2012 NEBRASKA ORDNANCE PLANT GROUNDWATER REPORT

METROPOLITAN UTILITIES DISTRICT WELL FIELD, NEBRASKA

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

STANDARD LIST - GLOSSARY OF TERMS AND ABBREVIATIONS

Alluvium: Unconsolidated terrestrial sediment composed of sorted or unsorted sand, gravel, and clay that has been deposited by water.

ARM: Absolute residual mean error. The ARM error represents the average of the absolute values of the differences between forecast and the corresponding observation.

Aquifer: An underground geological formation, or group of formations, containing water. Are sources of groundwater for wells and springs.

bgs: Below Ground Surface

CENWK: Kansas City District Corps of Engineers

CENWO: Omaha District Corps of Engineers

Drawdown: The drop in the water table or level of water in the ground when water is being pumped from a well.

Flood plain: The flat or nearly flat land along a river or stream or in a tidal area that is covered by water during a flood.

FNOP: Former Nebraska Ordnance Plant

gpm: Gallons per minute

Hydraulic conductivity (K): The rate at which water can move through a permeable medium. (i.e. the coefficient of permeability.)

Hydrogeology: The geology of ground water, with particular emphasis on the chemistry and movement of water.

LPNNRD: Lower Platte North Natural Resources District

LWS: Lincoln Water System

mgd: Million gallons per day

MODFLOW: Groundwater flow model developed by McDonald and Harbaugh (1988) with the USGS.

MODPATH: Groundwater particle tracking model developed by Pollock (1989) with the USGS.

MUD: Metropolitan Utilities District

NDNR: Nebraska Department of Natural Resources

NOPGR: Nebraska Ordnance Plant Groundwater Report

NRMS: Normalized root mean square error. The NRMS error is the standard deviation of a series of measurements divided by the range of observed values.

NWIS: National Water Information System

Potentiometric surface: The surface to which water in an aquifer can rise by hydrostatic pressure.

RDX: Hexahydro-1,3,5-trinitro-1,3,5-triazine

Riverbed conductance: A numerical parameter used by MODFLOW to calculate the leakage between the river and the aquifer.

TCE: Trichloroethylene

Unconfined aquifer: An aquifer containing water that is not under pressure; the water level in a well is the same as the water table outside the well.

UNLCSD: University of Nebraska – Lincoln Conservation and Survey

USACE: U.S. Army Corp of Engineers

USEPA: United States Environmental Protection Agency

USGS: U.S. Geological Survey

1 INTRODUCTION

The Metropolitan Utilities District (MUD) is responsible for providing potable water to the Greater Omaha (Nebraska) Metropolitan area. Based on the continuing growth in population and water demands in Greater Omaha, and constraints on supplies, MUD previously determined that a potential long term shortage in water existed. To remedy this situation, the District studied various alternatives and selected a source of water from the Platte River valley west of Omaha as the best alternative, known as the Platte West Well Field (well field). Construction of the well field and associated water treatment facilities was completed in July 2008. As a result, this project has increased MUD's peak day raw water capacity by 100 million gallons per day (mgd) to the current maximum of approximately 334 mgd.

The installation of transmission pipelines for the well field necessitated crossing the Platte River, Elkhorn River, and associated wetlands; therefore, MUD obtained a Clean Water Act Section 404 Permit (No. 199910085), referred to as Permit in this document. The Permit is administered by the Omaha District Corps of Engineers (CENWO). One of the Permit's requirements is an annual report concerning the Former Nebraska Ordnance Plant (FNOP). The FNOP site occupies approximately 17,250 acres located one-half mile south of Mead, in Saunders County, Nebraska. Groundwater contaminants in the form of explosives (associated with loading, assembling, and packing of munitions at four bomb load lines) and chlorinated solvents (associated with Atlas missile activities), underlie portions of the FNOP site. These groundwater contaminants are contained on site by a battery of pumping wells, maintained by the United States Army Corps of Engineers (USACE).

The purpose of this document, the Nebraska Ordnance Plant Groundwater Report (NOPGR), is to fulfill the annual reporting requirement. The objective of the NOPGR is to use available hydrogeologic data, both physical and chemical, as well as groundwater modeling to evaluate the impact of the operations of the well field on the aquifer and, more specifically, on the contaminant plumes and remediation efforts at the FNOP. The remainder of this section provides a general discussion of the project background and describes the overall purpose of work presented within this report. The report is organized as follows:

- **Section 1** – Introduction
- **Section 2** – Well Field Pumping
- **Section 3** – Hydrologic Data Analysis
- **Section 4** – Water Quality Data Analysis
- **Section 5** – Groundwater Model Simulations
- **Section 6** – Summary and Conclusions

1.1 PROJECT LOCATION

The well field is located on 2,230 acres of land in southeastern Nebraska encompassing both sides of the Platte River in Douglas and Saunders Counties. The well field consists of 42 production wells that pump water from the Platte River alluvial aquifer. The raw water is delivered to a new treatment plant in western Douglas County through a 3.5 mile long, 72-inch diameter pipeline. Treatment plant construction was completed in the summer of 2008. The treatment plant is located on a 158 acre site northeast of the intersection of Q and 216th Streets. The well field and study area locations are shown of Figure 1-1.

1.2 PERMIT REPORTING REQUIREMENTS

Section H of the Permit describes specific post-start up conditions that are required for operation of the well field. This NOPGR was developed to address Section H Permit Condition 62, which relates to the

annual reporting of water quality and hydraulic groundwater data collected from wells within the well field's monitoring network. An additional requirement of the permit is semi-annual updating of the existing groundwater model and reporting of those updates in the annual groundwater report (NOPGR). The general purpose of the Permit Conditions described in Section H are to ensure that the operations of the well field do not impact the contaminant plumes or the remediation efforts at the FNOP. The following section presents a summary of Section H Permit Condition 62, as they relate to the development of the NOPGR:

- Condition 62a – MUD will collect potentiometric surface elevation data on a monthly basis, for a period of at least one year after the startup of the well field. The potentiometric data will be obtained from monitoring wells located in coordination with the USACE.
- Condition 62b – MUD will collect groundwater samples for chemical analysis on a semi-annual basis from monitoring wells located in coordination with the USACE.
- Condition 62c – MUD will update the existing groundwater model on a semi-annual basis using data collected from the monitoring program to evaluate the potential impact of the well field on the operations at the FNOP.
- Condition 62f – MUD will develop the NOGPR to summarize the activities described in the above conditions. The NOPGR will be submitted on an annual basis for review by the Corps of Engineers, with the first NOPGR due within one year of well field startup.

1.3 SUMMARY OF PREVIOUS MODELING

The groundwater modeling activities presented in this NOPGR are a continuation of previous well field modeling activities that started in 1993 with the development of the Pre-Design model documented in the *Preliminary Engineering Study and Pre-Design Report* (HDR, 1993). The Pre-Design model was modified and improved during the Environmental Impact Statement (EIS) process, ultimately evolving into the model presented in the Final Environmental Impact Statement (FEIS) (Burns & McDonnell, 2002).

Prior to well field construction and startup, a more comprehensive groundwater modeling effort was undertaken by MUD. This effort used the results of the work presented in the FEIS as a point of departure to develop a groundwater model capable of depicting the influence, if any, of the well field on the FNOP contaminant plumes, the FNOP operating remedial system, and other area water users. The groundwater model was developed to simulate various operating scenarios and estimate the impact of an operational well field on water levels in the aquifer. This modeling effort was undertaken in phases, with the phases of work and associated major deliverables summarized below:

- Phase I - Well Field Installation and Assessment, completed December 2004.
- Phase II - Operations Assessment and Planning, January 2005 through December 2005.
- Phase III - Well Field Pre-Start-Up Support July 2005 through August 2008.
- Phase IV - Well Field Operations 2008 and Post Start-Up (ongoing).

The Permit describes specific numerical groundwater modeling tasks which are presented in Conditions 61 (c) and 62 (c) of Section H of the Permit. To date, two major groundwater modeling efforts have been developed to satisfy the requirements of the Permit and to develop an operational tool for MUD. The Phase I modeling effort is summarized in the *Well Field Groundwater Modeling Study* (Chatman and Associates, Inc., 2004). The Phase II modeling effort is summarized in the *Platte West Well Field/Groundwater Modeling Study* (Chatman and Associates, Inc., 2005).

As part of the Phase III project activities, the transmissivity of the aquifer near the well field was better quantified by analyzing the 48-hour aquifer tests performed on the 32 new production wells. These tests

were performed using a minimum of three (3) observation wells and were analyzed using the Cooper-Jacob distance drawdown method (Cooper-Jacob, 1946). The results of this analysis were presented as an Appendix to the 2008 NOPGR (Layne Christensen, 2009).

Also part of the Phase III activities, a detailed aquifer test and groundwater modeling exercise was performed to better quantify the degree of interconnection between the Platte River and the alluvial aquifer. The results of this activity were presented in *Induced Infiltration Aquifer Test - Riverbed Conductance Summary Report Saunders County Test* (Layne Christensen, 2008a), and were included as an Appendix to the 2008 NOPGR.

1.3.1 PHASE IV – GROUNDWATER MODEL POST AUDIT

1.3.1.1 2009 NOPGR SUMMARY

The 2009 NOPGR was structured as a model post audit to evaluate the ability of the groundwater model to reproduce the observed aquifer response to the first eight (8) months of well field pumping (February through September, 2009). During this period, the well field pumping rate averaged 36.8 mgd. To accomplish this objective, the monthly average flow rate for each of the 42 production wells was input into the model and the model was run to simulate transient conditions, using twelve one month stress periods that represented the October 2008 to September 2009 reporting period. The model-predicted drawdown was compared to the observed drawdown at 19 monitoring well sites equipped with pressure transducers/data loggers.

The results of the 2009 NOPGR post audit showed that the groundwater model accurately predicted the impact of well field operations on the Platte River alluvial aquifer. The transient drawdown hydrographs generated for 19 monitoring wells showed that the model accurately reproduced both the observed rate of expansion and the overall magnitude of the cone of depression created by operating the well field. Most observed drawdown values fell near or within the appropriate contour interval of the model-predicted drawdown for the end of September 2009 pumping period (Figure 5-4 in 2009 NOPGR). The groundwater model post audit conducted as part of the 2009 NOPGR validated the ability of the groundwater model to accurately reproduce the impact of well field pumping on the water level elevations in the Platte River alluvial aquifer.

1.3.1.2 2010 NOPGR SUMMARY

The predictive capability of the model was evaluated a second time through the 2010 NOPGR. The 2010 NOPGR was conducted as extension of the model post audit performed in 2009 by increasing the length of the model simulation to 24 one month stress periods, representing the groundwater conditions from October 2008 to September 2010. To further test the predictive capabilities of the groundwater model MUD shut off all nine pumping wells located in section 19 (in Saunders County) from the beginning of November 2009 through the end of February 2010. Before that time, the section 19 wells had operated from February 11, 2009 through November 2009.

The observed aquifer recovery, and the model simulation of the prolonged shut down of the section 19 wells, was presented in hydrographs that were summarized on Figure 5-3 of the 2010 NOPGR. These hydrographs illustrated the groundwater models accurate reproduction of both the drawdown in the aquifer that was induced when the well field began operations in February 2009, and the recovery in the aquifer that occurred when all wells in Section 19 (Saunders County) were shut off from November 2009 through the end of February 2010. This extended model post audit confirmed that the groundwater model accurately predicts the magnitude and pattern of groundwater elevation changes around the well field. These analyses provide confirmation that the aquifer parameters and degree of interconnection between the river boundary and the aquifer used in the groundwater model are appropriate.

1.3.1.3 2011 NOPGR SUMMARY

Observed groundwater elevations, chemical sampling data, and updated groundwater model results for the 2011 water year were presented in the 2011 NOPGR (HDR, 2012). MUD addressed comments provided by the USACE on the draft of this document, however at the time of the development of this 2012 NOPGR, the 2011 NOPGR has not been approved as final.

1.4 SCOPE OF SERVICES

In accordance with the Permit, a third party consultant is to assist MUD in the preparation of the NOPGR. This scope of services includes evaluation of hydraulic and water quality data to determine the impact of the well field on both the groundwater elevations and chemistry of the aquifer, as well as updating the existing groundwater flow model. In accordance with the Permit, the groundwater model was developed to depict the influence, if any, of the well field on the FNOP contaminant plumes, the FNOP operating remedial system, and other area water users. Additionally, the groundwater model was developed to simulate various operating scenarios and estimate the impact of an operational well field on water levels in the aquifer.

1.4.1 REFERENCES TO PREVIOUS MODELING REPORTS

As previously stated, the NOPGR is a submittal required by the Permit and is a continuation of a series of modeling studies and reports, of which the first report was developed in 2004. The NOPGRs are a summary of the hydrogeologic data collected during a one year monitoring period and a summary of the update of an existing groundwater model. Given the ongoing nature of the modeling activities and the numerous modeling related submittals that have been completed during the life cycle of the well field project, it is not practical to include a detailed summary of all model construction/calibration/sensitivity/post audit analyses performed from 2003 through 2011. If specific questions related to model construction, calibration, or sensitivity analysis arise during the review of the NOPGR, it is assumed the reviewers of this document have access to copies of the previous groundwater modeling reports. The most comprehensive reference on model construction, model calibration, sensitivity analyses (both of calibration residuals and model predictions), and predictive analyses performed can be found in the Phase II modeling report, the *Platte West Well Field/Groundwater Modeling Study* (Chatman and Associates, Inc., 2005).

If copies of these documents are not available to the reviewer, the documents can be downloaded on the MUD website, at http://www.mudomaha.com/plattewest/documents/contents.html. Previous documents that are relevant to groundwater modeling include:

:

- Phase I Baseline Groundwater Modeling Report (Chatman and Associates, Inc., 2004)
- Phase II Groundwater Modeling Report: *Platte West Well Field/Groundwater Modeling Study* (Chatman and Associates, Inc., 2005)
- 2008 NOPGR (HDR, 2009);
- 2009 NOPGR (HDR, 2010);
- 2010 NOPGR (HDR, 2011); and
- 2011 NOPGR (HDR, 2012).

1.4.2 REPORTING PERIOD

The typical reporting period for past NOPGR reports coincided with the United States Geological Survey (USGS) Water Year, from October 1 of the previous year to September 30 of the current year. However, at a meeting between MUD and the USACE on August 9, 2012, it was decided that the reporting period

for the 2012 NOPGR would be from October 1 of 2011 through the end of August 2012. This decision was made so that MUD could coordinate field efforts to download pressure transducers from its monitoring wells with the semi-annual water level monitoring event organized by the Lower Platte North Natural Resources District (LPNNRD), which was scheduled for the end of August 2012. In the past, MUD had downloaded its pressure transducers at the end of September. This decision was made to provide the best data for evaluation of the impact of the 2012 drought. Future NOPGR updates will return to the full water year time period that was used in past NOPGR reports.

2 WELL FIELD PUMPING

Intermittent well field pumping began in July 2008 from both the Douglas and Saunders County sides of the well field. Much of the well field pumping conducted in July and August 2008 was related to: filling plant basins, testing plant equipment, and shakedown testing of the overall well field, piping, and treatment process. Pumping associated with shakedown testing continued through the middle of October 2008. The well field did not operate from mid-November 2008 to mid-February 2009.

The well field began pumping operations on February 11, 2009 and has continued operations through the end of the reporting period of September 2010. Each supply well in the well field is equipped with an individual flow meter, which allows for accurate measurement of individual well flow rates. The well field Supervisory Control and Data Acquisition (SCADA) system tracks total flow from each well in mgd. Those daily data are provided by MUD to HDR and are used to calculate the pumping rates input into the NOPGR modeling update. A chart illustrating the monthly well field pumping rate for the duration of well field operations, including the 2012 reporting period, has been included as Figure 2-1.

In response to the drought of 2012, which began in mid June, pumping from the well field was voluntarily reduced in August 2012 to help maintain streamflow in the Platte River for downstream users. During the drought, Omaha's water demand for August 2012 was met by shifting raw water pumping to the Platte South well field and the Florence surface water intake. For the 2012 reporting period, the total daily pumping rate fluctuated from a low of 20.3 mgd, recorded in February 2012, to a high of 56.6 mgd recorded in July 2012. The average monthly pumping rate for the 2012 water year was 31.9 mgd, which is lower than both the 2011 average (37.2) and the 2010 average (32.6 mgd). Average monthly flow rates are summarized in the table below.

Table 2-1 Average Well Field Pumping Rate by Month (Oct 2011 to Sep 2012)

Year	2011			2012								
Month	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP
Douglas Co. Monthly Average Pumping (mgd)	8.8	4.3	5.5	7.2	3.8	4.3	7.9	10.8	13.5	19.1	10.7	0.0
Saunders Co. Monthly Average Pumping (mgd)	34.7	20.9	21.4	22.0	16.6	16.9	25.5	29.6	34.6	37.5	27.3	0.0
Totalized Well Field Monthly Average Pumping, (mgd)	43.6	25.2	26.8	29.2	20.3	21.2	33.4	40.4	48.0	56.6	38.1	0.0
Percentage of Well Field Flow from Douglas Co.	20.3%	17.1%	20.3%	24.8%	18.6%	20.1%	23.7%	26.7%	28.0%	33.7%	28.2%	0.0%

2.1 PUMPING DISTRIBUTION

The operational plan for well field was to simultaneously pump water from both the Douglas County and Saunders County sides of the well field at an approximate distribution of 35 and 65 percent of total pumping, respectively. This pumping distribution is not a condition of the Permit, but rather a design concept for how the well field and treatment plant would be operated. As shown in the table above (Table 2-1), the well field was operated with an average pumping distribution of 22 percent of the total flow being supplied by the Douglas County side of the well field. As operated, the average daily pumping distribution was 8 mgd from the Douglas County wells and 23.9 mgd from the Saunders County wells. This pumping distribution will continue to fluctuate seasonally, depending on several variables including water demand, streamflow, and other climatic conditions.

3 HYDROLOGIC DATA ANALYSIS

The following section presents an analysis of the hydrologic data collected as part of the monitoring program associated with the operation of the well field. The data includes pre and post-well field startup conditions and are comprised of water levels collected at observation wells and stream stage and flow data collected at existing USGS stream gauges.

MUD began collecting water levels from monitoring wells located in Douglas, Sarpy, and Saunders Counties in 1990. The monitoring well network was expanded in Douglas and Saunders Counties in 1995, and later expanded again with the addition of new monitoring wells in 2004 through 2006. All monitoring wells currently located in MUD's groundwater monitoring network are illustrated on Figure 3-1. Initially, water levels were measured manually at regular time intervals using electronic water level indicators; however, in 2004 MUD began equipping all the monitoring wells with pressure transducers/data loggers. Each pressure transducer/data logger collects and records a water level measurement at least once per day. Presently, MUD continues to make manual water level measurements at least twice yearly to check the accuracy of the pressure transducers/data loggers. The more recent water level data collection program, initiated as part of the Permit operating conditions, supplements the historical data collected by MUD and was evaluated in context with the more than 15 to 20 years of historical water level data collected prior to operation of the well field. Appendix 3-1 includes updated historical hydrographs from seven (7) monitoring wells in Douglas County (MW90-5, MW 90-6, MW 90-7, MW 90-12, MW 90-13, MW 94-1, and MW 94-2) and six (6) monitoring wells in Saunders County (MW 90-10, MW 94-3, MW 94-4, MW 94-5, MW 94-6, and MW 94-7). The updated hydrographs presented in Appendix 3-1 include water level data through the end of the NOPGR reporting period.

The objective of the analysis presented in the NOPGR is to use the hydrologic data and analyses presented in this section to evaluate potential impacts to the FNOP contaminant plumes and hydraulic containment system which could occur as a result of well field pumping. Because the FNOP contaminant plumes and hydraulic containment system are located in Saunders County, and the Platte River forms a hydraulic divide between Saunders and Douglas Counties, only hydrologic data from Saunders County were incorporated into the analysis of well field impact. Data collected from the Douglas County side of the well field have been included in the NOPGR to evaluate the overall performance of the groundwater model. However, these data are not relevant to issues related to the FNOP site.

3.1 NEW HYDROLOGIC DATA

Water level measurements were collected and recorded at all wells located in the monitoring network that was developed in cooperation with the USACE, as prescribed by Permit condition 62a. The monitoring network is shown on Figure 3-1 and consists of 41 monitoring wells equipped with pressure transducers. The monitoring wells are operated and maintained by one of three organizations: Lower Platte North Natural Resource District (LPNNRD), MUD, or the USACE. The following sections describe the hydrologic data that were utilized to evaluate the impact of the well field on the Platte Valley alluvial aquifer.

3.1.1 HYDROGRAPH INTERPRETATIONS

A water level hydrograph was plotted for each monitoring well equipped with a pressure transducer. In Douglas County, these wells include: MW90-5, MW90-6, MW90-7, MW90-12, MW90-13, MW94-1, MW94-2, MW05-24, MW05-25, MW05-26, and MW06-29. In Saunders County, these wells include: MW90-10, MW94-3, MW94-4, MW94-5, MW94-6, MW94-7, MW04-17, MW05-22, MW05-23, MW06-28, MW06-30, and MW06-31. A hydrograph for well MW06-27 was not generated because this well is located adjacent to a farmed field and the crop had not been harvested at the end of August when the field data was collected. These wells are all operated and maintained by MUD. Monitoring well

MW06-29 experienced a brief data collection error during the 2012 reporting period, which created a small data gap in the hydrograph.

Hydrographs were also generated for wells located in Saunders County that are not operated and maintained by MUD. These include the following wells, which are operated and maintained by the USACE: MW38-A, MW39A, MW46A, MW-56A, MW-106A, MW-110A, and MW-112A. Additionally, wells MW06-18 and MW06-19, which are operated and maintained by the LPNNRD, were included in the analysis. LPNNRD monitoring wells MW06-20 and MW06-21 have previously been included in the NOPGR, however data for these monitoring wells was not provided to MUD in time to include with the 2012 NOPGR. All data provided to HDR as of December 28, 2012 has been used to develop the hydrographs presented in this section.

3.1.1.1 RESPONSE OF WELLS NEAR WELL FIELD

Hydrographs for the monitoring wells located less than one mile from the well field have been included in Appendix 3-1 or Appendix 3-2. These hydrographs clearly show the impact of well field pumping on the groundwater elevations of the Platte River alluvial aquifer through the cycle of drawdown and recovery that can be observed in many of the hydrographs. For the 2012 water year, water levels were at their highest during the period of April through May, as water level elevations within the well field were rebounding from a period of low pumping from the Saunders County wells (less than 17 mgd per month for February and March). As the pumping from the Saunders County wells increased, up to 56.6 mgd in July, the water levels in the aquifer near the well field declined in response. Water levels near the well field began to rebound almost immediately after well field pumping was reduced in August, as seen in the hydrographs for MW94-4, MW04-17, MW05-22, and MW05-23. When reviewing the hydrographs for these near well field monitoring wells, it is important to note that the lowest water level elevations observed in these wells during the summer of 2012 are typically not the lowest water level observed for the entire historical dataset. This indicates that MUDs voluntary reduction in pumping from the well field was effective in minimizing the drawdown induced by the well field during the drought.

3.1.1.2 RESPONSE OF WELLS OVER ONE MILE FROM WELL FIELD

Monitoring wells located more than one mile from the boundary of the well field that are owned and operated by MUD include MW94-5, MW 94-6, MW94-7, and MW06-28. The hydrographs developed for these wells illustrate a water level signal that is typical of alluvial wells until June 2012. At that time, a decline in the water level elevation is observed at each of these wells. The decline in water level elevation from May to August 2012 at these wells is more than the change in water level observed at the monitoring wells located near the well field. Many of these wells are located near a center pivot irrigation well, and the decline appears consistent with irrigation pumping.

All of the monitoring wells operated and maintained by the USACE and LPNNRD were impacted by local irrigation pumping during the drought of 2012. The hydrographs of these wells show no signs of being impacted by well field operations. In most of these wells, pumping associated with the irrigation season causes the water level elevations to decline, followed by a period of water level recovery after the irrigation season is complete. Careful review of these hydrographs shows that nearly each of these wells experienced a sharp decline in water level elevation due to irrigation pumping in the summer of 2012. Examples of these irrigation signatures can be seen on the hydrographs for wells MW06-18, MW06-19, MW06-28, MW06-30, MW06-31, MW38-A, MW39A, MW46A, MW-56A, MW-106A, MW-110A, and MW-112A.

3.1.2 POTENTIOMETRIC SURFACE

Contours of the potentiometric surface of the Platte River alluvial aquifer and the Todd Valley aquifer were developed using data collected during the LPNNRD coordinated water level monitoring event, using data collected at the end of March 2012 and the end of August 2012. Water level measurements are taken by the following organizations in an effort to better document the potentiometric surface within Saunders County:

- LPNNRD,
- MUD,
- Kansas City District Corps of Engineers (CENWK), and
- United States Geological Survey (USGS).

Approximately 180 monitoring wells were used to develop the potentiometric surface map of the study area, the locations of which are shown on Figure 3-2a (March) and Figure 3-2b (August). Previous NOPGR submittals included numerous potentiometric surface maps, including several developed before the well field was constructed, for comparison purposes. The magnitude and direction of the hydraulic gradient presented on Figure 3-2a continues to be very similar to previous pre-pumping potentiometric surface maps generated by others, including:

- Souders, 1967. Availability of Water in Eastern Saunders County, Nebraska;
- Nebraska Department of Natural Resources (NDNR), 1995. Configuration of the Water Table, 1995;
- Chatman and Associates, Inc., 2005. Phase II Platte West Well Field Groundwater Modeling Study;
- URS, 2006. 2006 Groundwater Modeling Report Operable Unit No. 2; and
- 2009, 2010, and 2011 NOPGR studies.

The potentiometric surface of the Platte Valley and Todd Valley aquifers presented on Figure 3-2a and Figure 3-2b illustrates that the well field continues to remain hydraulically cross-gradient of the FNOP site after 3 years of continuous pumping at an average flow rate of over 34 mgd, including 25 mgd from Saunders County wells. The pattern and shape of the potentiometric surface in the Todd Valley, where the majority of the FNOP site is located, has not changed due to the operation of the well field, even during a significant drought. Groundwater flow directions along the eastern perimeter of the FNOP site have not changed as a result of well field pumping.

3.1.3 POTENTIOMETRIC SURFACE CHANGE DURING DROUGHT

Figure 3-3 was developed to illustrate the magnitude and spatial distribution of changes in water level elevations during the drought of 2012. This figure was developed by subtracting the observed August 2012 water level elevation from the observed March 2012 water level elevation, as reported in the data collected from the two LPNNRD coordinated water level monitoring events. As can be seen on this figure, the largest decline in water level elevations are observed in monitoring wells located near the City of Lincoln's well field (near Ashland), and in several monitoring wells that are located in the uplands area. The uplands region is characterized by low permeability sediments and the large water level declines were observed in monitoring wells are located near irrigation wells that provide water for a center pivot.

The data presented on Figure 3-3 clearly illustrates that the voluntary reduction in pumping from the Platte West well field helped to minimize water level declines near the well field during the drought. Water level declines from March 2012 to August 2012 were also minimal at the FNOP site.

3.1.4 CONTINGENCY PLAN ACTION LEVELS

Table 3-1 compares the observed water level elevations at each Well Field Contingency Plan monitoring well to the Tier 1 and Tier 2 action levels identified in that document (Layne Christensen, 2008b). In the Well Field Contingency Plan, a Tier 1 trigger level was defined as the water surface elevation that is one (1) foot lower than the anticipated post-startup groundwater elevation and a Tier 2 trigger level included the plausible additional lowering of the water surface elevation due to the natural seasonal changes on the groundwater levels. It is assumed the reviewers of this report have access to a copy of the Well Field Contingency Plan. If a copy is not available, the document can be downloaded on the MUD website, at the following URL:

- http://www.mudomaha.com/plattewest/documents/2008/wellfield.contingency.10.10.pdf

Water level elevations thorough out the Platte Valley, Todd Valley, and Uplands area were much below normal during the Summer of 2012 due to the drought and the resulting increase in irrigation pumping. As shown on Table 3-1, water level elevations were below the well specific Tier 1 value at many well sites during the summer. At some well sites, the water level elevation was also below the Tier 2 value.

All of the wells where a Tier 2 value was exceeded are near irrigation wells and careful review of the hydrographs of these wells indicated that the groundwater elevation at these wells was impacted by seasonal irrigation pumping. The impact of irrigation pumping on water levels in the monitoring wells used in the Contingency Plan was discussed in a meeting between MUD and the USACE on August 9, 2012. At the meeting it was agreed that the depressed water levels observed in August were a result of the significantly above normal pumping required for the 2012 irrigation season, and that the water levels in the monitoring wells should be checked against the Contingency Plan levels after the irrigation season was complete (to monitor rebound).

Contingency action levels were also reviewed using water elevations collected during September 2012, and only one well (MW90-10) was below the Tier 2 trigger level. The cause of this low water level was attributed to the continued influence of a nearby irrigation well; therefore, no further action was required by MUD at this time. The evaluation process followed to reach this conclusion is presented on the Tier 1 flow chart in the Well Field Contingency Plan (Layne Christensen, 2008b).

3.2 CLIMATIC CONDITIONS AND STREAMFLOW

During this NOPGR reporting period, Eastern Nebraska experienced a drought which was characterized as extreme or exceptional by National Oceanic and Atmospheric Administration (NOAA) Regional Climatic Data Center. As a result of the drought, streamflow conditions observed within the study area were very low during the summer months. Streamflow conditions within the study area were evaluated using data posted and distributed by USGS National Water Information System (NWIS). To evaluate the streamflow conditions of local water bodies near the well field, hydrologic data was obtained from the following USGS gauging stations:

- Platte River – at Leshara;
- Platte River – at Venice (near the well field);
- Platte River – at Ashland; and
- Elkhorn River at Waterloo.

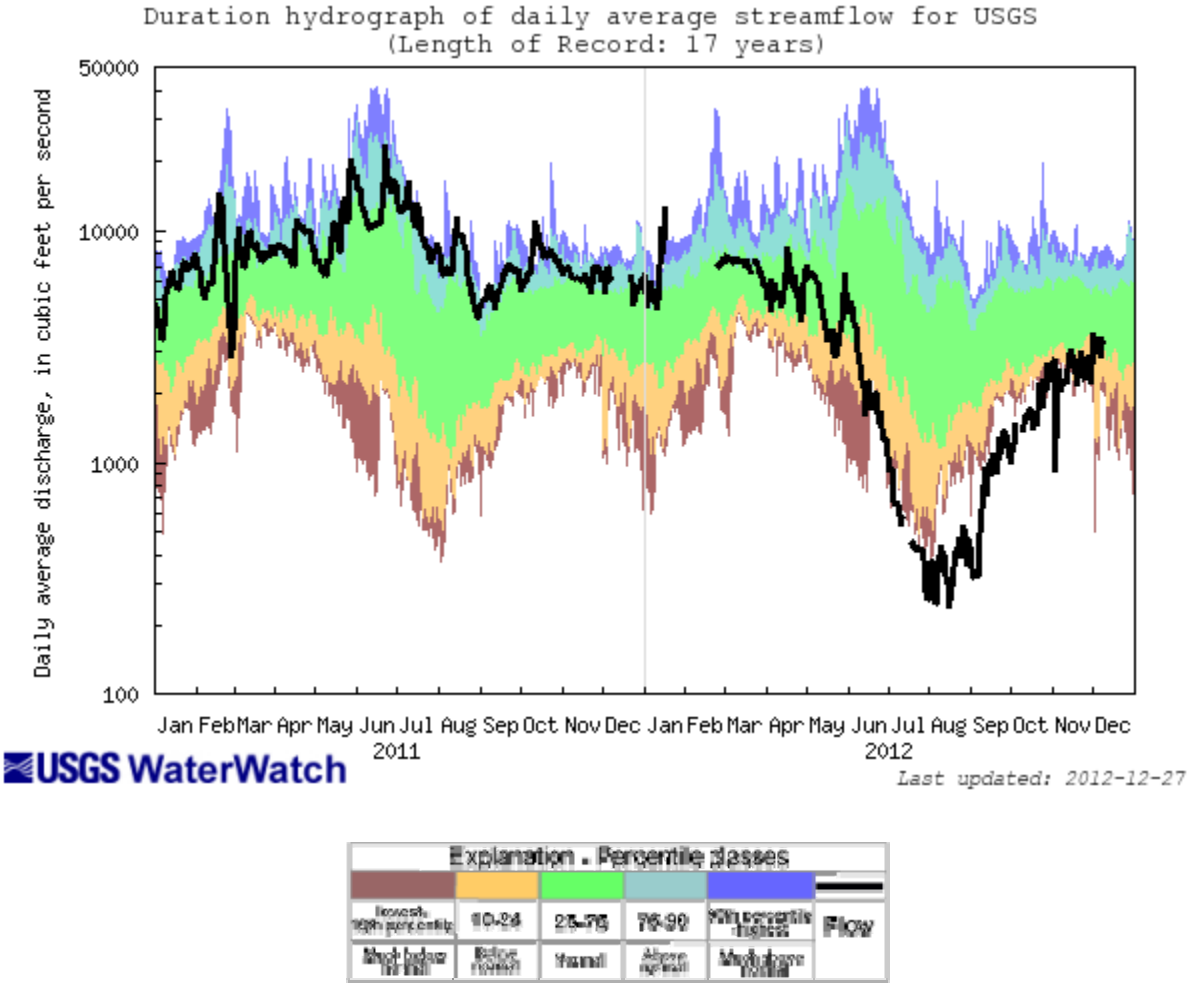
3.2.1 PLATTE RIVER

The mean flow for the 2012 water year for the USGS gage on the Platte River near Leshara, NE (06796500) was 4,310 cfs. According to the USGS flow duration curve for this station, this flow is

slightly less than the median flow of 4,440 cfs over the period of record. However, the minimum daily flow measured during the 2012 water year was 206 cfs, which according to the flow duration curve is exceeded more than 98% of the time. Though the period of record at the Leshara gage is relatively short, established in 1994, 206 cfs is the second lowest flow measured at the gage. The lowest flow of 199 cfs was measured in 2006.

As shown on the figure below (Figure 3-4a) stream flow conditions for the Platte River during the 2012 water year can be characterized as much above normal to normal until early June, when streamflow drops significantly until reaching extreme low flow conditions in August and September. The conditions observed in the Platte River during August and September 2012 are characterized as 90 percent exceedance (or higher) streamflow. Hydrographs for each of the USGS listed USGS gauge sites are provided in Appendix 3-3.

Figure 3-4a – Duration Hydrograph for the Platte River at Leshara

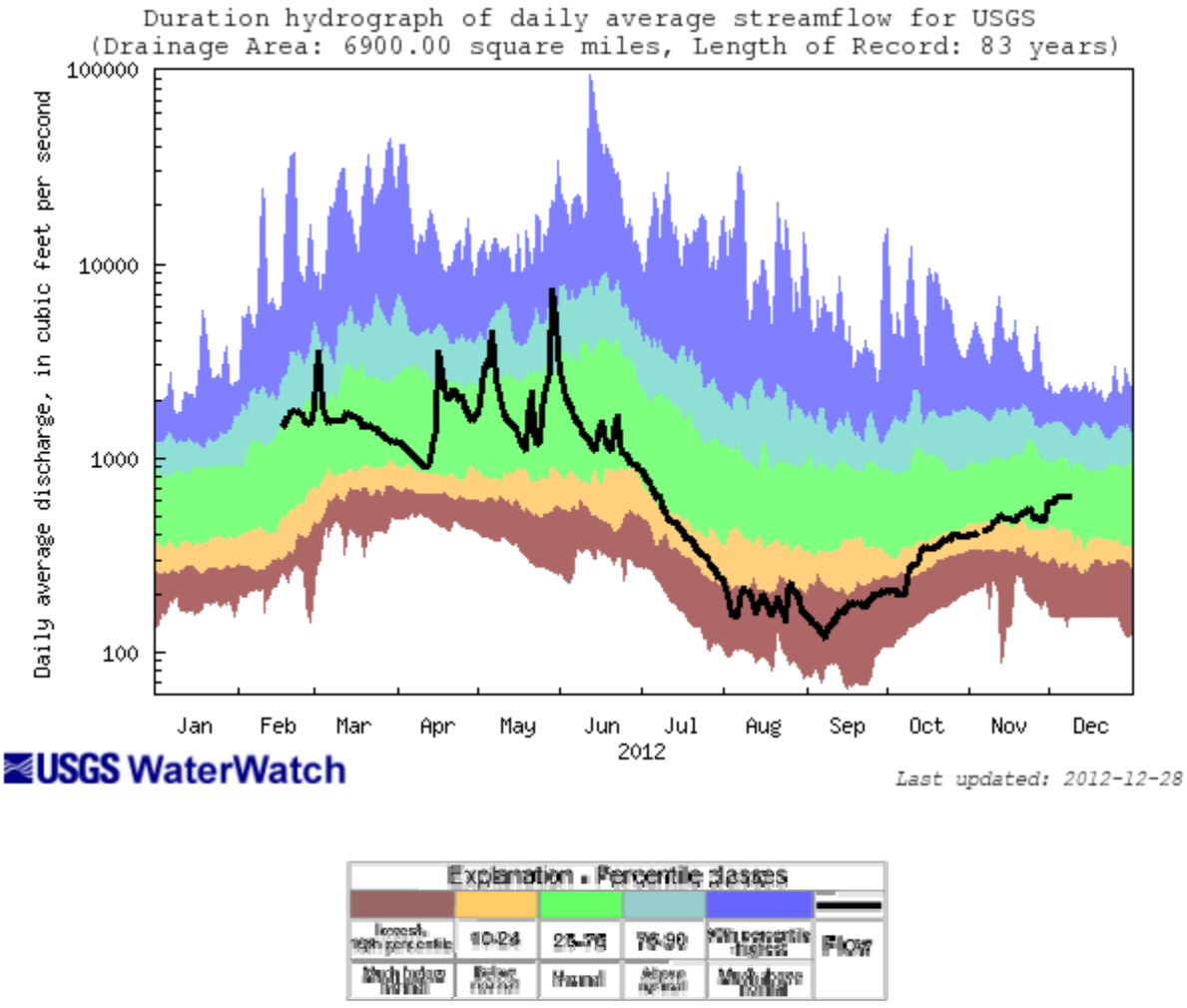


3.2.2 ELKHORN RIVER

The mean flow for the 2012 water year for the USGS gage on the Elkhorn River at Waterloo (06800500) was 1,150 cfs. According to the USGS flow duration curve for this station, this flow is slightly greater than the mean flow of 1,426 cfs over the period of record. However, the minimum daily flow measured

during the 2012 water year was 134 cfs, which according to the flow duration curve is exceeded more than 98% of the time. As shown on the figure below (Figure 3-4b) stream flow conditions for the Elkhorn River during the 2012 water year can be characterized as normal until early June, when streamflow drops significantly until reaching extreme low flow conditions in August and September.

Figure 3-4b – Duration Hydrograph for Elkhorn River at Waterloo



4 WATER QUALITY DATA ANALYSIS

The following section presents an analysis of the groundwater chemistry data collected as part of the monitoring program associated with the operation of the well field. The groundwater water quality data collected includes pre and post-well field startup data and consists of groundwater samples collected from wells that are part of the monitoring network that was developed in coordination with the USACE. The monitoring network includes wells owned by MUD and wells owned by CENWK. The objective of the analysis presented in this NOPGR is to evaluate the potential impact of well field operations on the travel path of the FNOP contaminant plumes or the remediation efforts at the FNOP site. Because the FNOP contaminant plumes and hydraulic containment system are located in Saunders County, only water quality data from Saunders County were incorporated into the analysis.

4.1 BASELINE FNOP PLUME

A total of seven chemicals were assigned cleanup goals for the FNOP site by the USEPA in the Record of Decision (ROD) document. Three of these chemicals are classified as volatile organic compounds (VOCs) and the other four chemicals are classified as explosives. Trichloroethene (TCE) is the most commonly detected VOC at the site and is used as an indicator for VOCs at the site. Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) is the most commonly detected explosive compound in groundwater at the FNOP site and is used as an indicator for explosives in groundwater at the site. Site specific cleanup goals and details on the use of RDX and TCE as indicator compounds to define the extent of groundwater contamination at the FNOP site can be found in the 2009 Containment Evaluation (ECC, 2010).

As required by the Permit, MUD requested and obtained the most recent interpretation of the extent of the FNOP contaminant plumes. This interpretation of the current understanding of the extent of the FNOP plumes, as provided by CENWK for 2012 (presented in Appendix 4-1).

4.1.1 HISTORICAL WATER QUALITY DATA

A groundwater quality monitoring program was initiated by MUD in 2005 to collect background, pre-well field startup, groundwater chemistry data from wells located within MUD's groundwater monitoring network. These data are summarized in the following monitoring reports:

- 2005 Annual Groundwater Monitoring Report (MUD, 2006);
- 2006 Annual Groundwater Monitoring Report (MUD, 2007); and
- 2007 Annual Groundwater Monitoring Report (MUD, 2008).

The post-startup groundwater chemistry data collection program supplements the historical data collected by MUD since 2005 and was evaluated in context with the data collected prior to the well field startup.

4.1.2 2011 NOPGR WATER QUALITY DATA

Under an agreement with MUD, Olsson Associates (OA) conducted two rounds of groundwater samples during this reporting period: May 2012 and October 2012. The wells sampled by OA include wells: MW-39 A and D, MW06-18 A and B, MW06-30 A and B, and MW06-31 A and B. The locations of these wells are shown on Figure 3-1. The groundwater samples collected from these wells sites were analyzed for volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) SW-846 Method 8260B and for explosives by EPA SW-846 Method 8330. All laboratory analyses were performed by Test America, Inc. The samples were analyzed by Test America of Burlington, Vermont.

The results of each sampling event were summarized by OA in a Quality Control Summary Report (QCSR). The QCSRs for both 2012 sampling events has been included in Appendix 4-2. Complete sampling results are presented in Tables 3-3 and 3-4 of the QCSRs.

The FNOP indicator compounds or Contaminants of Concern (COCs), TCE and RDX, were not detected above their reporting limit in any of the samples collected during either 2012 sampling event. Additionally, none of the other compounds assigned a cleanup goal in the ROD were detected above their reporting limit in either sampling event. The October sample for MW06-18A indicated an RDX concentration of 0.057 micrograms per liter (ug/L). This result was qualified with a J code, indicating the analyte was detected below the quantitation limit or reporting limit, but above the lowest level of detection of the instrument. The reporting limit for RDX was 0.2 ug/L and the site cleanup goal for RDX at the FNOP site is 2 ug/L.

5 GROUNDWATER MODEL SIMULATIONS

As discussed in Section One, a groundwater flow model was developed to help predict the impact of an operating Platte West well field. The model updates performed as part of the 2012 NOPGR incorporated the well field pumping and hydrologic data presented in Sections Two and Three of this report to evaluate the impact of well field operations on the potentiometric surface of the alluvial aquifer. By incorporating pumping and hydrologic data into the model, the model simulations presented in this NOPGR are an extension of the model post audit performed in previous NOPGRs.

5.1 LOOK BACK AND FORECAST STRUCTURE

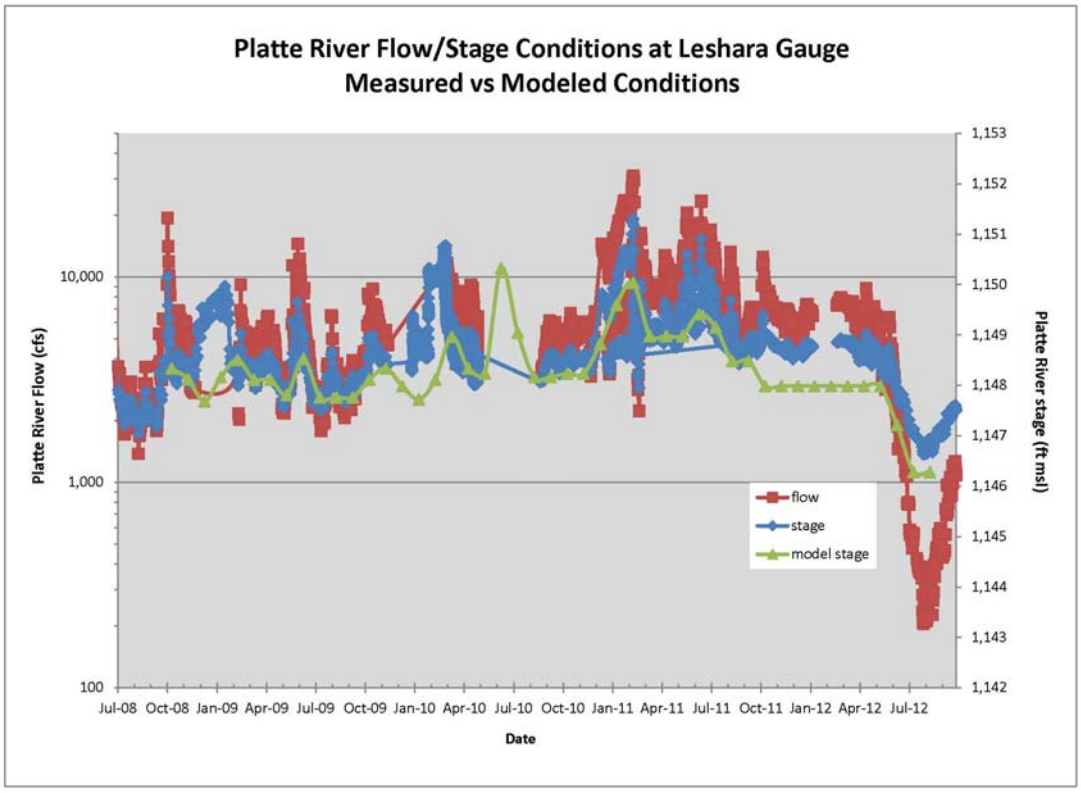
The 2012 NOPGR and other future NOPGR's will continue to evaluate the predictive capabilities of the groundwater model by comparing model predictions to observed data. In addition, MUD plans to also use the NOPGR to forecast the aquifer response to the planned pumping for the upcoming reporting cycle. To accomplish both the comparison (look back) and forecasting objectives, the 2012 NOPGR was structured as follows:

- Look back period – October 2011 to August 2012 of the current reporting period. For this time period the model was updated with the reported monthly pumping rates for the FNOP wells and the Platte West wells, average monthly stage elevations for the Platte and Elkhorn River. The model-predicted results were compared to actual field data. The approach for this portion of the model update was similar to the post audit approach presented in previous NOPGRs.
- Forecast period – October 2012 to April 2013 of the future reporting cycle. This time period will be used to predict aquifer behavior based on estimated future well field flow rates. The well field flow rates will be based on forecasted water demand and the availability of other MUD facilities to provide water.

5.2 LOOK BACK PERIOD (OCTOBER 2011 TO AUGUST 2012)

The look back period was evaluated by extending the transient model simulations presented in the previous 2011 NOPGR to include pumping and river stage data up to August 2012. This was done by extending the transient model simulations presented in the 2011 NOPGR from 36 months to 47 months. The SCADA system installed by MUD provides high quality data on the actual pumping distribution in the well field. To best represent the actual well field pumping, the transient groundwater model was discretized into 47, one (1) month stress periods that represent the October 2008 to August 2012 pumping period. Each monthly stress period was further discretized into ten time steps. The addition of 11 stress periods to the model was the first change made to the groundwater model before the look back analysis was performed. The second change made to the groundwater model was to import the river stage elevation for the Platte and Elkhorn rivers to reflect the average monthly river stage values reported at the Leshara and Waterloo gauges, respectively. This was performed to better represent the high streamflow conditions observed during the 2011 water year, the short duration flood events observed during the 2010 water year, and the extreme low streamflow observed during the summer of 2012. An example of how the river stage values are represented in the model is presented in the figure below.

Figure 5a – A Comparison of Daily River Stage to Monthly Modeled River Stage for the Platte River at Leshara



Once the changes to the length of the transient model run and the modification of the river stages were made, the following steps were performed to complete the model look back analysis:

1. Input the actual average monthly pumping rate for each supply well in the Platte West well field. These data were supplied by MUD. Well specific monthly flow rates are presented in Table 5-1.
2. Input the actual average monthly pumping rate for each FNOP hydraulic containment or focused extraction well. These data were supplied by ECC, a subcontractor to the CENWK. Well specific monthly flow rates for the FNOP pumping wells are presented in Table 5-1.
3. Add irrigation pumping wells constructed in the Platte Valley aquifer to the model for stress periods 46 and 47 (July and August). Irrigation wells were simulated in a manner consistent with the procedures described in the Phase II modeling report (CAI, 2005).
4. Run the groundwater model.
5. Compare the model-predicted groundwater elevations versus the observed groundwater elevations for the March and August 2012 stress period. Over 180 monitoring well sites were available for the synoptic comparisons. The data were collected as part of the semi-annual LPNNRD coordinated groundwater monitoring event and also included water level elevation data from the MUD Douglas County monitoring wells.

6. Compare the model-predicted groundwater elevation hydrographs versus the observed groundwater elevation hydrographs at each monitoring well site within the monitoring network operated and maintained by MUD.
7. Review the model predictions and compare to observed data. Perform a "goodness of fit" evaluation.
8. Look for areas where the model predictions could be improved and modify boundary conditions or aquifer parameters if necessary.
9. Re-run model and re-evaluate results.

No modifications were made to the hydraulic model input parameters such as hydraulic conductivity, recharge, aquifer storativity, etc. The following section presents a summary of the model evaluation.

5.3 LOOK BACK PERIOD RESULTS

The following sections describe the results of the look back period analysis from October 2011 to August 2012.

5.3.1 COMPARISON TO OBSERVED WATER LEVEL ELEVATIONS

The data set used to perform the 2012 NOPGR look back calibration check included: over three years of 34 mgd average pumping from the well field, pumping from several FNOP containment wells that were not installed or operating when the original model was constructed and calibrated, and water level data from numerous new FNOP monitoring wells that were not included in the Phase I and Phase II model calibration effort. Water level elevation data collected as part of the LPNNRD coordinated water level monitoring event, performed at the end of March 2012 and the end of August 2012, were used as the first check of model performance for the look back period. Water level elevations collected from the MUD Douglas County monitoring network were added to the LPNNRD data set to create a data set of over 180 water level elevation measurements available for the comparison. These data were used to check the ability of the model to reproduce post-well field startup water level elevations. Figure 5-1a and 5-1b maps a comparison of simulated and observed groundwater levels for March 2012 and August 2012, respectively.

The first model run was completed to evaluate the model predicted potentiometric surface at the end of March 2012 produced a set of calibration statistics including a normalized root mean square (NRMS) error of 1.6 percent and an absolute residual mean (ARM) error of 1.4 feet. Both of these values are nearly identical to the calibration statistics from the March 2011 calibration check and are within the pre-established calibration objectives of the Phase II groundwater modeling effort. Near the well field the water level elevations predicted by the model after over two years of pumping were generally within one or two feet of the observed water level elevation.

The second model run was completed to evaluate the model predicted potentiometric surface at the end of August 2012. This model run includes the impact of irrigation pumping, which was pronounced due to the drought. The calibration statistics resulting from this model run include a normalized root mean square (NRMS) error of 2.6 percent and an absolute residual mean (ARM) error of 1.7 feet. Both of these values are within the pre-established calibration objectives of the Phase II groundwater modeling effort. The change in residuals from this model run illustrate the uncertainty associated with irrigation pumping, which includes location of wells, pumping rates, and duration of pumping. However, even during an extreme drought, the model predicted water level elevations developed by the model were generally within one to two feet of the observed water level elevation.

Table 5-2a presents the final model-predicted and observed water level elevations for March 2012 groundwater elevation data set, while Table 5-2b presents this data for the August 2012 data set.

Figures 5-2a and 5-3a present a plot of the observed versus predicted water level elevations for the March 2012 data set. The best fit regression equation presented on these figures approximates the ideal conditions in which the observed versus predicted plot is represented by a line with a slope of one and an intercept of zero. Figures 5-2b and 5-3b present a plot of the residual error versus the observed water level elevation, which should have no bias in the distribution of the error. As with the calibration checks performed as part of previous NOPGR reports, there is no discernible bias in the error distribution presented in Figure 5-2b. However, Figure 5-3b shows a bias towards negative residuals, meaning the model is typically predicting too high of a water level elevation for the August time step. This is a result of the uncertainty relative to irrigation pumping.

5.3.2 MODEL-PREDICTED VS OBSERVED HYDROGRAPHS

Model-predicted versus observed groundwater elevation hydrographs were created for several monitoring well sites, located on both the Douglas and Saunders side of the well field, to evaluate the ability of the groundwater model to predict changes in groundwater elevations caused by well field pumping and changes in the Platte River stage. The observed groundwater elevations were obtained from the pressure transducers/data loggers installed in the monitoring wells. The pressure transducers collect and record, at a minimum, one water level elevation measurements per day. The hydrographs present the observed and model predicted groundwater elevations from February 2009 through August 2012 and are included in Appendix 5-1. As constructed, the model cannot reflect short term fluctuations in groundwater elevation since the pumping and boundary conditions are changed only on a monthly basis. However, the introduction of variable monthly river stage values has helped to capture more of these short term groundwater changes than in previous NOPGRs.

Saunders County Monitoring Network

On the Saunders County side of the well field, the model-predicted and observed hydrographs nearly overlap at the monitoring well sites that border the well field (MW90-10 MW94-4, MW05-22, and MW05-23). The Saunders County wells have been operated using a pumping/recovery/pumping/recovery/pumping pattern which is evident in the data presented on Figure 2-1. The hydrographs for the wells that border the well field illustrate that the groundwater model has accurately reproduced the water levels fluctuations near the well field which have resulted from this cyclical pumping pattern, including the aquifer recovery that was observed during the intentional shut down of the Section 19 wells (see 2010 NOPGR for details). The pattern and shape of the model predicted hydrographs closely mimics that of the observed data during these pumping and recovery cycles, indicating that the aquifer parameters and the degree of interconnection between the river and the aquifer used in the model are very accurate.

Further from the well field, the model-predicted hydrograph for MW94-3, MW94-5, MW94-6, and MW06-28 also indicate a good general match between the model predicted and observed groundwater level elevations as the pattern and shape of the model predicted hydrographs closely resembles the observed data. The impact of well field pumping at these well sites is minimal and the minor fluctuation in groundwater elevations observed at these sites is more a result of changes in local stresses, such as variable surface water elevations or irrigation pumping, than in well field pumping. The impact of irrigation pumping in 2012 is very evident in these wells, including the impact of how irrigation pumping was modeled. This group of monitoring wells provides a clear delineation of the maximum extent of the cone of depression created by well field pumping.

Douglas County Monitoring Network

On the Douglas County side of the well field, there is also generally good agreement between the model-predicted and observed hydrographs at the monitoring well sites that border the well field (MW90-5, MW90-7, MW94-1, MW94-2, MW05-24, MW05-25, and MW06-29). At most of these monitoring well sites, the model predictions closely resemble the observed data. The pattern and shape of the model predicted hydrographs closely mimics that of the observed data for most of the Douglas County well sites during these pumping and recovery cycles, indicating that the aquifer parameters and the degree of interconnection between the river and the aquifer used in the model are accurate. Review of the observed data for all of the well sites that border the Douglas County portion of the well field indicate that the cone of depression generated for these wells is limited and does not extend very far outside of the well field property boundary. However, because the smallest model stress period is one month, the model does not reflect short term fluctuations in groundwater elevation that occur when the river stage increases since the pumping and boundary conditions are changed only on a monthly basis

5.3.3 PARTICLE TRACKING

A transient particle tracking simulation was performed using MODPATH to illustrate the model-predicted travel path of hypothetical groundwater particles located along the perimeter of the FNOP contaminant plumes. The particle tracking simulation was performed using transient conditions for the full length of the reporting period and included the reported pumping from the FNOP wells and Platte West well field wells from October 2008 to August 2012 (Table 5-1). The starting location of the particles was modified from previous NOPGRs to reflect the most up to date interpretation of the FNOP RDX and TCE plumes, as presented in the most recent Containment Evaluation (ECC, 2010). A total of 205 particles were located on the perimeter of the easternmost TCE/RDX plumes, as shown on Figure 5-4. The particles were tracked forwards for the duration of the simulation, with a release time of 1,080 days. This model run symbolizes how much the mapped plume would have moved during the reporting period from October 2011 to August 2012.

As shown, operation of the well field has not altered the well documented historical flow path of the contaminant plumes located on the eastern edge of the FNOP site and the travel distances are consistent with the a groundwater flow velocity of 2 ft/day (URS, 2009).

5.4 MODEL FORECAST PREDICTIONS

The forecast model period of October 2012 to April 2013 was used to generate predications on aquifer response to planned well field pumping for this period of time. The pumping rates for this timeframe were estimated by MUD based on forecasted water demand and the availability of other MUD facilities to provide water.

Table 5-3
Forecasted Well Field Pumping Rates October 2012 to April 2013

Month	Douglas County Pumping (mgd)	Saunders County Pumping (mgd)	Total Pumping (mgd)
October 2011	8.8	34.7	43.5
November 2011	4.3	20.9	25.2
December 2011	5.5	21.4	26.9
January 2012	6	21	27
February 2012	8	18	26
March 2012	8	21	29
April 2012	10	24	34

For the forecast model scenario, pumping rates for the FNOP well field were held constant at the September 2012 pumping rate reported for those wells. Stage elevations for the river boundaries were input assuming average annual flow conditions, as described in the Phase II model (Chatman and Associates, Inc., 2005). Streamflow conditions began to rebound from the low flow conditions experienced in July and August, starting in September 2012. Streamflow in the Platte and Elkhorn Rivers was in the 25 -75 percent seasonal reoccurrence interval starting in November 2012.

5.4.1 FORECAST MODEL POTENTIOMETRIC SURFACE MAP

The model-predicted potentiometric surface for the last time step of each stress period is presented in Appendix 5-2. This figure represents the model-predicted potentiometric surface for the end of the last month in the forecast period (April 2013). The model predicted potentiometric surface is a function of the distribution of pumping assumed in the well field and change if wells other than those modeled are used to achieve similar well field flows. The forecast model run assumed that a mix of storage and river wells would be used to achieve the projected well field flow rates.

Review of the predictions indicates that the model predicted potentiometric surface for April 2013 is very similar to previous observed potentiometric surfaces for March. The potentiometric surface predicted by the model for April 2013 indicates that the FNOP plumes will remain hydraulically upgradient/cross gradient of the well field and that the flow direction in the Todd Valley aquifer will not be altered by operation of the well field.

6 SUMMARY AND CONCLUSIONS

The objective of the 2012 NOPGR is to analyze available hydraulic and water quality data to determine the impact of the Platte West well field on both the groundwater elevations and chemistry of the Platte River and Todd Valley alluvial aquifers, and to determine any potential negative impact on the FNOP contaminant plumes or the FNOP operating remedial system. To achieve this objective, HDR studied: MUD's water supply well pumping records, pressure transducer data from monitoring wells in the MUD, LPNNRD, and USACE monitoring network, one synoptic water level data set which consisted of water level elevations collected from over 180 monitoring wells, Platte River flow and stage data from three (3) stream gauges, Elkhorn River data from one (1) stream gauge, and two rounds of chemical sampling. These data were then used to update the groundwater flow model presented in the 2011 NOPGR with 2012 well field pumping and hydrologic data.

For the 2012 water year, the total daily pumping rate fluctuated from a low of 20.3 mgd, recorded in February 2012, to a high of 56.6 mgd recorded in July 2012. The average monthly pumping rate for the 2012 water year was 31.9 mgd, which is lower than both the 2011 average (37.2) and the 2010 average (32.6 mgd). In response to the drought of 2012, which began in mid June, pumping from the well field was voluntarily reduced in August 2012 to help maintain streamflow in the Platte River for downstream users. Omaha's water demand for August 2012 was met by shifting raw water pumping to the Platte South well field and the Florence surface water intake.

A post audit of the groundwater flow model was presented in the 2009 NOPGR and 2010 NOPGR. Both reports evaluated the capabilities of the groundwater to reproduce observed changes in the aquifer, using operational data from both the Platte West well field and the FNOP containment wells. The results of both post audits showed that the groundwater model accurately reproduced the observed drawdown in the Platte River alluvial aquifer that was induced by well field operations. The 2012 NOPGR continued to evaluate the ability of the groundwater model to reproduce observed conditions in the aquifer by comparing model predictions to observed data during a look back period, which consisted from October 2011 through August 2012. No changes were made to the hydraulic properties reported in the previous model to perform the 2012 NOPGR analysis. The look back analysis presented in this document is an extension of the previous model post audits, and represents actual pumping conditions for both the Platte West well field and the FNOP well field from 2009 through 2012. The following tasks were completed as part of the look back analysis:

1. Extend the model simulation time to include 47 monthly stress periods (October 2008 to August 2012).
2. Input the actual average monthly pumping rate for each supply well in the Platte West well field. These data were supplied by MUD. Well specific monthly flow rates are presented in Table 5-1.
3. Input the actual average monthly pumping rate for each FNOP hydraulic containment or focused extraction well. These data were supplied by ECC, a subcontractor to the CENWK. Well specific monthly flow rates for the FNOP pumping wells are presented in Table 5-1. .
4. Update the river boundary package to reflect average monthly river stage value for the Platte and Elkhorn Rivers, as reported at the Leshara and Waterloo gauges, respectively.
5. Add irrigation pumping wells constructed in the Platte Valley aquifer to the model for stress periods 46 and 47 (July and August). Irrigation wells were simulated in a manner consistent with the procedures described in the Phase II modeling report (CAI, 2005).
6. Run the groundwater model.

7. Compare the model-predicted groundwater elevations versus the observed groundwater elevations for the March and August 2012 stress periods. Over 180 monitoring well sites were available for this synoptic comparison. The data were collected as part of the semiannual LPNNRD coordinated groundwater monitoring event and also included water level elevation data from the MUD Douglas County monitoring wells.
8. Compare the model-predicted groundwater elevation hydrographs versus the observed groundwater elevation hydrographs at each monitoring well site within the monitoring network operated and maintained by MUD.
9. Review the model predictions and compare to observed data. Perform a "goodness of fit" evaluation.

The addition of 11 stress periods to the model and the addition of summer irrigation pumping are the only changes made to the model before the look back analysis was performed.

6.1 SUMMARY OF RESULTS

The 2012 NOPGR used available hydrogeologic data in the form of groundwater elevations, streamflow values, and groundwater quality data, as well as groundwater modeling to evaluate the impact of the operations of the well field on the Platte River and Todd Valley alluvial aquifers. The hydraulic data and updated groundwater flow model were used to evaluate any potential negative impact on the FNOP contaminant plumes or the FNOP operating remedial system. The following section summarizes the results of the 2012 NOPGR analysis.

6.1.1 SUMMARY OF MODEL PERFORMANCE

The predictive capability of the model was evaluated by comparing model predicted groundwater elevations versus observed values collected within the well field monitoring network, over a four (4) year period from 2008 through 2012. The results of the model review indicate that the model continues to accurately reproduce the transient changes in groundwater elevations that have been observed in the monitoring wells located near the well field. A summary of the groundwater model versus measured data comparisons is presented below.

Hydrograph Comparison for Wells Located Near the Well Field

Hydrographs which illustrate the three years of model predicted versus observed groundwater elevations for monitoring wells located near the well field are presented in Appendix 5-1. These hydrographs illustrate the ability of the model to reproduce the water level fluctuations near the well field which result from the cyclical pumping/recovery/pumping/recovery/pumping pattern of well field operation. The pattern and shape of the model predicted hydrographs closely resembles the pattern of the observed data during these pumping and recovery cycles, indicating that the aquifer parameters and the degree of interconnection between the river and the aquifer used in the model are very accurate. Included in the post audit data set is an extended period of aquifer recovery that was observed during the intentional shut down of the Saunders County Section 19 wells, which occurred from November 2009 through the end of February 2010 (see 2010 NOPGR for details).

Comparisons of Potentiometric Surfaces After Three Years of Pumping

Evaluating the ability of the groundwater model to predict groundwater elevations away from the well field was checked using data collected as part of the LPNNRD coordinated water level monitoring event, performed at the end of March and August 2012. Including data from the MUD Douglas County monitoring network, a total of 180 water level elevation data points were available for this comparison.

Figure 5-1a and 5-1b present a comparison of simulated and observed groundwater levels for March and August 2012.

The first model run was completed to evaluate the model predicted potentiometric surface at the end of March 2012 produced a set of calibration statistics including a normalized root mean square (NRMS) error of 1.6 percent and an absolute residual mean (ARM) error of 1.4 feet. The second model run was completed to evaluate the model predicted potentiometric surface at the end of August 2012. This model run includes the impact of irrigation pumping, which was pronounced due to the drought. The calibration statistics resulting from this model run include a normalized root mean square (NRMS) error of 2.6 percent and an absolute residual mean (ARM) error of 1.7 feet. Both calibration checks are within the pre-established calibration objectives of the Phase II groundwater modeling effort. The change in residuals from this model run illustrate the uncertainty associated with irrigation pumping, which includes location of wells, pumping rates, and duration of pumping. However, even during an extreme drought, the model predicted water level elevations developed by the model were generally within one to two feet of the observed water level elevation. No changes were made to the hydraulic properties of the model prior to performing these model evaluations.

6.1.2 GROUNDWATER ELEVATION AND CHEMICAL SAMPLING

Groundwater elevation and groundwater chemical sampling data collected from the MUD monitoring well network were evaluated and summarized as part of the 2012 NOPGR. The following presents a summary of those data.

Summary of Contingency Plan Water Levels

Water level elevations thorough out the Platte Valley, Todd Valley, and Uplands area were much below normal during the Summer of 2012 due to the drought and the resulting increase in irrigation pumping. As shown on Table 3-1, water level elevations were below the well specific Tier 1 value at many well sites during the summer. At some well sites, the water level elevation was also below the Tier 2 value. All of the wells where a Tier 2 value was exceeded are near irrigation wells and careful review of the hydrographs of these wells indicated that the groundwater elevation at these wells was impacted by seasonal irrigation pumping.

All of the wells where a Tier 2 value was exceeded are near irrigation wells and careful review of the hydrographs of these wells indicated that the groundwater elevation at these wells was impacted by seasonal irrigation pumping. The impact of irrigation pumping on water levels in the monitoring wells used in the Contingency Plan was discussed in a meeting between MUD and the USACE on August 9, 2012. At the meeting it was agreed that the depressed water levels observed in August were a result of the significantly above normal pumping required for the 2012 irrigation season, and that the water levels in the monitoring wells should be checked against the Contingency Plan levels after the irrigation season was complete (to monitor rebound).

Contingency action levels were reviewed using water elevations collected during September 2012, and only one well (MW90-10) was below the Tier 2 trigger level. The cause of this low water level was attributed to the continued influence of a nearby irrigation well; therefore, no further action was required by MUD at this time. The evaluation process followed to reach this conclusion is presented on the Tier 1 flow chart in the Well Field Contingency Plan (Layne Christensen, 2008b).

Summary of Chemical Data

Chemical data from two rounds of groundwater sampling were reviewed as part of this NOPGR. The wells sampled by as part of this event include the deep and shallow wells located at MW-39, MW06-18, MW06-30, and MW06-31 monitoring sites. The FNOP indicator compounds (TCE and RDX) were not detected above their reporting limit in any of the samples collected during either 2012 sampling event.

Additionally, none of the other compounds assigned a cleanup goal in the ROD were detected above their reporting limit in either sampling event. The October sample for MW06-18A indicated an RDX concentration of 0.057 micrograms per liter (ug/L). This result was qualified with a J code, indicating the analyte was detected below the quantitation limit or reporting limit, but above the lowest level of detection of the instrument.

6.2 CONCLUSIONS

During this NOPGR reporting period, Eastern Nebraska experienced a drought which was characterized as extreme or exceptional by National Oceanic and Atmospheric Administration (NOAA) Regional Climatic Data Center. As a result of the drought, streamflow conditions observed within the study area were very low during the summer months. The conditions observed in the Platte and Elkhorn Rivers during July, August, and September 2012 are characterized as 90 percent exceedance (or higher) streamflow conditions.

In response to the drought of 2012, which began in mid June, pumping from the well field was voluntarily reduced in August 2012 to help maintain streamflow in the Platte River for downstream users. Omaha's water demand for August 2012 was met by shifting raw water pumping to the Platte South well field and the Florence surface water intake. For the 2012 reporting period, the total daily pumping rate fluctuated from a low of 20.3 mgd, recorded in February 2012, to a high of 56.6 mgd recorded in July 2012. Since startup in February 2009, the well field has averaged a 33.9 mgd total pumping rate (25 mgd from the Saunders County wells), which is below both the permitted annual average and the maximum design pumping rate of the well field.

The hydraulic data collected as part of this and other previous NOPGR were used to develop long term hydrographs from the wells that form the groundwater monitoring network shown on Figure 3-1. These hydrographs clearly show the hydraulic influence of the well field pumping activities that have occurred to date is limited to an area which does not extend beyond the location of wells MW94-3, MW94-5, MW94-6, and MW06-28. The hydrographs from monitoring wells located west of these four (4) wells illustrate a variable water level signal that is typical of alluvial wells and show no long term changes in water level elevations that can be attributed to well field pumping.

Data presented in Figure 3-3, which shows water level declines from March 2012 to August 2012, clearly shows that water level declines observed between the eastern edge of the FNOP site and the Platte West well field were not caused by the well field operations. Water level changes between March and August were minimized near the well field because MUD voluntarily reduced pumping from the well field during August in response to the drought.

The hydraulic data collected as part of this and other previous NOPGR reports clearly show that the groundwater flow direction in the Todd Valley aquifer has not changed due to the operation of the well field. The interpreted potentiometric surfaces from October 2008, March 2009, March 2010, and March 2011, March 2012, and August 2012 indicate that the well field continues to remain hydraulically upgradient and cross-gradient of the FNOP site.

Regular chemical groundwater monitoring has been performed at several key monitoring wells located between the well field and the FNOP site. To date, no detections of the FNOP COCs (TCE and RDX), have been observed in these wells that are above reporting limits or have been validated through confirmation sampling.

The look back analysis performed, which extended the model post audit presented in the 2009 NOPGR, has shown that the groundwater flow model is a good tool that can be used to accurately predict the response of the alluvial aquifer to changes in well field pumping. The post audit presented in the 2009 and 2010 NOPGR and the look back analysis presented in the 2011 and 2012 NOPGR have shown that

the groundwater modeling predictions presented in the Phase II *Platte West Well Field/Groundwater Modeling Study* (Chatman and Associates, Inc., 2005) were reasonable approximations of how the aquifer would respond to the pumping from the Platte West well field. The hydraulic and chemical data collected to date, as well as the modeling analyses performed, support the conclusion that pumping from the Platte West well field is not adversely impacting the FNOP containment system efforts.

6.3 FUTURE UPDATES

The 2013 NOPGR will continue to review the available hydraulic and water quality data to evaluate the impact of the Platte West well field pumping on both the groundwater elevations and chemistry of the Platte River and Todd Valley alluvial aquifers. The 2013 NOPGR will also continue to test the predictive capabilities of the groundwater model by comparing model predictions to observed data. It is anticipated that the comparison (look back) and forecasting periods in the 2013 NOPGR will be structured as follows:

- Look back period - April to October of the current reporting period.
- Forecast period – October to April of the future reporting cycle.

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TABLES

Table 3-1
Well Field Contingency Plan Trigger Level Comparison
Nebraska Ordanance Plant Groundwater Report

Monitoring Well ID	Priority Well Designation	Measured (Feb/10/2009) Pre-Startup Groundwater Elevation (ft msl)	Lowest Measured Water Level Elevation for 2012 Reporting Period	Water Level Elevation September 2012	Tier 1 Trigger Level (ft msl)	Is September 2012 Water Level Elevation Below Tier 1 (Y/N)	Is Lowest Measured Water Level Elevation for 2012 Reporting Period Below Tier 1 (Y/N)	Tier 2 Trigger Level (ft msl)	Is September 2012 Water Level Elevation Below Tier 2 (Y/N)	Is Lowest Measured Water Level Elevation for 2012 Reporting Period Below Tier 2 (Y/N)	Notes
MW 90-10[B]	Priority Three	1095.5	1,086.8	1,088.3	1,091.0	Y	Y	1,089.0	Y	Y	Located near irrrigation well
MW 94-3	Priority One	1080.2	1,077.0	1,077.0	1,076.5	N	N	1,074.5	N	N	
MW 94-4B	Priority Three	1090.3	1,079.3	1,082.1	1,079.0	N	N	1,077.0	N	N	
MW 94-5[B]	Priority One	1094.4	1,089.0	1,090.2	1,091.5	Y	Y	1,089.5	N	Y	Located near irrrigation well
MW 94-6[B]	Priority One	1083.8	1,078.2	1,079.3	1,080.0	Y	Y	1,078.0	N	N	Located near irrrigation well
MW 94-7[B]	Priority Two	1075.4	1,072.2	1,072.4	1,073.5	Y	Y	1,071.5	N	N	Located near irrrigation well
MW 04-17	Priority Three	1100.8	1,092.5	1,097.6	1,094.5	N	Y	1,092.5	N	Y	
MW 05-22	Priority Three	1087.4	1,081.8	1,082.7	1,080.0	N	N	1,078.0	N	N	
MW 05-23	Priority Three	1085.7	1,079.5	1,080.2	1,078.0	N	N	1,076.0	N	N	
MW 06-18[BA]	Priority Two	1086.8	1,079.7	1,083.6	1,084.0	Y	Y	1,082.0	N	Y	Located near irrrigation well
MW 06-19[B]	Priority Two	1105.3	1,094.1	1,099.3	1,100.0	Y	Y	1,098.0	N	Y	Located near irrrigation well
MW 06-20[B]	Priority Two	1144.7	1148.33*	NA	1,137.0	N	N	1,135.0	N	N	Located near irrrigation well
MW 06-21[B]	Priority Two	1152.7	1144.46*	NA	1,143.0	N	N	1,141.0	N	N	Located near irrrigation well
MW 06-27[B]	Priority One	1086.8	no well data for 2012 for 06-27		1,081.8	Y	N	1,079.8	N	N	Located near irrrigation well
MW 06-28[B]	Priority One	1088.4	1,083.2	1,084.0	1,085.0	Y	Y	1,083.0	N	N	Located near irrrigation well
MW 06-30[B]	Priority Two	1128.1	1,129.4	1,129.6	1,125.5	N	N	1,123.5	N	N	Located near irrrigation well
MW 06-31[B]	Priority Two	1099.0	1,089.4	1,094.7	1,096.7	Y	Y	1,094.7	N	Y	Located near irrrigation well

Table 5-1
Average Monthly Flow Rate (gpm)
Wells in Transient Simulation
Nebraska Ordnance Plant Groundwater Report

Year	2011				2012								
Model Stress Period Number	36	37	38	39	40	41	42	43	44	45	46	47	48
Stress Period Month	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP
USACE FNOP Wells (rate in gpm)													
EW-1	196	196	140	168	200	97	250	198	196	199	199	197	165
EW-2	0				NO	NO	NO	NO	NO	NO	NO	NO	NO
EW-3	298	297	297	297	300	290	290	289	292	298	298	295	247
EW-4	93	92.6	87.9	90.25	89	95	93	93	92	94	94	75	77
EW-5	0				NO	NO	NO	NO	NO	NO	NO	NO	NO
EW-6	50	49.7	49.7	49.7	50	48	48	51	50	51	50	50	41
EW-7	285	288	280.6	284.3	287	279	276	280	280	284	284	282	240
EW-9	140	139.9	139.7	139.8	139	135	135	133	130	142	129	134	118
EW-10	0				NO	NO	NO	NO	NO	NO	NO	NO	NO
FEW-11	514	543.2	494.4	518.8	546	515	513	518	522	517	NO	312	391
EW-12	279	292	119.7	205.85	313	306	319	296	309	316	307	120	175
FEW-14	192	191.9	191.1	191.5	183	183	184	179	186	188	190	184	156
FEW-15	458	497	317.4	407.2	528	487	485	466	476	467	487	483	451
EW-16	97	104.9	101.1	103	99	96	96	105	99	98	93	94	82
Platte West Douglas County Wells (rate in gpm)													
2	1,422	357	0	0	44	14	0	0	2	1,317	1,819	336	0
3	2	0	0	0	0	0	8	160	56	225	771	652	0
4	12	28	18	26	0	17	4	0	18	0	0	0	0
5	20	0	0	0	0	0	16	27	33	32	11	0	0
6	760	763	765	1,213	330	1	0	270	301	1,207	1,062	80	0
7	0	0	2	0	100	116	0	0	223	183	236	165	0
8	892	3	103	154	0	0	2	0	0	2	31	0	0
9	1	0	0	0	0	0	0	0	0	0	75	98	0
10	1,306	1,638	756	2,314	612	13	439	2,208	1,235	2,039	1,666	1,619	0
11	1,956	1,023	0	0	1,118	441	94	46	22	167	679	201	0
12	1,547	627	41	47	1,252	223	911	62	1,568	212	0	575	0
13	578	0	0	0	0	0	13	0	0	0	344	167	0
14	741	674	0	0	272	241	16	457	0	454	1,420	528	0
15	1,647	181	0	32	331	1,391	611	749	1,023	994	1,705	1,765	0
16	1,616	846	1,313	0	3	0	6	81	1,208	866	1,941	298	0
17	0	2	0	0	963	163	830	1,429	1,785	1,644	1,485	981	0
Platte West Saunders County Wells (rate in gpm)													
30	729	448	255	0	854	0	132	771	231	1,439	579	0	0
31	1,944	1,697	1,183	13	189	562	11	1,711	882	2,101	835	608	0
32	343	196	444	0	0	1,365	820	0	572	0	736	30	0
33	2,105	1,838	0	0	1,440	75	0	0	185	1,671	309	0	0
34	0	0	0	0	0	1,672	1,275	1,999	2,198	533	1,822	1,315	0
35	1,487	1,825	0	598	1,600	0	619	35	243	830	2,043	1,728	0
36	2,370	2,632	1,112	43	1,759	9	737	1,042	545	1,886	2,429	2,504	0
37	0	0	0	0	0	2,335	2,625	2,591	122	0	1,233	2,755	0
38	956	1,084	767	1,284	0	283	13	2,017	1,280	1,070	2,227	2,333	0
39	1,919	1,002	667	0	1,809	2,021	821	38	529	1,325	1,457	2,098	0
40	2,317	2,248	1,636	2,264	335	0	547	944	2,358	1,761	1,977	1,789	0
41	187	826	596	1,440	0	395	0	718	269	0	181	0	0
42	909	42	0	2,053	2,035	0	22	0	0	1,173	1,081	0	0
43	1,220	1,651	1,679	122	88	1	1,355	1,297	962	599	0	0	0
44	1,129	1,284	807	0	0	604	0	7	1,426	405	732	0	0
45	1,397	347	904	776	1,881	278	0	28	2,126	1,780	2,247	2,179	0
46	1,878	1,047	162	187	484	500	0	398	1,529	1,730	1,430	679	0
47	1,062	98	0	255	0	0	0	576	625	925	278	0	0
48	425	244	166	27	940	0	108	112	876	352	695	0	0
49	1,944	762	2,295	2,300	524	648	1,327	2,175	1,377	1,439	1,834	831	0
50	29	641	0	145	0	100	106	121	0	915	319	0	0
51	1,370	1,677	1,523	201	0	0	3	0	1,346	655	285	0	0
52	1,280	901	0	0	0	180	1,199	785	446	1,294	837	0	0
53	571	513	10	1,712	970	470	7	0	237	0	105	128	0
54	941	371	305	705	0	0	8	338	28	111	0	0	0
55	840	739	0	703	365	0	6	0	166	0	402	0	0

Note: Well flow rate in gpm

Table 5-2
Transient Calibration Check
End of March 2012 Data Set
Nebraska Ordnance Plant Groundwater Report

Calibration Target Name	Water Level Data Provided By	Simulation Time (Days)	Measured Groundwater Elevation (ft msl)	Model Computed Groundwater Elevation (ft msl)	Residual (feet)
MW-03A	USACE	1260	1,135.68	1,132.52	3.16
MW-04A	USACE	1260	1,133.60	1,129.76	3.84
MW-05A	USACE	1260	1,134.81	1,130.83	3.98
MW-07A	USACE	1260	1,128.01	1,126.33	1.68
MW-08A	USACE	1260	1,119.35	1,117.80	1.55
MW-09A	USACE	1260	1,119.59	1,117.98	1.61
MW-10A	USACE	1260	1,110.82	1,109.81	1.01
MW-11	USACE	1260	1,123.91	1,119.16	4.75
MW-16B	USACE	1260	1,157.28	1,148.09	9.18
MW-18B	USACE	1260	1,103.09	1,104.91	-1.82
MW-19B	USACE	1260	1,149.79	1,147.29	2.50
MW-20B	USACE	1260	1,101.68	1,101.55	0.13
MW-21A	USACE	1260	1,130.74	1,127.12	3.62
MW-24A	USACE	1260	1,123.50	1,122.13	1.37
MW-25A	USACE	1260	1,132.19	1,129.29	2.90
MW-28A	USACE	1260	1,122.40	1,120.72	1.68
MW-29A	USACE	1260	1,111.31	1,111.71	-0.40
MW-31A	USACE	1260	1,119.92	1,118.11	1.81
MW-32A	USACE	1260	1,106.32	1,107.05	-0.73
MW-33A	USACE	1260	1,109.40	1,109.89	-0.49
MW-34A	USACE	1260	1,097.70	1,097.79	-0.09
MW-35A	USACE	1260	1,085.62	1,085.43	0.19
MW-38A	USACE	1260	1,075.96	1,077.19	-1.23
MW-39A	USACE	1260	1,078.50	1,078.51	-0.01
MW-40A	USACE	1260	1,131.30	1,130.38	0.92
MW-41A	USACE	1260	1,130.38	1,129.03	1.35
MW-42A	USACE	1260	1,094.76	1,094.12	0.64
MW-43A	USACE	1260	1,098.56	1,099.48	-0.92
MW-44A	USACE	1260	1,084.43	1,083.26	1.17
MW-46A	USACE	1260	1,078.55	1,078.51	0.04
MW-52A	USACE	1260	1,118.02	1,116.03	1.99
MW-53A	USACE	1260	1,109.96	1,111.98	-2.02
MW-54A	USACE	1260	1,111.81	1,114.19	-2.38
MW-55A	USACE	1260	1,110.03	1,111.99	-1.96
MW-56A	USACE	1260	1,109.39	1,111.28	-1.89
MW-60A	USACE	1260	1,092.72	1,090.87	1.84
MW-61A	USACE	1260	1,102.59	1,099.60	2.99
MW-65A	USACE	1260	1,132.47	1,128.71	3.76
MW-72A	USACE	1260	1,130.94	1,130.79	0.15
MW-73A	USACE	1260	1,130.44	1,130.17	0.28
MW-74A	USACE	1260	1,130.40	1,130.21	0.19
MW-75A	USACE	1260	1,130.46	1,130.25	0.21
MW-76A	USACE	1260	1,130.50	1,130.28	0.22
MW-77A	USACE	1260	1,130.50	1,130.32	0.18
MW-78A	USACE	1260	1,130.58	1,130.36	0.22
MW-79A	USACE	1260	1,100.06	1,098.25	1.81
MW-80A	USACE	1260	1,099.88	1,097.99	1.89
MW-81A	USACE	1260	1,100.22	1,099.64	0.58
MW-82A	USACE	1260	1,100.18	1,099.16	1.02
MW-83A	USACE	1260	1,097.13	1,097.04	0.09
MW-84A	USACE	1260	1,095.18	1,094.93	0.25
MW-85A	USACE	1260	1,088.34	1,087.80	0.54
MW-86A	USACE	1260	1,082.04	1,080.93	1.11
MW-88A	USACE	1260	1,075.06	1,076.54	-1.48
MW-89A	USACE	1260	1,105.15	1,103.10	2.05
MW-90A	USACE	1260	1,106.06	1,103.22	2.84
MW-91A	USACE	1260	1,106.00	1,103.65	2.35
MW-92A	USACE	1260	1,100.57	1,098.89	1.68
MW-93A	USACE	1260	1,104.59	1,102.37	2.22
MW-94A	USACE	1260	1,105.47	1,105.99	-0.52
MW-95A	USACE	1260	1,103.28	1,102.61	0.67
MW-96A	USACE	1260	1,097.47	1,096.76	0.71
MW-97A	USACE	1260	1,094.79	1,094.17	0.62
MW-98A	USACE	1260	1,091.85	1,090.67	1.18
MW-99A	USACE	1260	1,093.09	1,093.69	-0.60
MW-100A	USACE	1260	1,086.26	1,085.06	1.20
MW-101A	USACE	1260	1,099.55	1,097.55	2.00
MW-102A	USACE	1260	1,136.70	1,136.88	-0.18

Table 5-2
Transient Calibration Check
End of March 2012 Data Set
Nebraska Ordnance Plant Groundwater Report

Calibration Target Name	Water Level Data Provided By	Simulation Time (Days)	Measured Groundwater Elevation (ft msl)	Model Computed Groundwater Elevation (ft msl)	Residual (feet)
MW-103A	USACE	1260	1,132.68	1,132.96	-0.28
MW-104A	USACE	1260	1,078.77	1,080.60	-1.84
MW-105A	USACE	1260	1,075.73	1,078.20	-2.47
MW-106A	USACE	1260	1,100.64	1,101.67	-1.03
MW-107A	USACE	1260	1,096.87	1,098.15	-1.28
MW-108A	USACE	1260	1,096.75	1,096.30	0.45
MW-109A	USACE	1260	1,083.88	1,082.52	1.37
MW-110A	USACE	1260	1,088.31	1,086.35	1.96
MW-111A	USACE	1260	1,078.60	1,079.21	-0.60
MW-112A	USACE	1260	1,081.52	1,080.05	1.47
MW-113A	USACE	1260	1,079.98	1,079.11	0.87
MW-114A	USACE	1260	1,076.60	1,077.52	-0.92
MW-115A	USACE	1260	1,075.63	1,076.95	-1.32
MW-116A	USACE	1260	1,075.15	1,077.13	-1.98
MW-117A	USACE	1260	1,083.87	1,083.01	0.86
MW-118A	USACE	1260	1,093.09	1,092.94	0.15
MW-119A	USACE	1260	1,116.12	1,116.11	0.01
MW-120A	USACE	1260	1,114.49	1,114.51	-0.02
MW-120E	USACE	1260	1,114.55	1,114.52	0.02
MW-121A	USACE	1260	1,115.79	1,115.98	-0.19
MW-122A	USACE	1260	1,112.54	1,112.61	-0.07
MW-123A	USACE	1260	1,115.13	1,114.41	0.71
MW-124A	USACE	1260	1,120.51	1,120.41	0.09
MW-125A	USACE	1260	1,117.25	1,117.46	-0.21
MW-126A	USACE	1260	1,132.21	1,129.05	3.16
MW-127A	USACE	1260	1,138.32	1,134.65	3.67
MW-128A	USACE	1260	1,096.42	1,096.23	0.19
MW-129A	USACE	1260	1,089.03	1,089.54	-0.51
MW-130A	USACE	1260	1,086.49	1,086.73	-0.24
MW-131A	USACE	1260	1,092.28	1,092.65	-0.37
MW-132A	USACE	1260	1,094.70	1,094.76	-0.06
MW-133A	USACE	1260	1,123.59	1,122.79	0.80
MW-134A	USACE	1260	1,122.36	1,121.39	0.97
MW-135A	USACE	1260	1,122.68	1,121.87	0.81
MW-136A	USACE	1260	1,125.18	1,125.04	0.14
MW-137A	USACE	1260	1,130.93	1,129.78	1.14
MW-138A	USACE	1260	1,134.14	1,133.55	0.58
MW-139A	USACE	1260	1,137.52	1,138.13	-0.61
MW-140A	USACE	1260	1,086.51	1,084.33	2.18
MW-141A	USACE	1260	1,125.88	1,123.94	1.94
MW-142A	USACE	1260	1,107.99	1,106.41	1.59
MW-144A	USACE	1260	1,124.94	1,122.87	2.07
MW-145A	USACE	1260	1,113.63	1,113.22	0.41
MW-146A	USACE	1260	1,101.04	1,101.35	-0.32
MW-147A	USACE	1260	1,099.22	1,099.11	0.11
MW-149A	USACE	1260	1,107.79	1,108.35	-0.56
MW-150A	USACE	1260	1,100.13	1,100.33	-0.20
MW-151A	USACE	1260	1,115.88	1,114.70	1.18
MW-153A	USACE	1260	1,101.97	1,103.55	-1.58
MW-154A	USACE	1260	1,094.40	1,094.86	-0.46
MW-155A	USACE	1260	1,095.49	1,095.48	0.02
MW-156A	USACE	1260	1,088.31	1,085.34	2.98
MW-157A	USACE	1260	1,083.55	1,082.71	0.84
MW-158A	USACE	1260	1,074.48	1,077.06	-2.58
MW-159A	USACE	1260	1,115.57	1,115.85	-0.28
Brabec	LPNNRD	1260	1,101.14	1,099.69	1.45
D.Starns	LPNNRD	1260	1,055.92	1,051.43	4.49
Frahm	LPNNRD	1260	1,091.75	1,090.15	1.60
Hanson	LPNNRD	1260	1,095.78	1,094.96	0.82
LPN06-01	LPNNRD	1260	1,065.06	1,065.33	-0.27
LPN06-18	LPNNRD	1260	1,086.54	1,083.86	2.68
LPN06-19	LPNNRD	1260	1,104.88	1,103.64	1.24
LPN06-20	LPNNRD	1260	1,150.01	1,145.99	4.02
LPN06-21	LPNNRD	1260	1,155.28	1,158.81	-3.53
M90-01	LPNNRD	1260	1,071.96	1,073.49	-1.53
M90-02	LPNNRD	1260	1,071.34	1,073.65	-2.31
M90-04	LPNNRD	1260	1,068.23	1,069.66	-1.43
M90-05R	LPNNRD	1260	1,066.31	1,066.36	-0.05

Table 5-2
Transient Calibration Check
End of March 2012 Data Set
Nebraska Ordnance Plant Groundwater Report

Calibration Target Name	Water Level Data Provided By	Simulation Time (Days)	Measured Groundwater Elevation (ft msl)	Model Computed Groundwater Elevation (ft msl)	Residual (feet)
M90-09	LPNNRD	1260	1,064.65	1,066.30	-1.65
M90-12R	LPNNRD	1260	1,063.83	1,064.46	-0.63
M90-15	LPNNRD	1260	1,060.64	1,063.05	-2.41
M90-16R	LPNNRD	1260	1,061.12	1,059.78	1.34
M90-17R	LPNNRD	1260	1,060.23	1,061.35	-1.12
M90-20R	LPNNRD	1260	1,058.52	1,058.51	0.01
M90-21	LPNNRD	1260	1,057.28	1,059.61	-2.33
M90-22R	LPNNRD	1260	1,056.74	1,055.10	1.64
M90-23R	LPNNRD	1260	1,053.36	1,048.88	4.48
M90-24R	LPNNRD	1260	1,050.83	1,050.36	0.47
M90-26R	LPNNRD	1260	1,053.09	1,046.52	6.57
M90-36R	LPNNRD	1260	1,053.23	1,052.56	0.67
M90-37	LPNNRD	1260	1,051.86	1,050.85	1.01
MUD90-10	MUD	1260	1,091.07	1,092.73	-1.66
MUD94-3	MUD	1260	1,079.27	1,080.45	-1.18
MUD94-4	MUD	1260	1,084.86	1,085.91	-1.05
MUD94-5	MUD	1260	1,093.39	1,093.68	-0.29
MUD94-6	MUD	1260	1,082.82	1,081.62	1.20
MUD94-7	MUD	1260	1,075.93	1,076.66	-0.73
N.Keiser	LPNNRD	1260	1,081.25	1,080.89	0.36
N.Wann	LPNNRD	1260	1,104.13	1,104.29	-0.16
PV-37	LPNNRD	1260	1,091.05	1,091.55	-0.50
PV-38	LPNNRD	1260	1,094.80	1,093.99	0.81
PV-39	LPNNRD	1260	1,082.85	1,081.84	1.01
PV-40	LPNNRD	1260	1,081.01	1,082.36	-1.35
PV-41	LPNNRD	1260	1,091.11	1,091.07	0.04
S.Keiser	LPNNRD	1260	1,080.42	1,079.71	0.71
TV-16	LPNNRD	1260	1,094.62	1,093.52	1.10
TV-17A	LPNNRD	1260	1,087.75	1,082.52	5.23
MW05-23	MUD	1260	1,082.31	1,083.43	-1.13
MW05-22	MUD	1260	1,084.71	1,086.42	-1.71
MW06-28	MUD	1260	1,087.38	1,086.22	1.16
MW06-30	MUD	1260	1,131.98	1,129.70	2.27
MW06-31	MUD	1260	1,099.68	1,099.46	0.23
MW-90-6	MUD	1260	1,103.37	1,102.45	0.92
MW-90-4	MUD	1260	1,117.66	1,120.23	-2.57
MW90-5	MUD	1260	1,100.98	1,100.94	0.04
MW90-7	MUD	1260	1,106.05	1,106.13	-0.08
MW05-24	MUD	1260	1,097.24	1,098.40	-1.17
MW05-25	MUD	1260	1,103.51	1,103.18	0.33
MW05-26	MUD	1260	1,107.96	1,108.32	-0.37
MW90-12	MUD	1260	1,096.39	1,095.22	1.17
MW06-29	MUD	1260	1,094.37	1,096.76	-2.39
MW-94-1	MUD	1260	1,106.05	1,105.34	0.71
MW90-13	MUD	1260	1,089.78	1,090.87	-1.10
MW-94-2	MUD	1260	1,103.80	1,103.31	0.49
E-026	USGS	1260	1,083.25	1,085.93	-2.68
Ash01-113	USGS	1260	1,076.20	1,071.45	4.75
Ash04-45	USGS	1260	1,064.25	1,064.98	-0.73
Ash-05-43	USGS	1260	1,065.25	1,062.28	2.97
CBA1	USGS	1260	1,082.50	1,082.95	-0.45
Summary Statistics					

Residual Mean	0.54
Abs. Res. Mean	1.35
Res. Std. Dev.	1.80
RMS Error	1.63
Min. Residual	-3.53
Max. Residual	9.18
Range in Observations	112.28
Scaled Abs. Mean	1.20%
Scaled RMS	**1.60%**

Table 5-3
Transient Calibration Check
End of August 2012 Data Set
Nebraska Ordnance Plant Groundwater Report

Calibration Target Name	Water Level Data Provided By	Simulation Time (Days)	Measured Groundwater Elevation (ft msl)	Model Computed Groundwater Elevation (ft msl)	Residual (feet)
MW-03A	USACE	1410	1,133.91	1,132.43	1.48
MW-04A	USACE	1410	1,131.88	1,129.64	2.24
MW-05A	USACE	1410	1,133.92	1,130.69	3.24
MW-07A	USACE	1410	1,126.54	1,126.11	0.43
MW-08A	USACE	1410	1,117.39	1,117.55	-0.16
MW-09A	USACE	1410	1,117.65	1,117.72	-0.07
MW-10A	USACE	1410	1,109.22	1,109.93	-0.71
MW-11	USACE	1410	1,121.63	1,118.88	2.74
MW-16B	USACE	1410	1,155.37	1,148.01	7.36
MW-18B	USACE	1410	1,099.96	1,104.78	-4.82
MW-19B	USACE	1410	1,147.85	1,147.11	0.74
MW-20B	USACE	1410	1,100.74	1,101.56	-0.83
MW-21A	USACE	1410	1,129.70	1,127.17	2.53
MW-24A	USACE	1410	1,123.09	1,122.59	0.50
MW-25A	USACE	1410	1,130.32	1,129.26	1.06
MW-28A	USACE	1410	1,121.35	1,120.71	0.64
MW-29A	USACE	1410	1,110.75	1,111.67	-0.92
MW-31A	USACE	1410	1,118.94	1,117.98	0.96
MW-32A	USACE	1410	1,106.14	1,107.01	-0.87
MW-33A	USACE	1410	1,108.47	1,109.76	-1.29
MW-34A	USACE	1410	1,097.20	1,097.76	-0.56
MW-35A	USACE	1410	1,084.62	1,085.33	-0.71
MW-38A	USACE	1410	1,073.01	1,074.47	-1.46
MW-39A	USACE	1410	1,075.51	1,075.28	0.23
MW-40A	USACE	1410	1,130.25	1,130.08	0.17
MW-41A	USACE	1410	1,127.81	1,128.73	-0.92
MW-42A	USACE	1410	1,092.68	1,093.93	-1.25
MW-43A	USACE	1410	1,095.96	1,099.31	-3.35
MW-44A	USACE	1410	1,082.86	1,081.02	1.84
MW-46A	USACE	1410	1,075.72	1,075.12	0.60
MW-52A	USACE	1410	1,116.52	1,115.79	0.73
MW-53A	USACE	1410	1,107.13	1,111.79	-4.66
MW-54A	USACE	1410	1,109.00	1,113.98	-4.98
MW-55A	USACE	1410	1,107.13	1,111.81	-4.68
MW-56A	USACE	1410	1,106.48	1,111.11	-4.63
MW-60A	USACE	1410	1,086.28	1,090.96	-4.69
MW-61A	USACE	1410	1,100.96	1,099.60	1.36
MW-65A	USACE	1410	1,131.27	1,128.58	2.69
MW-72A	USACE	1410	1,129.94	1,130.50	-0.56
MW-73A	USACE	1410	1,129.37	1,129.87	-0.49
MW-74A	USACE	1410	1,129.42	1,129.91	-0.48
MW-75A	USACE	1410	1,129.43	1,129.95	-0.52
MW-76A	USACE	1410	1,129.46	1,129.98	-0.52
MW-77A	USACE	1410	1,129.37	1,130.02	-0.65
MW-78A	USACE	1410	1,129.53	1,130.06	-0.53
MW-79A	USACE	1410	1,098.74	1,098.47	0.27
MW-80A	USACE	1410	1,098.53	1,098.03	0.50
MW-81A	USACE	1410	1,099.03	1,099.88	-0.85
MW-82A	USACE	1410	1,099.19	1,099.21	-0.02
MW-83A	USACE	1410	1,096.62	1,097.07	-0.45
MW-84A	USACE	1410	1,094.65	1,094.96	-0.31
MW-85A	USACE	1410	1,083.50	1,087.81	-4.31
MW-86A	USACE	1410	1,080.39	1,080.59	-0.20
MW-88A	USACE	1410	1,071.97	1,074.30	-2.33
MW-89A	USACE	1410	1,103.74	1,103.47	0.27
MW-90A	USACE	1410	1,104.39	1,103.55	0.84
MW-91A	USACE	1410	1,104.52	1,103.81	0.71
MW-92A	USACE	1410	1,099.21	1,099.39	-0.18
MW-93A	USACE	1410	1,103.61	1,102.58	1.03
MW-94A	USACE	1410	1,104.98	1,105.98	-1.00
MW-95A	USACE	1410	1,102.83	1,102.63	0.20
MW-96A	USACE	1410	1,096.61	1,096.82	-0.21
MW-97A	USACE	1410	1,094.03	1,094.23	-0.20
MW-98A	USACE	1410	1,090.52	1,090.72	-0.20
MW-99A	USACE	1410	1,092.54	1,093.67	-1.13
MW-100A	USACE	1410	1,085.09	1,085.02	0.07
MW-101A	USACE	1410	1,098.13	1,097.55	0.58
MW-102A	USACE	1410	1,135.68	1,136.61	-0.93

Table 5-3
Transient Calibration Check
End of August 2012 Data Set
Nebraska Ordnance Plant Groundwater Report

Calibration Target Name	Water Level Data Provided By	Simulation Time (Days)	Measured Groundwater Elevation (ft msl)	Model Computed Groundwater Elevation (ft msl)	Residual (feet)
MW-103A	USACE	1410	1,131.56	1,132.67	-1.11
MW-104A	USACE	1410	1,077.26	1,078.51	-1.25
MW-105A	USACE	1410	1,073.69	1,076.75	-3.07
MW-106A	USACE	1410	1,096.77	1,101.52	-4.75
MW-107A	USACE	1410	1,092.53	1,097.83	-5.30
MW-108A	USACE	1410	1,091.36	1,095.78	-4.42
MW-109A	USACE	1410	1,081.11	1,074.92	6.19
MW-110A	USACE	1410	1,084.64	1,079.31	5.33
MW-111A	USACE	1410	1,076.07	1,076.18	-0.11
MW-112A	USACE	1410	1,078.34	1,073.88	4.46
MW-113A	USACE	1410	1,077.02	1,074.87	2.15
MW-114A	USACE	1410	1,073.85	1,075.18	-1.33
MW-115A	USACE	1410	1,072.66	1,074.40	-1.74
MW-116A	USACE	1410	1,072.50	1,074.59	-2.09
MW-117A	USACE	1410	1,082.68	1,082.79	-0.11
MW-118A	USACE	1410	1,092.62	1,092.97	-0.35
MW-119A	USACE	1410	1,115.98	1,117.03	-1.04
MW-120A	USACE	1410	1,114.36	1,115.62	-1.26
MW-120E	USACE	1410	1,114.38	1,115.64	-1.26
MW-121A	USACE	1410	1,115.69	1,117.02	-1.33
MW-122A	USACE	1410	1,111.84	1,113.10	-1.26
MW-123A	USACE	1410	1,115.37	1,116.20	-0.83
MW-124A	USACE	1410	1,120.34	1,121.06	-0.72
MW-125A	USACE	1410	1,116.29	1,118.51	-2.22
MW-126A	USACE	1410	1,130.78	1,129.03	1.75
MW-127A	USACE	1410	1,136.57	1,134.55	2.01
MW-128A	USACE	1410	1,095.96	1,096.22	-0.26
MW-129A	USACE	1410	1,088.48	1,089.57	-1.09
MW-130A	USACE	1410	1,085.57	1,086.67	-1.10
MW-131A	USACE	1410	1,091.81	1,092.69	-0.88
MW-132A	USACE	1410	1,094.27	1,094.77	-0.50
MW-133A	USACE	1410	1,122.49	1,122.48	0.01
MW-134A	USACE	1410	1,120.92	1,121.08	-0.16
MW-135A	USACE	1410	1,121.42	1,121.56	-0.14
MW-136A	USACE	1410	1,126.59	1,124.72	1.86
MW-137A	USACE	1410	1,129.95	1,129.48	0.47
MW-138A	USACE	1410	1,133.33	1,133.26	0.06
MW-139A	USACE	1410	1,136.63	1,137.88	-1.24
MW-140A	USACE	1410	1,083.25	1,072.71	10.54
MW-141A	USACE	1410	1,125.13	1,124.21	0.92
MW-142A	USACE	1410	1,106.12	1,106.48	-0.36
MW-144A	USACE	1410	1,124.04	1,122.78	1.27
MW-145A	USACE	1410	1,113.32	1,113.15	0.18
MW-146A	USACE	1410	1,100.48	1,101.38	-0.90
MW-147A	USACE	1410	1,098.61	1,099.15	-0.54
MW-149A	USACE	1410	1,107.03	1,108.24	-1.21
MW-150A	USACE	1410	1,099.50	1,100.28	-0.78
MW-151A	USACE	1410	1,113.74	1,114.47	-0.72
MW-153A	USACE	1410	1,099.98	1,103.42	-3.44
MW-154A	USACE	1410	1,090.70	1,094.27	-3.56
MW-155A	USACE	1410	1,093.26	1,095.27	-2.01
MW-156A	USACE	1410	1,088.72	1,081.96	6.76
MW-157A	USACE	1410	1,081.85	1,081.49	0.35
MW-158A	USACE	1410	1,071.75	1,075.61	-3.86
MW-159A	USACE	1410	1,112.54	1,115.64	-3.09
Brabec	LPNNRD	1410	1,099.94	1,099.74	0.20
Frahm	LPNNRD	1410	1,090.20	1,090.20	0.00
Hanson	LPNNRD	1410	1,094.71	1,095.02	-0.31
LPN06-01	LPNNRD	1410	1,062.40	1,062.46	-0.06
LPN06-18	LPNNRD	1410	1,082.89	1,074.05	8.84
LPN06-19	LPNNRD	1410	1,096.11	1,101.57	-5.46
LPN06-20	LPNNRD	1410	1,148.33	1,145.69	2.64
LPN06-21	LPNNRD	1410	1,144.46	1,157.54	-13.08
M90-01	LPNNRD	1410	1,068.18	1,070.17	-1.99
M90-02	LPNNRD	1410	1,068.83	1,070.57	-1.74
M90-04	LPNNRD	1410	1,064.92	1,065.82	-0.90
M90-05R	LPNNRD	1410	1,063.97	1,057.56	6.41
M90-09	LPNNRD	1410	1,061.96	1,063.87	-1.91

Table 5-3
Transient Calibration Check
End of August 2012 Data Set
Nebraska Ordnance Plant Groundwater Report

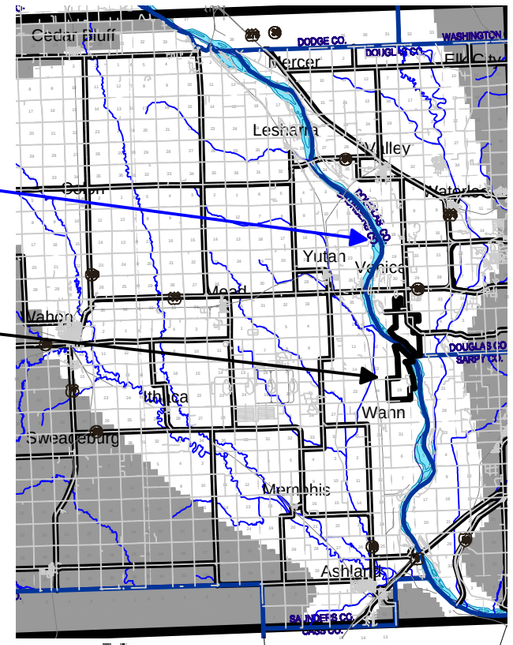
Calibration Target Name	Water Level Data Provided By	Simulation Time (Days)	Measured Groundwater Elevation (ft msl)	Model Computed Groundwater Elevation (ft msl)	Residual (feet)
M90-12R	LPNNRD	1410	1,059.62	1,062.23	-2.61
MUD90-10	MUD	1410	1,086.96	1,089.33	-2.37
MUD94-3	MUD	1410	1,077.03	1,078.43	-1.40
MUD94-4	MUD	1410	1,081.98	1,082.90	-0.92
MUD94-5	MUD	1410	1,089.54	1,092.42	-2.88
MUD94-6	MUD	1410	1,079.55	1,078.74	0.81
MUD94-7	MUD	1410	1,072.79	1,074.10	-1.31
N.Keiser	LPNNRD	1410	1,079.88	1,080.45	-0.57
N.Wann	LPNNRD	1410	1,101.76	1,102.92	-1.16
S.Keiser	LPNNRD	1410	1,078.80	1,079.17	-0.37
TV-16	LPNNRD	1410	1,092.78	1,093.59	-0.81
TV-17A	LPNNRD	1410	1,084.55	1,082.56	1.99
MW05-23	MUD	1410	1,080.16	1,081.21	-1.05
MW05-22	MUD	1410	1,082.66	1,084.55	-1.89
MW06-28	MUD	1410	1,083.95	1,085.53	-1.58
MW06-30	MUD	1410	1,130.20	1,129.52	0.68
MW06-31	MUD	1410	1,092.13	1,099.32	-7.18
MW-90-6	MUD	1410	1,100.62	1,100.41	0.20
MW-90-4	MUD	1410	1,116.30	1,118.08	-1.79
MW90-5	MUD	1410	1,095.68	1,095.98	-0.30
MW90-7	MUD	1410	1,101.60	1,103.21	-1.60
MW05-24	MUD	1410	1,094.19	1,095.67	-1.49
MW05-25	MUD	1410	1,099.12	1,099.64	-0.52
MW05-26	MUD	1410	1,105.22	1,106.31	-1.10
MW90-12	MUD	1410	1,094.37	1,093.02	1.34
MW06-29	MUD	1410	1,092.18	1,094.81	-2.63
MW-94-1	MUD	1410	1,101.54	1,101.39	0.15
MW90-13	MUD	1410	1,088.41	1,089.02	-0.61
MW-94-2	MUD	1410	1,098.98	1,099.27	-0.29
Summary Statistics					

Residual Mean	-0.47
Abs. Res. Mean	1.74
Res. Std. Dev.	2.63
RMS Error	1.63
Min. Residual	-13.08
Max. Residual	10.54
Range in Observations	99.98
Scaled Abs. Mean	1.74%
Scaled RMS	**2.63%**

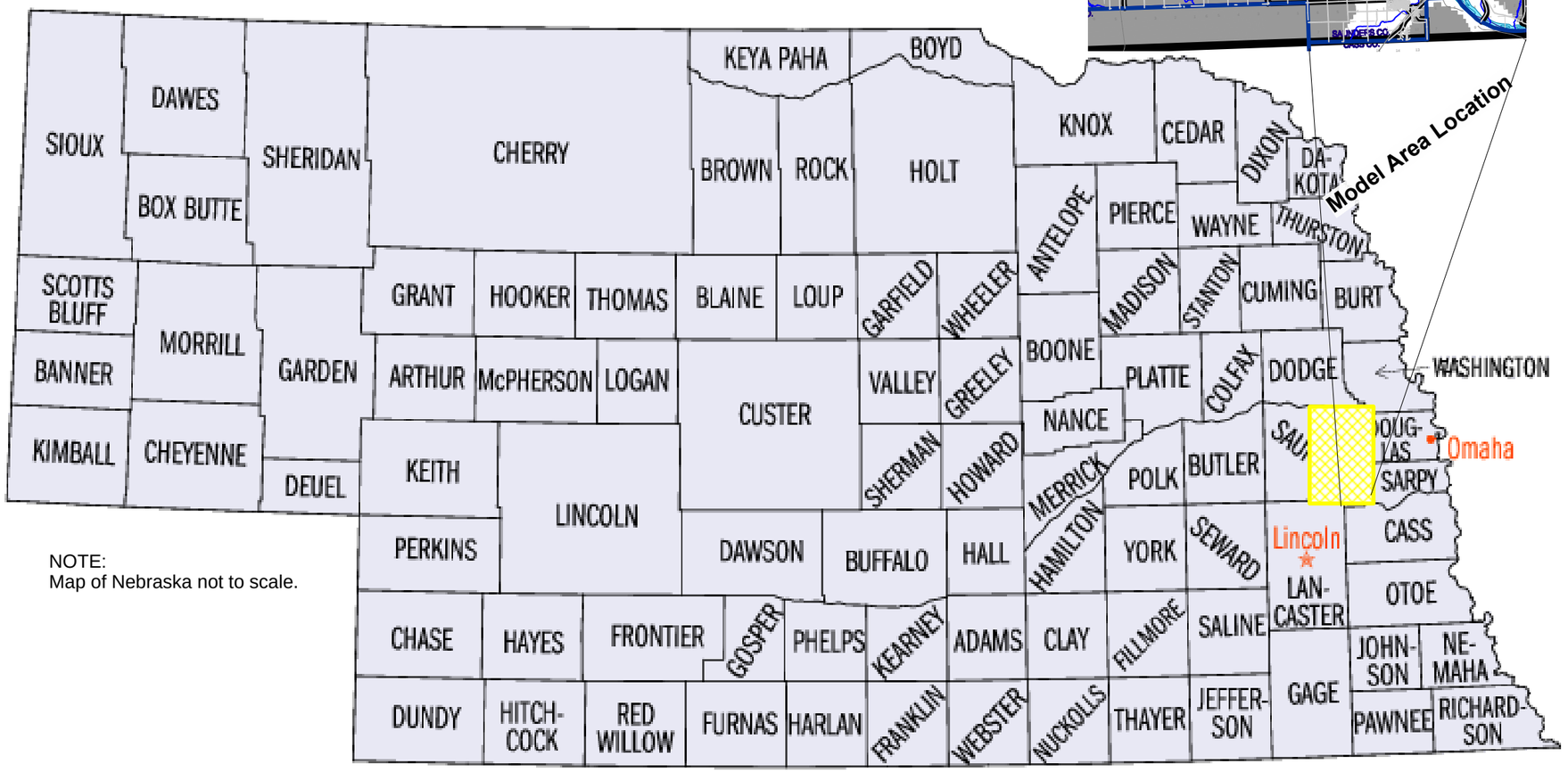
FIGURES

Platte River

Platte West Well Field



Model Area Location



NOTE:
Map of Nebraska not to scale.

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Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Figure 1-1
Platte West Well Field
Groundwater Model Boundaries

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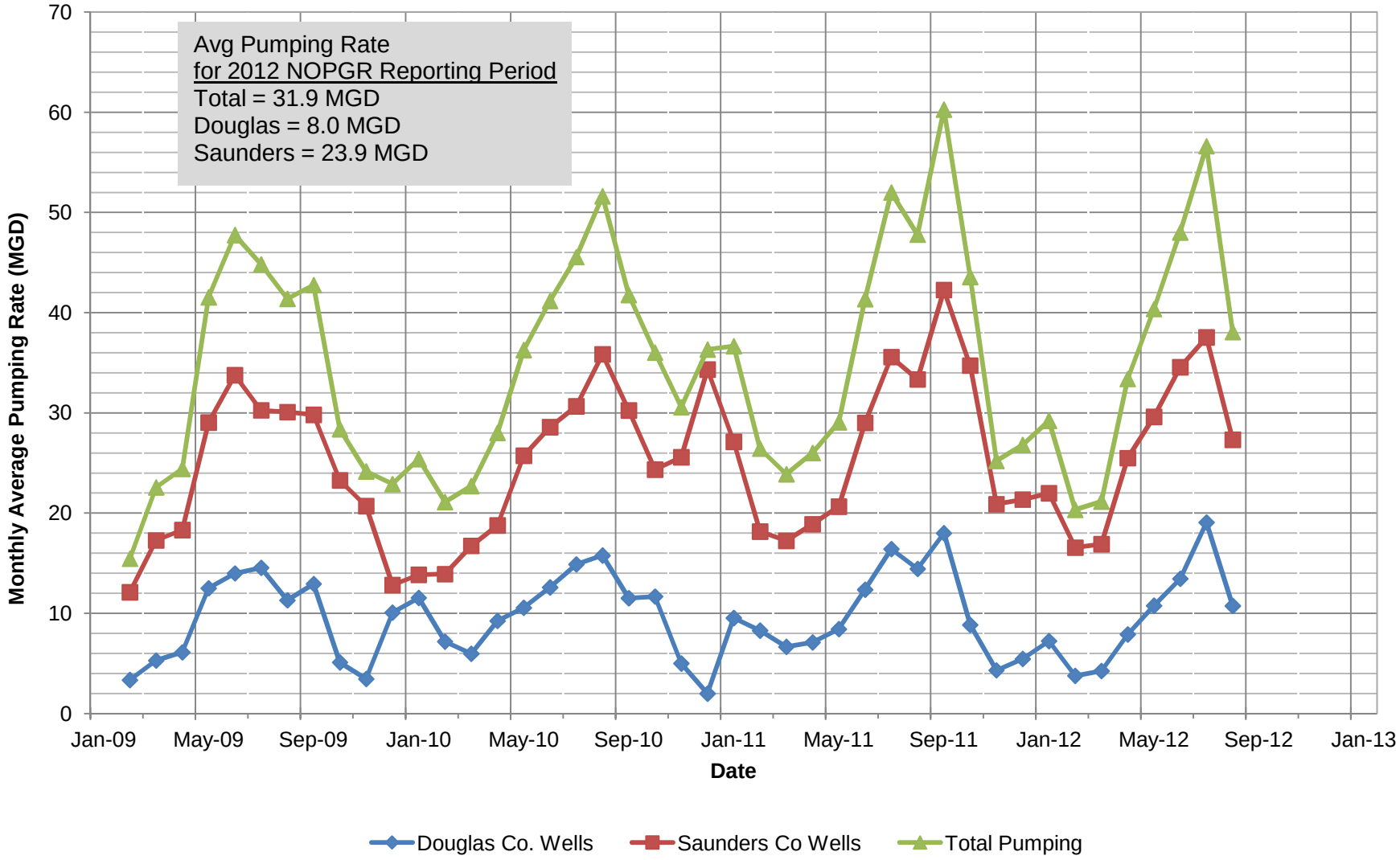
Figure 2-1
Monthly Average Pumping Rate
February 2009 through September 2012
MUD Platte West Well Field



Note:
All wells shown are equiped with pressure transducer/data logger to measure water level elevations

Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Figure 3-1:
Groundwater Monitoring Network

Legend

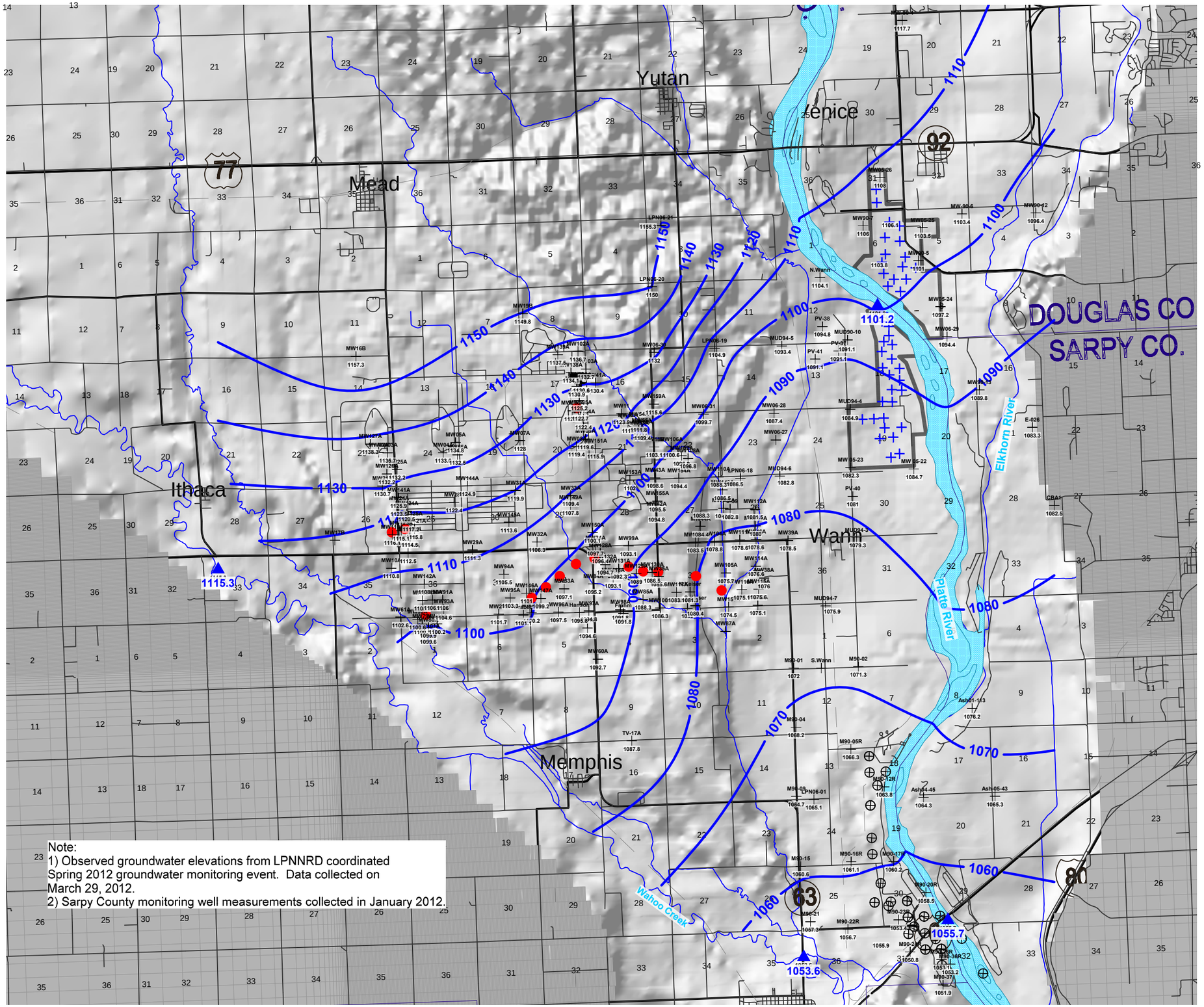
- Monitoring Wells Maintain by LPNNRD or USACE
- Monitoring Wells Maintain by MUD
- FNOP Pumping Wells
- MUD Pumping Wells
- Stream
- MUD Well Field
- Railroad

Highway

- Interstate
- US
- State
- Local
- County Boundary
- City

0 0.5 1 Miles

January 2013



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Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Figure 3-2
March 2012 Observed
Potentiometric Surface (ft msl)

LEGEND:

MW94-5 + 1093.4 — Observation Well with Measured Water Level Elevation in ft msl

Interpreted Potentiometric Surface Elevation Contour (ft msl)

Contour Interval = 10 feet

1101.2 ▲ USGS Gauging Station with Stream Elevation (ft msl)

Pumping Wellfields Operating During March 2012 Water Level Event

Platte West Well Field Boundary

Platte West Well Field Well

FNOP Containment/Focused Extraction Well

Ashland City Well/Lincoln Well Field Well

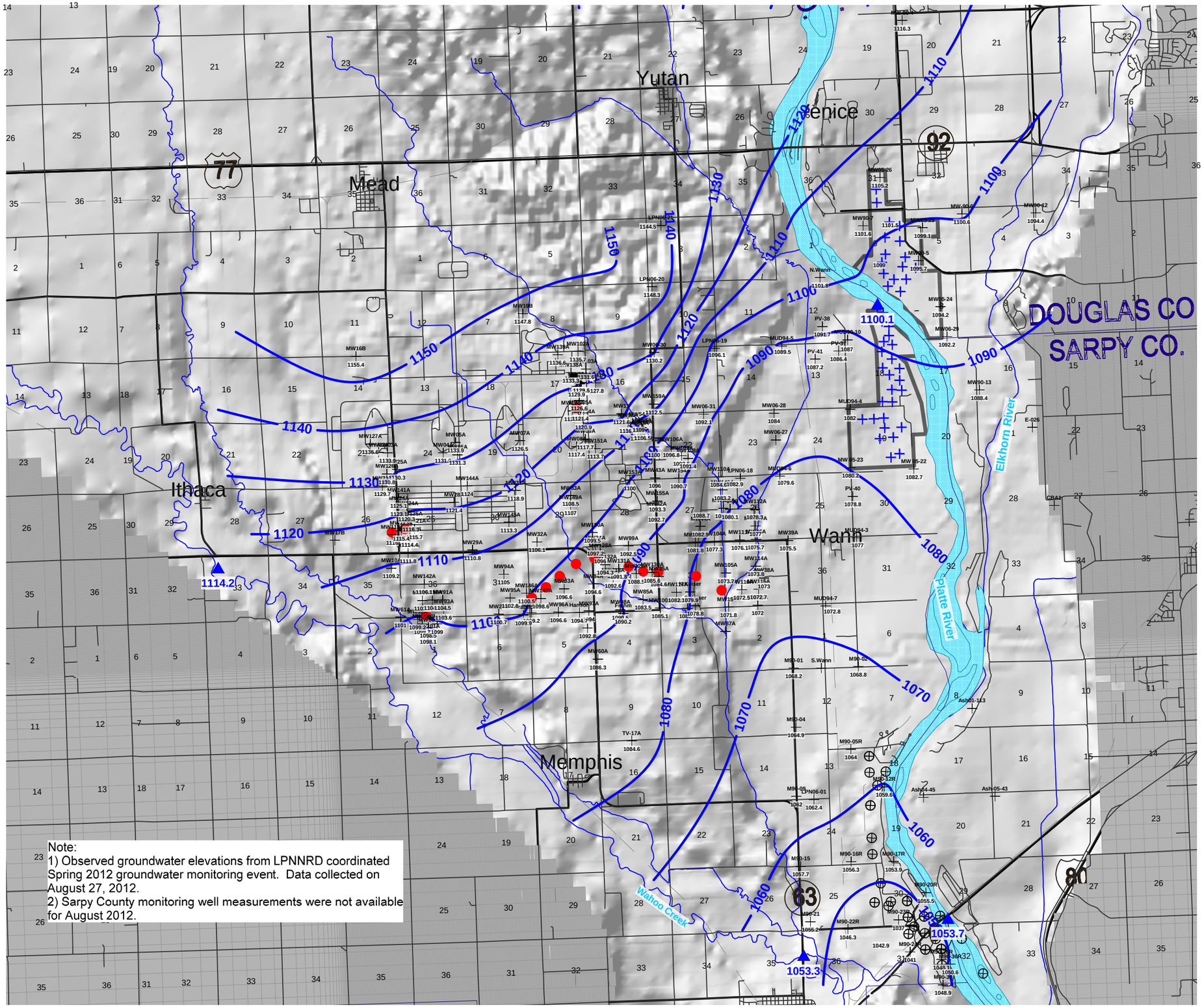
MAP SCALE (feet)

0 4000 8000

N

HDR

January 2013



Note:
1) Observed groundwater elevations from LPNNRD coordinated Spring 2012 groundwater monitoring event. Data collected on August 27, 2012.
2) Sarpy County monitoring well measurements were not available for August 2012.

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Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Figure 3-2b
August 2012 Observed
Potentiometric Surface (ft msl)

LEGEND:

MW94-5 + 1093.4 — Observation Well with Measured Water Level Elevation in ft msl

Interpreted Potentiometric Surface Elevation Contour (ft msl)

Contour Interval = 10 feet

1100.1 ▲ USGS Gauging Station with Stream Elevation (ft msl)

Pumping Wellfields Operating During August 2012 Water Level Event

Platte West Well Field Boundary

Platte West Well Field Well

FNOP Containment/Focused Extraction Well

Ashland City Well/Lincoln Well Field Well

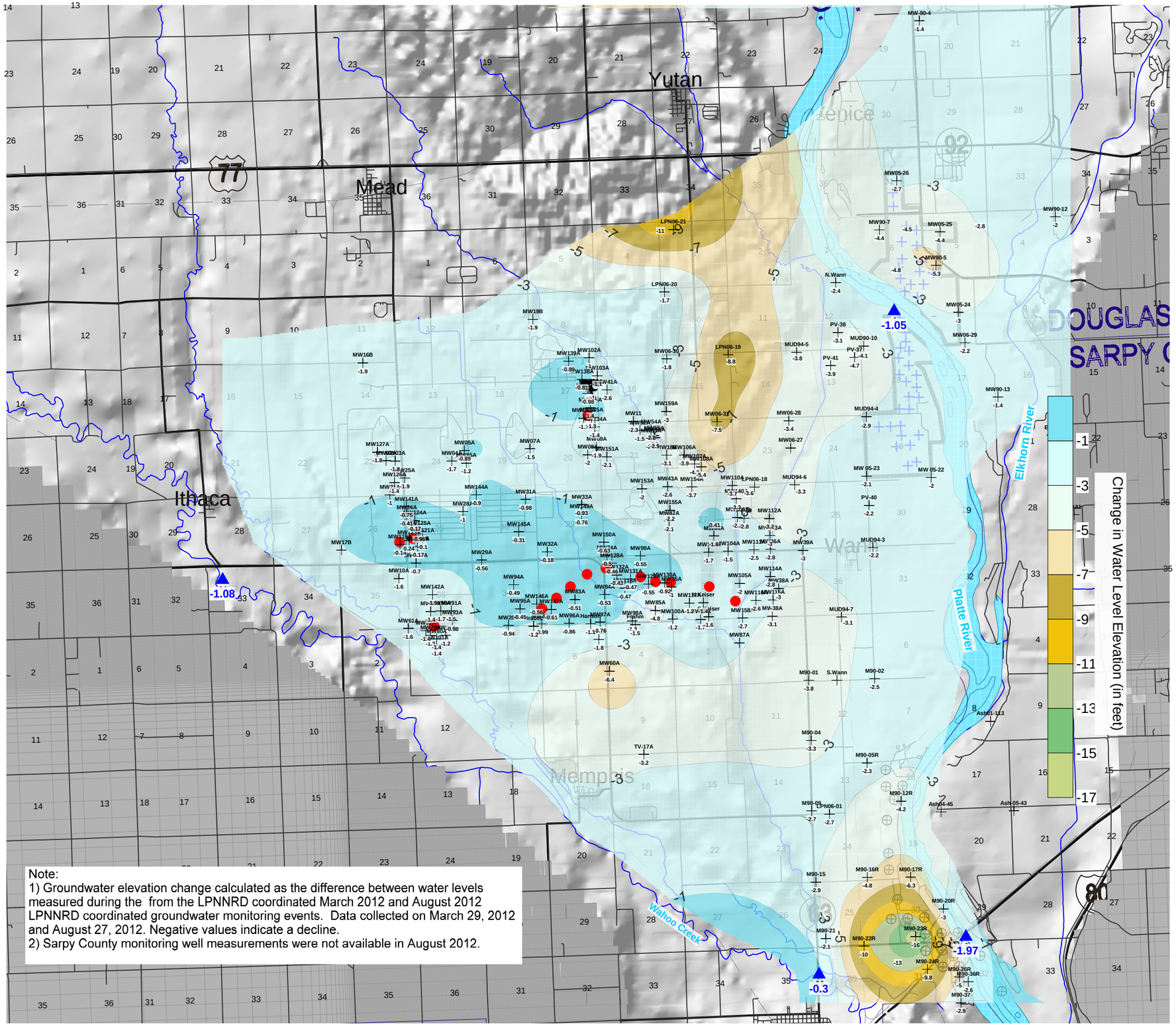
MAP SCALE (feet)

0 4000 8000

N

HDR

January 2013



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Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Figure 3-3
Change in the Potentiometric Surface (in feet) from March to August 2012

LEGEND:

MW94-5 / -3.8 — Observation Well with Measured Water Level Difference from March to August (in feet)

▲ -1.05 — USGS Gauging Station with Difference in Stream Elevation from March to August (feet)

Pumping Wellfields Operating During March 2012 and August 2012 Water Level Events

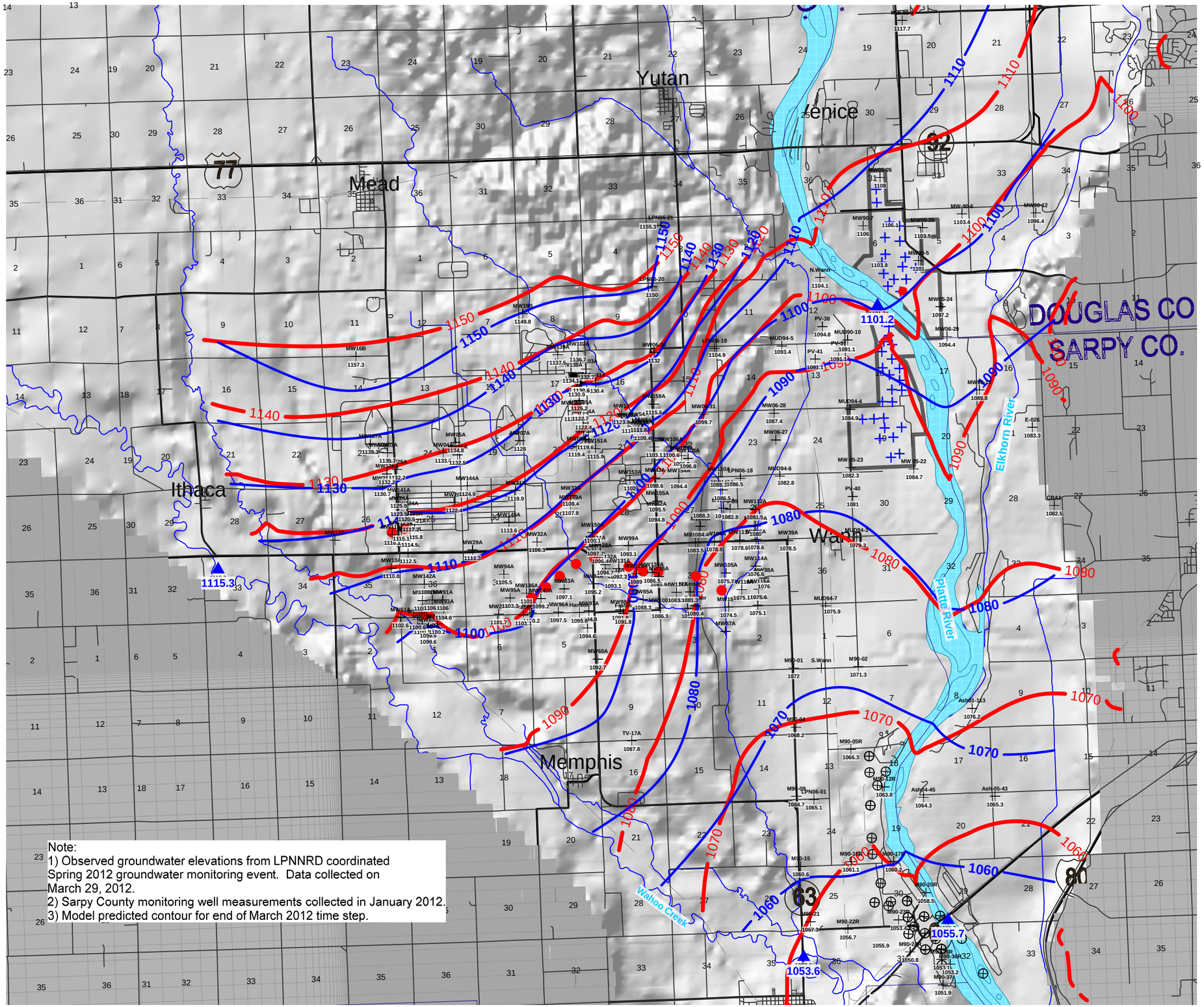
- Platte West Well Field Boundary
- Platte West Well Field Well
- FNOP Containment/Focused Extraction Well
- Ashland City Well/Lincoln Well Field Well

MAP SCALE (feet)

0 4000 8000

HDR

January 2013



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Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Figure 5-1
Comparison of Model Predicted vs Observed Potentiometric Surface (ft msl) for March 2012

LEGEND:

- MW94-5 / 1093.4 — Observation Well with Measured Water Level Elevation in ft msl
- Interpreted Potentiometric Surface Elevation Contour (ft msl)
- Model Predicted Potentiometric Surface Elevation Contour (ft msl)
- Contour Interval = 10 feet
- 1101.2 — USGS Gauging Station with Stream Elevation (ft msl)

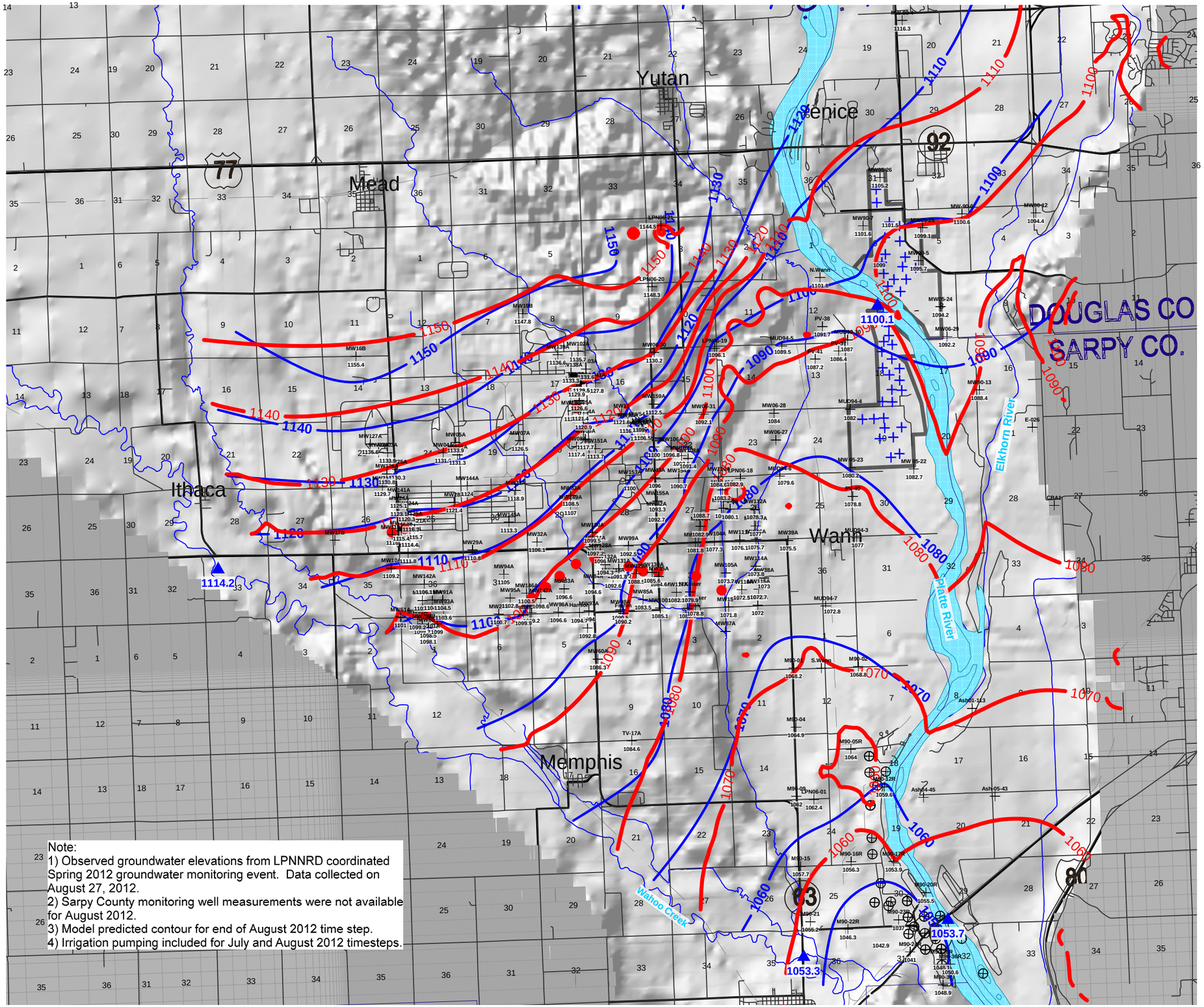
Pumping Wellfields Operating During March 2012 Water Level Event

- Platte West Well Field Boundary
- Platte West Well Field Well
- FNOP Containment/Focused Extraction Well
- Ashland City Well/Lincoln Well Field Well

MAP SCALE (feet)
0 4000 8000

HDR

January 2012



Note:
1) Observed groundwater elevations from LPNNRD coordinated Spring 2012 groundwater monitoring event. Data collected on August 27, 2012.
2) Sarpy County monitoring well measurements were not available for August 2012.
3) Model predicted contour for end of August 2012 time step.
4) Irrigation pumping included for July and August 2012 timesteps.

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Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Figure 5-1b
Comparison of Model Predicted vs Observed Potentiometric Surface (ft msl) for August 2012

LEGEND:

MW94-5 + 1093.4 — Observation Well with Measured Water Level Elevation in ft msl

Interpreted Potentiometric Surface Elevation Contour (ft msl)

Model Predicted Potentiometric Surface Elevation Contour (ft msl)

Contour Interval = 10 feet

▲ 1100.1 — USGS Gauging Station with Stream Elevation (ft msl)

Pumping Wellfields Operating During August 2012 Water Level Event

Platte West Well Field Boundary

Platte West Well Field Well

FNOP Containment/Focused Extraction Well

Ashland City Well/Lincoln Well Field Well

MAP SCALE (feet)

0 4000 8000

N

HDR

January 2013

Figure 5-2a
Comparison of Predicted vs Observed Water Level Elevations
End of March 2012 Calibration Check

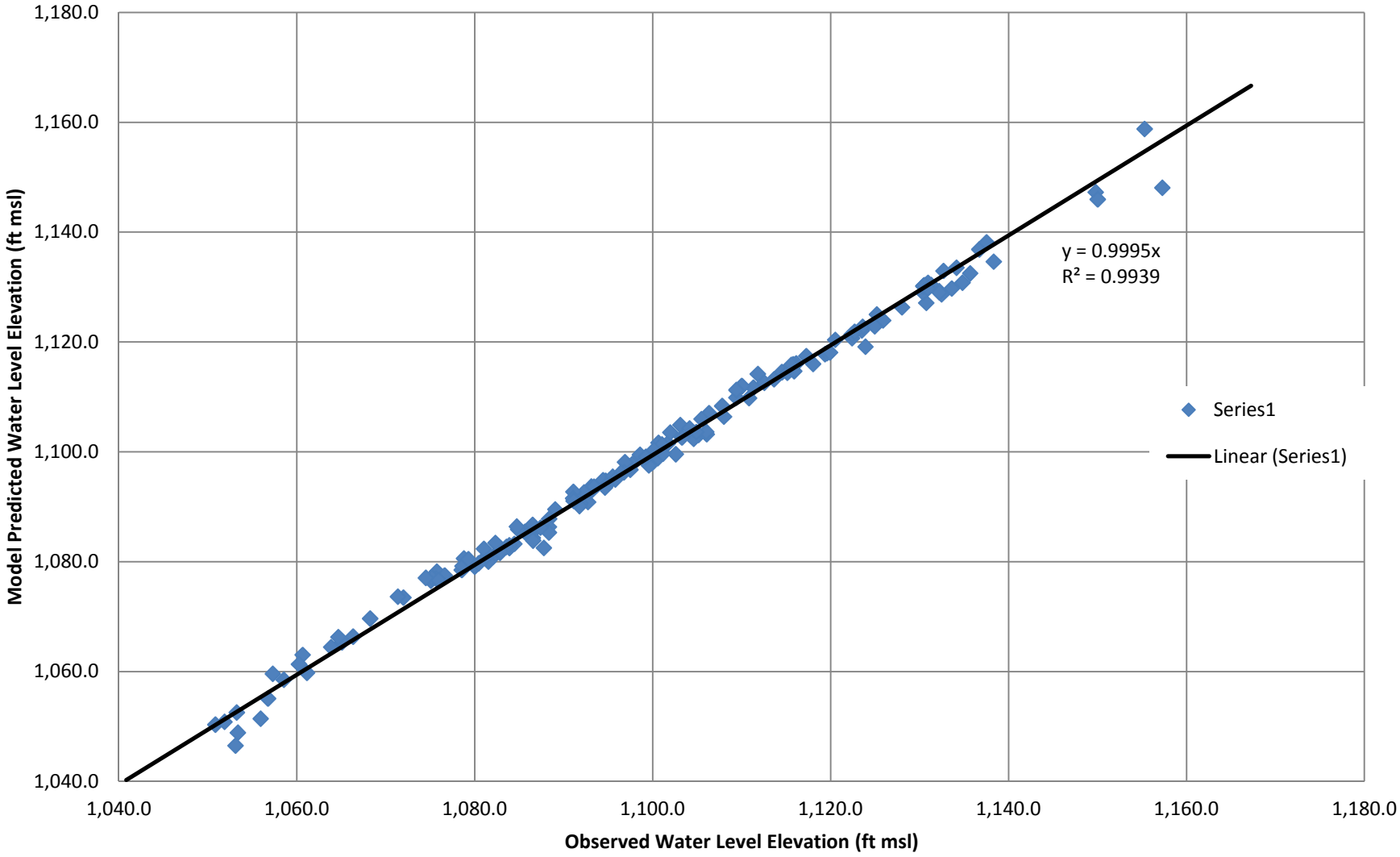


Figure 5-2b
Comparison of Residual Error vs Observed Water Level Elevation
End of March 2012 Calibration Check

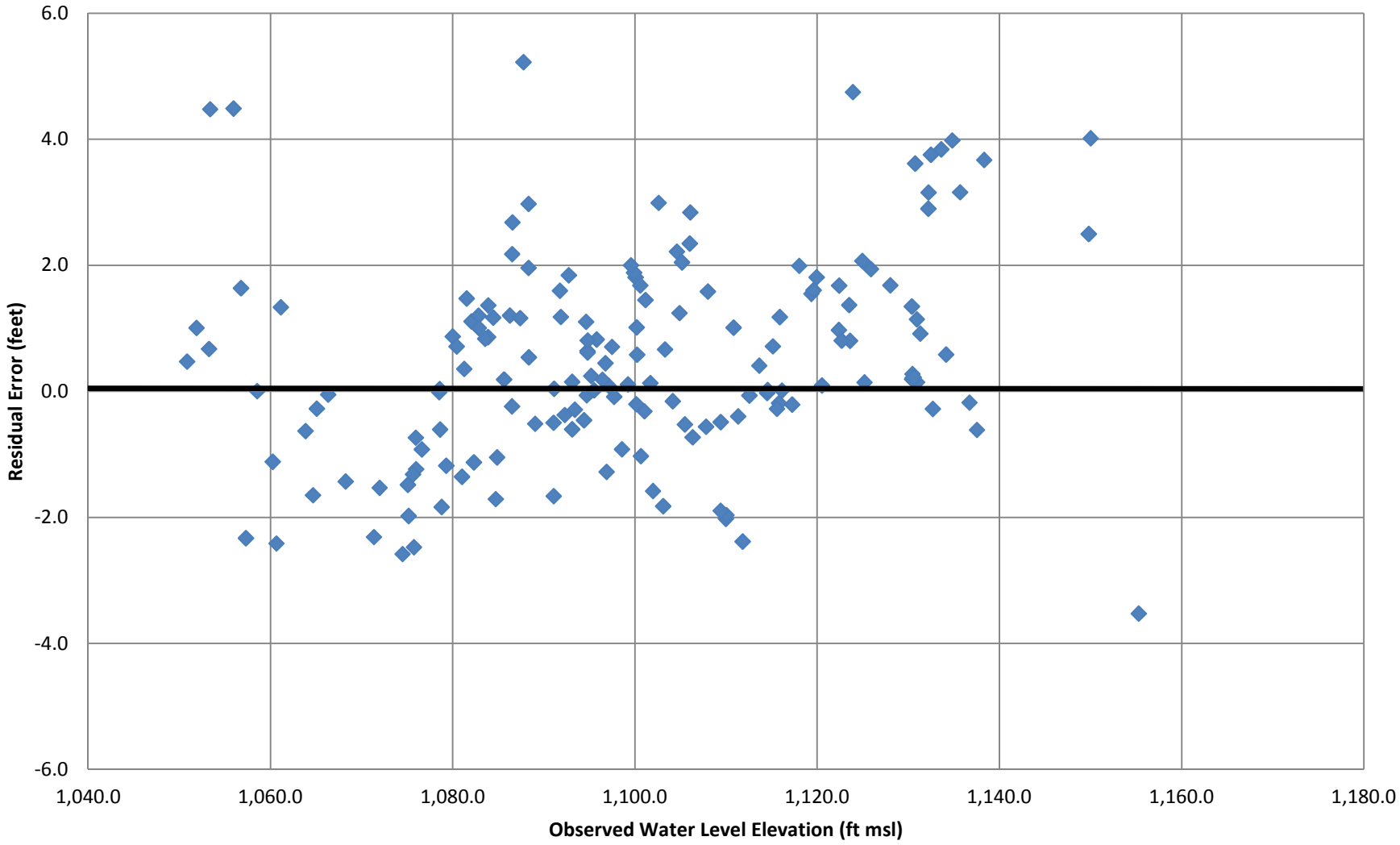


Figure 5-3a
Comparison of Predicted vs Observed Water Level Elevations
End of August 2012 Calibration Check

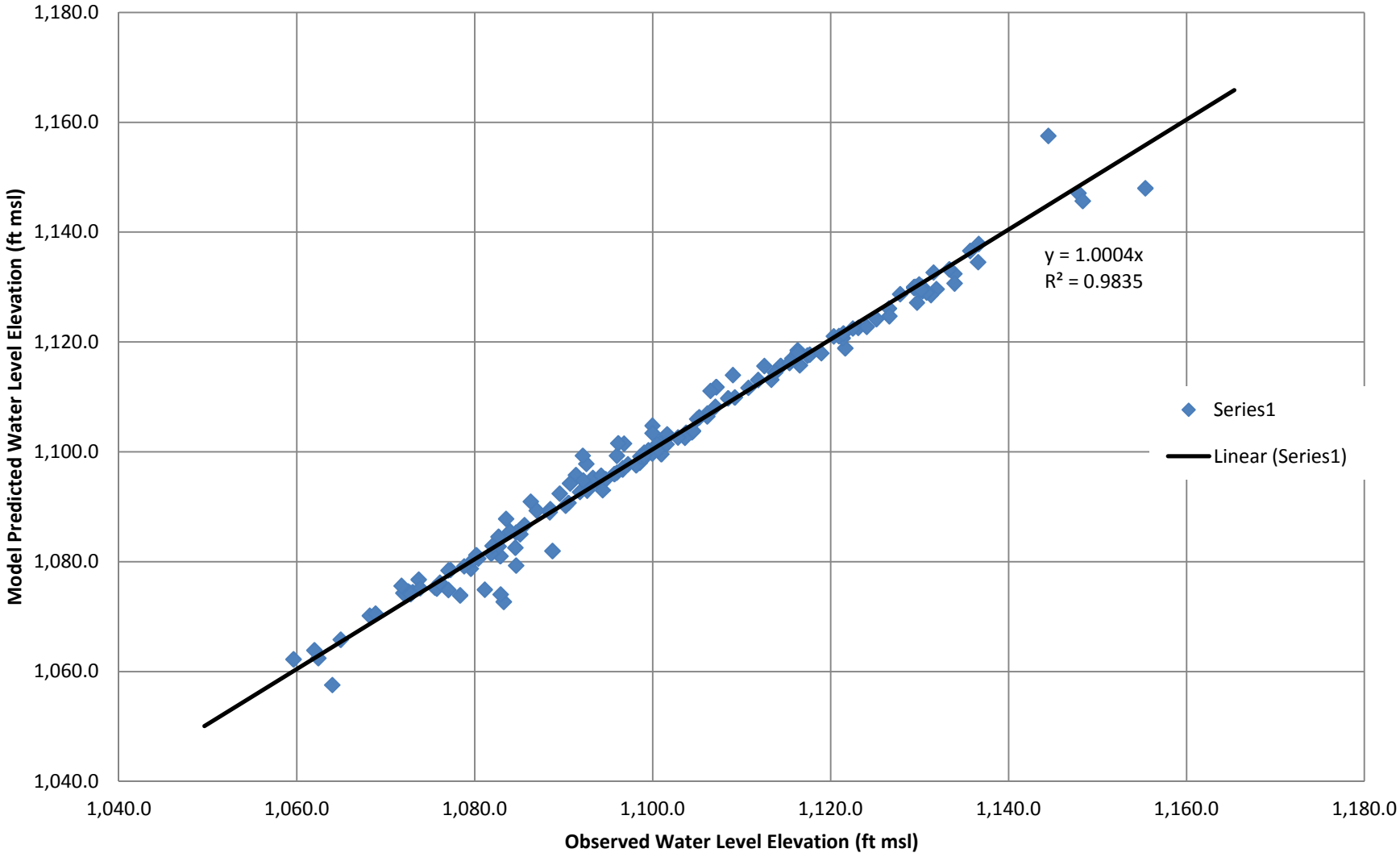
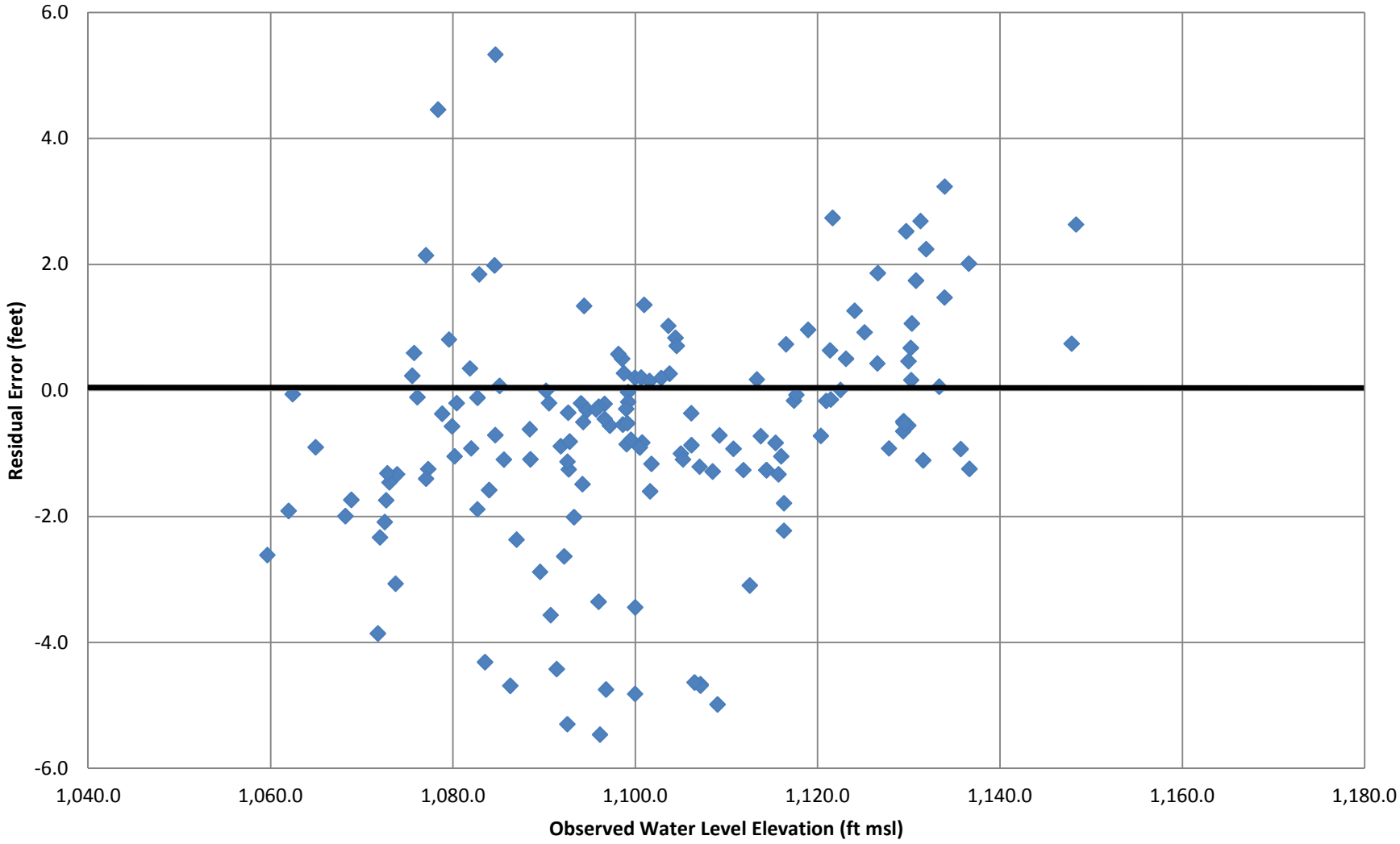


Figure 5-3b
Comparison of Residual Error vs Observed Water Level Elevation
End of August 2012 Calibration Check



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Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Figure 5-4
Transient Particle Tracking Results
(October 2011 to August 2012)

LEGEND:

- 1079.8 — Observation Well with Measured Water Level Elevation in ft msl (March 2012)
- Interpreted Potentiometric Surface Elevation Contour (ft msl) - March 2012
- MODPATH Particle Starting Location
- Three Year Particle Trace (MODPATH)
- TCE Plume
- Overlapping RDX/TCE Plume
- RDX Plume

Pumping Wellfields Operating During MODFLOW/MODPATH Simulation

- Platte West Well Field Boundary
- Platte West Well Field Well
- FNOP Containment/Focused Extraction Well

MAP SCALE (feet)

0 5000 10000

Note:
1) Observed groundwater elevations from LPNNRD coordinated Spring 2012 groundwater monitoring event. FNOP plume reflects the interpretation provided by the USACE for 2012.

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January 2013

APPENDICES

Appendix 3-1: Historical Monitoring Well Hydrographs

Appendix 3-2: Data Monitoring Well Hydrographs

Appendix 3-3: Platte River Streamflow/Stage Data

Appendix 4-1: FNOP Plume Baseline

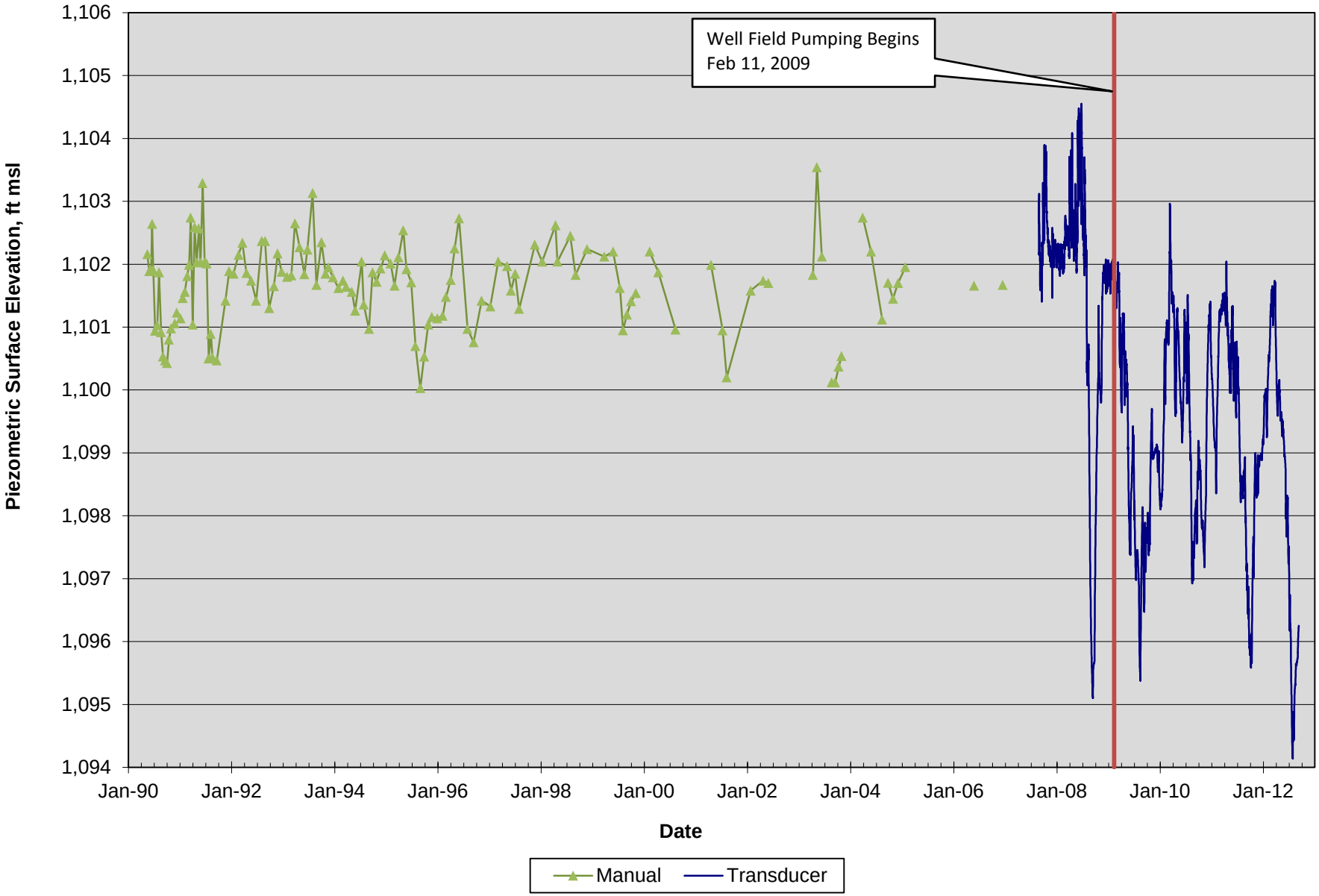
Appendix 4-2: Groundwater Chemical Sampling Data

Appendix 5-1: Groundwater Elevation Comparison Hydrographs

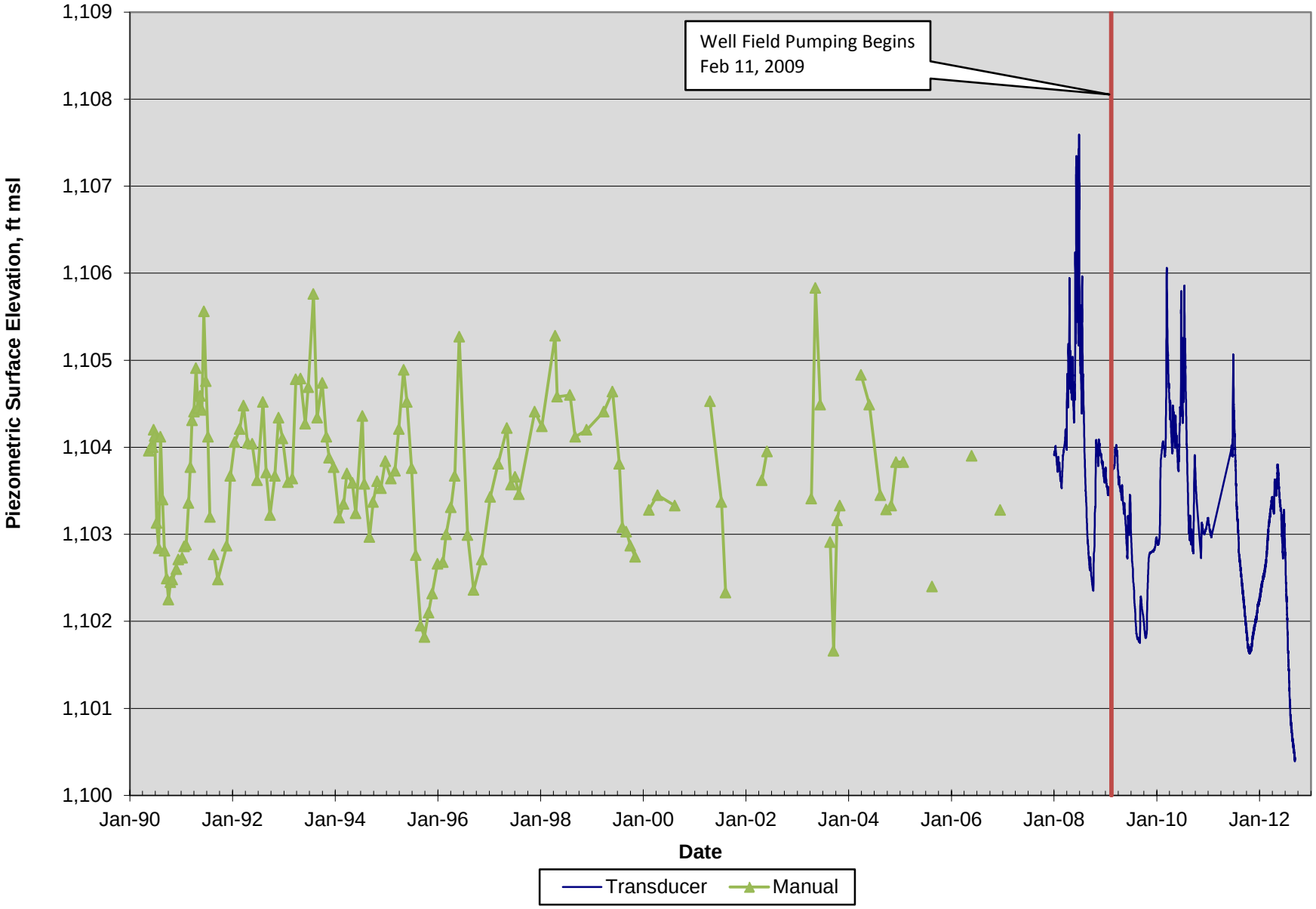
Appendix 5-2: Forecast Model Simulation – Predicted Potentiometric Surface Map

Douglas County Monitoring Wells

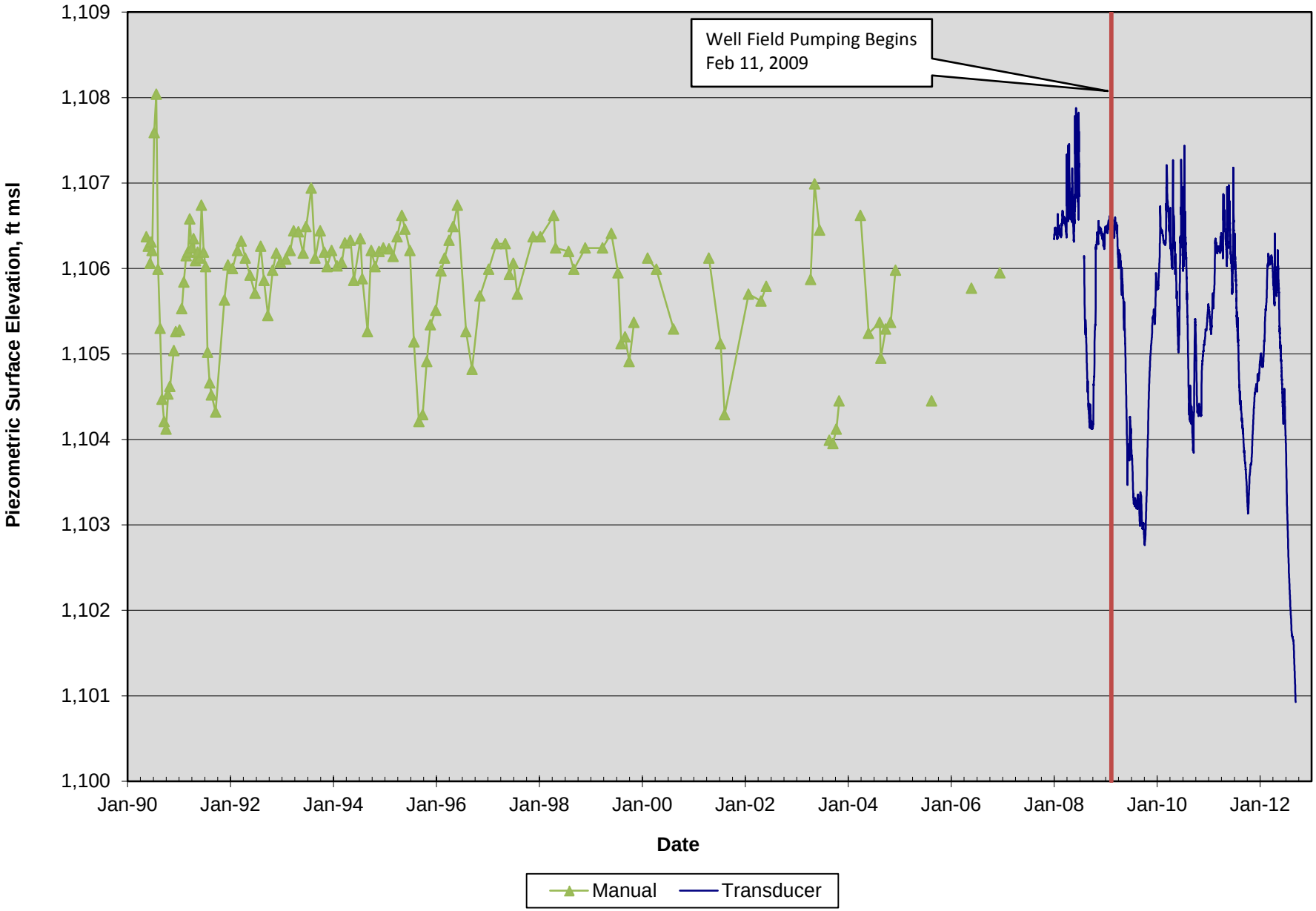
Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 90-5
1990 - 2012



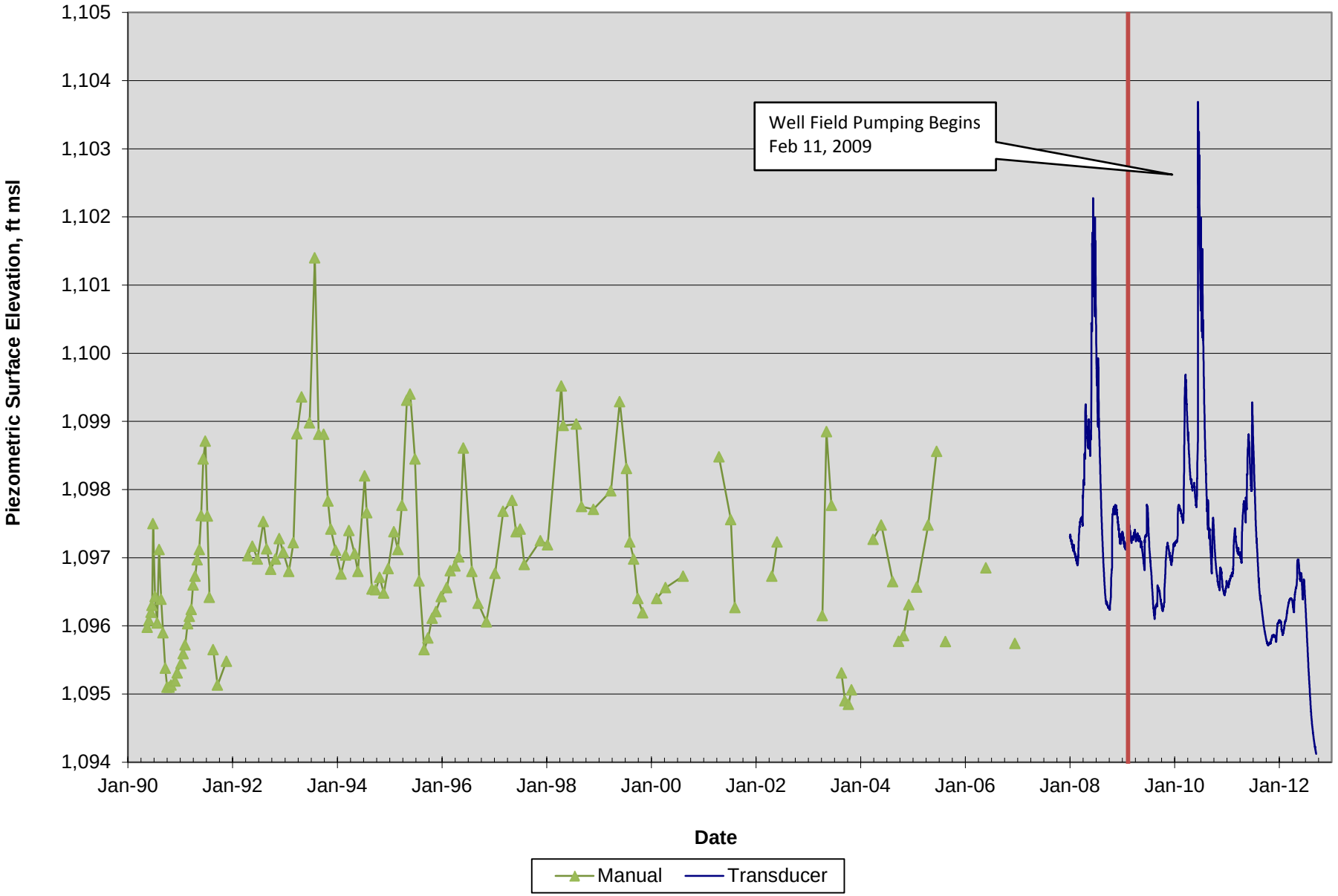
Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 90-6
1990 - 2012



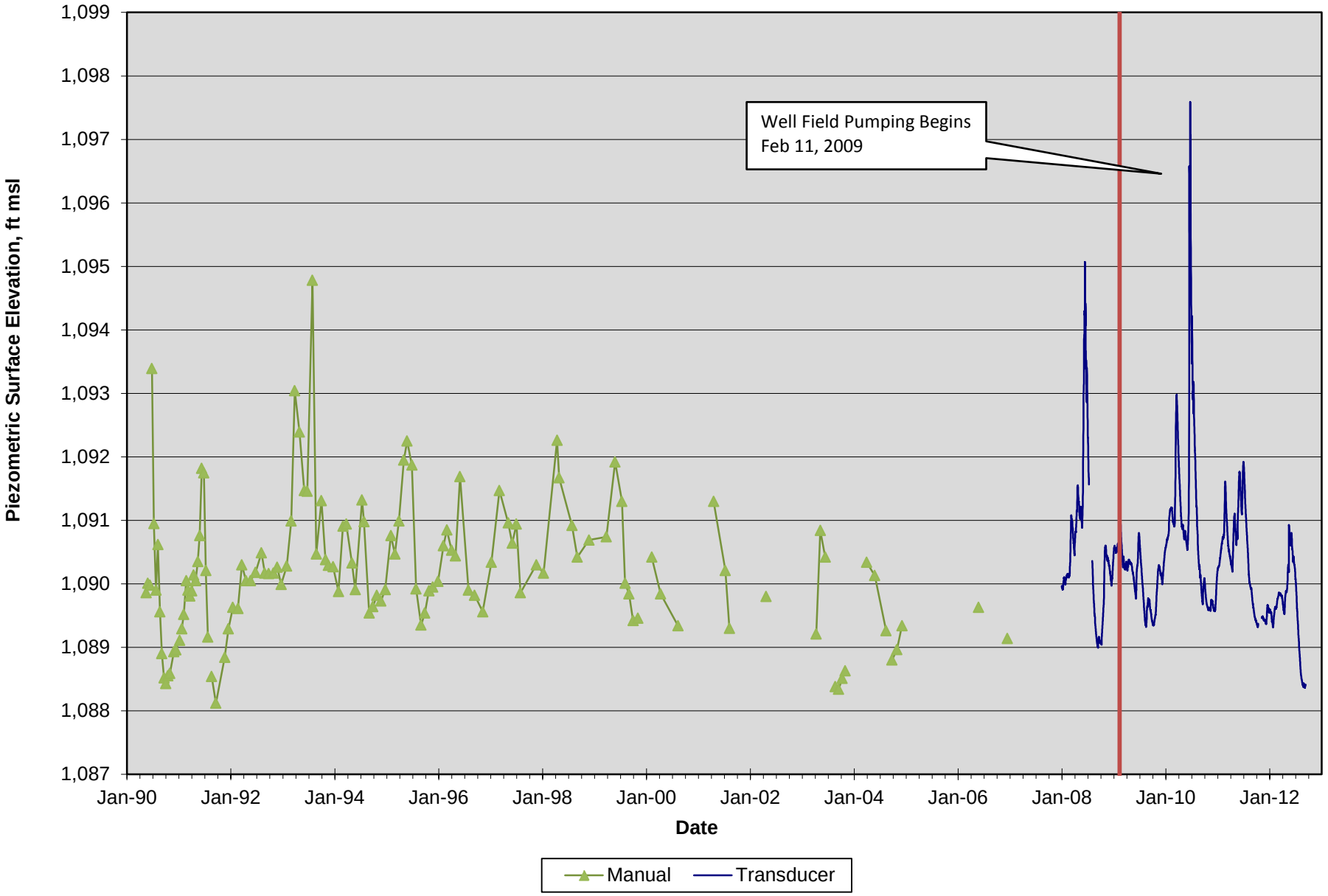
Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 90-7
1990 - 2012



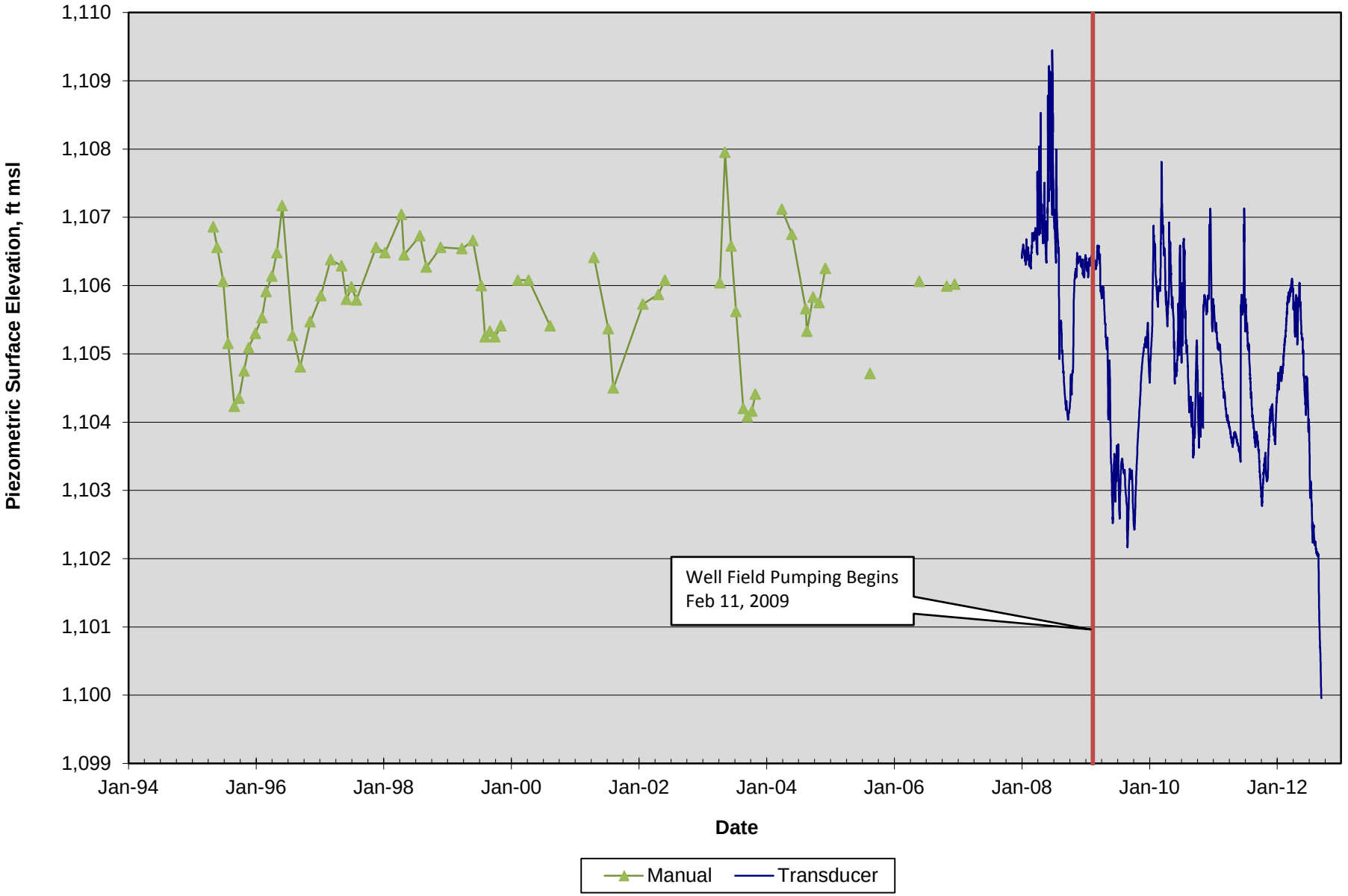
Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 90-12
1990 - 2012



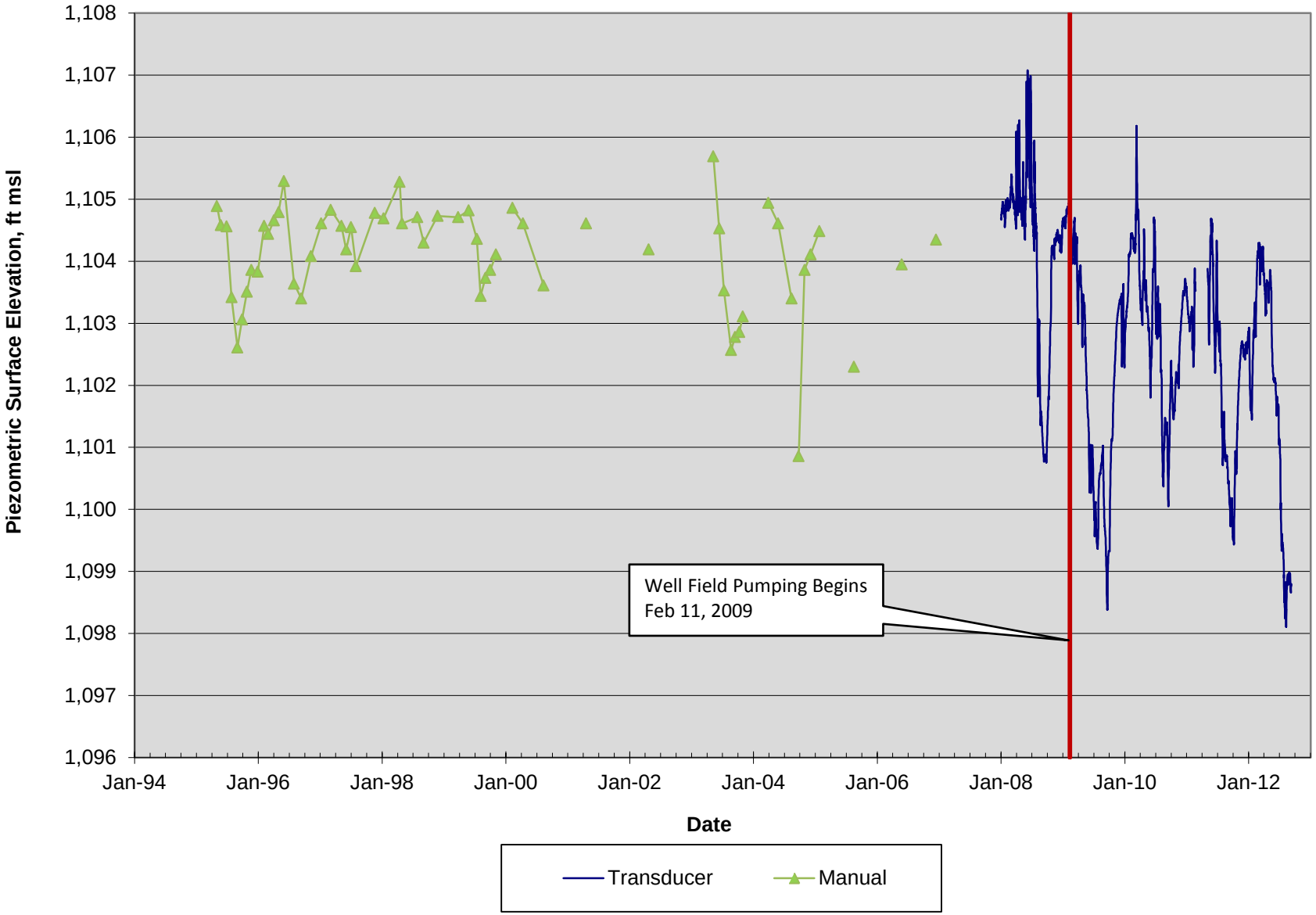
Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 90-13
1990 - 2012



Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 94-1
1995 - 2012

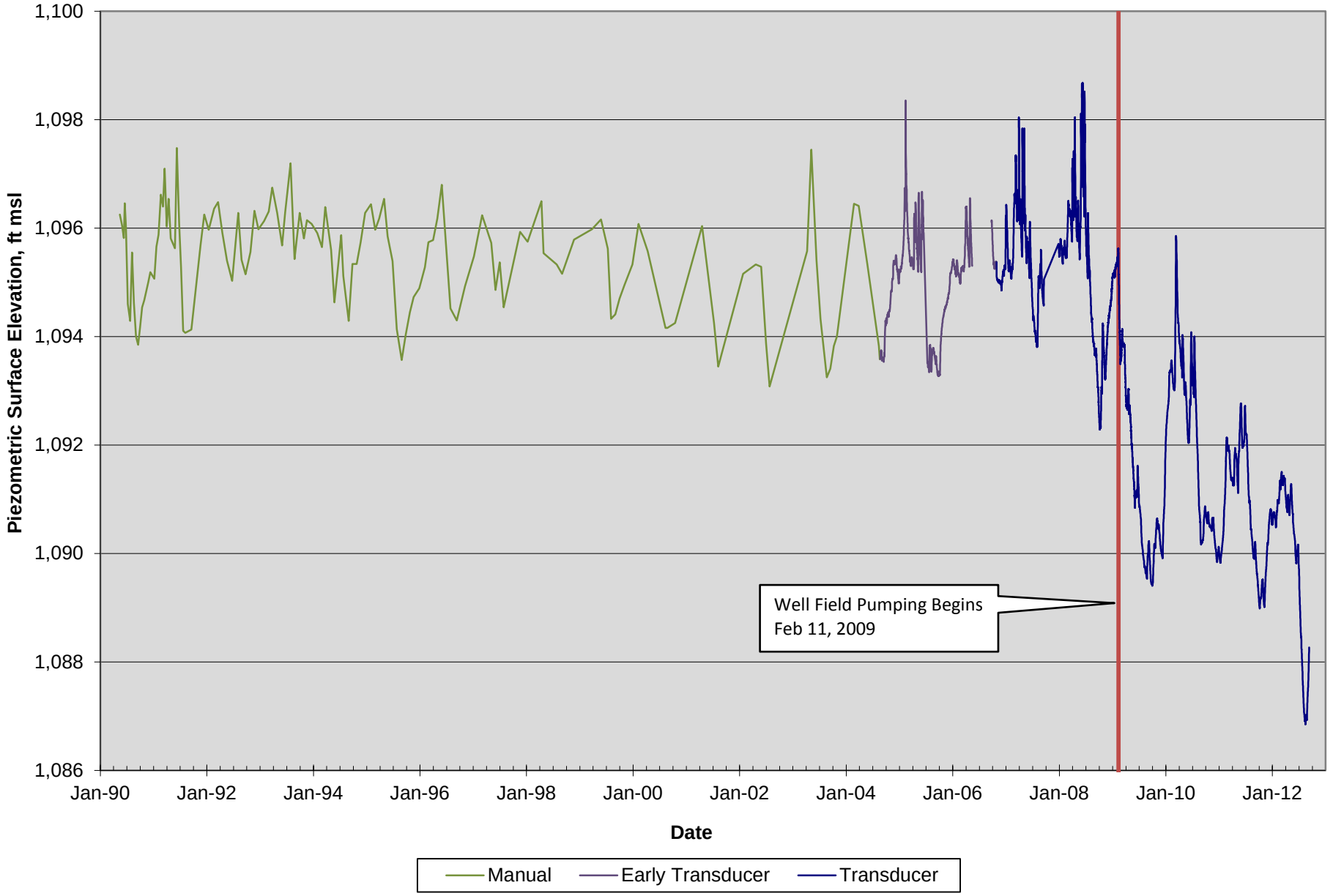


Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 94-2
1995 - 2012

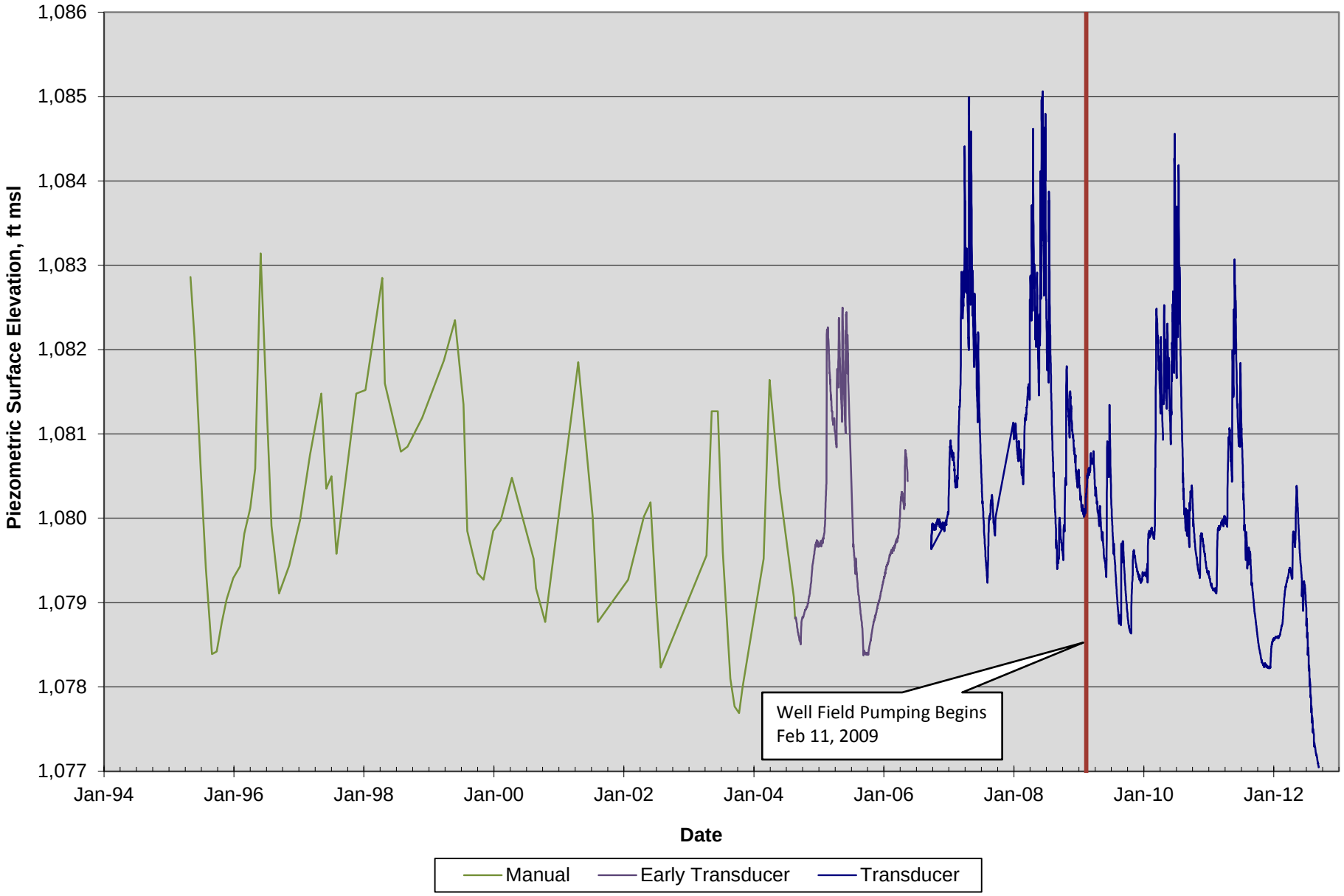


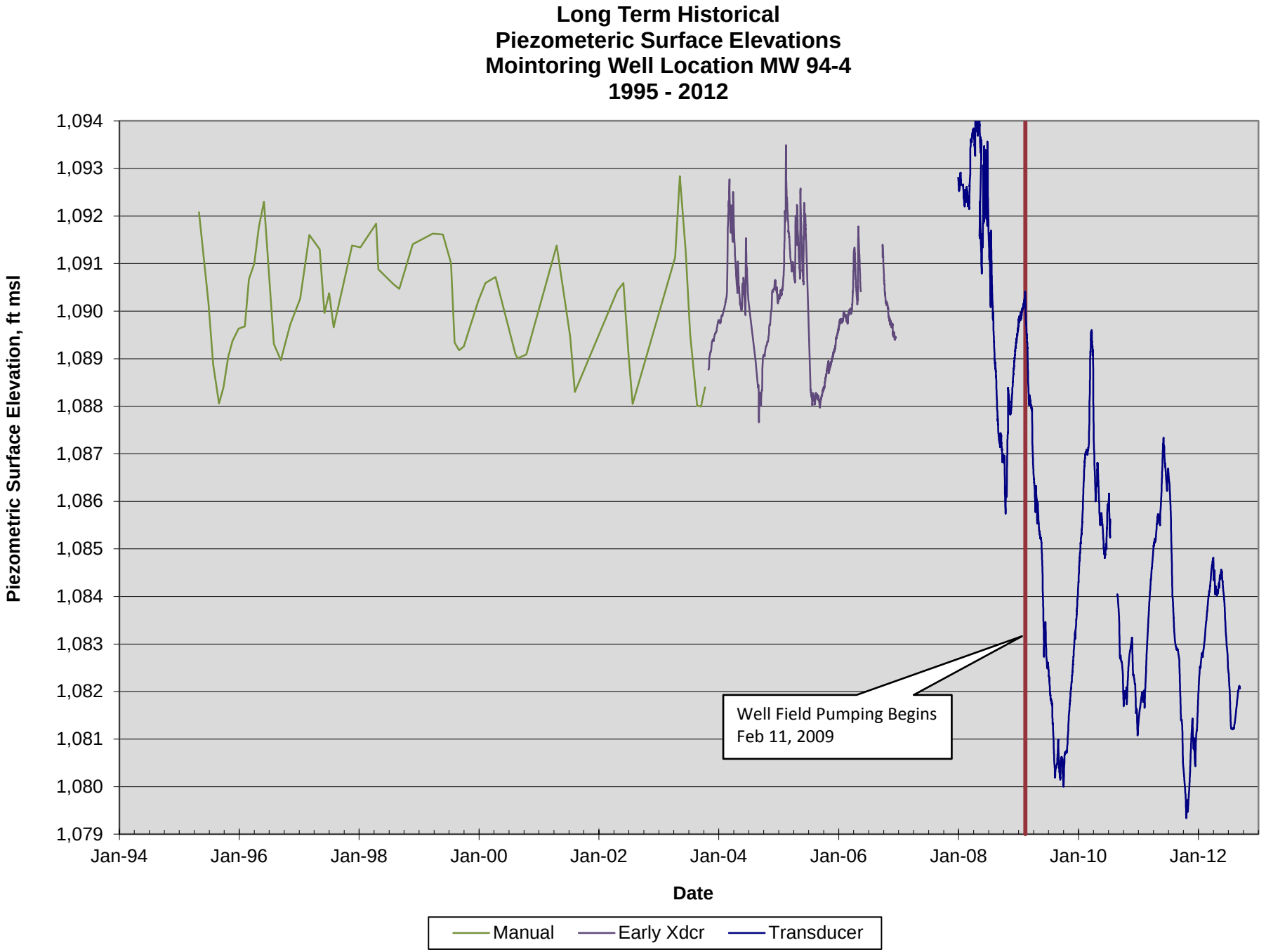
Saunders County Monitoring Wells

Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 90-10
1990 - 2012

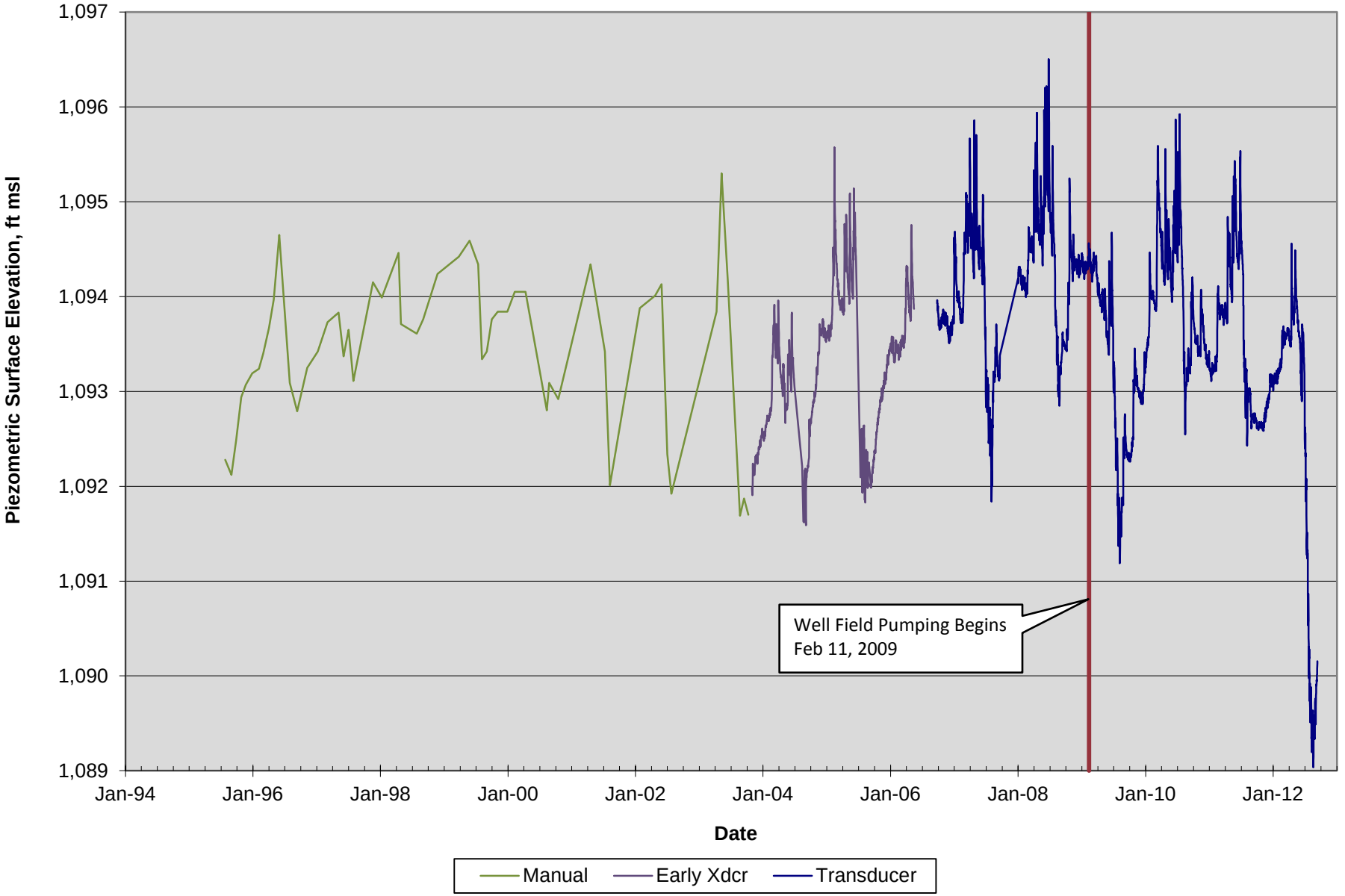


Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 94-3
1995 - 2012

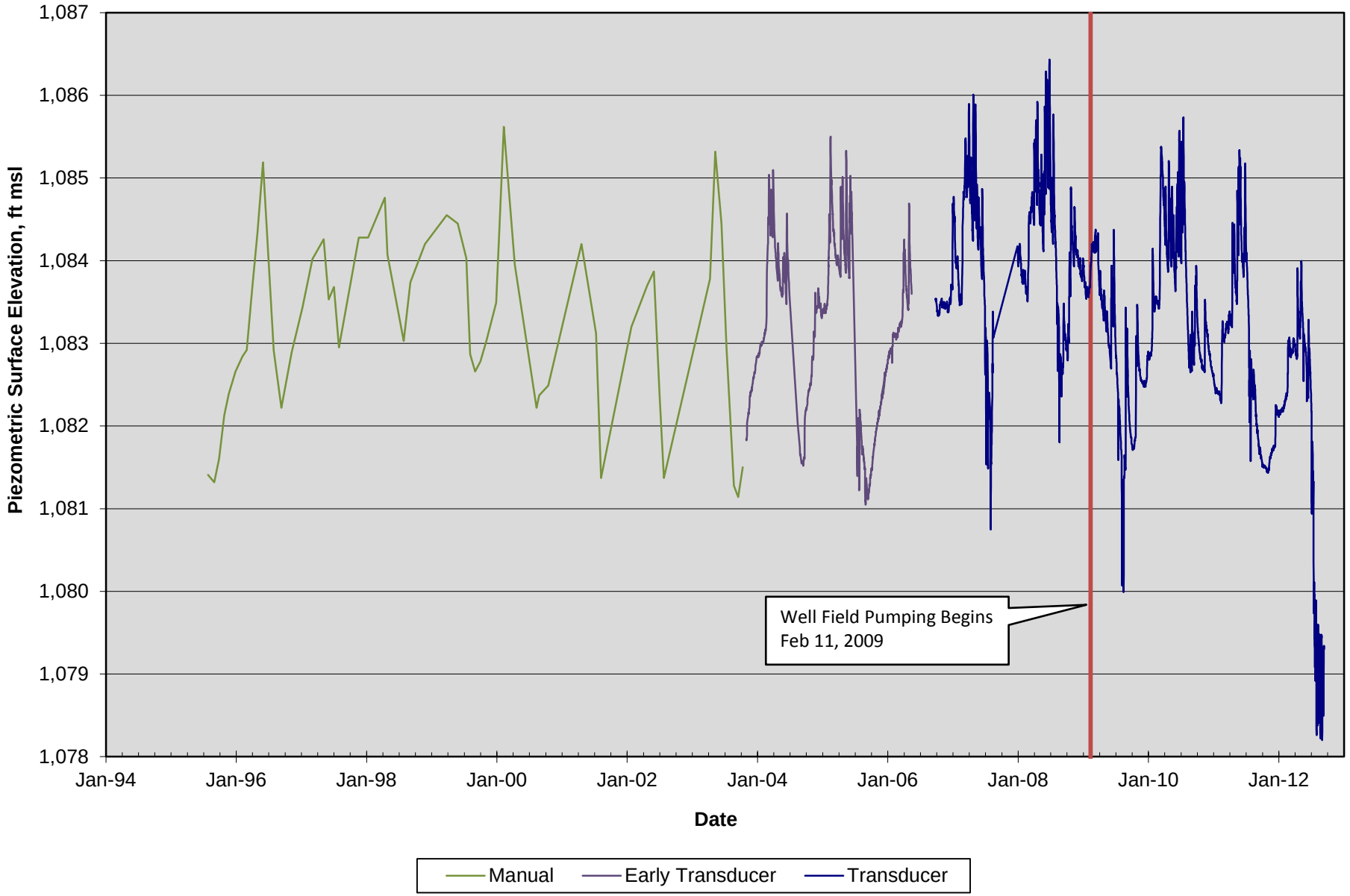


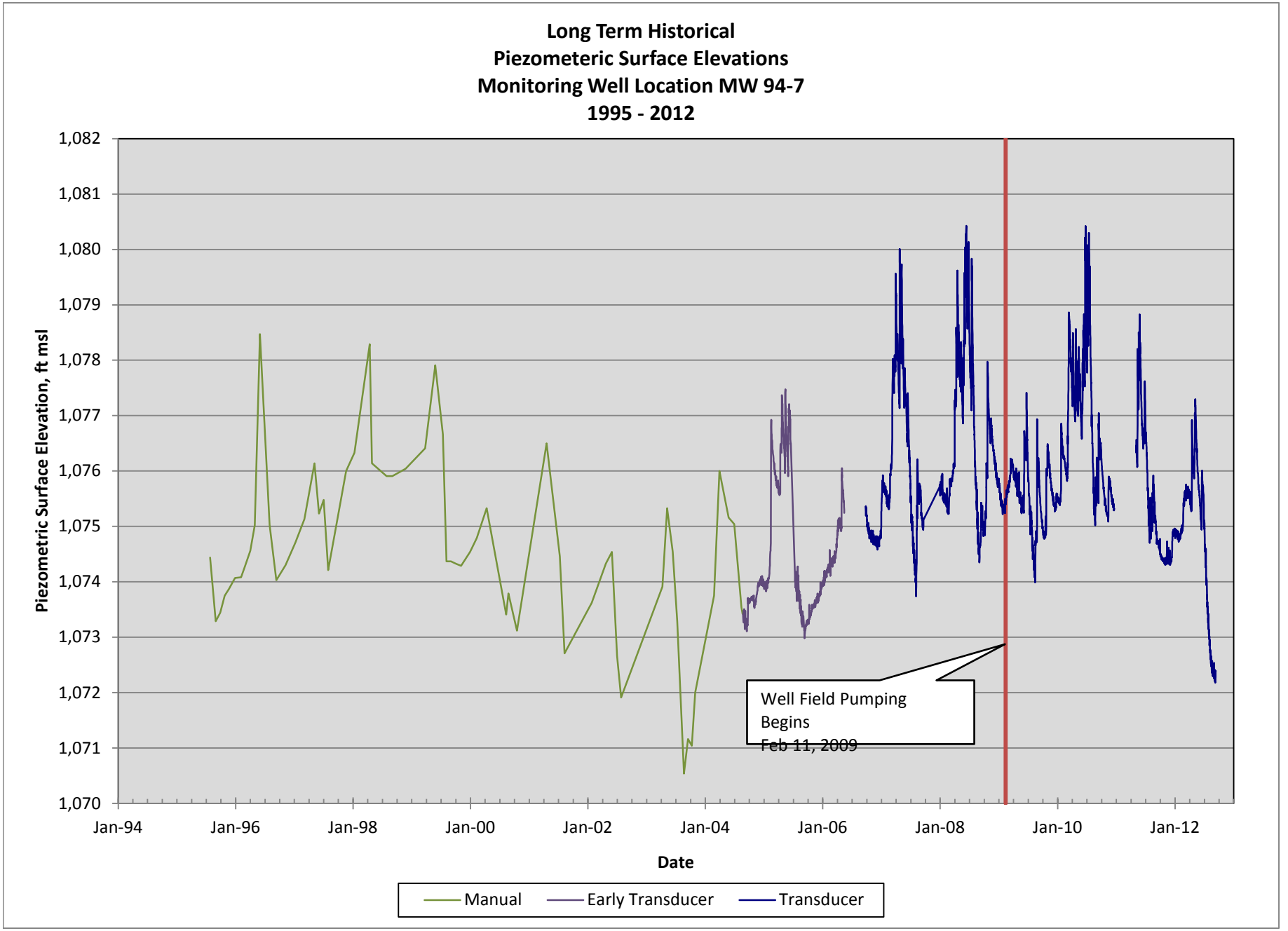

Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 94-4
1995 - 2012
Piezometric Surface Elevation, ft msl
1,094
1,093
1,092
1,091
1,090
1,089
1,088
1,087
1,086
1,085
1,084
1,083
1,082
1,081
1,080
1,079
Jan-94
Jan-96
Jan-98
Jan-00
Jan-02
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Date
Well Field Pumping Begins
Feb 11, 2009
Manual
Early Xdcr
Transducer

Long Term Historical
Piezometeric Surface Elevations
Mointoring Well Location MW 94-5
1995 - 2012



Long Term Historical
Piezometeric Surface Elevations
Monitoring Well Location MW 94-6
1995 - 2012




Long Term Historical
Piezometeric Surface Elevations
Monitoring Well Location MW 94-7
1995 - 2012
Piezometric Surface Elevation, ft msl
1,082
1,081
1,080
1,079
1,078
1,077
1,076
1,075
1,074
1,073
1,072
1,071
1,070
Jan-94
Jan-96
Jan-98
Jan-00
Jan-02
Jan-04
Jan-06
Jan-08
Jan-10
Jan-12
Date
Well Field Pumping
Begins
Feb 11, 2009
Manual
Early Transducer
Transducer

Appendix 3-2

Monitoring Well Hydrographs

Douglas County Monitoring Wells

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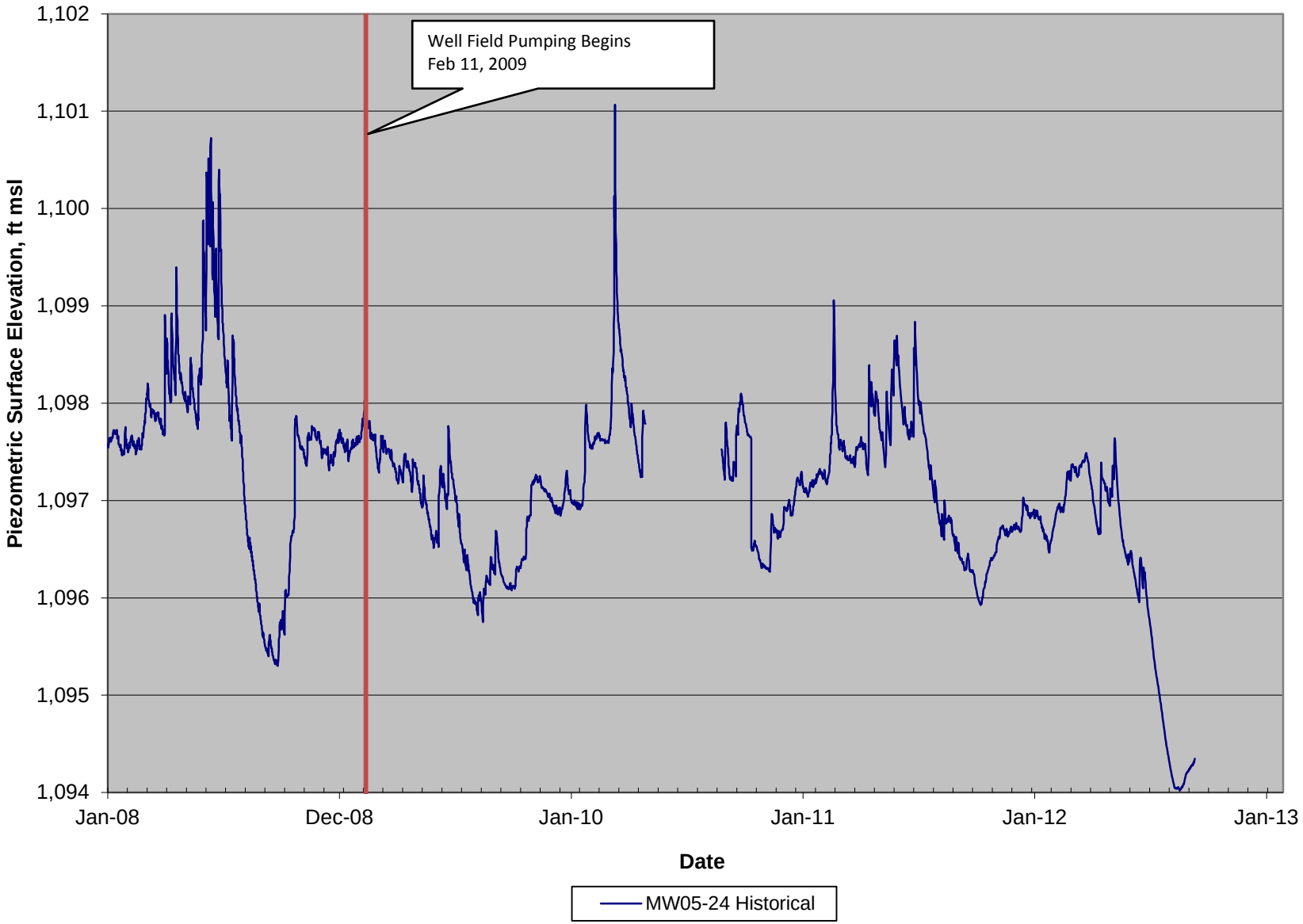
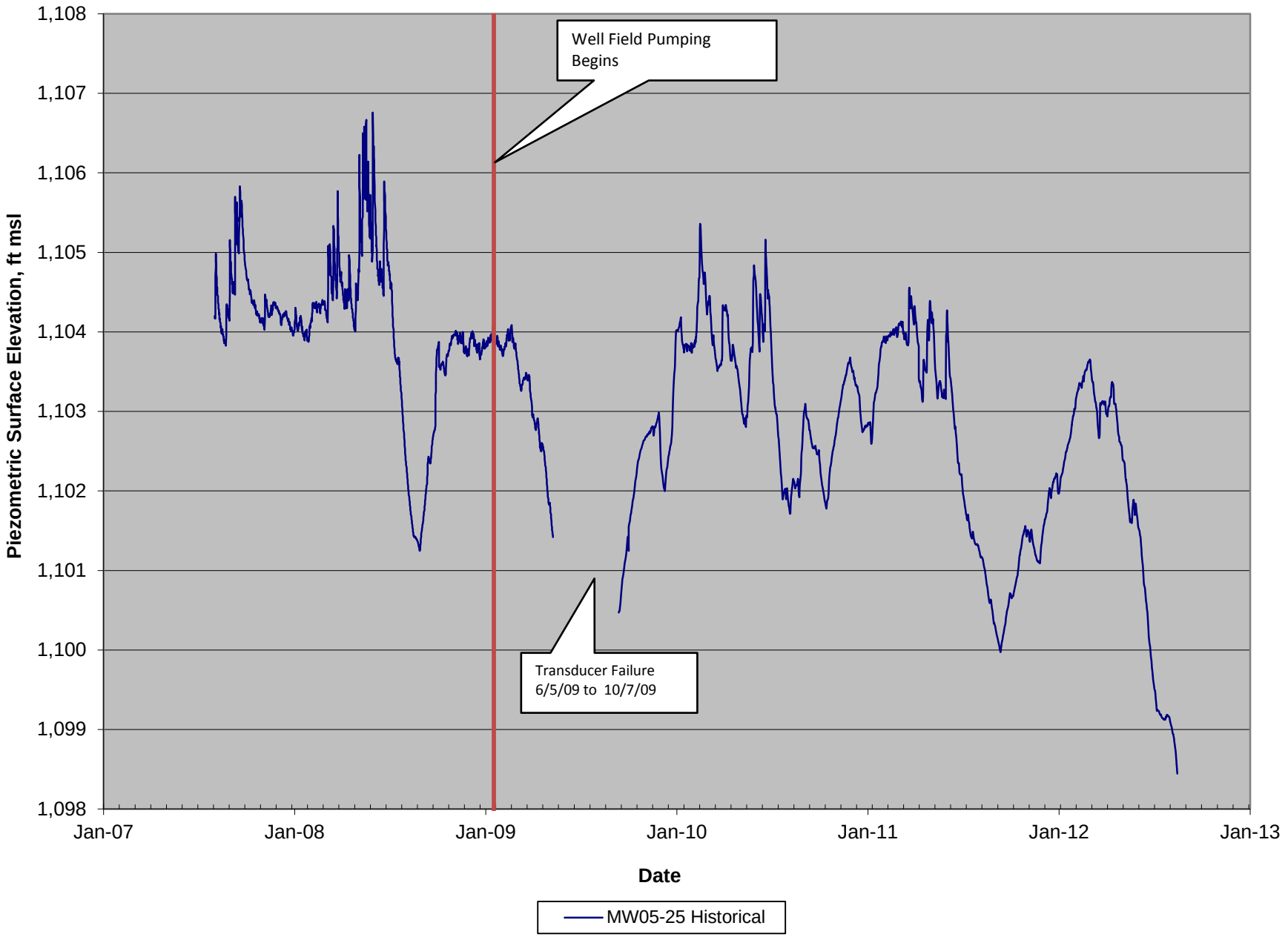
MW05-24 Piezometric Surface Elevations



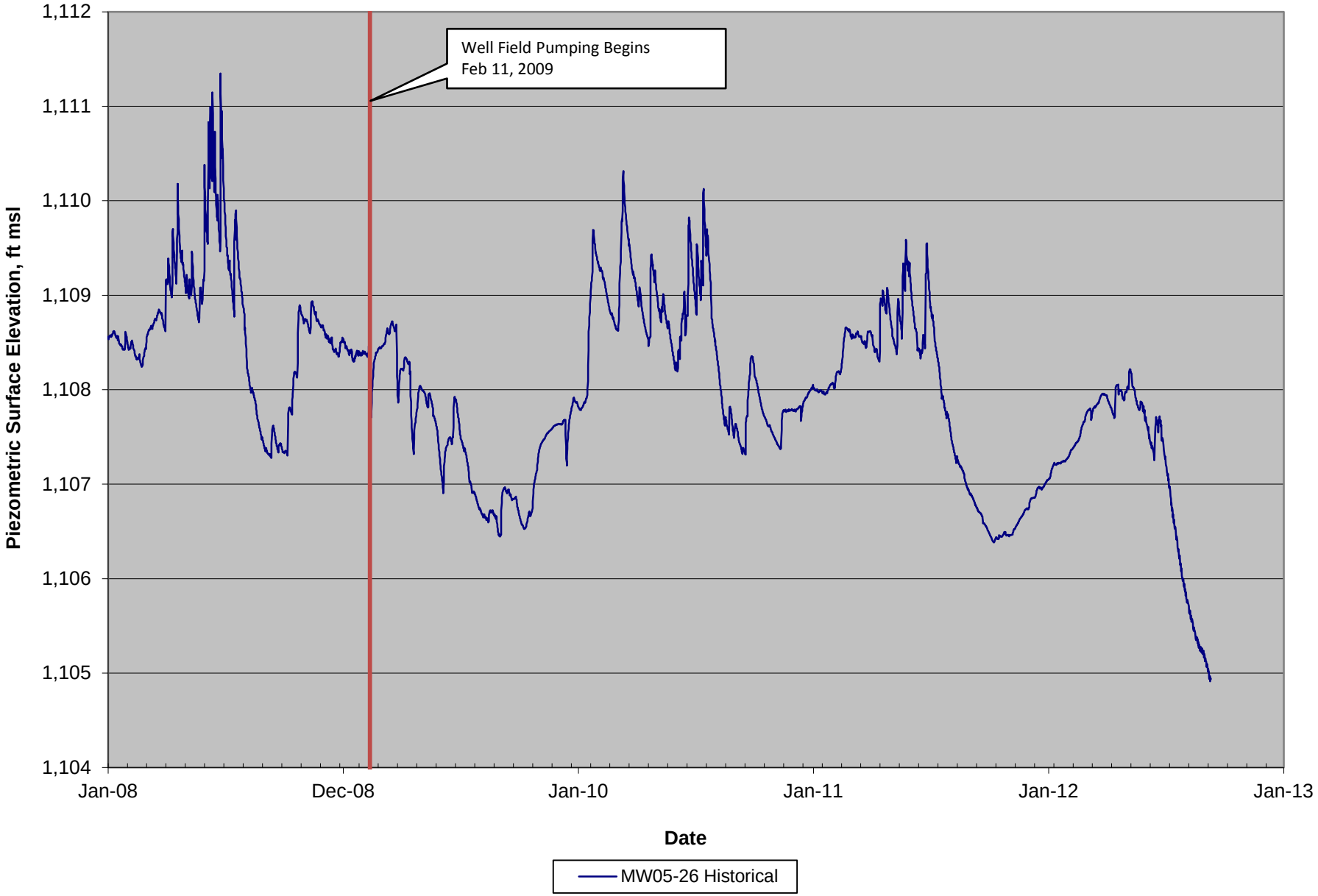
DRAFT

MW05-25 Piezometric Surface Elevations



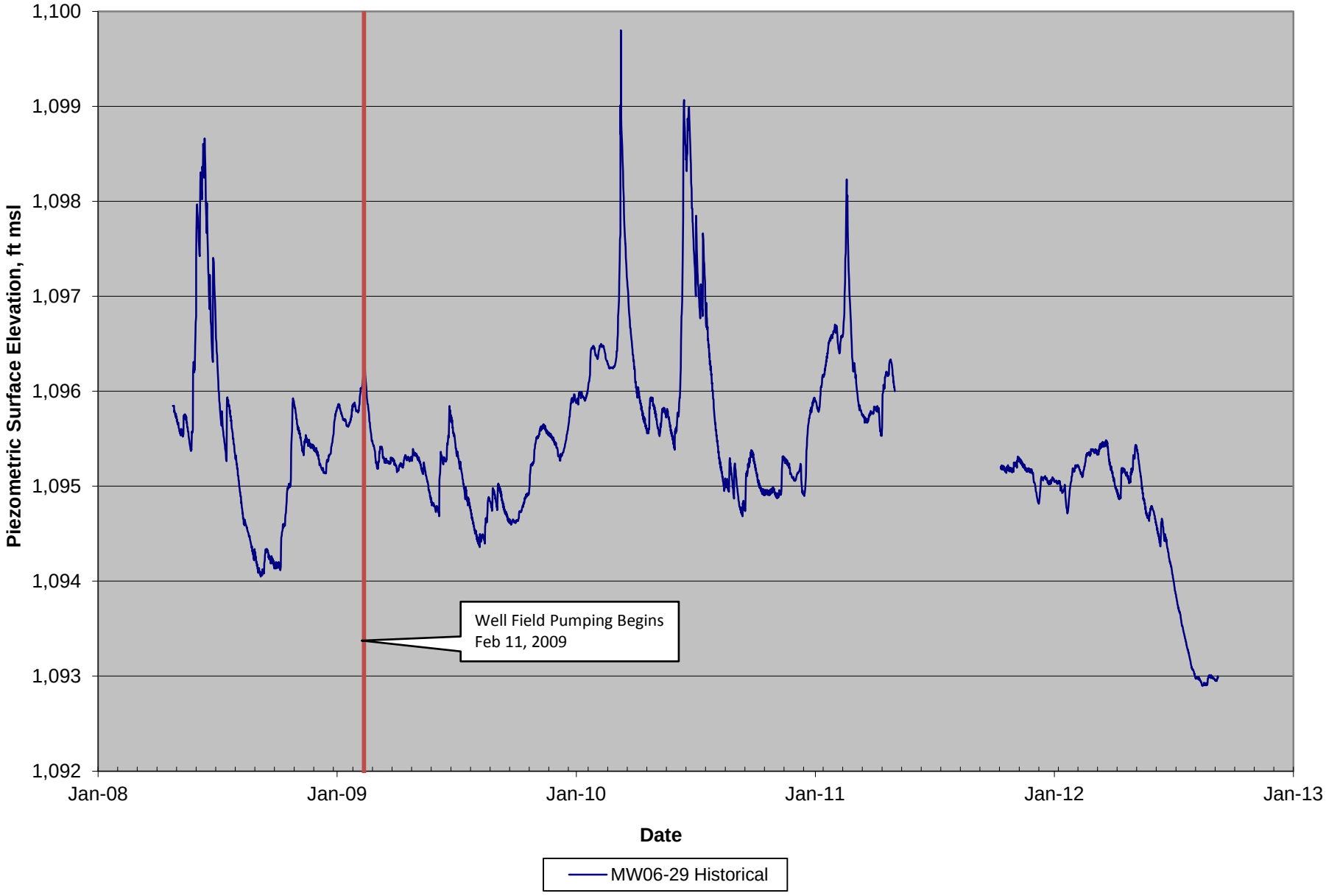
DRAFT

MW05-26 Piezometric Surface Elevations



DRAFT

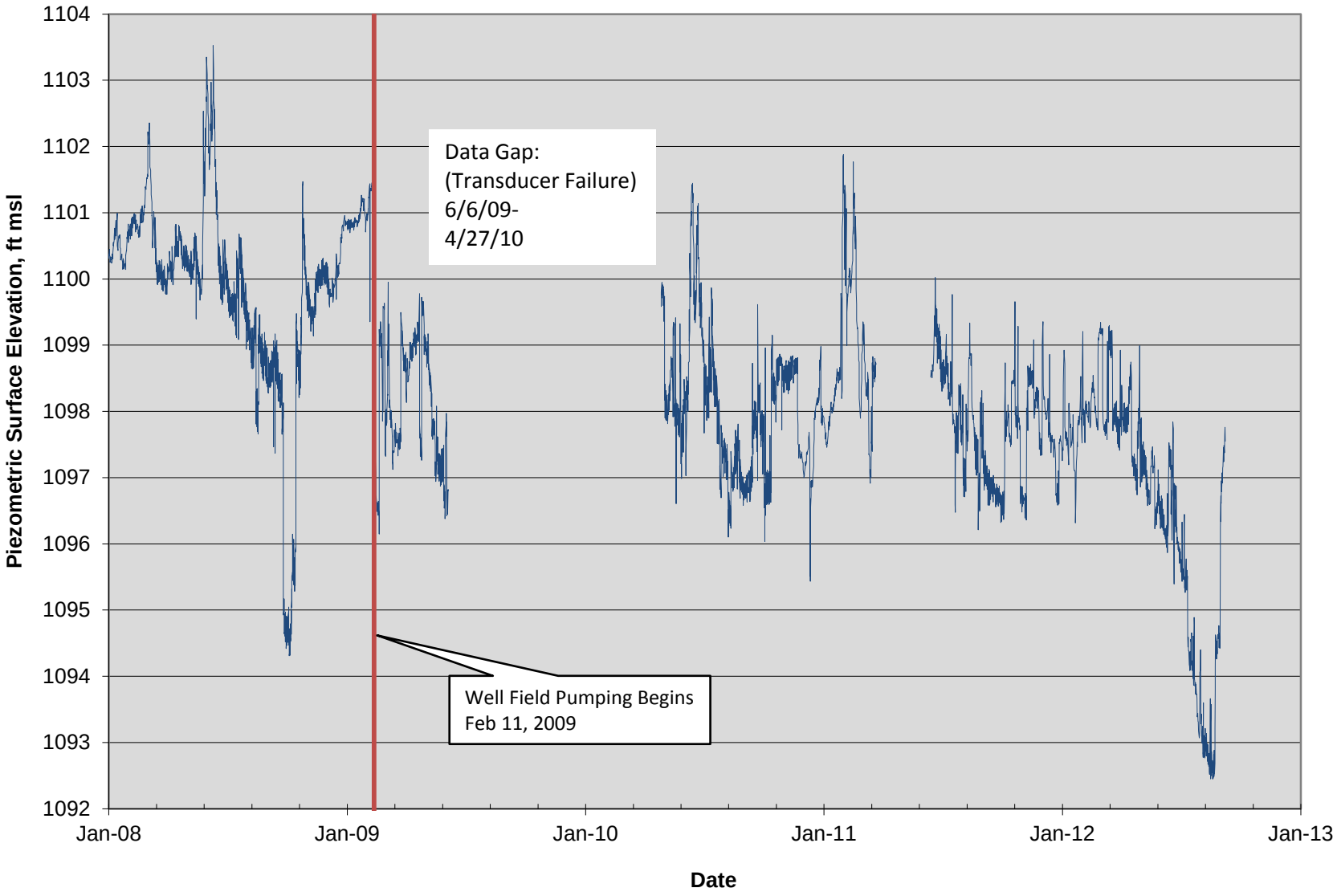
MW06-29 Piezometric Surface Elevations



Saunders County Monitoring Wells

DRAFT

MW04-17 Piezometric Surface Elevations



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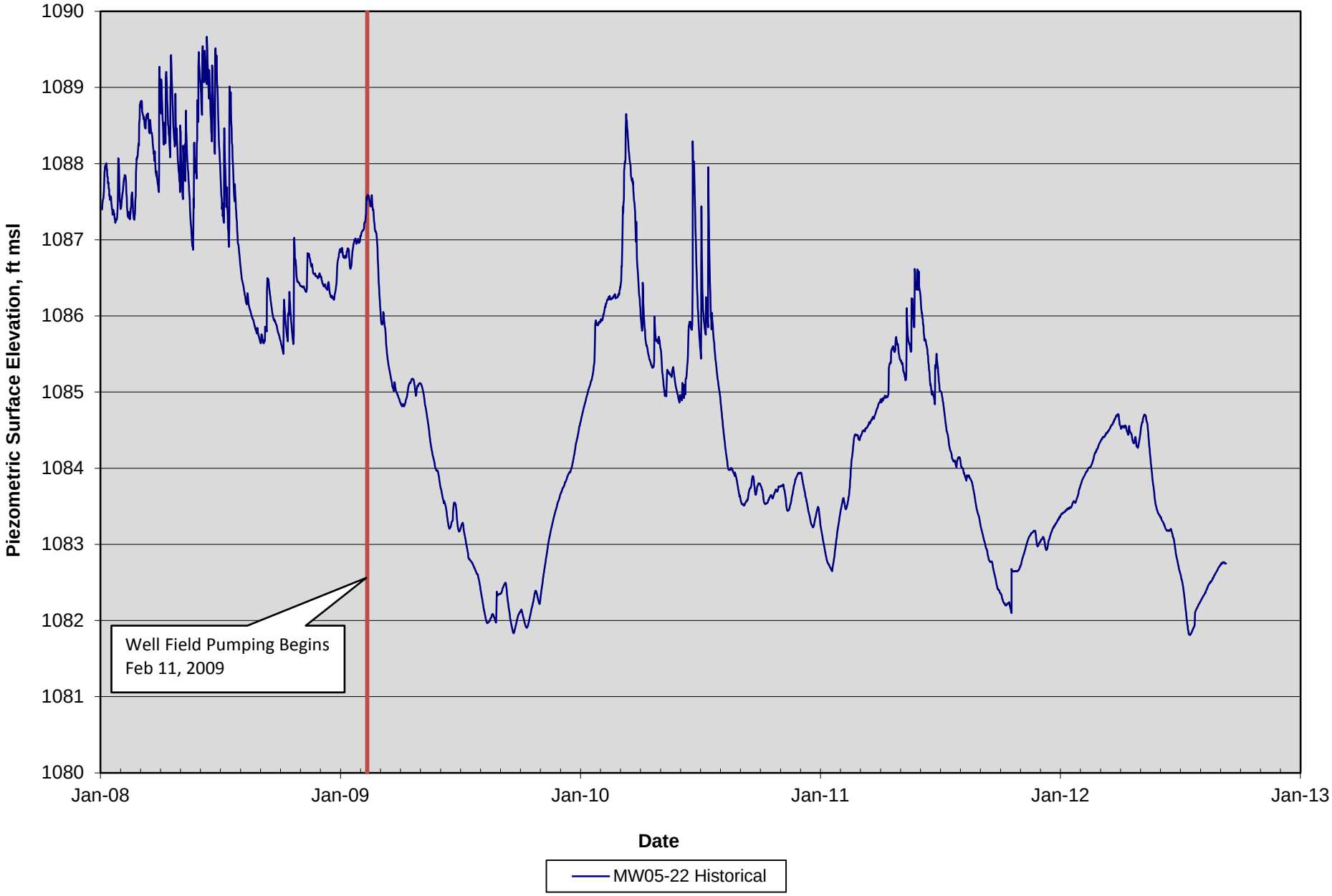
MW05-22 Piezometric Surface Elevations



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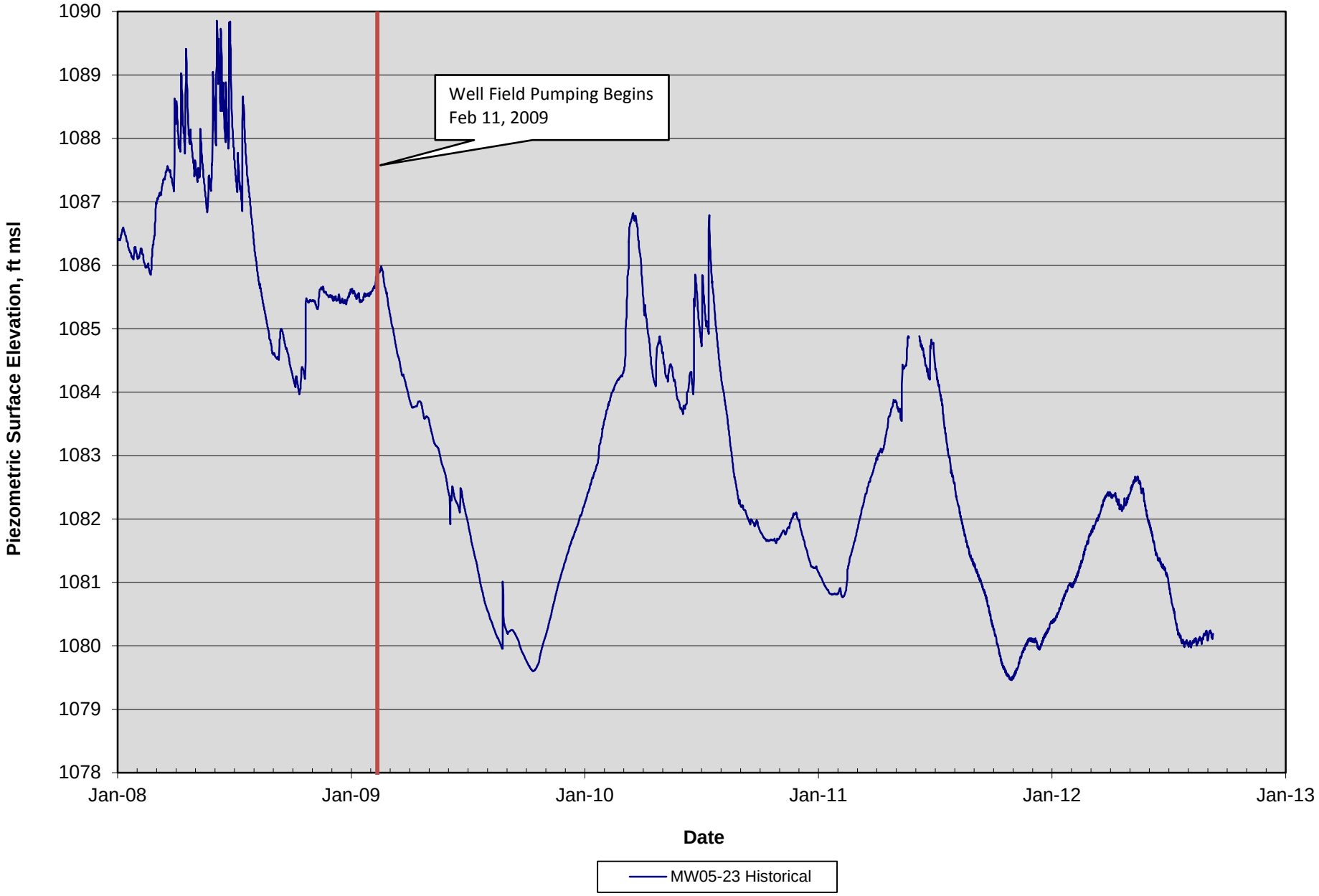
MW05-23 Piezometric Surface Elevations



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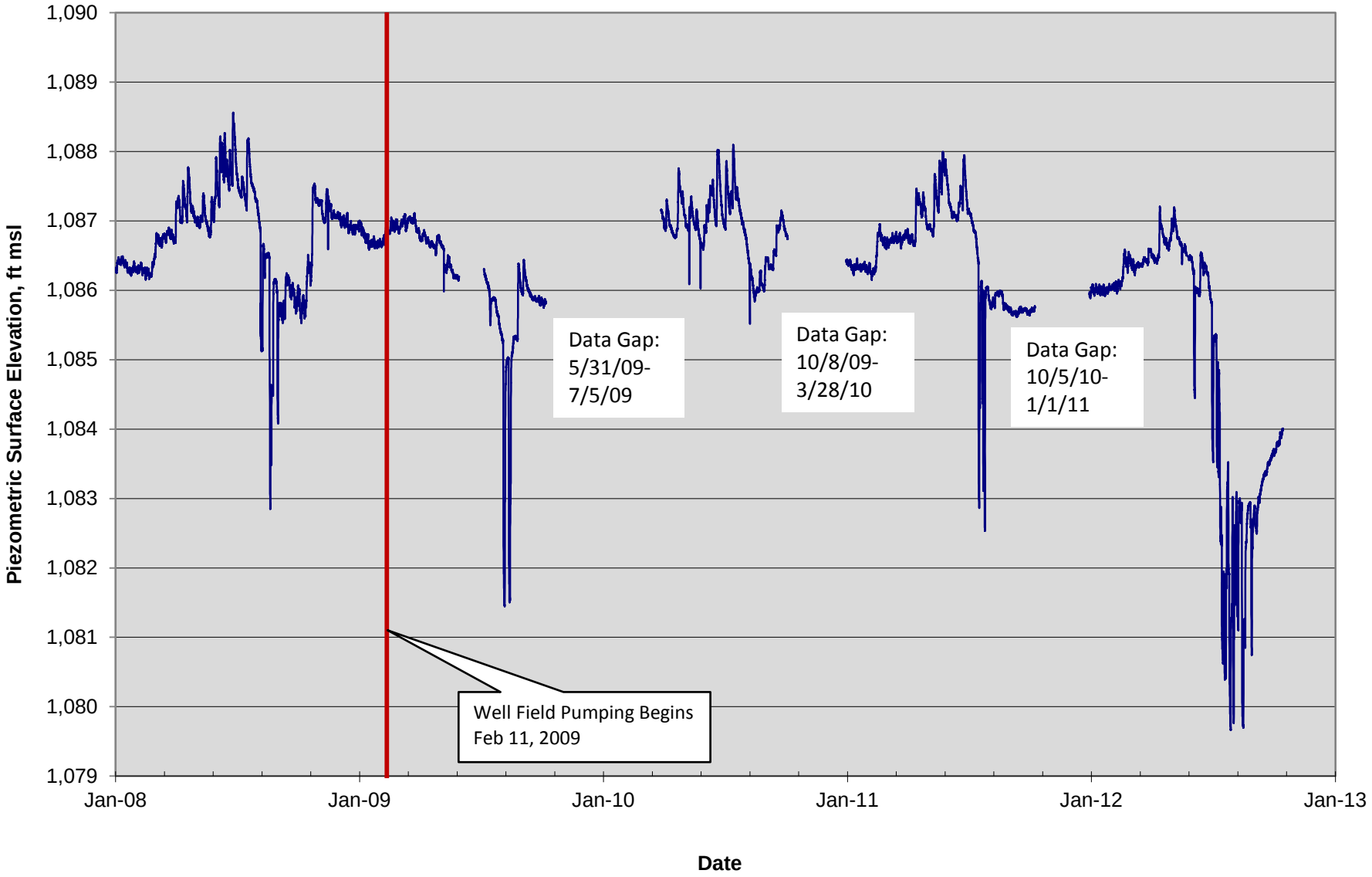
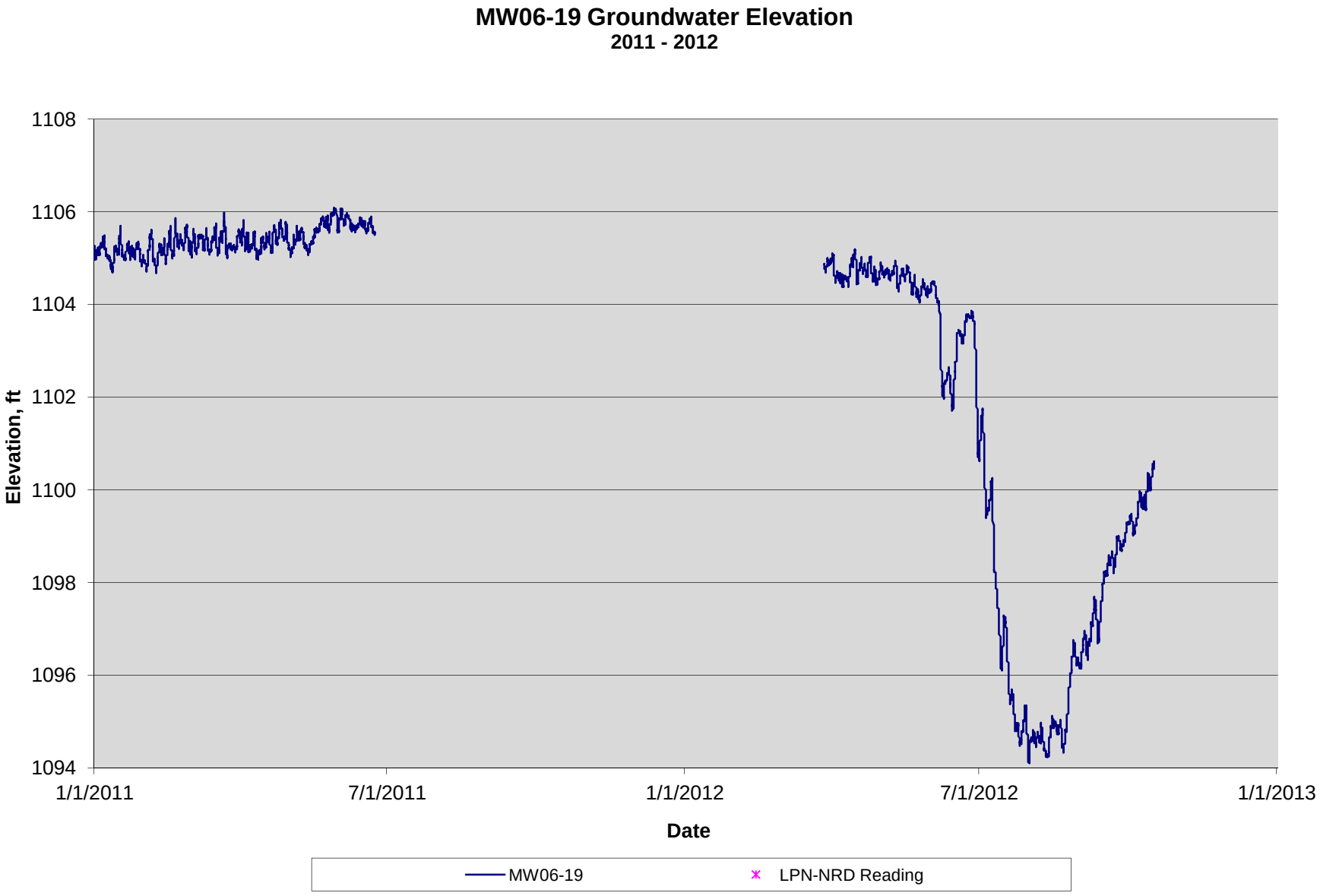
MW06-18 Piezometric Surface Elevations



Casing Elevation = 1142.20



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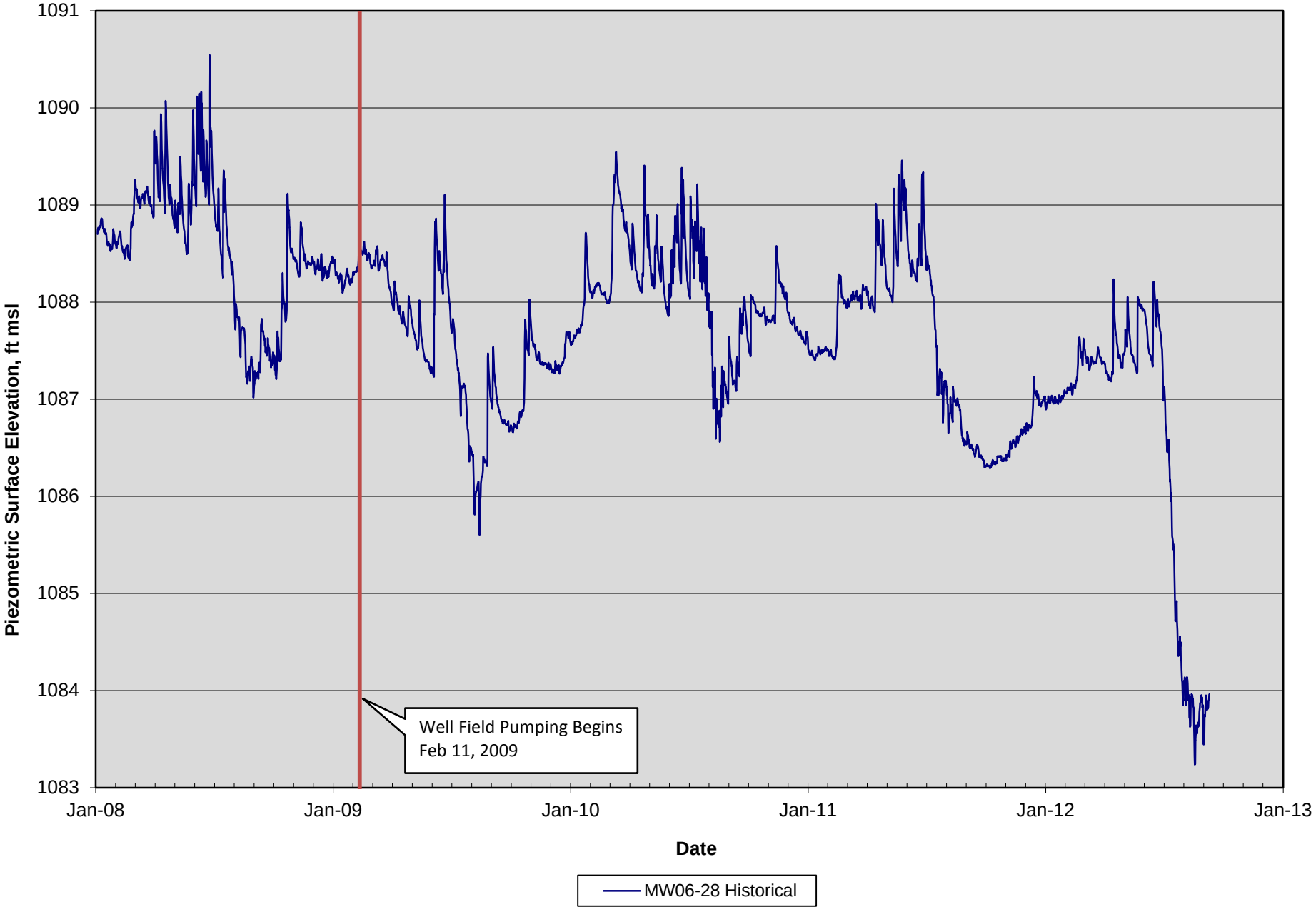
MW06-28 Piezometric Surface Elevations



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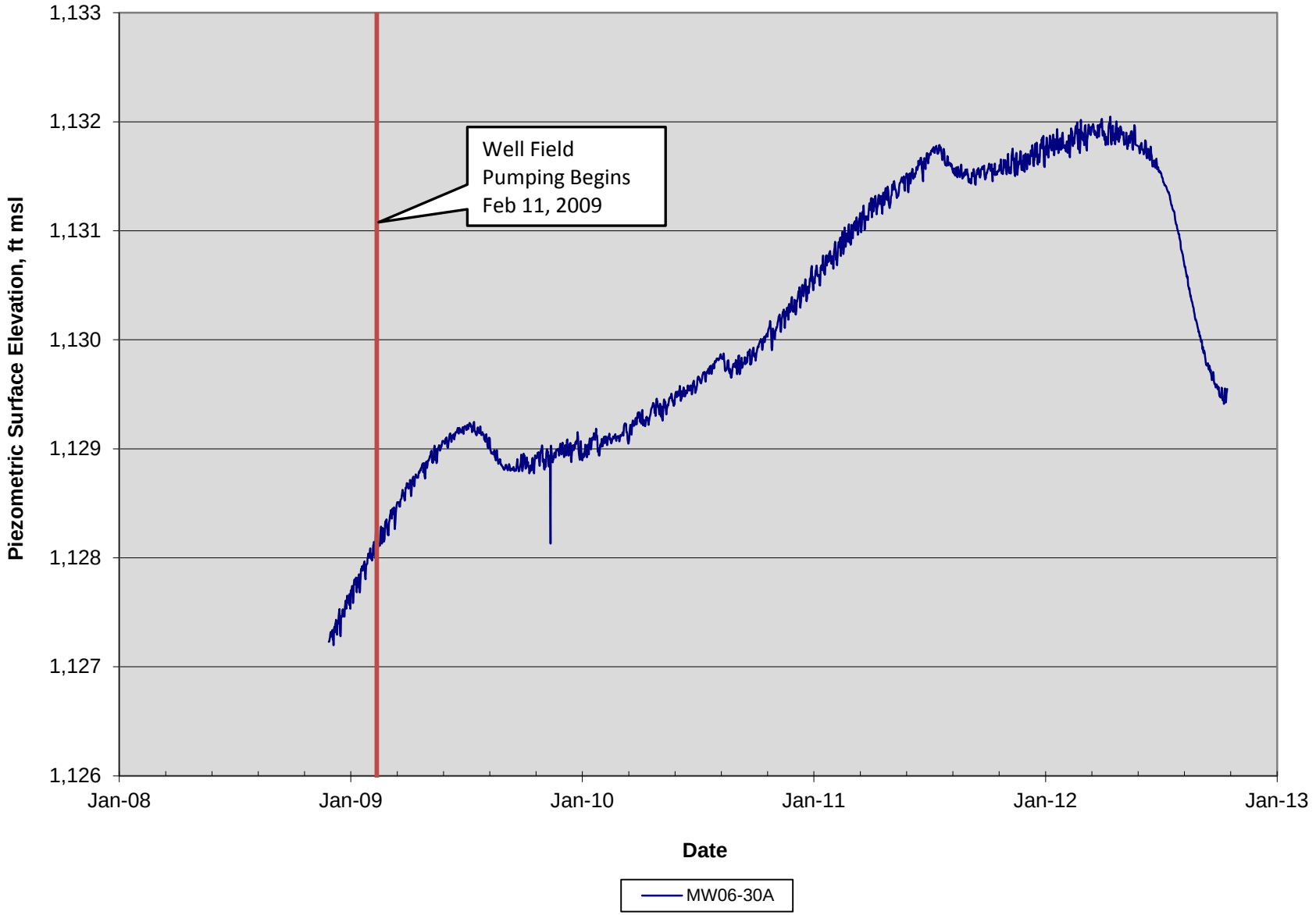
MW06-30A Piezometric Surface Elevations



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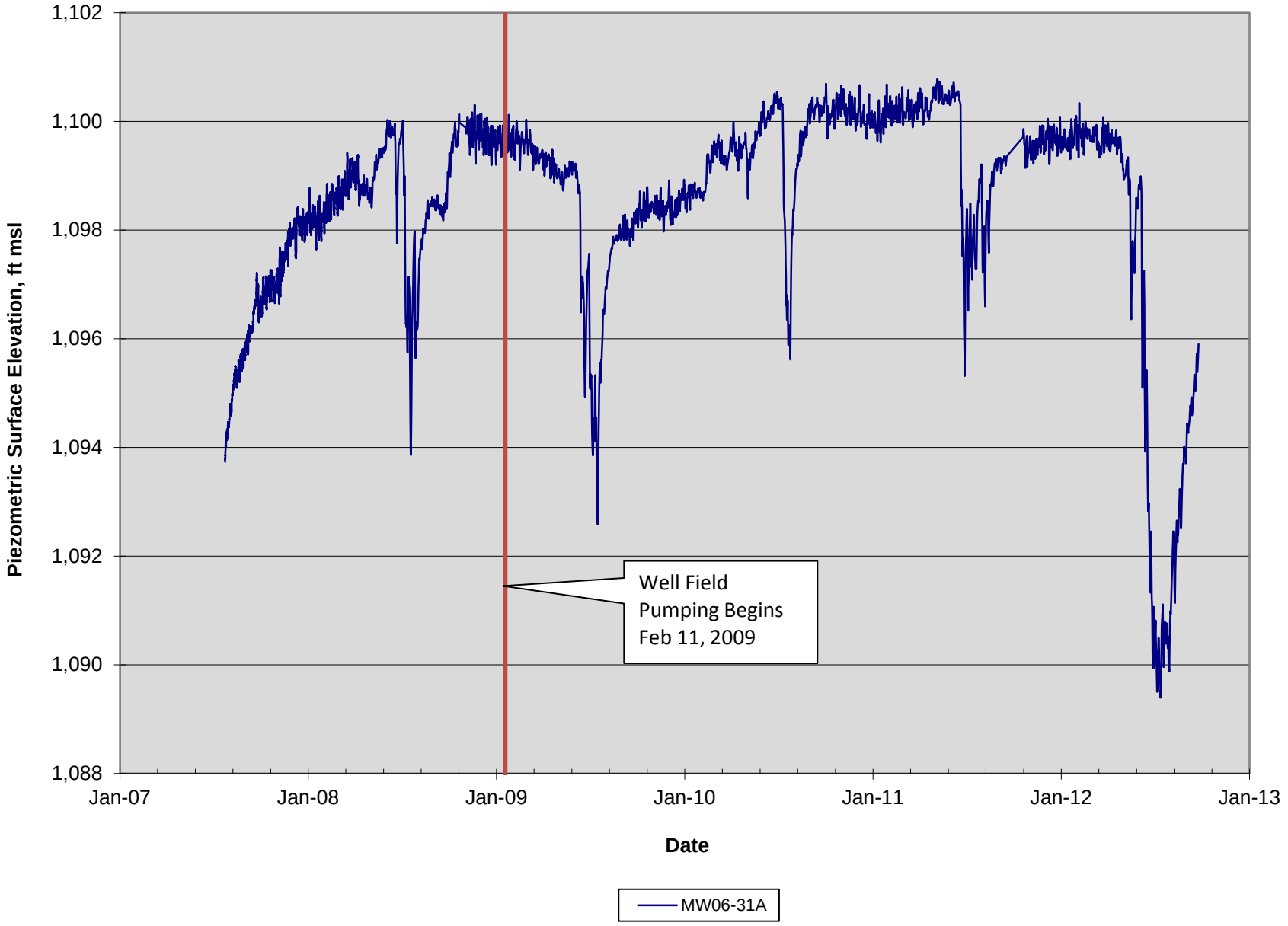
MW06-31A Piezometric Surface Elevations



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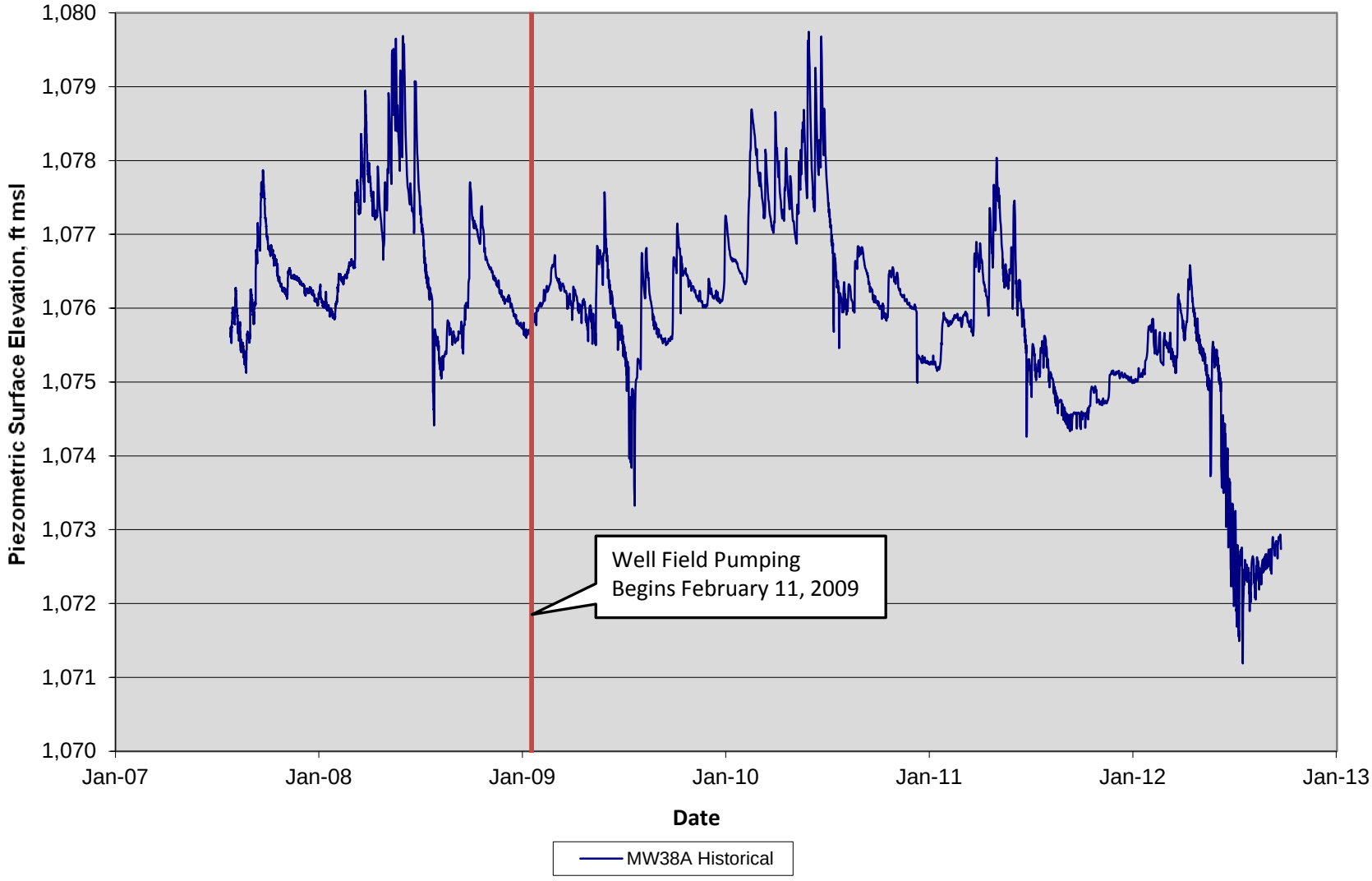
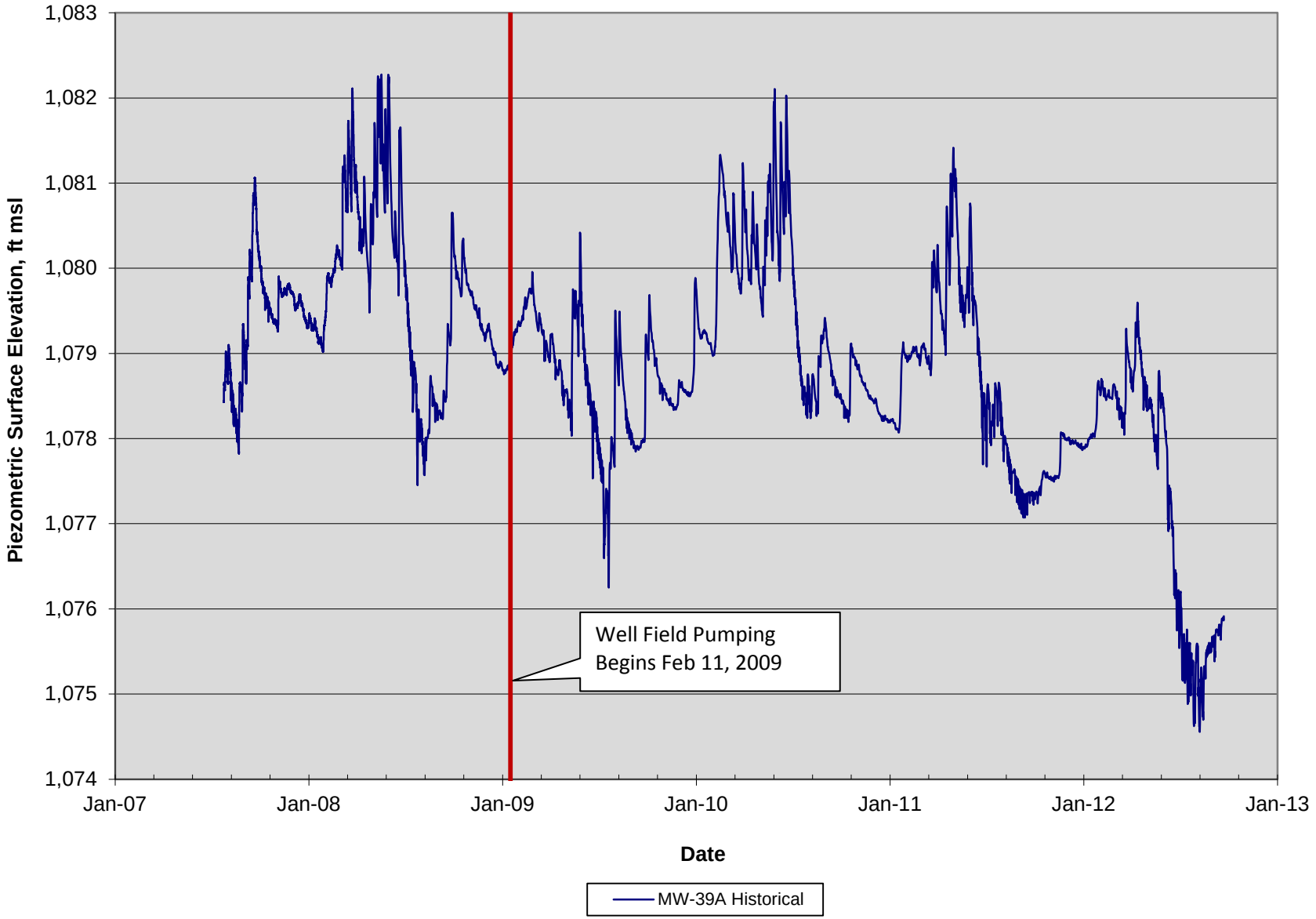
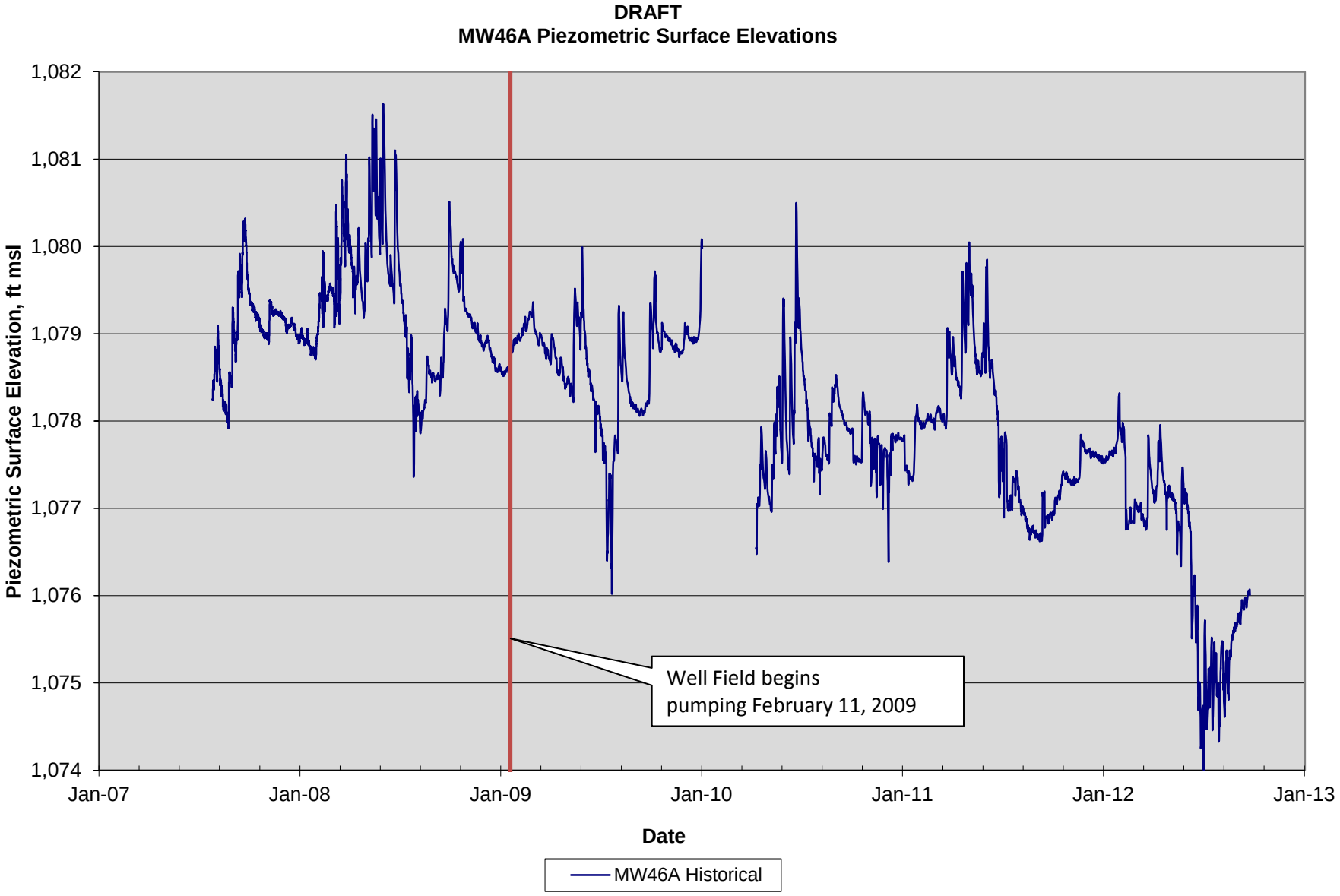
MW38A Piezometric Surface Elevations



DRAFT

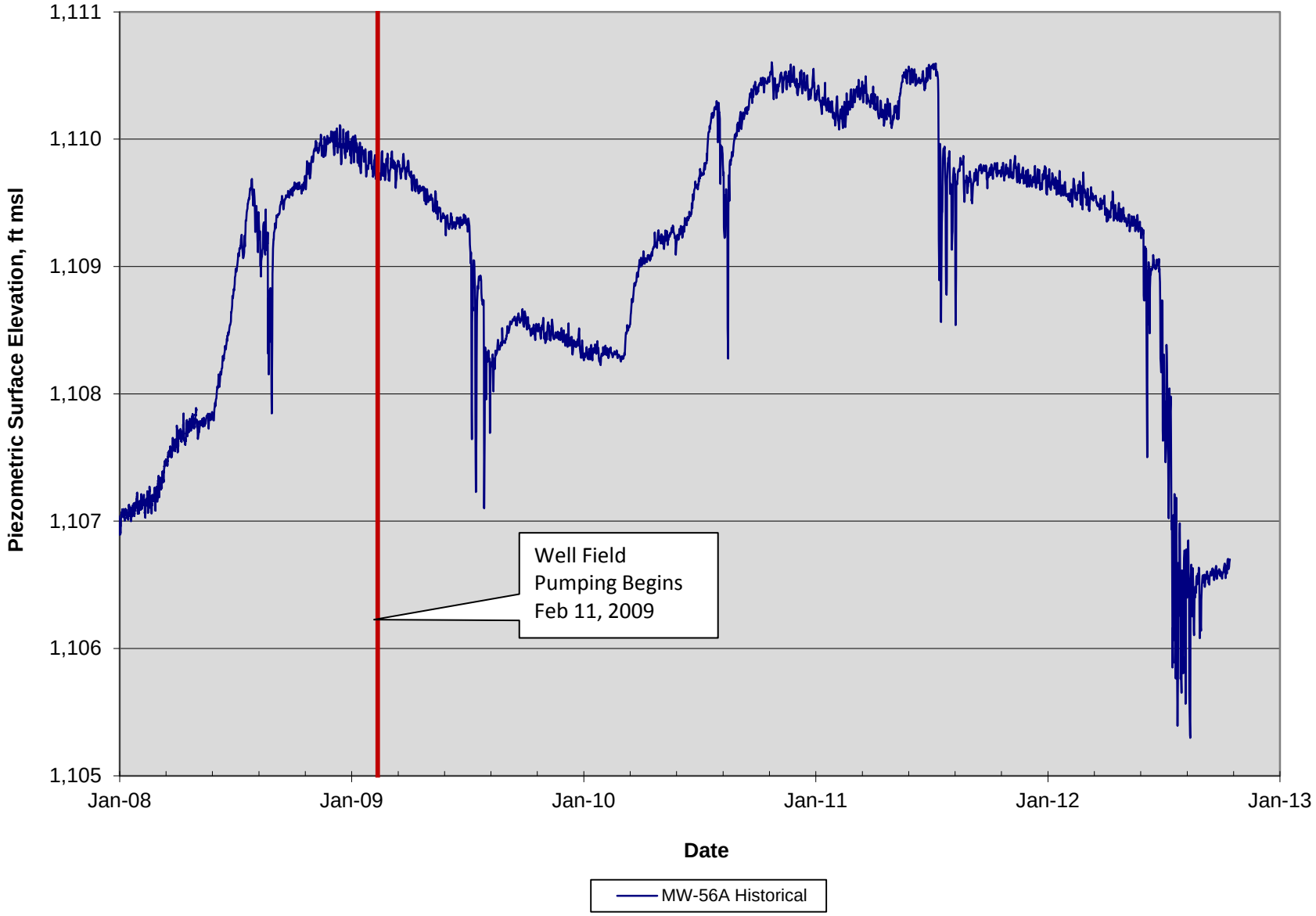
MW-39A Piezometric Surface Elevations




DRAFT
MW46A Piezometric Surface Elevations
Piezometric Surface Elevation, ft msl
1,082
1,081
1,080
1,079
1,078
1,077
1,076
1,075
1,074
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Date
Well Field begins
pumping February 11, 2009
MW46A Historical

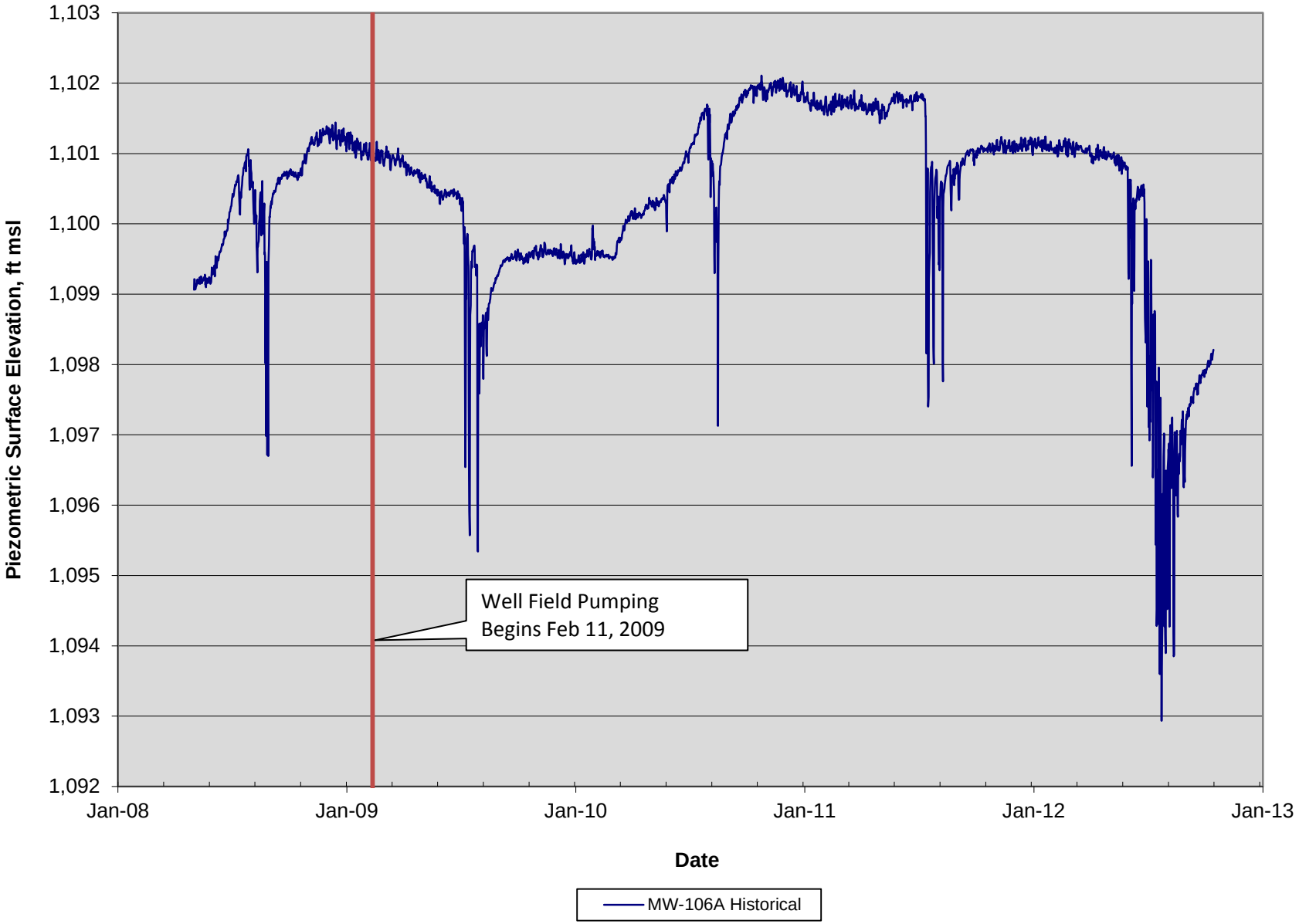
DRAFT

MW-56A Piezometric Surface Elevations



DRAFT

MW-106A Piezometric Surface Elevations



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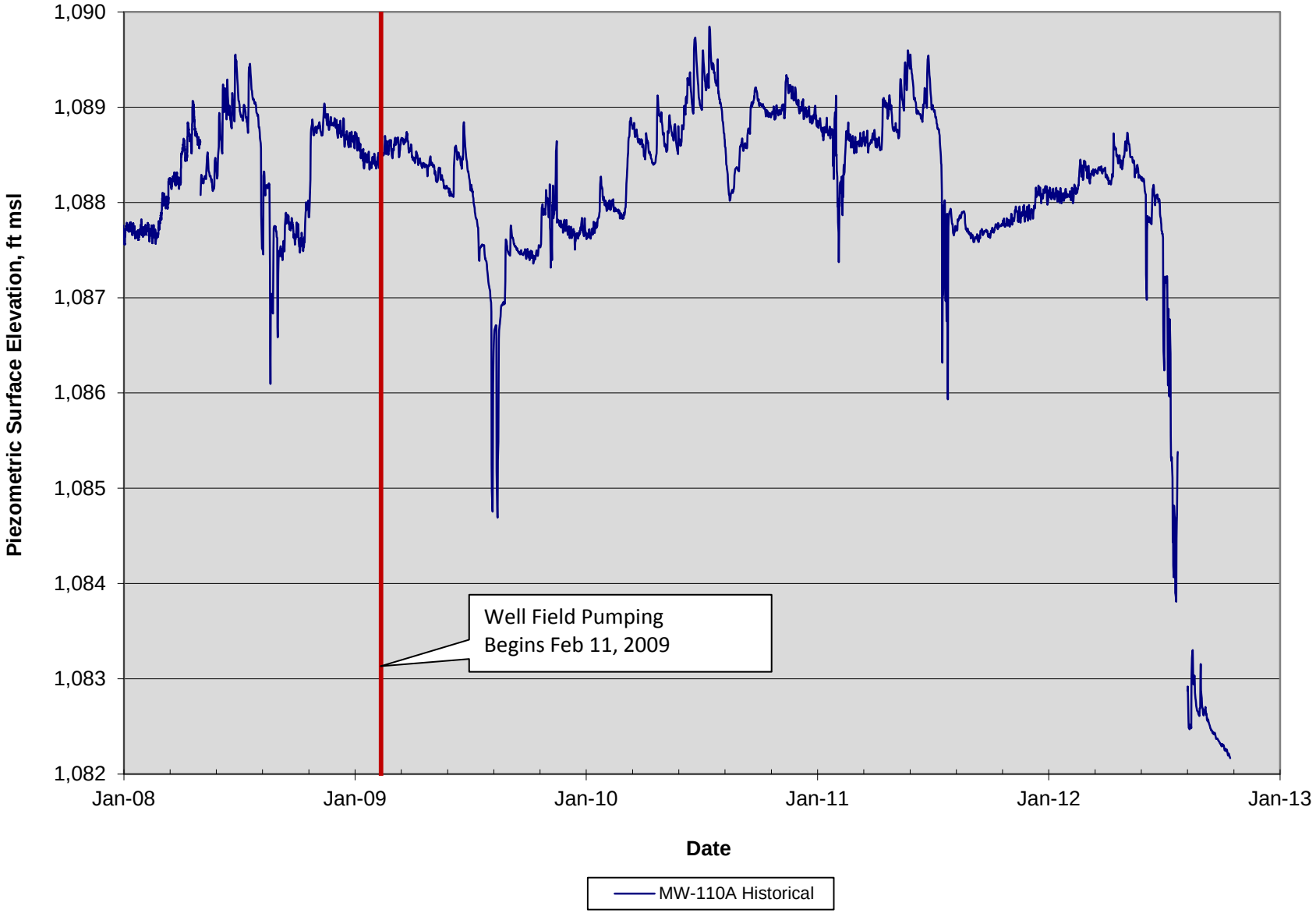
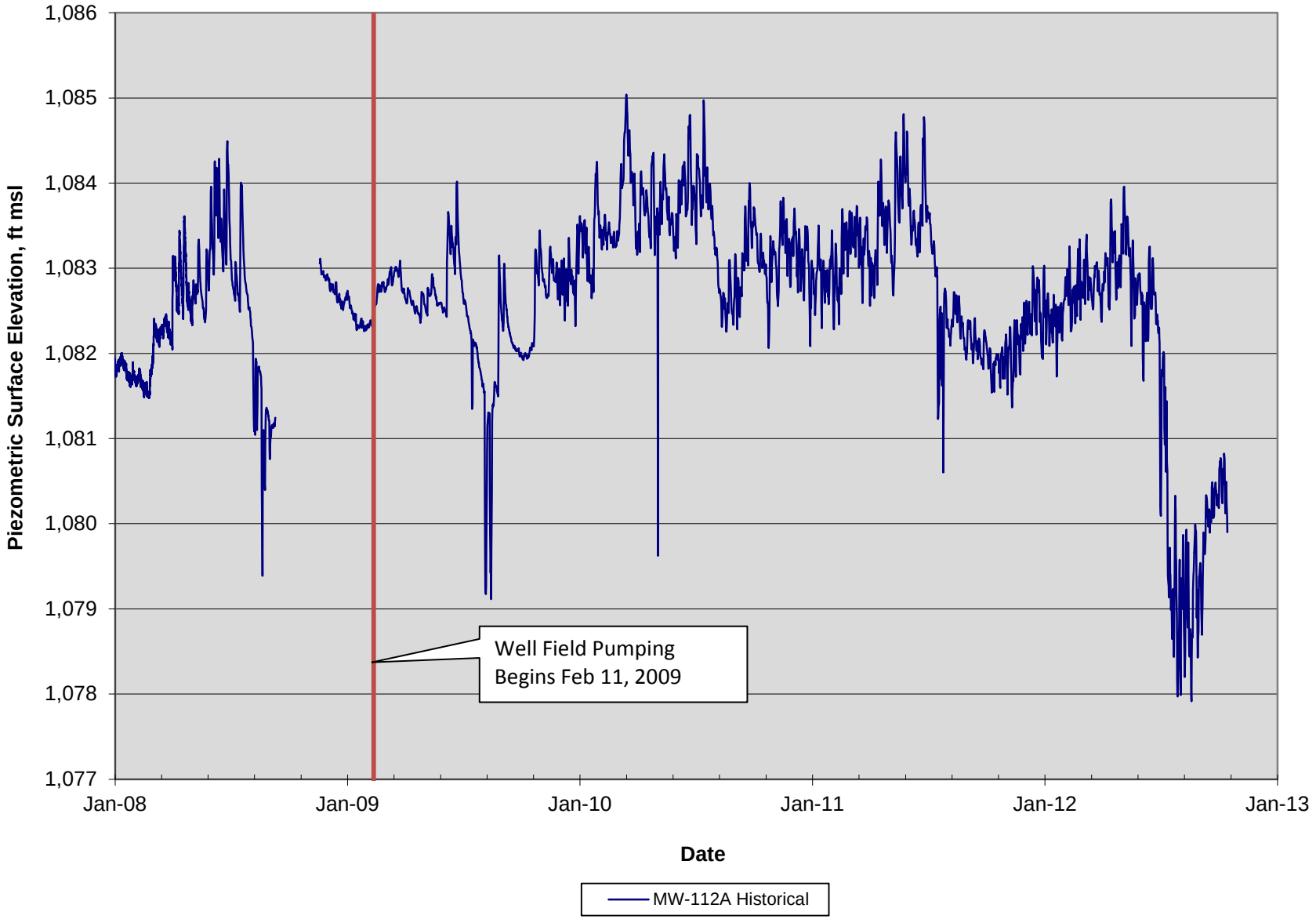


DRAFT

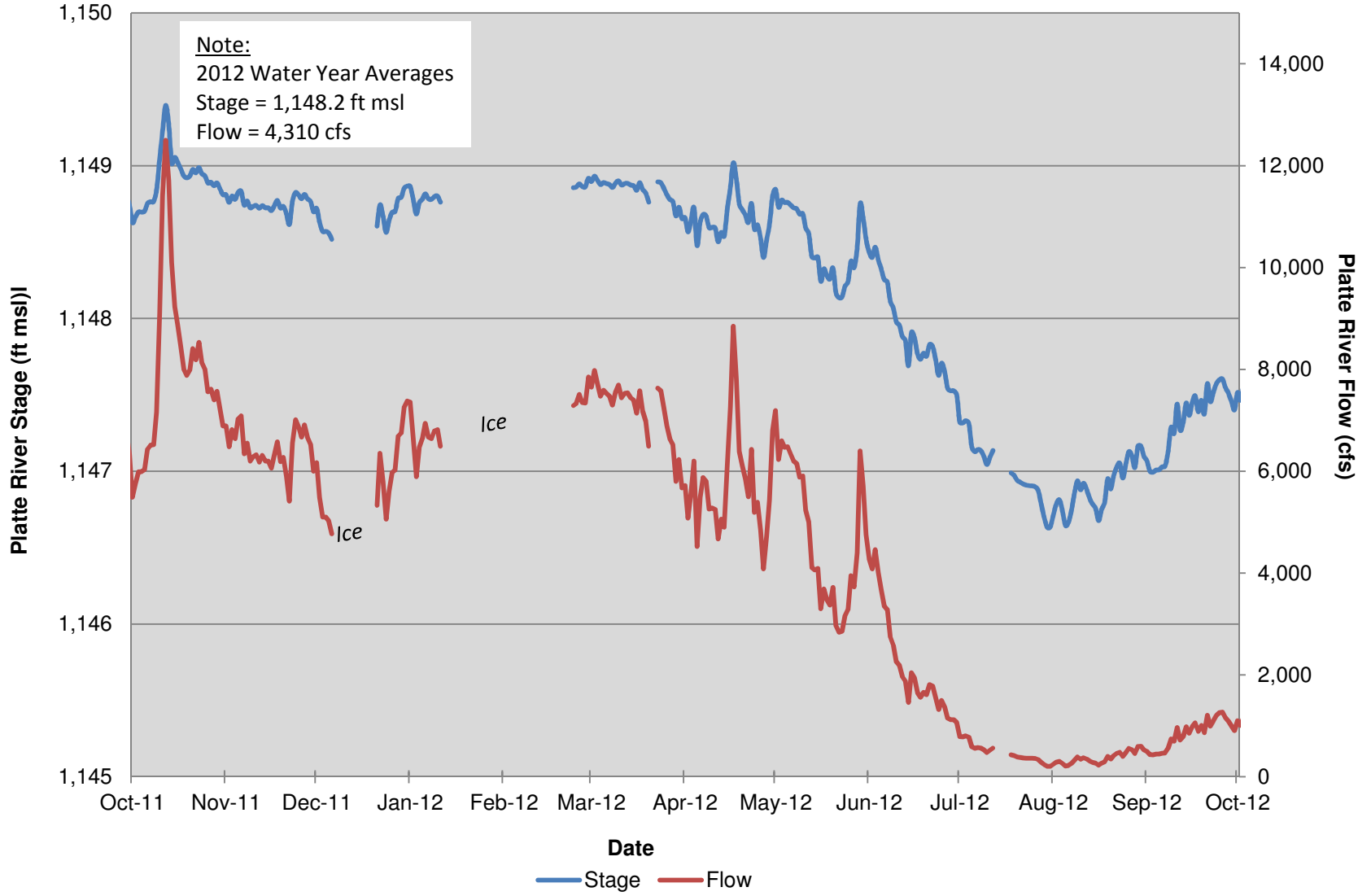
MW-112A Piezometric Surface Elevations



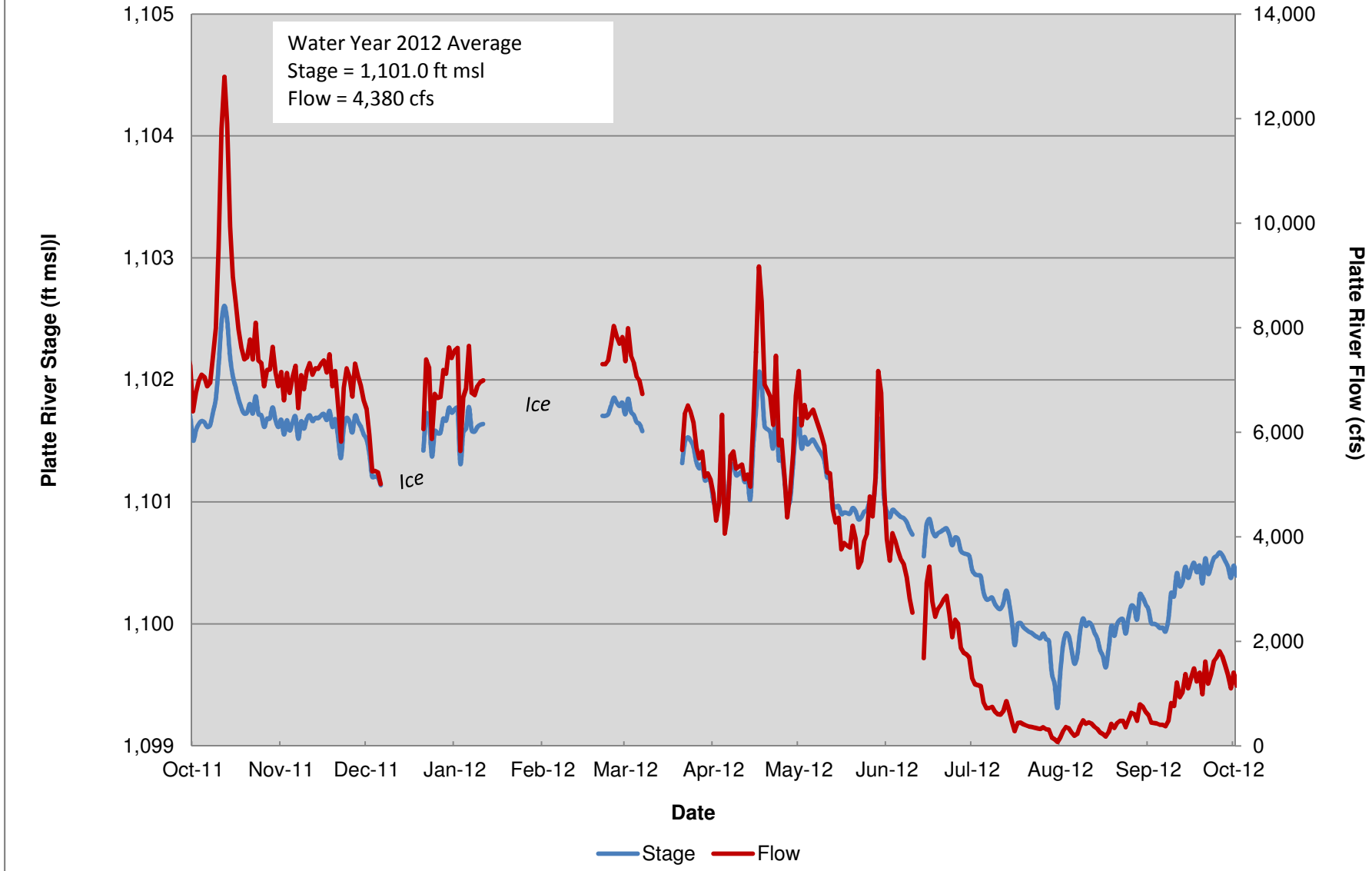
Appendix 3-3

Platte River Streamflow/Stage Data

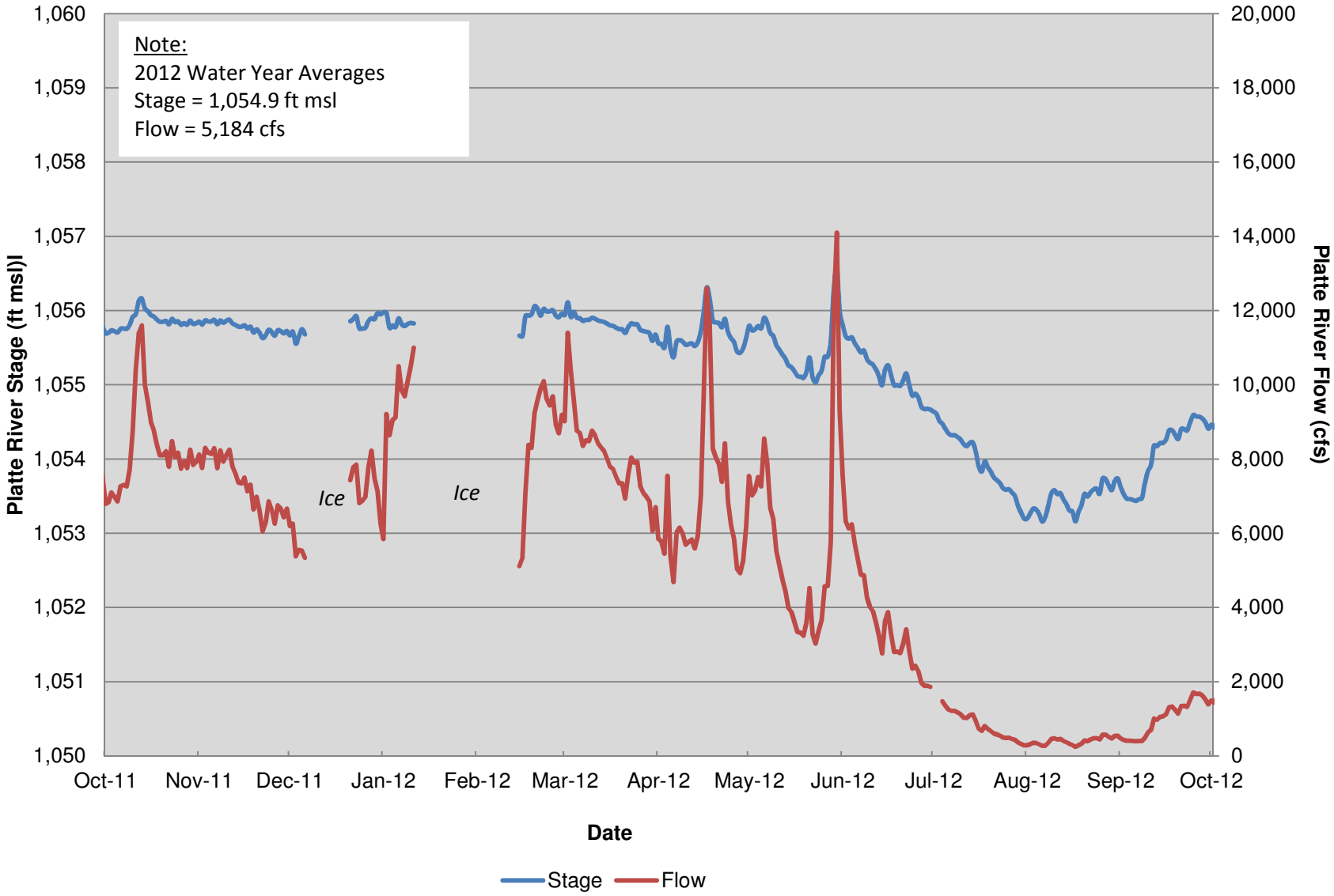
Platte River Flow Conditions for Water Year 2012 at Leshara Gage



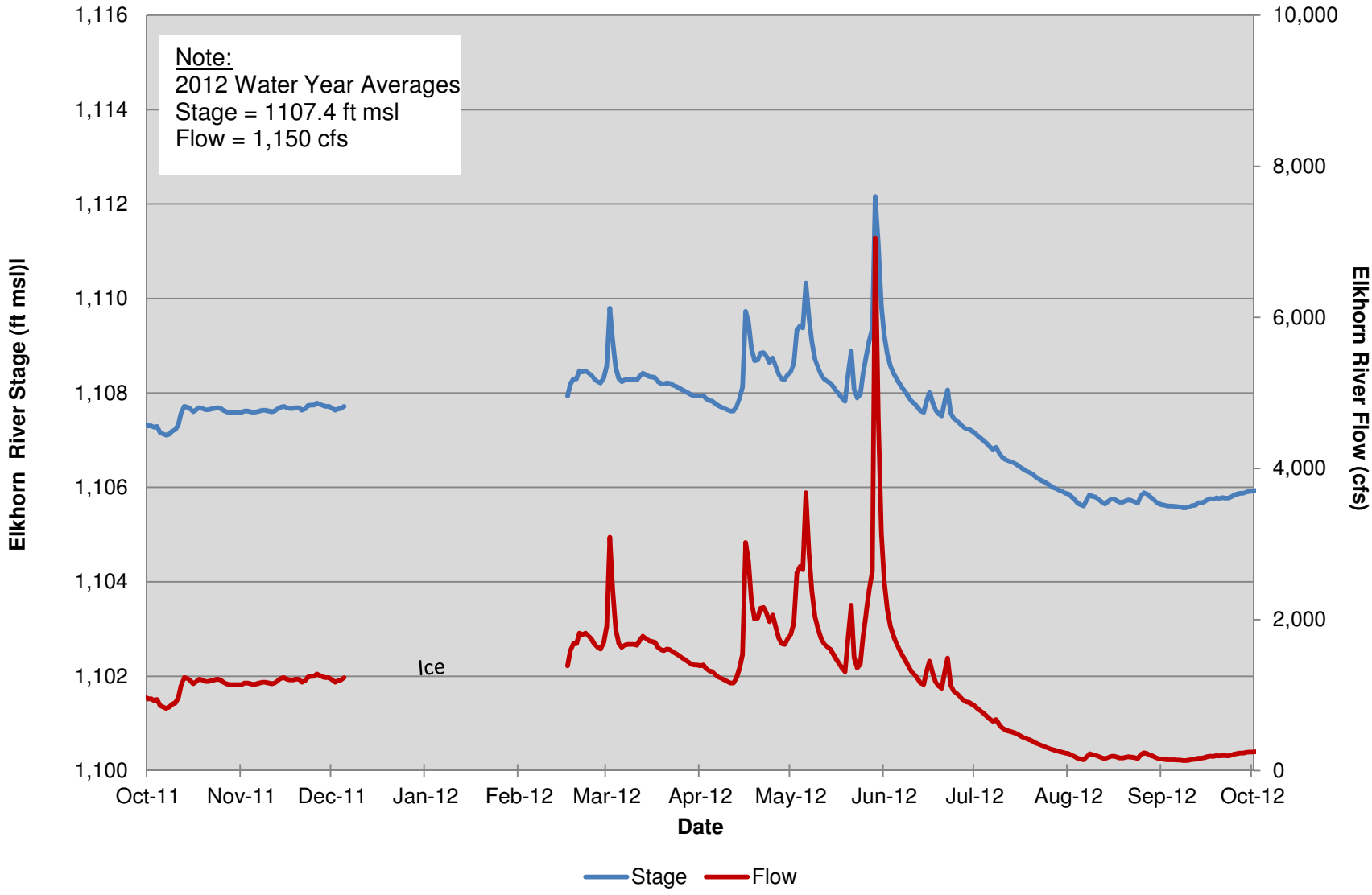
Platte River Stage Conditions for Water Year 2012 at Venice Gage



Platte River Flow Conditions for Water Year 2012 at Ashland Gage



Elkhorn River Flow Conditions for Water Year 2012 Waterloo Gage



Appendix 4-1:

FNOP Plume Baseline

Legend

- Groundwater Monitoring Well Cluster
- Groundwater Extraction Well (Active)
- Groundwater Extraction Well (Inactive)
- TCE Greater than or Equal to 10,000 ug/L
- TCE Greater Than or Equal to 1,000 ug/L
- TCE Greater Than or Equal to 100 ug/L
- TCE Greater Than or Equal to 10 ug/L
- TCE Greater Than or Equal to 5 ug/L

NOTE:

TCE plume delineations are based on Groundwater Monitoring Program data, direct-push data, and other data. The plume delineations represent a combination of the shallow zone data and the intermediate zone data.

Observation wells not shown due to scale.

TCE - trichloroethene

ug/L - micrograms per liter

N

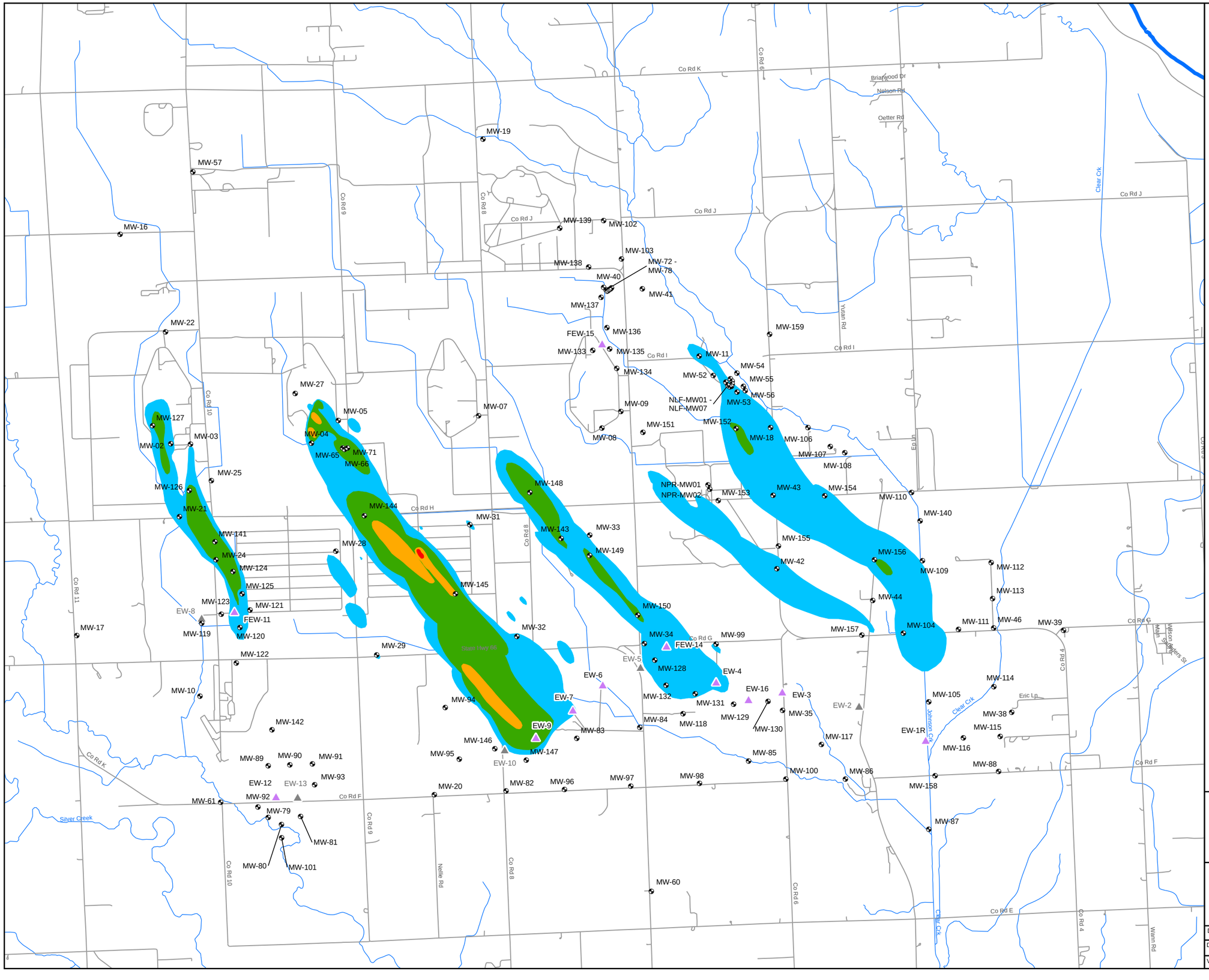
0 1,250 2,500 5,000 7,500 10,000

Feet

US Army Corps of Engineers ®
Kansas City District

TCE Greater Than or Equal To 5 ug/L in the Intermediate and Shallow Layers (2012 Data)

Drawn by: M Johanson	Reviewed by:	Notes and Sources Projection: North American Datum 1983 Nebraska State Plane Units: Feet
Date: 9/20/2012	Date:	
Version:	Revision Date / Initials:	



Legend

- Groundwater Monitoring Well Cluster
- Groundwater Extraction Well (Active)
- Groundwater Extraction Well (Inactive)
- RDX Greater Than or Equal To 100 ug/L
- RDX Greater Than or Equal To 50 ug/L
- RDX Greater Than or Equal To 10 ug/L
- RDX Greater Than or Equal To 2 ug/L

NOTE:

RDX plume delineations are based on Groundwater Monitoring Program data, direct-push data, and other data. The plume delineations represent a combination of the shallow zone data and the intermediate zone data.

Observation wells not shown due to scale.

RDX - hexahydro-1,3,5-trinitro-1,3,5-triazine

ug/L - micrograms per liter

N

0 1,250 2,500 5,000 7,500 10,000

Feet

US Army Corps of Engineers ®
Kansas City District

RDX Greater Than or Equal To 2 ug/L in the Intermediate and Shallow Layers (2012 Data)

Drawn by: M Johanson	Reviewed by:	Notes and Sources Projection: North American Datum 1983 Nebraska State Plane Units: Feet
Date: 9/20/2012	Date:	
Version:	Revision Date / Initials:	

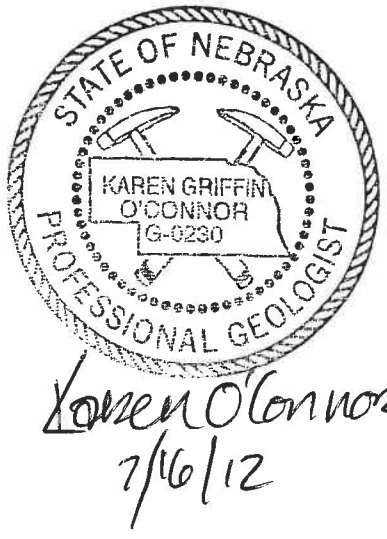
Appendix 4-2

Groundwater Chemical Sampling Data

QUALITY CONTROL SUMMARY REPORT
MAY 2012 MONITORING WELL SAMPLING EVENT

METROPOLITAN UTILITIES DISTRICT OF OMAHA
PLATTE WEST WELL FIELD
SAUNDERS COUNTY, NEBRASKA

PREPARED FOR
METROPOLITAN UTILITIES DISTRICT OF OMAHA



Karen O'Connor
7/16/12

PREPARED BY
OLSSON ASSOCIATES

OLSSON PROJECT NUMBER: 011-1087

JULY 2012

OLSSON ASSOCIATES

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

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1.0 INTRODUCTION

The Metropolitan Utilities District of Omaha (MUD) provides potable water for a metropolitan area of over three-quarters of a million people. To meet projected water demands from continued population growth in the greater Omaha area in the coming decades, MUD completed construction of the Platte West Well Field (PWWF) in 2008. The PWWF consists of 42 wells constructed along and adjacent to the Platte River approximately 7 miles east of the town of Mead in Saunders County, Nebraska. The well field began operations in July of 2008 and currently has the capacity to provide 334 million gallons per day (mgd). Because the PWWF transmits water across the Platte River from wells on the west bank eastward via a pipeline, the well field is subject to U.S. Army Corp of Engineers (USACE) Omaha District (CENWO) Section 404 Permit regulations. This permit requires MUD to monitor any influence the well field activity may have on remediation efforts at the former Nebraska Ordnance Plant (NOP) south of Mead, which is under the jurisdiction of the USACE Kansas City District (CENWK). Two overlapping plumes of contaminants (trichloroethylene and RDX) from former munitions and missile plants are found in the subsurface south/southeast of Mead and follow the ambient groundwater gradient from the northwest to the southeast. USACE monitoring of the aquifer conditions consists of tracking both physical parameters (water table elevations and gradient) and changes in contaminant concentrations in the groundwater in both the plume area and the PWWF. Data obtained from these activities will be used by MUD and the USACE to determine if any impacts have occurred by assessing changes in any concentrations of any contaminants present in monitoring wells. Water levels will also be used to verify the groundwater model of the well field area.

Olsson Associates was contracted by the MUD to monitor the aquifer conditions in accordance with the USACE requirements. This Quality Control Summary Report (QCSR) provides the results of data validation for the Spring 2012 sampling event at the PWWF completed on May 29th and 30th, 2012.

2.0 FIELD SAMPLING ACTIVITIES

In accordance with the Field Sampling Plan (Olsson, 2011), samples were collected from eight monitoring wells and analyzed for volatile organic compounds (VOCs) and explosive compounds as listed in Table 2-1. Additionally, three quality control (QC) samples were collected:

1. One field duplicate
2. One matrix spike/matrix spike duplicate
3. One trip blank

Field notes are included in Appendix B. It should be noted that originally, samples were collected on May 25, 2012, however, the samples did not arrive within the specified temperature limits. The samples were not analyzed and the entire network of wells and QC samples were resampled on May 29 and 30th, 2012. The May 29/30 samples were received within the specified temperature limits and all analyses were run according to laboratory requirements.

Table 2-2 provides an explanation of all abbreviations, laboratory qualifiers and notes associated with the tables in this QCSR report. Table 2-3 provides information on sample collection, laboratory numbering and analyses requested as listed below:

- Quality control sample information including duplicate sample location
- A cross reference between field sample and laboratory sample IDs

- Sample delivery group numbers
- Dates of sample collection and sample receipt at the laboratory
- List of analyses requested

3.0 ANALYTICAL RESULTS

The samples were analyzed by TestAmerica, Inc. in Burlington, Vermont for VOCs and explosive compounds. A summary of the analytical results is presented in Table 3-1 for VOCs and Table 3-2 for explosive compounds. As listed in Tables 3-3 and 3-4, there were no VOCs or explosive compounds detected above the reporting limit.

The following subsections present results of the data quality evaluation. The evaluation was performed in accordance with the Quality Assurance Project Plan (QAPP) developed specifically for this monitoring program (Olsson, 2011). Qualifiers were assigned by the laboratory in accordance to their quality control program.

3.1 Summary of Receipt in the Laboratory

The samples were received on May 31, 2012 as noted on the Chain-of-Custody (COC) included in Appendix A. The samples arrived in good condition, properly preserved and on ice. The temperature of the coolers was within the acceptable range.

3.2 Holding Times

All samples were extracted and analyzed within the method specific holding times as noted in the QAPP (Olsson, 2011):

- 14-days to extraction for VOCs
- 7-days to extraction and 40-days to analysis for Explosives

3.3 Tuning and Calibration

Assessment of tune and calibration data was validated by reviewing the case narrative and analytical report. Tuning and calibration outliers are to be detailed by the laboratory in Final Analytical Report. No deviations from method specifications for the calibration and tuning of pertinent instrumentation were reported by TestAmerica.

3.4 Laboratory Method Blanks

Method blanks were prepared and analyzed as per the requirements of the QAPP (Olsson, 2011). Method blanks are sample containers filled by the laboratory with analyte-free water that is carried through the entire preparation and analysis sequence for the purpose of identifying potential contamination. Method blanks were analyzed with each sample batch for all analyses.

The analysis of blank spike sample LCS 200-39676/2-A yielded marginally elevated recoveries of HMX and RDX, neither of which were detected in the associated samples. The values are flagged using the Data Reporting Qualifier – asterisk (*) where * = Recovery of RPD exceeds control limits.

3.5 Trip Blanks

Trip blanks are required when samples are collected for analysis of VOCs. Trip blanks are prepared in the laboratory with analyte-free water and are shipped to the site with the regular sample containers. The blanks are kept unopened in the field during site sampling activities and

are shipped for analysis with the project samples. Trip blanks are designed to evaluate VOC contamination encountered during sampling, transportation, and storage. One trip blank sample was placed in each sample cooler containing samples to be analyzed for VOCs, and was analyzed with the samples selected for VOC analysis. As noted in Table 3-7, no detections were noted in the trip blank analysis.

3.6 Rinsate Blanks

Rinsate blank samples serve as a quality control check on the cleanliness of the sampling device and the equipment decontamination process. Rinsate blanks are prepared in the field using analyte-free or organic-free water. The samples are used to evaluate if contaminants have been introduced through contact with the sampling equipment. Rinsate blanks are only required when non-dedicated sampling equipment is used to collect groundwater samples, as specified in the QAPP (Olsson, 2011). For the MUD Platte West Monitoring program, rinsate samples were not required because dedicated sampling equipment, specifically, Hydrasleeves, were used to collect the groundwater samples.

3.7 Surrogates

Surrogates are compounds that are added (spiked) into samples prior to sample extraction or analysis, depending on the method. The compounds are not normally found in the environment and therefore can be analyzed for their percent recovery as part of the quality control process. The percent recovery (%REC) of each surrogate is used to assess the success of the sample preparation process for each sample.

For the 8260B VOC analyses (GC/MS), four surrogate analytes were introduced:

- 1,2-Dichloroethane-d4 (80-115%)
- Toluene-d8 (80-115%)
- Bromofluorobenzene (85-120%)
- 1,2-Dichlorobenzene-d4 (80-115%)

All four surrogates were recovered within their acceptable range as noted above.

For the 8330B Nitroaromatic and nitramines (HPLC) explosive compound analyses, the surrogate 1,2-dinitrobenzene was introduced. The surrogate recoveries were within the TestAmerica control limits of 40-150%.

3.8 Laboratory Control Sample/Laboratory Control Sample Duplicate

The laboratory control sample (LCS) consists of a matrix similar to the field sample. The LCS is spiked with known concentrations of analytes. As with the surrogates, the LCS %REC is a measure of the method accuracy. If % REC results are outside the laboratory criteria, then the data is flagged with a laboratory qualifier “F” meaning the recovery (REC) or Relative Percent Difference (RPD) exceeds the control limits.

For the VOCs, no qualifiers were noted in the Quality Control Results of the Final Analytical Report (TestAmerica, 2011) because the % RECs were within the acceptable laboratory limits. For the Explosive analyses, three compound were qualified with “p” qualifiers because the RPD between the primary and confirmation columns differed by more than 40%. The compounds were 3-Nitrotoluene, 4-Amino-2,6-dinitrotoluene, and 4-Nitrotoluene. The lower value has been reported.

3.9 Matrix Spike/Matrix Spike Duplicate

Matrix Spike/Matrix Spike Duplicate (MS/MSD) analyses measure method accuracy and precision for a project-specific matrix. A field sample is split into three portions (original, MS, and MSD) and known amounts of analytes are spiked into the MS and MSD portions of the sample. The analytical results of these two portions are compared to each other for reproducibility using the RPD. The results are also compared against the unspiked portion of the sample for % REC of the spiked analytes. Typically, MS/MSD samples are analyzed for each Sample Delivery Group (SDG) for all analytes. For this sample event, there was only one SDG and therefore only one MS/MSD was analyzed for each analysis. All results that are qualified with J this round are due to MS/MSD % REC or RPD outliers. Results for contaminants of concern are R-coded if the MS/MSD %REC is less than 10%.

MS/MSD % REC were within laboratory limits for VOCs. For the explosive compounds, data qualifiers due to MSMSD % REC are as follows. J-coded data are noted in Table 3-2 as follows:

- 3-Nitrotoluene for sample BMW06-030-052912
- 4-Amino-2,6-dinitrotoluene for samples AMW06-030-053012 and AMW06-031-052912
- 4-Nitrotoluene for samples AMW06-030-053012

There were no rejected data. All other quality control parameters were within the acceptance limits.

3.10 Field Duplicate Results

Field duplicate results provide information on the reproducibility of field sample results and account for error introduced from handling, shipping, storage, preparation, and analysis of field samples. One field duplicate pair was collected during the May 2012 groundwater sampling event. The field duplicate pair is AMW06-018-052912 and AMW06-218-052912. The pair were analyzed for VOCs and explosives.

Along with QC evaluations presented in other sections of this QCSR, the results of the field duplicate pair are compared to one another. Results within a factor of two of each other are considered to be in agreement. Results between a factor of two to three of each other are considered a minor discrepancy and results greater than a factor of three are considered a major discrepancy. Table 3-5 and 3-6 present the results of the field duplicate pair for VOCs and explosive compounds (respectively). Field duplicate comparisons between AMW06-018-052912 and AMW06-218-052912 are considered to be in agreement.

3.11 Dilutions and Re-analyses

As noted on the data tables presented in this QCSR, the VOC and explosive samples did not require dilution (dilution factor = 1). The data reported in the tables are usable as reported.

3.12 Other QC Parameters

A column comparison between the detected explosive results was made using explosive identification summary forms. The RPDs were calculated by the laboratory on the appropriate Form X, Identification Summary. All detected explosives reported were confirmed by a second column. The lower value was reported. The percent difference between the two columns did not exceed 40% with the exception of seven compounds. As stated above, three compounds were qualified with “p” qualifiers because the RPD between the primary and confirmation columns differed by more than 40%. The compounds are 3-Nitrotoluene, 4-Amino-2,6-

dinitrotoluene, and 4-Nitrotoluene. This is four less than the last sampling round when seven compounds were qualified with “p” qualifiers.

3.13 Laboratory Qualifiers For May 2012 Data

Analytes detected below the quantitation limit or reporting limit but above the lowest level of detection were quantified and results were assigned an estimate (J) qualifier by the laboratory. The qualifiers are identified in Tables 3-1 through 3-7. These qualifiers were carried over and were not used to evaluate analytical completeness or project completeness.

4.0 OVERALL ASSESSMENT

The following sections present the field completeness, analytical completeness and project completeness for the May 2012 monitoring well sampling event.

4.1 Field Completeness

Field completeness for sample collection is assessed by comparing the number of samples collected to the number of samples originally planned for collection. Table 4-1 presents the field completeness values for the May 2012 monitoring event. Field completeness for explosives was 100%. Field completeness for the VOCs was 100%. The overall field completeness was 100% which is above the goal of 95%.

4.2 Analytical Completeness

There are two components to the analytical completeness evaluation. Analytical completeness is evaluated by quantifying the overall acceptable data and the overall quality data. The following paragraphs provide the evaluation of each component.

Acceptable data is a measure of contract laboratory compliance. Acceptable data includes data that has not been rejected or qualified as estimated (J). Qualified data is considered acceptable if appropriate corrective actions were taken by the laboratory. The acceptable data completeness percentage for VOCs was 100% and for explosives was 98%. The overall acceptable data completeness is 99% which is above the overall acceptable data completeness goal of 85%.

Quality data is a measure of the percentage of usable data. Quality data includes all data except rejected data points, and does not include analyses for which replacement data points are available. There was no rejected data and therefore quality data completeness percentages for VOCs and explosives were 100% which exceeds the quality data completeness goals of 85% for each analytical method. Table 4-2 presents acceptable and quality data completeness.

By averaging the completeness of the two components, the overall analytical completeness evaluation is calculated. Overall quality data completeness is 100% for the Spring 2012 sampling event, which exceeds the overall quality data completeness goal of 85%.

4.3 Project Completeness

Project completeness combines sampling and analytical completeness percentages to assess the success in achieving the expectations of the project as a whole. Project completeness is determined by comparing the percentage of usable samples/measurements to the percentage of planned or observed samples/measurements. For the field completeness portion, this involves comparison of the number of samples properly collected to the number of samples planned for collection. For the analytical data completeness portion, this involves comparison

of the number of usable data points to the number of observed data points. The field completeness and analytical completeness (quality data) completeness percentages are used to calculate the project completeness percentage. Table 4-3 presents project completeness calculations. For the May 2012 monitoring event, project completeness is 100%, which is above the project completeness goal of 90%.

5.0 CONCLUSIONS

Data are valid for use, as qualified. Overall field completeness is 100%, acceptable data completeness is 99%, quality data completeness is 100%, and project completeness is 100%. No data have been rejected. Data are qualified using the laboratory qualifiers as listed in Table 2-2 and as associated with the data provided in Tables 3-1 through 3-7.

6.0 REFERENCES

Olsson Associates, 2011. Final Field Sampling Plan for the Metropolitan Utilities District of Omaha, Platte West Well Field, Monitoring Well Sampling Program, Mead, Nebraska, prepared for the Metropolitan Utilities District of Omaha, July.

Olsson Associates, 2011. Quality Assurance Project Plan for the Metropolitan Utilities District of Omaha, Platte West Well Field, Monitoring Well Sampling Program, Mead, Nebraska, prepared for the Metropolitan Utilities District of Omaha, July.

TABLES

Table 2-1
Monitoring Well Samples and Analytical Requirements
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Well Identification	Latitude	Longitude	Analyses
MW06-18A	-96.382036	41.160754	Volatile Organic and Explosive Compounds
MW06-18B	-96.382036	41.160754	Volatile Organic and Explosive Compounds
MW06-30A	-96.405926	41.190157	Volatile Organic and Explosive Compounds
MW06-30B	-96.405926	41.190157	Volatile Organic and Explosive Compounds
MW06-31A	-96.391220	41.175544	Volatile Organic and Explosive Compounds
MW06-31B	-96.391220	41.175544	Volatile Organic and Explosive Compounds
MW-39A	-96.368231	41.146403	Volatile Organic and Explosive Compounds
MW-39D	-96.368231	41.146403	Volatile Organic and Explosive Compounds

Table 2-2
Abbreviations, Data Qualifiers and Notes
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Notes:

All analyses were completed by TestAmerica in Burlington, Vermont

Abbreviations:

Dup	Duplicate sample
ID	Identification
Invest.	Investigative sample
Lab	Laboratory
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NA	Not Analyzed
VOCs	Volatile Organic Compounds
VOAs	Volatile Organic Analyses
RPD	Relative Percent Difference
HPLC/IC	High Performance Liquid Chromatography/Ionic Chromatography

Data Qualifiers:

GC/MS VOA

F	MS/MSD Recovery or RPD exceeds the control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected. The laboratory reporting limit (RL) is listed for U coded data.

HPLC/IC

*	Recovery or RPD exceeds control limits
F	MS/MSD Recovery or RPD exceeds the control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
U	Indicates the analyte was analyzed for but not detected. The laboratory reporting limit (RL) is listed for U coded data.

Table 2-3
Sample Collection Summary
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Well Number	Investigative Sample ID	Quality Control Sample ID	MS/MSD Sample ID	Trip Blank Sample ID	Date Sampled	Date Received by Lab	COC Record Number	Lab ID	Sample Delivery Group	VOCs	Explosives
MW06-18A	AMW06-018-052912	--	--	--	5/29/2012	5/31/12	None	200-11041-3	11041	Yes	Yes
MW06-18A	--	AMW06-218-052912	--	--	5/29/2012	5/31/12	None	200-11041-4	11041	Yes	Yes
MW06-18B	BMW06-018-052912	--	--	--	5/29/2012	5/31/12	None	200-11041-5	11041	Yes	Yes
MW06-18B	--	--	BMW06-018-052912MS	--	5/29/2012	5/31/12	None	200-11041-5MS	11041	No	No
MW06-18B	--	--	BMW06-018-052912MSD	--	5/29/2012	5/31/12	None	200-11041-5MSD	11041	No	No
MW06-30A	AMW06-030-052912	--	--	--	5/30/2012	5/31/12	None	200-11041-9	11041	Yes	Yes
MW06-30B	BMW06-030-052912	--	--	--	5/29/2012	5/31/12	None	200-11041-8	11041	Yes	Yes
MW06-31A	AMW06-031-052912	--	--	--	5/29/2012	5/31/12	None	200-11041-6	11041	Yes	Yes
MW06-31B	BMW06-031-052912	--	--	--	5/29/2012	5/31/12	None	200-11041-7	11041	Yes	Yes
MW-39A	AMW-39-052912	--	--	--	5/29/2012	5/31/12	None	200-11041-1	11041	Yes	Yes
MW-39D	DMW-039-052912	--	--	--	5/29/2012	5/31/12	None	200-11041-2	11041	Yes	Yes
All wells	--	--	--	TRB-239-052912	5/29/2012	5/31/12	None	200-11041-10	11041	Yes	No

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-1 Results - Volatile Organic Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912		BMW06-018-052912		AMW06-030-053012		BMW06-030-052912		AMW06-031-052912		BMW06-031-052912		AMW-039-052912		DMW-039-052912	
Lab Sample Number	200-11041-3		200-11041-5		200-11041-9		200-11041-8		200-11041-6		200-11041-7		200-11041-1		200-11041-2	
Sampling Date	05/29/12		05/29/12		05/30/12		05/29/12		05/29/12		05/29/12		05/29/12		05/29/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte																
1,1,1,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,3-Trichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,4-Trichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,4-Trimethylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dibromo-3-Chloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dibromoethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethene, Total	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3,5-Trimethylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,4-Dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
2-Butanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chlorotoluene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
2-Hexanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorotoluene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
4-Isopropyltoluene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Table 3-1 Results - Volatile Organic Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912		BMW06-018-052912		AMW06-030-053012		BMW06-030-052912		AMW06-031-052912		BMW06-031-052912		AMW-039-052912		DMW-039-052912	
Lab Sample Number	200-11041-3		200-11041-5		200-11041-9		200-11041-8		200-11041-6		200-11041-7		200-11041-1		200-11041-2	
Sampling Date	05/29/12		05/29/12		05/30/12		05/29/12		05/29/12		05/29/12		05/29/12		05/29/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte																
4-Methyl-2-pentanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Acetone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromochloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromodichloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromoform	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromomethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Carbon disulfide	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Carbon tetrachloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroform	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromochloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromomethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichlorodifluoromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Ethylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Freon TF	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Hexachlorobutadiene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Isopropylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
m&p-Xylene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Methyl t-butyl ether	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Table 3-1 Results - Volatile Organic Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912		BMW06-018-052912		AMW06-030-053012		BMW06-030-052912		AMW06-031-052912		BMW06-031-052912		AMW-039-052912		DMW-039-052912	
Lab Sample Number	200-11041-3		200-11041-5		200-11041-9		200-11041-8		200-11041-6		200-11041-7		200-11041-1		200-11041-2	
Sampling Date	05/29/12		05/29/12		05/30/12		05/29/12		05/29/12		05/29/12		05/29/12		05/29/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte																
Methylene Chloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Naphthalene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
n-Butylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
n-Propylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
o-Xylene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
sec-Butylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Styrene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
tert-Butylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Tetrachloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Toluene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Vinyl chloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Xylenes, Total	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-2 Results - Explosive Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912		BMW06-018-052912		AMW06-030-053012		BMW06-030-052912		AMW06-031-052912		BMW06-031-052912		AMW-039-052912		DMW-039-052912	
Lab Sample Number	200-11041-3		200-11041-5		200-11041-9		200-11041-8		200-11041-6		200-11041-7		200-11041-1		200-11041-2	
Sampling Date	05/29/12		05/29/12		05/30/12		05/29/12		05/29/12		05/29/12		05/29/12		05/29/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte																
1,3,5-Trinitrobenzene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,3-Dinitrobenzene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,4,6-Trinitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,4-Dinitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,6-Dinitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2-Amino-4,6-dinitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2-Nitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
3-Nitrotoluene	0.2	U	0.2	U	0.2	U	0.092	J p	0.2	U	0.2	U	0.2	U	0.2	U
4-Amino-2,6-dinitrotoluene	0.2	U	0.2	U	0.034	J p	0.2	U	0.022	J p	0.2	U	0.2	U	0.2	U
4-Nitrotoluene	0.2	U	0.2	U	0.17	J	0.15	p	0.2	U	0.2	U	0.2	U	0.2	U
HMX	0.2	U *	0.2	U *	0.2	U *	0.2	U *	0.2	U *	0.2	U *	0.2	U *	0.2	U *
Nitrobenzene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
RDX	0.2	U *	0.2	U *	0.2	U *	0.2	U *	0.2	U *	0.2	U *	0.2	U *	0.2	U *
Tetryl	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-3 Detections - Volatile Organic Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912	BMW06-018-052912	AMW06-030-053012	BMW06-030-052912	AMW06-031-052912	BMW06-031-052912	AMW-039-052912	DMW-039-052912
Lab Sample Number	200-11041-3	200-11041-5	200-11041-9	200-11041-8	200-11041-6	200-11041-7	200-11041-1	200-11041-2
Sampling Date	05/29/12	05/29/12	05/30/12	05/29/12	05/29/12	05/29/12	05/29/12	05/29/12
Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Dilution Factor	1	1	1	1	1	1	1	1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Analyte								

There were no detections for volatile organic compounds above the reporting limit.

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-4 Detections - Explosive Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912	BMW06-018-052912	AMW06-030-053012	BMW06-030-052912	AMW06-031-052912	BMW06-031-052912	AMW-039-052912	DMW-039-052912
Lab Sample Number	200-11041-3	200-11041-5	200-11041-9	200-11041-8	200-11041-6	200-11041-7	200-11041-1	200-11041-2
Sampling Date	05/29/12	05/29/12	05/30/12	05/29/12	05/29/12	05/29/12	05/29/12	05/29/12
Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Dilution Factor	1	1	1	1	1	1	1	1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

There were no detections for explosive compounds above the reporting limit.

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-5 Field Duplicate Results - Volatile Organic Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912		AMW06-218-052912	
Lab Sample Number	200-11041-3		200-11041-4	
Sampling Date	05/29/12		05/29/12	
Matrix	Water		Water	
Dilution Factor	1		1	
Units	ug/L		ug/L	
Analyte				
1,1,1,2-Tetrachloroethane	1.0	U	1.0	U
1,1,1-Trichloroethane	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U
1,1,2-Trichloroethane	1.0	U	1.0	U
1,1-Dichloroethane	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U
1,1-Dichloropropene	1.0	U	1.0	U
1,2,3-Trichlorobenzene	1.0	U	1.0	U
1,2,4-Trichlorobenzene	1.0	U	1.0	U
1,2,4-Trimethylbenzene	1.0	U	1.0	U
1,2-Dibromo-3-Chloropropane	1.0	U	1.0	U
1,2-Dibromoethane	1.0	U	1.0	U
1,2-Dichlorobenzene	1.0	U	1.0	U
1,2-Dichloroethane	1.0	U	1.0	U
1,2-Dichloroethene, Total	1.0	U	1.0	U
1,2-Dichloropropane	1.0	U	1.0	U
1,3,5-Trimethylbenzene	1.0	U	1.0	U
1,3-Dichlorobenzene	1.0	U	1.0	U
1,3-Dichloropropane	1.0	U	1.0	U
1,4-Dichlorobenzene	1.0	U	1.0	U
2-Butanone	5.0	U	5.0	U
2-Chlorotoluene	1.0	U	1.0	U
2-Hexanone	5.0	U	5.0	U
4-Chlorotoluene	1.0	U	1.0	U
4-Isopropyltoluene	1.0	U	1.0	U
4-Methyl-2-pentanone	5.0	U	5.0	U
Acetone	5.0	U	5.0	U
Benzene	1.0	U	1.0	U
Bromobenzene	1.0	U	1.0	U
Bromochloromethane	1.0	U	1.0	U
Bromodichloromethane	1.0	U	1.0	U
Bromoform	1.0	U	1.0	U
Bromomethane	1.0	U	1.0	U
Carbon disulfide	1.0	U	1.0	U
Carbon tetrachloride	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U

Table 3-5 Field Duplicate Results - Volatile Organic Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912		AMW06-218-052912	
Lab Sample Number	200-11041-3		200-11041-4	
Sampling Date	05/29/12		05/29/12	
Matrix	Water		Water	
Dilution Factor	1		1	
Units	ug/L		ug/L	
Analyte				
Chloroethane	1.0	U	1.0	U
Chloroform	1.0	U	1.0	U
Chloromethane	1.0	U	1.0	U
cis-1,2-Dichloroethene	1.0	U	1.0	U
cis-1,3-Dichloropropene	1.0	U	1.0	U
Dibromochloromethane	1.0	U	1.0	U
Dibromomethane	1.0	U	1.0	U
Dichlorodifluoromethane	1.0	U	1.0	U
Ethylbenzene	1.0	U	1.0	U
Freon TF	1.0	U	1.0	U
Hexachlorobutadiene	1.0	U	1.0	U
Isopropylbenzene	1.0	U	1.0	U
m&p-Xylene	1.0	U	1.0	U
Methyl t-butyl ether	1.0	U	1.0	U
Methylene Chloride	1.0	U	1.0	U
Naphthalene	1.0	U	1.0	U
n-Butylbenzene	1.0	U	1.0	U
n-Propylbenzene	1.0	U	1.0	U
o-Xylene	1.0	U	1.0	U
sec-Butylbenzene	1.0	U	1.0	U
Styrene	1.0	U	1.0	U
tert-Butylbenzene	1.0	U	1.0	U
Tetrachloroethene	1.0	U	1.0	U
Toluene	1.0	U	1.0	U
trans-1,2-Dichloroethene	1.0	U	1.0	U
trans-1,3-Dichloropropene	1.0	U	1.0	U
Trichloroethene	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U
Vinyl chloride	1.0	U	1.0	U
Xylenes, Total	1.0	U	1.0	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-6 Field Duplicate Results - Explosive Compounds
May 2012 Monitroing Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912		AMW06-218-052912	
Lab Sample Number	200-11041-3		200-11041-4	
Sampling Date	05/29/12		05/29/12	
Matrix	Water		Water	
Dilution Factor	1		1	
Units	ug/L		ug/L	
Analyte				
1,3,5-Trinitrobenzene	0.2	U	0.2	U *
1,3-Dinitrobenzene	0.2	U	0.2	U *
2,4,6-Trinitrotoluene	0.2	U	0.2	U
2,4-Dinitrotoluene	0.2	U	0.2	U
2,6-Dinitrotoluene	0.2	U	0.2	U
2-Amino-4,6-dinitrotoluene	0.2	U	0.2	U
2-Nitrotoluene	0.2	U	0.2	U
3-Nitrotoluene	0.2	U	0.2	U
4-Amino-2,6-dinitrotoluene	0.2	U	0.2	U
4-Nitrotoluene	0.2	U	0.2	U
HMX	0.2	U *	0.2	U
Nitrobenzene	0.2	U	0.2	U
RDX	0.2	U *	0.2	U
Tetryl	0.2	U	0.2	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-7
Trip Blank Results - Volatile Organic Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	TRB-239-052912	
Lab Sample Number	200-11041-10	
Sampling Date	05/29/12	
Matrix	Water	
Dilution Factor	1	
Units	ug/L	
Analyte		
1,1,1,2-Tetrachloroethane	1.0	U
1,1,1-Trichloroethane	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U
1,1,2-Trichloroethane	1.0	U
1,1-Dichloroethane	1.0	U
1,1-Dichloroethene	1.0	U
1,1-Dichloropropene	1.0	U
1,2,3-Trichlorobenzene	1.0	U
1,2,4-Trichlorobenzene	1.0	U
1,2,4-Trimethylbenzene	1.0	U
1,2-Dibromo-3-Chloropropane	1.0	U
1,2-Dibromoethane	1.0	U
1,2-Dichlorobenzene	1.0	U
1,2-Dichloroethane	1.0	U
1,2-Dichloroethene, Total	1.0	U
1,2-Dichloropropane	1.0	U
1,3,5-Trimethylbenzene	1.0	U
1,3-Dichlorobenzene	1.0	U
1,3-Dichloropropane	1.0	U
1,4-Dichlorobenzene	1.0	U
2-Butanone	5.0	U
2-Chlorotoluene	1.0	U
2-Hexanone	5.0	U
4-Chlorotoluene	1.0	U
4-Isopropyltoluene	1.0	U
4-Methyl-2-pentanone	5.0	U
Acetone	5.0	U
Benzene	1.0	U
Bromobenzene	1.0	U
Bromochloromethane	1.0	U
Bromodichloromethane	1.0	U
Bromoform	1.0	U
Bromomethane	1.0	U
Carbon disulfide	1.0	U
Carbon tetrachloride	1.0	U

Table 3-7
Trip Blank Results - Volatile Organic Compounds
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	TRB-239-052912	
Lab Sample Number	200-11041-10	
Sampling Date	05/29/12	
Matrix	Water	
Dilution Factor	1	
Units	ug/L	
Analyte		
Chlorobenzene	1.0	U
Chloroethane	1.0	U
Chloroform	1.0	U
Chloromethane	1.0	U
cis-1,2-Dichloroethene	1.0	U
cis-1,3-Dichloropropene	1.0	U
Dibromochloromethane	1.0	U
Dibromomethane	1.0	U
Dichlorodifluoromethane	1.0	U
Ethylbenzene	1.0	U
Freon TF	1.0	U
Hexachlorobutadiene	1.0	U
Isopropylbenzene	1.0	U
m&p-Xylene	1.0	U
Methyl t-butyl ether	1.0	U
Methylene Chloride	1.0	U
Naphthalene	1.0	U
n-Butylbenzene	1.0	U
n-Propylbenzene	1.0	U
o-Xylene	1.0	U
sec-Butylbenzene	1.0	U
Styrene	1.0	U
tert-Butylbenzene	1.0	U
Tetrachloroethene	1.0	U
Toluene	1.0	U
trans-1,2-Dichloroethene	1.0	U
trans-1,3-Dichloropropene	1.0	U
Trichloroethene	1.0	U
Trichlorofluoromethane	1.0	U
Vinyl chloride	1.0	U
Xylenes, Total	1.0	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table- 4-1
Field Completeness
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

	Volatile Organic Compounds (8260B)		Percent Complete	Explosive Compounds (8330B)		Percent Complete
	Actual	*Proposed*		*Actual*	*Proposed*	
No. of Sampling Locations	8	8	100%	8	8	100%
Number of Field Duplicates	1	1	100%	1	1	100%
Number of Matrix Spike Samples	1	1	100%	1	1	100%
Number of Matrix Spike Duplicate Samples	1	1	100%	1	1	100%
Number of Field Blanks	0	0	NA[2]	0	0	NA[2]
Number of Equipment Blanks	0	0	NA[2]	0	0	NA[2]
Number of VOC Trip Blanks	1	1	100%	0	0	NA[2]
Number of Lab Performance Testing Samples[1]	0	0	NA[2]	0	0	NA[2]
Total Number of Samples per event	12	12	100%	11	11	100%

Overall Field Completeness	100%	**Overall Field Completeness Goal**	95%

[1] The number of Batch or Project-specific proficiency testing (PT) samples are scheduled for this sampling event.

[2] Percent Complete calculation not required since no samples were proposed for this event.

Table- 4-2
Analytical Completeness
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

	Volatile Organic Compound Analyses	Explosive Compound Analyses
Number of Analyses	792	418
Number of J qualified data points	1	4
Percent Complete	100%	99%

Overall Acceptable Data Analytical Completeness	99%

Overall Acceptable Data Analytical Completeness Goal	85%

	Volatile Organic Compound Analyses	Explosive Compound Analyses
Number of Analyses	660	126
Number of Rejected Data points	0	0
Percent Complete	100%	100%

Overall Quality Data Analytical Completeness	100%

Overall Quality Data Analytical Completeness Goal	85%

Table- 4-3
Project Completeness
May 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Overall Field Completeness	Overall Analytical Completeness[1]	Overall Project Completeness[2]
100%	99%	100%

Overall Project Completeness Goal	90%

Notes:
1 = Analytical completeness is the percentage of usable data i.e. quality data completeness.
2 = Project completeness combines sampling and analytical protocols to assess the expectations of the project as a whole. Project completeness is determined by comparing the percentage of samples / measurements that are determined to be usable to the total number of samples / measurements planned.

APPENDIX A

Chain of Custody

TestAmerica Burlington
30 Community Drive, Suite 11
South Burlington, VT 05403
Phone:(802)660-1990

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Ryan Doty	Lab PM: Jim Madison	Carrier Tracking No(s):	COC No:
Client Contact: Jeff McPeak	Phone: 402-458-5909	E-Mail: jmcpeak@olssonassociates.com		Page: 1 of 2
Company: Olsson Associates				Job #:
Address: 1111 Lincoln Mall	Due Date Requested:			
City: Lincoln	TAT Requested (days): Standard			
State, Zip: NE 68508	PO #:			
Phone: 402-458-5909	WO #:			
Email: jmcpeak@olssonassociates.com				
Project Name: MUD-Platte West Well Field	Project #: 011-1087			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	VOCs 8260	Explosives 8330	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
AMW-039-052912	5/29/12	0843	G	W			X	X		
DMW-039-052912	5/29/12	0904	G	W			X	X		
AMW06-018-052912	5/29/12	0948	G	W			X	X		
AMW06-218-052912	5/29/12	0948	G	W			X	X		
BMW06-018-052912	5/29/12	1000	G	W			X	X		
BMW06-018-052912 MS	5/29/12	1000	G	W			X	X		
BMW06-018-052912 MSD	5/29/12	1000	G	W			X	X		
AMW06-031-052912	5/29/12	1047	G	W			X	X		
BMW06-031-052912	5/29/12	1107	G	W			X	X		
BMW06-030-052912	5/29/12	1218	G	W			X	X		
AMW06-030-053012	5/30/12	1428	G	W			X	X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Relinquished by:	Date/Time: 5/30/12 1700	Company: Olsson	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

TestAmerica Burlington
30 Community Drive, Suite 11
South Burlington, VT 05403
Phone:(802)660-1990

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Ryan Doty	Lab PM: Jim Madison	Carrier Tracking No(s):	COC No:
Client Contact: Jeff McPeak	Phone: 402-458-5909	E-Mail: jmcpeak@olssonassociates.com		Page: 2 of 2
Company: Olsson Associates				Job #:
Address: 1111 Lincoln Mall	Due Date Requested:			
City: Lincoln	TAT Requested (days): Standard			
State, Zip: NE 68508	PO #:			
Phone: 402 458-5909	WO #:			
Email: jmcpeak@olssonassociates.com	Project #: 011-1087			
Project Name: NRD-Platte West Well Field	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	VOCs 8260	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
TRB-239-052912	—	—	G	W			X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Deliverable Requested: I, II, III, IV, Other (specify)

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements:

Relinquished by:	Date/Time: 5/30/12 1700	Company: Olsson	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

APPENDIX B

Field Notes

Location Saunders County Date 5/25/12

Project / Client MUD PWSF

Personnel: Ryan Doby
Cloudy, high 76, chance showers
POD: deploy hydrasleeves for resample
Instruments: see Page 2

1025	Head to site
1055	arrive at MW-39
1058	remove transducer
1112	deploy hydrasleeves
1114	leave site
1119	arrive at MW06-18
1121	remove transducer
1127	deploy hydrasleeves
1129	leave site
1132	arrive at MW06-31
1134	remove transducer
1147	deploy hydrasleeves
1149	leave site
1152	arrive at MW06-30
1154	remove transducer
1205	deploy hydrasleeves
1209	leave site
1316	stop at drill shop

Location Saunders County Date 5/29/12

Project / Client MUD PWWF

Personnel: Ryan Doty

Weather: Sunny, high 74

POD: collect groundwater samples

Instruments: See Page 2

0735	leave office
0821	arrive at MW-39
0843	collect AMW-039-052912
0904	collect DMW-039-052912
0913	deploy transducer
0918	leave site
0923	arrive at MW06-18
0948	collect AMW06-018-052912 and AMW06-218-052912
1000	collect BMW-018-052912 and BMW06-018-052912MS + BMW06-018-052912MSD
1024	deploy transducer
1033	leave site
1037	arrive at MW06-31
1047	collect AMW06-031-052912
1107	collect BMW06-031-052912
1116	deploy transducer
1121	leave site
1126	arrive at MW06-30

Location Saunders County Date 5/29/12

Project / Client MUD PWWF

1139	collect ~~AMW06-030-052912~~ Hydrasleeve broke, unable to collect sample
1210	deploy new hydrasleeve
1218	collect BMW06-030-052912
1230	leave site
1318	return to office

Ryan Doty

5/29/12

Location Saunders County Date 5/30/12

Project / Client MUD PWWF

Personnel: Ryan Doty

Weather: Cloudy, 65, chance of rain

POD: Sample MW06-30A

Instruments: See Page 2

1233	head to site
1418	arrive at MW06-30
1428	collect AMW06-030-053012
1438	deploy transducer
1448	leave site
1559	return to office

Ryan Doty

5/30/12

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW06-18	Date: 5/29/12
Sample Number: AMW06-018-052912	Weather Conditions: Sunny, windy, 64°
PID Reading: —	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	3.09	5. TOC Elevation:	1089.79
2. Measured Well Depth (+/-0.25 ft.)	—	6. Static Water Elevation:	1086.88
3. Casing Diameter (in)	4"	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	2L Custom		

Purging: Not Applicable - No Purge

Duplicate Collected?	Yes	Duplicate ID:	AMW06-218-052912
MS/MSD Collected?	No	MS/MSD ID:	
Sample Analysis:	VOCs (8260) + Explosives (8330)		
Number of Bottles Filled:	VOAs 6	500ml	4
Investigative Sample pH:	— (must be < 2)		

Sample Clear or Turbid:	Clear	Preservation Method:	Per SAP
Sample Color:	None	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Samples collected at 0948

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW06-18	Date: 5/29/12
Sample Number: BMW06-018-052912	Weather Conditions: Sunny, windy, 64°
PID Reading: —	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	3.09	5. TOC Elevation: 1089.79	~~1086.79~~ ~~1086.88~~ 1089.70
2. Measured Well Depth (+/-0.25 ft.)	—	6. Static Water Elevation: 1086.88	~~1086.88~~
3. Casing Diameter (in)	4	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	3L Custom		

Purging: Not Applicable - No Purge

Duplicate Collected?	NO	Duplicate ID:	
MS/MSD Collected?	Yes	MS/MSD ID:	BMW06-018-052912MS and BMW06-018-052912 MSD
Sample Analysis: VOCs (8260) + Explosives (8330)			
Number of Bottles Filled:	VOAs 9	500ml	6
Investigative Sample pH: —	(must be < 2)		

Sample Clear or Turbid:	Clear	Preservation Method:	Per SAP
Sample Color:	None	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Samples collected at 1000

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW06-30A	Date: 5/30/12
Sample Number: AMW06-030 - 053012	Weather Conditions: Cloudy, windy, 66°
PID Reading: —	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	67.89	5. TOC Elevation:	1199.31
2. Measured Well Depth (+/-0.25 ft.)	—	6. Static Water Elevation:	1131.42
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L SuperSleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	NO	Duplicate ID:	
MS/MSD Collected?	NO	MS/MSD ID:	
Sample Analysis:	VOCs (8260) + Explosives (8330)		
Number of Bottles Filled:	VOAs 3	500ml	2
Investigative Sample pH:	— (must be < 2)		

Sample Clear or Turbid:	Turbid	Preservation Method:	Per SAP
Sample Color:	Brown	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Samples collected at 1428

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West		Sampler Name(s): Ryan Doty	
Monitor Well Identification Number: MW06-30B		Date: 5/29/12	
Sample Number: BMW06-030-052912		Weather Conditions: Sunny, windy 65	
PID Reading: —		Wellhead Inspection (note conditions):	OK / Needs Repair
		Damage	X /
		Locked	X /
		Intact Cap	X /
		Other (note in comments section)	

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	67.86	5. TOC Elevation:	1199.37
2. Measured Well Depth (+/-0.25 ft.)	—	6. Static Water Elevation:	1131.51
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L Super Sleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	NO	Duplicate ID:	
MS/MSD Collected?	NO	MS/MSD ID:	
Sample Analysis:	VOCs (8260) + Explosives (8330)		
Number of Bottles Filled:	VOAs 3	500ml 2	
Investigative Sample pH:	— (must be < 2)		

Sample Clear or Turbid:	Turbid	Preservation Method:	Per SAP
Sample Color:	Brown	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Samples collected at 1218

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW06-31A	Date: 5/29/12
Sample Number: ArMW06-031-052912	Weather Conditions: Sunny, Windy, 650
PID Reading: —	Wellhead Inspection (note conditions): OK / Needs Repair

	OK	Needs Repair
Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	51.30	5. TOC Elevation:	1149.98
2. Measured Well Depth (+/-0.25 ft.)	—	6. Static Water Elevation:	1098.68
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	LL SuperSleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	NO	Duplicate ID:	
MS/MSD Collected?	NO	MS/MSD ID:	
Sample Analysis:	VOCs (8260) + Explosives (8330)		
Number of Bottles Filled:	VOAs 3	500ml 2	
Investigative Sample pH:	— (must be < 2)		

Sample Clear or Turbid:	Turbid	Preservation Method:	Per SAP
Sample Color:	Brown	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

samples collected at 1047

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW06-031B	Date: 5/29/12
Sample Number: BMW06-031-052912	Weather Conditions: Sunny, windy, 65
PID Reading: —	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	51.05	5. TOC Elevation:	1150.02
2. Measured Well Depth (+/-0.25 ft.)	—	6. Static Water Elevation:	1098.97
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	2L SuperSleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	NO	Duplicate ID:	
MS/MSD Collected?	NO	MS/MSD ID:	
Sample Analysis:	VOCs (8260) + Explosives (8330)		
Number of Bottles Filled:	VOAs 3	500ml 2	
Investigative Sample pH:	— (must be < 2)		

Sample Clear or Turbid:	Clear	Preservation Method:	Per SAP
Sample Color:	Lt Brown	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Samples collected at 1107

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW-39A	Date: 5/29/12
Sample Number: AMW-039-052912	Weather Conditions: Sunny, windy, 59°
PID Reading: —	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	4.30	5. TOC Elevation:	1082.82
2. Measured Well Depth (+/-0.25 ft.)	—	6. Static Water Elevation:	1078.52
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L Super Sleeve		

Purging: Not Applicable - No Purge

Duplicate Collected? NO		Duplicate ID:	
MS/MSD Collected? NO		MS/MSD ID:	
Sample Analysis: VOCs (8260) + Explosives (8330)			
Number of Bottles Filled:	VOAs 3	500ml 2	
Investigative Sample pH: —	(must be < 2)		

Sample Clear or Turbid:	Slightly Turbid	Preservation Method:	Per SAP
Sample Color:	Light brown	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Sample collected at 0843

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West		Sampler Name(s): Ryan Doty	
Monitor Well Identification Number: MW-39D		Date: 5/29/12	
Sample Number: DMW-039-052912		Weather Conditions: Sunny, windy, 59°	
PID Reading: NA		Wellhead Inspection (note conditions):	OK / Needs Repair
		Damage	X /
		Locked	X /
		Intact Cap	X /
		Other (note in comments section)	

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	4.39	5. TOC Elevation:	1082.95
2. Measured Well Depth (+/-0.25 ft.)	—	6. Static Water Elevation:	1078.56
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L SuperSleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	NO	Duplicate ID:	
MS/MSD Collected?	NO	MS/MSD ID:	
Sample Analysis:	VOCs (8260) & Explosives (8330)		
Number of Bottles Filled:	VOAs 3	500ml 2	
Investigative Sample pH:	NA (must be < 2)		

Sample Clear or Turbid:	Sl. Turbid	Preservation Method:	Per SAP
Sample Color:	Clear	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Sample collected at 0904

APPENDIX C

Laboratory Analytical Report

CASE NARRATIVE

Client: Olsson Associates

Project: M.U.D. Platte West Well Field

Report Number: 200-11041-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 05/31/2012; the samples arrived in good condition, properly preserved and on ice.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples AMW-039-052912, DMW-039-052912, AMW06-018-052912, AMW06-218-052912, BMW06-018-052912, AMW06-031-052912, BMW06-031-052912, BMW06-030-052912, AMW06-030-053012 and TRB-239-052912 were analyzed for volatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 06/06/2012.

A matrix spike performed on sample BMW06-018-052912 yielded marginally low recovery of bromomethane. That compound exhibited acceptable recovery in the matrix spike duplicate and blank spike samples.

No other difficulties were encountered during the volatiles analyses.

All other quality control parameters were within the acceptance limits.

NITROAROMATICS AND NITRAMINES (HPLC)

Samples AMW-039-052912, DMW-039-052912, AMW06-018-052912, AMW06-218-052912, BMW06-018-052912, AMW06-031-052912, BMW06-031-052912, BMW06-030-052912 and AMW06-030-053012 were analyzed for Nitroaromatics and Nitramines (HPLC) in accordance with EPA SW-846 Method 8330B. The samples were prepared on 06/03/2012 and analyzed on 06/04/2012 and 06/05/2012.

The analysis of blank spike sample LCS 200-39676/2-A yielded marginally elevated recoveries of HMX and RDX, neither of which were detected in the associated samples.

A matrix spike performed on sample BMW06-018-052912 yielded marginally elevated recovery of 2-nitrotoluene. That compound exhibited acceptable recovery in the matrix spike duplicate and blank spike samples.

No other difficulties were encountered during the explosives analyses.

All other quality control parameters were within the acceptance limits.

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW-039-052912**

Lab Sample ID: 200-11041-1
Client Matrix: Water

Date Sampled: 05/29/2012 0843
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39880	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbg18.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 0105			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 0105				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW-039-052912**

Lab Sample ID: 200-11041-1
Client Matrix: Water

Date Sampled: 05/29/2012 0843
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39880	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbg18.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 0105			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 0105				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	105		80 - 115
Toluene-d8	101		80 - 115
Bromofluorobenzene	102		85 - 120
1,2-Dichlorobenzene-d4	99		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **DMW-039-052912**

Lab Sample ID: 200-11041-2
Client Matrix: Water

Date Sampled: 05/29/2012 0904
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh07.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1121			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1121				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **DMW-039-052912**

Lab Sample ID: 200-11041-2
Client Matrix: Water

Date Sampled: 05/29/2012 0904
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh07.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1121			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1121				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	96		80 - 115
Toluene-d8	103		80 - 115
Bromofluorobenzene	101		85 - 120
1,2-Dichlorobenzene-d4	99		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-018-052912**

Lab Sample ID: 200-11041-3
Client Matrix: Water

Date Sampled: 05/29/2012 0948
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39880	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbg20.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 0209			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 0209				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-018-052912**

Lab Sample ID: 200-11041-3
Client Matrix: Water

Date Sampled: 05/29/2012 0948
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39880	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbg20.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 0209			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 0209				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	106		80 - 115
Toluene-d8	101		80 - 115
Bromofluorobenzene	103		85 - 120
1,2-Dichlorobenzene-d4	99		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-218-052912**

Lab Sample ID: 200-11041-4
Client Matrix: Water

Date Sampled: 05/29/2012 0948
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh08.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1153			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1153				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-218-052912**

Lab Sample ID: 200-11041-4
Client Matrix: Water

Date Sampled: 05/29/2012 0948
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh08.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1153			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1153				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	99		80 - 115
Toluene-d8	102		80 - 115
Bromofluorobenzene	103		85 - 120
1,2-Dichlorobenzene-d4	101		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-018-052912**

Lab Sample ID: 200-11041-5
Client Matrix: Water

Date Sampled: 05/29/2012 1000
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39880	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbg21.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 0241			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 0241				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-018-052912**

Lab Sample ID: 200-11041-5
Client Matrix: Water

Date Sampled: 05/29/2012 1000
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39880	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbg21.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 0241			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 0241				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	106		80 - 115
Toluene-d8	102		80 - 115
Bromofluorobenzene	104		85 - 120
1,2-Dichlorobenzene-d4	98		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-031-052912**

Lab Sample ID: 200-11041-6
Client Matrix: Water

Date Sampled: 05/29/2012 1047
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh09.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1225			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1225				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-031-052912**

Lab Sample ID: 200-11041-6
Client Matrix: Water

Date Sampled: 05/29/2012 1047
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh09.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1225			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1225				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	100		80 - 115
Toluene-d8	100		80 - 115
Bromofluorobenzene	102		85 - 120
1,2-Dichlorobenzene-d4	100		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-031-052912**

Lab Sample ID: 200-11041-7
Client Matrix: Water

Date Sampled: 05/29/2012 1107
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh10.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1257			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1257				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-031-052912**

Lab Sample ID: 200-11041-7
Client Matrix: Water

Date Sampled: 05/29/2012 1107
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh10.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1257			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1257				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	103		80 - 115
Toluene-d8	103		80 - 115
Bromofluorobenzene	104		85 - 120
1,2-Dichlorobenzene-d4	99		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-030-052912**

Lab Sample ID: 200-11041-8
Client Matrix: Water

Date Sampled: 05/29/2012 1218
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh11.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1329			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1329				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-030-052912**

Lab Sample ID: 200-11041-8
Client Matrix: Water

Date Sampled: 05/29/2012 1218
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh11.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1329			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1329				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	102		80 - 115
Toluene-d8	101		80 - 115
Bromofluorobenzene	102		85 - 120
1,2-Dichlorobenzene-d4	98		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-030-053012**

Lab Sample ID: 200-11041-9
Client Matrix: Water

Date Sampled: 05/30/2012 1428
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh12.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1401			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1401				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-030-053012**

Lab Sample ID: 200-11041-9
Client Matrix: Water

Date Sampled: 05/30/2012 1428
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh12.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1401			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1401				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	102		80 - 115
Toluene-d8	100		80 - 115
Bromofluorobenzene	101		85 - 120
1,2-Dichlorobenzene-d4	98		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **TRB-239-052912**

Lab Sample ID: 200-11041-10
Client Matrix: Water

Date Sampled: 05/29/2012 0000
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh13.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1433			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1433				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **TRB-239-052912**

Lab Sample ID: 200-11041-10
Client Matrix: Water

Date Sampled: 05/29/2012 0000
Date Received: 05/31/2012 1030

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-39920	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	lhbh13.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	06/06/2012 1433			Final Weight/Volume:	5 mL
Prep Date:	06/06/2012 1433				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.32	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	103		80 - 115
Toluene-d8	102		80 - 115
Bromofluorobenzene	103		85 - 120
1,2-Dichlorobenzene-d4	98		80 - 115

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW-039-052912**

Lab Sample ID: 200-11041-1
Client Matrix: Water

Date Sampled: 05/29/2012 0843
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2050			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	101		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW-039-052912**

Lab Sample ID: 200-11041-1
Client Matrix: Water

Date Sampled: 05/29/2012 0843
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2121			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	100		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **DMW-039-052912**

Lab Sample ID: 200-11041-2
Client Matrix: Water

Date Sampled: 05/29/2012 0904
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2125			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	99		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **DMW-039-052912**

Lab Sample ID: 200-11041-2
Client Matrix: Water

Date Sampled: 05/29/2012 0904
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2159			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-018-052912**

Lab Sample ID: 200-11041-3
Client Matrix: Water

Date Sampled: 05/29/2012 0948
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2159			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	100		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-018-052912**

Lab Sample ID: 200-11041-3
Client Matrix: Water

Date Sampled: 05/29/2012 0948
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2236			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	99		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-218-052912**

Lab Sample ID: 200-11041-4
Client Matrix: Water

Date Sampled: 05/29/2012 0948
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2307			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	102		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-218-052912**

Lab Sample ID: 200-11041-4
Client Matrix: Water

Date Sampled: 05/29/2012 0948
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2351			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	100		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-018-052912**

Lab Sample ID: 200-11041-5
Client Matrix: Water

Date Sampled: 05/29/2012 1000
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/04/2012 2341			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-018-052912**

Lab Sample ID: 200-11041-5
Client Matrix: Water

Date Sampled: 05/29/2012 1000
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0029			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	96		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-031-052912**

Lab Sample ID: 200-11041-6
Client Matrix: Water

Date Sampled: 05/29/2012 1047
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0016			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Amino-2,6-dinitrotoluene	0.073	J p	0.020	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-031-052912**

Lab Sample ID: 200-11041-6
Client Matrix: Water

Date Sampled: 05/29/2012 1047
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0106			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.022	J p	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-031-052912**

Lab Sample ID: 200-11041-7
Client Matrix: Water

Date Sampled: 05/29/2012 1107
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0050			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-031-052912**

Lab Sample ID: 200-11041-7
Client Matrix: Water

Date Sampled: 05/29/2012 1107
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0144			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	102		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-030-052912**

Lab Sample ID: 200-11041-8
Client Matrix: Water

Date Sampled: 05/29/2012 1218
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0124			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Nitrotoluene	0.15	J p	0.054	0.20
3-Nitrotoluene	0.15	J p	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **BMW06-030-052912**

Lab Sample ID: 200-11041-8
Client Matrix: Water

Date Sampled: 05/29/2012 1218
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0221			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.33	p	0.054	0.20
3-Nitrotoluene	0.092	J p	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-030-053012**

Lab Sample ID: 200-11041-9
Client Matrix: Water

Date Sampled: 05/30/2012 1428
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39721	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0158			Injection Volume:	450 uL
Prep Date:	06/03/2012 1029			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Amino-2,6-dinitrotoluene	0.19	J p	0.020	0.20
4-Nitrotoluene	0.18	J	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		40 - 150

Client: Olsson Associates

Job Number: 200-11041-1
Sdg Number: 11041

Client Sample ID: **AMW06-030-053012**

Lab Sample ID: 200-11041-9
Client Matrix: Water

Date Sampled: 05/30/2012 1428
Date Received: 05/31/2012 1030

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-39718	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-39676	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	06/05/2012 0258			Injection Volume:	150 uL
Prep Date:	06/03/2012 1029			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U *	0.011	0.20
RDX	0.20	U *	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.034	J p	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.17	J	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		40 - 150

Karen O'Connor

7/16/12

QUALITY CONTROL SUMMARY REPORT
OCTOBER 2012 MONITORING WELL SAMPLING EVENT

METROPOLITAN UTILITIES DISTRICT OF OMAHA
PLATTE WEST WELL FIELD
SAUNDERS COUNTY, NEBRASKA

PREPARED FOR
METROPOLITAN UTILITIES DISTRICT OF OMAHA

PREPARED BY
OLSSON ASSOCIATES

OLSSON PROJECT NUMBER: 011-1087

NOVEMBER 2012

OLSSON ASSOCIATES

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

F:\Projects\011-1087\Documents\Reports\QCSR\2012 Fall QCSR\OA_QCSR_MUD_011-1087 FALL 2012.docx

1.0 INTRODUCTION

The Metropolitan Utilities District of Omaha (MUD) provides potable water for a metropolitan area of over three-quarters of a million people. To meet projected water demands from continued population growth in the greater Omaha area in the coming decades, MUD completed construction of the Platte West Well Field (PWWF) in 2008. The PWWF consists of 42 wells constructed along and adjacent to the Platte River approximately seven miles east of the town of Mead in Saunders County, Nebraska. The well field began operations in July of 2008 and currently has the capacity to provide 334 million gallons per day (mgd). Because the PWWF transmits water across the Platte River from wells on the west bank eastward via a pipeline, the well field is subject to U.S. Army Corp of Engineers (USACE) Omaha District (CENWO) Section 404 Permit regulations. This permit requires MUD to monitor any influence the well field activity may have on remediation efforts at the former Nebraska Ordnance Plant (NOP) south of Mead, which is under the jurisdiction of the USACE Kansas City District (CENWK). Two overlapping plumes of contaminants (trichloroethylene and RDX) from former munitions and missile plants are found in the subsurface south/southeast of Mead and follow the ambient groundwater gradient from the northwest to the southeast. USACE monitoring of the aquifer conditions consists of tracking both physical parameters (water table elevations and gradient) and changes in contaminant concentrations in the groundwater in both the plume area and the PWWF. Data obtained from these activities will be used by MUD and the USACE to determine if any impacts have occurred by assessing changes in any concentrations of any contaminants present in monitoring wells. Water levels will also be used to verify the groundwater model of the well field area.

Olsson Associates was contracted by the MUD to monitor the aquifer conditions in accordance with the USACE requirements. This Quality Control Summary Report (QCSR) provides the results of data validation for the October 2012 sampling event at the PWWF completed on October 18, 2012.

2.0 FIELD SAMPLING ACTIVITIES

In accordance with the Field Sampling Plan (Olsson, 2011), samples were collected from eight monitoring wells and analyzed for volatile organic compounds (VOCs) and explosive compounds as listed in Table 2-1. Additionally, the following three quality control (QC) samples were collected:

1. One field duplicate
2. One matrix spike/matrix spike duplicate
3. One trip blank

Field notes are included in Appendix B. The October 18th samples were received within the specified temperature limits and all analyses were run according to laboratory requirements.

Table 2-2 provides an explanation of all abbreviations, laboratory qualifiers and notes associated with the tables in this QCSR report. Table 2-3 provides information on sample collection, laboratory numbering and analyses requested as listed below:

- Quality control sample information including duplicate sample location
- A cross reference between field sample and laboratory sample IDs
- Sample delivery group numbers
- Dates of sample collection and sample receipt at the laboratory
- List of analyses requested

3.0 ANALYTICAL RESULTS

The samples were analyzed by TestAmerica, Inc. in Burlington, Vermont for VOCs and explosive compounds. A summary of the analytical results is presented in Table 3-1 for VOCs and Table 3-2 for explosive compounds. As listed in Tables 3-3 and 3-4, there were no VOCs or explosive compounds detected above the reporting limit.

The following subsections present results of the data quality evaluation. The evaluation was performed in accordance with the Quality Assurance Project Plan (QAPP) developed specifically for this monitoring program (Olsson, 2011). Qualifiers were assigned by the laboratory in accordance to their quality control program.

3.1 Summary of Receipt in the Laboratory

The samples were received on October 19, 2012 as noted on the Chain-of-Custody (COC) included in Appendix A. The samples arrived in good condition, properly preserved and on ice. The temperature of the coolers was within the acceptable range (cooled to 4^{o} Celsius).

3.2 Holding Times

All samples were extracted and analyzed within the method specific holding times as noted in the QAPP (Olsson, 2011):

- 14-days to extraction for VOCs
- 7-days to extraction and 40-days to analysis for Explosives

3.3 Tuning and Calibration

Assessment of tune and calibration data was validated by reviewing the case narrative and analytical report. Tuning and calibration outliers were detailed by the laboratory in Final Analytical Report. According to the report (Test America, 2012), the initial calibration curve was outside acceptance criteria for Bromomethane, and Chloroethane. The equipment was recalibrated and was within acceptable criteria. All other quality control parameters were within the acceptance limits.

3.4 Laboratory Method Blanks

Method blanks were prepared and analyzed per the requirements of the QAPP (Olsson, 2011). Method blanks are sample containers filled by the laboratory with analyte-free water that is carried through the entire preparation and analysis sequence for the purpose of identifying potential contamination. Method blanks were analyzed with each sample batch for all analyses. The blank spike sample exhibited acceptable recoveries for all compounds.

3.5 Trip Blanks

Trip blanks are required when samples are collected for analysis of VOCs. Trip blanks are prepared in the laboratory with analyte-free water and are shipped to the site with the regular sample containers. The blanks are kept unopened in the field during site sampling activities and are shipped for analysis with the project samples. Trip blanks are designed to evaluate VOC contamination encountered during sampling, transportation, and storage. One trip blank sample was placed in the sample cooler containing samples to be analyzed for VOCs, and was analyzed with the samples selected for VOC analysis. As noted in Table 3-7, no detections were noted in the trip blank analysis.

3.6 Rinsate Blanks

Rinsate blank samples serve as a quality control check on the cleanliness of the sampling device and the equipment decontamination process. Rinsate blanks are prepared in the field using analyte-free or organic-free water. The samples are used to evaluate if contaminants have been introduced through contact with the sampling equipment. Rinsate blanks are only required when non-dedicated sampling equipment is used to collect groundwater samples, as specified in the QAPP (Olsson, 2011). For the MUD Platte West Monitoring program, rinsate samples were not required because dedicated sampling equipment, specifically, Hydrasleeves, were used to collect the groundwater samples.

3.7 Surrogates

Surrogates are compounds that are added (spiked) into samples prior to sample extraction or analysis, depending on the method. The compounds are not normally found in the environment and therefore can be analyzed for their percent recovery as part of the quality control process. The percent recovery (%REC) of each surrogate is used to assess the success of the sample preparation process for each sample.

For the 8260B VOC analyses (GC/MS), four surrogate analytes were introduced:

- 1,2-Dichloroethane-d4 (80-120%)
- Toluene-d8 (80-120%)
- Bromofluorobenzene (80-125%)
- 1,2-Dichlorobenzene-d4 (75-120%)

All four surrogates were recovered within their acceptable range as noted above.

For the 8330B Nitroaromatic and nitramines (HPLC) explosive compound analyses, the surrogate 1,2-dinitrobenzene was introduced. The surrogate recoveries were within the TestAmerica control limits of 75-130%.

3.8 Laboratory Control Sample/Laboratory Control Sample Duplicate

The laboratory control sample (LCS) consists of a matrix similar to the field sample. The LCS is spiked with known concentrations of analytes. As with the surrogates, the LCS %REC is a measure of the method accuracy. If % REC results are outside the laboratory criteria, then the data is flagged with a laboratory qualifier “F” meaning the recovery (REC) or Relative Percent Difference (RPD) exceeds the control limits.

For the VOCs, no qualifiers were noted in the Quality Control Results of the Final Analytical Report (TestAmerica, 2012) because the % RECs were within the acceptable laboratory limits. For the Explosive analyses, one compound was qualified with a “p” qualifier because the RPD between the primary and confirmation columns differed by more than 40%. The compound was HMX, also called octogen, for sample AMW06-031-101812. The lower value was reported.

3.9 Matrix Spike/Matrix Spike Duplicate

Matrix Spike/Matrix Spike Duplicate (MS/MSD) analyses measure method accuracy and precision for a project-specific matrix. A field sample is split into three portions (original, MS, and MSD) and known amounts of analytes are spiked into the MS and MSD portions of the sample. The analytical results of these two portions are compared to each other for reproducibility using the RPD. The results are also compared against the unspiked portion of

the sample for % REC of the spiked analytes. Typically, MS/MSD samples are analyzed for each Sample Delivery Group (SDG) for all analytes. For this sample event, there was only one SDG and therefore only one MS/MSD was analyzed for each analysis. All results that are qualified with J this round are due to MS/MSD % REC or RPD outliers. Results for contaminants of concern are R-coded if the MS/MSD %REC is less than 10%.

MS/MSD % REC were within laboratory limits for VOCs. Matrix spikes performed on sample BMW06-018-101812 yielded marginally low recovery of carbon disulfide. For the explosive compounds, data qualifiers due to MSMSD % REC are as follows. J-coded data are noted in Table 3-2 and MSMSD Results for J Qualified Explosive Compounds are noted in Table 3.2b. The J coded data are as follows:

- RDX for AMW06-018-101812
- 4-Amino-2,6-dinitrotoluene for AMW06-030-101812
- HMX for AMW06-031-101812

There were no rejected data. All other quality control parameters were within the acceptance limits.

3.10 Field Duplicate Results

Field duplicate results provide information on the reproducibility of field sample results and account for error introduced from handling, shipping, storage, preparation, and analysis of field samples. One field duplicate pair was collected during the May 2012 groundwater sampling event. The field duplicate pair is AMW06-018-101812 and AMW06-218-101812. The pair were analyzed for VOCs and explosives.

Along with QC evaluations presented in other sections of this QCSR, the results of the field duplicate pair are compared to one another. Results within a factor of two of each other are considered to be in agreement. Results between a factor of two to three of each other are considered a minor discrepancy and results greater than a factor of three are considered a major discrepancy. Table 3-5 and 3-6 present the results of the field duplicate pair for VOCs and explosive compounds (respectively). Field duplicate comparisons for AMW06-018-101812 are considered to be in agreement. Field duplicate comparisons for AMW06-218-101812 would be considered a major discrepancy. However, the discrepancy is the result of the estimated value (J-coded) for the investigative sample. The reported concentration is an approximate value and therefore a comparison of the two values is not valid in this case.

3.11 Dilutions and Re-analyses

As noted on the data tables presented in this QCSR, the VOC and explosive samples did not require dilution (dilution factor = 1). The data reported in the tables are usable as reported.

3.12 Other QC Parameters

A column comparison between the detected explosive results was made using explosive identification summary forms. The RPDs were calculated by the laboratory on the appropriate Form X, Identification Summary. All detected explosives reported were confirmed by a second column. The lower value was reported. The percent difference between the two columns did not exceed 40% with the exception of one compound (HMX). As stated above, the compound was qualified with a “p” qualifier because the RPD between the primary and confirmation column differed by more than 40%. The compound was HMX. This is three less than the last sampling round when four compounds were qualified with “p” qualifiers.

3.13 Laboratory Qualifiers For October 2012 Data

Analytes detected below the quantitation limit or reporting limit but above the lowest level of detection were quantified and results were assigned an estimate (J) qualifier by the laboratory. The qualifiers are identified in Tables 3-1 through 3-7. These qualifiers were carried over and were not used to evaluate analytical completeness or project completeness.

4.0 OVERALL ASSESSMENT

The following sections present the field completeness, analytical completeness and project completeness for the October 2012 monitoring well sampling event.

4.1 Field Completeness

Field completeness for sample collection is assessed by comparing the number of samples collected to the number of samples originally planned for collection. Table 4-1 presents the field completeness values for the October 2012 monitoring event. Field completeness for explosives was 100%. Field completeness for the VOCs was 100%. The overall field completeness was 100% which is above the goal of 95%.

4.2 Analytical Completeness

There are two components to the analytical completeness evaluation. Analytical completeness is evaluated by quantifying the overall acceptable data and the overall quality data. The following paragraphs provide the evaluation of each component.

Acceptable data is a measure of contract laboratory compliance. Acceptable data includes data that has not been rejected or qualified as estimated (J). Qualified data is considered acceptable if appropriate corrective actions were taken by the laboratory. The acceptable data completeness percentage for VOCs was 100% and for explosives was 99%. The overall acceptable data completeness is 100% which is above the overall acceptable data completeness goal of 85%.

Quality data is a measure of the percentage of usable data. Quality data includes all data except rejected data points, and does not include analyses for which replacement data points are available. There was no rejected data and therefore quality data completeness percentages for VOCs and explosives were 100% which exceeds the quality data completeness goals of 85% for each analytical method. Table 4-2 presents acceptable and quality data completeness.

By averaging the completeness of the two components, the overall analytical completeness evaluation is calculated. Overall quality data completeness is 100% for the Fall 2012 sampling event, which exceeds the overall quality data completeness goal of 85%.

4.3 Project Completeness

Project completeness combines sampling and analytical completeness percentages to assess the success in achieving the expectations of the project as a whole. Project completeness is determined by comparing the percentage of usable samples/measurements to the percentage of planned or observed samples/measurements. For the field completeness portion, this involves comparison of the number of samples properly collected to the number of samples planned for collection. For the analytical data completeness portion, this involves comparison of the number of usable data points to the number of observed data points. The field completeness and analytical completeness (quality data) completeness percentages are used

to calculate the project completeness percentage. Table 4-3 presents project completeness calculations. For the October 2012 monitoring event, project completeness is 100%, which is above the project completeness goal of 90%.

5.0 CONCLUSIONS

Data are valid for use, as qualified. Overall field completeness is 100%, acceptable data completeness is 100%, quality data completeness is 100%, and project completeness is 100%. No data have been rejected. Data are qualified using the laboratory qualifiers as listed in Table 2-2 and as associated with the data provided in Tables 3-1 through 3-7.

6.0 REFERENCES

Olsson Associates, 2011. Final Field Sampling Plan for the Metropolitan Utilities District of Omaha, Platte West Well Field, Monitoring Well Sampling Program, Mead, Nebraska, prepared for the Metropolitan Utilities District of Omaha, July.

Olsson Associates, 2011. Quality Assurance Project Plan for the Metropolitan Utilities District of Omaha, Platte West Well Field, Monitoring Well Sampling Program, Mead, Nebraska, prepared for the Metropolitan Utilities District of Omaha, July.

TestAmerica, 2012. Analytical Report, Job Number 200-13309-1. M.U.D. Platte Well Field prepared for Olsson Associates by TestAmerica, James W. Madison, Project Manager. October 13, 2012.

TABLES

Table 2-1
Monitoring Well Samples and Analytical Requirements
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Well Identification	Latitude	Longitude	Analyses
MW06-18A	-96.382036	41.160754	Volatile Organic and Explosive Compounds
MW06-18B	-96.382036	41.160754	Volatile Organic and Explosive Compounds
MW06-30A	-96.405926	41.190157	Volatile Organic and Explosive Compounds
MW06-30B	-96.405926	41.190157	Volatile Organic and Explosive Compounds
MW06-31A	-96.391220	41.175544	Volatile Organic and Explosive Compounds
MW06-31B	-96.391220	41.175544	Volatile Organic and Explosive Compounds
MW-39A	-96.368231	41.146403	Volatile Organic and Explosive Compounds
MW-39D	-96.368231	41.146403	Volatile Organic and Explosive Compounds

Table 2-2
Abbreviations, Data Qualifiers and Notes
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Notes:

All analyses were completed by TestAmerica in Burlington, Vermont

Abbreviations:

Dup	Duplicate sample
ID	Identification
Invest.	Investigative sample
Lab	Laboratory
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NA	Not Analyzed
VOCs	Volatile Organic Compounds
VOAs	Volatile Organic Analyses
RPD	Relative Percent Difference
HPLC/IC	High Performance Liquid Chromatography/Ionic Chromatography

Data Qualifiers (Q):

GC/MS VOA

F	MS/MSD Recovery or RPD exceeds the control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected. The laboratory reporting limit (RL) is listed for U coded data.

HPLC/IC

*	Recovery or RPD exceeds control limits
F	MS/MSD Recovery or RPD exceeds the control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
U	Indicates the analyte was analyzed for but not detected. The laboratory reporting limit (RL) is listed for U coded data.

Table 2-3
Sample Collection Summary
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Well Number	Investigative Sample ID	Quality Control Sample ID	MS/MSD Sample ID	Trip Blank Sample ID	Date Sampled	Date Received by Lab	COC Record Number	Lab ID	Sample Delivery Group	VOCs	Explosives
MW06-18A	AMW06-018-101812	--	--	--	10/18/2012	10/19/12	None	200-13309-3	13309	Yes	Yes
MW06-18A	--	AMW06-218-101812	--	--	10/18/2012	10/19/12	None	200-13309-4	13309	Yes	Yes
MW06-18B	BMW06-018-101812	--	--	--	10/18/2012	10/19/12	None	200-13309-5	13309	Yes	Yes
MW06-18B	--	--	BMW06-018-101812MS	--	10/18/2012	10/19/12	None	200-13309-5 MS	13309	Yes	Yes
MW06-18B	--	--	BMW06-018-101812MSD	--	10/18/2012	10/19/12	None	200-13309-5 MSD	13309	Yes	Yes
MW06-30A	AMW06-030-101812	--	--	--	10/18/2012	10/19/12	None	200-13309-8	13309	Yes	Yes
MW06-30B	BMW06-030-101812	--	--	--	10/18/2012	10/19/12	None	200-13309-9	13309	Yes	Yes
MW06-31A	AMW06-031-101812	--	--	--	10/18/2012	10/19/12	None	200-13309-6	13309	Yes	Yes
MW06-31B	BMW06-031-101812	--	--	--	10/18/2012	10/19/12	None	200-13309-7	13309	Yes	Yes
MW-39A	AMW-39-101812	--	--	--	10/18/2012	10/19/12	None	200-13309-1	13309	Yes	Yes
MW-39D	DMW-039-101812	--	--	--	10/18/2012	10/19/12	None	200-13309-2	13309	Yes	Yes
All wells	--	--	--	TRB-239-101812	10/18/2012	10/19/12	None	200-13309-10TB	13309	Yes	No

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-1 Results - Volatile Organic Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-101812		BMW06-018-101812		AMW06-030-101812		BMW06-030-101812		AMW06-031-101812		BMW06-031-101812		AMW-039-101812		DMW-039-101812	
Lab Sample Number	200-13309-3		200-13309-5		200-13309-8		200-13309-9		200-13309-6		200-13309-7		200-13309-1		200-13309-2	
Sampling Date	10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
1,1,1,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,1-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1,2-Trichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,1-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,3-Trichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,4-Trichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2,4-Trimethylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dibromo-3-Chloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dibromoethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloroethene, Total	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,2-Dichloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3,5-Trimethylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,3-Dichloropropane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
1,4-Dichlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
2-Butanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
2-Chlorotoluene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
2-Hexanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
4-Chlorotoluene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
4-Isopropyltoluene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
4-Methyl-2-pentanone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U

Table 3-1 Results - Volatile Organic Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-101812		BMW06-018-101812		AMW06-030-101812		BMW06-030-101812		AMW06-031-101812		BMW06-031-101812		AMW-039-101812		DMW-039-101812	
Lab Sample Number	200-13309-3		200-13309-5		200-13309-8		200-13309-9		200-13309-6		200-13309-7		200-13309-1		200-13309-2	
Sampling Date	10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Acetone	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
Benzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromochloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromodichloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromoform	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Bromomethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Carbon disulfide	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Carbon tetrachloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloroform	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Chloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromochloromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dibromomethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Dichlorodifluoromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Ethylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Freon TF	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Hexachlorobutadiene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Isopropylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
m&p-Xylene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Methyl t-butyl ether	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Methylene Chloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Table 3-1 Results - Volatile Organic Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-101812		BMW06-018-101812		AMW06-030-101812		BMW06-030-101812		AMW06-031-101812		BMW06-031-101812		AMW-039-101812		DMW-039-101812	
Lab Sample Number	200-13309-3		200-13309-5		200-13309-8		200-13309-9		200-13309-6		200-13309-7		200-13309-1		200-13309-2	
Sampling Date	10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Naphthalene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
n-Butylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
n-Propylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
o-Xylene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
sec-Butylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Styrene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
tert-Butylbenzene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Tetrachloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Toluene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-Dichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,3-Dichloropropene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichloroethene	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Vinyl chloride	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Xylenes, Total	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-2 Results - Explosive Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-101812		BMW06-018-101812		AMW06-030-101812		BMW06-030-101812		AMW06-031-101812		BMW06-031-101812		AMW-039-101812		DMW-039-101812	
Lab Sample Number	200-13309-3		200-13309-5		200-13309-8		200-13309-9		200-13309-6		200-13309-7		200-13309-1		200-13309-2	
Sampling Date	10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
1,3,5-Trinitrobenzene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
1,3-Dinitrobenzene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,4,6-Trinitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,4-Dinitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,6-Dinitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2-Amino-4,6-dinitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2-Nitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
3-Nitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
4-Amino-2,6-dinitrotoluene	0.2	U	0.2	U	0.04	J	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
4-Nitrotoluene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
HMX	0.2	U	0.2	U	0.2	U	0.2	U	0.014	J p	0.2	U	0.2	U	0.2	U
Nitrobenzene	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
RDX	0.057	J	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Tetryl	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-2b MSMSD Results for J Qualified Explosive Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Analyte	Spike Added	Sample Concentration	MS Concentration	MS% Recovery	QC Limits Recovery
4-Amino-2,6-dinitrotoluene	4.0	0.04	3.984	100	80-120
HMX	4.0	0.014	3.982	100	80-120
RDX	4.0	0.057	3.928	98	80-120

Table 3-3 Detections - Volatile Organic Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-101812		BMW06-018-101812		AMW06-030-101812		BMW06-030-101812		AMW06-031-101812		BMW06-031-101812		AMW-039-101812		DMW-039-101812	
Lab Sample Number	200-13309-3		200-13309-5		200-13309-8		200-13309-9		200-13309-6		200-13309-7		200-13309-1		200-13309-2	
Sampling Date	10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12		10/18/12	
Matrix	Water		Water		Water		Water		Water		Water		Water		Water	
Dilution Factor	1		1		1		1		1		1		1		1	
Units	ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**

There were no detections for volatile organic compounds above the reporting limit.

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-4 Detections - Explosive Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-101812	BMW06-018-101812	AMW06-030-101812	BMW06-030-101812	AMW06-031-101812	BMW06-031-101812	AMW-039-101812	DMW-039-101812
Lab Sample Number	200-13309-3	200-13309-5	200-13309-8	200-13309-9	200-13309-6	200-13309-7	200-13309-1	200-13309-2
Sampling Date	10/18/12	10/18/12	10/18/12	10/18/12	10/18/12	10/18/12	10/18/12	10/18/12
Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Dilution Factor	1	1	1	1	1	1	1	1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L

There were no detections for explosive compounds above the reporting limit.

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-5 Field Duplicate Results - Volatile Organic Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-101812		AMW06-218-101812	
Lab Sample Number	200-13309-3		200-13309-4	
Sampling Date	10/18/12		10/18/12	
Matrix	Water		Water	
Dilution Factor	1		1	
Units	ug/L		ug/L	
Analyte	**Result**	**Q**	**Result**	**Q**
1,1,1,2-Tetrachloroethane	1.0	U	1.0	U
1,1,1-Trichloroethane	1.0	U	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U	1.0	U
1,1,2-Trichloroethane	1.0	U	1.0	U
1,1-Dichloroethane	1.0	U	1.0	U
1,1-Dichloroethene	1.0	U	1.0	U
1,1-Dichloropropene	1.0	U	1.0	U
1,2,3-Trichlorobenzene	1.0	U	1.0	U
1,2,4-Trichlorobenzene	1.0	U	1.0	U
1,2,4-Trimethylbenzene	1.0	U	1.0	U
1,2-Dibromo-3-Chloropropane	1.0	U	1.0	U
1,2-Dibromoethane	1.0	U	1.0	U
1,2-Dichlorobenzene	1.0	U	1.0	U
1,2-Dichloroethane	1.0	U	1.0	U
1,2-Dichloroethene, Total	1.0	U	1.0	U
1,2-Dichloropropane	1.0	U	1.0	U
1,3,5-Trimethylbenzene	1.0	U	1.0	U
1,3-Dichlorobenzene	1.0	U	1.0	U
1,3-Dichloropropane	1.0	U	1.0	U
1,4-Dichlorobenzene	1.0	U	1.0	U
2-Butanone	5.0	U	5.0	U
2-Chlorotoluene	1.0	U	1.0	U
2-Hexanone	5.0	U	5.0	U
4-Chlorotoluene	1.0	U	1.0	U
4-Isopropyltoluene	1.0	U	1.0	U
4-Methyl-2-pentanone	5.0	U	5.0	U
Acetone	5.0	U	5.0	U
Benzene	1.0	U	1.0	U
Bromobenzene	1.0	U	1.0	U
Bromochloromethane	1.0	U	1.0	U
Bromodichloromethane	1.0	U	1.0	U
Bromoform	1.0	U	1.0	U
Bromomethane	1.0	U	1.0	U
Carbon disulfide	1.0	U	1.0	U
Carbon tetrachloride	1.0	U	1.0	U
Chlorobenzene	1.0	U	1.0	U
Chloroethane	1.0	U	1.0	U
Chloroform	1.0	U	1.0	U

Table 3-5 Field Duplicate Results - Volatile Organic Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-101812		AMW06-218-101812	
Lab Sample Number	200-13309-3		200-13309-4	
Sampling Date	10/18/12		10/18/12	
Matrix	Water		Water	
Dilution Factor	1		1	
Units	ug/L		ug/L	
Analyte	**Result**	**Q**	**Result**	**Q**
Chloromethane	1.0	U	1.0	U
cis-1,2-Dichloroethene	1.0	U	1.0	U
cis-1,3-Dichloropropene	1.0	U	1.0	U
Dibromochloromethane	1.0	U	1.0	U
Dibromomethane	1.0	U	1.0	U
Dichlorodifluoromethane	1.0	U	1.0	U
Ethylbenzene	1.0	U	1.0	U
Freon TF	1.0	U	1.0	U
Hexachlorobutadiene	1.0	U	1.0	U
Isopropylbenzene	1.0	U	1.0	U
m&p-Xylene	1.0	U	1.0	U
Methyl t-butyl ether	1.0	U	1.0	U
Methylene Chloride	1.0	U	1.0	U
Naphthalene	1.0	U	1.0	U
n-Butylbenzene	1.0	U	1.0	U
n-Propylbenzene	1.0	U	1.0	U
o-Xylene	1.0	U	1.0	U
sec-Butylbenzene	1.0	U	1.0	U
Styrene	1.0	U	1.0	U
tert-Butylbenzene	1.0	U	1.0	U
Tetrachloroethene	1.0	U	1.0	U
Toluene	1.0	U	1.0	U
trans-1,2-Dichloroethene	1.0	U	1.0	U
trans-1,3-Dichloropropene	1.0	U	1.0	U
Trichloroethene	1.0	U	1.0	U
Trichlorofluoromethane	1.0	U	1.0	U
Vinyl chloride	1.0	U	1.0	U
Xylenes, Total	1.0	U	1.0	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-6 Field Duplicate Results - Explosive Compounds
October 2012 Monitroing Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	AMW06-018-052912		AMW06-218-052912	
Lab Sample Number	200-11041-3		200-11041-4	
Sampling Date	05/29/12		05/29/12	
Matrix	Water		Water	
Dilution Factor	1		1	
Units	ug/L		ug/L	
Analyte	**Result**	**Q**	**Result**	**Q**
1,3,5-Trinitrobenzene	0.2	U	0.2	U
1,3-Dinitrobenzene	0.2	U	0.2	U
2,4,6-Trinitrotoluene	0.2	U	0.2	U
2,4-Dinitrotoluene	0.2	U	0.2	U
2,6-Dinitrotoluene	0.2	U	0.2	U
2-Amino-4,6-dinitrotoluene	0.2	U	0.2	U
2-Nitrotoluene	0.2	U	0.2	U
3-Nitrotoluene	0.2	U	0.2	U
4-Amino-2,6-dinitrotoluene	0.2	U	0.2	U
4-Nitrotoluene	0.2	U	0.2	U
HMX	0.2	U	0.2	U
Nitrobenzene	0.2	U	0.2	U
RDX	0.057	J	0.2	U
Tetryl	0.2	U	0.2	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table 3-7
Trip Blank Results - Volatile Organic Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	TRB-239-101812	
Lab Sample Number	200-13309-10	
Sampling Date	10/18/12	
Matrix	Water	
Dilution Factor	1	
Units	ug/L	
Analyte	**Result**	**Q**
1,1,1,2-Tetrachloroethane	1.0	U
1,1,1-Trichloroethane	1.0	U
1,1,2,2-Tetrachloroethane	1.0	U
1,1,2-Trichloroethane	1.0	U
1,1-Dichloroethane	1.0	U
1,1-Dichloroethene	1.0	U
1,1-Dichloropropene	1.0	U
1,2,3-Trichlorobenzene	1.0	U
1,2,4-Trichlorobenzene	1.0	U
1,2,4-Trimethylbenzene	1.0	U
1,2-Dibromo-3-Chloropropane	1.0	U
1,2-Dibromoethane	1.0	U
1,2-Dichlorobenzene	1.0	U
1,2-Dichloroethane	1.0	U
1,2-Dichloroethene, Total	1.0	U
1,2-Dichloropropane	1.0	U
1,3,5-Trimethylbenzene	1.0	U
1,3-Dichlorobenzene	1.0	U
1,3-Dichloropropane	1.0	U
1,4-Dichlorobenzene	1.0	U
2-Butanone	5.0	U
2-Chlorotoluene	1.0	U
2-Hexanone	5.0	U
4-Chlorotoluene	1.0	U
4-Isopropyltoluene	1.0	U
4-Methyl-2-pentanone	5.0	U
Acetone	5.0	U
Benzene	1.0	U
Bromobenzene	1.0	U
Bromochloromethane	1.0	U
Bromodichloromethane	1.0	U
Bromoform	1.0	U
Bromomethane	1.0	U
Carbon disulfide	1.0	U
Carbon tetrachloride	1.0	U
Chlorobenzene	1.0	U
Chloroethane	1.0	U

Table 3-7
Trip Blank Results - Volatile Organic Compounds
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Sample ID	TRB-239-101812	
Lab Sample Number	200-13309-10	
Sampling Date	10/18/12	
Matrix	Water	
Dilution Factor	1	
Units	ug/L	
Analyte	**Result**	**Q**
Chloroform	1.0	U
Chloromethane	1.0	U
cis-1,2-Dichloroethene	1.0	U
cis-1,3-Dichloropropene	1.0	U
Dibromochloromethane	1.0	U
Dibromomethane	1.0	U
Dichlorodifluoromethane	1.0	U
Ethylbenzene	1.0	U
Freon TF	1.0	U
Hexachlorobutadiene	1.0	U
Isopropylbenzene	1.0	U
m&p-Xylene	1.0	U
Methyl t-butyl ether	1.0	U
Methylene Chloride	1.0	U
Naphthalene	1.0	U
n-Butylbenzene	1.0	U
n-Propylbenzene	1.0	U
o-Xylene	1.0	U
sec-Butylbenzene	1.0	U
Styrene	1.0	U
tert-Butylbenzene	1.0	U
Tetrachloroethene	1.0	U
Toluene	1.0	U
trans-1,2-Dichloroethene	1.0	U
trans-1,3-Dichloropropene	1.0	U
Trichloroethene	1.0	U
Trichlorofluoromethane	1.0	U
Vinyl chloride	1.0	U
Xylenes, Total	1.0	U

Note: See Table 2-2 for laboratory qualifiers, notes, and abbreviations.

Table- 4-1
Field Completeness
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

	Volatile Organic Compounds (8260B)		Percent Complete	Explosive Compounds (8330B)		Percent Complete
	Actual	*Proposed*		*Actual*	*Proposed*	
No. of Sampling Locations	8	8	100%	8	8	100%
Number of Field Duplicates	1	1	100%	1	1	100%
Number of Matrix Spike Samples	1	1	100%	1	1	100%
Number of Matrix Spike Duplicate Samples	1	1	100%	1	1	100%
Number of Field Blanks	0	0	NA[2]	0	0	NA[2]
Number of Equipment Blanks	0	0	NA[2]	0	0	NA[2]
Number of VOC Trip Blanks	1	1	100%	0	0	NA[2]
Number of Lab Performance Testing Samples[1]	0	0	NA[2]	0	0	NA[2]
Total Number of Samples per event	12	12	100%	11	11	100%

Overall Field Completeness	100%	**Overall Field Completeness Goal**	95%

[1] The number of Batch or Project-specific proficiency testing (PT) samples are scheduled for this sampling event.

[2] Percent Complete calculation not required since no samples were proposed for this event.

Table- 4-2
Analytical Completeness
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

	Volatile Organic Compound Analyses	Explosive Compound Analyses
Number of Analyses	792	418
Number of J qualified data points	0	3
Percent Complete	100%	99%

Overall Acceptable Data Analytical Completeness	100%

Overall Acceptable Data Analytical Completeness Goal	85%

	Volatile Organic Compound Analyses	Explosive Compound Analyses
Number of Analyses	792	418
Number of Rejected Data points	0	0
Percent Complete	100%	100%

Overall Quality Data Analytical Completeness	100%

Overall Quality Data Analytical Completeness Goal	85%

Table- 4-3
Project Completeness
October 2012 Monitoring Well Sampling Event
Metropolitan Utilities District, Saunders County, NE

Overall Field Completeness	Overall Analytical Completeness[1]	Overall Project Completeness[2]
100%	100%	100%

Overall Project Completeness Goal	90%

Notes:
1 = Analytical completeness is the percentage of usable data i.e. quality data completeness.
2 = Project completeness combines sampling and analytical protocols to assess the expectations of the project as a whole. Project completeness is determined by comparing the percentage of samples / measurements that are determined to be usable to the total number of samples / measurements planned.

APPENDIX A

Chain of Custody

TestAmerica Burlington
30 Community Drive, Suite 11
South Burlington, VT 05403
Phone:(802)660-1990

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Ryan Doty	Lab PM: Jim Madison	Carrier Tracking No(s):	COC No:
Client Contact: Jeff McPeak	Phone: 402-827-7220	E-Mail:		Page: 1 of 2
Company: Olsson Associates				Job #:
Address: 1111 Lincoln Mall	Due Date Requested:			
City: Lincoln, NE	TAT Requested (days): Standard			
State, Zip: Nebraska 68508	PO #:			
Phone: 402-458-5909	WO #:			
Email: jmcpeak@olssonassociates.com				
Project Name: MUD-Platte West Wellfield	Project #: 011-1087			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	VOCs 8260	Explosives 8330	Total Number of containers	Special Instructions/Note:
	Preservation Code:				N				
AMW-039-101812	10/18/12	0910	G	W		X	X	5	
DMW-039-101812	10/18/12	0930	G	W		X	X	5	
AMW06-018-101812	10/18/12	1020	G	W		X	X	5	
AMW06-218-101812	10/18/12	1020	G	W		X	X	5	
BMW06-018-101812	10/18/12	1032	G	W		X	X	5	
BMW06-018-101812MS	10/18/12	1032	G	W		X	X	5	
BMW06-018-101812MSD	10/18/12	1032	G	W		X	X	5	
AMW06-031-101812	10/18/12	1128	G	W		X	X	5	
BMW06-031-101812	10/18/12	1156	G	W		X	X	5	
AMW06-030-101812	10/18/12	1235	G	W		X	X	5	
BMW06-030-101812	10/18/12	1250	G	W		X	X	5	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	10/18/12 1500	Olsson	Steph Bush	10/19/12 1000	TABLR
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

TestAmerica Burlington
30 Community Drive, Suite 11
South Burlington, VT 05403
Phone:(802)660-1990

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Ryan Eddy	Lab PM: Jim Madson	Carrier Tracking No(s):	COC No:
Client Contact: Jeff McPeak	Phone: 402-827-7220	E-Mail:		Page: 2 of 2
Company: Olsson Associates				Job #:
Address: 1111 Lincoln Mall	Due Date Requested:	Analysis Requested		Preservation Codes:
City: Lincoln	TAT Requested (days): Standard			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: NE 68508	PO #:			
Phone: 402-458-5909	WO #:			Other:
Email: jmcpeak@olssonassociates.com	Project #: 011-1087			
Project Name: MUD - Platte West Wellfield	SSOW#:			
Site:				

Sample Identification - Client ID	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	VOCs 8260	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	X	
TRB-239-101812	10/18/12	—	G	W		X	3	

Page 571 of 572

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	10/18/12 1500	Olsson		10/19/12 1000	TAEUK
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

APPENDIX B

Field Notes

Well Gauging Report

Project Number: 011-1087	**Project Location:** Platte West Wellfield		**Client:** MUD
Personnel: Ryan Doty	Date: 10/17/12	Checked by:	Date:
Water Level Gauging Instrument: Solinst Model 101 Serial Number: 39726		Interface Probe Instrument: Serial Number:	

Well ID Number	Date	Time	TOC Elevation (ft)	Depth to Ground water (ft)	Total Depth (ft)	Remarks
MW06-30A	10/17/12	0925	1199.31	72.49	92.55	
MW06-30B	10/17/12	0927	1199.37	70.14	82.08	
MW06-31A	10/17/12	0840	1149.98	54.71	158.50	
MW06-31B	10/17/12	0843	1150.02	56.73	71.98	
MW06-18	10/17/12	0817	1089.79	7.95	49.75	
MW-39A	10/17/12	0745	1082.82	9.49	51.30	
MW-39D	10/17/12	0747	1082.95	9.57	57.55	
MW-38A			---			
MW-112A			---			
MW-46A			---			
MW-110A			---			
MW-106A			---			
MW-56A			---			
MW06-19			---			

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW06-30B	Date: 10/18/12
Sample Number: BMW06-030-101812	Weather Conditions: 50°, Cloudy, 30mph winds
PID Reading: NA	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	70.14	5. TOC Elevation:	1199.37
2. Measured Well Depth (+/-0.25 ft.)	82.08	6. Static Water Elevation:	1129.23
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L Supersleeve		

Purging: Not Applicable - No Purge

Duplicate Collected? No		Duplicate ID:	
MS/MSD Collected? No		MS/MSD ID:	
Sample Analysis: 8260 + 8330			
Number of Bottles Filled:	VOAs 3	~~500ml~~	2-1 Liters
Investigative Sample pH: NA	(must be < 2)		

Sample Clear or Turbid:	Turbid	Preservation Method:	
Sample Color:	Brown	Decon Procedures:	
Sample Odor:	None	Instrument Calibrations:	

Comments:

Samples collected at 1250

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doby
Monitor Well Identification Number: MW06-30A	Date: 10/18/12
Sample Number: AMW06-030-101812	Weather Conditions: Cloudy, 50°, 30 mph winds
PID Reading: NA	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	72.49	5. TOC Elevation:	11993.1
2. Measured Well Depth (+/-0.25 ft.)	92.55	6. Static Water Elevation:	1126.82
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L Supersleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	No	Duplicate ID:	
MS/MSD Collected?	No	MS/MSD ID:	
Sample Analysis:	8260 + 8330		
Number of Bottles Filled:	VOAs 3	~~500~~ml	2 - 1Liters
Investigative Sample pH:	NA (must be < 2)		

Sample Clear or Turbid:	Turbid	Preservation Method:	
Sample Color:	Brown	Decon Procedures:	
Sample Odor:	None	Instrument Calibrations:	

Comments: collected sample at 1235

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Dirth
Monitor Well Identification Number: MW06-31B	Date: 10/18/12
Sample Number: BMW06-031-101812	Weather Conditions: Cloudy, 50°, 30 mph winds
PID Reading:	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	56.73	5. TOC Elevation:	1150.02
2. Measured Well Depth (+/-0.25 ft.)	71.98	6. Static Water Elevation:	1093.29
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	2L SuperSleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	No	Duplicate ID:	
MS/MSD Collected?	No	MS/MSD ID:	
Sample Analysis:	8260 + 8330		
Number of Bottles Filled:	VOAs 3	~~500ml~~	2 - 1Liters
Investigative Sample pH:	Yes (must be < 2)		

Sample Clear or Turbid:	Clear	Preservation Method:	
Sample Color:	No	Decon Procedures:	
Sample Odor:	NO	Instrument Calibrations:	

Comments:

Sample collected at 1156

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW06-31A	Date: 10/18/12
Sample Number: AMW06-031-101812	Weather Conditions: Cloudy, 51° 29 mph winds
PID Reading: NA	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	54.71	5. TOC Elevation:	1149.98
2. Measured Well Depth (+/-0.25 ft.)	158.50	6. Static Water Elevation:	1095.27
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L Supersleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	No	Duplicate ID:	
MS/MSD Collected?	No	MS/MSD ID:	
Sample Analysis:	8260 and 8330		
Number of Bottles Filled:	VOAs 3	~~500ml~~	2- 1Liters
Investigative Sample pH:	NA (must be < 2)		

Sample Clear or Turbid:	Turbid	Preservation Method:	
Sample Color:	Brown	Decon Procedures:	
Sample Odor:	None	Instrument Calibrations:	

Comments:

Sample collected at 1128

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW06-18	Date: 10/18/12
Sample Number: BMW06-018-101812	Weather Conditions: Cloudy, 51, 29 mph winds
PID Reading: NA	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	7.95	5. TOC Elevation:	1089.79
2. Measured Well Depth (+/-0.25 ft.)	49.75	6. Static Water Elevation:	1081.84
3. Casing Diameter (in)	4	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	3L Custom 4" Hydrasleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	No	Duplicate ID:	
MS/MSD Collected?	Yes	MS/MSD ID:	BMW06-018-101812MS and BMW06-018-101812 MSD
Sample Analysis:			
Number of Bottles Filled:	VOAs 9	~~500ml~~	6 - 1 Liters
Investigative Sample pH:	NA (must be < 2)		

Sample Clear or Turbid:	Clear	Preservation Method:	Per SAP
Sample Color:	None	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Samples collected at 1032

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MWOG-18	Date: 10/18/12
Sample Number: AMWOG-018-101812	Weather Conditions: Cloudy, 51° 29 mph winds
PID Reading: NA	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	7.95	5. TOC Elevation:	1089.79
2. Measured Well Depth (+/-0.25 ft.)	49.75	6. Static Water Elevation:	1081.84
3. Casing Diameter (in)	4	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	4" 2L Hydrasleeve		

Purging: Not Applicable - No Purge

Duplicate Collected? Yes		Duplicate ID: AMWOG-218-101812	
MS/MSD Collected? No		MS/MSD ID:	
Sample Analysis: 8260 + 8330			
Number of Bottles Filled:	VOAs 6	~~500ml~~ 4 - 1 Liters	
Investigative Sample pH: NA	(must be < 2)		

Sample Clear or Turbid:	Clear	Preservation Method:	Per SAP
Sample Color:	None	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Samples collected at 1020

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW-39D	Date: 10/18/12
Sample Number: DMW-039-101812	Weather Conditions: Cloudy 51° 24 mph winds
PID Reading: NA	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	9.57	5. TOC Elevation:	1082.95
2. Measured Well Depth (+/-0.25 ft.)	57.55	6. Static Water Elevation:	1073.38
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L Supersleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	No	Duplicate ID:	
MS/MSD Collected?	No	MS/MSD ID:	
Sample Analysis:	8260 (VOC) 8330 (Explosives)		
Number of Bottles Filled:	VOAs 3	~~500ml~~	1 Liter - 2
Investigative Sample pH:	NA (must be < 2)		

Sample Clear or Turbid:	Clear	Preservation Method:	Per SAP
Sample Color:	None	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments:

Sample collected at 0930

Groundwater Sampling Field Notes

General Information

Facility Name: MUD Platte West	Sampler Name(s): Ryan Doty
Monitor Well Identification Number: MW-39A	Date: 10/18/12
Sample Number: AMW-039-101812	Weather Conditions: 51°, cloudy, 20mph winds
PID Reading: NA	Wellhead Inspection (note conditions): OK / Needs Repair

Damage	X	
Locked	X	
Intact Cap	X	
Other (note in comments section)		

Ground Water Measurements

1. Static Water Level (+/-)0.01 ft.)	9.49	5. TOC Elevation:	1082.82
2. Measured Well Depth (+/-0.25 ft.)	51.30	6. Static Water Elevation:	1073.33
3. Casing Diameter (in)	2	7. Water Level Equipment:	Solinst
4. Sample Equipment (Hydrasleeve type):	1L Supersleeve		

Purging: Not Applicable - No Purge

Duplicate Collected?	No	Duplicate ID:	
MS/MSD Collected?	No	MS/MSD ID:	
Sample Analysis:	VOCs + Explosives		
Number of Bottles Filled:	VOAs 3	~~500ml~~ 1 Liter - 2	
Investigative Sample pH:	NA (must be < 2)		

Sample Clear or Turbid:	Clear	Preservation Method:	Per SAP
Sample Color:	None	Decon Procedures:	Per SAP
Sample Odor:	None	Instrument Calibrations:	Per SAP

Comments: Sample collected at 0910

Location Saunders County Date 10/17/12

Project / Client MUD PWWF

Personnel: Ryan Doty
Weather: Partly cloudy, windy, high 60
POO: Install hydrasleeves, download data
Instruments: Water Level Meter

0647 leave Omaha
0701 stop at MUD Plant
0732 arrive at MW-39
0737 download MW-39A transducer
Installed large desiccant
0753 install hydrasleeves
0802 leave MW-39
0809 arrive at MW06-18
0811 download transducer (large desiccant)
0817 measure water level
0820 install hydrasleeve
0829 leave MW06-18
0832 arrive at MW06-31
0834 download transducer
Install large desiccant
0840 water levels
0846 install hydrasleeves
0911 leave MW06-31
0915 arrive at MW06-30

Location Saunders County Date 10/17/12

Project / Client MUD PWWF

0917 download transducer
Install large desiccant
0923 measure water levels
0930 Install hydrasleeves
0941 leave MW06-30
0946 download MW06-19 transducer
and install large desiccant
1000 download MW-56A transducer
and install large desiccant
1021 download MW-106 transducer
and install large desiccant
1035 download MW-110 transducer
and install large desiccant
1042 download MW-46A transducer
and install large desiccant
1048 download MW-112A transducer
there's no desiccant in this well, just
a red rubber cover
1056 download MW-38A transducer,
needs a large desiccant
1100 leave site
1140 return to Omaha

Ryan Doty
10/17/12

Location Saunders County Date 10/18/12

Project / Client MUD PWWF

Personnel: Ryan Doty
Weather: Cloudy, windy, high 48
POD: Collect GW Samples
Instruments: NA

0740 leave Omaha
0812 Install large desiccant in MW-38A
0817 arrive at MW-39
0826 run to Ashland for ice
0849 return to MW-39
0910 collect AMW-039-101812
0930 collect DMW-039-101812
0941 redeploy transducer
0947 leave site
0954 arrive at MW06-18
1020 collect AMW06-018-101812 and
AMW06-218-101812
1032 collect BMW06-018-101812 and
BMW06-018-101812MS and BMW06-018-101812MSD
1104 redeploy transducer
1115 leave site
1120 arrive at MW06-31
1128 collect AMW06-031-101812
1156 collect BMW06-031-101812

Location Saunders County Date 10/18/12

Project / Client MUD PWWSF

1210	redeploy transducer
1216	leave site
1223	arrive at MW06-30
1235	collect AMW06-030-101812
1250	collect BMW06-030-101812
1300	redeploy transducer
1312	leave site
1348	return to Omaha
1528	take samples to FedEx

[signature]

10/18/12

Location Date

Project / Client

APPENDIX C

Laboratory Analytical Report

CASE NARRATIVE

Client: Olsson Associates

Project: M.U.D. Platte West Well Field

Report Number: 200-13309-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 10/19/2012; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples AMW-039-101812, DMW-039-101812, AMW06-018-101812, AMW06-218-101812, BMW06-018-101812, AMW06-031-101812, BMW06-031-101812, AMW06-030-101812, BMW06-030-101812 and TRB-239-101812 were analyzed for volatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 10/24/2012.

The initial calibration curve was outside acceptance criteria for Bromomethane, and Chloroethane.

Matrix spikes performed on sample BMW06-018-101812 yielded marginally low recovery of carbon disulfide. The blank spike sample exhibited acceptable recoveries for all compounds.

No other difficulties were encountered during the volatiles analyses.

All other quality control parameters were within the acceptance limits.

NITROAROMATICS AND NITRAMINES (HPLC)

Samples AMW-039-101812, DMW-039-101812, AMW06-018-101812, AMW06-218-101812, BMW06-018-101812, AMW06-031-101812, BMW06-031-101812, AMW06-030-101812 and BMW06-030-101812 were analyzed for Nitroaromatics and Nitramines (HPLC) in accordance with EPA SW-846 Method 8330B. The samples were prepared on 10/22/2012 and analyzed on 10/29/2012.

No difficulties were encountered during the explosives analyses.

All quality control parameters were within the acceptance limits.

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW-039-101812**

Lab Sample ID: 200-13309-1
Client Matrix: Water

Date Sampled: 10/18/2012 0910
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr10.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1359			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1359				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW-039-101812**

Lab Sample ID: 200-13309-1
Client Matrix: Water

Date Sampled: 10/18/2012 0910
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr10.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1359			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1359				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	101		80 - 120
Toluene-d8	101		80 - 120
Bromofluorobenzene	101		80 - 125
1,2-Dichlorobenzene-d4	93		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **DMW-039-101812**

Lab Sample ID: 200-13309-2
Client Matrix: Water

Date Sampled: 10/18/2012 0930
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr11.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1431			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1431				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **DMW-039-101812**

Lab Sample ID: 200-13309-2
Client Matrix: Water

Date Sampled: 10/18/2012 0930
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr11.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1431			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1431				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	104		80 - 120
Toluene-d8	101		80 - 120
Bromofluorobenzene	103		80 - 125
1,2-Dichlorobenzene-d4	95		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-018-101812**

Lab Sample ID: 200-13309-3
Client Matrix: Water

Date Sampled: 10/18/2012 1020
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr12.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1503			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1503				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-018-101812**

Lab Sample ID: 200-13309-3
Client Matrix: Water

Date Sampled: 10/18/2012 1020
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr12.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1503			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1503				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	104		80 - 120
Toluene-d8	101		80 - 120
Bromofluorobenzene	102		80 - 125
1,2-Dichlorobenzene-d4	94		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-218-101812**

Lab Sample ID: 200-13309-4
Client Matrix: Water

Date Sampled: 10/18/2012 1020
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr13.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1535			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1535				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-218-101812**

Lab Sample ID: 200-13309-4
Client Matrix: Water

Date Sampled: 10/18/2012 1020
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr13.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1535			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1535				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	102		80 - 120
Toluene-d8	98		80 - 120
Bromofluorobenzene	103		80 - 125
1,2-Dichlorobenzene-d4	95		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: BMW06-018-101812

Lab Sample ID: 200-13309-5
Client Matrix: Water

Date Sampled: 10/18/2012 1032
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr14.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1607			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1607				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-018-101812**

Lab Sample ID: 200-13309-5
Client Matrix: Water

Date Sampled: 10/18/2012 1032
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr14.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1607			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1607				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	103		80 - 120
Toluene-d8	100		80 - 120
Bromofluorobenzene	104		80 - 125
1,2-Dichlorobenzene-d4	94		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-031-101812**

Lab Sample ID: 200-13309-6
Client Matrix: Water

Date Sampled: 10/18/2012 1128
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr15.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1639			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1639				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-031-101812**

Lab Sample ID: 200-13309-6
Client Matrix: Water

Date Sampled: 10/18/2012 1128
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr15.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1639			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1639				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	105		80 - 120
Toluene-d8	100		80 - 120
Bromofluorobenzene	104		80 - 125
1,2-Dichlorobenzene-d4	94		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-031-101812**

Lab Sample ID: 200-13309-7
Client Matrix: Water

Date Sampled: 10/18/2012 1156
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr16.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1711			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1711				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-031-101812**

Lab Sample ID: 200-13309-7
Client Matrix: Water

Date Sampled: 10/18/2012 1156
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr16.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1711			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1711				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	103		80 - 120
Toluene-d8	101		80 - 120
Bromofluorobenzene	103		80 - 125
1,2-Dichlorobenzene-d4	96		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: AMW06-030-101812

Lab Sample ID: 200-13309-8
Client Matrix: Water

Date Sampled: 10/18/2012 1235
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr17.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1743			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1743				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-030-101812**

Lab Sample ID: 200-13309-8
Client Matrix: Water

Date Sampled: 10/18/2012 1235
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr17.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1743			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1743				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	104		80 - 120
Toluene-d8	101		80 - 120
Bromofluorobenzene	104		80 - 125
1,2-Dichlorobenzene-d4	95		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-030-101812**

Lab Sample ID: 200-13309-9
Client Matrix: Water

Date Sampled: 10/18/2012 1250
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr18.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1815			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1815				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-030-101812**

Lab Sample ID: 200-13309-9
Client Matrix: Water

Date Sampled: 10/18/2012 1250
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr18.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1815			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1815				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	105		80 - 120
Toluene-d8	101		80 - 120
Bromofluorobenzene	104		80 - 125
1,2-Dichlorobenzene-d4	95		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: TRB-239-101812

Lab Sample ID: 200-13309-10TB
Client Matrix: Water

Date Sampled: 10/18/2012 0000
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr19.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1847			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1847				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Dichlorodifluoromethane	1.0	U	0.090	1.0
Chloromethane	1.0	U	0.12	1.0
Vinyl chloride	1.0	U	0.090	1.0
Bromomethane	1.0	U	0.43	1.0
Chloroethane	1.0	U	0.12	1.0
Trichlorofluoromethane	1.0	U	0.092	1.0
1,1-Dichloroethene	1.0	U	0.18	1.0
Freon TF	1.0	U	0.18	1.0
Acetone	5.0	U	0.92	5.0
Carbon disulfide	1.0	U	0.15	1.0
Methylene Chloride	1.0	U	0.21	1.0
trans-1,2-Dichloroethene	1.0	U	0.17	1.0
Methyl t-butyl ether	1.0	U	0.17	1.0
1,1-Dichloroethane	1.0	U	0.16	1.0
cis-1,2-Dichloroethene	1.0	U	0.16	1.0
2-Butanone	5.0	U	1.1	5.0
Bromochloromethane	1.0	U	0.14	1.0
Chloroform	1.0	U	0.16	1.0
1,1,1-Trichloroethane	1.0	U	0.16	1.0
1,1-Dichloropropene	1.0	U	0.15	1.0
Carbon tetrachloride	1.0	U	0.17	1.0
Benzene	1.0	U	0.17	1.0
1,2-Dichloroethane	1.0	U	0.15	1.0
Trichloroethene	1.0	U	0.14	1.0
1,2-Dichloropropane	1.0	U	0.17	1.0
Dibromomethane	1.0	U	0.16	1.0
Bromodichloromethane	1.0	U	0.16	1.0
cis-1,3-Dichloropropene	1.0	U	0.16	1.0
4-Methyl-2-pentanone	5.0	U	0.90	5.0
Toluene	1.0	U	0.17	1.0
trans-1,3-Dichloropropene	1.0	U	0.18	1.0
1,1,2-Trichloroethane	1.0	U	0.18	1.0
Tetrachloroethene	1.0	U	0.18	1.0
1,3-Dichloropropane	1.0	U	0.20	1.0
2-Hexanone	5.0	U	1.1	5.0
Dibromochloromethane	1.0	U	0.17	1.0
1,2-Dibromoethane	1.0	U	0.18	1.0
Chlorobenzene	1.0	U	0.19	1.0
1,1,1,2-Tetrachloroethane	1.0	U	0.16	1.0
Ethylbenzene	1.0	U	0.18	1.0
m&p-Xylene	1.0	U	0.36	1.0
Xylenes, Total	1.0	U	0.17	1.0
o-Xylene	1.0	U	0.17	1.0
Styrene	1.0	U	0.17	1.0
Bromoform	1.0	U	0.17	1.0
Isopropylbenzene	1.0	U	0.17	1.0

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **TRB-239-101812**

Lab Sample ID: 200-13309-10TB
Client Matrix: Water

Date Sampled: 10/18/2012 0000
Date Received: 10/19/2012 1000

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	200-47077	Instrument ID:	L.i
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	libr19.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Analysis Date:	10/24/2012 1847			Final Weight/Volume:	5 mL
Prep Date:	10/24/2012 1847				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Bromobenzene	1.0	U	0.19	1.0
1,1,2,2-Tetrachloroethane	1.0	U	0.17	1.0
n-Propylbenzene	1.0	U	0.17	1.0
2-Chlorotoluene	1.0	U	0.18	1.0
1,3,5-Trimethylbenzene	1.0	U	0.18	1.0
4-Chlorotoluene	1.0	U	0.19	1.0
tert-Butylbenzene	1.0	U	0.16	1.0
1,2,4-Trimethylbenzene	1.0	U	0.20	1.0
sec-Butylbenzene	1.0	U	0.17	1.0
1,3-Dichlorobenzene	1.0	U	0.18	1.0
4-Isopropyltoluene	1.0	U	0.17	1.0
1,4-Dichlorobenzene	1.0	U	0.15	1.0
1,2-Dichlorobenzene	1.0	U	0.15	1.0
n-Butylbenzene	1.0	U	0.19	1.0
1,2-Dibromo-3-Chloropropane	1.0	U	0.22	1.0
1,2,4-Trichlorobenzene	1.0	U	0.18	1.0
Hexachlorobutadiene	1.0	U	0.16	1.0
Naphthalene	1.0	U	0.12	1.0
1,2,3-Trichlorobenzene	1.0	U	0.16	1.0
1,2-Dichloroethene, Total	1.0	U	0.16	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4	105		80 - 120
Toluene-d8	101		80 - 120
Bromofluorobenzene	103		80 - 125
1,2-Dichlorobenzene-d4	94		75 - 120

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW-039-101812**

Lab Sample ID: 200-13309-1
Client Matrix: Water

Date Sampled: 10/18/2012 0910
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 0554			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U	0.011	0.20
RDX	0.20	U	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	101		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: AMW-039-101812

Lab Sample ID: 200-13309-1
Client Matrix: Water

Date Sampled: 10/18/2012 0910
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 0946			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	104		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: DMW-039-101812

Lab Sample ID: 200-13309-2
Client Matrix: Water

Date Sampled: 10/18/2012 0930
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 0631			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U	0.011	0.20
RDX	0.20	U	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	101		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: DMW-039-101812

Lab Sample ID: 200-13309-2
Client Matrix: Water

Date Sampled: 10/18/2012 0930
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1020			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-018-101812**

Lab Sample ID: 200-13309-3
Client Matrix: Water

Date Sampled: 10/18/2012 1020
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 0708			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U	0.011	0.20
RDX	0.068	J	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-018-101812**

Lab Sample ID: 200-13309-3
Client Matrix: Water

Date Sampled: 10/18/2012 1020
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1054			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
RDX	0.057	J	0.021	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-218-101812**

Lab Sample ID: 200-13309-4
Client Matrix: Water

Date Sampled: 10/18/2012 1020
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 0746			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U	0.011	0.20
RDX	0.20	U	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	107		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-218-101812**

Lab Sample ID: 200-13309-4
Client Matrix: Water

Date Sampled: 10/18/2012 1020
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1128			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	108		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-018-101812**

Lab Sample ID: 200-13309-5
Client Matrix: Water

Date Sampled: 10/18/2012 1032
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 0823			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U	0.011	0.20
RDX	0.20	U	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	101		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-018-101812**

Lab Sample ID: 200-13309-5
Client Matrix: Water

Date Sampled: 10/18/2012 1032
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1202			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	100		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-031-101812**

Lab Sample ID: 200-13309-6
Client Matrix: Water

Date Sampled: 10/18/2012 1128
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1016			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.014	J p	0.011	0.20
RDX	0.20	U	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	103		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-031-101812**

Lab Sample ID: 200-13309-6
Client Matrix: Water

Date Sampled: 10/18/2012 1128
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1345			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.057	J p	0.011	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	106		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-031-101812**

Lab Sample ID: 200-13309-7
Client Matrix: Water

Date Sampled: 10/18/2012 1156
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1255			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U	0.011	0.20
RDX	0.20	U	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	104		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-031-101812**

Lab Sample ID: 200-13309-7
Client Matrix: Water

Date Sampled: 10/18/2012 1156
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1453			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	106		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-030-101812**

Lab Sample ID: 200-13309-8
Client Matrix: Water

Date Sampled: 10/18/2012 1235
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1332			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U	0.011	0.20
RDX	0.20	U	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.041	J	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **AMW06-030-101812**

Lab Sample ID: 200-13309-8
Client Matrix: Water

Date Sampled: 10/18/2012 1235
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1528			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Amino-2,6-dinitrotoluene	0.040	J	0.020	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	98		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-030-101812**

Lab Sample ID: 200-13309-9
Client Matrix: Water

Date Sampled: 10/18/2012 1250
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47152	Instrument ID:	CH1208
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1410			Injection Volume:	150 uL
Prep Date:	10/22/2012 1151			Result Type:	PRIMARY

Analyte	Result (ug/L)	Qualifier	MDL	RL
HMX	0.20	U	0.011	0.20
RDX	0.20	U	0.021	0.20
1,3,5-Trinitrobenzene	0.20	U	0.0098	0.20
1,3-Dinitrobenzene	0.20	U	0.016	0.20
Nitrobenzene	0.20	U	0.041	0.20
Tetryl	0.20	U	0.028	0.20
2,4,6-Trinitrotoluene	0.20	U	0.032	0.20
4-Amino-2,6-dinitrotoluene	0.20	U	0.020	0.20
2-Amino-4,6-dinitrotoluene	0.20	U	0.026	0.20
2,6-Dinitrotoluene	0.20	U	0.018	0.20
2,4-Dinitrotoluene	0.20	U	0.028	0.20
2-Nitrotoluene	0.20	U	0.034	0.20
4-Nitrotoluene	0.20	U	0.054	0.20
3-Nitrotoluene	0.20	U	0.054	0.20

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	97		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Client Sample ID: **BMW06-030-101812**

Lab Sample ID: 200-13309-9
Client Matrix: Water

Date Sampled: 10/18/2012 1250
Date Received: 10/19/2012 1000

8330B Nitroaromatics and Nitramines (HPLC)

Analysis Method:	8330B	Analysis Batch:	200-47172	Instrument ID:	CH1488
Prep Method:	8330-Prep	Prep Batch:	200-46824	Initial Weight/Volume:	500 mL
Dilution:	1.0			Final Weight/Volume:	10000 uL
Analysis Date:	10/29/2012 1602			Injection Volume:	450 uL
Prep Date:	10/22/2012 1151			Result Type:	SECONDARY

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dinitrobenzene	96		75 - 130

Client: Olsson Associates

Job Number: 200-13309-1
Sdg Number: 13309

Surrogate Recovery Report

8260B Volatile Organic Compounds (GC/MS)

Client Matrix: Water

Lab Sample ID	Client Sample ID	DCA %Rec	TOL %Rec	BFB %Rec	DCZ %Rec
200-13309-1	AMW-039-101812	101	101	101	93
200-13309-2	DMW-039-101812	104	101	103	95
200-13309-3	AMW06-018-101812	104	101	102	94
200-13309-4	AMW06-218-101812	102	98	103	95
200-13309-5	BMW06-018-101812	103	100	104	94
200-13309-6	AMW06-031-101812	105	100	104	94
200-13309-7	BMW06-031-101812	103	101	103	96
200-13309-8	AMW06-030-101812	104	101	104	95
200-13309-9	BMW06-030-101812	105	101	104	95
200-13309-10	TRB-239-101812	105	101	103	94
MB 200-47077/6		100	100	104	95
LCS 200-47077/3		101	101	101	93
200-13309-5 MS	BMW06-018-101812 MS	106	100	100	95
200-13309-5 MSD	BMW06-018-101812 MSD	103	100	100	93

Surrogate	Acceptance Limits
DCA = 1,2-Dichloroethane-d4	80-120
TOL = Toluene-d8	80-120
BFB = Bromofluorobenzene	80-125
DCZ = 1,2-Dichlorobenzene-d4	75-120

Appendix 5-1

Groundwater Elevation Comparison Hydrographs

Douglas County Monitoring Wells

Douglas CO Wells

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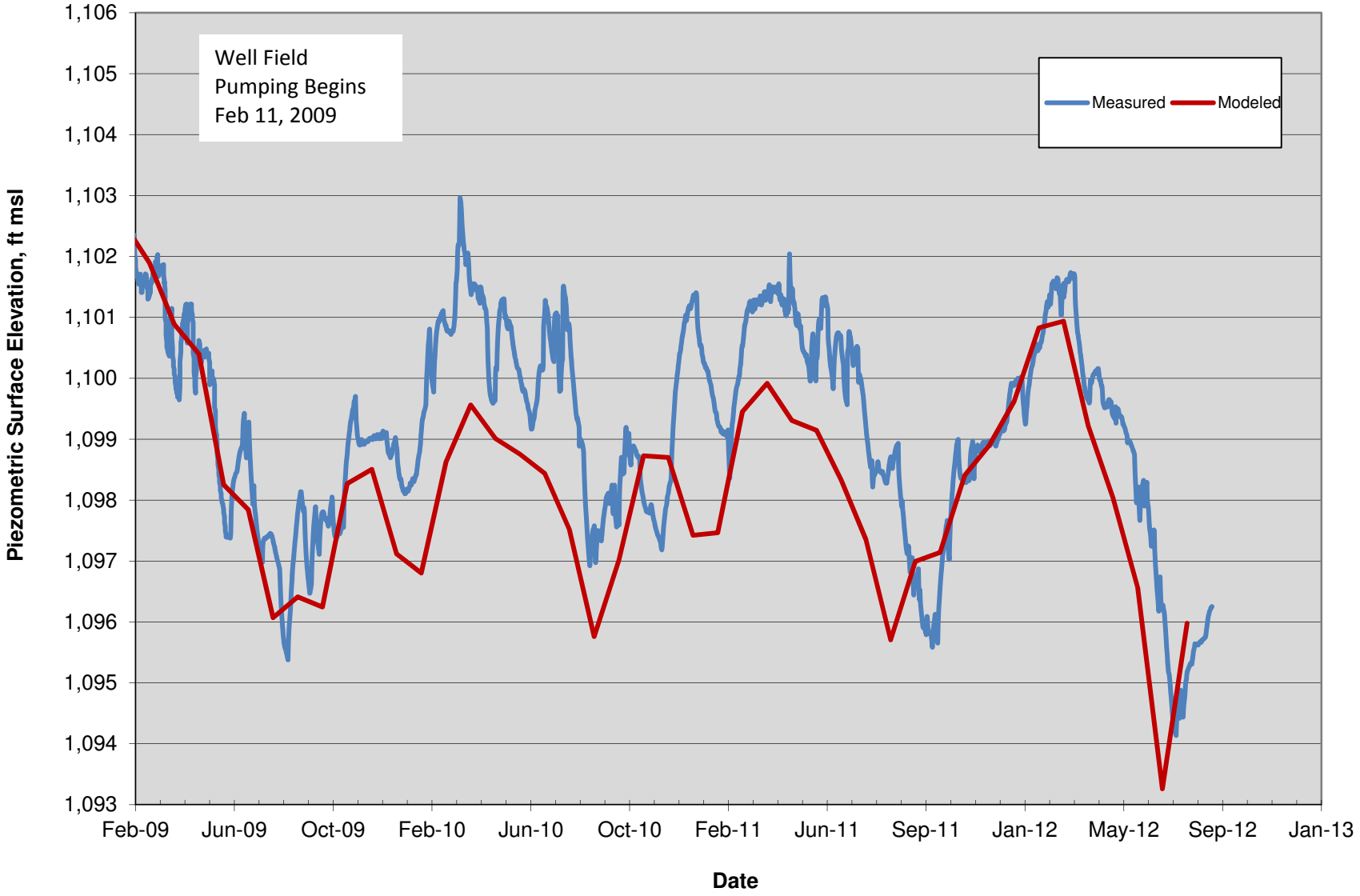
MW90-5 Hydrograph

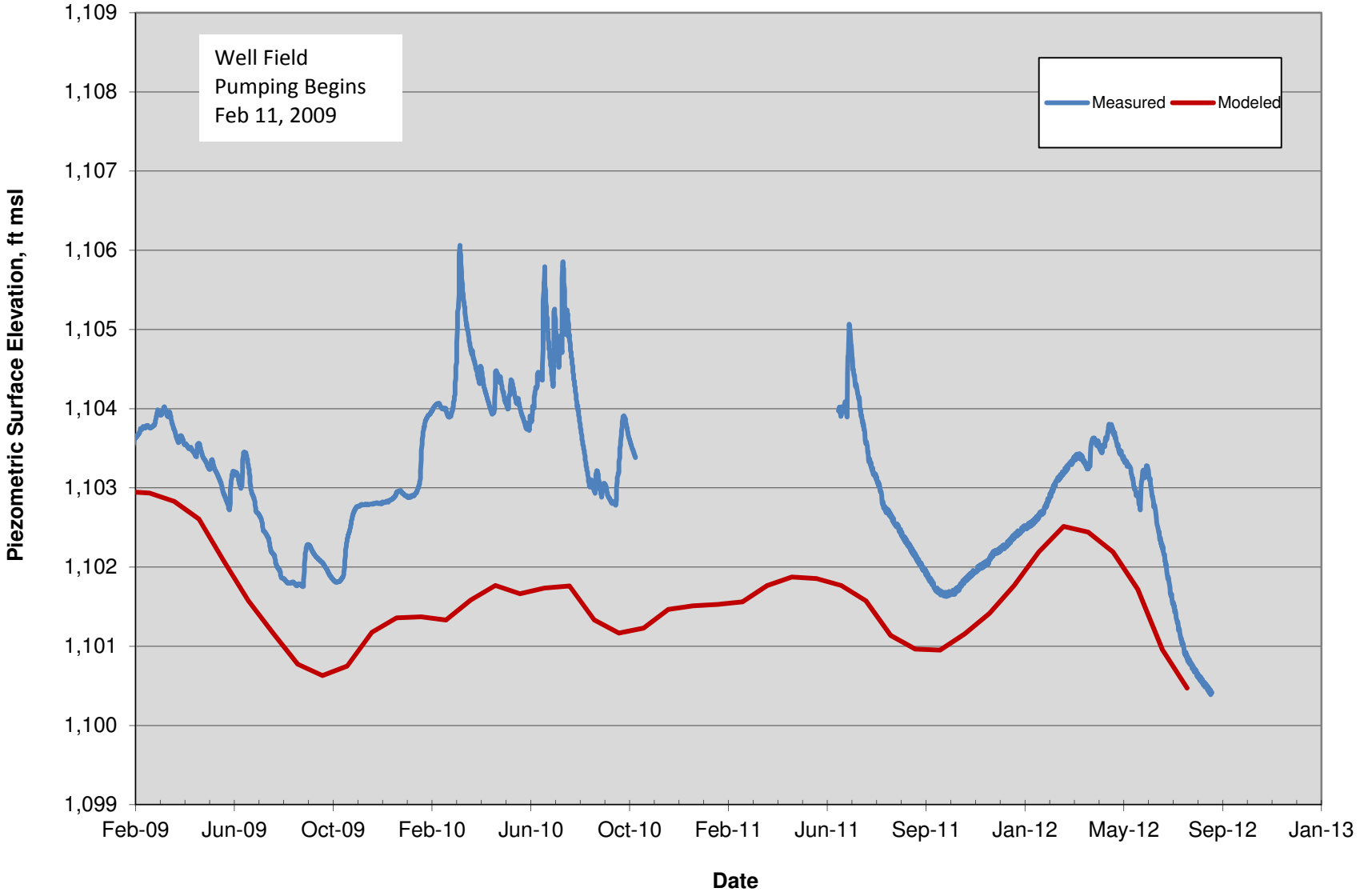
Measured and Modeled Piezometric Surface Elevations



DRAFT

MW90-6 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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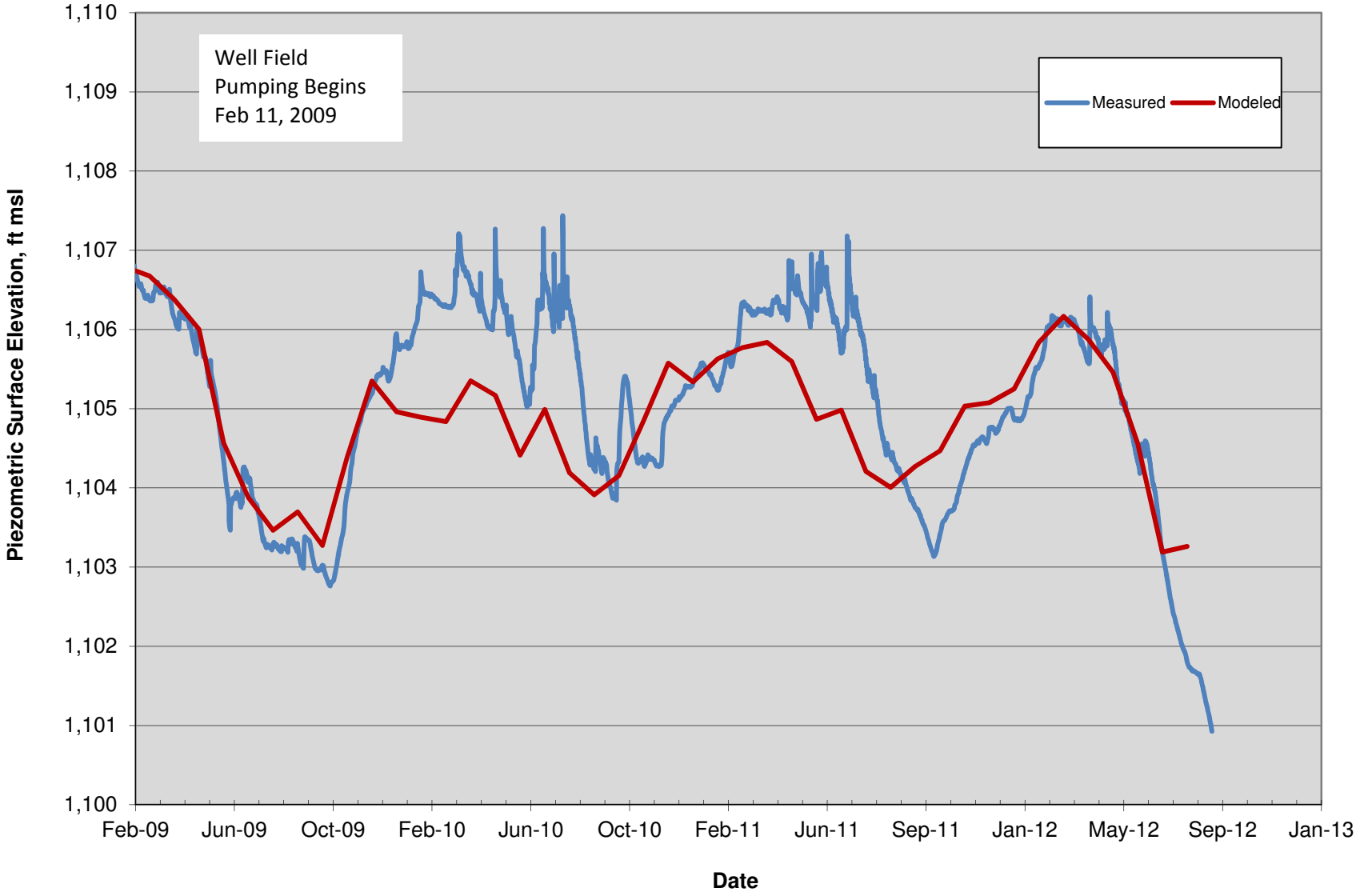
MW90-7 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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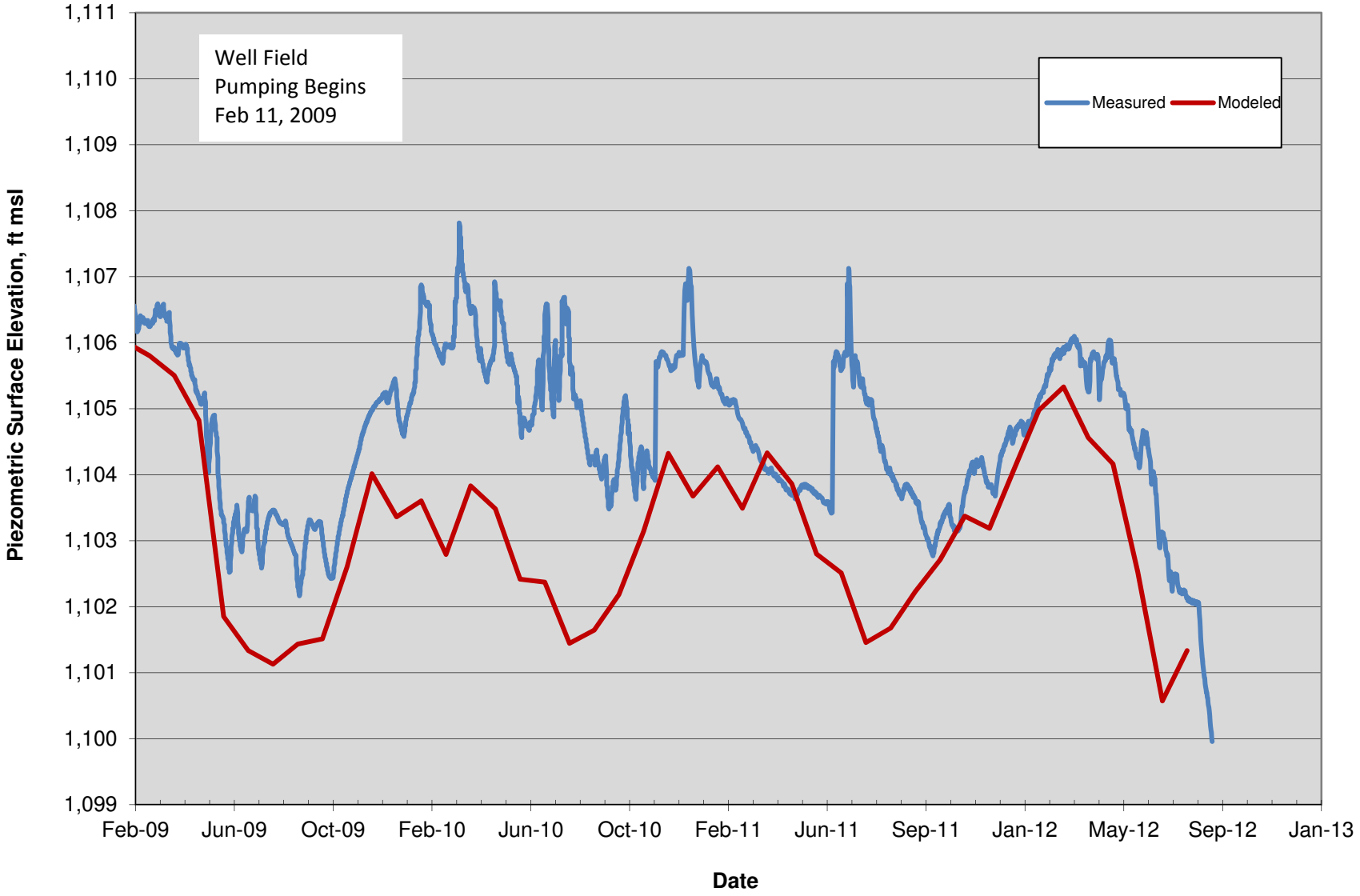
MW94-1 Hydrograph

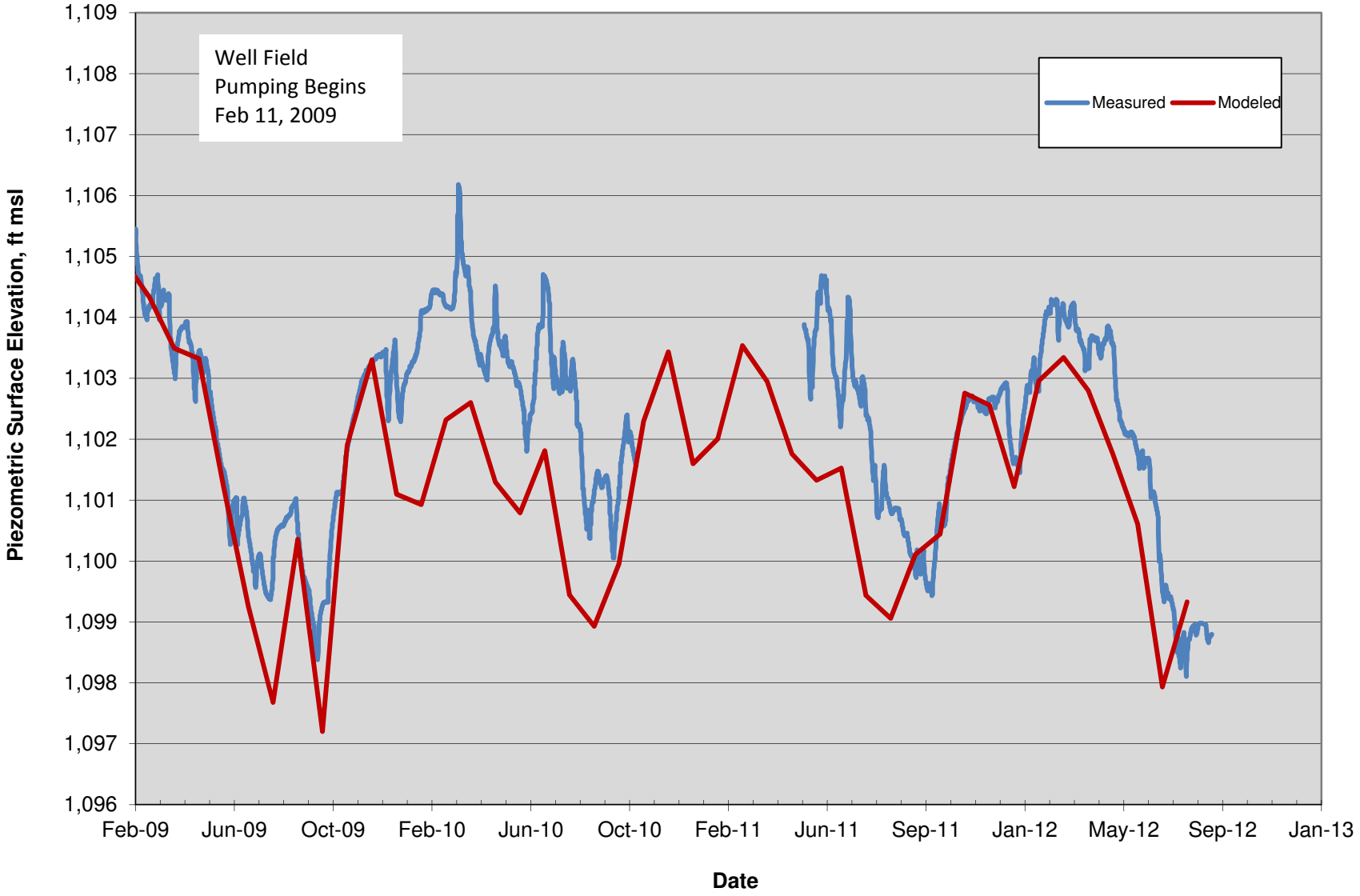
Measured and Modeled Piezometric Surface Elevations



DRAFT

MW94-2 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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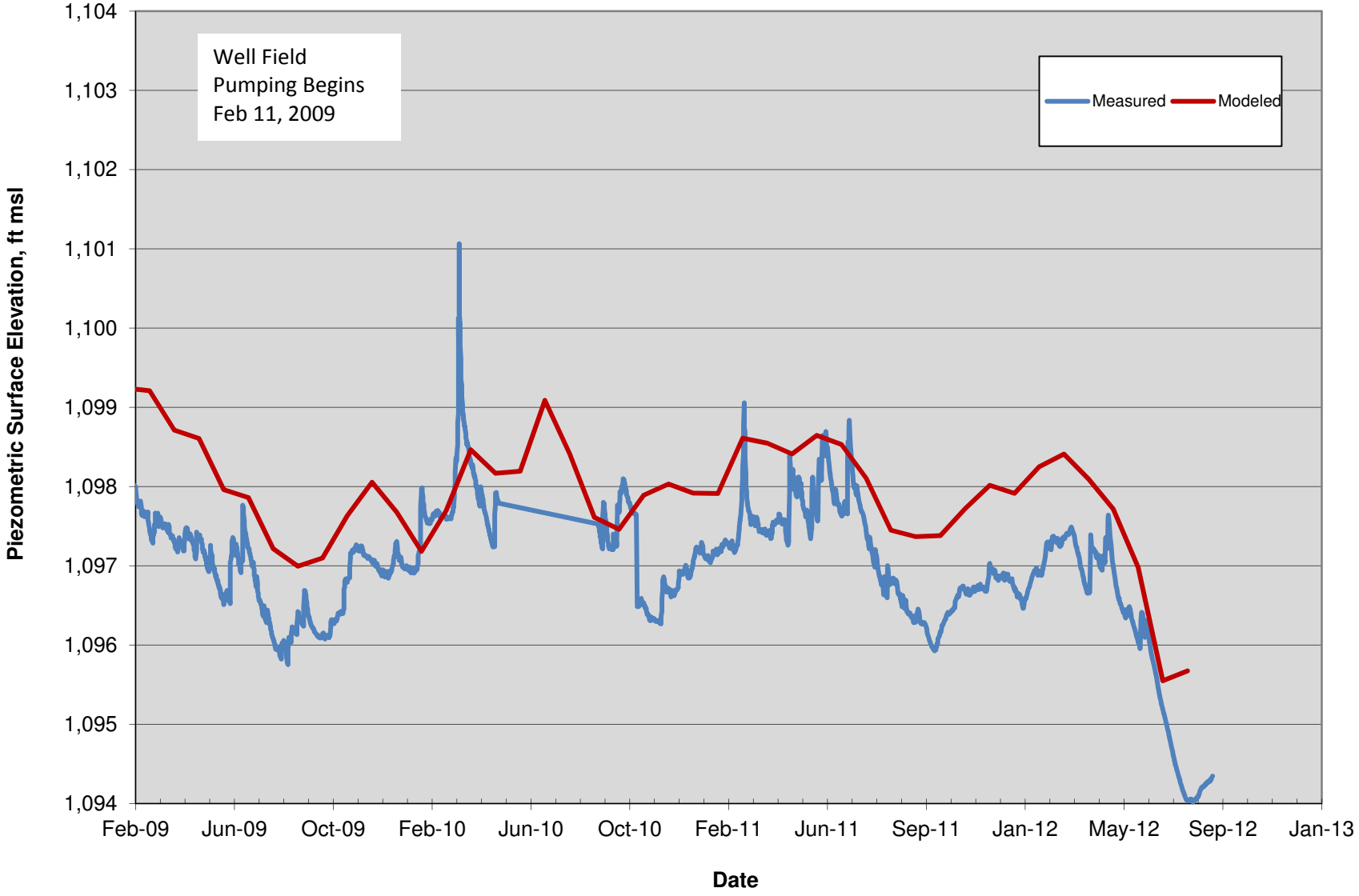
MW05-24 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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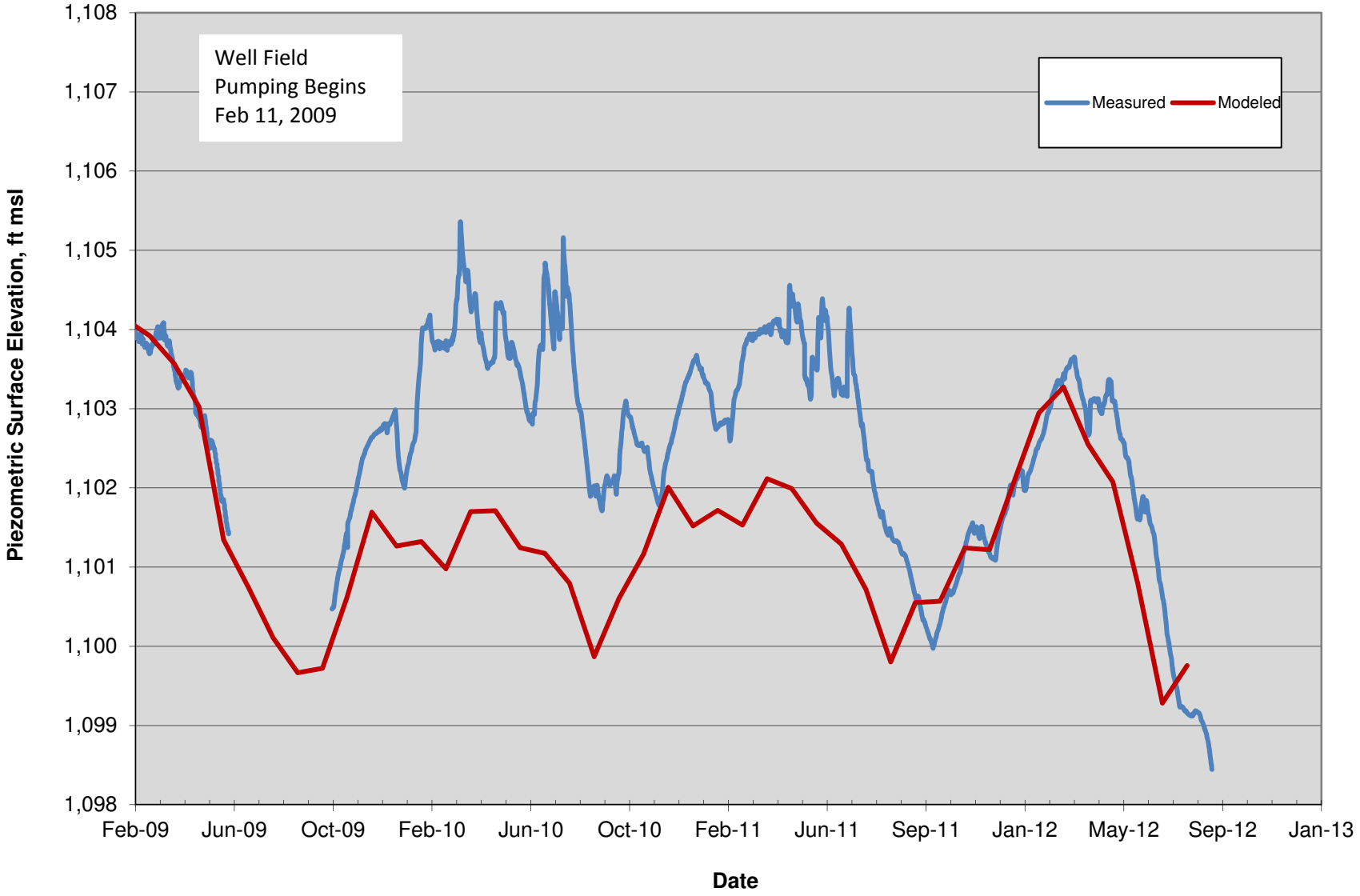
MW05-25 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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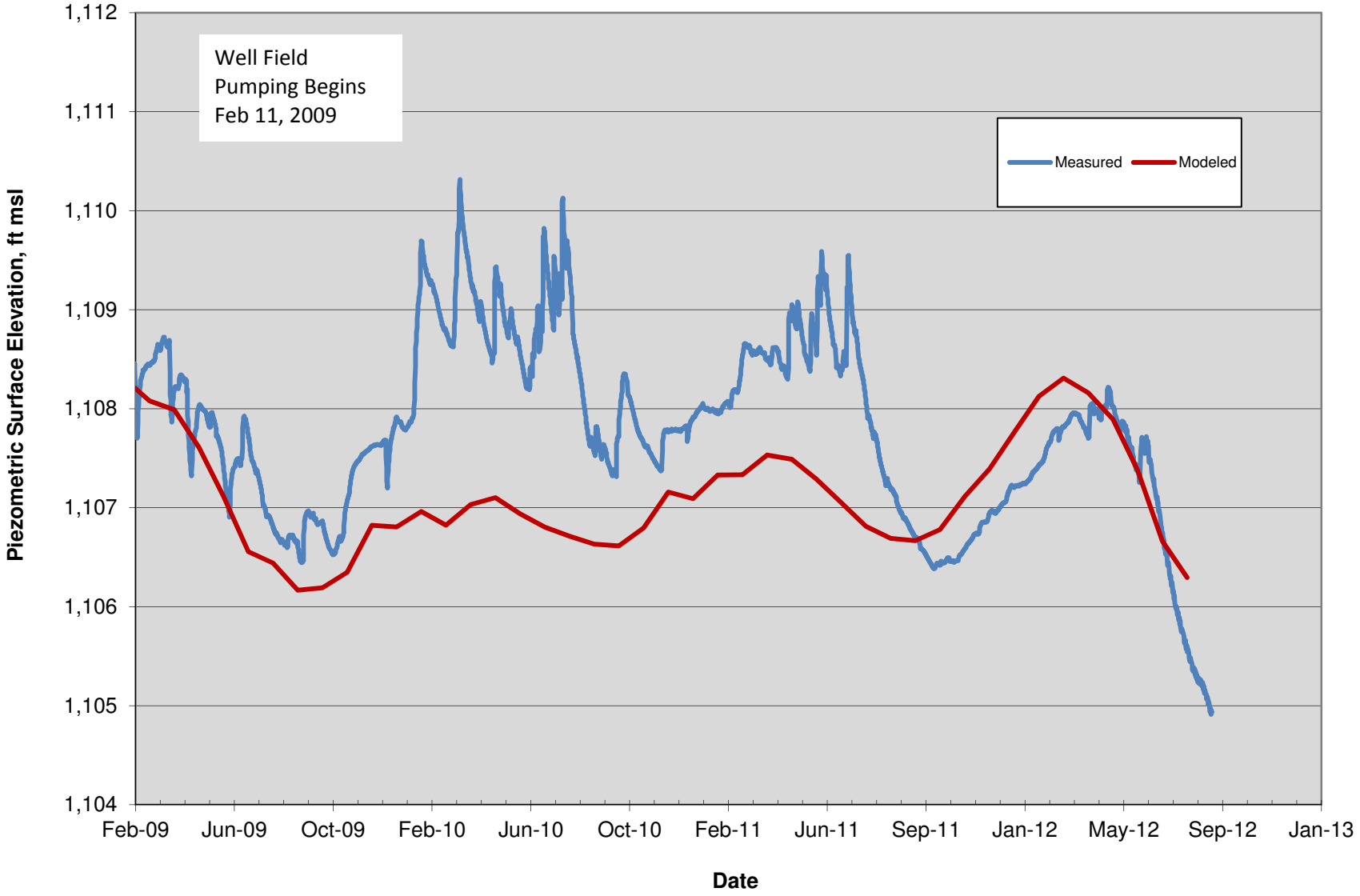
MW05-26 Hydrograph

Measured and Modeled Piezometric Surface Elevations



NOP Wells

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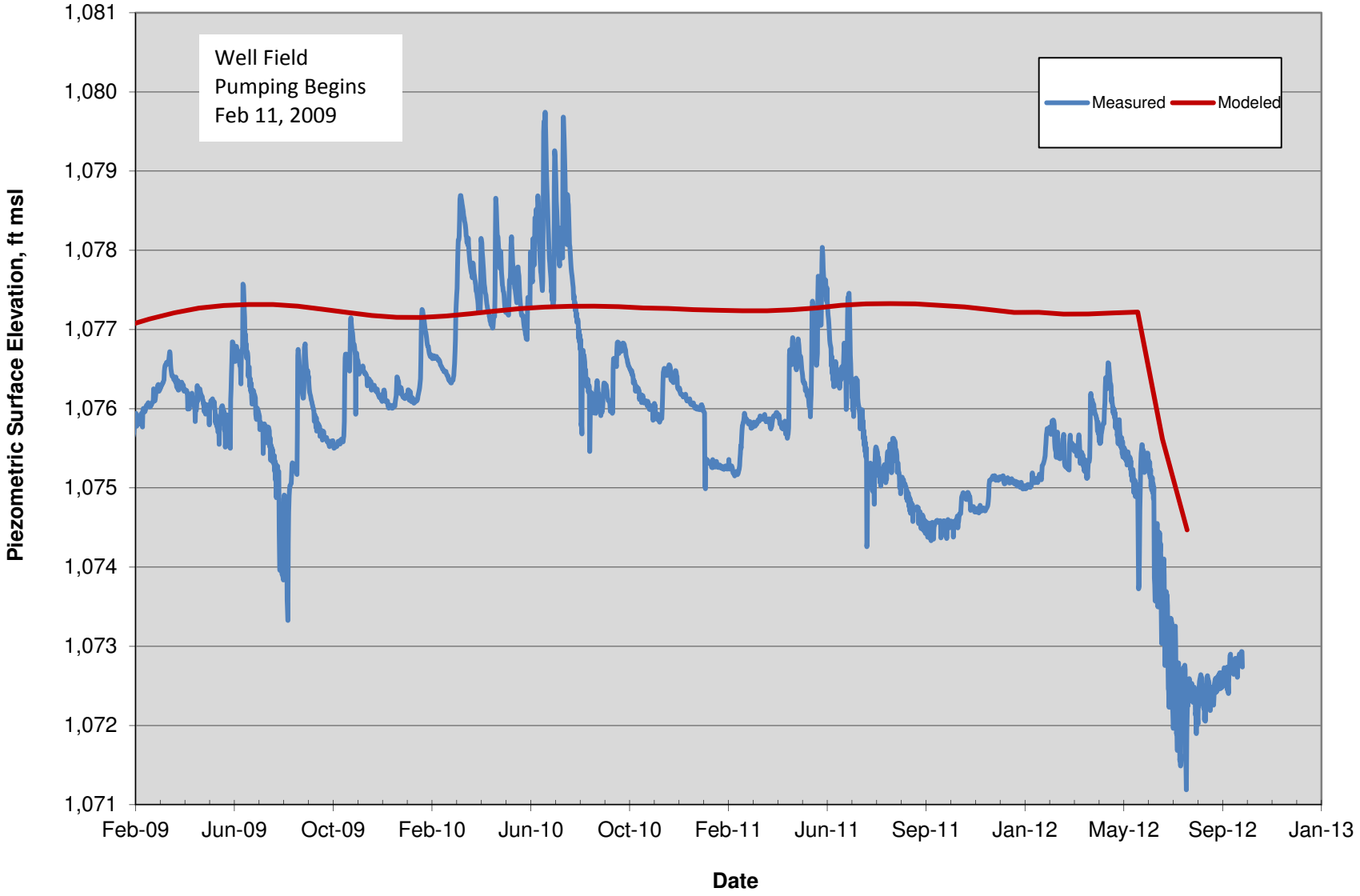
MW38 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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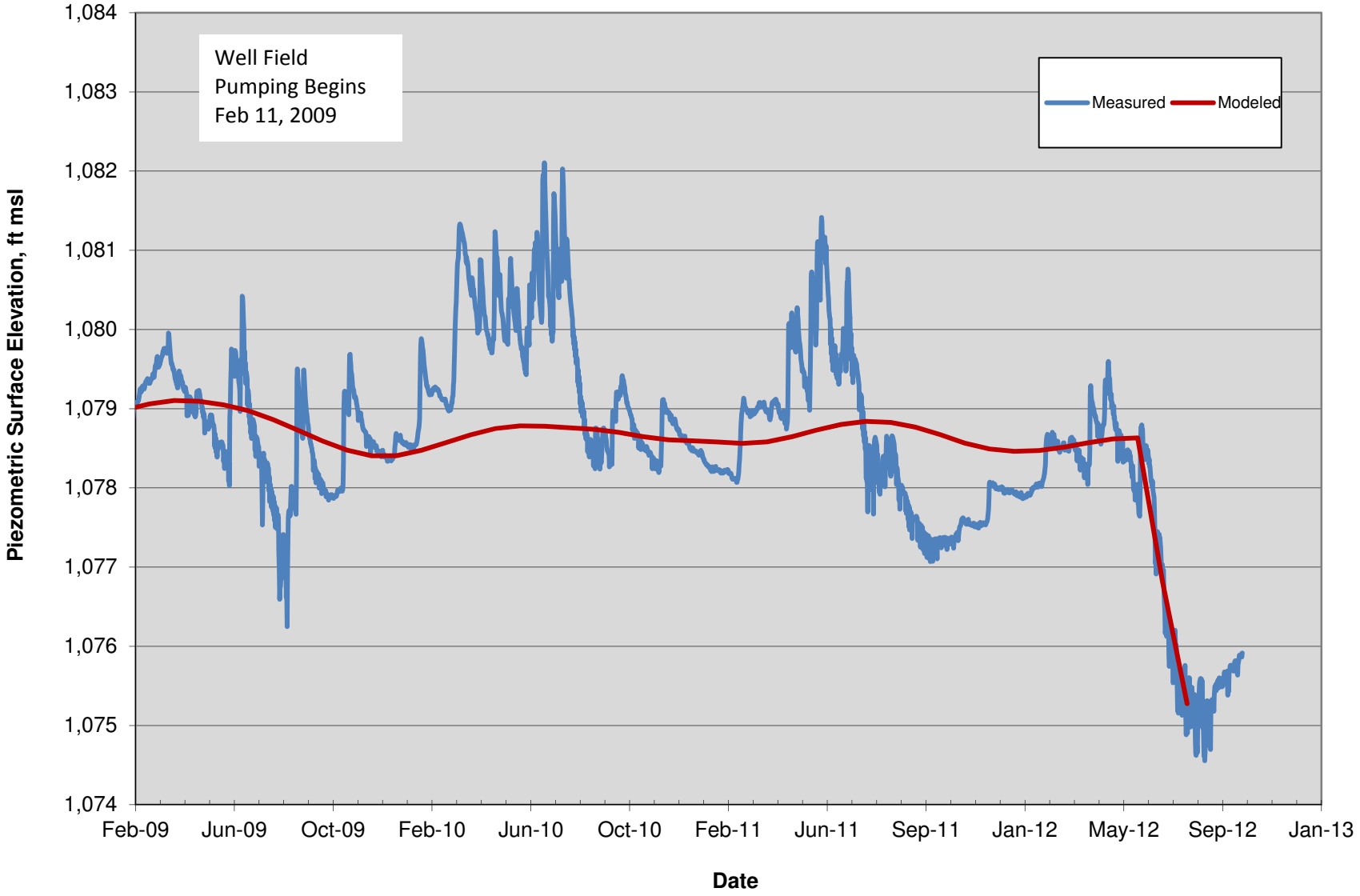
MW39 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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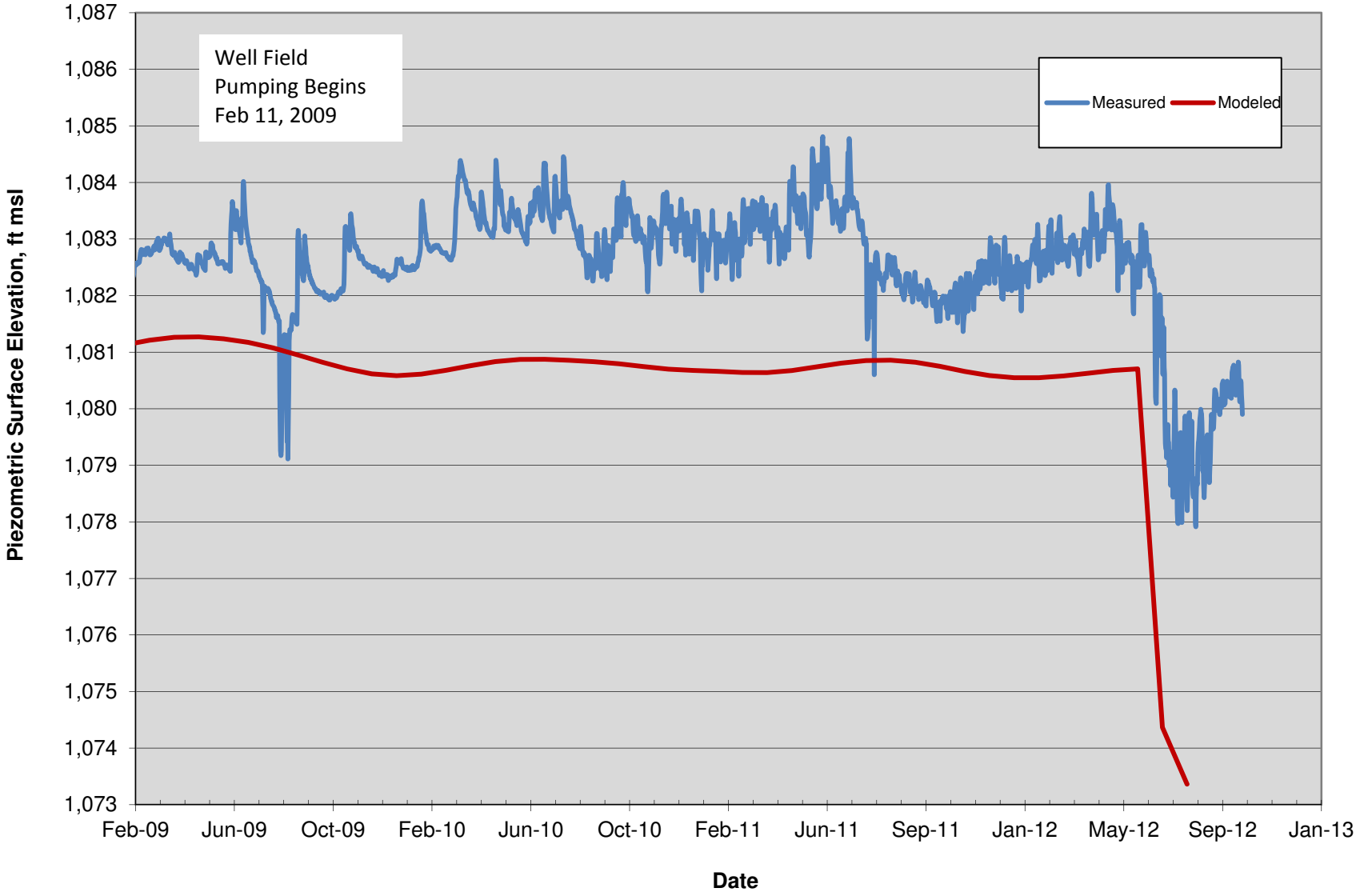
MW112 Hydrograph

Measured and Modeled Piezometric Surface Elevations



Saunders County Monitoring Wells

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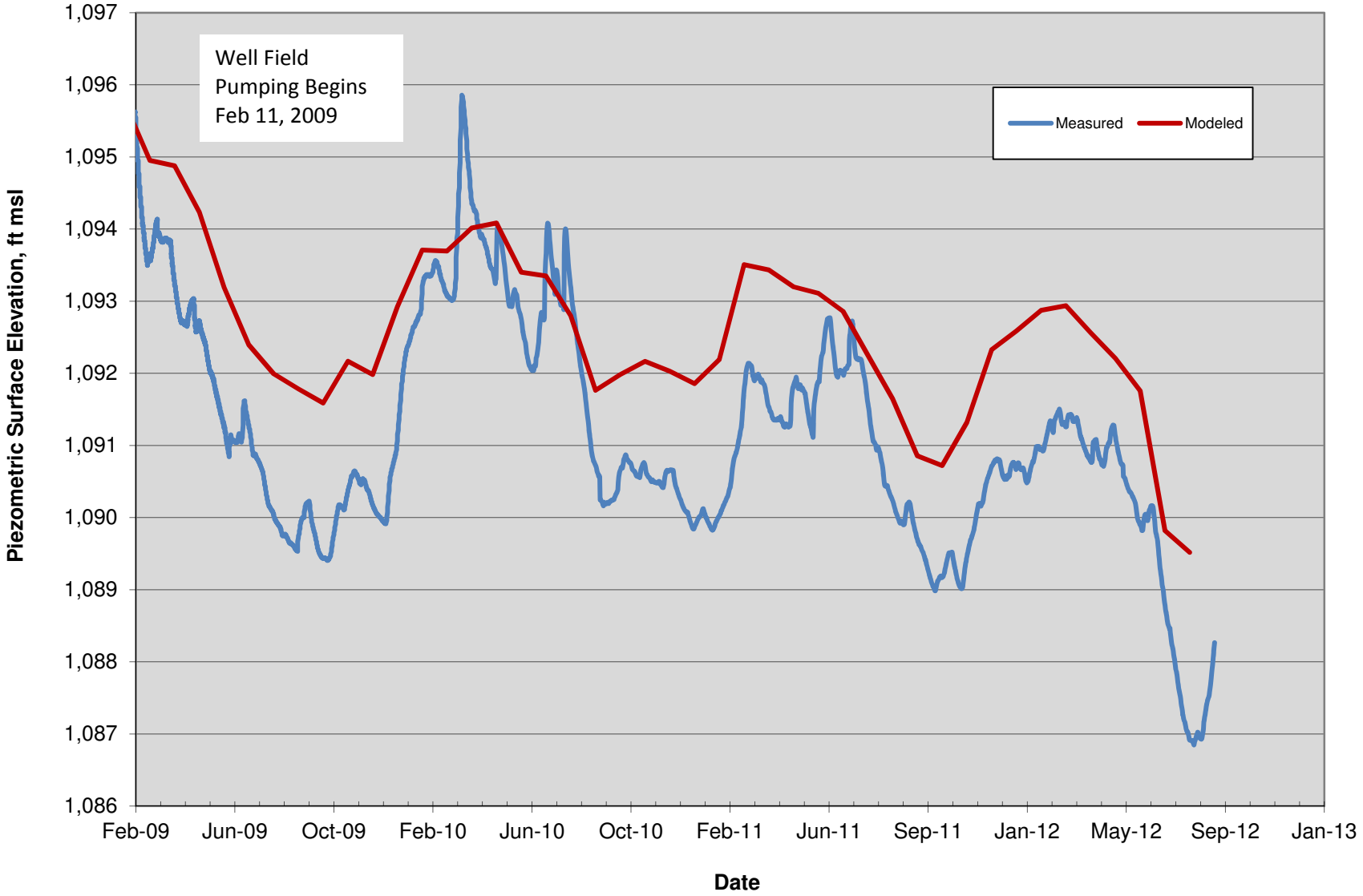
MW90-10 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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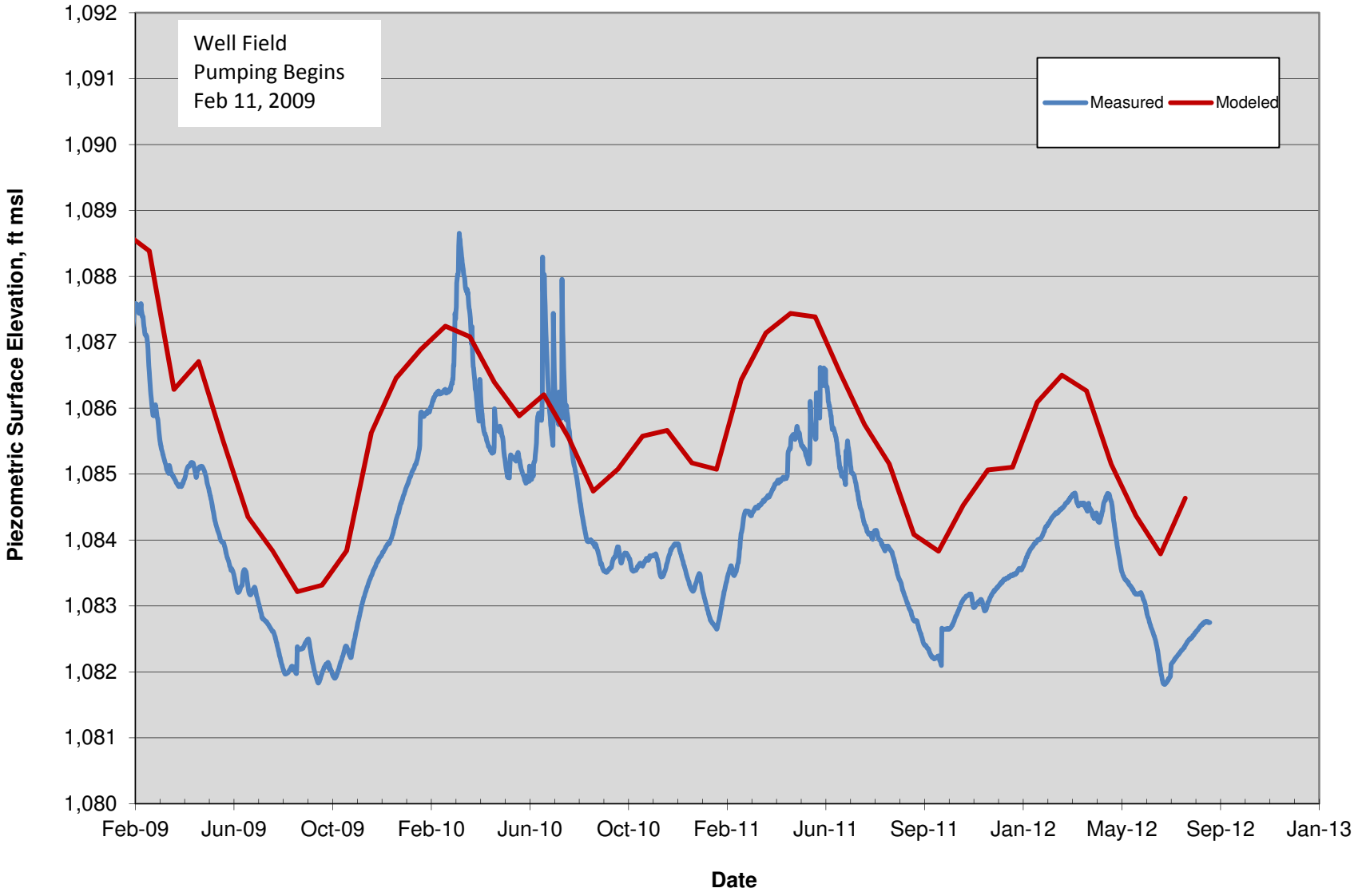
MW05-22 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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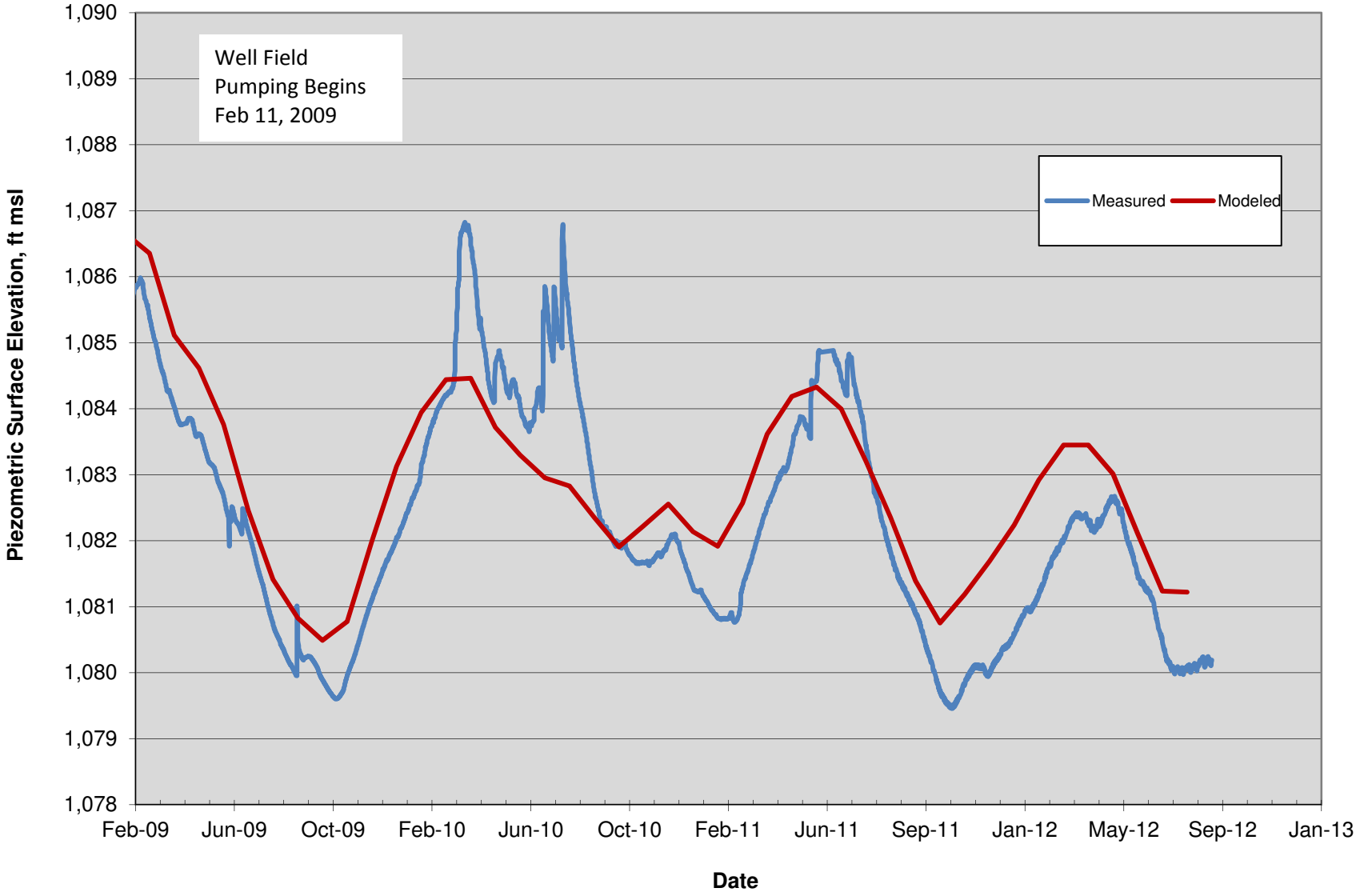
MW05-23 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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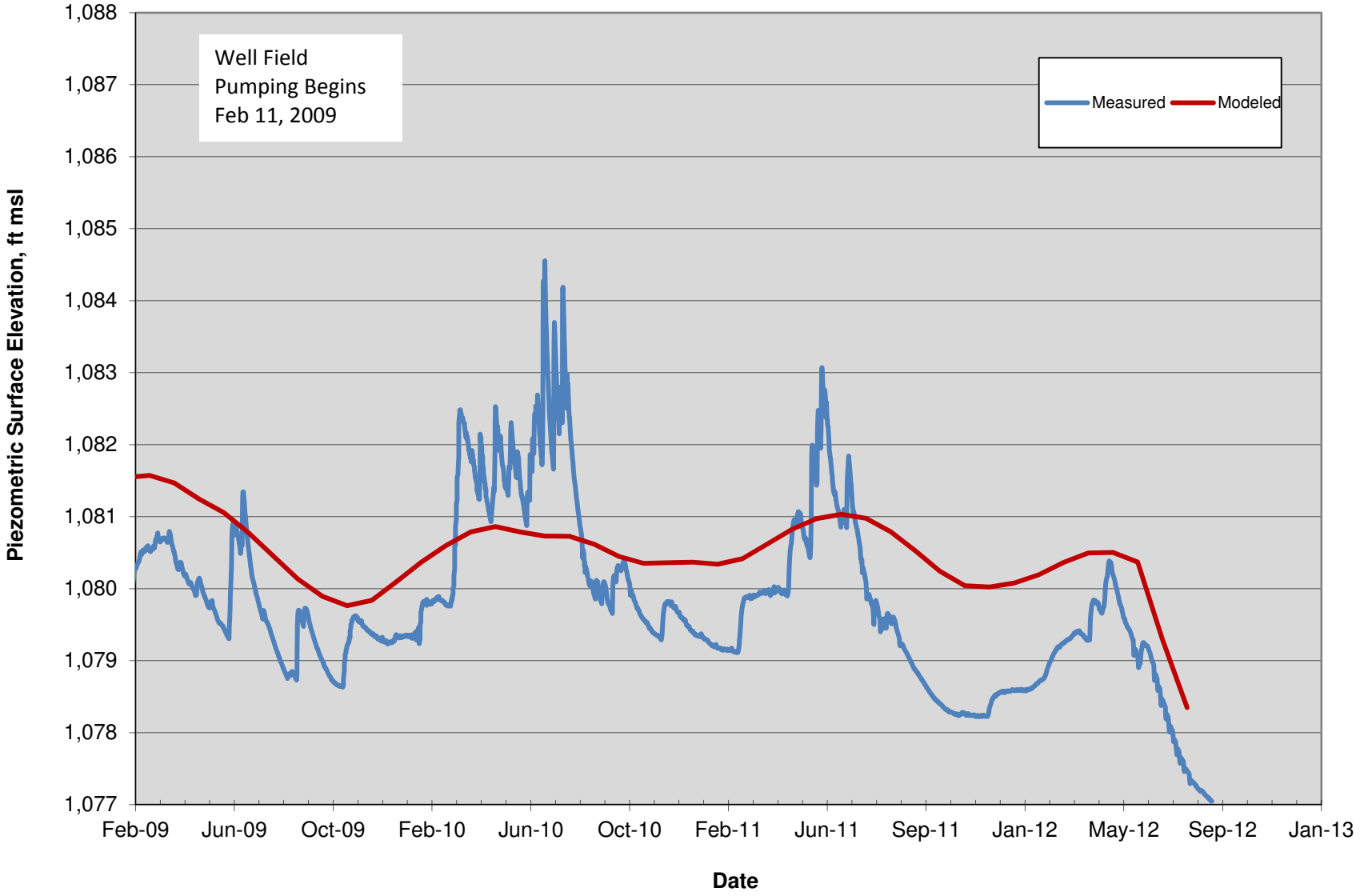
MW94-3 Hydrograph

Measured and Modeled Piezometric Surface Elevations



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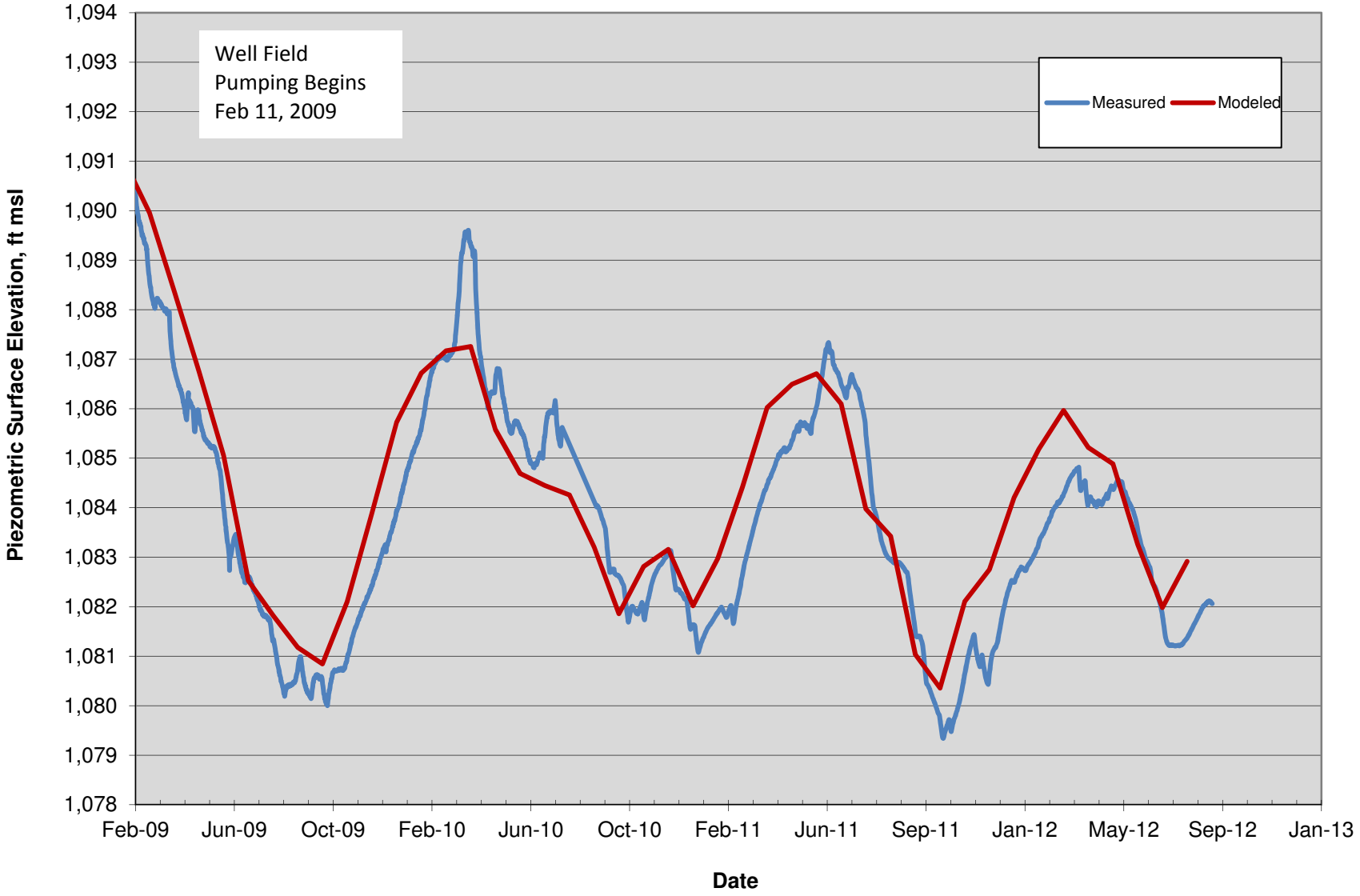
MW94-4 Hydrograph

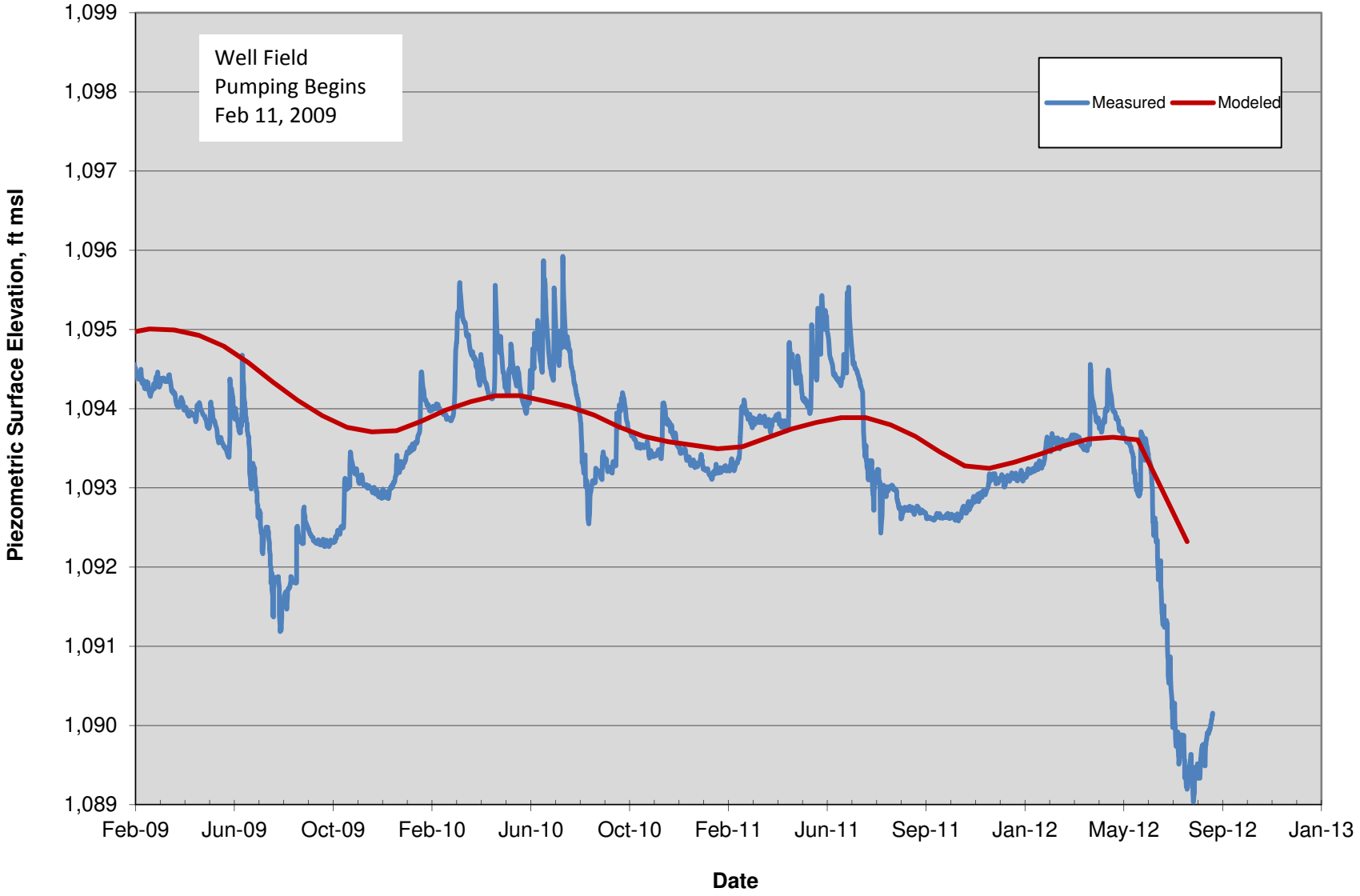
Measured and Modeled Piezometric Surface Elevations



DRAFT

MW94-5 Hydrograph

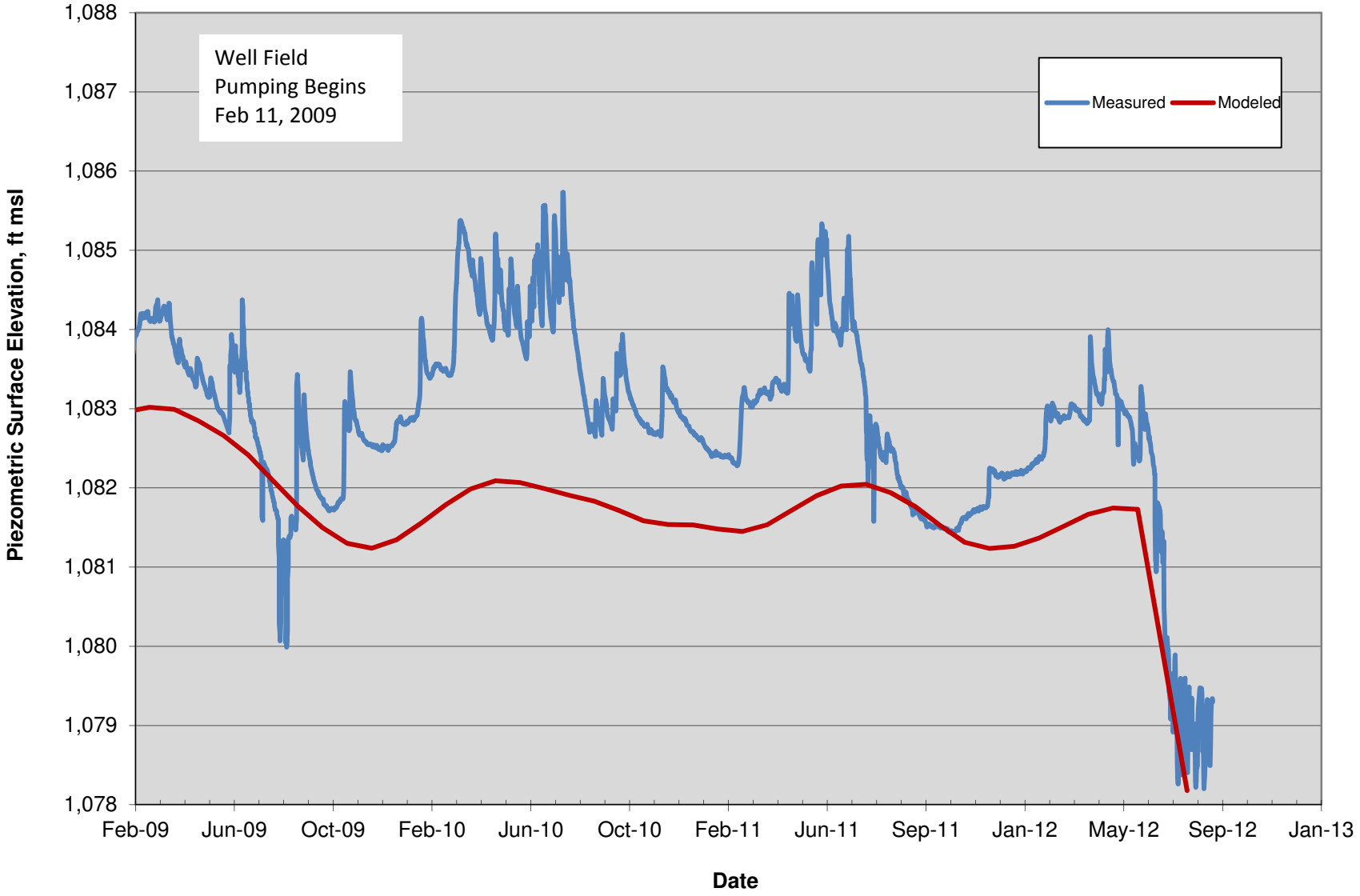
Measured and Modeled Piezometric Surface Elevations



DRAFT

MW94-6 Hydrograph

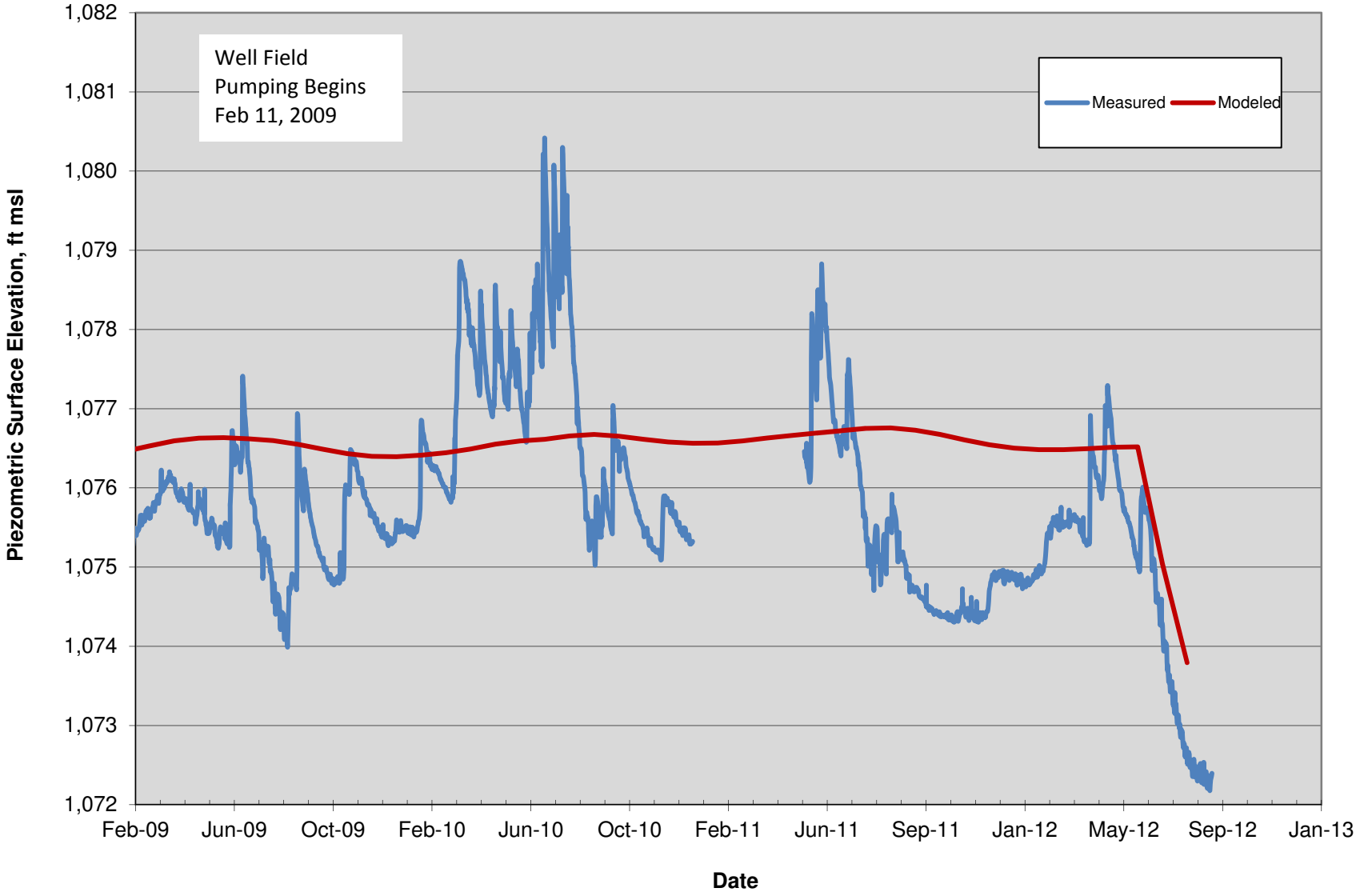
Measured and Modeled Piezometric Surface Elevations



DRAFT

MW94-7 Hydrograph

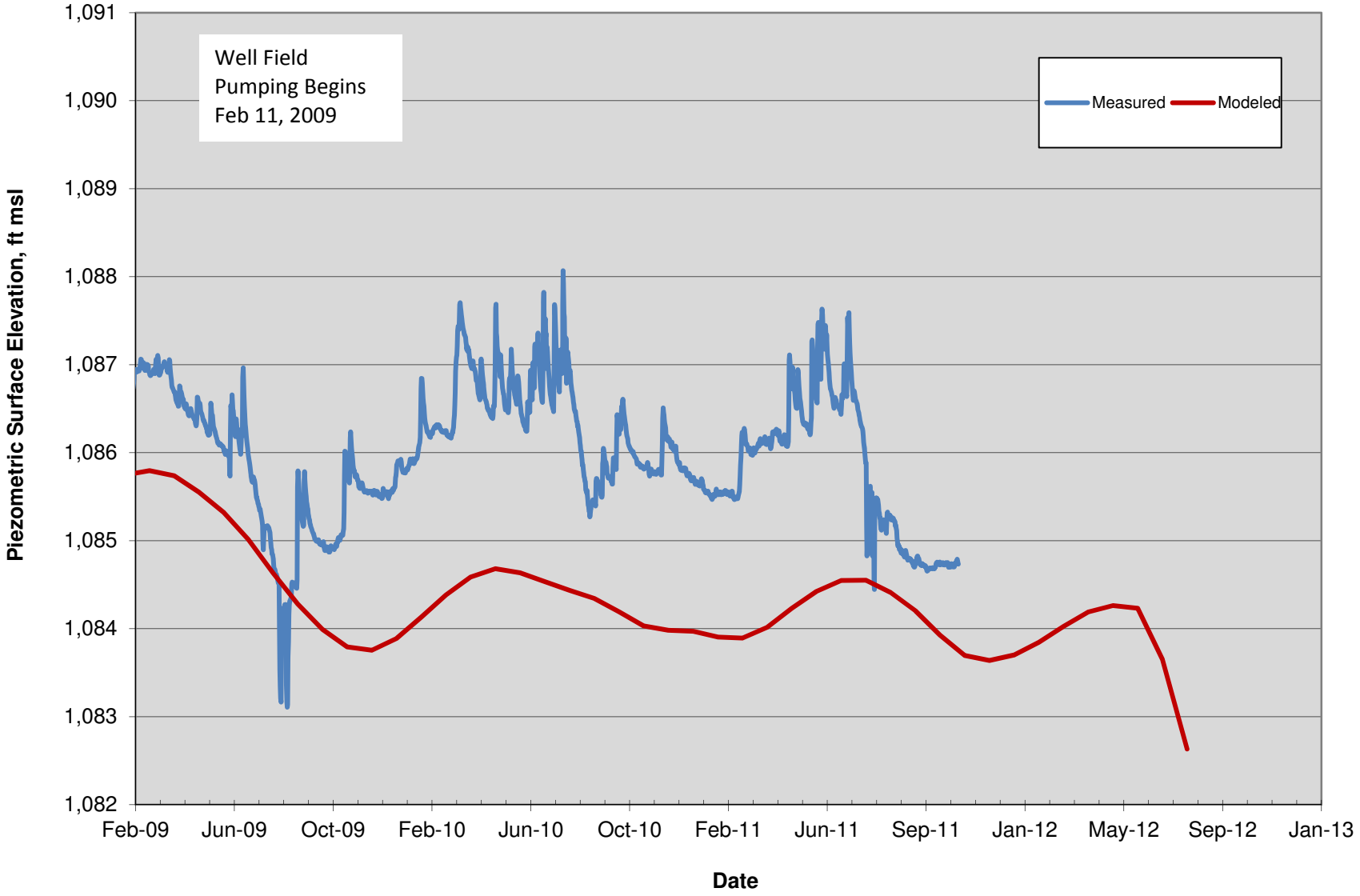
Measured and Modeled Piezometric Surface Elevations



DRAFT

MW06-27 Hydrograph

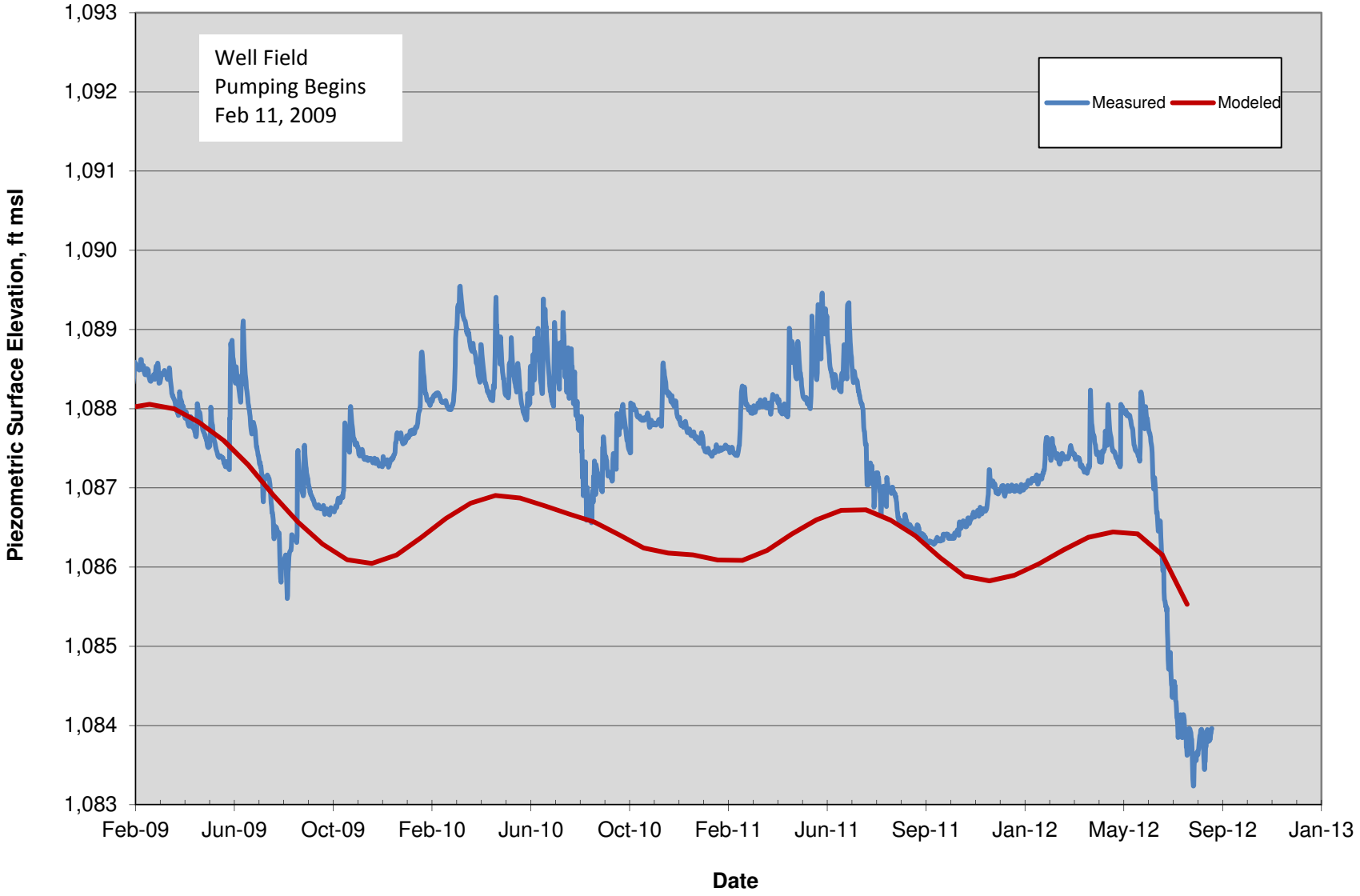
Measured and Modeled Piezometric Surface Elevations



DRAFT

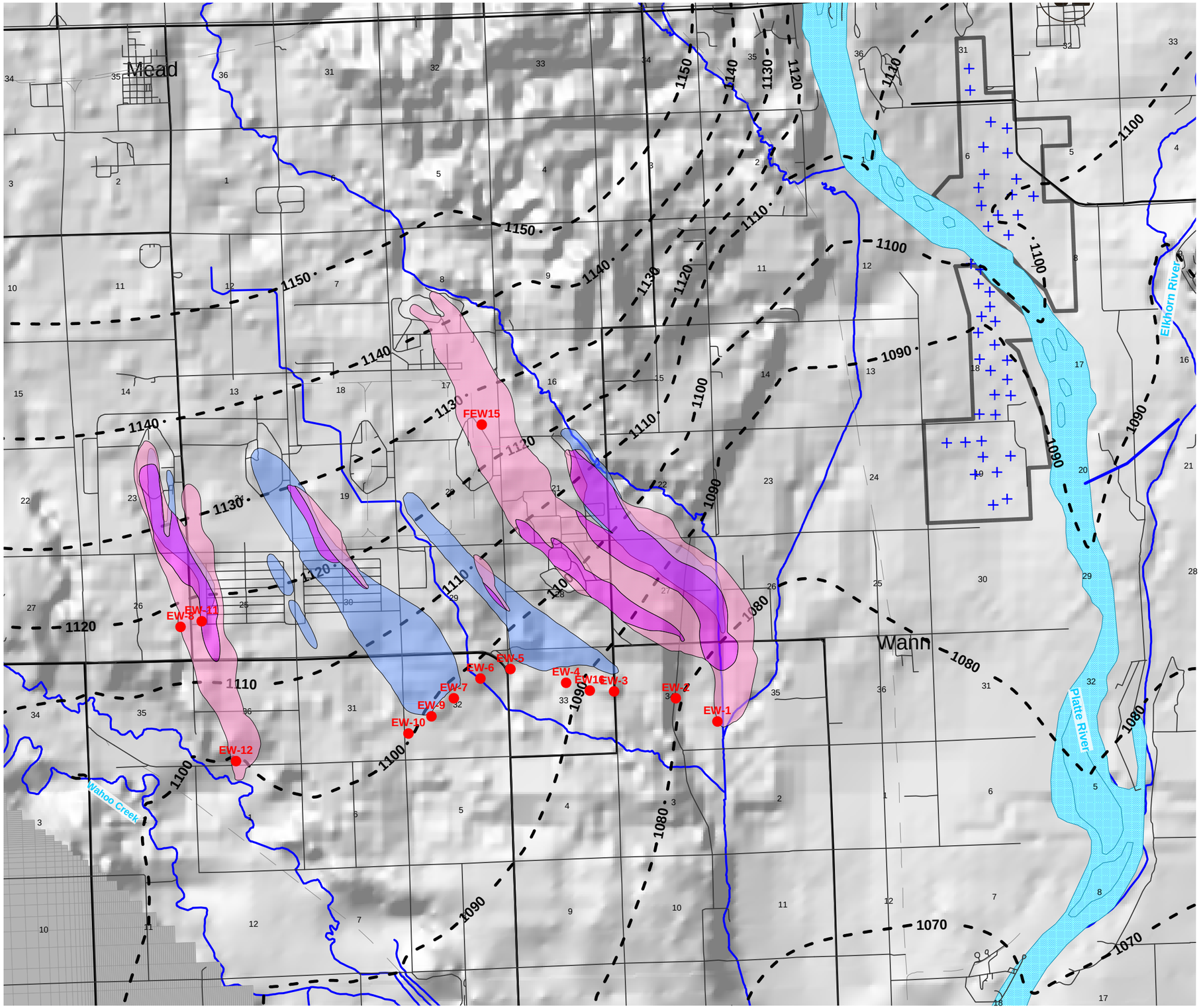
MW06-28 Hydrograph

Measured and Modeled Piezometric Surface Elevations



Appendix 5-2

Forecast Model Simulation – Predicted Potentiometric Surface Map



metropolitan UTILITIES DISTRICT

Platte West Well Field
Nebraska Ordnance Plant
Groundwater Report

Appendix 5-2
Forecast Model Predicted Potentiometric Surface (End of April 2013)

LEGEND:

- Forecast Model Predicted Potentiometric Surface Elevation Contour (ft msl) - End of April 2013
- TCE Plume
- Overlapping RDX/TCE Plume
- RDX Plume

Pumping Wellfields Operating During MODFLOW Simulation

- Platte West Well Field Boundary
- Platte West Well Field Well
- FNOP Containment/Focused Extraction Well

MAP SCALE (feet)

0 5000 10000

HDR

January 2012