cooler to maintain a temperature of approximately 40°F (4°C). The water was transmitted to Lancaster Laboratories in Lancaster, Pennsylvania for analysis. Proper chain of custody documentation was maintained throughout the sampling and analysis process.

Sample analyses conducted on groundwater samples during the 2009 events include the following:

- chloride EPA Method 300.0;
- TDS by SM20 2540C.

3.3 GROUNDWATER ANALYTICAL RESULTS

The constituents of concern in groundwater at the Site are chloride and TDS. A Historical Summary of Groundwater Analytical Results is presented in Table 2. Laboratory analytical reports for each sampling event of 2009 are presented as Appendix B.

3.3.1 January 2009 Sampling Event

Groundwater samples were collected from monitoring wells TW-9, TW-15 and TW-23 on January 19, 2009. Reported chloride concentrations were 82.6 mg/L (TW-9), 108 mg/L (TW-15), and 177 mg/L (TW-23). These concentrations are all below the NMWQCC standard of 250 mg/L. All reported TDS concentrations were below the NMWQCC standard of 1,000 mg/L.

3.3.2 April 2009 Sampling Event

Chloride concentrations measured in twelve groundwater samples collected on April 13-14, 2009 ranged from 27.8 mg/L (TW-19) to 1,250 mg/L (RW-3). All reported chloride concentrations from the groundwater samples collected were below the NMWQCC standard of 250 mg/L with the exception of the groundwater sample collected from extraction well RW-3. An isopleth map of chloride concentrations for the April 2009 sampling event is presented on Figure 5.

3.3.3 July 2009 Sampling Event

Groundwater samples were collected from monitoring wells TW-9 and TW-15 on July 6, 2009. Reported chloride concentrations were 75.4 mg/L (TW-9), 66.5 (TW-15) and 48.2 mg/L (TW-23). These concentrations are all below the NMWQCC standard of 250 mg/L. All reported TDS concentrations were below the NMWQCC standard of 1,000 mg/L.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

GROUNDWATER SAMPLING PROTOCOL AND ANALYSIS

3.3.4 October 2009 Sampling Event

Chloride concentrations reported for the twelve groundwater samples collected on October 1, 2009 ranged from 29.5 mg/L (TW-19) to 1,320 mg/L (RW-3). All chloride concentrations from the groundwater samples collected were below the NMWQCC standard of 250 mg/L with the exception of the groundwater sample collected from extraction well RW-3. An isopleth map of chloride concentrations for the October 2009 sampling event is presented in Figure 6.

Historical chloride data trending graphs for the monitoring well network are included as Figures 7 through 18.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

QUALITY ASSURANCE/QUALITY CONTROL

4.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality objectives for groundwater monitoring data include:

- Collection of data in accordance with procedures as appropriate for its intended use;
 - Maintaining sufficient quality data to meet scientific and legal scrutiny;
- Generation of representative data of known and acceptable precision and accuracy; and
- Evaluation of data that is consistent in content and quality.

Steps were taken to insure the integrity of collected water samples and analytical results. Sections 2.1, 3.1 and 3.2 present discussions of the procedures used in field quality assurance and quality control (QA/QC). The pump was decontaminated with an Alconox[©] wash and a distilled-water rinse prior to beginning field activities and between all wells.

Specific QA/QC procedures implemented for this project are described below.

4.1 DUPLICATE SAMPLES

A field duplicate sample is a second sample collected at the same location as the original sample. Duplicate samples are collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. Duplicate samples are collected to assure accuracy of testing methods by the laboratory.

The following table presents chloride analytical results for wells sampled during the 2009 semiannual events compared to their respective duplicate sample results.

Date	Original Sample ID	Original Sample Analytical Results	Duplicate Sample ID	Duplicate Sample Analytical Result
4/14/09	TW-15	87.1	Dup 1	95.2
10/01/09	TW-14	154	Dup #100	163

Chloride analytical results for duplicate samples indicate acceptable laboratory precision and defendable analytical data.

4.2 HOLDING TIME LIMITS

Holding times before extraction and analysis are specified in USEPA, *Test Methods for Evaluating Solid Waste Physical/Chemical Methods*, SW-846. All laboratory analysis were performed within specified holding times. No quality control issues were identified due to lengthened holding time.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

QUALITY ASSURANCE/QUALITY CONTROL

4.3 LABORATORY QA/QC

Laboratory QA/QC data is provided in the laboratory analytical reports presented as Appendix B.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

OVERVIEW, CONCLUSIONS, AND RECOMMENDATIONS

5.0 OVERVIEW, CONCLUSIONS, AND RECOMMENDATIONS

The following overview, conclusions, and recommendations are based upon data collected during the 2009 groundwater sampling events.

5.1 **PROJECT OVERVIEW**

The Site is located immediately south of County Road 57 within the location of a Dynegy compressor station. The Site legal description is (SW/4, SE/4), Section 36, Township 17 South, Range 34 East, Lea County, New Mexico. The Site was originally owned and operated by Texaco and operated as the Texaco Buckeye Gas Plant.

Quarterly groundwater sampling and gauging activities were conducted on January 19, April 13-14, July 6, and October 1, 2009 from monitoring wells TW-9, TW-15, and TW-23. Semi-annual sampling and gauging of all the monitoring wells was conducted on April 13-14 and October 9-14.

5.2 CONCLUSIONS

Chloride concentration trending graphs are shown on Figures 7-18 for the 12 Site wells. The following findings and conclusions can be drawn from the 2009 groundwater monitoring events:

- The depth to groundwater is approximately 128 feet below ground surface and groundwater flow direction is toward the northeast, with an approximate hydraulic gradient of 0.002 vertical feet per horizontal foot;
- All monitoring wells, with the exception of extraction well RW-3, have exhibited chloride concentrations below the NMWQCC standard of 250 mg/L for a minimum of four consecutive quarters;
- The chloride concentration trend is decreasing for monitoring well TW-23. Chloride concentrations for the last four quarters of sampling have been below the NMWQCC standard of 250 mg/L;
- The chloride concentration trend is increasing for extraction well RW-3. Chloride concentrations have been above the NMWQCC standard of 250 mg/L during every sampling event since May of 2004;
- Extraction well RW-2 has exhibited chloride concentrations below the NMWQCC standard since groundwater samples were first collected on May 28, 2004. The only exception was the sampling event in October 2005, where the chloride concentration was measured at 264 mg/L. Chloride concentrations have been below the NMWQCC standard in groundwater samples collected from RW-2 in 2006, 2007, 2008, and 2009;
- TDS concentrations measured in the groundwater samples collected during 2009 were below the NMWQCC standard of 1,000 mg/L for all of the monitoring and extraction wells except for groundwater samples collected from RW-3. The highest TDS concentration measured from extraction well RW-3 was 2,850 mg/L (October 2009);

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2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

OVERVIEW, CONCLUSIONS, AND RECOMMENDATIONS

- All wells have exhibited chloride concentrations below the standard of 250 mg/L for the past four years with the exception of monitoring well TW-23 and extraction well RW-3; and
- Monitoring wells TW-10, TW-13, and TW-14 have slightly increasing chloride concentration trends. However, chloride concentrations remain below the NMWQCC standard.
- The chloride isopleth concentration map was developed from two separate sampling events in 2004. Due to the variability in sample collection frequency and in the sampling results, only the highest concentrations from the February and August 2004 sampling events are shown on Figure 19. A substantial decrease in horizontal extents of the chloride concentrations in groundwater is evident when compared to the September 2009 chloride data (Figure 6).

5.3 **RECOMMENDATIONS**

Chevron, NMOCD, and Stantec met on October 21, 2009 in Santa Fe, NM to discuss the Site. Chevron and Stantec proposed the following to NMOCD:

- Discontinue the sampling schedule approved by NMOCD on September 30, 2004;
- Reduce analytical analyses to chloride only;
- Reduce sampling frequency to semi-annual;
- Monitor the following wells:
 - Upgradient: TW-17
 - o Source Area: RW-3
 - Down gradient: TW-10, TW-13, and TW-14.
- Plug and abandon all remaining wells with the exception of:
 - Monitoring wells to be added to Buckeye Compressor monitoring well network: TW-11 and TW-13
 - o Down gradient wells: TW-9 and TW-20.
- Re-evaluate the Site following two years of semi-annual sampling; and
- Discuss optimization of recovery well pumping rate with the operators of the CO₂ Plant.

NMOCD agreed verbally to the proposed changes to the sampling protocol, the monitoring well abandonment, and the optimization of the recovery well. A formal written approval is expected from NMOCD prior to the first 2010 sampling event scheduled for April.

2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

STATEMENT OF LIMITATIONS

6.0 STATEMENT OF LIMITATIONS

The conclusions and recommendations contained in this report are based upon professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted hydrogeologic and engineering standards and practices applicable to the Site. Stantec derived the data in this report primarily from visual inspections, examination of records in the public domain, and interviews with individuals having information about the Site.

This report is based, in part, on information supplied to Stantec by a third-party source. Efforts have been made to substantiate the third-party information; however, Stantec can not guarantee the information completeness or accuracy. Descriptions and protocol presented in this report are intended to summarize activities conducted by Stantec in 2009.

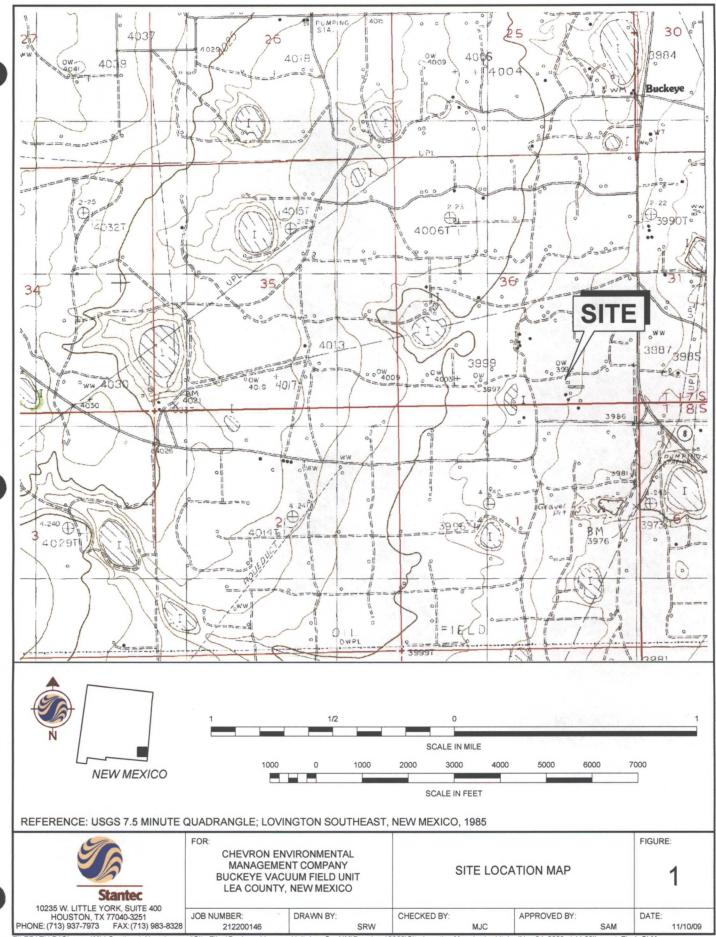
2009 GROUNDWATER MONITORING REPORT BUCKEYE VACUUM UNIT, LEA COUNTY, NEW MEXICO

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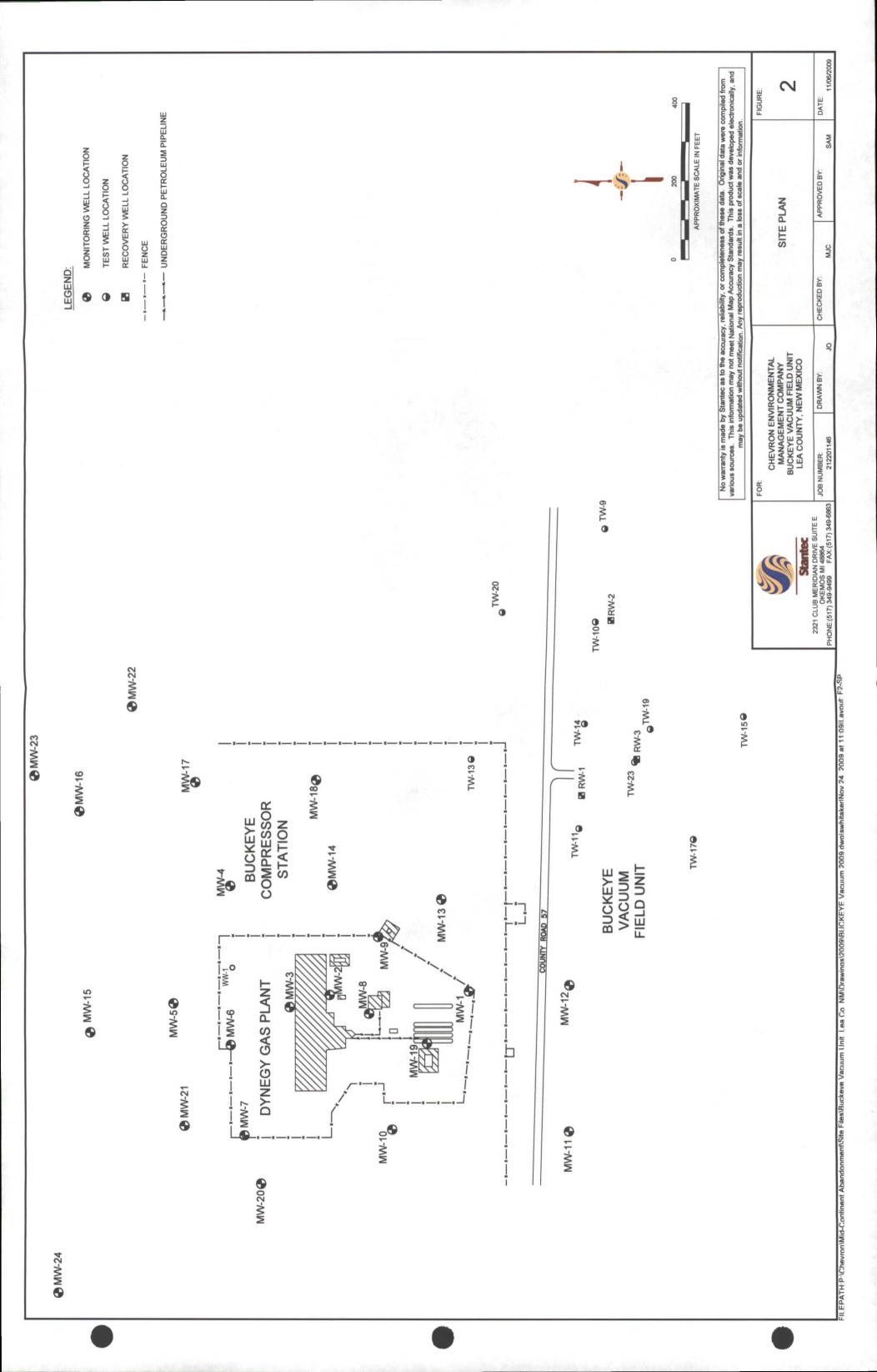
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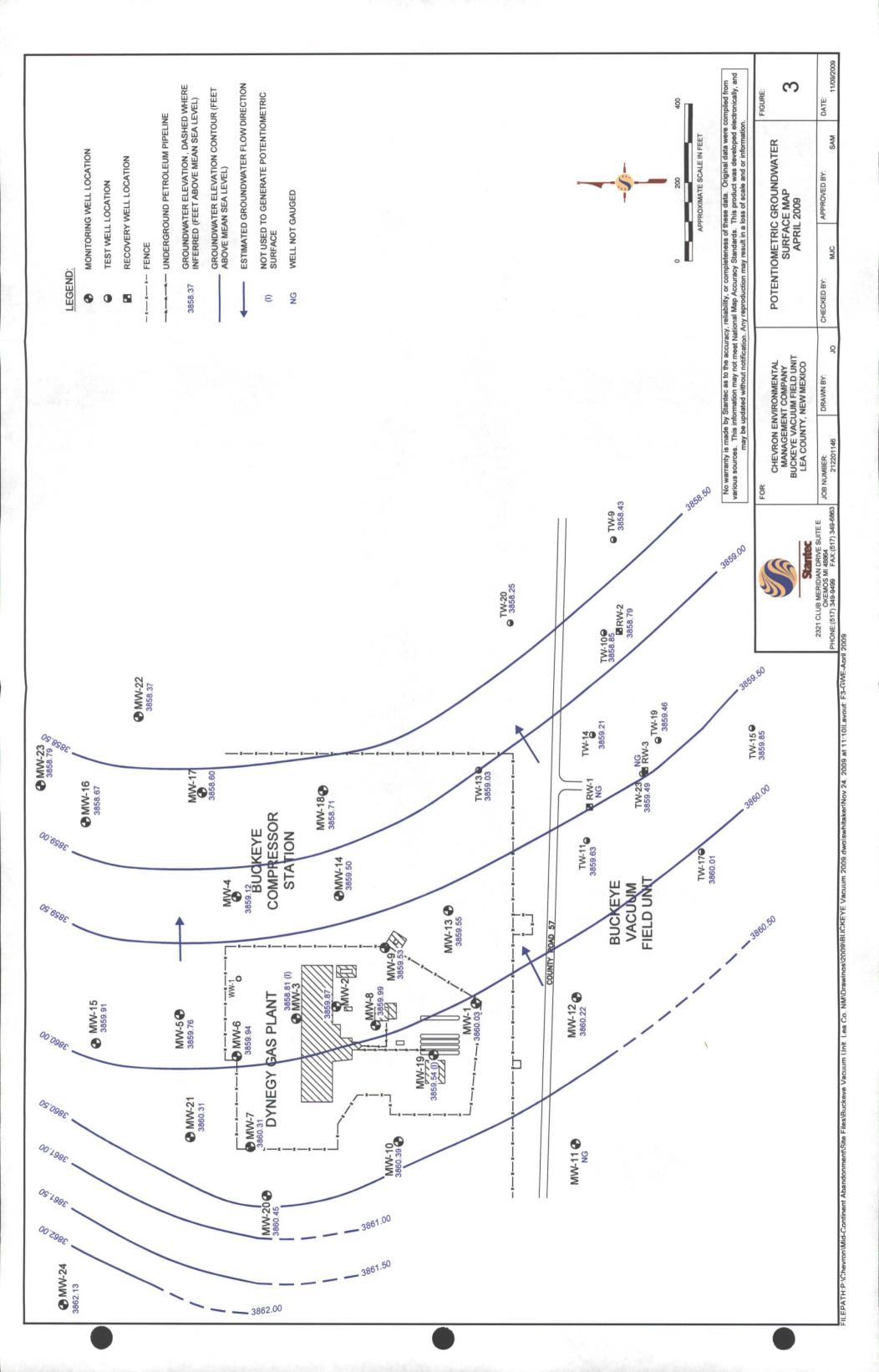
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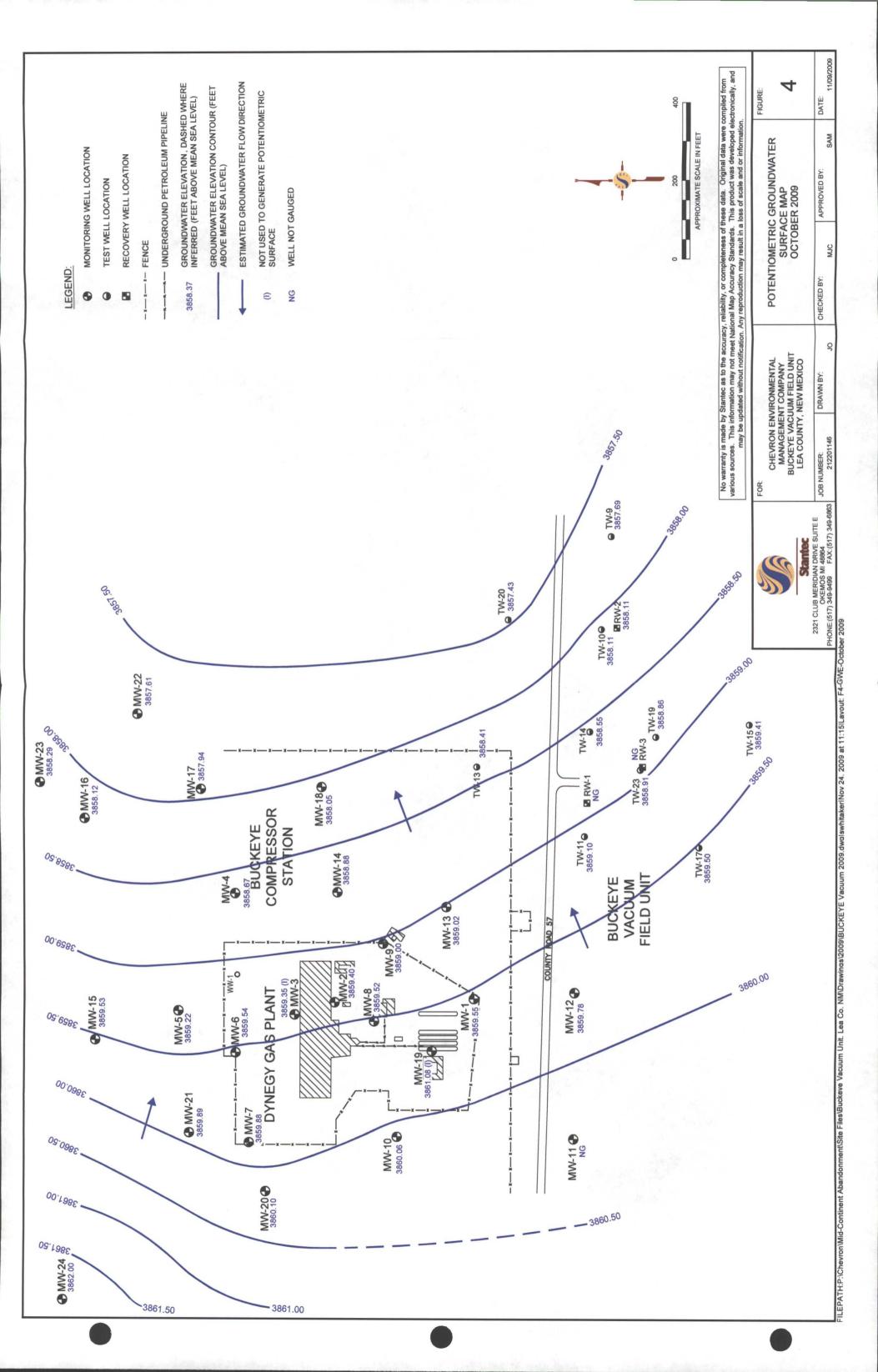
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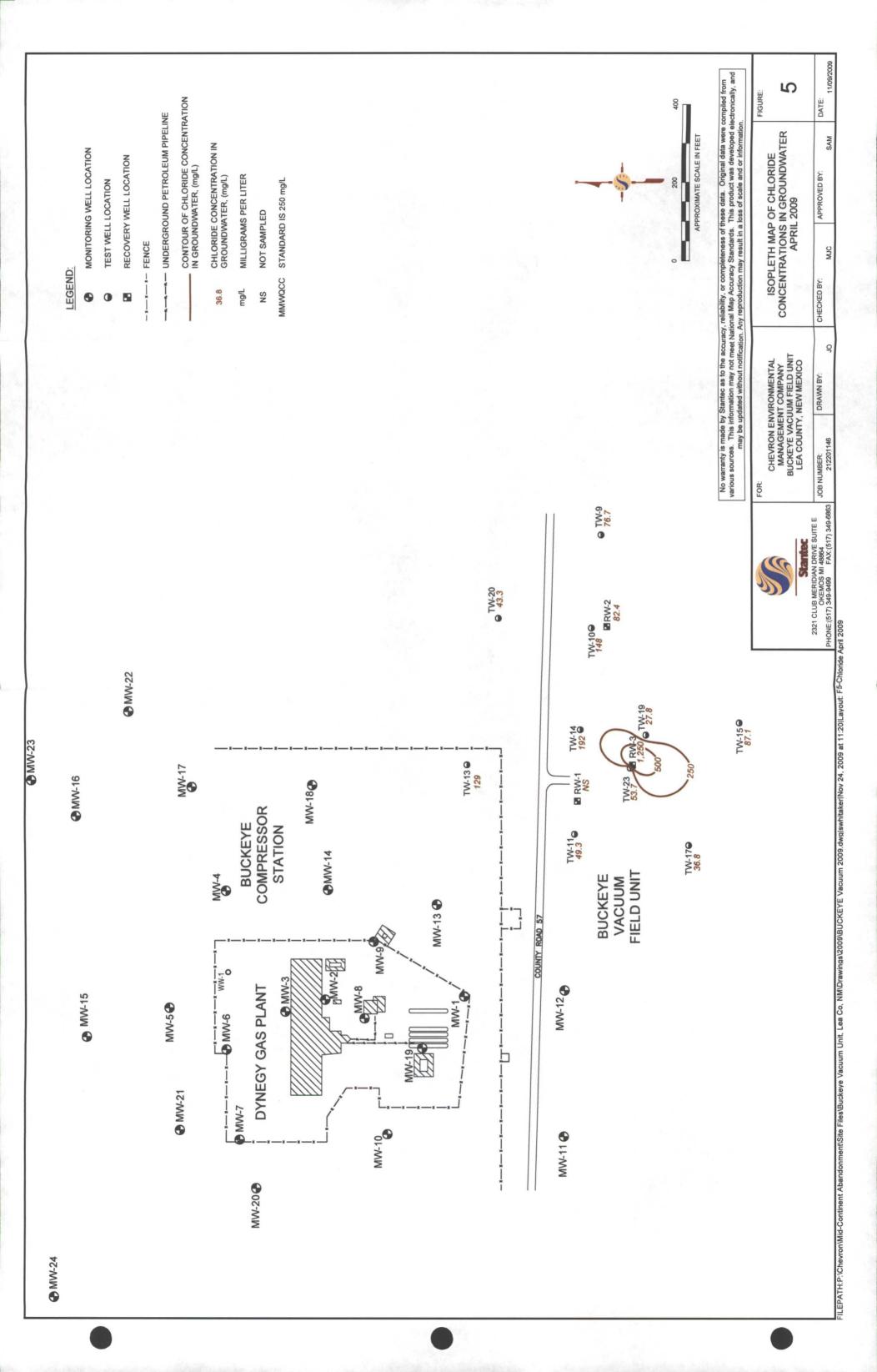


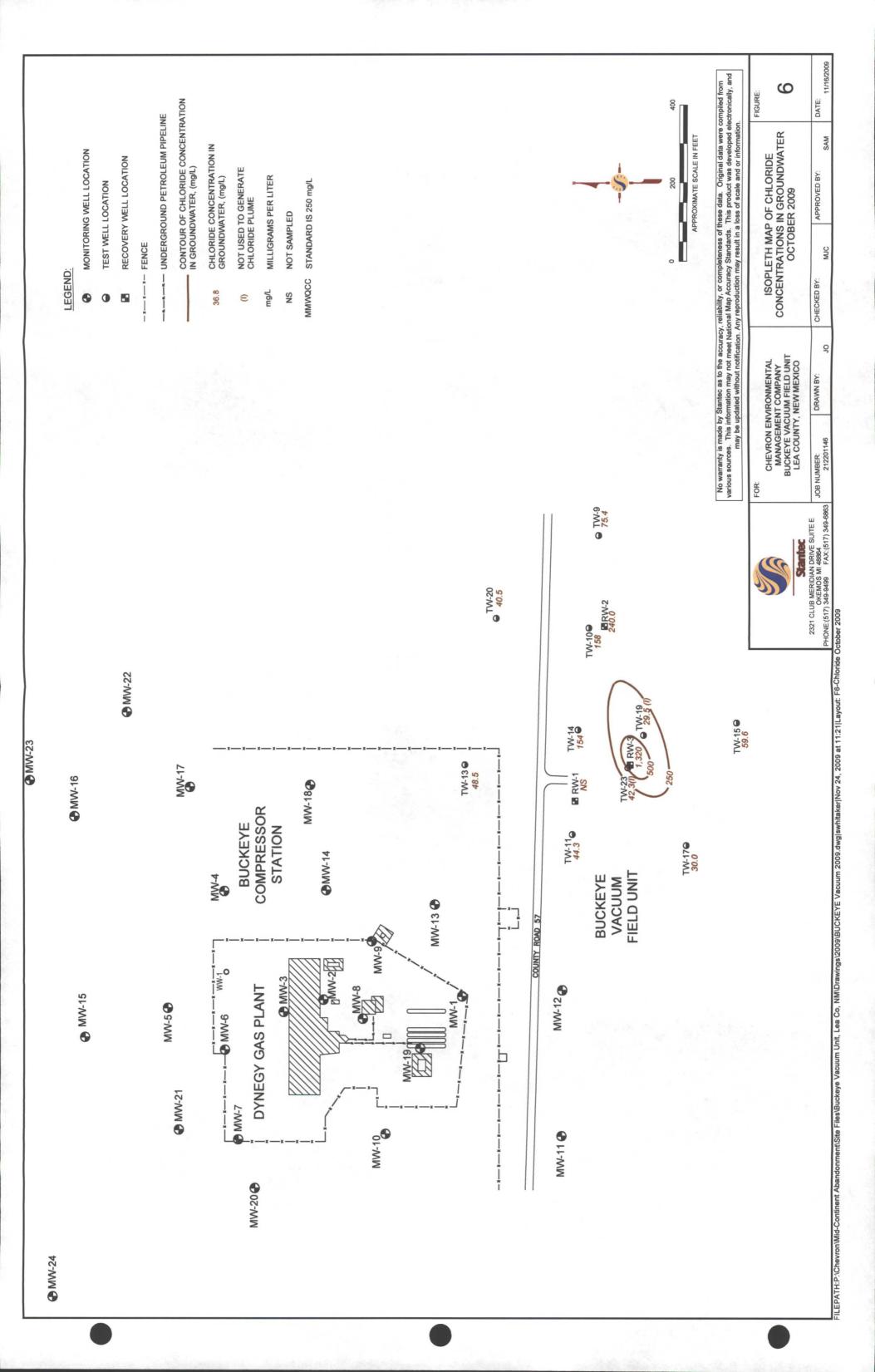
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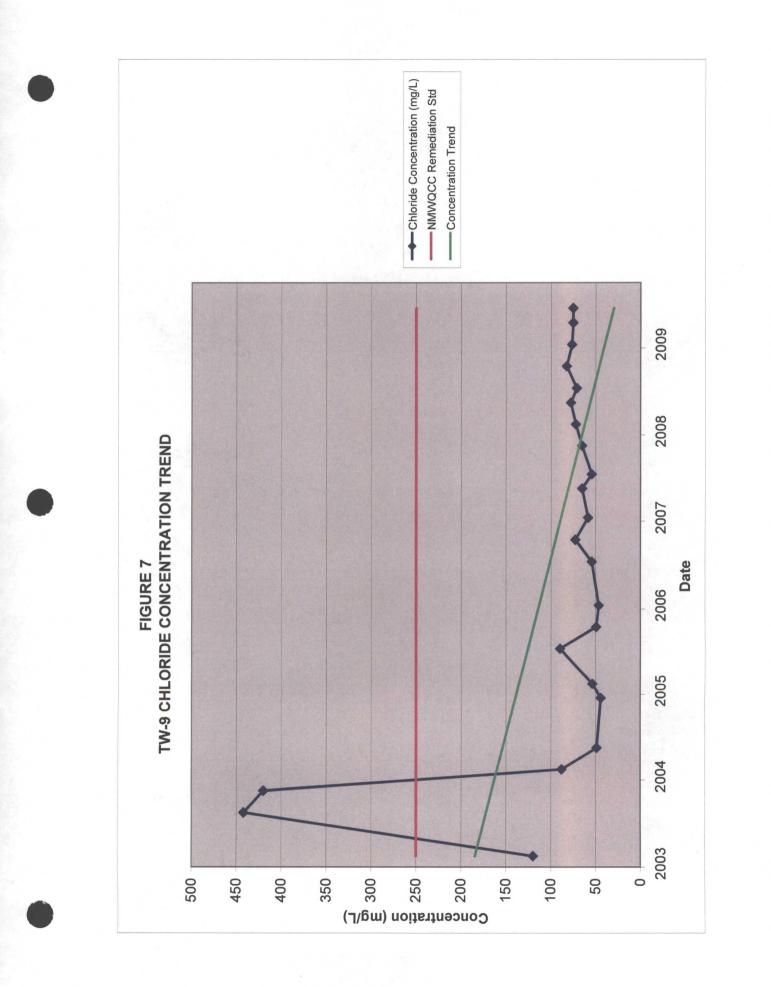


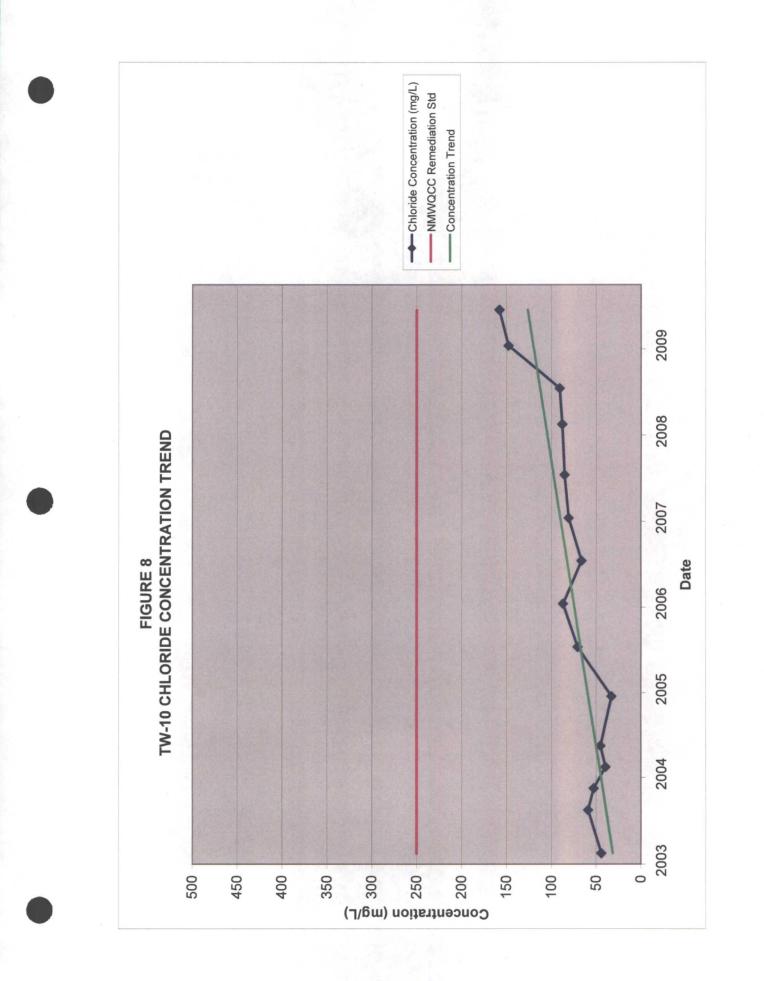


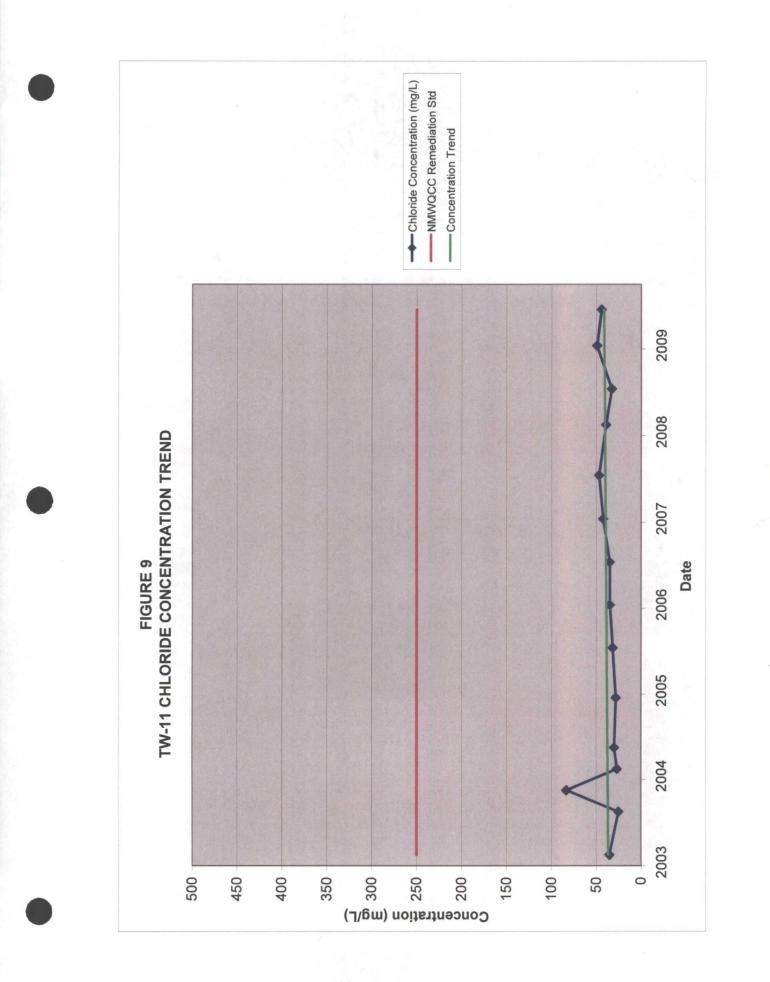


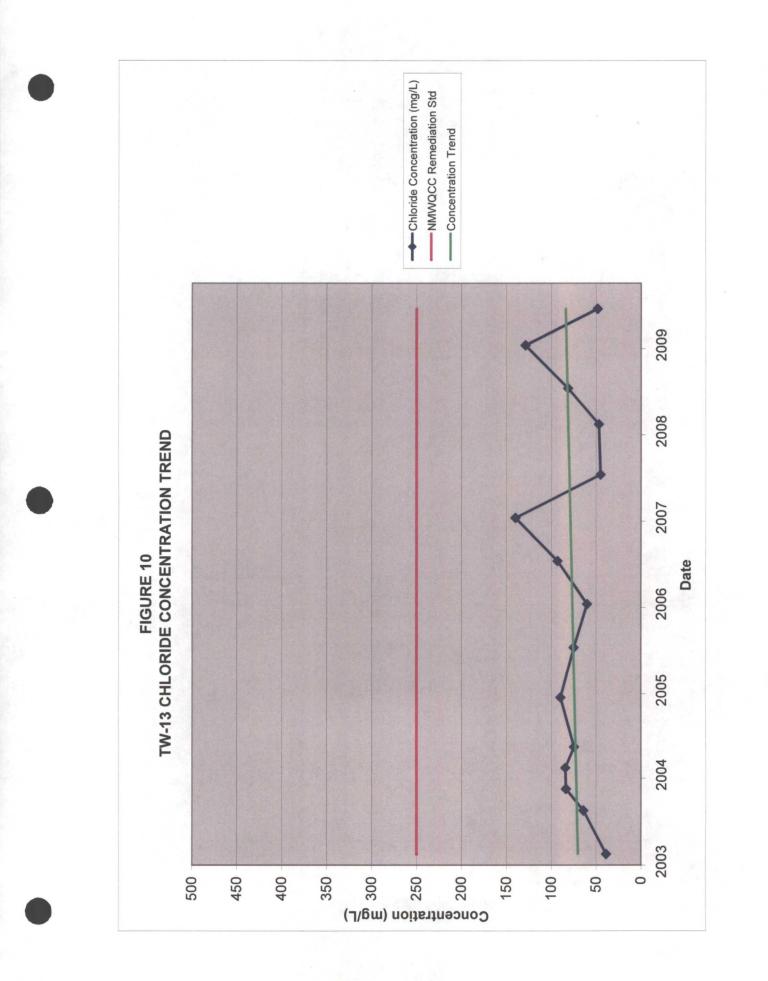


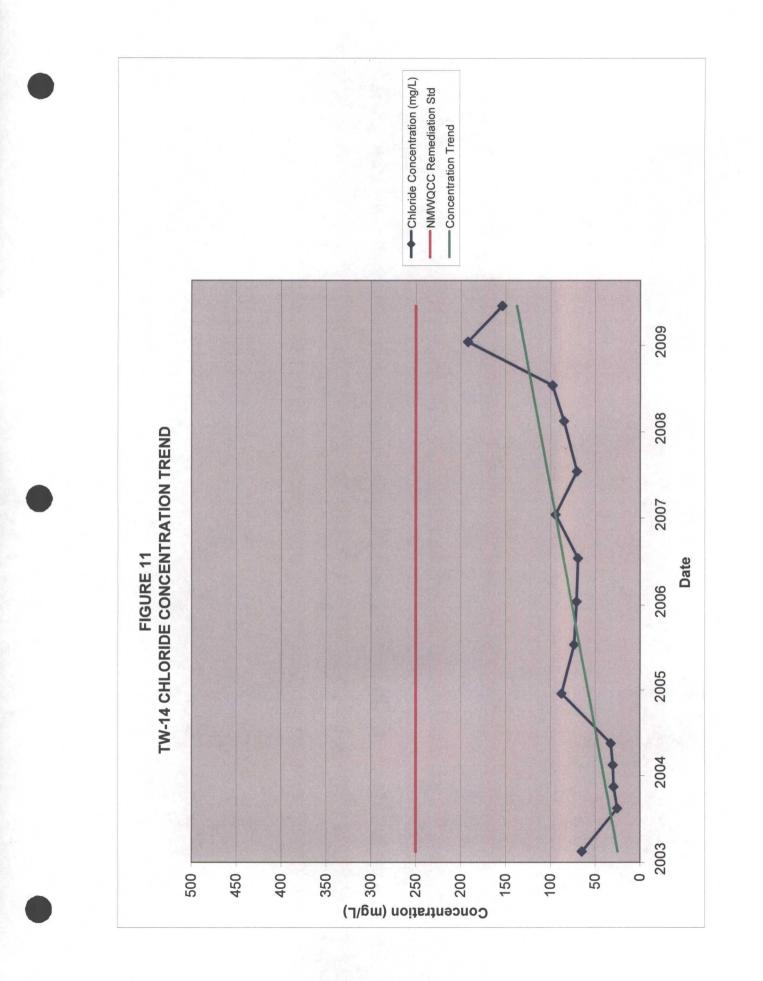


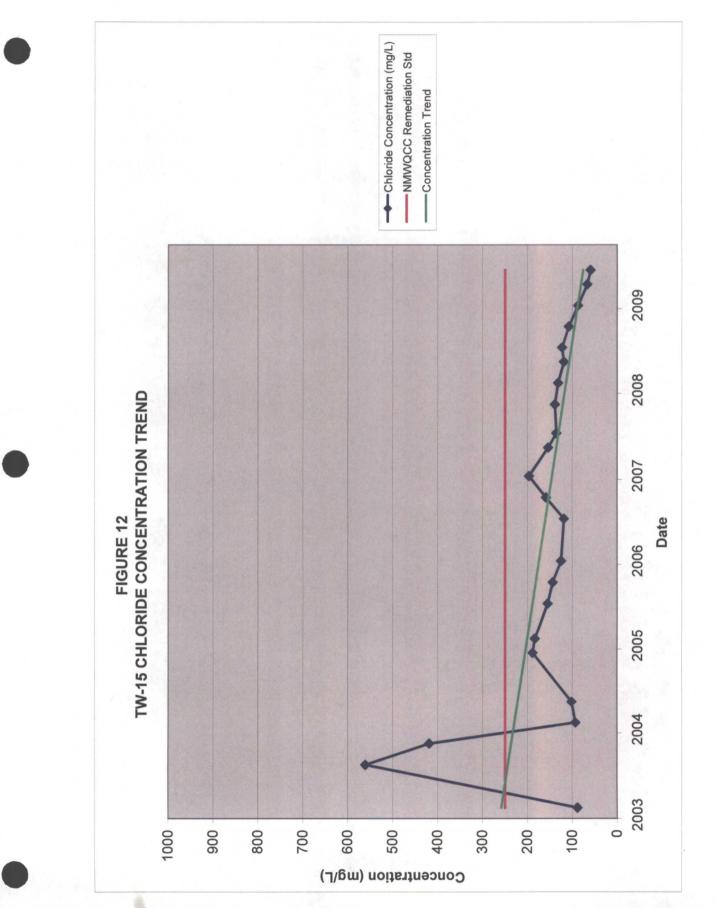


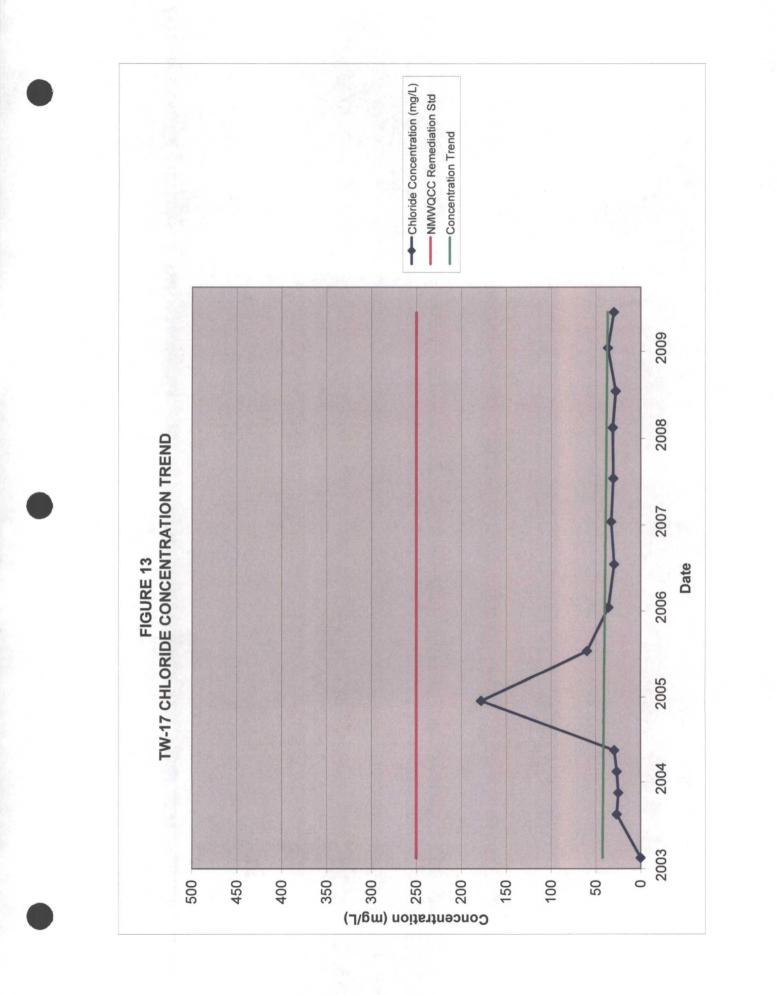


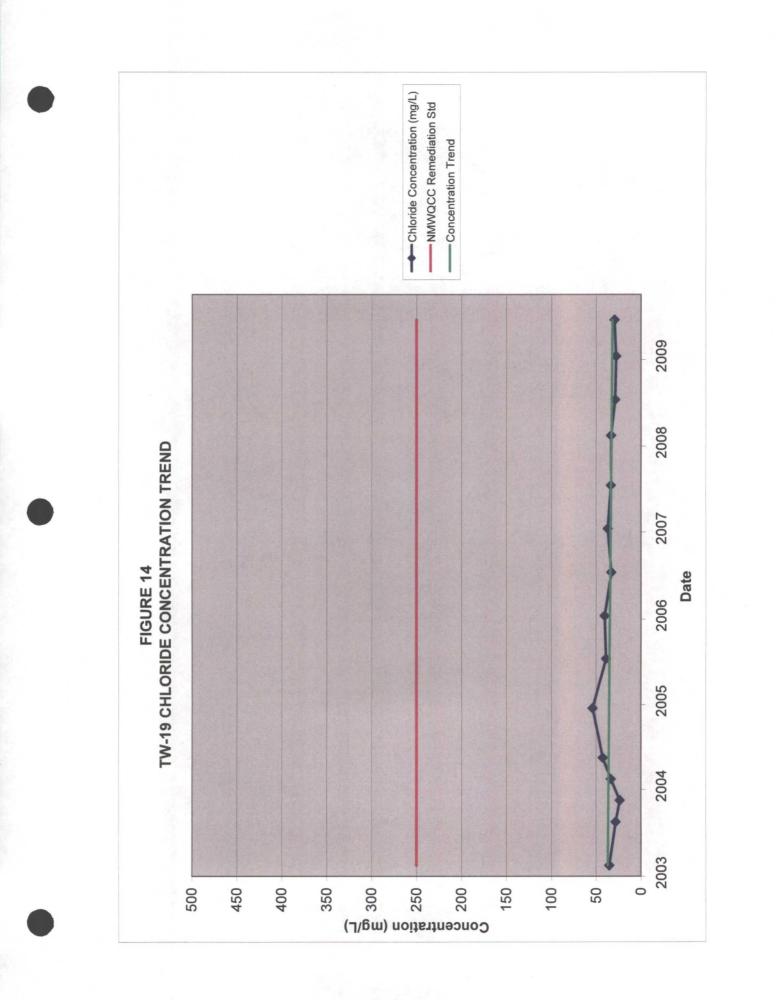


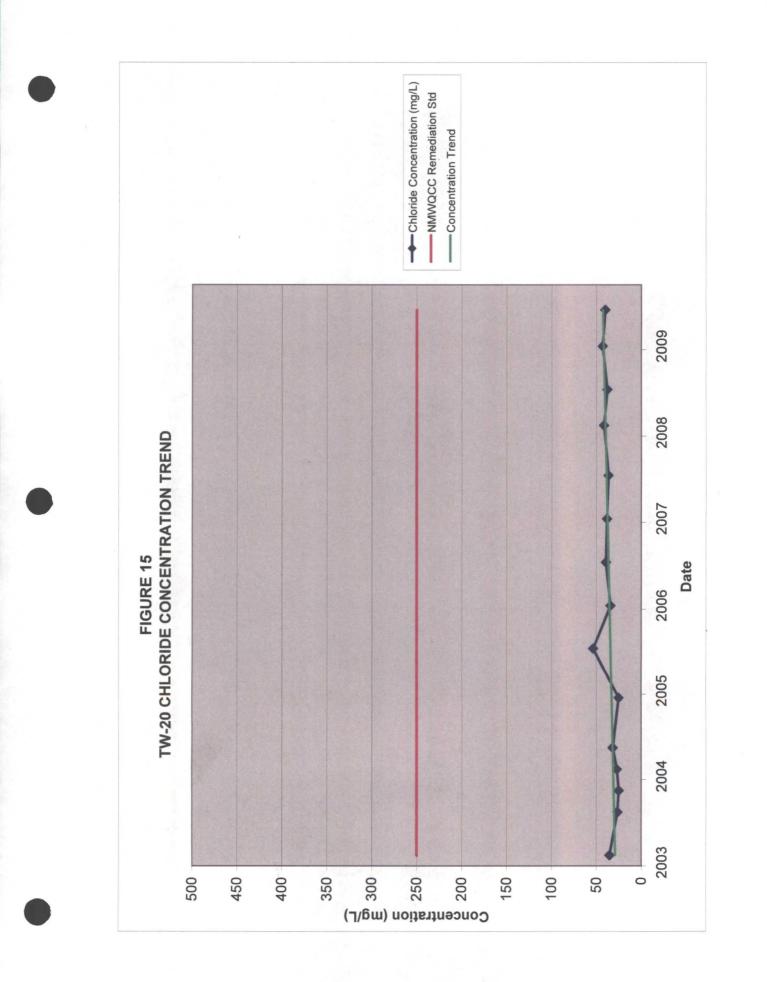


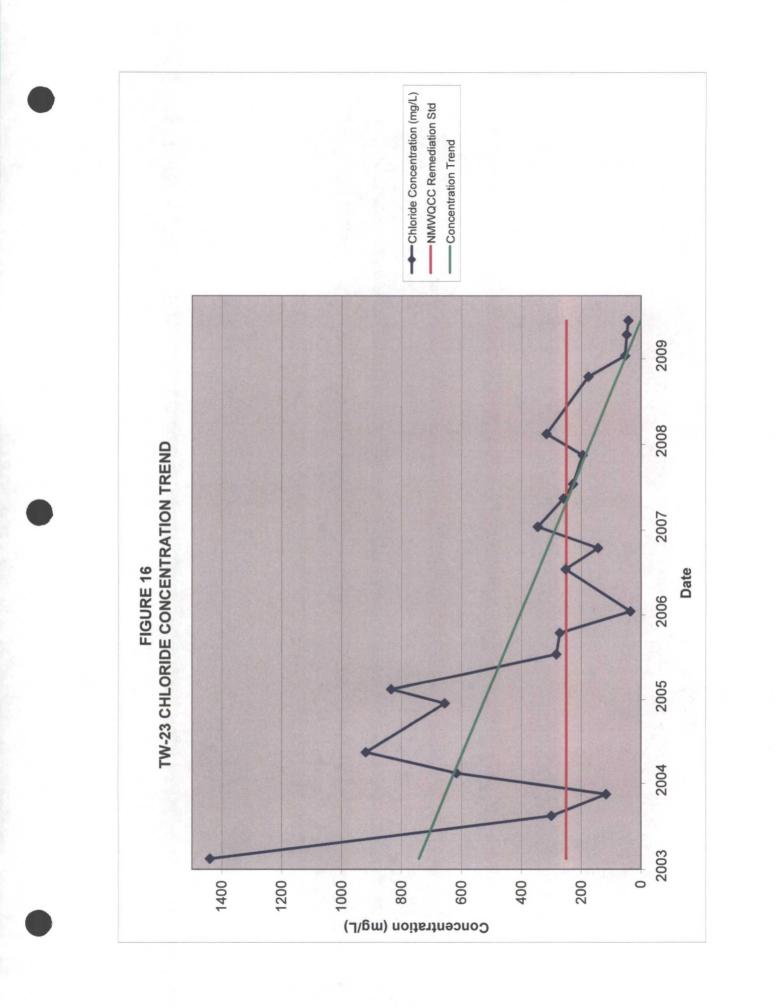


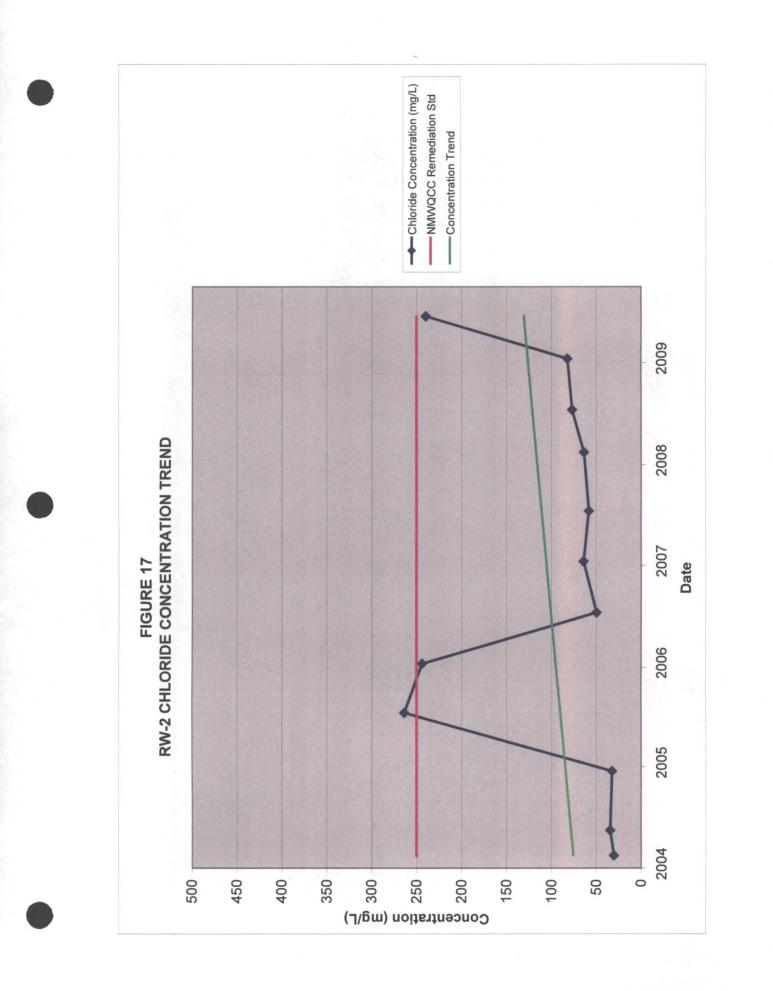


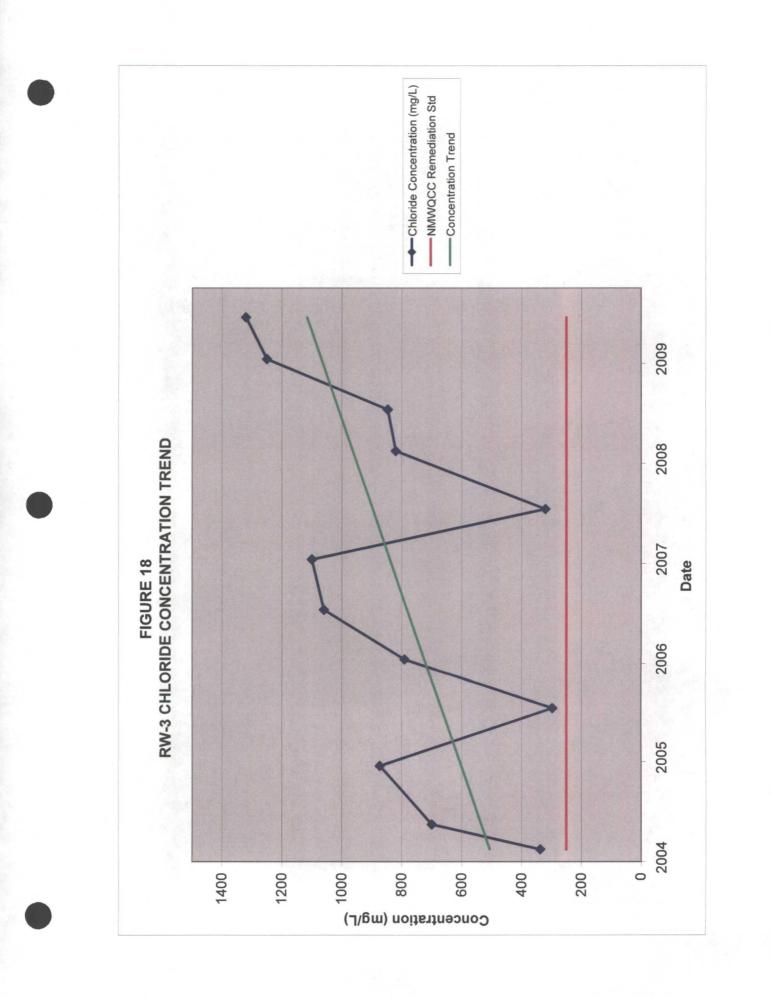


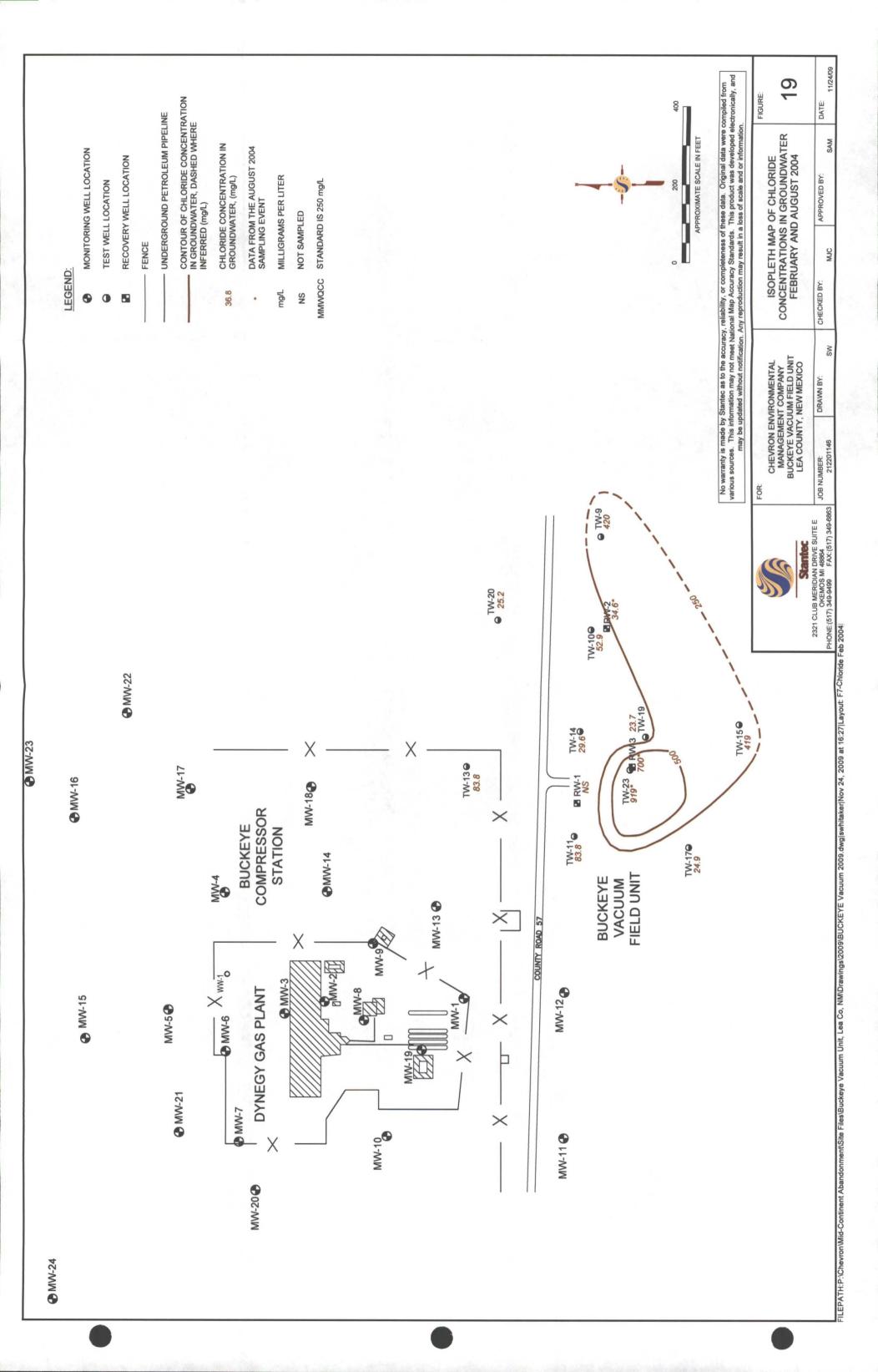












Monitoring	-	Lea County, NN TOC	Depth	Water
Monitoring Well	Date	Elevation	To Water	Elevation
ID	Gauged		(ft.)	(ft.)
U	05/15/03	(ft.) 3988.69	129.01	3859.68
	11/18/03	3988.69	129.01	3859.72
	02/11/04	3988.69	128.62	3860.07
	05/27/04	3988.69		
	08/06/04	3988.69	128.65 128.64	3860.04 3860.05
	03/03/05	3988.69	127.79	3860.90
	05/09/05	3988.69	<u>~ 128.67</u>	3860.02
	11/01/05	3988.69	128.62	3860.07
	01/12/06	3988.69	129.05	3859.64
	04/03/06	3988.69	129.55	3859.14
	09/06/06	3988.69	129.20	3859.49
TW-9	10/03/06	3988.69	129.15	3859.54
	01/31/07	3988.69	126.39	3862.30
	04/23/07	3988.69	129.10	3859.59
	08/06/07	3988.69	128.98	3859.71
· ·	10/02/07	3988.69	128.81	3859.88
	02/20/08	3988.69	128.92	3859.77
	05/21/08	3988.69	128.81	3859.88
	08/14/08	3988.69	129.58	3859.11
	10/09/08	3988.69	128.99	3859.70
	01/19/09	3988.69	130.05	3858.64
	04/09/09	3988.69	130.26	3858.43
	07/06/09	3988.69	130.36	3858.33
	09/28/09	3988.69	131.00	3857.69
	÷.			
	05/15/03	3987.87	127.99	3859.88
	11/19/03	3987.87	128.11	3859.76
	02/11/04	3987.87	127.69	3860.18
	05/28/04	3987.87	127.66	3860.21
	08/06/04	3987.87	127.69	3860.18
	03/03/05	3987.87	126.80	3861.07
	05/09/05	3987.87	126.68	3861.19
	11/01/05	3987.87	127.54	3860.33
TW-10	04/03/06	3987.87	128.47	3859.40
	10/03/06	3987.87	128.17	3859.70
	04/23/07	3987.87	128.14	3859.73
	10/02/07	3987.87	127.86	3860.01
	05/21/08	3987.87	127.89	3859.98
	10/09/08	3987.87	128.09	3859.78
	04/09/09	3987.87	128.09	3858.85
	09/28/09	3987.87	129.02	3858.11
· · · · ·	09120109	3801.01	129.70	0000.11
	05/15/02	2000 44	100.07	2060 14
	05/15/03	3989.11	128.97	3860.14
	11/19/03	3989.11	129.14	3859.97
	02/11/04	3989.11	128.67	3860.44
	05/28/04	3989.11	128.39	3860.72 3860.69
	08/05/04	3989.11	128.42	3861.55
	03/03/05	3989.11	127.56	
	05/09/05	3989.11	127.41	3861.70
TW-11	11/01/05	3989.11	128.11	3861.00
	04/03/06	3989.11	128.97	3860.14
	10/03/06	3989.11	128.98	3860.13
	04/23/07	3989.11	128.94	3860.17
	10/02/07	3989.11	128.66	3860.45
	05/22/08	3989.11	128.69	3860.42
	10/09/08	3989.11	128.91	3860.20
	04/09/09	3989.11	129.48	3859.63
	09/28/09	3989.11	130.01	3859.10

		Lea County, NM		
Monitoring	Date	тос	Depth	Water
Well	Gauged	Elevation	To Water	Elevation
ID	Gaugeo	(ft.)	(ft.)	(ft.)
	05/15/03	3988.73	128.85	3859.88
	11/18/03	3988.73	128.89	3859.84
	02/11/04	3988.73	128.67	3860.06
	05/27/04	3988.73	128.67	3860.06
	08/06/04	3988.73	128.66	3860.07
	03/03/05	3988.73	127.74	3860.99
	05/09/05	3988.73	127.68	3861.05
TW-13	11/01/05	3988.73	128.43	3860.30
	04/03/06	3988.73	· 129.31	3859.42
	10/03/06	3988.73	129.13	3859.60
	04/23/07	3988.73	129.00	3859.73
	10/02/07	3988.73	128.76	3859.97
	05/21/08	3988.73	128.86	3859.87
	10/09/08	3988.73	128.96	3859.77
	04/09/09	3988.73	129.70	3859.03
	09/28/09	3988.73	130.32	3858.41
			100	
	05/15/03	3986.77	126.78	3859.99
	11/19/03	3986.77	127.28	3859.49
	02/11/04	3986.77	127.32	3859.45
	05/28/04	3986.77	126.44	3860.33
	08/05/04	3986.77	126.48	3860.29
	03/03/05	3986.77	125.55	3861.22
	05/09/05	3986.77	125.43	3861.34
TW-14	11/01/05	3986.77	126.24	3860.53
	04/03/06	3986.77	127.09	3859.68
	10/03/06	3986.77	127.05	3859.72
	04/23/07	3986.77	127.04	3859.73
	10/02/07	3986.77	126.67	3860.10
	05/22/08	3986.77	126.66	3860.11
	10/09/08	3986.77	126.98 ·	3859.79
	04/09/09	<u>3986.77</u> 3986.77	127.56 128.22	3859.21
	09/28/09	3900.77	120.22	3858.55
	05/15/02	2094 14	123.50	2960.64
	05/15/03	3984.14 3984.14	123.50	3860.64 3860.38
	02/11/04	3984.14	123.76	3860.38
	02/11/04	3984.14	123.34	3860.80
	08/05/04	3984.14	123.00	3861.08
	03/03/05	3984.14	123.07	3861.96
	05/09/05	3984.14	122.18	3862.01
	11/01/05	3984.14	122.13	3861.46
	01/12/06	3984.14	122.00	3860.81
	04/03/06	3984.14	123.65	3860.49
	09/06/06	3984.14	123.61	3860.53
	10/03/06	3984.14	123.59	3860.55
TW-15	01/31/07 、	3984.14	123.33	3860.81
	04/23/07	3984.14	123.59	3860.55
	08/06/07	3984.14	123.58	3860.56
	10/02/07	3984.14	123.24	3860.90
	02/20/08	3984.14	123.40	3860.74
	05/21/08	3984.14	123.39	3860.75
	08/14/08	3984.14	123.77	3860.37
	10/09/08	3984.14	123.64	3860.50
	01/19/09	3984.14	124.03	3860.11
	04/09/09	3984.14	124.29	3859.85
	07/06/09	3984.14	124.28	3859.86
	09/28/09	3984.14	124.73	3859.41
	<u>.</u>	·		•

Monitoring		TOC	Depth	Water
Well	Date	Elevation	To Water	Elevation
	Gauged			
ID	05/45/00	(ft.)	(ft.)	(ft.)
	05/15/03	3986.01	122.87	3863.14
	11/19/03	3986.01	125.64	3860.37
	02/11/04	3986.01	125.15	3860.86
	05/28/04	3986.01	124.89	3861.12
	08/05/04	3986.01	124.88	3861.13
	03/03/05	3986.01	124.06	3861.95
	05/09/05	3986.01	123.97	3862.04
TW-17	11/01/05	3986.01	124.50	3861.51
	04/03/06	3986.01	125.40	3860.61
	10/03/06	3986.01	125.45	3860.56
	04/23/07	3986.01	125.43	3860.58
	10/02/07	3986.01	125.19	3860.82
	05/22/08	3986.01	125.20	3860.81
	10/09/08	3986.01	125.48	3860.53
	04/09/09	3986.01	126.00	3860.01
	09/28/09	3986.01	126.51	3859.50
	05/15/03	3985.70	121.80	3863.90
	11/19/03	3985.70	126.25	3859.45
	02/11/04	3985.70	125.31	3860.39
	05/27/04	3985.70	125.11	3860.59
	08/05/04	3985.70	125.14	3860.56
	03/03/05	3985.70	123.14	3861.44
	05/09/05	3985.70	124.02	3861.68
	11/01/05	3985.70	124.02	3860.91
TW-19	04/03/06	3985.70	125.66	3860.04
	10/02/06	3985.70	125.78	3859.92
	04/23/07	3985.70	126.25	3859.45
	10/02/07	3985.70	125.28	3860.42
	05/22/08			
ν.	10/09/08	3985.70 3985.70	125.34 125.80	3860.36 3859.90
	04/09/09	3985.70 3985.70	126.24	3859.46
	09/28/09	3965.70	126.84	3858.86
	05/15/03	3988.40	129.07	3859.33
	11/18/03	3988.40	128.93	3859.47
	02/11/04	3988.40	128.69	3859.71
	05/27/04	3988.40	128.69	3859.71
	08/06/04	3988.40	128.67	3859.73
	03/03/05	3988.40	127.79	3860.61
	05/09/05	3988.40	127.69	3860.71
TM. 20	11/01/05	3988.40	128.74	3859.66
TW-20	04/03/06	3988.40	129.59	3858.81
	10/03/06	3988.40	129.20	3859.20
	04/23/07	3988.40	129.12	3859.28
i	10/02/07	3988.40	128.84	3859.56
	05/21/08	3988.40	128.84	3859.56
	10/09/08	3988.40	128.98	3859.42
	04/09/09	3988.40	130.15	3858.25

	1			Matan
Monitoring Well	Date	TOC Elevation	Depth To Water	Water Elevation
ID	Gauged	(ft.)	(ft.)	(ft.)
	05/15/03	3984.58	124.42	3860.16
	11/19/03	3984.58	125.95	3858.63
	02/11/04	3984.58	123.95	3860.42
	05/27/04	3984.58	123.94	3860.64
	08/05/04	3984.58	124.03	3860.55
	03/03/05	3984.58	124.03	3861.48
	05/09/05	3984.58	123.10	3861.60
	11/01/05	3984.58	122.98	3860.87
	01/12/06	3984.58	124.06	
	04/03/06		124.52	3860.52
		3984.58	124.52	3860.06
	09/06/06	3984.58	124.52	3860.06
TW-23	10/02/06	3984.58		3859.77
	01/31/07	3984.58	124.12	3860.46
	04/23/07	3984.58	126.02	3858.56
	08/06/07	3984.58	124.64 124.20	3859.94
	10/02/07	3984.58	124.20	3860.38
	02/20/08	3984.58	124.19	3860.39
	05/22/08	3984.58		3860.33
	08/14/08	<u>3984.58</u> 3984.58	124.76 124.85	3859.82 3859.73
		3984.58	124.65	
	01/19/09			3859.37
	04/09/09	3984.58	125.09	3859.49
÷	07/06/09	3984.58	125.1 4 125.67	3859.44
	09/28/09	3984.58	125.07	3858.91
	05/45/00	0007.04	NO	NG
	05/15/03	<u>3987.04</u> 3987.04	NG NG	NG
	02/11/04	3987.04	NG	NG
	05/28/04		126.82	3860.22
	08/06/04	3987.04 3987.04	126.81	3860.22
	03/03/05	3987.04	126.90	3860.14
	05/09/05	3987.04	125.84	3861.20
	11/01/05		NG	NG
RW-2		3987.04	127.61	3859.43
	04/03/06	3987.04	127.81	3859.43
	10/03/06	3987.04		
	04/23/07	3987.04	127.40	3859.64 3860.07
		3987.04	126.97 127.02	
	05/21/08	3987.04 3987.04	127.02	3860.02 3859.79
	04/09/09	3987.04	127.25	3858.79
	09/28/09	3987.04	128.93	3858.11
	09/20/09	5907.04	120.95	3630.11
-	05/15/03		NG	
	11/18/03		NG	
	02/11/04		NG	
	05/27/04	3984.18	123.50	3860.68
	08/06/04	3984.18	123.58	3860.60
	03/03/05	3984.18	122.67	3861.51
0147.0	05/09/05	3984.18	122.54	3861.64
RW-3	11/01/05	3984.18	126.72	3857.46
	04/03/06		NG	• · · · ·
	10/03/06		NG	
	05/22/08		NG	<u> </u>
	10/09/08		NG	
	04/09/08		NG	
	09/28/09		NG	

NOTES:

NG - Not Gauged

	nediation Standards mg/L)	250	1,000	
Monitoring Well ID	Sample Date	Chloride (mg/L)	Total Dissolved Solids (mg/L)	
	05/15/03	120	NA	
	11/18/03	442	892	
-	02/11/04	420	972	
	05/27/04	88.2	461	
	08/06/04	49.0	385	
	03/03/05	44.5	239	
	05/09/05	53.7	378	
	10/27/05	89.9	431	
	01/12/06	49.6	325	
	04/05/06	46.7	321	
774/0	10/02/06	54.5	319	
TW-9	01/31/07	73.0	309	
	04/24/07	58.8	324	
	08/06/07	65.2	320	
-	10/03/07	54.6	322	
n	02/20/08	65.5	342	
-	05/21/08	72.5	331	
-	08/14/08	78.0	351	
-	10/09/08	71.5	371	
-	01/19/09	82.6	388	
,	04/13/09	76.7	376	
·	07/06/09 10/01/09	75.4	417 356	
	10/01/09	75.4	350	
	05/15/03	44.3	NA	
in	11/19/03	59.1	369	
	02/11/04	52.9	372	
	05/28/04	39.9	344	
	08/06/04	45.4	354	
	03/03/05	33.0	226	
	10/27/05	71.0	372	
TW-10	04/05/06	87.4	406	
	10/03/06	66.6	375	
·	04/24/07	81.0	389	
_	10/03/07	85.6	385	
	05/21/08	88.1	408	
	10/09/08	91.1	456	
	04/13/09	148	532	
	10/01/09	158	622	
r	05/15/03	35.4	NA	
ŀ	11/19/03	25.3	307	
ŀ	02/11/04	83.8	610	
ľ	05/28/04	27.0	274	
	08/05/04	30.1	269	
· • •	03/03/05	28.4	174	
	10/27/05	31.8	260	
	04/05/06	34.8	269	
TW-11	10/03/06	35.1	265	
ľ	04/24/07	42.3	285	
	10/04/07	47.0	388	
ſ	05/22/08	39.3	256	
	05/22/08 (Dup-1)	39.1	253	
	10/13/08	33.0	269	
ľ	10/13/08 (Dup-1)	39.3	284	
	04/14/09	49.3	270	
L	10/01/09	44.3	289	

	mediation Standards (mg/L)	250	1,000	
Monitoring Well ID	Sample Date	Chloride (mg/L)	Total Dissolved Solids (mg/L)	
	05/15/03	39.0	NA	
	11/18/03	64.3	560	
	02/11/04	83.8	610	
	05/27/04	84.5	625	
	08/06/04	74.8	596	
	03/03/05	90.0	502	
	10/26/05	75.1	485	
TW-13	04/06/06	60.3	429	
	10/03/06	93.5	546	
	04/25/07	140	921	
	10/04/07	45.2	892	
	05/21/08	47.1	614	
	10/13/08	81.7	798	
	04/14/09	129	1,000	
	10/01/09	48.5	709	
	05/15/03	65.0	NA NA	
	11/19/03	25.4	368	
	02/11/04	29.6	339	
	05/28/04	30.3	346	
	08/05/04	32.7	347	
÷	03/03/05	87.9	340	
	10/27/05	73.9	419	
	04/05/06	71.1	421	
TW-14	10/03/06	69.6	424	
	04/24/07	94.6	444	
	10/04/07	70.7	425	
	05/22/08	85.2	421	
	10/13/08	98.1	463	
	04/14/09	192	600	
	10/01/09	154	727	
	10/1/2009 (Dup-#100)	163	714	
	05/45/00	00.0	NA	
	05/15/03	88.6	NA	
	11/19/03	561	1,132 908	
	02/11/04 05/27/04	419		
	08/05/04	<u>93.4</u> 102	439	
	03/03/05	102	545 577	
	05/09/05	184	711	
	10/27/05 01/12/06	<u>155</u> 144	569 486	
	01/12/06	144	557	
	10/02/06	125	503	
	01/31/07	159	480	
TW-15	04/25/07	197	594	
	08/06/07	154	502	
	10/04/07	136	636	
	02/20/08	139	502	
	05/21/08	139	483	
	08/14/08	119	483	
	10/13/08	123	498 547	
	01/19/09			
		108	477	
	04/14/09	87.1	446	
	4/14/2009 (Dup-1)	95.2	450	
	07/06/09	66.5 59.6	432 389	

NMWQCC Remediation Standards (mg/L)		250	1,000	
Monitoring Well ID	Sample Date	Chloride (mg/L)	Total Dissolved Solids (mg/L)	
	05/15/03	31.9	NA	
	11/19/03	26.7	295	
	02/11/04	24.9	294	
	05/28/04	26.7	302	
_	08/05/04	29.4	306	
_	03/03/05	178	565	
	10/26/05	59.9	362	
TW-17	04/05/06	36.1	294	
	10/03/06	29.8	296	
	04/24/07	32.9	311	
Ļ	10/04/07	30.8	310	
L	05/22/08	31.2	281	
_	10/13/08	28.0	303	
_	04/14/09	36.8	304	
	10/01/09	30.0	314	
	05/15/03	35.4	NA .	
F	11/19/03	28.3	325	
	02/11/04	23.7	387	
-	05/27/04	33.6	287	
	08/05/04	42.8	344	
	03/03/05	54.2	224	
L L	10/27/05	39.0	293	
TW-19	04/06/06	40.5	308	
	10/02/06	33.2	290	
	04/24/07	37.3	287	
	10/03/07	33.7	293	
Γ	05/22/08	33.5	275	
	10/13/08	28.8	277	
	04/13/09	27.8	278	
	10/01/09	29.5	296	
	05/15/03	35.4	NA	
-	11/18/03	26.5	328	
F	02/11/04	25.2	353	
. F	05/27/04	27.1	316	
F	08/06/04	31.8	338	
·	03/03/05	25.3	232	
-	10/26/05	53.7	351	
TW-20	04/06/06	34.3	329	
F	10/03/06	39.4	310	
ſ	04/24/07	38.2	324	
F	10/03/07	36.8	340	
	05/21/08	41.7	315	
Ē	10/09/08	38.1	338	
	04/13/09	43.3	330	
	10/01/09	40.5	345	

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Monitoring Well ID			1,000
	Sample Date	Chloride (mg/L)	Total Dissolved Solids (mg/L)
	05/15/03	1440	NA
	11/19/03	300	964
	02/11/04	117	603
	05/27/04	617	1,710
	08/05/04	919	2,000
	03/03/05	656	1,680
	05/09/05	835	2,680
	10/27/05	284	1,460
	01/12/06	272	1,090
	04/06/06	35.2	1,070
TW-23	10/02/06	253	1,070
	01/31/07	144	626
	. 04/25/07	346	1,260
	08/06/07	260 228	1,030
	10/03/07 02/20/08	196	1,110 944
	05/22/08	317	1,300
	01/19/09	177	882
	04/14/09	53.7	456
	07/06/09	48.2	445
	10/01/09	42.3	462
	10.01100	12.0	
	05/28/04	30.4	306
	08/06/04	34.6	354
	03/03/05	32.4	244
	10/27/05	264	600
	04/07/06	244	767
RW-2	10/03/06	49.8	325
RW-2	04/25/07	64.3	331
	10/03/07	58.5	346
,	05/21/08	63.9	350
	10/09/08	77.0	371
	04/13/09	82.4	382
	10/01/09	240.0	691
	05/27/04	338	854
	08/06/04	700	1,620
	03/03/05	873	1,710
	10/27/05	298	844
	04/07/06	791	1,700
RW-3	10/02/06	1,060	1,930
	04/24/07	1,100	2,090
Ĺ	10/03/07	321	902
	05/22/08	820	1,390
	10/14/08	847	1,630
I	04/13/09	1,250	2,740
	10/01/09	1,320	2,850

Stantec

APPENDIX A GROUNDWATER MONITORING DATA SHEETS

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FIRST QUARTER 2009

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• .	<i>.</i> .				x	;	
		S I	ECOR				
	GROUNDWA			ELD DATA S	<u>HEET</u>		
SECOR PN: 89CH.	49529.08.1000		DAT	E: 1-19-09	WELL NO	TW-9	
FACILITY NAME:Bug	<u>ckeye Vacuum Field U</u>	Init	. i	TEM	PERATURE: _	58	_°F
FIELD PERSONNEL:	SB/DE	· .	:	WEATHER:	lian	Itwood	
FIELD MEASUREMENT	<u>[S:</u>		, ,				
A. Static Water Level (SW	L) below top of casing	g/piezometer:	:			130.08	FT. or IN
B. Thickness of Free Produ	act, if present:	Inches			· . ·	^ ^	FT. or IN
C. Total Depth of well (TE			·		· · ·		FT. or IN
D. Height of Water Colum	•••					73.92	FT: or IN
	3 Well Vols.	<u>5 Well Vo</u>	<u>ls.</u>				
2" Diameter = (4" Diameter = 2	0.5 gals/ft 2.0 gals/ft	0.82 gals/1 3.25 gals/1		x feet of water x feet of water		115marl	_PV (Gal _PV (Gal
6" Diameter =		7.35 gals/1		x feet of water		<u>-147.</u> DT	PV (Gal
PURGING METHOD:	Bailer Grundfos Pur	np) Bladder P	, מחונ	DURATION	50		
		/					
OBSERVATIONS: Vv (Cum. PV (Gal) Time	-51 Stor 4: 112 TDS	<u>8</u> DO	ORP	рH	Temp.	Conduct.	SWL
)145	<u>100 </u>	<u>.</u>	<u> </u>	<u>p+x</u>	<u>101119.</u>	<u>Conduct.</u>	1 27 ,
1155			·				127
1205					<u> </u>		125
						<u> </u>	
·····	· · ·		<u></u>	· · · · · · · · · · · · · · · · · · ·	<u> </u>		
·		· · · · ·					
· <u></u>			· ·	<u></u>	··		<u> </u>
TOTAL VOLUME OF WA				·.			
PURGE WATER STORED					. •	,	
SAMPLES COLLECTED							
Sample Number(s)	<u>.</u> Depuir to water at	-		f Container(s)	Preservative	······	
Sample Number(s)	1218		1-5002	A	No.1-	i	
	0	· · ·		0	<u> </u>		
	·		<u> </u>		·		•
COMMENTS:	_				· ·		
3244-	- 3 spin		<u> </u>				
		· · ·					<u> </u>
Casing Capacities: 2-inch hole0.16 gal/lin ft.		·		Recharge Calcu	ulation at Time	e of Sample C	ollection
4-inch hole0.65 gal/lin ft.	·				-77 10	Total Dept	
6.5-inch hole1.70 gal/lin ft. 8-inch hole2.60 gal/lin ft.			Origin	al Water Column Collect	: <u>73.92</u> x sample when D		
10-inch hole4,10 gal/lin ft.					Campio mion D	Less than or	
				1,	Þ		
			Signat	ure:	the De	\swarrow	
		Рас	elofl				

SECOR PN: 89CH.49	9529.08.1000		DA	TE: 1-19-08	WELL N	10. <u>TW-</u>	15
FACILITY NAME: <u>Buck</u>	eve Vacuum Fie		·		PERATURE		°F
	SB/DE	·.		WEATHER:	Clean	Cumpte	LA Breeze
FIELD MEASUREMENTS	5:				······································	9	
A. Static Water Level (SWL	— · . ·	sing/niezome	tor:	· · · ·		1240	<u>3</u> FT. or IN.
 B. Thickness of Free Produc 				· · · ·	· · ·		FT. or IN.
C. Total Depth of well (TD)				i.	•	204	<u>/</u> FT. or IN.
D. Height of Water Column	-	÷-	•		۰.		<u>7</u> FT. or IN.
E. Useful approximate Pur			water column fo	r common casing	sizes:	<u> </u>	
<u>3</u>	Well Vols.	<u>5 We</u>	<u>ll Vols.</u>	. –	•	· · ·	
	5 gals/ft	0.82		x feet of water			PV (Gal)
	0 gals/ft 4 gals/ft	3.25 g 7.35 g		x feet of water x feet of water		= <u>1 </u>	PV (Gal)
o Diamotor 4.	f guilo/it		5413/10				i v (Oui)
PURGING METHOD:Ba	<u>iler (Grundfos</u>	Pump) Blade	ler Pump	DURATION:	_54	<u>·</u> ·	
DBSERVATIONS: PUB	EJE Sta BI - 1	1505					
Cum. PV (Gal)	TDS	<u>DO</u>	ORP	pH	Temp	<u>Condu</u>	<u>ct.</u> <u>SWL</u>
1515						. ·	124.7
1525							127.7
1525		·		<u></u>			12-7.7
				<u></u>		·····	
· · · · · · · ·		•					
·····	<u> </u>			<u></u>		·····	
, <u></u>		· <u> </u>	<u> </u>	·			
		<u> </u>					
OTAL VOLUME OF WAT	ER PURGED F	ROM WELL:		·			
URGE WATER STORED/I	VISPOSED OF V	WHERE/HOW	/:				<u></u> .
AMPLES COLLECTED:	Depth to Wate	er at time of sa	mple collection:				<u> </u>
ample Number(s)	Time		Size/Number	of Container(s)	Preservati	ve	
	Haat	,	1-501 14	<i>N</i>	nleit		
	1559		<i>,</i>			······································	
			<u> </u>	·····			
OMMENTS:			•	<u></u>		<u> </u>	••••
OMMENTS.							
······································	•						
·····	·				==	~ ~	
asing Capacities:	·····			<u>Recharge Calcu</u>	llation at Tir	ne of Sampl	e Collection:
asing Capacities: inch hole0.16 gal/lin ft. inch hole0.65 gal/lin ft.						Total D	epth of Well:
inch hole0.16 gal/lin ft. inch hole0.65 gal/lin ft. 5-inch hole1.70 gal/lin ft.			Origi	nal Water Column:	22.97	Total D $\mathbf{x} 0.80 = $	epth of Well: (1 40.02)
inch hole0.16 gal/lin ft. inch hole0.65 gal/lin ft.			Origi	nal Water Column:	22.97	Total D x $0.80 = $ Depth to Wa	epth of Well:

Page 1 of 1

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ACILITY NAME: Bickeye Vacuum Field Unit TEMPERATURE: ?f THELD PERSONNEL: SB/DE WEATHER: Clear (1) summer THELD MEASUREMENTS: 125,22 FT. or ID A. Static Water Level (SWL) below top of casing/piezometer: 125,22 FT. or ID 3. Thickness of Free Product, if present: Inches FT. or ID 2. Total Depth of well (TD) from top of casing/piezometer: 125,22 FT. or ID 3. Wall Vols. S. Well Vols. S. Well Vols. S. Well Vols. 2. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes: 3. Well Vols. S. Well Vols. 2. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes: 3. Well Vols. S. Well Vols. 2. Useful approximater = 4.4 gais/ft 3.25 gais/ft x feet of water = PV (Ga 4" Diameter = 4.4 gais/ft 7.35 gais/ft x feet of water = PV (Ga 'URGING METHOD: Bailer DO ORP pH Temp. Conduct. SWL 'URGING METHOD: Bailer DO ORP pH Temp. (22.5) 'Z2.9	GROUNDWATE	SECC ER SAMPLIN		SHEET	
SHELD PERSONNEL: SD/DE WEATHER: C/eac//summy PTELD MEASUREMENTS: 135,22 FT. or ID A. Static Water Level (SWL) below top of casing/piczometer: 135,22 FT. or ID 3. Thickness of Free Product, if present: Inches FT. or ID 2. Total Depth of well (TD) from top of casing/piczometer: 125,22 FT. or ID 3. Well Vols. S.Well Vols. SWell Vols. FT. or ID 2. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes: 3.Well Vols. S.Well Vols. 2.* Diameter = 0.8 gals/ft x feet of water = PV (Ga 4* Diameter = 2.0 gals/ft 3.25 gals/ft x feet of water = PV (Ga 0.5 gals/ft x feet of water = PV (Ga P	SECOR PN:		_ DATE: <u> </u>	9 WELL NO	TW-23
TELD MEASUREMENTS: J25.21 A Static Water Level (SWL) below top of casing/piezometer: J25.22 S. Thickness of Free Product, if present: Inches D. Height of Water Column in casing (h = TD - SWL): L0.74 D. Height of Water Column in casing (h = TD - SWL): L0.74 S. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes: 2 Well Vols. 2 "Diameter = 0.5 gals/ft 0.32 gals/ft x feet of water 2 "Diameter = 0.5 gals/ft 0.32 gals/ft x feet of water 2 "Diameter = 0.5 gals/ft 0.32 gals/ft x feet of water 2 "Diameter = 0.5 gals/ft 0.32 gals/ft x feet of water 2 "DIAMETER 2.0 gals/ft 7.35 gals/ft x feet of water PV (Gals/ft 2 "URGING METHOD: Bailer Grundfog Pump DURATION: ////25 2 ZO 7	FACILITY NAME: <u>Buckeye Vacuum Field Unit</u>	· · · ·	· · ·T	EMPERATURE:	۳ ۴
A. Static Water Level (SWL) below top of casing/piezometer: IAS.24 FT. or D 3. Thickness of Free Product, if present: Inches 2. Total Depth of well (TD) from top of casing/piezometer: ISL.25 FT. or D b. Height of Water Column in casing (h = TD - SWL): Lo 274 FT. or D 2. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes: SWell Vols. 2. Well Vols. SWell Vols. 2. Prior Diameter = 0.5 gals/ft 0.82 gals/ft x feet of water (ag - 7) 2. Useful approximate Purge Volumes (PV) Size gals/ft x feet of water (ag - 7) = 121.52 PV (Ga 2. WRING METHOD: Bailer Grundfos Pump DURATION: ///56 DBSERVATIONS: DO ORP pH Terms Conduct. SWI 2. (20.7)	FIELD PERSONNEL:	<u> </u>	WEATHE	R: Chear / SUN	VM
A. Static Water Level (SWL) below top of casing/piezometer: IAS.24 FT. or D 3. Thickness of Free Product, if present: Inches 2. Total Depth of well (TD) from top of casing/piezometer: ISL.25 FT. or D b. Height of Water Column in casing (h = TD - SWL): Lo 274 FT. or D 2. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes: SWell Vols. 2. Well Vols. SWell Vols. 2. Prior Diameter = 0.5 gals/ft 0.82 gals/ft x feet of water (ag - 7) 2. Useful approximate Purge Volumes (PV) Size gals/ft x feet of water (ag - 7) = 121.52 PV (Ga 2. WRING METHOD: Bailer Grundfos Pump DURATION: ///56 DBSERVATIONS: DO ORP pH Terms Conduct. SWI 2. (20.7)	FIELD MEASUREMENTS:				/ ··· ···
3. Thickness of Free Product, if present: Inches Inches If is of Mater Column is a sing (h = TD - SWL): Iso of a sing/piezometer: Iso of a sing/piezometer: Iso of a sing/piezometer: Iso of a sing proximate Purge Volumes (PV) per foot of water column for common casing sizes: Iso of water Iso of water column for common casing sizes: Iso of water Iso of water column for common casing sizes:		zometer:		17	25.21 FT. or IN
2. Total Depth of well (TD) from top of casing/piezometer: 3. Height of Water Column in casing (h = TD - SWL): 3. Useful approximate Purge Volumes (PV) per foot of water column for common casing sizes: 3. Well Vols. 2° Diameter = 0.5 gals/ft 0.82 gals/ft x feet of water = PV (Ga 4° Diameter = 2.0 gals/ft 7.35 gals/ft x feet of water = PV (Ga 6° Diameter = 2.0 gals/ft 7.35 gals/ft x feet of water = PV (Ga 6° Diameter = 4.4 gals/ft 7.35 gals/ft x feet of water = PV (Ga 9000000000000000000000000000000000000	· · ·				FT. or IN
D: Height of Water Column in casing (h = TD - SWL): $\begin{bmatrix} b 0.74 \\ 0 \\ 0 \end{bmatrix}$ (Jost of water Purge Volumes (PV) per foot of water column for common casing sizes: $3 Well Yols$. 2^n Diameter = 0.5 gals/ft 0.82 gals/ft x feet of water $\begin{bmatrix} b 0.74 \\ 0 \end{bmatrix}$ PV (Gal 4" Diameter = 2.0 gals/ft 0.82 gals/ft x feet of water $\begin{bmatrix} b 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} b 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} b 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water $\begin{bmatrix} c 0.74 \\ 0 \end{bmatrix}$ PV (Gal 7.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for conduct 1.35 gals/ft x feet of water dimension for the matter dimension for conduct 1.35 gals/ft x feet of water dime	· · · · · · · · · · · · · · · · · · ·			18	56.00 FT. or IN
3 Well Vols. 5 Well Vols. 2" Diameter = 0.5 gals/ft 0.82 gals/ft x feet of water					
DURGING METHOD: Bailer Grundfos Pump Bladder Pump DURATION: /156 DBSERVATIONS: DO ORP pH Temp. Conduct. SWI. /157 /126 /269 /252 /252 /252 /2074 /2237 /252 /252 /252 /2237 /2237 /225 /225 /2174 /2237 /225 /225 /2237 /2237 /225 /225 /2174 /225 /225 /225 /2237 /2237 /225 /225 /2174 /225 /225 /225 /2237 /225 /225 /225 /2237 /225 /225 /225 /2174 /225 /225 /225 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180 /2180	<u>3 Well Vols.</u> 2" Diameter =0.5 gals/ft4" Diameter =2.0 gals/ft	<u>5 Well Vols.</u> 0.82 gals/ft 3.25 gals/ft	x feet of wax feet of wa	$\frac{1}{1} = \frac{1}{1}$	
District frame District frame Domestic frame Domestic frame DBSERVATIONS: District frame Domestic frame District frame U151	o Diameter = 4.4 gais/It	7.35 gais/π	X leet of wa		PV (Ga
Dum PV (Gal) Time TDS DO ORP pH Temp. Conduct. SWI (151 (151 (152<	URGING METHOD: <u>Bailer</u> (Grundfos Pump)	Bladder Pump	DURATIO	DN: 1/56	· · ·
Sum PV (Gal) Time TDS DO ORP pH Temp. Conduct. SWI (151 (151 (152) (152) (152) (152) (209 (151) (152) (152) (152) (217) (152) (152) (152) (223) (152) (155) (155) (223) (152) (155) (155) (223) (152) (155) (155) (223) (152) (155) (155) (223) (152) (155) (155) (223) (155) (155) (155) (223) (150) (150) (150) (216) (216) (150) (150) (216) (150) (150) (150) (216) (150) (160) (170) (217) (210) (150) (150) (217) (210) (150) (150) (217) (210) (150) (150) (217) (210) (150) (150) (217)	DESERVATIONS				
/157 /207 /25 /2/7 /25 /25 /223 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /237 /25 /25 /24 /25 /25 /25 /26 /25 /25 /26 /25 /25 /27 /25 /25 /27 /26 /26 /27 /27 /27 /27 /27 /28 /29 /29 /29 /29 /29 /29 /29 /29 /29 /29 /27 /29 /29 /27 /29 /27 </td <td></td> <td>ORP</td> <td>pH</td> <td>Temp.</td> <td>Conduct. SWI</td>		ORP	pH	Temp.	Conduct. SWI
/209 /223 /217 /25 /223 /25 /237 /25 /237 /25 /237 /25 /237 /25 /237 /25 /237 /25 /237 /25 /237 /25 /237 /25 /250 /25 /251 /25 /252 /25 /253 /25 /254 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25 /255 /25					
Image: Constraint of the constraint					
223 7251 1237 125 1237 125 1237 125 1237 125 1237 125 OTAL VOLUME OF WATER PURGED FROM WELL: 125 URGE WATER STORED/DISPOSED OF WHERE/HOW: 125 AMPLES COLLECTED: Depth to Water at time of sample collection: ample Number(s) Time Size/Number of Container(s) Preservative Size/Number of Container(s) Preservative Size/A (300,0) S00-4 100 aver collection: OMMENTS: Statistics: Recharge Calculation at Time of Sample Collection Sing Capacities: Total Depth of Well Original Water Column: 101 aver of well Original Water Column: 101 aver of well Original Water Column: 101 aver measure Collect sample when Depth to Water measure Collect sample when Depth to Water measure				·	
OTAL VOLUME OF WATER PURGED FROM WELL: URGE WATER STORED/DISPOSED OF WHERE/HOW: AMPLES COLLECTED: Depth to Water at time of sample collection: ample Number(s) Time Size/Number of Container(s) Preservative				- <u></u>	
URGE WATER STORED/DISPOSED OF WHERE/HOW: AMPLES COLLECTED: Depth to Water at time of sample collection: ample Number(s) Time Size/Number of Container(s) Preservative COMMENTS: Recharge Calculation at Time of Sample Collection Total Depth of Well OOMMENTS: Recharge Calculation at Time of Sample Collection Total Depth of Well Original Water Column: Log, 79, x 0.80 =(177,37) Collect sample when Depth to Water measure	1237				125
URGE WATER STORED/DISPOSED OF WHERE/HOW: AMPLES COLLECTED: Depth to Water at time of sample collection: ample Number(s) Time Size/Number of Container(s) Preservative COMMENTS: Recharge Calculation at Time of Sample Collection Total Depth of Well OOMMENTS: Recharge Calculation at Time of Sample Collection Total Depth of Well Original Water Column: Log, 79, x 0.80 =(177,37) Collect sample when Depth to Water measure		<u> </u>			
URGE WATER STORED/DISPOSED OF WHERE/HOW: AMPLES COLLECTED: Depth to Water at time of sample collection: ample Number(s) Time Size/Number of Container(s) Preservative COMMENTS: Recharge Calculation at Time of Sample Collection Total Depth of Well OOMMENTS: Recharge Calculation at Time of Sample Collection Total Depth of Well Original Water Column: Log, 79, x 0.80 =(177,37) Collect sample when Depth to Water measure		<u> </u>	· ·		·
URGE WATER STORED/DISPOSED OF WHERE/HOW: AMPLES COLLECTED: Depth to Water at time of sample collection: ample Number(s) Time Size/Number of Container(s) Preservative COMMENTS: Recharge Calculation at Time of Sample Collection Total Depth of Well OOMMENTS: Recharge Calculation at Time of Sample Collection Total Depth of Well Original Water Column: Log, 79, x 0.80 =(177,37) Collect sample when Depth to Water measure		· ·		·	·
AMPLES COLLECTED: Depth to Water at time of sample collection: ample Number(s) Time Size/Number of Container(s) Preservative TDS_CL (300.0)	OTAL VOLUME OF WATER PURGED FROM W	ELL:			
ample Number(s) Time Size/Number of Container(s) Preservative $TDS_{1}CL(3\sigma\sigma_{1}\sigma)$ $Lowc$ $Lowc$ $TDS_{1}CL(3\sigma\sigma_{1}\sigma)$ $Lowc$ $Lowc$ $TOMMENTS:$ $Common Common $	URGE WATER STORED/DISPOSED OF WHERE	/HOW:			
ample Number(s) Time Size/Number of Container(s) Preservative $TDS_{1}CL(3\sigma\sigma_{1}\sigma)$ $Lowc$ $Lowc$ $TDS_{1}CL(3\sigma\sigma_{1}\sigma)$ $Lowc$ $Lowc$ $TOMMENTS:$ $Common Common $	AMPLES COLLECTED: Depth to Water at time	of sample collect	tion:		
TDS, Cl. $(300,0)$ Source Source (1) Newc COMMENTS: Source (1) Source (1) Newc Source (1) Newc Source (1) Newc COMMENTS: Source Newc Source (1) (1) Source				Droportzative	
Recharge Calculation at Time of Sample Collection asing Capacities: Recharge Calculation at Time of Sample Collection inch hole0.16 gal/lin ft. Total Depth of Well 5-inch hole1.70 gal/lin ft. Original Water Column: $Lro, 79 \ge 0.80 = -(137.37)$ inch hole2.60 gal/lin ft. Collect sample when Depth to Water measure					
Asing Capacities: Inch hole0.16 gal/lin ft. 5-inch hole					
asing Capacities: inch hole0.16 gal/lin ft. 5-inch hole1.70 gal/lin ft. inch hole			<u></u>	• •••••• •••	
asing Capacities: inch hole0.16 gal/lin ft. 5-inch hole1.70 gal/lin ft. inch hole	OMMENTS:				· · · · · · · · · · · · · · · · · · ·
inch hole0.16 gal/lin ft.Total Depth of Wellinch hole0.65 gal/lin ft.Total Depth of Well5-inch hole1.70 gal/lin ft.Original Water Column: $L_{12}, 7, 9$ x $0.80 = -(1, 37, 37)$ inch hole2.60 gal/lin ft.Collect sample when Depth to Water measure	······································				
inch hole0.16 gal/lin ft.Total Depth of Wellinch hole0.65 gal/lin ft.Total Depth of Well5-inch hole1.70 gal/lin ft.Original Water Column: $L_{12}, 7, 9$ x $0.80 = -(1, 37, 37)$ inch hole2.60 gal/lin ft.Collect sample when Depth to Water measure					
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inch hole0.65 gal/lin ft.Total Depth of Well5-inch hole1.70 gal/lin ft.Original Water Column: $L_{12}, 7, 9$ x $0.80 = -(1, 37, 37)$ inch hole2.60 gal/lin ft.Collect sample when Depth to Water measure			<u>Recharge Ca</u>	aculation at Time of	Sample Collection
inch hole2.60 gal/lin ft. Collect sample when Depth to Water measure	inch hole0.65 gal/lin ft.				
• •	5-inch hole1.70 gal/lin ft.				
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	non norommerino gavini it.				20 Junio VI Coqual to
			Signature:		

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Stantec

SECOND QUARTER 2009

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ĸ	GROUND		Stantec MPLING FIE	LD DATA S	<u>HEET</u>		
) PROJECT NO.: <u>212201</u>	144		DATI	3: 4/13/09	WELL NO.	Tw-9	
FACILITY NAME: <u>Buc</u>							Ŷ
FIELD PERSONNEL;				WEATHER: _			
EQUIPMENT CALIBRAT	_	SI) QED			1		
Spec. Conductivity: Standar	<u>d: R</u>	eading:	;pH_Standard:	7 Reading	;Standard 4 R	Reading:	
Standard 10 Reading:	; ORP: Sta	andard:	Reading:	; DO: T°C:	mmHg:	DO Conc.	
End-of-Day Recheck: Spec.	Cond:;p	<u>H7:</u> ;pH	4: ;pH: 10	:ORP:		: ·	
FIELD MEASUREMENTS	<u>:</u>			· · ·	· · ·		
A. Static Water Level (SWL)) below top of cas	ing/piezometer	•	S	e esta en	130.2	<u>6</u> ft
B. Thickness of Free Product	t, if present:	Inches				<u>/30.2</u> 	FT
C. Total Depth of well (TD)	•					202	$\frac{4}{2}$ FT
D. Height of Water Column i	n casing ($h = TD$	- SWL):				71.7	<u>7</u> FT
PURGING METHOD:	undfos) Bladder	r Peristaltic	Fultz DUR	ATION: _ /3	12	<u> </u>	
OBSERVATIONS: Pu Time	rging Start Time	$\frac{ORP(\pm 10mV)}{ORP(\pm 10mV)}$	– <u>pH(±0,1)</u>	<u>Temp.(±3%)</u>	Conduct.(±3%)	<u>SWL</u>	
1322	D.FO	<u>/07.3</u>	<u>pra=0.11</u> 7.33	20, 85	SFO	127.35	
1327	D.76	104.2	7.34	21.04	582	127.34	
1332	0.75	102.2	7.33	21.08	583	127.33	
							<u></u>
		<u> </u>					
	<u> </u>	<u> </u>		<u> </u>			
						<u> </u>	
				······			
				<u></u>	. <u></u>		
PURGE WATER STORED/D	DISPOSED OF W	HERE/HOW:		<u>.</u>			
SAMPLES COLLECTED:		-		. , .		· .	
Sample Number(s)	Time		Size/Number of	Container(s)	Preservative		
TDS/CL	1332		500 ml	/			
					;;		
		·	•	······			
COMMENTS:				· · ·			
	265 Hz	······		<u> </u>		<u> </u>	
· · · · · · · · · · · · · · · · · · ·						· · · ·	
asing Capacities:				Recharge Calcu			
-inch hole0.16 gal/lin ft -inch hole0.65 gal/lin ft			Collect sample	when Depth to V	Vater measures <u>I</u>		ual to:
.5-inch hole1.70 gal/lin ft	Original V	Vater Column:	71.74 x 0.	80 = <u> (</u> Total]	Depth of Well)	144.60	
-inch hole2.60 gal/lin ft 0-inch hole4.10 gal/lin ft.				10			·
•••••			Signatu			N	

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~		GROUNI		Stantec MPLING FIEI	LD DATA SF	TET		
) PROJECI	`NO.:2122(. <u></u>	<u>, , , , , , , , , , , , , , , , , , , </u>	DATE:	17	WELL NO	TW-10	
	Y NAME:B		Field				60	°F
	RSONNEL:				WEATHER:	SUNNY		
	ENT CALIBRA		YSI QED	Serial No.:		1		
	ductivity: Standa		\smile	;pH Standard: 7		:Standard 4 R	eading:	
Standard 1	0 Reading:	; ORP:	Standard:	Reading:	; DO: T⁰C:	mmHg:	DO Conc.:	<u> </u>
End-of-D	ay Recheck: Spec	c.Cond:	;pH 7: ;pH 4	4: ;pH: 10	:ORP:			
FIELD M	EASUREMENT	<u>`S:</u>	·			· · · ·		
A. Static	Water Level (SW)	L) below top of a	asing/piezometer:	•			129.02	<u>FT.</u>
	ess of Free Produ	• •						_FT.
	Depth of well (TD	• •		. •			190.06	
D. Height	of Water Columr	h in casing (h = 1	D-SWL):	·			61.07	_ FT.
)	<u>Time</u> /355 /400 /405	Purging Start Ti <u>DO (±10%)</u> <u>/. 23</u> <u>/. /6</u> <u>//6</u> <u>//6</u> <u>//6</u>	<u>ORP(±10mV)</u> 79.0 71.7 71.0	<u>pH(±0.1)</u> <u>7.23</u> <u>7.23</u> <u>7.23</u>	<u>Temp.(±3%)</u> <u>21.45</u> <u>2.640</u> <u>2.646</u> 	Conduct.(±3%) Fo6 Po2	SWL /29.23 /29.23 	
		•	WHERE/HOW: _					
	COLLECTED	-		at 1 6a		D (1		
Sample Nu アロタ		Time- 40	5	Size/Number of C		Preservative		•
		······································			·			
·		·				· · · · · · · · · · · · · · · · · · ·	·····	
COMMEN	VTS:	265H						
		201612						
-inch hole 5-inch hole -inch hole	ties: 0.16 gal/lin ft 0.65 gal/lin ft 1.70 gal/lin ft 2.60 gal/lin ft 4.10 gal/lin ft.	Origina	l Water Column:		when Depth to W 0 = (Total I	ater measures L	f Sample Collec ess than or equ /4//·22	

GROUNDWATER	Stantec SAMPLING FIE	ELD DATA S	HEET		
PROJECT NO.: <u>212201144</u>	DATI	<u> =: 4/14/09</u>	WELL NC	. Tw-11	
FACILITY NAME: Buckeye Vacuum Field		TEM	PERATURE: _		°F
FIELD PERSONNEL:SB/JI		WEATHER:	Parthy 1	Cloury	
EQUIPMENT CALIBRATION: YSI QE	D Serial No.:	·	· (
Spec. Conductivity: Standard: Reading:	;pH Standard:	7 Reading	Standard 4	Reading:	<u> </u>
Standard 10 Reading: ; ORP: Standard:	Reading:	; DO: T°C:	mmHg:	DO Conc.	·
End-of-Day Recheck: Spec.Cond: ;pH 7: ;	p <u>H 4: ;pH: 10</u>	:ORP:			:
FIELD MEASUREMENTS:			· ·	: . ;	
A. Static Water Level (SWL) below top of casing/piezom	eter:		· · · · · ·	129.4	<u>/</u> FT.
B. Thickness of Free Product, if present: Inch				191.30	FT.
C. Total Depth of well (TD) from top of casing/piezometerD. Height of Water Column in casing (h = TD - SWL):	er:			6/. F2	
	· · ·		2/9		
PURGING METHOD: Grundfos Bladder Peristal		ATION:	<u> </u>		
OBSERVATIONS: Purging Start Time: 1259		· ·			
$\frac{1}{309} \frac{DO (\pm 10\%)}{0.14} \frac{ORP(\pm 10r)}{-14F-5}$		<u>Temp.(±3%)</u> スよ、41	<u>Conduct.(±3%</u> 4/4/2	6) <u>SWL</u> /27./2	• .
$\frac{1314}{1314} 0.67 -131.7$	1.45	22.42	439	127.12	
1319 0.63 -104.7	7.46	22.73	440	127.12	
1324 0.60 -96.0	7.47	22.64	437	127.12	.
1329 0.56 -89.3	7.47	22.52	435	127.12	
			···		
	<u>.</u>				
			······		
			<u></u>	<u> </u>	
PURGE WATER STORED/DISPOSED OF WHERE/HO	w:	· · · ·	<u></u>	·····	·
SAMPLES COLLECTED: Sample Number(s) Time TDS 1329	Size/Number of	Container(s)	Preservative	; ;	
· 	<u></u>	······································	- <u></u>	<u></u>	
<u>COMMENTS:</u> 265 Hz		······································			
asing Capacities: 				of Sample Coll Less than or eq	
6.5-inch hole1.70 gal/lin ft Original Water Colum	in: <u>61. F2</u> x 0.	80 = <u>- (</u> Total	Depth of Well)	141.84	
8-inch hole2.60 gal/lin ft 10-inch hole4.10 gal/lin ft.	~	h		4	
	Signatu	re:	<u> </u>		/2008
· · · · · · · · · · · · · · · · · · ·				•,	

PROJECT NO.	: 212201	144		DAT	Е: <u>4/14/09</u>	WELL'NO	TW-13	
		ckeye Vacuum Fie			7.7			°F
		SB/JI			WEATHER:		1	
EQUIPMENT			SI) QED		· .	· (
		d; R					Reading:	
		; ORP: Sta	-					:
•		Cond: ;p		4:;pH: 10			•••	
FIELD MEAS	UREMENTS	<u>.</u>			· · · ·			·
) below top of cas		:		•	129.7	_
		t, if present: from top of casing				. •.	177.6	<u></u> FT. え FT
-	• •	in casing $(h = TD)$				•	47.92	
		undfos Bladder	Doristaltia			44		
				<u>Fuitz</u> DOF	ATION			<u> </u>
OBSERVATIC	<u>DNS:</u> Pu _Time	rging Start Time	$\frac{ORP(\pm 10mV)}{ORP(\pm 10mV)}$	_ _pH(±0,1)	<u>Temp.(±3%)</u>	Conduct.(±3%	b) <u>SWL</u>	
	1354	<u>DO (±10%)</u> 0.60	JF-9	6.67	21.97	<u>このれれに、モシック</u> (SOL	(29. / 6	
	1359	0.36	46.P	6.6F	22.11	1502	129.87	<u> </u>
	1404	0-23	51.9	6.67	22.01	1491	129.07	
	- <u></u>					1490		
	1409	0.20	57.1	6.67	22.14	1970	129.07	
·								
· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			• <u></u> *		· <u> </u>	<u> </u>	
<u> </u>				·	<u> </u>	<u></u>		
<u></u>						. <u> </u>	<u></u>	
<u></u>	- <u></u>	<u> </u>	<u> </u>					
PURGE WATE	R STORED/	DISPOSED OF W	HERE/HOW:				· · ·	
SAMPLES CO			· · ·		· · · · · · · · · · · · · · · · · · ·			
		Time		Size/Number o	f Container(a)	Preservative		•
Sample Number	(S)	Time 1409	· .	Size/Number 0				
143.10	<u>L</u>			<u>500 MC</u>	/			
<u> </u>	- <u></u>	- <u></u>						
		<u> </u>	<u></u>			•	·····	
<u>COMMENTS:</u>	265	de la	. 1	Dansel	Porge Wa	Fer 17	Sala	1420
<u> </u>	×61	<u>N</u> <u>–</u>	/~	ringer	1		gan (°	120
			· · · ·			<u> </u>		
asing Capacities:							of Sample Coll	
				Collect sampl	e when Depth to	Water measures	Less than or ec	ual to:
4-inch hole0.65 6.5-inch hole1.7	-	Original W	Vater Column	417.92 .	.80 = <u>- (</u> Total	Depth of Welly	139.28	1
8-inch hole2.60				<u> </u>				
) gal/lin ft.	,						

	GROUNDWATER SA	Stantec MPLING FIELD D	DATA SHE	ЕТ	
PROJECT NO 212201	144		Γ		W-14
FACILITY NAME: <u>Buc</u>		22			
	SB/JI				
EQUIPMENT CALIBRATI	\frown	_		•	
	1: 1, 4/3 Reading:// 098				· .
	C : ORP: Standard 240				1
	· · · · ·				DO Colic
	Cond: ;pH 7: ;pH	4: .pH: 10	;ORP:		· • •
FIELD MEASUREMENTS:	-	•			·. ハフノ(-
B. Thickness of Free ProductC. Total Depth of well (TD) f	rom top of casing/piezometer:				<u>/27.56</u> F F <u></u> F
D. Height of Water Column in	$h \operatorname{casing}(h = TD - SWL):$			2.3	62.37 F
PURGING METHOD:	undfos Bladder Peristaltic	Fultz DURATION	1: <u>093</u>	0.	<u> </u>
	rging Start Time:_ <u>0930</u>				
<u>Time</u> 0940 0945	$\frac{DO (\pm 10\%)}{1.79} \qquad \frac{ORP(\pm 10mV)}{1.77.2}$	7.34 20	.57 1	1020 /2	<u>WL</u> 27.77 27:75
<u>0950</u>	<u>/. 56 169.4</u>	<u>7.35</u> <u>20.</u>	<u>79</u> <u>//</u>	<u>016 14</u> 	<u> </u>
· <u> </u>		、			· · · · · · · · · · · · · · · · · · ·
					<u>.</u>
·i	· · · · · · · · · · · · · · · · · · ·	<u> </u>	<u> </u>		
PURGE WATER STORED/D	ISPOSED OF WHERE/HOW		,		
SAMPLES COLLECTED:					
Sample Number(s) TDS / CL	Time 	Size/Number of Contai	iner(s) F	Preservative	
COMMENTS:	265 Hz		- <u></u>		
asing Capacities: Linch hole0.16 gal/lin ft 4-inch hole0.65 gal/lin ft 6.5-inch hole1.70 gal/lin ft 8-inch hole2.60 gal/lin ft 10-inch hole4.10 gal/lin ft.	Original Water Column	$\frac{\text{Recha}}{\text{Collect sample when }}$ $\frac{62.37}{\text{Signature:}} \times 0.80 = -$	Depth to Wate	er measures Less	ample Collection s than or equal to HO. O3 8/200

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	Dup #1
	Stantec
	SAMPLING FIELD DATA SHEET
PROJECT NO.: 212201144	DATE: 4/14/09 WELL NO. TW-15
FACILITY NAME:Buckeye Vacuum Field	TEMPERATURE:°F
FIELD PERSONNEL:SB/J1	WEATHER:
EQUIPMENT CALIBRATION: (YSI) QEI	D Serial No.:
Spec. Conductivity: Standard; Reading:	pH Standard: 7 Reading ;Standard 4 Reading:
Standard 10 Reading: ; ORP: Standard:	Reading: ; DO: T ^o C: mmHg: DO Conc.:
End-of-Day Recheck: Spec.Cond: ;pH 7: ;r	oH 4: ;pH: 10 :ORP:
FIELD MEASUREMENTS:	
A. Static Water Level (SWL) below top of casing/piezome	• • •
 B. Thickness of Free Product, if present: Inche C. Total Depth of well (TD) from top of casing/piezomete 	
 D. Height of Water Column in casing (h = TD - SWL): 	$\frac{202}{77.71}$ FT.
	10.21
PURGING METHOD: Grundfos Bladder Peristalt	ic Fultz DURATION: 7056
OBSERVATIONS: Purging Start Time: /636	· · · · · · · · · · · · · · · · ·
$\frac{\text{Time}}{1644} \frac{\text{DO}(\pm 10\%)}{7} \frac{\text{ORP}(\pm 10m)}{1644}$	
$\frac{1046}{1051} \frac{3.65}{3.51} \frac{115.2}{113.4}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
1056 3.3P /12.1	<u>7.12</u> 20.86 662 124.46
·· <u></u>	· · ·
	· · · · · · · · · · · · · · · · · · ·
PURGE WATER STORED/DISPOSED OF WHERE/HOV	W:
SAMPLES COLLECTED:	
Sample Number(s) Time	Size/Number of Container(s) Preservative
TDS /CL 1056	500 ml 1 -
	· · · · · · · · · · · · · · · · · · ·
<u>COMMENTS:</u>	
265 1/2	
	<u>tt </u>
asing Capacities:	Recharge Calculation at Time of Sample Collection:
	Collect sample when Depth to Water measures <u>Less than or equal to</u> :
6.5-inch hole	m: $77.7($ x 0.80 =(Total Depth of Well) 139.83
lo-inch hole4.10 gal/lin ft.	Simeture
	Signature:
	5,2000

		AMPLING FIE			T1 17	
PROJECT NO.:212201144		DATI	e: <u>4/14/09</u>	WELL NO.	TW-17	
FACILITY NAME:Buckey	e Vacuum Field	·	TEM	PERATURE:		
FIELD PERSONNEL: <u>SB</u>	/ <u>Л</u>		WEATHER:	Parthy C	wody	.
EQUIPMENT CALIBRATION	: YSI QED	Serial No.:			· · · · · ·	
Spec. Conductivity: Standard:	Reading:	;pH Standard:	7 Reading	:Standard 4 I	Reading:	
Standard 10 Reading:	; ORP: Standard:	Reading:	; DO: T℃:	mmHg:	DO Conc.	
End-of-Day Recheck: Spec.Cond	<u>i:;pH 7:;pI</u>	<u>H 4: ;pH: 10</u>	:ORP:	······································		
FIELD MEASUREMENTS:		<i>,</i>		,		
A. Static Water Level (SWL) bel			· .		126.0	
B. Thickness of Free Product, if p					181.30	<u> </u>
C. Total Depth of well (TD) fromD. Height of Water Column in ca	. 01	· · ·	· · · ·	· · · ·	55.30	
			Ĩ		22,25	
PURGING METHOD: Grundf	os Bladder Peristaltio	<u>Fultz</u> DUR	ATION://	09		
	g Start Time:/09					
	$\frac{ORP(\pm 10m)}{ORP(\pm 10m)}$	/) <u>pH(±0.1)</u>	<u>Temp.(±3%)</u>	Conduct.(±3%)	<u>swl</u>	
1119 6	1.32 100.5	7.31	20.82	454	126.25	
<u> </u>	36 99.3	7.32	20.8-7	456	126.25	
1129 D.	<u>53 98.3</u>	7.33	20.94	461	126,25	
	<u> </u>		<u> </u>			
· · · · · · · · · · · · · · · · · · ·	<u> </u>					
·	<u> </u>					_
		·		<u></u>		
,						
PURGE WATER STORED/DISP	OSED OF WHERE/HOW	······································	······································		······	
SAMPLES COLLECTED:				· .		
Sample Number(s)	Time	Size/Number of	Container(s)	Preservative	ı	
1 PS/cL	1129	500 ml			·	
· · · · · · · · · · · · · · · · · · ·		·				
		<u> </u>				
COMMENTS:	1					
265 H	L				······	
					·	
Tasing Capacities:			Recharge Calci	ulation at Time	of Sample Coll	ectic
-inch hole0.16 gal/lin ft.		Collect sample	when Depth to	Water measures]	Less than or eq	ual
4-inch hole0.65 gal/lin ft		11 20 0	A A A A A A A A A A	Donth of Wall	137.06	
-	Original Water Column		$X() = \dots (C)$			
6.5-inch hole1.70 gal/lin ft 8-inch hole2.60 gal/lin ft	Original Water Column	: <u>55-50</u> x 0.	80 =(Total)	Deptil of wen <u>)</u>		

	GROUNDWA		Stantec APLING FIEI	LD DATA SH	ŒET		-
) PROJECT NO.: 21220	<u> </u>			4/13/09		TW-19	
FACILITY NAME:B				'		61	°F
FIELD PERSONNEL:					-	<u></u>	
EQUIPMENT CALIBRA	\sim	`	Serial No.:			<u></u>	
Spec. Conductivity: Standa	\sim		;pH Standard: 7		:Standard 4 R	leading:	
Standard 10 Reading:				; DO: T°C:			·
End-of-Day Recheck: Spec			: ;pH: 10				
FIELD MEASUREMENT		<u></u>	<u> </u>				· .
A. Static Water Level (SW		/niezometer:				126.24	FT
B. Thickness of Free Produ		-		•			FT.
C. Total Depth of well (TD) from top of casing/pi	ezometer:	· · ·	•. •	• • • •	<u>187.75</u>	
D. Height of Water Column	n in casing (h = TD - S	WL):		, ·		61.51	FT.
PURGING METHOD:	Grundfos Bladder	Peristaltic	Fultz DURA	TION:/4	449		
OBSERVATIONS:	Purging Start Time:	1449		· .			
		<u>DRP(±10mV)</u>	- _ <u>pH(±0.1)</u>	<u>Temp.(±3%)</u>	Conduct.(±3%)	<u>SWL</u>	
1459	0.38	4.6	7.54	21.17	457	126.50	
1504	0-28 5	0.8	7.54	21.27	457	126.48	
1509	0.2F	4F.P.	7.58	21.26	487	126-48	
·	<u> </u>				<u></u>		
			<u> </u>	<u> </u>	·····		
·····	· · ·	<u> </u>	••			·	
	· ·		<u></u>	<u> </u>		. <u> </u>	
PURGE WATER STORED				<u> </u>			
	,	/IU./IIO W		. <u> </u>			· ·
SAMPLES COLLECTED			o. o. 1 . co		.		
Sample Number(s) $\nabla DS / cl$	Time /509		Size/Number of C	container(s)	Preservative		•
	_/		500_7~(<u>.</u> .
				1			·
COMMENTS:				,			
	265 Hz	<u> </u>				,	
· · · · · · · · · · · · · · · · · · ·	- <u> </u>			_ ··· · · · · · · · · · · · · · · · · ·			
asing Capacities:						of Sample Collect	
inch hole0.16 gal/lin ft 4-inch hole0.65 gal/lin ft			-	-		Less than or equ	<u>a) to</u> :
6.5-inch hole1.70 gal/lin ft 8-inch hole2.60 gal/lin ft	Original Wate	er Colúmn: _	<u>61.51</u> x 0.8	0 = <u>- (</u> Total E	Depth of Well)	150.57	
10-inch hole4.10 gal/lin ft.			Signature				
			orginature	·			2008

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6	<u>GROUNDV</u>	VATER SAM	MPLING FII	LD DATA S	HEET		
) PROJECT NO.: <u>2122</u>	01144		DAT	=: <u>4/13/09</u>	WELL NO.	TW-20	
FACILITY NAME:B		ld			PERATURE:		⁰F
FIELD PERSONNEL:				WEATHER:	SUNNY		
EQUIPMENT CALIBRA	-	SI) QED	Serial No.:	76F1362			
Spec. Conductivity: Stand) ;Standard 4 R	eading: 4.0/	/
Standard 10 Reading: /0.							
End-of-Day Recheck: Spe		H 7: ;pH 4					·····
FIELD MEASUREMENT	· · · ·				· · ·	. 7	
A. Static Water Level (SW		ing/piezometer				130.15	FT.
B. Thickness of Free Produ	- ,						FT.
C. Total Depth of well (TD) from top of casing	/piezometer:				202-	
D. Height of Water Column	n in casing ($h = TD$	- SWL):				71.85	FT.
PURGING METHOD:	Grundfos) Bladder	Peristaltic	Fultz DUR	ATION: 2	40		<u>.</u>
	Purging Start Time			-			
<u>DBSERVATIONS:</u> Time	DO (±10%)	$\frac{ORP(\pm 10mV)}{ORP(\pm 10mV)}$	<u>pH(±0.1)</u>	<u>Temp.(±3%)</u>	Conduct.(±3%)	<u>SWL</u>	
1250	0.70	118.3	7.27	21.16	508	130.30	
1255	0.52	117.3	7.27	21.31	510	130.31	· · · ·
1300	0.44	115.3	7.27	21.39	511	130.32	
		<u></u>		· · · · ·		<u></u>	· ·
	• <u>.</u>	· ·	<u></u>	<u> </u>			
		·	`		<u></u>		<u> </u>
	·		<u></u>	<u> </u>		· · ·	
	· · · · · · · · · · · · · · · · · · ·					··	
·							
PURGE WATER STORED	DISPOSED OF W	HERE/HOW:			·	, .	<u> </u>
AMPLES COLLECTED	:	1			۲		
Sample Number(s)	Time		Size/Number of		Preservative		
TDS/cl	/300		500 ml	<u> </u>		·	—— .
			••••••••••••••••••••••••••••••••••••••		. - 	(
COMMENTS:		<u> </u>					······································
	5 Hz						
······································	······································			······································			、
psing Capacities:				Recharge Calcu	lation at Time c	of Sample Coll	ection:
inch hole0.16 gal/lin ft			Collect sample		Water measures I		
-inch hole0.65 gal/lin ft .5-inch hole1.70 gal/lin ft	Original W	ater Column:	71.85 x 0.	80 = <u> (</u> Total)	Depth of Well)	144.52	•
-inch hole2.60 gal/lin ft 0-inch hole4.10 gal/lin ft.	2						
			Signati				

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	GROUNDWATER SA	Stantec MPLING FIEL	D DATA SI	IEET		
PROJECT NO.: <u>21220</u>			11	WELL NO	TW-23	•
FACILITY NAME:Bu			TEMÌ	PERATURE:		°F
FIELD PERSONNEL:			WEATHER:	cloups		
EQUIPMENT CALIBRAT	\sim	Serial No.:		<u> </u>	· · ·	
Spec. Conductivity: Standa		;pH Standard: 7	Reading	:Standard 4 Re	ading:	
Standard 10 Reading:	; ORP: Standard:	Reading:	; DO: T°C:	mmHg:	DO Conc.:	<u> </u>
End-of-Day Recheck: Spec	.Cond: ;pH 7: ;pH	<u>4: ;pH: 10</u>	:ORP:		•	
FIELD MEASUREMENT	<u>S:</u>				· · · ,	
B. Thickness of Free ProducC. Total Depth of well (TD)	.) below top of casing/piezometer et, if present: Inches from top of casing/piezometer:	r:	· · · · · · · · · · · · · · · · · · ·		125.09	_ FT. _ FT.
D. Height of Water Column	in casing (h = TD - SWL):	Fultz DURA			54.31	_ FT.,
	urging Start Time: $/005$ DO (±10%) ORP(±10mV) 0.41 $/3F \cdot 5$ 0.31 $/42 \cdot 5$ 0.45 $/44.0$	F.F0 F.64	<u>Temp.(±3%)</u> <u>20.50</u> <u>20.7F</u> <u>20.92</u>		<u>SWL</u> 25.24 25.24 25.24	
				·		·
	<u> </u>			 		
PURGE WATER STORED	DISPOSED OF WHERE/HOW:	· · · · · · · · · · · · · · · · · · ·	·	· · · · · · · · · · · · · · · · · · ·		
SAMPLES COLLECTED:					·	
Sample Number(s)	Time 	Size/Number of C 500 m	ontainer(s)	Preservative		
COMMENTS:	265 Hz					
Jasing Capacities: Jinch hole0.16 gal/lin ft 4-inch hole0.65 gal/lin ft 6.5-inch hole1.70 gal/lin ft 8-inch hole2.60 gal/lin ft 10-inch hole4.10 gal/lin ft.	Original Water Column:	Collect sample w	when Depth to V =(Total I)	lation at Time of Vater measures <u>La</u> Depth of Well) /	<u>ess than or equ</u> 3 <i>5, 95</i>	

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	GROUNDWATER S.	Stantec	σι η ηληγά εί	OTOTOT		
PROJECT NO.:21220			TE: 4/13/69		RW-2	
		DA1			60	01-
FACILITY NAME: <u>B</u>		<u> </u>	WEATHER:			F
FIELD PERSONNEL:	\frown			•	<u> </u>	······
EQUIPMENT CALIBRA				· · ·	<u> </u>	1
	ard: Reading:					
Standard 10 Reading:	; ORP: Standard:	Reading:	; DO: T°C:	<u>mmHg</u> :	DO Conc.:	
End-of-Day Recheck: Spec	c.Cond: ;pH 7: ;p]	H_4: ;pH: 1	0;ORP:		1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	
FIELD MEASUREMENT	<u>'S:</u>			• • • • •		
A. Static Water Level (SW)	L) below top of casing/piezomet	ter:		· · ·	128.2	<u>۲</u> FT.
	ct, if present: Inches				<u> </u>	FT.
_) from top of casing/piezometer				202 +	
D. Height of Water Column	In casing $(n = 1D - SWL)$:		•			F1.
PURGING METHOD:	brundfos Bladder Peristalti	<u>c Fultz</u> DUI	RATION:/4	[]2		
OBSERVATIONS: P	urging Start Time: 1412		· •			
Time	$\underline{DO(\pm 10\%)} \qquad \underline{ORP(\pm 10m)}$	<u>∨) pH(±0.1)</u>	<u>Temp.(±3%)</u>	Conduct.(±3%) <u>SWL</u>	
1422	1.40 80.3	7.31	20.27	606	128.24	
<u> </u>	<u>h07</u> <u>76.8</u>	2.3/	21.38	622	128.28	<u> </u>
1432	0.92 76.7	7.30	21.36	621	128.29	
1437	0.89 77.9	7.30	21.38	621	129.29	
·						
	·····	·	·	·	<u> </u>	
		<u></u>				,
· · · · · · · · · · · · · · · · · · ·						
PURGE WATER STORED	DISPOSED OF WHERE/HOW	/:		· · · · · · · · · · · · · · · · · · ·	· · · · ·	
SAMPLES COLLECTED:			•		· .	
Sample Number(s)	Time		f Container(s)	> Preservative	. '	•
TDS/CL		500 ml	/			
			· · ·	<u> </u>		··· ,
COMMENTS:		<u> </u>		<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>		
Comments.	265 Hz	κ.				
	· · · · · · · · · · · · · · · · · · ·					·
asing Capacities:			Recharge Calcu	lation at Time	of Sample Colle	ection
-inch hole0.16 gal/lin ft		Collect samp	le when Depth to V			
A-inch hole0.65 gal/lin ft 6.5-inch hole1.70 gal/lin ft	Original Water Column	1: 73.75 x ().80 = (Total]	Depth of Well)	14.3,00	
8-inch hole2.60 gal/lin ft 10-inch hole4.10 gal/lin ft.	· · · · · · · · · · · · · · · · · · ·	·		L+ <u>/</u>		
To mon noio		Signat	ure:			
			•		87	2008

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, · · ·	GROUNDWATER SA	Stantec	ID DATA SP	FFF		
PROJECT NO.: <u>21220114</u>			, ,		RW-3	
FACILITY NAME: <u>Bucke</u>			• •	PERATURE:		
FIELD PERSONNEL:S				_		
EQUIPMENT CALIBRATIO				. /	:.	
Spec. Conductivity: Standard;					ading:	
Standard 10 Reading:						
End-of-Day Recheck: Spec.Co						
FIELD MEASUREMENTS:				· . · ·		
A. Static Water Level (SWL) be	elow top of casing/piezometer	ei	• *.	· · · ·	· · · · · · · · ·	FT.
B. Thickness of Free Product, in				1		_ _ FT.
C. Total Depth of well (TD) fro		·			• • • <u>• • • • • • • • • •</u>	_ FT.
D. Height of Water Column in a	casing ($h = TD - SWL$):					_ FT.
PURGING METHOD:	dfos Bladder Peristaltic	<u>Fultz</u> DURA	TION:			
OBSERVATIONS: Purg	ing Start Time:					
v	<u>DO (±10%)</u> <u>ORP(±10mV)</u>		<u>Temp.(±3%)</u>	Conduct.(±3%)	SWL	
)	· · · · · · · · · · · · · · · · · · ·	<u></u>	<u></u>			
	· · · · · · · · · · · · · · · · · · ·				·	
<u> </u>	·		<u> </u>			
			·			
<u></u> <u>_</u>	<u> </u>	· · ·		<u> </u>	·	
	· · · · · · · · · · · · · · · · · · ·		<u> </u>			
<u></u>	·			` <u></u>		
· · · · · · · · · · · · · · · · · · ·		·			·	
PURGE WATER STORED/DIS	POSED OF WHERE/HOW:				· · · ·	
SAMPLES COLLECTED:					· .	
Sample Number(s)	Time 1455	Size/Number of C		Preservative		
105/cl	1457	500 ml			·	
			:			<u> </u>
COMMENTS:		1 -				
YUN PINC	6 Wed No	VeramiTers		<u></u>		
				· ·		
Casing Capacities: -inch hole0.16 gal/lin ft				ation at Time of ater measures Le		
i-inch hole0.65 gal/lin ft	Onininal Western Online	-	<u>^</u>		unan or equi	<u></u>
5.5-inch hole1.70 gal/lin ft 3-inch hole2.60 gal/lin ft	Original Water Column:	x 0.8	$v = \underline{-(1)} \text{ otal } \mathbf{I}$	peptn of well)	•	
10-inch hole4.10 gal/lin ft.		Signature	e:	, ?		
					8/2	2008

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	GROUNDWATER S	Stantec	ELD DATA S	HEET		
PROJECT NO · 2122	01144				TW-9	·
FACILITY NAME:E						ع ہ
•	SB/JI					-
	\bigcirc	2		1		
EQUIPMENT CALIBRA			06F13621			
	lard: 1.413 Reading: 1,41					
Standard 10 Reading: 10.	00 ; ORP: Standard: 24	0 Reading: 240	² ; DO: T°C: ⅔	: 09 _{mmHg:} 7. (2 DO Conc.	<u> </u>
End-of-Day Recheck: Spe	c.Cond: ;pH 7: ;r	0H 4: ;pH: 1);ORP:		•	
FIELD MEASUREMEN	<u>ГS:</u>					•
•	(L) below top of casing/piezome uct, if present: Inche				130.36	FT. FT.
· - · ·) from top of casing/piezomete	r:				
D. Height of Water Colum	n in casing ($h = TD - SWL$):		· • .	, ·	71.6.	<u>4</u> FT.
PURGING METHOD:	Grundfos Bladder Peristalt	ic Fultz DUF	ATION:		P	, <u></u> ,,
OBSERVATIONS:	Purging Start Time://22					
<u>Time</u>	$\frac{DO(\pm 10\%)}{DO(\pm 10\%)} \qquad ORP(\pm 10m)$		$\frac{\text{Temp.}(\pm 3\%)}{27}$	<u>Conduct.(±3%)</u> 604		
<u> </u>	<u> .74</u> <u>F .3</u> <u> .35</u> <u>7F.2</u>	7.21	<u>23.10</u> 22.59	603	<u>127.46</u> 127.47	
	1.20 75.3	7.22	22.73	607	127.47	
1148	1.00 71.8	7.22	22.80	612	127.47	
1153	0.92 70.0	7.23	23.06	613	127.47	
	<u> </u>		۰. ۱		· .	<u> </u>
<u> </u>	·		. <u></u>			
						<u></u>
<u> </u>						
PURGE WATER STORED	DISPOSED OF WHERE/HOV	W:		· ,	1	
SAMPLES COLLECTED	<u>:</u>	·			• •	
Sample Number(s)	Time	Size/Number o	f Container(s)	Preservative		
TDS/ch	1153	500 ml			<u>.</u>	
·	, , , , , , , , , , , , , , , , , , , 	·		~	<u></u>	<u> </u>
COMMENTS:		 		<u></u>		
	S. Hz					
hsing Capacities; p-inch hole0.16 gal/lin ft		Collect sampl	Recharge Calcu e when Depth to V			
4-inch hole0.65 gal/lin ft 6.5-inch hole1.70 gal/lin ft	Original Water Colum	_	_			
6.5-inch hole	Original water Colum	n: <u>77007</u> x 0 Signat	14	Depui Or weit)	171.00	
		~-5.144			8,	/2008

_		Stan					
) <u>GROUNDWATER</u> PROJECT NO.: <u>212201144</u>					Tw-15	
	FACILITY NAME:Buckeye Vacuum Field			TEMP	ERATURE:	77	
	FIELD PERSONNEL:SB/JI			WEATHER.	cloudy		
	\frown				/		
	Spec. Conductivity: Standard; Reading:				;Standard 4 R	eading.	
	Standard 10 Reading: ; ORP: Standard;						
•		;pH 4:	-		<u>.</u>		
	FIELD MEASUREMENTS:	<u>,p11</u> -1.		,oiu		~~	
	A. Static Water Level (SWL) below top of casing/piezo	meter:			· · · · ·	124.20	ד ~
	B. Thickness of Free Product, if present: In						
	C. Total Depth of well (TD) from top of casing/piezome		•			202+	F [
	D. Height of Water Column in casing ($h = TD - SWL$):			•		77.72	F'
	<u>1338</u> <u>3.60</u> <u>58.9</u> <u>1343</u> <u>3.66</u> <u>58.6</u> <u></u>			<u>22.07</u> <u>22.03</u>	<u>660</u> <u>659</u>	<u>124.55</u> <u>124.55</u> 	
		011/		ز 			
	PURGE WATER STORED/DISPOSED OF WHERE/H SAMPLES COLLECTED:						
	Sample Number(s) Time <u>TDS</u> <u>Cl</u> <u>1343</u>	Size/N	-	ontainer(s)	Preservative		
•	<u>COMMENTS:</u> 270 Hz			· · · · · · · · · · · · · · · · · · ·			
•	Asing Capacities: 2-inch hole0.16 gal/lin ft 4-inch hole0.65 gal/lin ft 6.5-inch hole1.70 gal/lin ft Original Water Col- 8-inch hole2.60 gal/lin ft		ct sample v	vhen Depth to W	<u>ation at Time o</u> ater measures <u>L</u> Depth of Well <u>) /</u>	ess than or equ	

PROJECT NO.:21220	1144			ге: 7-6-09	WELL NO	TW-23	
FACILITY NAME:Bu					PERATURE:	18	0
FIELD PERSONNEL:							·
EQUIPMENT CALIBRAT		SI) QED					
Spec. Conductivity: Standa			-				
Standard 10 Reading:							
End-of-Day Recheck: Spec			-	Ň		······	
FIELD MEASUREMENT	•	······································	· ·				
 A. Static Water Level (SWI B. Thickness of Free Product C. Total Depth of well (TD) D. Height of Water Column 	.) below top of cas ct, if present: from top of casing	Inches g/piezometer:			a di sana	<u>125.19</u> <u>179.40</u> 54.26	F1 F1
		• •					
PURGING METHOD:			<u>Fultz</u> DUI	RATION:	<u> </u>	· · · · · · · · · · · · · · · · · · ·	
OBSERVATIONS: P Time 1407 1412 1417 1417 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1422 1423 1422 1424 1422 1425 1422 1423 1422 1424 1422 1425 1422	urging Start Time <u>DO (±10%)</u> <u>2.25</u> <u>1.70</u> <u>1.54</u> <u>1.67</u> DISPOSED OF W. Time <u>1422</u>	<u>ORP(±10mV)</u> <u><i>444.0</i> <u>43.7</u> <u>43.4</u> <u>42.1</u> HERE/HOW:</u>	$\frac{pH(\pm 0.1)}{f \cdot f \cdot z}$ $\frac{f \cdot f \cdot z}{f \cdot 40}$ $\frac{f \cdot 1}{f \cdot 2}$ $\frac{f \cdot 2}{f \cdot 2}$ $\frac{f \cdot 2}{f \cdot 2}$ $\frac{f \cdot 2}{f \cdot 2}$		<u>Conduct.(±3%)</u> <u>630</u> <u>670</u> <u>722</u> <u>745</u> Preservative	<u>SWL</u> <u>[25.3]</u> <u>[25.3]</u> <u>[25.3]</u>	
/	·	·					
COMMENTS:		······································	<u></u> .			,	
sing Capacities: -inch hole0.16 gal/lin ft -inch hole0.65 gal/lin ft 5.5-inch hole1.70 gal/lin ft B-inch hole2.60 gal/lin ft 10-inch hole4.10 gal/lin ft.	Original W	/ater Column:	-	Recharge Calculute le when Depth to W 0.80 =(Total I ture:	Vater measures <u>L</u>	<u>ess than or equ</u> 135.99	

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			•.	•		
	.		Stantec			
)	GROUN	DWATER SAN				
PROJECT NO.: 212.	201144	·	DAT	те: /9/ // <i>0</i> ?	WELL NO.	TW-19
FACILITY NAME:	Buckeye Vacuum	Field		TEM	PERATURE:	o
FIELD PERSONNEL:	,	Lowswell	, 	WEATHER:	Clege 1	Slight Breat
EOUIPMENT CALIBR	ATION:	(YSI) QED	Serial No.:	07/005 ©2	13	
Spec. Conductivity: Stan	dard; 1413	Reading: /9/12	3.29 ;pH Standard;	7 Reading 7.00	33C Standard 4 F	@23-9 Reading: 4.00
Standard 10 Reading: 9	Q74 55	Standard 240	Reading: Z90	' 25,45 P. &: DO: T°C: 32	2.6 mmHg: 6.7	3P 7 DO Optic.: 65
End-of-Day Recheck: Sp		· · · · · ·	- , ,	· -		
-		.pm /, /~ /,pm	t. 9,00 , pi1. 1	<u>, ,,,,,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
FIELD MEASUREMEN		- •				126,84FT
A. Static Water Level (SV	· –		:	·		
 Thickness of Free Proc Total Depth of well (T 	· ·					
D. Height of Water Colum	· -					60.83 FT
-						
PURGING METHOD:(Grundfos Blac	lder Peristaltic	<u>Fultz</u> DUI	RATION:		
DBSERVATIONS:	Purging Start T	ime: <u>0931</u>	_	4		
Time	<u>DO (±10%)</u>	$ORP(\pm 10mV)$	<u>pH(±0,1)</u>	<u>Temp.(±3%)</u>	<u>Conduct.(±3%)</u>	
<u>) 0733</u>		91.6	7.13	22.06	0,442	121.15
0938	0,99	720	7.34	Z1.82	0.430	127,13
	<u> </u>	<u>64.8</u>	7.36	22.59	0.931	127,13
<u>0988</u> D953	1.82	<u>59.4</u> 48.8	<u>+131</u>	<u>22.75</u> 22.97	<u>0.43/</u> 0.43/	127.19
0958	7.07	46.4	7.35	22.88	0.431	127.19
1008		6.4	<u>`+.``</u>	<u>th</u>	<u></u>	1.07.01
					·····	·
		20300	le lat Gr		······································	
	No Col	Alsep	020-10	clear	u	······································
URGE WATER STORE	D/DISPOSED OF	WHERE/HOW: _	,	<u> </u>	<u> </u>	<u> </u>
AMPLES COLLECTE	<u>D:</u>					. •
ample Number(s)	J Time		Size/Number o	f Container(s)	Preservative	JL .
_XXXXXX	$\rightarrow _ c$	958	XXX	\$2\(3)	N	p
01-(300.0)	7DS	L	500 m 1	34 0		
		······································		(·····	·
<u>274</u> Mz		•				
		······································		· · · ·	· · · · · · · · · · · · · · · · · · ·	·····
				D		
ng Capacities: mch hole0.16 gal/lin ft.			Collect sampl			of Sample Collection Less than or equal to
inch hole 0.65 gal/lin ft	<u></u>	al Water Column:			_	. <u>`</u>
5-inch hole1.70 gal/lin ft inch hole2.60 gal/lin ft	Origina	ai water Column:	<u>00-8.3</u> x ($0.50 = \(10ta)$	Depin of Well)	1.51.01
0-inch hole4.10 gal/lin ft.			Signat	ure.	592	·
•			orginal			8/2008

- 		Stantec				
	GROUNDWATER SA					
PROJECT NO.: <u>212201</u>	144	DATE	: 10/1109	WELL NO.	-1W-11	
FACILITY NAME: Buc	keve Vacuum Field	<u></u>	TEM	PERATURE:	76	°F
FIELD PERSONNEL:	J, Longwell		WEATHER:	Clear / 8	recage	
EQUIPMENT CALIBRATI	ION: YSI QED	Serial No.:	· · · · · · · · · · · · · · · ·	· · · ·	· .	••••
Spec. Conductivity: Standard	i: Reading:	:pH Standard: (7 Reading	:Standard 4 R	leading:	
Standard 10 Reading:	; ORP: Standard:	Reading	; DO: T°C:	mmHg:	DO Conc.:	
End-of-Day Recheck: Spec.(<u>Cond: ;pH 7: ;pH</u>	4: ;pH: 10	:ORP:	• .		•
FIELD MEASUREMENTS		•	-	· · · ·		
 A. Static Water Level (SWL) B. Thickness of Free Product C. Total Depth of well (TD) f D. Height of Water Column in 	, if present: Inches from top of casing/piezometer:				126.51	_ FT. _ FT.
PURGING METHOD:	undfos Bladder Peristaltic	Fultz DURA	ATION:	· ·		
OBSERVATIONS: Put Time Image: Coll 9 Image: Coll 9 Image: Coll 9	rging Start Time: 2013 DO (±10%) ORP(±10mV) $3,7-8$ 494.9 0.73 43.0 0.60 39.9 0.95 38.2 1.00 36.5 1.11 34.0	pH(±0.1) 7.29 7.16 7.15 7.15 7.13 7.13	<u>Temp.(±3%)</u> Z3.5/ Z1.77 <u>Z6.95</u> <u>Z1.95</u> <u>Z1.95</u>	<u>Conduct.(±3%)</u> <u>0.447</u> <u>0.444</u> <u>0.444</u> <u>0.449</u> <u>0.449</u> <u>0.449</u> <u>0.449</u>	<u>SWL</u> 126,93 126,93 126,93 126,94 126,94 126,94	(
PURGE WATER STORED/D	Isposed of where/how:		Clear		· · · · · · · · · · · · · · · · · · ·	
SAMPLES COLLECTED:						
Sample Number(s) (300.0) 7D5	Time 	Size/Number of <u>500-e</u> B/	• •	Preservative		
<u>Сомментя:</u> 						
hg Capacities: 2=inch hole0.16 gal/lin ft 4-inch hole0.65 gal/lin ft 6.5-inch hole1.70 gal/lin ft 8-inch hole2.60 gal/lin ft 10-inch hole4.10 gal/lin ft.	Original Water Column:	Collect sample	when Depth to V	Water measures I	of Sample Collec Less than or equal 137,46	
- The addition to Bann It.		Signatu	re:	180	8/2	2008

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				S	tantec			
	·	GROUN	DWATI			LD DATA SI	HEET	
PROJECT NO.:	2122011	44			DATE	10/1/09	WELL NO.	TW-20
FACILITY NAM	ME: Buck	<u>teye Vacuum</u>	n Field			TEM	PERATURE:	70
FIELD PERSON								
EQUIPMENT (•							
Spec. Conductiv								•
Standard 10 Read	• •		: Standard			; DO: T°C:		
End-of-Day Rec					-	•	– .	
FIELD MEASU	-		10.2.2				·····	
A. Static Water			casing/nie	zometer:				130.
B. Thickness of								
C. Total Depth c	of well (TD) fr	om top of ca	asing/piezo	meter:	•			202
D. Height of Wa	ater Column in	casing (h =	TD - SWL	J):		•		7/.0
	1115 1125	0.67 1.08 0.93 0.85 0.85	26 	. 9 . 9 8. 2 6. 3	7.17 7.17 7.18 7.18 7.18 7.18	<u>21.65</u> <u>21.83</u> <u>21.83</u> <u>21.98</u> <u>21.98</u>	0.486 0.486 0.496 0.486 0.486	<u>131,1</u> 6 <u>131,1</u> 6 <u>181,1</u> 7 <u>181,17</u>
						Cleer		
		(SPOSED 0	1			Cleer		
	R STORED/DI		1			<u>Cleer</u>		
PURGE WATER	STORED/DI	 SPOSED 01 Time	1	/HOW:	Size/Number of	Container(s)	Preservative	
PURGE WATER	STORED/DI	Time	1	/HOW:		Container(s)	Preservative	
PURGE WATER	STORED/DI	Time	FWHERE	/HOW:	Size/Number of	Container(s)	Preservative	
PURGE WATER SAMPLES COL Sample Number(s	STORED/DI	Time	FWHERE	/HOW:	Size/Number of	Container(s)	Preservative	
PURGE WATER	x stored/di <u>Lected:</u> s) (<u>{300,</u> 0)	Time	FWHERE	/HOW:	Size/Number of	Container(s)	Preservative	
PURGE WATER SAMPLES COL Sample Number(s 7705 / CA COMMENTS:	x stored/di <u>Lected:</u> s) (<u>{300,</u> 0)	Time	FWHERE	/HOW:	Size/Number of	Container(s)	Preservative	
PURGE WATER SAMPLES COL Sample Number(s 5705 / CA COMMENTS:	x stored/di <u>Lected:</u> s) (<u>{300,</u> 0)	Time	FWHERE	/HOW:	Size/Number of	Container(s)	lation at Time of	
PURGE WATER SAMPLES COL Sample Number(s 7705 / C/ COMMENTS: 274	(<u>(300,</u> 0) <u>(1,200,0</u>) <u>(1,200,0</u>) <u>(1,200,0</u>) <u>(1,200,0</u>) <u>(1,200,0</u>)	Time	FWHERE	/HOW:	Size/Number of	Container(s)	lation at Time of	

. .

-`	GROUNDY	-	Stantec APLING FIE	LD DATA SI	HEET		
) PROJECT NO.: 21220	1144	• .	DATE	johlog	WELL NO.	-TW-11	
FACILITY NAME: BI	ickeye Vacuum Fie	eld		TEMI	PERATURE:	80	⁰F
FIELD PERSONNEL:	The	erand		WEATHER:	Clear 1	Breeze	
EQUIPMENT CALIBRA		SI) OED				/	
		<u> </u>				• •	• :
Spec. Conductivity: Standa			-		· ·	eading:	
Standard 10 Reading:						DO Conc.: 1	<u>.</u>
End-of-Day Recheck: Spec	.Cond: ;p	<u> 9H 7: ;pH 4</u>	: :pH: 10	;ORP:	• · · · · · · · · · · · · · · · · · · ·	.:	. ·
FIELD MEASUREMENT	<u>S:</u>	•	• . •		ала ала 1917 г. н.		
A. Static Water Level (SW)	.) below top of cas	sing/piezometer:	· ,			130.0	FT.
B. Thickness of Free Produ							_ FT.
C. Total Depth of well (TD)						1110-2	
D. Height of Water Column	in casing $(h = TD)$	- SWL):	•			61.24	<u>-</u> FT.
PURGING METHOD:	rundfos) Bladde	r Peristaltic	Fultz DURA	ATION:	•	· ·	
						· . · ·	
	urging Start Tim		- 	<u>Temp.(±3%)</u>	Conduct.(±3%)	<u>SWL</u>	
<u> </u>	<u>DO (±10%)</u> Z.10	<u>ORP(±10mV)</u> 50, <u>(</u>	7.63	<u>73,88</u>	0.474	<u>;30,19</u>	
<u> </u>	0,50	41.9	7.34	22,65	0.429	130,20	
	0.42	36,2	733	28,17	0.429	130.20	
		30,0	702	23.39	0.431	130.20	
<u>1202</u>	0,39	15.2	7.37	23,42	0,432	130.20	
1707	0.38	<u></u>	713-	<u></u>		<u>,,,,,,</u> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
<u>M12</u>			·	<u></u>	<u> </u>		
······································	· · · ·	·	·				
<u> </u>	<u> </u>				· · ·		
· · · · · · · · · · · · · · · · · · ·	130 6.	for 1 12	, Odor /	Clear	···		
PURGE WATER STORED	-1 -						
SAMPLES COLLECTED:		_					
			o: :				
Sample Number(s)	Time	-	Size/Number of		Preservative		
<u> </u>		<u> </u>	500 L Po	ty (O			
8	<u></u>			<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	. 		
		. <u> </u>	,				<u>.</u>
<u>COMMENTS:</u> 7.74 HZ					·		
_279 H2						· · · · · · · · · · · · · · · · · · ·	
·····	<u></u>			······			
)g Capacities:						of Sample Collec	
َحَسَرُدُهُ hole0.16 gal/lin ft 4-inch hole0.65 gal/lin ft			Collect sample	when Depth to V	vater measures L	ess than or equ	<u>ai to</u> :
6.5-inch hole1.70 gal/lin ft	Original V	Water Column:	61.24 x 0.	80 = <u> (</u> Total]	Depth of Well)	142,26	
8-inch hole2.60 gal/lin ft 10-inch hole4.10 gal/lin ft.	-		i	~	-		
Horennin hav Bullin th			Signatu	re:	x.		
		-		-		8/2	8008

OSP-

	<u>(</u>	GROUNDV		Stantec MPLING FIE	LD DATA S	HEET	•	
PROJECT NO.:	21220114	4		DATE	10/1/09	WELL NO	TW.23	
FACILITY NAME	: Bucke					PERATURE:		
FIELD PERSONN								
EQUIPMENT CA		ٽر :	-	Serial No.:			,	· ·
Spec. Conductivit								· - ·
<u>Standard 10 Readir</u>								
	-			-				
End-of-Day Reche		<u>10: ;p</u>		-			с. в . С	
FIELD MEASUR							-	^
A. Static Water Le				<u>.</u>		1997 <u>1</u> 997 - 19	12,0	<u>7</u> FT. FT
B. Thickness of FrC. Total Depth of the	well (TD) from	present:	mones				178.25	.11 7
D. Height of Water	r Column in c	asing $(h = TD)$	- SWL):				52.5	FT.
		_						
PURGING METHO	DD: <u>Grund</u>	lfos) Bladder	Peristaltic	<u>Fultz</u> DURA	ATION:	<u> </u>	: 	<u></u>
OBSERVATIONS	: Purgi	ing Start Time	e: 1212	_				
<u></u>		O (±10%)	ORP(±10mV)	<u>pH(±0.1)</u>	<u>Temp.(±3%)</u>	Conduct.(±3%)	SWL	
) /3		1.02	47.6	8,12	22.99	0.627	125.92	
/7		0.38	417	8,13	22.87		125.93	
/2		0.39	40,6	8.19	2Z, 20		125,93	
		0,42	34.3	8,15	12.92	0.687	176.96	
12		0,47	29.1	8.13	22.88	0.697	126.00	
/2						<u> </u>		
<u> </u>	<u> </u>	<u> </u>			• *			
	<u></u>					·		
				·····				·· .
PURGE WATER S	TORED/DIS	POSED OF W	HERE/HOW:	· · · · · ·	· .			
SAMPLES COLL	ECTED:			2				
Sample Number(s)		Time	·	Size/Number of	Container(s)	Preservative		
TDS/ C/1	300,07	1235	2	500-C Pol				
			· · ·					
		·						
COMMENTS:								
	······································							
hg Capacities:			. •			lation at Time o		
Finch hole0.16 gal/				Collect sample	when Depth to V	Vater measures <u>L</u>	ess than or equ	ual to:
-inch hole0.65 gal/ .5-inch hole1.70 gal		Original V	ater Column:	52.58 x 0.8	30 = <u>-(</u> Total]	Depth of Well)	136.19	
-inch hole2.60 gal/ 0-inch hole4,10 gal		_			\sim		•••	
				Signatu	re:			

Stantec

APPENDIX B LABORATORY ANALYTICAL REPORTS

p:\chevron\mid-continent abandonment\site files\buckeye vacuum unit, lea co, nm\reports\2009 gw\2009 gwm report buckeye vacuum 0910.docx

Stantec

FIRST QUARTER 2009

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ANALYTICAL RESULTS

Prepared for:

STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

713-937-7973

Prepared by:

Lancaster Laboratories 2425 New Holland Pike Lancaster, PA 17605-2425

SAMPLE GROUP

The sample group for this submittal is 1129250. Samples arrived at the laboratory on Friday, January 23, 2009. The PO# for this group is 89CH.49529.08 and the release number is BUCKEYE-SA.

Client Description TW-9 Grab Water Sample TW-15 Grab Water Sample TW-23 Grab Water Sample Lancaster Labs Number 5583163 5583164 5583165

ELECTRONIC COPY TO ELECTRONIC COPY TO

STANTEC International, Inc.

STANTEC International, Inc.

Attn: Steve Bell

Attn: Bill Goldsby



Analysis Report

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Questions? Contact your Client Services Representative Wendy A Kozma at (717) 656-2300

Respectfully Submitted,

Robert Here

Robert Heisey Senior Specialist



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Page 1 of 1

Lancaster Laboratories Sample	No. WW5583163	Group No. 1129250
TW-9 Grab Water Sample Buckeye Vacuum		
Collected:01/19/2009 12:18	by SB	Account Number: 11842
Submitted: 01/23/2009 09:00 Reported: 02/04/2009 at 16:54 Discard: 03/07/2009		STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

				As Received		
CAT			As Received	Method		Dilution
No.	Analysis Name	CAS Number	Result	Detection Limit	Units	Factor
00212	Total Dissolved Solids	.n.a.	388	9.7	mg/l	1
00224	Chloride	16887-00-6	82.6	20.0	mg/l	100

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CA No

Laboratory Chronicle							
CAT		-		Analysis		Dilution	
No.	Analysis Name	Method	Trial#	Date and Time	Analyst	Factor	
00212	Total Dissolved Solids	SM20 2540 C	1	01/26/2009 08:38	Susan E Hibner	1	
00224	Chloride	EPA 300.0	1	02/03/2009 14:36	Ashley M Heckman	100	





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Page 1 of 1

Lancaster Laboratories Sample No. WW5583164

Group No. 1129250

TW-15 Grab Water Sample Buckeye Vacuum

Collected:01/19/2009 15:59 by SB

Submitted: 01/23/2009 09:00 Reported: 02/04/2009 at 16:54 Discard: 03/07/2009 Account Number: 11842

STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT			As Received	As Received Method		Dilution
No.	Analysis Name	CAS Number	Result	Detection Limit	Units	Factor
00212	Total Dissolved Solids	n.a.	477	9.7	mg/l	1
00224	Chloride	16887-00-6	108	20.0	mg/l	100

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Chronicle							
CAT		_		Analysis		Dilutio	
No.	Analysis Name	Method	Trial#	Date and Time	Analyst	Factor	
00212	Total Dissolved Solids	SM20 2540 C	1	01/26/2009 08:38	Susan E Hibner	1	
00224	Chloride	EPA 300.0	1	02/03/2009 14:52	Ashley M Heckman	100	



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Page 1 of 1

Lancaster Laboratories Sample No. WW5583165	Group No. 1129250
TW-23 Grab Water Sample	
Buckeye Vacuum	
Collected:01/19/2009 12:40 by SB	Account Number: 11842
Submitted: 01/23/2009 09:00	STANTEC International, Inc.
Reported: 02/04/2009 at 16:54	10235 West Little York Road
Discard: 03/07/2009	Houston TX 77040

				As Received		
CAT			As Received	Method		Dilution
No.	Analysis Name	CAS Number	Result	Detection Limit	Units	Factor
00212	Total Dissolved Solids	n.a.	882	38.8	mg/l	l
00224	Chloride	16887-00-6	177	40.0	mg/l	200

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Chronicle CAT Analysis Dilution Trial# Date and Time No. Method Analyst Factor Analysis Name 00212 Total Dissolved Solids SM20 2540 C 1 01/26/2009 08:38 Susan E Hibner 1 EPA 300.0 02/03/2009 15:08 200 00224 Chloride Ashley M Heckman 1





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Page 1 of 1

Quality Control Summary

Client Name: STANTEC International, Inc. Reported: 02/04/09 at 04:54 PM

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Group Number: 1129250

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

<u>Analysis Name</u>	Blank <u>Result</u>	Blank <u>MDL</u>	Report <u>Units</u>	LCS <u>%REC</u>	LCSD <u>%REC</u>	LCS/LCSD <u>Limits</u>	<u>RPD</u>	<u>RPD Max</u>
Batch number: 09026021201A Total Dissolved Solids	Sample nu N.D.	umber(s): 9.7	5583163-55 mg/l	83165 90		80-120		
Batch number: 09034196601A Chloride	Sample nu N.D.	umber(s): 0.20	5583163-55 mg/l	83165 99		90-110		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS <u>%REC</u>	MSD <u>%REC</u>	MS/MSD <u>Limits</u>	<u>RPD</u>	RPD <u>MAX</u>	BKG <u>Conc</u>	DUP <u>Conc</u>	DUP <u>RPD</u>	Dup RPD Max
Batch number: 09026021201A Total Dissolved Solids	Sample : 102	number(s) 102	: 5583163 54-143	-558316 0	5 UNSPI 12	K: 5583165 882	BKG: 5583165 894	5 1	9
Batch number: 09034196601A Chloride	Sample : 94	number(s)	: 5583163 90-110	-558316	5 UNSPI	K: P583861 174	BKG: P583861 172	1 (1)	20

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*- Outside of specification

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

3566 Rev. 1/31/02 1-23-09/09/C ☐ Must meet lowest detection limits Time Time Time Time T = Thiosulfate 006900 Confirm MTBE + Naphthalene ___oxy's on highest hit Chevron G(_)eric Analysis Request/Chain of Cu(_)ody possible for 8260 compounds Confirm highest hit by 8260 Grof 1129250 **Preservative Codes** $\mathbf{B} = \mathsf{NaOH}$ CRun ____ oxy's on all hits $\mathbf{O} = \mathbf{O}$ ther J value reporting needed Confirm all hits by 8260 Comments / Remarks 8021 MTBE Confirmation Date Date Date Date H = HCI N = HNO₃ **S** = H₂SO₄ SCR# Yes For Lancaster Laboratories use only Acot # 川842 Sample # こ5583163-65 Custody Seals Intach Lancaster Laboratories, Inc., 2425 New Holland Pike, PO Box 12425, Lancaster, PA 17605-2425 (717) 656-2300 Copies: White and yellow should accompany samples to Lancaster Laboratories. The pink copy should be retained by the client. (0°00E) 7 ۲ Refeived by: Received by: Received by: Received by: 7 5 J 7 Analyses Requested ۱ 7 Preservation Codes noticolitication INTPH HLICID. Hd3/Hd/ <u>Time</u> Time listoT bise. bortheM 🛄 .. szi 🖸 🛄 Extended Rng. 0 Hat Refect Qate Date Date D Hol Oxygenates neos lluit 0828 ່ບ 3021 🗖 8260 🗍 Naphth 🗌 38TM + X3T8 Relinquished by Commercial Carrier: Fotal Number of Containers Other Temperature Upon Receipt 200 🗆 iiA 🖸 liC Matrix E Potable No **Nater** 7 7 FedEx lioS Relinquished by: etisoqmoO Relinquished by: Relinquished by: Grab 7 A. 281-507-3578 7 7 Lead Consultant: <u>**B.** Goldshy</u> 04 6 - 89CH 49539.08 Collected NPS 810 559 Time -19-09 Collected Stanke-Heiston 1-19-09 1-19-09 Date BUCKEVE, New MARKED Non SAR: Turnaround Time Requested (TAT) (please circle) 48 hour **Data Package Options** (please circle if required) Facility #: Buckeye Vacuum Gieid Bul Golds 5 day Consultant Phone #: 113-937-7973 Other. Where quality is a science. Standard Format 均 Type I - Full Disk / EDD Hudsen 72 hour 4 day Consultant Prj. Mgr.: Sample Identification न्ने Chevron PM: M Consultant/Office: Thu as Type VI (Raw Data) SI-WT Service Order #: TW-9 WIP (RWQCB) Site Address: QC Summary Sampler: STD. TAL 24 hour Disk

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Lancaster Laboratories Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	BMQL	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	MPN	Most Probable Number
IU	International Units	CP Units	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	NTU	nephelometric turbidity units
C	degrees Celsius	F	degrees Fahrenheit
Cal	(diet) calories	Ib.	pound(s)
meq	milliequivalents	kg	kilogram(s)
g	gram(s)	mg	milligram(s)
ug	microgram(s)	I	liter(s)
ml	milliliter(s)	ul	microliter(s)
m3	cubic meter(s)	fib >5 um/ml	fibers greater than 5 microns in length per r

< less than – The number following the sign is the <u>limit of quantitation</u>, the smallest amount of analyte which can be reliably determined using this specific test.

- > greater than
- **ppm** parts per million One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.
- ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture.

U.S. EPA data qualifiers:

Organic Qualifiers

- A TIC is a possible aldol-condensation product
- B Analyte was also detected in the blank
- C Pesticide result confirmed by GC/MS
- **D** Compound quatitated on a diluted sample
- E Concentration exceeds the calibration range of the instrument
- J Estimated value
- **N** Presumptive evidence of a compound (TICs only)
- P Concentration difference between primary and confirmation columns >25%
- U Compound was not detected
- X,Y,Z Defined in case narrative

- Inorganic Qualifiers
- B Value is <CRDL, but ≥IDL
- E Estimated due to interference
- M Duplicate injection precision not met
- N Spike amount not within control limits
- S Method of standard additions (MSA) used for calculation

ml

- U Compound was not detected
- W Post digestion spike out of control limits
 - * Duplicate analysis not within control limits
- + Correlation coefficient for MSA < 0.995

Analytical test results for methods listed on the laboratories' accreditation scope meet all requirements of NELAC unless otherwise noted under the individual analysis.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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SECOND QUARTER 2009

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ANALYTICAL RESULTS

Prepared for:

STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

713-937-7973

Prepared by:

Lancaster Laboratories 2425 New Holland Pike Lancaster, PA 17605-2425

April 29, 2009

SAMPLE GROUP

The sample group for this submittal is 1140565. Samples arrived at the laboratory on Wednesday, April 15, 2009. The PO# for this group is 89CH.49529.08 and the release number is BUCKEYE-SA.

Client Description TW-20 Grab Water Sample TW-9 Grab Water Sample TW-10 Grab Water Sample RW-2 Grab Water Sample TW-19 Grab Water Sample RW-3 Grab Water Sample TW-14 Grab Water Sample TW-23 Grab Water Sample TW-15 Grab Water Sample TW-17 Grab Water Sample TW-11 Grab Water Sample TW-13 Grab Water Sample DUP #1 Grab Water Sample

METHODOLOGY

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Chronicle.

ELECTRONIC STA

STANTEC International, Inc.

Attn: Steve Bell





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COPY TO ELECTRONIC COPY TO

STANTEC International, Inc.

Attn: Bill Goldsby

Questions? Contact your Client Services Representative Wendy A Kozma at (717) 656-2300

Respectfully Submitted,

Kobert Neisei Robert Heisey

Senior Specialist



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646821 TW-20 Grab Water Sample Buckeye Vacuum	Group No. 1140565 NM
Collected: 04/13/2009 13:00 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009	STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet	Chemistry	mg/l	mg/l	
00224 Chloride		16887-00-6	43.3	10.0	50
SM20 2540 C	Wet	Chemistry	mg/l	mg/l	
00212 Total Dissolved Sc	lids	n.a.	330	9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality notrol Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09112196102A	04/23/2009 00:28	Ashley M Heckman	50
00212	Total Dissolved Solids	SM20 2540 C	1	09106021201A	04/16/2009 08:48	Susan A Engle	1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646822	Group No. 1140565 NM
TW-9 Grab Water Sample Buckeye Vacuum	· · · ·
Collected: 04/13/2009 13:32 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009	STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0 00224 Chloride	Wet Che	emistry 16887-00-6	mg/1 76.7	mg/1 . 10.0	50
SM20 2540 C 00212 Total Dissolved Sc	Wet Che	n.a.	mg/l 376	mg/l 9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09112196102A	04/23/2009 00:46	Ashley M Heckman	50
00212	Total Dissolved Solids	SM20 2540 C	1	09106021201A	04/16/2009 08:48	Susan A Engle	1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646823 TW-10 Grab Water Sample Buckeye Vacuum Collected: 04/13/2009 14:05 by SB Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009 Group No. 1140565 NM Account Number: 11842 STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/l	mg/l	100
00224 Chloride	16887-00-6	148	20.0	
SM20 2540 C	Wet Chemistry	mg/l	mg/1	1
00212 Total Dissolved So	^{lids} n.a.	532	9.7	

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality ntrol Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09112196102A	04/23/2009 01:03	Ashley M Heckman	100
00212	Total Dissolved Solids	SM20 2540 C	1	09106021201A	04/16/2009 08:48	Susan A Engle	1



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Page 1 of 1

Lancaster Laboratories Sample No. WW	5646824 Group No. 1140565 NM
RW-2 Grab Water Sample Buckeye Vacuum	
Collected: 04/13/2009 14:37 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10	STANTEC International, Inc.
Reported: 04/29/2009 at 07:11 Discard: 05/30/2009	10235 West Little York Road Houston TX 77040

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0 00224 Chloride	Wet	Chemistry 16887-00-6	mg/l 82.4	mg/1 10.0	50
SM20 2540 C 00212 Total Dissolved So		Chemistry n.a.	mg/l 382	mg/1 9.7	1 .

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	e	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09112196102A	04/23/2009 0	01:20	Ashley M Heckman	50
00212	Total Dissolved Solids	SM20 2540 C	1	09106021201A	04/16/2009 0	08:48	Susan A Engle	1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646825 TW-19 Grab Water Sample Buckeye Vacuum Collected: 04/13/2009 15:09 by SB Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009 Group No. 1140565 NM Account Number: 11842 STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name	. CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/l	mg/1	10
00224 Chloride	16887-00-6	27.8	20.	
SM20 2540 C	Wet Chemistry	mg/l	mg/l	1
00212 Total Dissolved So	ids n.a.	278	9.7	

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality ntrol Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	2	09112196102A	04/24/2009 05:4	4 Ashley M Heckman	. 10
00212	Total Dissolved Solids	SM20 2540 C	1	09106021201A	04/16/2009 08:4	8 Susan A Engle	1 ·
					· · · ·		



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646826	Group No. 1140565 NM
RW-3 Grab Water Sample Buckeye Vacuum	
Collected: 04/13/2009 14:55 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009	STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0 We	t Chemistry	mg/l	mg/l	500
00224 Chloride	16887-00-6	1,250	100	
SM20 2540 C We	t Chemistry	. mg/l	mg/1	1
00212 Total Dissolved Solids	n.a.	2,740	77.6	

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	-	09112196102A 09106021201A	04/23/2009 01:55	-	500
00212	Total Dissolved Solids	SM20 2540 C	T	09106021201A	04/16/2009 08:48	Susan A Engle	Ţ



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646827 TW-14 Grab Water Sample Buckeye Vacuum

Collected: 04/14/2009 09:50 by SB

Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009

Group No. 1140565 NM

Account Number: 11842

STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

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CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/l	mg/l	
00224 Chloride	16887-00-6	192	20.0	100
SM20 2540 C	Wet Chemistry	mg/l	mg/l	
00212 Total Dissolved So	olids n.a.	600	19.4	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality entrol Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C		09112196102A 09106021201A	04/23/2009 02:13 04/16/2009 08:48	Ashley M Heckman Susan A Engle	100 1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646828	Group No. 1140565 NM
TW-23 Grab Water Sample Buckeye Vacuum	
Collected: 04/14/2009 10:25 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009	STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/l	mg/1	20
00224 Chloride	16887-00-6	53.7	4.0	
SM20 2540 C	Wet Chemistry	mg/l	mg/l	l
00212 Total Dissolved Sc	lids n.a.	456	9.7	

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Ti	me	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	2	09112196102A	04/24/2009	06:02	Ashley M Heckman	20
00212	Total Dissolved Solids	SM20 2540 C	1	09107021201A '	04/17/2009	09:21	Susan E Hibner	1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646829 TW-15 Grab Water Sample Buckeye Vacuum	Group No. 1140565 NM
Collected: 04/14/2009 10:56 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009	STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0 00224 Chloride	Wet Chemi:	stry 16887-00-6	mg/1 87.1	mg/l 10.0	50
SM20 2540 C 00212 Total Dissolved S	Wet Chemis	n.a.	mg/l 446	mg/l 9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality ntrol Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
	Chloride	EPA 300.0	-	09112196601B	04/22/2009 21:04	Ashley M Heckman	50
00212	Total Dissolved Solids	SM20 2540 C	1	09107021201A	04/17/2009 09:21	Susan E Hibner	1





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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646830	Group No. 1140565 NM
TW-17 Grab Water Sample Buckeye Vacuum	
Collected: 04/14/2009 11:29 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009	STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet	Chemistry	mg/l	mg/l	
00224 Chloride		16887-00-6	36.8	10.0	50 .
SM20 2540 C	Wet	Chemistry	mg/l	mg/l	
00212 Total Dissolved Sol	ids	n.a.	304	9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09112196601B	04/22/2009 21:20	Ashley M Heckman	50
00212	Total Dissolved Solids	SM20 2540 C	1	09107021201A	04/17/2009 09:21	Susan E Hibner	1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646831	Group No. 1140565 NM
TW-11 Grab Water Sample Buckeye Vacuum	
Collected: 04/14/2009 13:29 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10	STANTEC International, Inc.
Reported: 04/29/2009 at 07:11	10235 West Little York Road
Discard: 05/30/2009	Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/l	mg/l	
00224 Chloride	16887-00-6	49.3	10.0	50
SM20 2540 C	Wet Chemistry	mg/l	mg/l	
00212 Total Dissolved Sol	ids n.a.	270	9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality ntrol Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C		09112196601B 09107021201A	04/22/2009 21:35 04/17/2009 09:21	Ashley M Heckman Susan E Hibner	50 1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646832 TW-13 Grab Water Sample Buckeye Vacuum	Group No. 1140565 NM
Collected: 04/14/2009 14:09 by SB	Account Number: 11842
Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009	STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/1	mg/1	200
00224 Chloride	16887-00-6	129	40.0	
SM20 2540 C	Wet Chemistry	mg/l	mg/l	. 1
00212 Total Dissolved Sc	blids n.a.	1,000	38.8	

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	-	09112196601B 09107021201A	04/22/2009 21:51 04/17/2009 09:21	Ashley M Heckman Susan E Hibner	200 1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5646833 Group No. 1140565 NM DUP #1 Grab Water Sample Buckeye Vacuum Collected: 04/14/2009 by SB

Submitted: 04/15/2009 09:10 Reported: 04/29/2009 at 07:11 Discard: 05/30/2009

Account Number: 11842

STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0 00224 Chloride	Wet Chemistry	mg/l 95.2	mg/l 20.0	100
SM20 2540 C 00212 Total Dissolved Sol	Wet Chemistry	mg/l 450	mg/1 9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality ntrol Summary for overall QC performance data and associated samples.

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	e	Analyst	Dilution Factor
	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	-	09112196601B 09107021201A	04/22/2009 2 04/17/2009 0	22:06 09:21	Ashley M Heckman Susan E Hibner	100 1





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Page 1 of 1

Quality Control Summary

Client Name: STANTEC International, Inc. Reported: 04/29/09 at 07:11 AM Group Number: 1140565

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank <u>Result</u>	Blank <u>MDL</u>	Report <u>Units</u>	LCS <u>%REC</u>	LCSD <u>%REC</u>	LCS/LCSD <u>Limits</u>	RPD	RPD Max
Batch number: 09112196102A Chloride	Sample nu N.D.	mber(s): 0.20	5646821-5 mg/l	646828 102		90-110		
Batch number: 09112196601B Chloride	Sample nu N.D.	mber(s): 0.20	5646829-5 mg/l	646833 100		90-110		
Batch number: 09106021201A Total Dissolved Solids	Sample nu N.D.	mber(s): 9.7	5646821-5 mg/l	646827 96		80-120		
Batch number: 09107021201A Total Dissolved Solids	Sample nu N.D.	mber(s): 9.7	5646828-5 mg/l	646833 96		80-120		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS <u>%rec</u>	MSD <u>%REC</u>	MS/MSD Limits	RPD	RPD <u>MAX</u>	BKG <u>Conc</u>	DUP <u>Conc</u>	DUP <u>RPD</u>	Dup RPD Max
Batch number: 09112196102A Chloride	Sample 97	number(s)	: 5646821 90-110	-564682	8 UNSPK	: P648966 210	BKG: P648966 200	5	20
Batch number: 09112196601B Chloride	Sample 89*	number(s)	: 5646829 90-110	-564683	3 UNSPK	C: P648941 61.1	BKG: P648941 60.7	1 ·	20
Batch number: 09106021201A Total Dissolved Solids	Sample 103	number(s) 99	: 5646821 54-143	-564682 1	7 UNSPK 12	C: P646129 3,050	BKG: P646129 2,990	2	9
Batch number: 09107021201A Total Dissolved Solids	Sample 97	number(s) 100	: 5646828 54-143	-564683 2	3 UNSPK 12	C: 5646832 1,000	BKG: 5646832 954	5	9

*- Outside of specification

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

	01034	0000# 11 402@ 2	Preserva	H = HCl T = Thiosulfate	$S = H_2 SO_4$ $O = Other$	□ J value reporting needed	possible for 8260 compounds	8021 MTBE Confirmation	Confirm MTBE + Naphthalene		C C Run oxy's on highest hit oxy's or all hits	Comments / Remarks				7						AI 10	ا ہے ج	1 What red the to		Date Time		Date Time	ARNI. Olate	A LINES NO	3566 Rev. 1/31/02
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Lancaster Laboratories Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D. TNTC IU umhos/cm	none detected Too Numerous To Count International Units micromhos/cm	BMQL MPN CP Units NTU	Below Minimum Quantitation Level Most Probable Number cobalt-chloroplatinate units nephelometric turbidity units
С	degrees Celsius	F	degrees Fahrenheit
Cal	(diet) calories	lb.	pound(s)
meq	milliequivalents	kg	kilogram(s)
g	gram(s)	mg	milligram(s)
ug	microgram(s)	- I	liter(s)
mĺ	milliliter(s)	ul	microliter(s)
m3	cubic meter(s)	fib >5 um/ml	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the <u>limit of quantitation</u>, the smallest amount of analyte which can be reliably determined using this specific test.

- .> greater than
- ppm parts per million One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.
- ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture.

U.S. EPA data qualifiers:

Organic Qualifiers

- A TIC is a possible aldol-condensation product
- **B** Analyte was also detected in the blank
- C Pesticide result confirmed by GC/MS
- **D** Compound quatitated on a diluted sample
- E Concentration exceeds the calibration range of the instrument
- J Estimated value
- **N** Presumptive evidence of a compound (TICs only)
- P Concentration difference between primary and confirmation columns >25%
- U Compound was not detected
- X,Y,Z Defined in case narrative

- **Inorganic Qualifiers**
- **B** Value is <CRDL, but \ge IDL
- E Estimated due to interference
- M Duplicate injection precision not met
- N Spike amount not within control limits
- S Method of standard additions (MSA) used for calculation
- U Compound was not detected
- W Post digestion spike out of control limits
 - Duplicate analysis not within control limits
- + Correlation coefficient for MSA < 0.995

Analytical test results for methods listed on the laboratories' accreditation scope meet all requirements of NELAC unless otherwise noted under the individual analysis.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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ANALYTICAL RESULTS

Prepared for:

STANTEC International, Inc. 10235 West Little York Road Houston TX 77040

Prepared by:

Lancaster Laboratories 2425 New Holland Pike Lancaster, PA 17605-2425

July 16, 2009

SAMPLE GROUP

The sample group for this submittal is 1152270. Samples arrived at the laboratory on Tuesday, July 07, 2009. The PO# for this group is 89CH.49529.08 and the release number is BUCKEYE-SA.

Client Description TW-9 Grab Water Sample TW-15 Grab Water Sample TW-23 Grab Water Sample Lancaster Labs Number 5717013 5717014 5717015

METHODOLOGY

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO ELECTRONIC COPY TO STANTEC International, Inc.

STANTEC International, Inc.

Attn: Steve Bell

Attn: Matt Carlson



Analysis Report

2425 New Holland Pike; PO.Box (12425) Lancaster, PA 17605-2425 17/656-2300 Fax: 717-656-2681 www.lancasterlabs.com

Questions? Contact your Client Services Representative Wendy A Kozma at (717) 656-2300

Respectfully Submitted,

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Robert Heisey Senior Specialist



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5717013 TW-9 Grab Water Sample	Group No. 1152270 NM
Buckeye Vacuum	
Collected: 07/06/2009 11:53 by SB	Account Number: 11842
Submitted: 07/07/2009 09:10	STANTEC International, Inc.
Reported: 07/16/2009 at 14:57 Discard: 08/16/2009	10235 West Little York Road Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/1	mg/l	50
00224 Chloride	16887-00-6	75.4	10.0	
SM20 2540 C	Wet Chemistry	mg/l	mg/1	1
00212 Total Dissolved Sc	lids n.a.	417	9.7	

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality ntrol Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name .	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09196196601B	07/16/2009 07:21	Ashley M Adams	50
00212	Total Dissolved Solids	SM20 2540 C	1	09190021201A	07/09/2009 08:21	Susan A Engle	1
							•



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5717014 TW-15 Grab Water Sample Buckeye Vacuum	Group No. 1152270 NM
Collected: 07/06/2009 13:43 by SB	Account Number: 11842
Submitted: 07/07/2009 09:10	STANTEC International, Inc.
Reported: 07/16/2009 at 14:57	10235 West Little York Road
Discard: 08/16/2009	Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/l	mg/l	
00224 Chloride	16887-00-6	66.5	10.0	50 .
SM20 2540 C	Wet Chemistry	mg/l	mg/l	
00212 Total Dissolved Sol	lids n.a.	432	9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09196196601B	07/16/2009 07:37	Ashley M Adams	50
00212	Total Dissolved Solids	SM20 2540 C	1	09190021201A	07/09/2009 08:21	Susan A Engle	1



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Page 1 of 1

Lancaster Laboratories Sample No. WW 5717015 TW-23 Grab Water Sample Buckeye Vacuum	Group No. 1152270 NM
Collected: 07/06/2009 14:22 by SB	Account Number: 11842
Submitted: 07/07/2009 09:10 Reported: 07/16/2009 at 14:57 Discard: 08/16/2009	STANTEC International, Inc., 10235 West Little York Road Houston TX 77040

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
EPA 300.0	Wet Chemistry	mg/l	mg/l	
00224 Chloride	16887-00-6	48.2	10.0	50
SM20 2540 C	Wet Chemistry	mg/l	mg/l	
00212 Total Dissolved Sol	ids n.a.	445	9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality ntrol Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.			d Trial# Batch#		Analysis Date and Time	Analyst	Dilution Factor	
00224	Chloride	EPA 300.0	1	09196196601B	07/16/2009 07:53	Ashley M Adams	50	
00212	Total Dissolved Solids	SM20 2540 C	1	09190021201A	07/09/2009 08:21	Susan A Engle	1	





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Page 1 of 1

Quality Control Summary

Client Name: STANTEC International, Inc. Reported: 07/16/09 at 02:57 PM Group Number: 1152270

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank <u>Result</u>	Blank <u>MDL</u>	Report <u>Units</u>	LCS <u>%REC</u>	LCSD <u>%REC</u>	LCS/LCSD <u>Limits</u>	<u>RPD</u>	<u>RPD Max</u>	
Batch number: 09196196601B Chloride	Sample num N.D.	nber(s): 57 0.20	17013-5717 mg/l	7015 98		90-110			
Batch number: 09190021201A Total Dissolved Solids	Sample num N.D.	nber(s): 57 9.7	17013-5717 mg/l	7015 95		80-120			

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS <u>%rec</u>	MSD <u>%REC</u>	MS/MSD Limits	RPD	RPD <u>MAX</u>	BKG <u>Conc</u>	DUP <u>Conc</u>	DUP <u>RPD</u>	Dup RPD
Batch number: 09196196601B Chloride	Sample 94	number(s): 5717013 90-110	-57170	15 UNSI	PK: P71758 41.5	4 BKG: P71758 42.0	4 1	20
Batch number: 09190021201A Total Dissolved Solids	Sample 92	number(s 95): 5717013 54-143	-57170 1	15 UNSI 12	PK: P71810 2,340	3 BKG: P71810 2,280	3 3	9

*- Outside of specification

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

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Lancaster Laboratories Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D. TNTC IU umhos/cm C Cal	none detected Too Numerous To Count International Units micromhos/cm degrees Celsius (diet) calories	BMQL MPN CP Units NTU F Ib.	Below Minimum Quantitation Level Most Probable Number cobalt-chloroplatinate units nephelometric turbidity units degrees Fahrenheit pound(s)
meq	milliequivalents	kg	kilogram(s)
g	gram(s)	mg	milligram(s)
ug	microgram(s)	1	liter(s)
ml	milliliter(s)	ul	microliter(s)
m3	cubic meter(s)	fib >5 um/ml	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the <u>limit of quantitation</u>, the smallest amount of analyte which can be reliably determined using this specific test.

- > greater than
- ppm parts per million One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.
- ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture.

U.S. EPA data qualifiers:

Organic Qualifiers

- A TIC is a possible aldol-condensation product
- **B** Analyte was also detected in the blank
- **C** Pesticide result confirmed by GC/MS
- **D** Compound quatitated on a diluted sample
- E Concentration exceeds the calibration range of the instrument
- J Estimated value
- **N** Presumptive evidence of a compound (TICs only)
- P Concentration difference between primary and
- confirmation columns >25%
- U Compound was not detected
- X,Y,Z Defined in case narrative

Inorganic Qualifiers

- B Value is <CRDL, but ≥IDL
- E Estimated due to interference
- M Duplicate injection precision not met
- N Spike amount not within control limits
- S Method of standard additions (MSA) used for calculation
- U Compound was not detected
- W Post digestion spike out of control limits
 - * Duplicate analysis not within control limits
- + Correlation coefficient for MSA < 0.995

Analytical test results for methods listed on the laboratories' accreditation scope meet all requirements of NELAC unless otherwise noted under the individual analysis.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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Stantec

FOURTH QUARTER 2009



2425 New Holland Pike; PO.Box 12425 Lancaster, PA: 17605-2425 *717-656-2300. Fax: 717-656-2681 * www.lancasterlabs.com.

ANALYTICAL RESULTS

Prepared for:

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

Prepared by:

Lancaster Laboratories 2425 New Holland Pike Lancaster, PA 17605-2425

October 14, 2009

Project: Buckeye Vacuum

Samples arrived at the laboratory on Friday, October 02, 2009. The PO# for this group is 89CH.49529.08 and the release number is BUCKEYE-SA. The group number for this submittal is 1164552.

Client Sample Description TW-19 Grab Water Sample TW-17 Grab Water Sample TW-20 Grab Water Sample TW-11 Grab Water Sample TW-23 Grab Water Sample RW-3 Grab Water Sample

Lancaster Labs (LLI) # 5794493 5794494 5794495 5794496 5794497

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO ELECTRONIC COPY TO STANTEC International, Inc.

Stantec

Attn: Steve Bell

5794498

Attn: Matt Carlson





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Questions? Contact your Client Services Representative Wendy A Kozma at (717) 656-2300

Respectfully Submitted,

1 4:01

Robert Heisey Senior Specialist



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Page 1 of 1

Sample Description: TW-19 Grab Water Sample Buckeye Vacuum

LLI Sample # WW 5794493 LLI Group # 1164552 NM

Project Name: Buckeye Vacuum

Collected: 10/01/2009 09:58 by JL

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:46 Discard: 11/14/2009

Account Number: 11842

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No. Analysis Name	CAS Num	As Received ber Result	As Received Method Detection Limit	Dilution Factor
Wet Chemistry 00224 Chloride	EPA 300.0	mg/l 0-6 29.5	mg/l 1.0	5
	SM20 2540 C	ng/1	mg/l	
00212 Total Dissolved Soli		296	9.7	1

General Sample Comments

		Labora	atory Sa	mple Analys:	is Record		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09285196101B	10/13/2009 17:20	Ashley M Adams	5
00212	Total Dissolved Solids	SM20 2540 C -	1	09278021201A	10/05/2009 10:06	Susan E Hibner	1



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Page 1 of 1

	TW-17 Grab Water Sample Buckeye Vacuum	-	#	WW 5794494 1164552
Project Name: Buckey	ve Vacuum			NM

Collected: 10/01/2009 10:39 by JL

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:46 Discard: 11/14/2009 Account Number: 11842

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No. Ana	lysis Name			CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor	
Wet Chemi 00224 Chl	stry oride	EPA 3	00.0	16887-00-6	mg/l 30.0	mg/l 1.0	5	
00224 CIII	OIIde			1000/-00-0			2	
	1	SM20	2540	C	mg/l	mg/l		
00212 Tot	al Dissolved Sol	ids		n.a.	314	9.7	l	

General Sample Comments

		Labora	tory Sa	mple Analys	is Record		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224 00212	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	1 1	09285196101B 09278021201A	10/13/2009 18: 10/05/2009 10:		5 1



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by JL

Page 1 of 1

Sample Description: TW-20 Grab Water Sample		LLI Sample # WW 5794495
Buckeye Vacuum		LLI Group # 1164552
	•	NM
Project Name: Buckeye Vacuum		

Account Number: 11842

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:46 Discard: 11/14/2009

Collected: 10/01/2009 11:26

	CAT No.	Analysis Name			CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
	Wet C	nemistry	EPA	300.0		mg/l	mg/l	
	00224	Chloride			16887-00-6	40.5	2.0	10
÷			SM20	2540	C	mg/l	mg/l	
	00212	Total Dissolved Sol	ids		n.a.	345	9.7	1

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

control building for overall ge performance data and associated samples.

		Labora	atory Sa	mple Analys:	is Record		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224 00212	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	_	09285196101B 09278021201A	10/13/2009 18:46 10/05/2009 10:06	Ashley M Adams Susan E Hibner	10 1



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Page 1 of 1

Sample Description: TW-11 Grab Water Sample Buckeye Vacuum	LLI Sample # LLI Group #	
Project Name: Buckeye Vacuum		NM

Collected: 10/01/2009 12:07 by JL

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:46 Discard: 11/14/2009

Account Number: 11842

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No.	Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor	
Wet C	hemistry	EPA 300.0		mg/l	mg/l		
00224	Chloride		16887-00-6	44.3	2.0	10	
		SM20 2540	С	mg/l	mg/l		
00212	Total Dissolved Sol	ids	n.a.	289	9.7	1	

General Sample Comments

		Laborat	ory Sa	ample Analysi	s Record			
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Tim	le	Analyst /	Dilution Factor
	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	-	09285196101B 09278021201A		19:01 10:06	Ashley M Adams Susan E Hibner	10 1



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Page 1 of 1

Sample Description: TW-23 Grab Water Sample LLI Sample # WW 5794497 LLI Group # 1164552 Buckeye Vacuum NM

Project Name: Buckeye Vacuum

Collected: 10/01/2009 12:33 by JL

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:46 Discard: 11/14/2009

Stantec 2321 Club Meridian Drive Suite E

Account Number: 11842

Okemos MI 48864

CAT No.	Analysis Name			CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor	
Wet C	hemistry	EPA	300.0		mg/l	mg/l		
00224	Chloride			16887-00-6	42.3	2.0	10	
		SM20	2540	С	mg/l	mg/l		
00212	Total Dissolved So	lids		n.a.	462	9.7	1 ·	

General Sample Comments

		Labora	atory Sa	ample Analys	is Record		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224	Chloride	EPA 300.0	1	09285196101B	10/13/2009 19:15	Ashley M Adams	10
00212	Total Dissolved Solids	SM20 2540 C	1	09278021201A	10/05/2009 10:06	Susan E Hibner	1



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Page 1 of 1

NM

LLI Sample # WW 5794498 Sample Description: RW-3 Grab Water Sample Buckeye Vacuum LLI Group # 1164552 Project Name: Buckeye Vacuum

Collected: 10/01/2009 12:24 by JL

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:46 Discard: 11/14/2009

Account Number: 11842.

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No. Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
Wet Chemistry 00224 Chloride	EPA 300.0 16887-00-6	mg/l 1,320	mg/l 100	500
00212 Total Dissolved So	SM20 2540 C lids n.a.	mg/l 2,850	mg/l 77.6	1

General Sample Comments

		Laborat	ory Sa	ample Analysi	s Record		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	1 1	09285196101B 09278021201A	10/13/2009 01:47 10/05/2009 10:06	Ashley M Adams Susan E Hibner	500 1



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Page 1 of 1

Quality Control Summary

Client Name: Stantec Reported: 10/14/09 at 03:46 PM Group Number: 1164552

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank <u>Result</u>	Blank <u>MDL</u>	Report <u>Units</u>	LCS <u>%REC</u>	LCSD <u>%REC</u>	LCS/LCSD Limits	<u>RPD</u>	<u>RPD Max</u>
Batch number: 09285196101B Chloride	Sample num N.D.	ber(s): 57 0.20	94493-5794 mg/l	498 96		90-110		
Batch number: 09278021201A Total Dissolved Solids	Sample num N.D.	ber(s): 57 9.7	94493-5794 mg/l	498 98	•	80-120		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS <u>%REC</u>	MSD <u>%REC</u>	MS/MSD <u>Limits</u>	<u>RPD</u>	RPD <u>MAX</u>	BKG <u>Conc</u>	DUP <u>Conc</u>	DUP <u>RPD</u>	Dup RPD <u>Max</u>
Batch number: 09285196101B Chloride	Sample 87*	number(s)): 5794493 90-110	-57944	98 UNSE	29.5 29.5	BKG: 579449 28.6	3 3	20
Batch number: 09278021201A Total Dissolved Solids	Sample 97	number(s) 98		-57944 0	98 UNSE 12	2,850 PK: 5794498	BKG: 579449 2,840	98 1	9

*- Outside of specification

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

		Chev	evron		Generic Analysis	ic /	Ina	lysi	SF	seq	nes	<i>VCh</i>	Request/Chain of Custody	ustod	X
Lancaster Laboratories					Acct.#	-811	45	Sample	or Lano	aster l 79 L	aborator イロ3	Acct. #: 11842 Sample #: 5794493-98	Ny SCR#:	01322	20
Where quality is a science.								Ā	nalyse	s Req.	Analyses Requested		JGrpHIILUASS	1 lous	3
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Lancaster Laboratories Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D.	none detected	BMQL	Below Minimum Quantitation Level
TNTC	Too Numerous To Count	MPN	Most Probable Number
IU	International Units	CP Units	cobalt-chloroplatinate units
umhos/cm	micromhos/cm	NTU	nephelometric turbidity units
С	degrees Celsius	F	degrees Fahrenheit
Cal	(diet) calories	lb.	pound(s)
meg	milliéguivalents	kg	kilogram(s)
· g	gram(s)	mg	milligram(s)
ug	microgram(s)	Ĩ	liter(s)
mĬ	milliliter(s)	ul	microliter(s)
m3	cubic meter(s)	fib >5 um/ml	fibers greater than 5 microns in length per

< less than – The number following the sign is the <u>limit of quantitation</u>, the smallest amount of analyte which can be reliably determined using this specific test.

- > greater than
- ppm parts per million One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.
- ppb parts per billion

Dry weight Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture.

U.S. EPA data qualifiers:

Organic Qualifiers

- A TIC is a possible aldol-condensation product
- **B** Analyte was also detected in the blank
- **C** Pesticide result confirmed by GC/MS
- D Compound quatitated on a diluted sample
- E Concentration exceeds the calibration range of the instrument
- J Estimated value
- **N** Presumptive evidence of a compound (TICs only)
- P Concentration difference between primary and confirmation columns >25%
- U Compound was not detected
- X,Y,Z Defined in case narrative

Inorganic Qualifiers

ml

- **B** Value is <CRDL, but \ge IDL
- E Estimated due to interference
- M Duplicate injection precision not met
- N Spike amount not within control limits
- S Method of standard additions (MSA) used for calculation
- U Compound was not detected
- W Post digestion spike out of control limits
- * Duplicate analysis not within control limits
- + Correlation coefficient for MSA < 0.995

Analytical test results for methods listed on the laboratories' accreditation scope meet all requirements of NELAC unless otherwise noted under the individual analysis.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

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ANALYTICAL RESULTS

Prepared for:

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

Prepared by:

Lancaster Laboratories 2425 New Holland Pike Lancaster, PA 17605-2425

October 14, 2009

Project: Buckeye Vacuum

Samples arrived at the laboratory on Friday, October 02, 2009. The PO# for this group is 89CH.49529.08 and the release number is BUCKEYE-SA. The group number for this submittal is 1164553.

Client Sample Description TW-9 Grab Water Sample RW-2 Grab Water Sample TW-15 Grab Water Sample TW-13 Grab Water Sample TW-10 Grab Water Sample TW-14 Grab Water Sample Dup #100 Grab Water Sample

Lancaster Labs (LLI) # 5794499 5794500 5794501 5794502 5794503 5794503 5794504 5794505

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO ELECTRONIC COPY TO STANTEC International, Inc.

Stantec

Attn: Steve Bell

Attn: Matt Carlson





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Questions? Contact your Client Services Representative Wendy A Kozma at (717) 656-2300

Respectfully Submitted,

Kob

Robert Heisey Senior Specialist



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Page 1 of 1

Sample Description: TW-9 Grab Water Sample Buckeye Vacuum

LLI Sample # WW 5794499 LLI Group # 1164553 NM

Project Name: Buckeye Vacuum

Collected: 10/01/2009 09:51 by SB

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:48 Discard: 11/14/2009

Account Number: 11842

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
Wet Chemistry	EPA 300.0		mg/l	mg/l	,
00224 Chloride		16887-00-6	75.4	20.0	100
	SM20 2540	с	mg/l	mg/l	
00212 Total Dissolved Sol	lids	n.a.	356	9.7	1

General Sample Comments

		Labora	tory Sa	umple Analys:	is Record		
CAT 1 No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
	Chloride Notal Dissolved Solids	EPA 300.0 SM20 2540 C		09285196101B 09278021201A	10/13/2009 02: 10/05/2009 10:		100 , 1



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Page 1 of 1

Sample Description: RW-2 Grab Water Sample Buckeye Vacuum	LLI Sample # WW 5794500 LLI Group # 1164553 NM
Project Name: Buckeye Vacuum	
Collected: 10/01/2009 10:34 by SB	Account Number: 11842
Submitted: 10/02/2009 09:15	Stantec
Reported: 10/14/2009 at 15:48	2321 Club Meridian Drive
Discard: 11/14/2009	Suite E
	Okemos MI 48864

CAT No.	Analysis Name			CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor	
Wet Ch	emistry	EPA	300.0		mg/l	mg/l		
00224	Chloride			16887-00-6	240	40.0	200	
		SM20	2540	с	mg/l	mg/l		
00212	Total Dissolved Sol	ids		n.a.	691	19.4	1	

General Sample Comments

		Labora	itory Sa	ample Analysi	is Record		
CAT . No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224 00212	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	1 1	09285196101B 09278021201A	10/13/2009 02:15 10/05/2009 10:06	Ashley M Adams Susan E Hibner	200 1



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Page 1 of 1

Sample Description: TW-15 Grab Water Sample Buckeye Vacuum				-	WW 5794501 1164553 NM
Project Name: Buckeye Vacuum					
Collected: 10/01/2009 11:10	by SB	Account Number: 11842	2		

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:48 Discard: 11/14/2009 Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor	
Wet Chemistry	EPA 300.0		mg/l	mg/l		
00224 Chloride		16887-00-6	59.6	2.0	10	
	SM20 2540	с	mg/l	mg/l		
00212 Total Dissolved Soli	ds	n.a.	389	9.7	1	

General Sample Comments

		Labora	tory Sa	mple Analys:	is Record			
CAT . No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	8	Analyst	Dilution Factor
	Chloride Total Dissolved Solids	EPÀ 300.0 SM20 2540 C	1 1	09285196101B 09278021201A	10/13/2009 1 10/05/2009 1		Ashley M Adams Susan E Hibner	10 1



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Page 1 of 1

Sample Description: TW-13 Grab Water Sample	LLI Sample # WW 5794502
Buckeye Vacuum	LLI Group # 1164553
Project Name: Buckeye Vacuum	NM

Collected: 10/01/2009 11:48 by SB

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:48 Discard: 11/14/2009 Account Number: 11842

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
Wet Chemistry	EPA 300.0		mg/l	mg/l	
00224 Chloride		16887-00-6	48.5	2.0	10
	SM20 2540	с	mg/l	mg/l	-
00212 Total Dissolved Soli	ids	n.a.	709	19.4	1

General Sample Comments

		Labora	atory Sa	mple Analys:	is Record		
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224 00212	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	1	09285196101B 09278021201A	10/14/2009 06:16 10/05/2009 10:06	Ashley M Adams Susan E Hibner	10 1



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Page 1 of 1

Sample Description: TW-10 Grab Water Sample Buckeye Vacuum	LLI Sample # WW 5794503 LLI Group # 1164553 NM
Project Name: Buckeye Vacuum	
Collected: 10/01/2009 12:23 by SB	Account Number: 11842
Submitted: 10/02/2009 09:15	Stantec
Reported: 10/14/2009 at 15:48	2321 Club Meridian Drive

Suite E

Okemos MI 48864

Reported: 10/14/2009 at 15:48 Discard: 11/14/2009

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
Wet Chemistry 00224 Chloride	EPA 300.0	16887-00-6	mg/l 158	mg/l 40.0	200
00212 Total Dissolved Soli	SM20 2540 ds	C n.a.	mg/l 622	mg/l 19.4	1 .

General Sample Comments

		Labora	atory Sa	mple Analys:	is Record			
CAT 2	Analysis Name	Method	Trial#	Batch#	Analysis Date and Ti	me	Analyst	Dilution Factor
	Chloride Fotal Dissolved Solids	EPA 300.0 SM20 2540 C	-	09285196102A 09279021201A	10/13/2009 10/06/2009		Ashley M Adams Hannah M Royer	200 1



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Page 1 of 1

LLI Sample # WW 5794504 LLI Group # 1164553

NM

Sample Description:	TW-14 Grab Water Sample
	Buckeye Vacuum

Project Name: Buckeye Vacuum

Collected: 10/01/2009 12:56 by SB

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:48 Discard: 11/14/2009 Account Number: 11842

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No. Analysis Name		CAS Number	As Received . Result	As Received Method Detection Limit	Dilution Factor
Wet Chemistry 00224 Chloride	EPA 300.0	16887-00-6	mg/l 154	mg/l 40.0	200
00212 Total Dissolved So	SM20 2540 lids	C n.a.	mg/1 727	mg/1 19.4	1

General Sample Comments

		Labora	atory Sa	mple Analysi	s Record		、 、
CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
00224 00212	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	1 1	09285196102A 09279021201A	10/13/2009 04: 10/06/2009 09:	•	200 1



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Page 1 of 1

Sample Description: Dup #100 Grab Water Sample Buckeye Vacuum

LLI Sample # WW 5794505 LLI Group # 1164553 . NM

Project Name: Buckeye Vacuum

Collected: 10/01/2009 by SB

Submitted: 10/02/2009 09:15 Reported: 10/14/2009 at 15:48 Discard: 11/14/2009 Account Number: 11842

Stantec 2321 Club Meridian Drive Suite E Okemos MI 48864

CAT No. Analysis Name		CAS Number	As Received Result	As Received Method Detection Limit	Dilution Factor
Wet Chemistry 00224 Chloride	EPA 300.0	16887-00-6	mg/l 163	mg/l 40.0	200
00212 Total Dissolved Sol	SM20 2540 .ids	C n.a.	mg/l 714	mg/1. . 19.4	1

General Sample Comments

		Labora	tory Sa	mple Analys:	is Record			
CAT	Analysis Name	Method	Trial#	Batch#	Analysis Date and Ti	me	Analyst	Dilution Factor
00224	Chloride Total Dissolved Solids	EPA 300.0 SM20 2540 C	1 1	09285196102A 09279021201A	10/13/2009 10/06/2009	04:53 09:08	Ashley M Adams Hannah M Royer	200 1



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Page 1 of 1

Quality Control Summary

Client Name: Stantec Reported: 10/14/09 at 03:48 PM Group Number: 1164553

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Laboratory Compliance Quality Control

Analysis Name	Blank <u>Result</u>	Blank MDL	Report <u>Units</u>	LCS <u>%REC</u>	LCSD <u>%REC</u>	LCS/LCSD Limits	RPD	<u>RPD Max</u>
Batch number: 09285196101B Chloride	Sample numb N.D.	er(s): 579 0.20	94499-5794 mg/l ·	502 96	x.	90-110		
Batch number: 09285196102A Chloride	Sample numb N.D.	er(s): 579 0.20	94503-5794 mg/l	505 101		90-110		
Batch number: 09278021201A Total Dissolved Solids	Sample numb N.D.	er(s): 579 9.7	94499-5794 mg/l	502 98		80-120		
Batch number: 09279021201A Total Dissolved Solids	Sample numb N.D.	er(s): 579 9.7	94503-5794 mg/l	505 103		80-120		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS <u>%rec</u>	MSD <u>%REC</u>	MS/MSD Limits	<u>RPD</u>	RPD <u>MAX</u>	BKG Conc	DUP <u>Conc</u>	DUP <u>RPD</u>	Dup RPD <u>Max</u>
Batch number: 09285196101B Chloride	Sample 87*	number(s)	: 5794499- 90-110	-579450	2 UNSPH	K: P794493 29.5	BKG: P794493 28.6	3	20
Batch number: 09285196102A Chloride	Sample 98	number(s)	: 5794503- 90-110	-579450	5 UNSPI	K: 5794503 158	BKG: 5794503 172	8 (1)	20
Batch number: 09278021201A Total Dissolved Solids	Sample 97	number(s) 98	: 5794499 54-143	-579450 0	2 UNSPH 12	<pre>X: P794498 2,850</pre>	BKG: P794498 2,840	1	9.
Batch number: 09279021201A Total Dissolved Solids	Sample 113	number(s) 110	: 5794503- 54-143	-579450 2	5 UNSPE 12	K: P795166 467	BKG: P795166 447	4	9

*- Outside of specification

(1) The result for one or both determinations was less than five times the LOQ.

(2) The unspiked result was more than four times the spike added.

		Chev	evron	Gene	ric A	nalys	is Re	sanba	:t/Cha	Generic Analysis Request/Chain of Custody	stody	
A Lancaster Laboratories				Acct. #:		イン Samp	1842 For Lancaster Laboratories use only 1842 Sample # 5794499-505	ar Laborate う リ ソク・	ries use on	X SCR#∷	010315	l
Where quality is a science.							Analyses Requested	equested		Grp # 116455	Leyss 3	1
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	Orunty, Yeu	<u> </u>		F	<u>□</u> फ़्र)	N = HUO3 S = HSO3	I = I niosuitate B = NaOH D = Other	
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n/att	Br/98h			вюч (Рога Рога			.gnЯ be Sel Clea orth9M [o, G		☐ Must meet low possible for 82	Must meet lowest detection limits possible for 8260 compounds	
517. 349.9499	-ENC-L 15 #179	0.	336	J	er of C	Sð	Extend Silica (Silica (8021 MTBE Confirmation	irmation + Naphthalene	
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RW-3	60/1/01	1034	<u>7</u>	7				7	7			
7W-15	50/1/01	110	7	7				7	7			
TW-13	6e/1/01	8411	7	7				7	7			
JW-10	_7.	1223	7	7	-			<u> </u>	7			
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STD. TAT) 72 hour 48 hour 24 hour 4 day 5 day	4	Relinquished by:	hed by:			Date	Time	Received by	ة: م		Date Time	r
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Lancast Copies: White	Lancaster Laboratories, Inc., 2425 New Hoiland Pike, PO Box 12425, Lancaster, PA 17605-2425 Copies: White and yellow should accompany samples to Laboratories. The pink copy should I	nc., 2425 New t accompany s	Holland Pi amples to I	ъ Б.	2425, Land boratories.	aster, PA 17 The pink co	د ا	(717) 656-2300 s retained by the	00 the client.		3566 Rev. 1/31/02	

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Lancaster Laboratories Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

N.D. TNTC IU umhos/cm C Cai meq g ug	none detected Too Numerous To Count International Units micromhos/cm degrees Celsius (diet) calories milliequivalents gram(s) microgram(s) milliitor(c)	BMQL MPN CP Units NTU F Ib. kg mg I	Below Minimum Quantitation Level Most Probable Number cobalt-chloroplatinate units nephelometric turbidity units degrees Fahrenheit pound(s) kilogram(s) milligram(s) liter(s)
ml	milliliter(s)	ul	microliter(s)
m3	cubic meter(s)	fib >5 um/ml	fibers greater than 5 microns in length per ml

< less than – The number following the sign is the <u>limit of quantitation</u>, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

ppm parts per million – One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture.

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- confirmation columns >25%
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- B Value is <CRDL, but ≥IDL
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- M Duplicate injection precision not met
- N Spike amount not within control limits
- S Method of standard additions (MSA) used for calculation
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- W Post digestion spike out of control limits
 - * Duplicate analysis not within control limits
 - + Correlation coefficient for MSA < 0.995

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