



Packer Testing Report

**Gasoline Fueling Station – Royal Farms #96
500 Mechanics Valley Road
North East, Cecil County, Maryland 21901**

**OCP Case No. 2011-0729-CE
MDE Facility No. 13326**

AEC Project Number: 05-056 RF096

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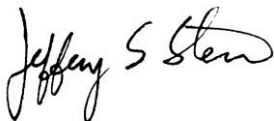
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ADVANTAGE ENVIRONMENTAL CONSULTANTS, LLC

Packer Testing Report



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Introduction and Background

Advantage Environmental Consultants, LLC (AEC) has completed packer testing in the three deep monitoring wells (MW-10D, MW-12D, and MW-13D) at Royal Farms Store No. 96, located at 500 Mechanics Valley Road, North East, Maryland. The packer testing was performed in general accordance with the Addendum to Work Plan for Deep Well Discrete Groundwater Sampling, dated September 17, 2012 which was approved by the Maryland Department of the Environment (MDE) Oil Control Program (OCP) via correspondence to Royal Farms/Two Farms, Inc., dated December 7, 2012. A Site Vicinity Map and Site Plan are included as Figures 1 and 2 in Attachment A.

Due to an apparent limited connection within the subsurface and in order to determine if relatively low levels of methyl tert-butyl ether (MTBE) (up to 200 micrograms per liter ($\mu\text{g/L}$)) are present within a very large water column, the MDE required preliminary packer testing of the sampling zones selected to ensure that they are viable flow pathways and communication zones for off-site transport of contaminants. Data obtained from the packer testing could potentially be used to specify the zones to be targeted for discrete sampling during quarterly groundwater monitoring events. These directives were issued to AEC in e-mail correspondence, dated August 17, 2012.

The objectives of the packer testing were to:

1. Isolate the identified fracture zones within the deep wells at the Site. These fracture zones were identified during the bore-hole geophysics investigation as summarized in an attachment in AEC's report titled Work Plan for Deep Well Discrete Groundwater Sampling dated April 12, 2012.
2. Conduct a pump or slug test within each packed zone to ensure competent packer seal and collect fracture transmissivity/ specific capacity data.
3. Purge each packed zone prior to discrete sample collection.
4. Collect groundwater samples from each packed zone using low flow sampling procedures.

Packer Testing Means and Methods

In order to ascertain if the selected sampling intervals were viable flow pathways and communication zones for off-site transport of contaminants, AEC's contractor, Earth Data, Inc., performed packer testing using the general procedures summarized below. Specific methods employed at each deep well location and deviations from the general procedures are discussed in the Results of Packer Testing In Three Wells Located At The Royal Farms Store #96, 500 Mechanics Valley Road, North East, Maryland, dated March 2013 and prepared by Earth Data Incorporated as a subcontractor to AEC. A copy of this report is included as Attachment B.

Proposed packer zones and packer spread were based on the findings of the March 2012 geophysical survey, which are summarized in the following table. Based on field conditions, modifications to the proposed testing zones and packer spread distances were made. Modified packer testing and discrete sampling intervals are also summarized in the following table.

Well ID	Geophysics Secondary Porosity Depth Intervals (ft)	Drillers Logs Fracture Zone Depth Intervals (ft)	Proposed Packer Testing and Discrete Sampling Intervals (ft)	Modified Packer Testing Intervals (ft)	Modified Discrete Sampling Intervals (ft)	Total Number of Samples	Approximate Well Depth (ft)
MW-10D (CE-10-0216)	75-80 80.5-85 85-90 174-177	95-96 130-131 190-191	75-85 85-90 174-177	74.4-85.3 71.9-82.9 61.0-95.9 170.0-180.1	61.0-95.9 170.0-180.1	2	201
MW-12D (CE-10-0217)	63-75 84-97 127-154	110-111	63-75 84-97 127-154	59.0-78.0 82.4-102.3 125.4-160.0	No Samples Collected	0	160
MW-13D (CE-10-0215)	56-66 119-131 140-142	65-66 125-130	56-66 119-131 140-142	59.0-73.4 116.9-134.2 139.0-156.3	59.0-73.4 116.9-134.2 139.0-156.3	3	180

AEC performed packer tests to evaluate the fracture zones at each deep well location at the depth intervals noted in the table above. The purpose of the packer tests was to provide data to allow a quantitative measurement of connectivity between the observed fracture zones in the deep wells. Prior to and during the packer testing activities, manual water level readings were collected in the shallow monitoring wells (MW-10S, MW-12S, and MW-13S) associated with the deep wells and the two deep wells that were not being tested. These readings were collected using an electronic water level indicator accurate to within 0.01 foot. An estimation of fracture yield was also performed by pumping the fracture zone at a constant rate and head.

Prior to starting each packer test, the pressure transducers were calibrated so they all read the static water level in the selected zones. The packers were inflated and the redistribution of water levels below, between and above the packers was recorded. These baseline conditions were used to compare the hydraulic response in the monitored test zones.

A slug test was performed to estimate specific capacity of each packed interval. One slug test per packed interval was performed by introducing one gallon of distilled water in the lift pipe to determine if the zone would produce water or to determine a specific capacity if it is a low producing zone. The water level within the packed zone was monitored as a means of attempting to evaluate the transmissivity using conventional slug test analysis. Water levels above and below the packed zone were also monitored to evaluate the tightness of the packer seal. An instantaneous change in water levels above or below the packed zone was an indication that the seal was not competent and the packers would need to be adjusted in order to create an adequate seal. Packer zone adjustments are summarized in the table above.

Results of the slug tests were used to either estimate the pumping rate for pump-out testing or as a basis for moving the packer assembly to a more suitable testing zone. Once the estimated pumping rate was established, the pump was activated and drawdown and discharge data was collected with data loggers. Flow rates were adjusted as necessary to avoid dewatering the fracture zone. Once a constant pumping rate was established, the test continued for a period of approximately one hour or once the drawdown had stabilized, whichever occurred first. At the completion of the test, the pump was shut down and recovery data was collected.

Groundwater Sampling Means and Methods

Once the recovery data was collected, discrete sampling was performed at each packed interval in MW-10D and MW-13D. No samples were collected from MW-12D because the water levels in the test intervals did not show any recovery indicating that any samples collected would be representative of casing storage and not fracture zone water. The sampling was performed using low-flow sampling procedures in general accordance with USEPA Low-Flow Purging and Sampling of Groundwater Monitoring Well procedures (Bulletin No. QAD023). The low-flow samples were collected with a Grundfos Redi-Flow submersible pump. New PVC tubing and nylon rope will be used at each sampling location. The groundwater quality was monitored using a Horiba U-22 Multi-meter with a flow-through cell. The monitored groundwater quality parameters included pH, conductivity, turbidity, dissolved oxygen (DO), temperature, and oxidation-reduction potential (ORP). Groundwater quality parameter field notes are included as Attachment C.

Once the groundwater quality parameters stabilized, sample bottles for VOCs were filled so that there was no headspace or air bubbles within the container and placed in a cooler on ice pending laboratory analysis. The analytical laboratory provided pre-preserved sample containers where appropriate. Sample labels were firmly attached to the container side, and the following information was legibly and indelibly written on the labels: facility name; sample identification; sampling date and time; preservatives added; and, sample collector's initials. After the samples were sealed and labeled, they were packaged for transport to the analytical laboratory.

The groundwater samples were analyzed for VOCs including fuel oxygenates per EPA Analytical Method 8260, as well as total petroleum hydrocarbon (TPH) diesel range organics (DRO) and TPH gasoline range organics (GRO) per USEPA Analytical Method 8015B.

All well sampling and gauging equipment was disassembled (if appropriate) and properly cleaned and calibrated (if required) prior to use in the field. All portions of the sampling and test equipment that contact the sample were thoroughly cleaned with a Liquinox (phosphate-free laboratory-grade) bath and triple rinse of potable water before initial use and between each sampling point. In addition, a clean pair of new, disposable nitrile gloves was worn each time a different well interval was gauged and sampled.

Upon completion of the testing and sampling within a particular zone, the packers were deflated and re-positioned within the next zone to be tested. Testing procedures for each zone were the same. Once each zone within a particular well was tested, a short pumping test was performed with the packers deflated to determine the open borehole specific capacity. Upon completion of testing at each well location the packers, pump and transducers were removed from the well and decontaminated prior to being deployed in the next well location.

All investigation derived waste was containerized for off-site disposal via vacuum truck. Approximately 650 gallons of groundwater were generated during the packer testing activities. Non-Hazardous Waste Manifests are included in Attachment D.

Summary of Results

Packer Testing Results

Aquifer Transmissivity

All three deep monitoring wells are completed in consolidated bedrock with only a few fracture openings that produce water. Well MW-13D had the highest open-hole specific capacity (0.120 gallons per minute per foot (gpm/ft)) and the highest blown yield when initially drilled. Well MW-10D had the lowest specific capacity (0.020 gpm/ft) and appeared to have the least permeable isolated zones during packer testing. Well MW-12D had a somewhat higher open-hole specific capacity (0.028 gpm/ft) but was closer to MW-10D in penetrating rock of lower fracture permeability than the fractured rock encountered in MW-13D.

Because the duration of pumping had to be limited and casing storage was a major factor in the water that was actually pumped from the each isolated zone, it was impossible to calculate meaningful and useful values of transmissivity. However, it appears that transmissivity is generally low along Mechanics Valley Road based on well yields and well depths. Fracture permeability may increase toward Route 40 which is perpendicular to the center line of the on-site dissolved phase plume.

Relative Water Level Elevations

The water level commonly measured in deep, open-hole wells in fractured rock normally represents the head of the most permeable water-bearing fracture encountered by the well. Because consolidated rock fracture flow systems can be fairly complicated, it is important to understand that there may be head differences in both horizontal and vertical directions. When packers are inflated, the divergence of the pre-pumping water levels provides an indication of the head distribution within the well and the aquifer at that location.

The packer testing at the Site revealed head differences between individual fractures in all three deep monitoring wells. There was also significant head difference between the

shallow monitoring wells and the water levels measured in the adjacent deep monitoring well. For example, the static water level in MW-13S was approximately 9.0 feet when the static water level in MW-13D was approximately 19.0 feet. This represents a 10.0 foot head difference and has important implications regarding the shallow and deep flow systems at the Site. While the potential exists for the downward migration of groundwater, the large head difference indicates very low permeability in the base of the shallow sediments underlying the Site. This will significantly reduce the downward migration of groundwater and any contaminants that may be found in the groundwater.

If a relatively good connection exists between the overburden and the bedrock, water levels in both will be very close in elevation. This is often the case in Piedmont bedrock aquifers covered with saprolite. At the Site, the overburden consists of Coastal Plain, Cretaceous age sediments overlying bedrock. The overburden is not weathered bedrock as it is in much of the Piedmont. Horizontally extensive fine grained sediments in the overburdened significantly reduce vertical groundwater flow and large head differences result. In some situations, this may even result in seasonal perched water-table conditions.

Response of Shallow Monitoring Wells

As Figures 2, 3, and 4 and associated groundwater gauging data tables in the Earth Data Incorporated Report (Attachment B) indicate, there was no measureable response in the shallow monitoring wells MW-10S, MW-12S or MW-13S during the packer testing or open-hole test pumping of any of the three deep monitoring wells. The slight change in water levels in the shallow wells as the testing in MW-10D began, is attributed to shutting down the on-site remediation system and/or changes in the water-level probe from one day to the next. These changes in water level were not repeated for the duration of the on-site testing.

Response of Deep Monitoring Wells

Water-level changes in the two deep monitoring wells not being tested provided some insight into the connectability (or lack thereof) between the three deep monitoring wells on the Site. As Figures 5, 6, and 7 and associated groundwater gauging data tables in the Earth Data Incorporated Report (Attachment B) indicate, there were more changes in water levels during the packer testing than were observed in the shallow monitoring wells.

At first, it was suspected that all of the changes were due to pumping a particular fracture zone in a particular well. However, since the duration of pumping a particular zone was short (one hour or less), the distances between wells is fairly significant, and two (MW-10D and MW-12D) of the deep wells did not appear to intersect very permeable well connected fractures, it is apparent that the changes in water levels might not be due to packer testing. A closer examination of the data plots indicated that drawdown was occurring after pumping in a particular well had stopped and the packers had been deflated. The decline in water levels also appeared to coincide with the last

two or three measurements at the end of a work day. After each of these episodes, the water level in the deep well appeared to recover by the time the first reading was made the next morning.

While the greatest change was observed in MW-13D when MW-12D was being packer tested (a drawdown of approximately 6.0 feet), a similar large drawdown was not seen in MW-12D when MW-13D was being tested.

Since all of the drawdown occurred in late afternoon hours, it is assumed that some and perhaps all of the drawdown observed is due to other pumping in the aquifer and not necessarily the pumping that occurred during packer testing. To test this conclusion, continuous water level recorders could be placed in the three deep monitoring wells to collect water data over an approximate two or three week period. Recorders could also be placed in the on-site commercial well to see if the pumping of this well influences the levels in the three deep monitoring wells.

Groundwater Sampling Results

Based on the laboratory analytical results, no VOCS, TPH DRO or TPH GRO concentrations were detected in samples from any of the three zones within MW-13D.

Methyl tert-butyl ether (MTBE) with an estimated concentration of 2.5 µg/L and tetrachloroethene (PCE) with an estimated concentration of 3.9 µg/L were detected in sample 10D-Z2. Toluene and TPH DRO were detected in sample 10D-Z3 with an estimated concentration of 2.2 µg/L and 0.22 milligrams per liter (mg/L), respectively. None of the detected analytes exceeded their respective MDE Generic Numeric Cleanup Standards for Type I and II Aquifers with the exception of TPH DRO in sample 10D-Z3. It should be noted that the first well to be evaluated during this investigation was MW-10D and the elevated DRO concentration detected in this well may be the result of cross-contamination occurring during transport of packer equipment after the initial decontamination performed at the Earth Data facility in Centreville, Maryland.

No samples were collected from MW-12D because the water levels in the test intervals did not show any recovery indicating that any samples collected would be representative of casing storage and not fracture zone water.

A groundwater quality map is included as Figure 3 in Attachment A. Laboratory analytical results and chain-of custody documentation are included in Attachment D.

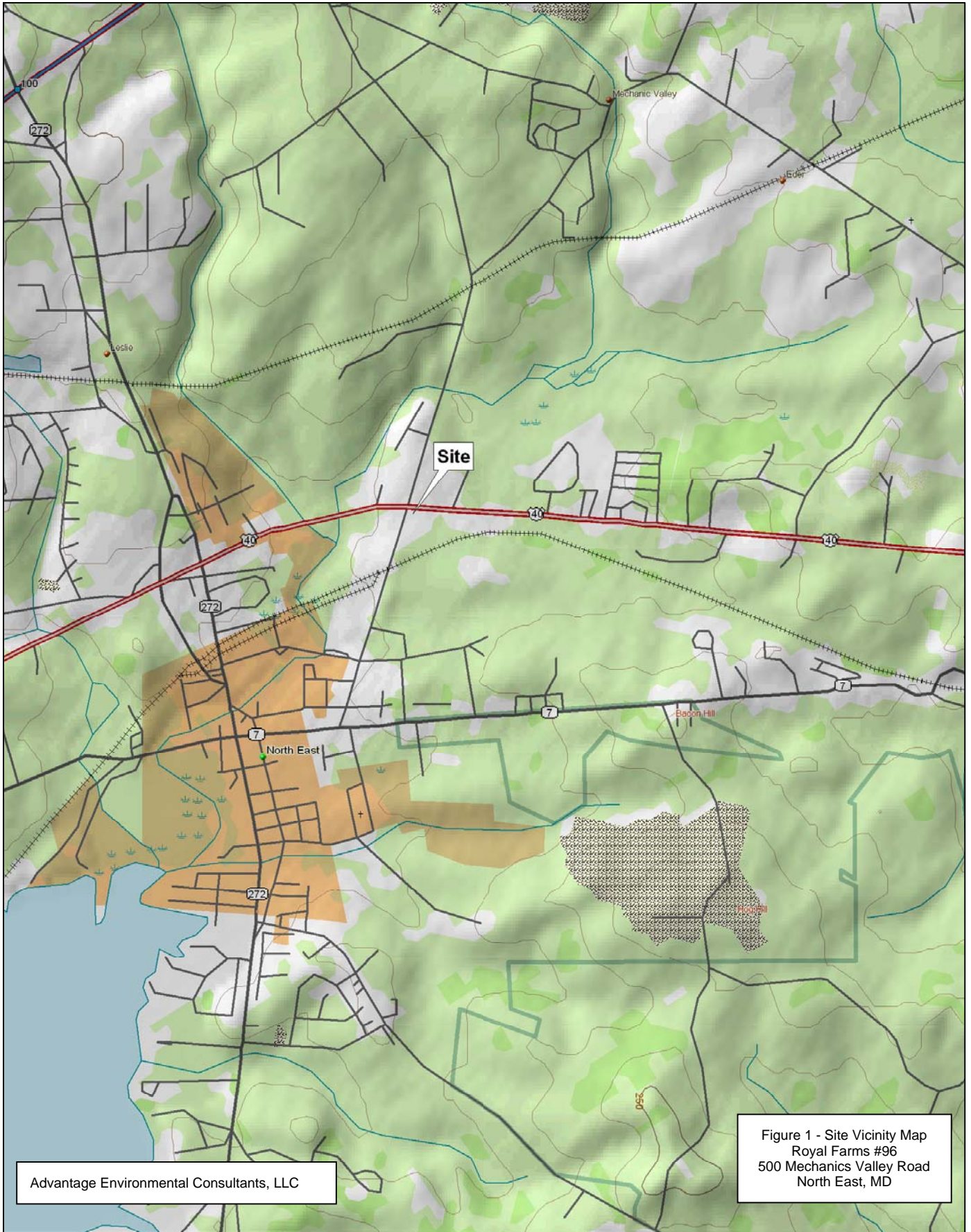
Conclusions

Based on the results of the packer testing and groundwater sampling activities performed from January 22 to January 31, 2013 it is our professional opinion that there is limited connectivity, if any, between the surficial and bedrock aquifers at the Site. The following observations support this assertion:

- There was significant head difference between the shallow monitoring wells and the water levels measured in the adjacent deep monitoring well. While the potential exists for the downward migrations of groundwater, the large head difference indicates very low permeability in the base of the shallow sediments underlying the Site. This will significantly reduce the downward migration of groundwater and any contaminants that may be found in the groundwater.
- During pumping of the deep wells there was no measureable corresponding response in the shallow monitoring wells. In addition, limited response in the non-pumping deep wells indicated a limited connection between fracture zones within the bedrock aquifer. Responses that were noted (i.e., drawdown in MW-13D when MW-12D was being packer tested) may be the result of other pumping in the aquifer and not necessarily the pumping that occurred during packer testing. Due to the lack of response, radius of influence calculations for fracture connectivity were not performed.
- AEC has recently performed low-flow groundwater sampling at all three of the on-site deep wells. Upon review of the results of these samples, AEC will compare the results of the discrete samples collected during this investigation and present an addendum to this report specifying future discrete interval sampling via the Hydrasleeve sampling methodology.

AEC recommends that after the hydrasleeve sampling, the deep monitoring wells be abandoned or a sleeve be placed in them to prevent water movement up or down the borehole. These wells may become a source of short circuiting between the fracture zones in one or all of the wells.

ATTACHMENT A



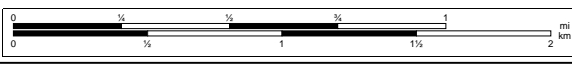
Advantage Environmental Consultants, LLC

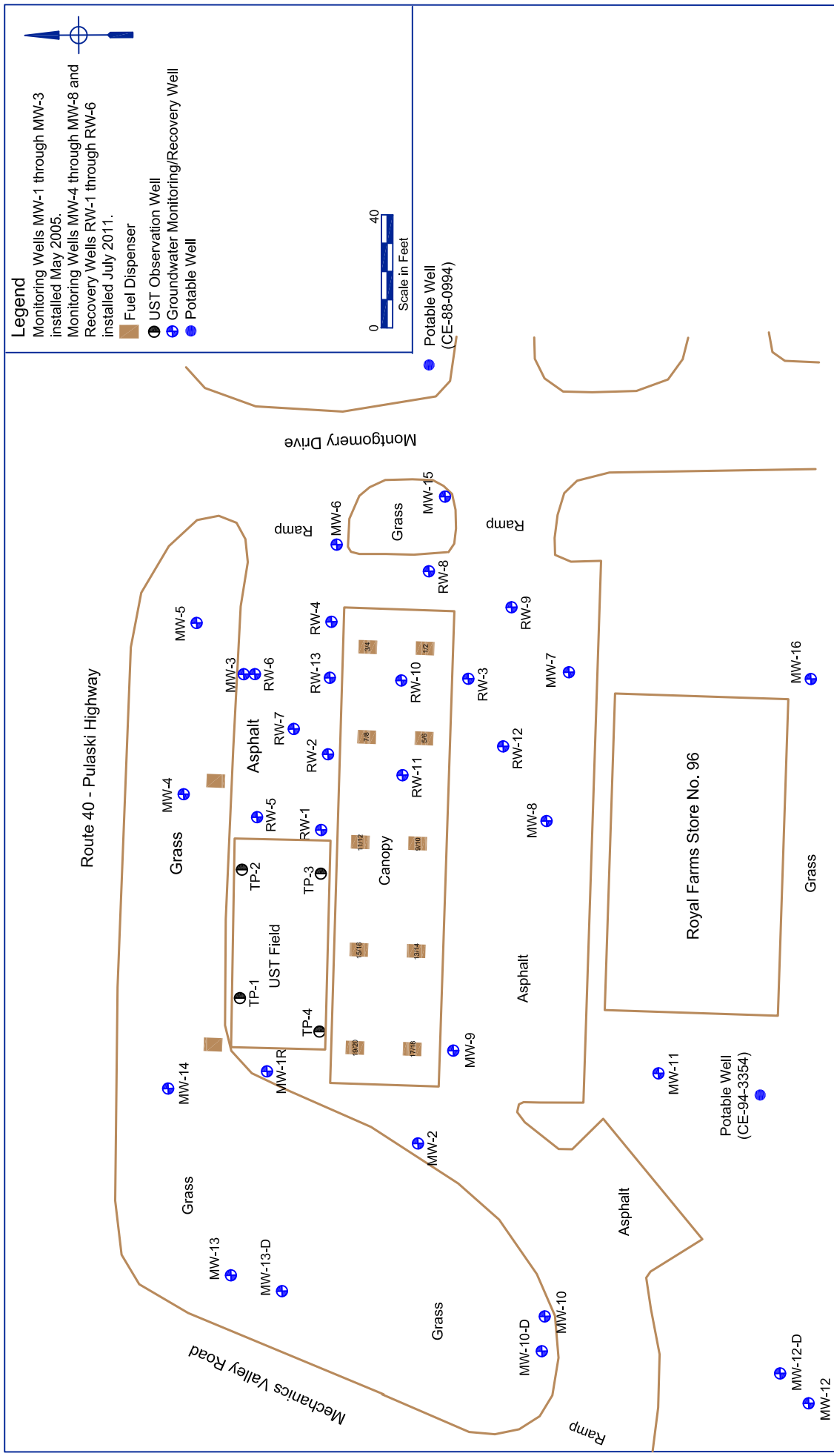
Figure 1 - Site Vicinity Map
 Royal Farms #96
 500 Mechanics Valley Road
 North East, MD



© 2001 DeLorme. Topo USA® 3.0
 Zoom Level: 12-7 Datum: WGS84

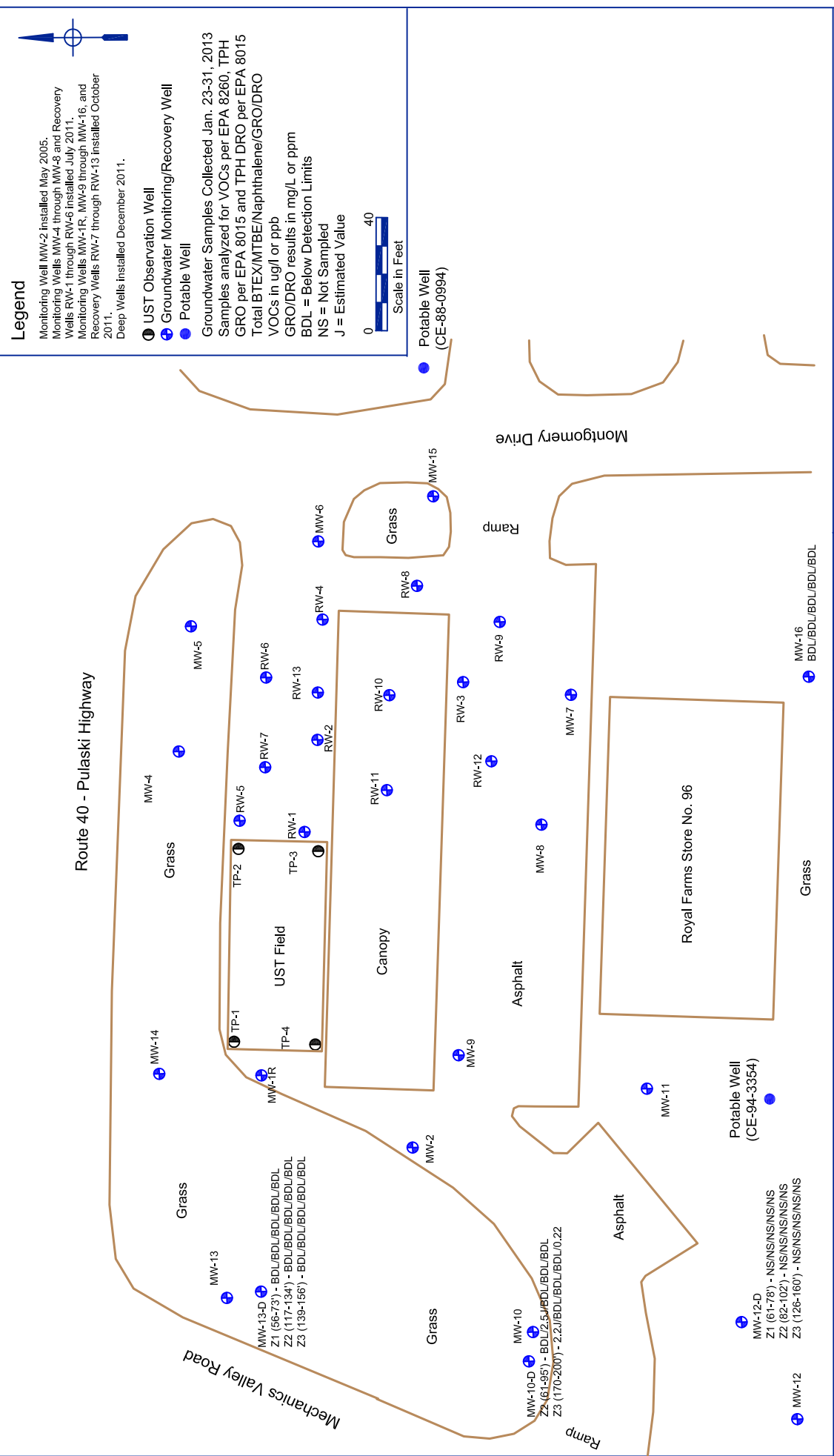
Scale: 1" = 28.125'
 1" = 2,343.75 ft





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		Task No.: RF96	Date: 2-7-12
		File: Site Features	Revision No.: 3

Figure 2 - Site Features Map
 Royal Farms No. 96
 500 Mechanics Valley Road
 North East, MD



Legend

Monitoring Well MW-2 installed May 2005.
 Monitoring Wells MW-4 through MW-8 and Recovery Wells RW-1 through RW-6 installed July 2011.
 Monitoring Wells MW-1R, MW-9 through MW-16, and Recovery Wells RW-7 through RW-13 installed October 2011.
 Deep Wells installed December 2011.

- UST Observation Well
- ⊕ Groundwater Monitoring/Recovery Well
- Potable Well

Groundwater Samples Collected Jan. 23-31, 2013
 Samples analyzed for VOCs per EPA 8260, TPH
 GRO per EPA 8015 and TPH DRO per EPA 8015
 Total BTEX/MTBE/Naphthalene/GRO/DRO
 VOCs in ug/l or ppb
 GRO/DRO results in mg/L or ppm
 BDL = Below Detection Limits
 NS = Not Sampled
 J = Estimated Value



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		File: Site Features	Revision No.: 3

Figure 3 - Groundwater Quality Map
 Royal Farms No. 96
 500 Mechanics Valley Road
 North East, MD

ATTACHMENT B

**RESULTS OF PACKER TESTING
IN THREE WELLS LOCATED AT
THE ROYAL FARMS STORE #96
500 MECHANICS VALLEY ROAD
NORTH EAST, MARYLAND**

MARCH 2013

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FIGURES

Figure

- 1 Site map showing the location of monitoring wells at the North East, Maryland Royal Farms Store No. 96
- 2 Water level response in shallow monitoring wells to packer testing in MW-10D.
- 3 Water level response in shallow monitoring wells to packer testing in MW-12D.
- 4 Water level response in shallow monitoring wells to packer testing in MW-13D.
- 5 Water level response in deep monitoring wells to packer testing in MW-10D.
- 6 Water level response in deep monitoring wells to packer testing in MW-12D.
- 7 Water level response in deep monitoring wells to packer testing in MW-13D.

APPENDICES

Appendix

- A Typical Straddle Packer Assembly Configuration
- B Well MW-10D Packer Test Data and Plots
- C Well MW-12D Packer Test Data and Plots
- D Well MW-13D Packer Test Data and Plots

1.0 INTRODUCTION

1.1 Background

Earth Data Incorporated of Centreville, Maryland (Earth Data), working as a subcontractor to Advantage Environmental Consultants, LLC of Jessup, Maryland (AEC), has completed straddle packer testing in three (3) wells at the Royal Farms Store #96, located at 500 Mechanics Valley Road, North East, Cecil County, Maryland. The wells that were tested were all constructed with 6-inch diameter steel casing set through a sedimentary formation with an open borehole drilled into the underlying fractured bedrock aquifer. An open hole was completed in the bedrock below the bottom of each well casing. A map showing the location of each monitoring well on the site is included in Figure 1 of this report. A shallow monitoring well (not shown on the figures) with the same number as the deep well is located near each of the deep monitoring wells.

The construction features of the three (3) wells in which straddle packer testing was performed are summarized in the following table:

Well Name	Permit No.	Casing Dia. (inches)	Casing Material	Casing Depth (ft.)	Total Well Depth (ft.)	Number Of Packer Intervals
MW-10D	CE-10-0216	6	STEEL	61	198	4
MW-12D	CE-10-0217	6	STEEL	59	160	3
MW-13D	CE-10-0215	6	STEEL	59	181	4

1.2 Scope of Work

Earth Data performed straddle packer testing in the three wells identified above from January 22 through 31, 2013. The purpose of the packer testing was to determine the hydraulic characteristics and water quality of selected fractured intervals. The intervals that were isolated were identified during a comprehensive borehole geophysical investigation completed in each well as part of a previous work assignment. The packer testing program was designed by AEC in consultation with Earth Data. The specific number of borehole intervals to be tested, pumping rates utilized,

purge times, purged groundwater monitoring/sample collection and laboratory analytical parameters were all determined by AEC. This report presents the mechanics and basic findings of the packer testing.

2.0 STRADDLE PACKER TESTING

Tests were conducted in selected isolated intervals of three bedrock monitoring wells previously discussed. Manual water levels were also measured by AEC in three shallow monitoring wells during the packer testing. The recovery/containment system in operation on the property was shut down the day before packer testing began.

The selected intervals within each borehole were isolated from the remaining portions of the open bedrock borehole by means of straddle packer assemblies. Packers with natural rubber-coated external bladders were inflated with nitrogen in order to expand the units to form a seal against the borehole wall. Within the isolated borehole intervals measurements of hydraulic head potential and hydraulic yield were recorded and when warranted, discrete water quality samples were collected for laboratory analysis. A discussion and summary of the individual well straddle packer testing results is found in Section 2.3 of this report. Generalized diagrams of the straddle packer assembly configuration can be found in Appendix A.

All water quality samples were collected by AEC and analyzed by their subcontracted laboratory. That water quality data is not contained or discussed in this report.

2.1 Description of Equipment

The packer testing system used during the work included a straddle packer assembly as generally depicted in the diagram presented in the appendix. The following describes the components of the system used on this project.

Packers and Pumps

Uninflated Outer Diameter (inches)	Maximum Inflated Diameter (inches)	Overall Bladder Length (feet)	Mandril Inner Diameter (inches)
3.5	6.5	3.3	1.25

A ½-horsepower Grundfos Redi-flo submersible pump was lowered through the 2-inch lift pipe to the top of the packer assembly when required. The system allowed for the individual inflation/deflation of each packer. This allowed for the isolation of larger sections of borehole for example from the top packer to the bottom of the well when a shorter isolated zone between the two packers did not produce a sufficient quantity of water.

Data Collection System

Three (3) pressure transducers (4-20 mA) calibrated to read depth to water were inserted in the borehole as part of the straddle packer system which, with both packers inflated, allowed for the continuous monitoring of water levels above, within and below each isolated interval being tested. The transducer monitoring the water level below the lower packer was located between the packers and sensed pressure changes below the bottom packer by means of a ¼-inch diameter tube.

Transducer signals were directed through the top packer to a digital data logger. The data logger output was directed to a field laptop computer which provided either a real time tabular or graphical display of the water level data. The data logger also stored all water level readings at an interval of 15 seconds during each day of testing.

2.2 Packer Testing Procedure

The standard packer testing procedure utilized in each borehole included the following basic steps:

1. A fixed length between packers is selected and the piping between the packers is adjusted accordingly.
2. The composite packer assembly is lowered into the well bore to the desired depth.
3. The selected depth is given a “set” designation such as Set 1, Set 2, etc.
4. The static water level in the well is measured to calibrate the transducers.
5. Pressure transducers are activated and initial milliamp readings are obtained.

6. A measuring point is designated for the well so that all depths are from the same point.
7. The water level for all three transducers is adjusted to read the same measured static water level.
8. Data logging is initiated.
9. Nitrogen is introduced through the inflation tubes to each packer causing the packers to expand outward against the wall of the well boreholes.
10. Once the packers are inflated the transducer readings are allowed to equilibrate, revealing head pressure differential values between borehole intervals. These initial readings are recorded.
11. Next, a slug test is normally performed to determine if the isolated zone will produce water or to determine a specific capacity if it is a low water producing zone.
12. Pumping of the isolated interval is initiated utilizing a ½-horsepower Redi-flo pump inside the 2-inch diameter galvanized steel lift pipe on dedicated ¼-inch diameter polyethylene tubing.
13. Water level data including drawdown in the isolated zone and changes in the zones above and below the pack are collected.
14. Pumping rates are monitored and controlled as required for low flow sampling.
15. All purge water is pumped into an enclosed container for later disposal.
16. When requested, the pump is deactivated and water-level recovery readings are recorded.
17. Prior to and upon the completion of the packer testing in each borehole, the submersible pump, galvanized steel lift pipe, packers, transducer cables and inflation tubes are physically scrubbed with mixtures of Liquinox and distilled water, thoroughly steam cleaned and allowed to air dry.

All sampling pumps, packers and lift pipe sections are steam cleaned internally and externally. Temperature-sensitive pressure transducers are cleaned with a Liquinox and distilled water scrub and allowed to air dry.

2.3 Summary of Well Packer Testing

In each well discrete zones were selected for packer testing based on the results of the previous borehole geophysical survey. All water level measurements taken during the testing were made from the top of the existing well casing inside the flush mounted well vault. A short open-hole pumping test was completed in each well. Water levels were recorded using pressure transducers mounted on the packer assembly. For reporting purposes water level values discussed in this text are taken from logged data and not from field observations. The report appendix contains all packer test data and field notes.

2.3.1 Well MW-10D

Four interval sets were selected for testing in the MW-10D well. Testing was performed January 22-24, 2013. The intervals selected for testing are summarized in the following table:

Set I.D.	Test Date(s)	Packer Interval
1	1-22-2013	74.4'- 85.3'
1B	1-22-2013	71.9'-82.9'
2	1-23-2013	61.0'- 95.9'
3	1-24-2013	170.0'-180.1'

MW-10D: Set 1

Set 1 was tested on January 22, 2013. Testing was performed on the borehole interval from 74.4 feet to 85.3 feet. Prior to inflating the packers the open-hole static water level in the well was measured at a depth of 12.86 feet. Following inflation the pre-slug water level above, within and below the inflated packers was 11.04 feet, 11.11 feet, and 11.21 feet, respectively.

A 1-gallon slug of water was poured into the lift pipe connected to the isolated interval. The water level rose approximately 2.5 feet and decayed rapidly. A similar response in magnitude of change and general shape of the data plot was recorded below the packer (7.92 feet), indicating a poor packer seal due to an uneven borehole wall. Following an adjustment of the packer testing pressures, a second slug test was completed with similar results. Therefore, it was decided to relocate the packer assembly to a smoother portion of the borehole. This new location is identified as Set 1B.

The well hydraulic head data from MW10D: Set 1 testing is summarized as follows:

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	12.86	13.00	12.91	12.98
Inflated (pre-slug) Water Level (ft.)	n/a	11.04	11.11	11.21
Peak Slug Test Water Level (ft.)	n/a	10.86	7.75	7.92
2 nd Pre-slug Water Level (ft.)	n/a	10.99	11.07	11.18
2 nd Peak Slug Test Water Level (ft.)	n/a	10.87	6.60	6.78

MW-10D: Set 1B

Set 1B was tested on January 22, 2013. Testing was performed on the borehole interval from 71.9 feet to 82.9 feet. Prior to inflating the packers the open-hole static water level in the well was measured at a depth of 14.05 feet. Following inflation the pre-slug water level above, within and below the inflated packers was 11.37 feet, 11.33 feet, and 11.89 feet, respectively.

A slug test was performed on the isolated interval. The water level in the lift pipe rose approximately 5.5 feet. A muted response to the slug test was recorded below the bottom packer (3.8 feet). However, the overall shape of the response curve appeared identical to the test interval which was interpreted as possibly still being a poor packer seal. It was decided by AEC to lower the packer assembly approximately 10.0 feet but not to inflate the top packer creating a composite zone from the bottom of the casing to the top of the bottom packer.

The well hydraulic head data from MW10D: Set 1B testing is summarized as follows:

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	14.05	14.00	14.00	14.00
Inflated (pre-slug) Water Level (ft.)	n/a	11.37	11.33	11.89
Peak Slug Test Water Level (ft.)	n/a	11.37	6.42	8.25

MW-10D: Set 2

Set 2 was tested on January 23, 2013. The packer assembly was lowered in the borehole to isolate an interval from 61.0 feet to 95.9 feet. Only the lower packer was inflated for this test. Prior to inflating the packer the open-hole static water level in the well was measured at a depth of 14.45 feet. Following inflation the pre-slug water levels above and below the inflated packer were 13.50 feet and 17.99 feet, respectively.

Since an open 6-inch diameter borehole was being tested, a 2-gallon slug of water was poured into the lift pipe connected to the interval. No response to the slug test was recorded below the packer indicating a good seal and no discernable interconnectivity with the fractured bedrock immediately below the inflated packer. The small (0.6-feet) response to the slug test indicates that the zone had a viable amount of water production for a pumping test.

Following slug testing the pre-pumping water level above and below the bottom packer were 13.44 feet and 19.57 feet, respectively. The interval was pumped at an average rate of approximately 1.0 gpm for a period of approximately 93 minutes during which time low-flow sampling was initiated by AEC. Numerous flow rate adjustments were made during pumping in order to stabilize the flow. The calculated specific capacity for this zone was .028 gpm/ft.

The maximum observed depth to water above the lower packer (test interval) was 49.17 feet, resulting in a drawdown of 35.73 feet. The maximum observed water level below the inflated packer was 21.73 feet. Therefore, the change in water level below the test interval was 2.16 feet and indicate a lower head in the well below a depth of approximately 100 feet.

At or near the end of the 20-minute recovery period the water level within and below the pumped interval was 41.76 feet and 22.87 feet, respectively.

The well hydraulic head data from MW-10D: Set 2 testing is summarized as follows:

	Open Hole	Upper Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	14.45	14.42	14.41
Inflated (pre-slug) Water Level (ft.)	n/a	13.50	17.99
Peak Slug Test Water Level (ft.)	n/a	12.91	17.99
Pre-pumping Water Level (ft.)	n/a	13.44	19.57
Maximum Pumping Level (ft.)	n/a	49.17	21.73
Calculated Drawdown (ft.)	n/a	35.73	2.16
20-Minute Recovery Water Level (ft.)	n/a	41.76	22.87

MW-10D: Set 3

Set 3 was tested on January 24, 2013. Testing was performed in an interval from 170.0 feet to 181.0 feet in the borehole. Prior to inflating the packers the open-hole static water level in the well was measured at a depth of 13.97 feet. Following inflation, the pre-slug water levels above, within and below the inflated packers was 12.80 feet, 12.47 and 15.61 feet, respectively. Again, it appeared that the lowest head in the well was near the bottom of the well between the approximate depths of 184.3 and 198.0 feet.

A 1-gallon slug of water was poured into the lift pipe connected to the isolated interval. The large (5.1-feet) response to the slug test indicated that the zone would only produce a very small amount of water. The response below the bottom packer was more muted and delayed as compared to the test interval. A muted and delayed response indicates that the bottom packer has a good seal against the borehole wall; however, interconnectivity of fractures out in the formation likely exists between and below the packers.

With packers inflated, a pumping test was performed to try and determine the actual yield. Following inflation the pre-pumping water levels above, within and below the isolated interval were 12.91 feet, 6.33 feet and 12.33 feet, respectively. The high water level in the test interval is due to the pump insertion acting as a “slug test” and the water level not recovering. The isolated interval was pumped at an average rate of approximately 0.25 gpm for a period of approximately 33 minutes followed by an increase to 0.5 gpm for a 30 minute period. The pumping rate was reduced to approximately 0.25 gpm during the final 15 minutes of the test. The calculated specific capacity for this zone was .0021 gpm/ft.

The deepest observed water level between the packers was 127.26 feet, resulting in a drawdown of 120.93 feet. The maximum observed water levels above and below the packer interval were 14.36 feet and 48.47 feet, respectively. Therefore, the drawdown above the isolated packer interval is calculated to be 1.45 feet and the drawdown below the packer interval is calculated to be 36.14 feet.

At or near the end of the approximate 30-minute recovery period the water levels above, within and below the pumped interval were recorded to be at the depths of 14.62 feet, 112.33 feet and 46.45 feet, respectively. Following a recovery period, the pump was turned on for low-flow sampling by AEC. After an approximate 10 minute sampling period, the pump was shut-off and the packers were deflated in preparation for an open-borehole pumping test.

The well hydraulic head data from MW-10D: Set 3 testing is summarized as follows:

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	13.97	13.93	13.93	13.94
Inflated (pre-slug) Water Level (ft.)	n/a	12.80	12.47	15.61
Peak Slug Test Water Level (ft.)	n/a	12.80	7.36	12.61
Pre-pumping Water Level (ft.)	n/a	12.91	6.33	12.33
Maximum Pumping Level (ft.)	n/a	14.36	127.26	48.47
Calculated Drawdown (ft.)	n/a	1.45	120.93	36.14
30-Minute Recovery Water Level (ft.)	n/a	14.62	112.33	46.45

MW-10D Open-Borehole Pumping Test

A pumping test was run in the well immediately following the Set 3 packer test on January 24, 2013. After the packers were deflated the water levels were allowed to stabilize before turning the pump back on.

The pre-pumping water level was 22.88 feet. The well was pumped at an average rate of approximately 1.0 gpm for a period of approximately 60 minutes. The maximum observed water level was 41.49 feet, resulting in a drawdown of 18.61 feet. At the end of the approximate 20-minute recovery period the water level was recorded to be 35.04 feet. The specific capacity is calculated to be .054 gpm/ft.

The well hydraulic head data from MW-10D: Open-Hole testing is summarized as follows:

	Open Hole
Pre-pumping Water Level (ft.)	22.88
Maximum Pumping Level (ft.)	41.49
Calculated Drawdown (ft.)	18.61
20-Minute Recovery Water Level (ft.)	35.04

2.3.2 Well MW-12D

Three interval sets were selected for testing in the MW-12D well. Testing was performed January 28 through 29, 2013. The intervals selected for testing are summarized in the following table:

Set I.D.	Test Date(s)	Packer Interval
1	1-28-2013	59.0'- 78.0'
2	1-28-2013	82.4'- 102.3'
3	1-29-2013	125.4'-160.0'

MW-12D Open-Borehole Pumping Test

An open-borehole pumping test was run in well MW-12D on January 25, 2013 prior to the Set 1 packer test. The packer assembly had been lowered into the well to the first set 1 depth but the packers were not inflated when the test was run.

The pre-pumping test water level was 29.26 feet. The well was pumped at a rate in excess of 1.0 gpm for a period of approximately 15 minutes, at which time the rate was reduced to an average flow of 0.3 gpm for an additional 45 minutes. The maximum observed water level was 44.42 feet, resulting in a drawdown of 15.16 feet. At the end of the approximate 20-minute recovery period, the water level was recorded to be 42.14 feet. The calculated specific capacity from the open-hole test was .020 gpm/ft.

The well hydraulic head data from MW-12D: Open-Hole testing is summarized as follows:

	Open Hole
Pre-pumping Water Level (ft.)	29.26
Maximum Pumping Level (ft.)	44.42
Calculated Drawdown (ft.)	15.16
20-Minute Recovery Water Level (ft.)	42.14

MW-12D: Set 1

Set 1 was tested on January 28, 2013. Testing was performed on the borehole interval from 59.0 feet to 78.0 feet. Only the lower packer was inflated for this test due to the proximity of the end of the well casing to the packer assembly. Prior to inflating the packer, the open-hole static water level in the well was measured at a depth of 28.15 feet. Following inflation, the pre-slug water levels above and below the inflated packer was 26.61 feet and 27.78 feet, respectively.

A 2-gallon slug of water was poured into the lift pipe connected to the upper isolated interval. The water level in the pipe rose approximately 1.0 feet. No response to the slug test was recorded below the packer indicating a good seal and no interconnectivity with the borehole immediately below the inflated packer.

As directed by AEC, a pump was lowered to the top of the packer assembly to provide for water sample collection. The pre-pumping water level above and below the inflated packer was 25.52 feet and 27.89 feet, respectively. The interval was pumped at an average rate of approximately 0.2 gpm for a period of approximately 20 minutes at the end of which time low-flow sampling was initiated. It was not appropriate to calculate a specific capacity for this zone.

The maximum observed water level above the inflated packer was 28.53 feet, resulting in a drawdown of 3.01 feet. The maximum observed water level below the packer interval was 27.94 feet. Therefore, the change in water level below the test interval is 0.1 feet. At or near the end of the approximate 29-minute recovery period the water level within and below the pumped interval was 28.52 feet and 27.95 feet, respectively. The water level in the test interval did not show any recovery indicating no water production within the test zone. The water pumped came entirely from borehole storage and the water sample was discarded.

The well hydraulic head data from MW-12D: Set 1 testing is summarized as follows:

	Open Hole	Upper Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	28.15	28.13	28.13
Inflated (pre-slug) Water Level (ft.)	n/a	26.61	27.78
Peak Slug Test Water Level (ft.)	n/a	25.53	27.78
Pre-pumping Water Level (ft.)	n/a	25.52	27.89
Maximum Pumping Level (ft.)	n/a	28.53	27.94
Calculated Drawdown (ft.)	n/a	3.01	0.1
29-Minute Recovery Water Level (ft.)	n/a	28.52	27.95

MW-12D: Set 2

Set 2 was tested on January 28, 2013. The testing was performed on the borehole interval from 82.4 feet to 102.3 feet. Prior to inflating the packers the open-hole static water level in the well was measured at a depth of 28.41 feet.

A 1-gallon slug of water was poured into the lift pipe connected to the isolated interval. The water level in the pipe rose approximately 7.0 feet. There was no response to the slug test below the bottom packer. Following slug testing, the pre-pumping water levels above, within and below the isolated interval were 25.29 feet, 18.41 feet and 28.19 feet, respectively. Based on these levels, it appeared that the fracture controlling the static water level in MW-12D is in the lower portion of the well below 105.6 feet. The isolated interval was pumped at an average rate of approximately 0.2 gpm for a period of 10 minutes; at this time the pumping rate was increased to approximately 0.4 gpm for a final 18 minute period before the intake of the pump was reached. No sample was taken at this zone because the water came from casing storage and not the formation.

The maximum observed pumping water level between the packers was 73.59 feet, resulting in a drawdown of 55.18 feet. The maximum observed water levels above and below the packer interval were 25.50 feet and 28.71 feet, respectively. Therefore, the change in water level above the isolated packer interval during the pumping period is calculated to be 0.21 feet and below the packer interval is calculated to be 0.52 feet. The calculated specific capacity for this zone was .007 gpm/ft.

Near the end of the approximate 75-minute recovery period the water levels, within the isolated interval was recorded to be at a depth of 65.85 feet. The water level had recovered only 7.74 feet in 75 minutes.

The well hydraulic head data from MW-12D: Set 2 testing is summarized as follows:

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	28.41	28.40	28.40	28.41
Inflated (pre-slug) Water Level (ft.)	n/a	25.44	25.26	27.91

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Peak Slug Test Water Level (ft.)	n/a	25.44	19.75	27.94
Pre-pumping Water Level (ft.)	n/a	25.29	18.41	28.19
Maximum Pumping Level (ft.)	n/a	25.50	73.59	28.71
Calculated Drawdown (ft.)	n/a	0.21	55.18	0.52
75-Minute Recovery Water Level (ft.)	n/a	25.88	65.85	29.07

MW-12D: Set 3

Set 3 was tested on January 29, 2013. The straddle packer assembly was lowered in the well and only the top packer was inflated for this test. The isolated interval was from 125.4 feet to the bottom of the well at 160.0 feet. Prior to inflating the packer the open-hole static water level in the well was measured at a depth of 29.17 feet. Following inflation the pre-slug water levels above and below the inflated packer were 27.98 feet and 27.58 feet, respectively.

A 1-gallon slug test was performed on the isolated interval. The water level in the isolated interval rose 5.0 feet. No decline in the water level was noted immediately following the slug test and no response was recorded above the top packer.

Following the slug test, the pre-pumping water levels above and below the inflated packer were 27.99 feet and 19.89 feet, respectively. The increased water level in the bottom test interval was due to the slug test and the insertion of the submersible pump which acted as another “slug test”. With no recovery, the zone between 125.4 and 160.0 feet appeared to be very tight. Never-the-less, the isolated interval was pumped at an average rate of approximately 0.5 gpm for a period of approximately 17 minutes; at this time the pumping rate was increased to approximately 1.0 gpm for a final 9 minutes before the intake of the pump was reached. Since most of the water pumped came from casing storage, no water sample was taken from this zone.

The maximum observed water level below the packer was 117.35 feet, resulting in a drawdown of 97.46 feet. The maximum observed water level above the packer interval was 28.44 feet. The specific capacity for this zone was calculated to be .008 gpm/ft.

At or near the end of the approximate 70-minute recovery period, the water level within the pumped interval was recorded to be at a depth of 96.25 feet indicating that the water level had recovered only 21.1 feet.

The well hydraulic head data from MW-12D:Set 3 testing is summarized as follows:

	Open Hole	Upper Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	29.17	29.14	29.13
Inflated (pre-slug) Water Level (ft.)	n/a	27.98	27.58
Peak Slug Test Water Level (ft.)	n/a	27.99	22.35
Pre-pumping Water Level (ft.)	n/a	27.99	19.89
Maximum Pumping Level (ft.)	n/a	28.44	117.35
Calculated Drawdown (ft.)	n/a	0.45	97.46
70-Minute Recovery Water Level (ft.)	n/a	29.63	96.25

2.3.3 Well MW-13D

Four packer sets were selected for testing in the MW-13D well. Testing was performed January 29 through 31, 2013. The sets selected for testing are summarized in the following table:

Set I.D.	Test Date(s)	Packer Interval
1	1-30-2013	59.0'- 73.4'
2	1-30-2013	116.9'- 134.2'
2B	1-30-2013	118.0'- 135.2'
3	1-31-2013	139.0'-156.3'

MW-13D Open-Borehole Pumping Test

An open-borehole pumping test was run in well MW-13D on January 29, 2013. The packer assembly was lowered into the well but the packers were not inflated.

The pre-pumping water level was 22.88 feet. The well was pumped at an average rate of 3.0 gpm for a period of approximately 37 minutes. The maximum observed water level was 47.81 feet, resulting in a drawdown of 24.93 feet. At the end of the approximate 24-minute recovery period the water level in the well had recovered to a depth of 36.70 feet. The calculated specific capacity for the open-borehole was .120 gpm/ft.

The well hydraulic head data from MW-13D: Open-Hole testing is summarized as follows:

	Open Hole
Pre-pumping Water Level (ft.)	22.88
Maximum Pumping Level (ft.)	47.81
Calculated Drawdown (ft.)	24.93
24-Minute Recovery Water Level (ft.)	36.70

MW-13D: Set 1

The intervals selected for Set 1 were tested on January 30, 2013. Testing was performed on the borehole interval from the bottom of the casing at 59.0 feet to a depth of 73.4 feet. Prior to inflating the packers the open-hole static water level in the well was measured at a depth of 19.74 feet. Following inflation the pre-slug water levels above, within and below the inflated packers were 16.84 feet, 11.00 and 20.63 feet, respectively.

A 1-gallon slug test was performed in the isolated interval. The water level rose approximately 5.2 feet. There was no response to the slug test above or below the packers. Following the slug test, the pre-pumping water levels above, within and below the isolated interval

were 16.74 feet, 8.53 feet and 20.87 feet, respectively. The isolated interval was pumped at an average rate of approximately 0.25 gpm for a period of approximately 30 minutes; at which time, the pumping rate was increased to approximately 0.4 gpm for a 15-minute period. The rate was reduced to 0.25 gpm for a final 15 minute period during which time AEC began low-flow sampling procedures. The specific capacity for the zone was calculated to be .008 gpm/ft.

The maximum observed water level between the packers was 45.39 feet, resulting in a drawdown of 36.86 feet. The maximum observed water level above and below the packer interval was 17.44 feet and 22.49 feet, respectively. The water level in the lower zone declined and the level was lower than the open-hole water level. This would indicate a lower head with depth but that the lower portion of the borehole might not entirely control the open-borehole static water level.

At or near the end of the approximate 75-minute recovery period, the water level within the isolated interval had recovered to 21.14 feet. Recovery was comparatively fast indicating the zone between 59.0 and 73.4 feet in this well also produced water.

The well hydraulic head data from MW-13D: Set 1 testing is summarized as follows:

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	19.74	19.69	19.69	19.71
Inflated (pre-slug) Water Level (ft.)	n/a	16.84	11.00	20.63
Peak Slug Test Water Level (ft.)	n/a	16.84	5.64	20.63
Pre-pumping Water Level (ft.)	n/a	16.74	8.53	20.87
Maximum Pumping Level (ft.)	n/a	17.44	45.39	22.49
Calculated Drawdown (ft.)	n/a	0.7	36.86	1.62
75-Minute Recovery Water Level (ft.)	n/a	17.55	21.14	22.57

MW-13D: Set 2

The packer assembly was lowered to Set 2 on January 30, 2013 and testing was performed in the borehole interval from 116.9 feet to 134.2 feet. Prior to inflating the packers the open-hole static

water level in the well was measured at a depth of 20.39 feet. Following inflation, the water levels above, within and below the inflated packers were 17.63 feet, 22.25 feet and 22.94 feet, respectively.

Because a water level response below the bottom packer was noted during the slug test at Set 2, AEC asked that the packers be repositioned to a smoother portion of the borehole. These new depths are identified as Set 2B.

The well hydraulic head data from MW13D: Set 2 testing is summarized as follows:

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	20.39	20.19	20.18	20.17
Inflated (pre-slug) Water Level (ft.)	n/a	17.63	22.25	22.94
Peak Slug Test Water Level (ft.)	n/a	17.63	19.71	22.11

MW-13D: Set 2B

Testing was performed at Set 2B for the borehole interval from 118.0 feet to 135.2 feet. Prior to inflating the packers the open-hole static water level in the well was measured at a depth of 22.13 feet. Following inflation, the water levels above, within and below the inflated packers were 18.91 feet, 22.05 and 23.13 feet, respectively.

The slug test indicated that the isolated zone should produce some water. The water level decline in the lower zone indicated that the bottom portion of the well was at a lower head than the isolated zone between the packers. The isolated interval was pumped at an average rate of approximately 1.0 gpm for a period of approximately 10 minutes; at this time the pumping rate was increased to approximately 1.5 gpm for a final 60 minute period. A water sample was taken from this zone by AEC near the end of the pumping period. The specific capacity calculated for this zone was .068 gpm/ft.

The maximum observed water level between the packers was 43.23 feet, resulting in a drawdown of 21.04 feet. The water level in the bottom zone declined in tandem with the isolated

zone but not in parallel. This would indicate that a connection between the two zones exists out in the aquifer and that the packers were providing a tight seal with the borehole.

Near the end of the approximate 20-minute recovery period, the water levels above, within and below the pumped interval were recorded to be at the depths of 17.65 feet, 32.65 feet and 32.10 feet, respectively.

The well hydraulic head data from MW-13D: Set 2B testing is summarized as follows:

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	22.13	22.03	22.04	22.06
Inflated (pre-slug) Water Level (ft.)	n/a	18.91	22.05	23.13
Peak Slug Test Water Level (ft.)	n/a	18.91	19.18	22.40
Pre-pumping Water Level (ft.)	n/a	17.91	22.19	23.13
Maximum Pumping Level (ft.)	n/a	17.74	43.23	37.82
Calculated Drawdown (ft.)	n/a	-0.17	21.04	14.69
20-Minute Recovery Water Level (ft.)	n/a	17.65	32.65	32.10

MW-13D: Set 3

Set 3 was tested on January 31, 2013. Testing was performed on the borehole interval from 139.0 feet to 156.3 feet. Prior to inflating the packers the open-hole static water level in the well was measured at a depth of 20.23 feet. Following inflation the pre-slug water levels above, within and below the inflated packers were 19.86 feet, 20.64 and 6.41 feet, respectively. The elevated head in the lower zone was due to the pressurization of the interval from 159.6 to 181.0 feet (the bottom of the well) when the packers were inflated. This would indicate that the lower zone would be extremely tight.

The slug test showed no apparent response above or below the inflated packers. Following slug testing the pre-pumping water levels above, within and below the isolated interval were 20.02 feet, 20.19 feet and 15.77 feet, respectively. The isolated interval was pumped at an average rate of approximately 0.3 gpm for a period of approximately 45 minutes; at this time the pumping rate was increased to approximately 0.45 gpm for a final 45 minute period before the intake of the pump was reached. A water sample was collected by AEC near the end of the pumping period. The specific capacity calculated for this zone was .012 gpm/ft.

The deepest observed water level between the packers was 50.42 feet, resulting in a drawdown of 30.23 feet. The water level above the upper packer only slowly declined due to pumping while the lower zone declined in tandem with the middle zone but only about one-half as much.

At or near the end of the approximate 27-minute recovery period the water levels above, within and below the pumped interval were recorded to be at the depths of 24.12 feet, 25.96 feet and 26.39 feet, respectively.

The well hydraulic head data from MW-13D: Set 3 testing is summarized as follows:

	Open Hole	Upper Zone	Middle Zone	Bottom Zone
Pre-Inflation Static Level (ft.)	20.23	20.46	20.47	20.47
Inflated (pre-slug) Water Level (ft.)	n/a	19.86	20.64	6.41
Peak Slug Test Water Level (ft.)	n/a	19.86	15.87	6.75
Pre-pumping Water Level (ft.)	n/a	20.02	20.19	15.77
Maximum Pumping Level (ft.)	n/a	24.09	50.42	38.70
Calculated Drawdown (ft.)	n/a	4.07	30.23	22.93
27-Minute Recovery Water Level (ft.)	n/a	24.12	25.96	26.39

2.4 Monitoring Well Water Levels

During each packer test, AEC staff measured water levels in the three shallow monitoring wells (MW-10S, MW-12S and MW-13S) and in the two deep monitoring wells that were not being packer tested (MW-10D, MW-12D or MW-13D). Measurements were made and tabulated on an almost continuous basis throughout each working day from January 22 through January 31, 2013.

Plots of these water levels are presented in Figures 2 through 7 and the well being packer tested is noted on each figure. The individual wells are color coded on each plot to provide continuity for each well in all of the plots and to aid in the interpretation of the results.

3.0 INTERPRETATION OF RESULTS

3.1 Aquifer Transmissivity

All three deep monitoring wells are completed in consolidated bedrock with only a few fracture openings that produce water. Well MW-13D had the highest open-hole specific capacity and the highest blown yield when initially drilled. Well MW-10D had the lowest specific capacity and appeared to have the tightest isolated zones during packer testing. Well MW-12-D had a somewhat higher open-hole specific capacity but was closer to MW-10D in penetrating rock of lower fracture permeability than the fractured rock encountered in MW-13D.

Because the duration of pumping had to be limited and casing storage was a major factor in the water that was actually pumped from the each isolated zone, it was impossible to calculate meaning full and useful values of transmissivity. While one should never generalize about aquifer transmissivity in a fractured rock aquifer, it does appear that transmissivity is extremely low along Mechanics Valley Road based on packer testing results. Fracture permeability does appear to increase toward Route 40 as evidence by the increased specific capacities noted in MW-13D.

3.2 Relative Water Level Elevations

The water level commonly measured in deep, open-hole wells in fractured rock normally represents the head of the most permeable water-bearing fracture encountered by the well. Because consolidated rock fracture flow systems can be fairly complicated, it is important to understand that there may be head differences in both horizontal and vertical directions. When packers are inflated, the divergence of the pre-pumping water levels provides an indication of the head distribution within the well and the aquifer at that location.

The packer testing at the North East site revealed head differences between individual fractures in all three deep monitoring wells. There was also significant head difference between the shallow monitoring wells and the water levels measured in the adjacent deep monitoring well. For example, the static water level in MW-13S was approximately 9.0 feet when the static water level in

MW-13D was approximately 19.0 feet. This represents a 10.0 foot head difference and has important implications regarding the shallow and deep groundwater flow systems at the site. While the potential exists for the downward migration of ground water, the large head difference indicates very low permeability in the base of the shallow unconsolidated sediments underlying the site. This will significantly reduce the downward migration of ground water and any contaminants that may be found in the ground water.

If a relatively good connection exists between the overburden and the bedrock, water levels in both will be very close in elevation. This is often the case in Piedmont bedrock aquifers covered with saprolite. At the North East site, the overburden consists of Coastal Plain, Cretaceous age sediments overlying bedrock. The overburden is not weathered bedrock as it is in much of the Piedmont. Horizontally extensive fine grained sediments in the overburdened significantly reduce vertical groundwater flow and large head differences result. In some situations, this may even result in seasonal perched water-table conditions in the shallow system.

3.3 Response of Shallow Monitoring Wells

As Figures 2, 3, and 4 indicate, there was no measureable response in the shallow monitoring wells MW-10S, MW-12S or MW-13S during the packer testing or open-hole test pumping of any of the three deep monitoring wells. The slight change in water levels in the shallow zone as the testing in MW-10D began on February 22, 2013, is attributed to shutting down the on-site containment system and/or changes in the water-level probe from one day to the next. These changes in water level were not seen again for the duration of the on-site testing.

3.4 Response of Deep Monitoring Wells

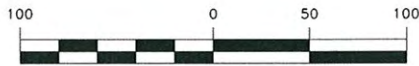
Water-level changes in the two deep monitoring wells not being tested provided some insight into the connectability (or lack thereof) between the three deep monitoring wells on the site. As Figures 5, 6, and 7 indicate, there were more changes in waters during the packer testing than were observed in the shallow monitoring wells.

At first, it was suspected that all of the changes were due to pumping a particular fracture zone in a particular well. However, since the duration of pumping a particular zone was short (one hour or less), the distances between wells fairly significant and two (MW-10D and MW-12D) of the deep wells did not appear to intersect very permeable well connected fractures, it became apparent that the changes in water levels might not be due to packer testing. A closer examination of the data plots indicated that drawdown was occurring after pumping in a particular well had stopped and the packers had been deflated. The decline in water levels also appeared to coincide with the last two or three measurements at the end of a particular work day. After each of these episodes, the water level in the deep well appeared to recover by the time the first reading was made the next morning.

While the greatest change was observed in MW-13D when MW-12D was being packer tested (a drawdown of approximately 6.0 feet), a similar large drawdown was not seen in MW-12D when MW-13D was being tested.

Since all of the drawdown occurred in late afternoon hours, it is assumed that some and perhaps all of the drawdown observed is due to other pumping in the aquifer and not necessarily the pumping that occurred during packer testing. To test this conclusion, continuous water level recorders could be placed in the three deep monitoring wells to collect water data over an approximate two or three week period. Recorders could also be placed in the two on-site commercial wells to see if the pumping of these wells influences the levels in the three deep monitoring wells.

FIGURES



GRAPHIC SCALE (FEET)



GROUNDWATER & ENVIRONMENTAL CONSULTANTS

131 COMET DRIVE
CENTREVILLE, MARYLAND 21617
TEL. 410.758.8160 / FAX 410.758.8168
www.earthdatainc.com

FIGURE 1

SITE MAP
FOR

ROYAL FARMS STORE #96

NORTH EAST, CECIL COUNTY, MARYLAND

PROJ. MGR.:	T.MOORSHEAD
DATE:	03/22/2012
SCALE:	AS SHOWN
EDI #:	4396
DRAWN BY:	T.COCHRAN

Figure 1 - Map showing location of monitoring wells at Royal Farms store #96. Image from Google Earth, US Geological Survey dated 1/31/2008.

Response to Packer Testing of 10 D - Shallow

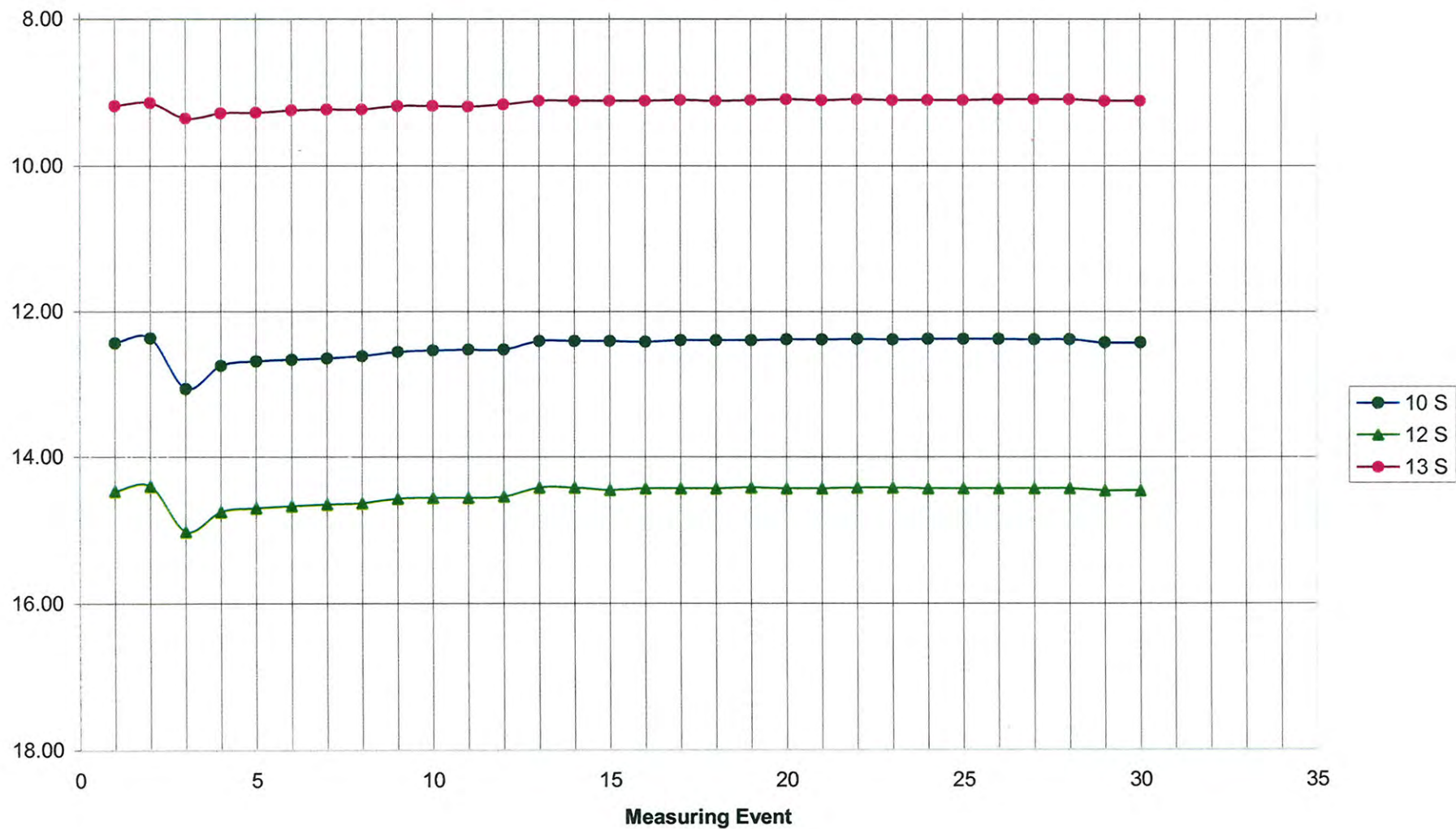


Figure 2 - Water level response in shallow monitoring wells to packer testing in MW-10D.

Response to 12 D Packer Testing - Shallow

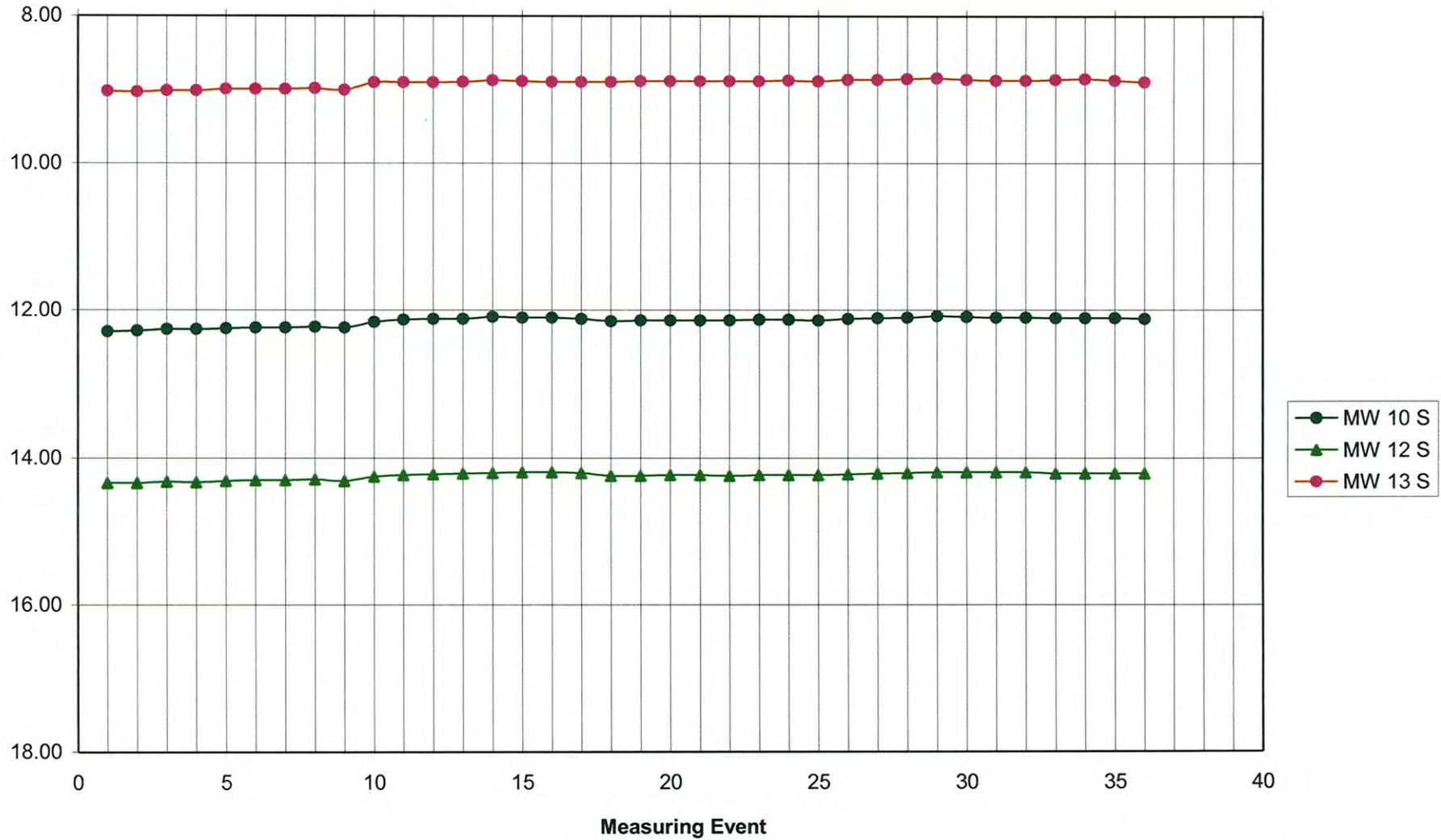


Figure 3 - Water level response in shallow monitoring wells to packer testing in MW-12D.

Response to 13 D Packer Testing - Shallow

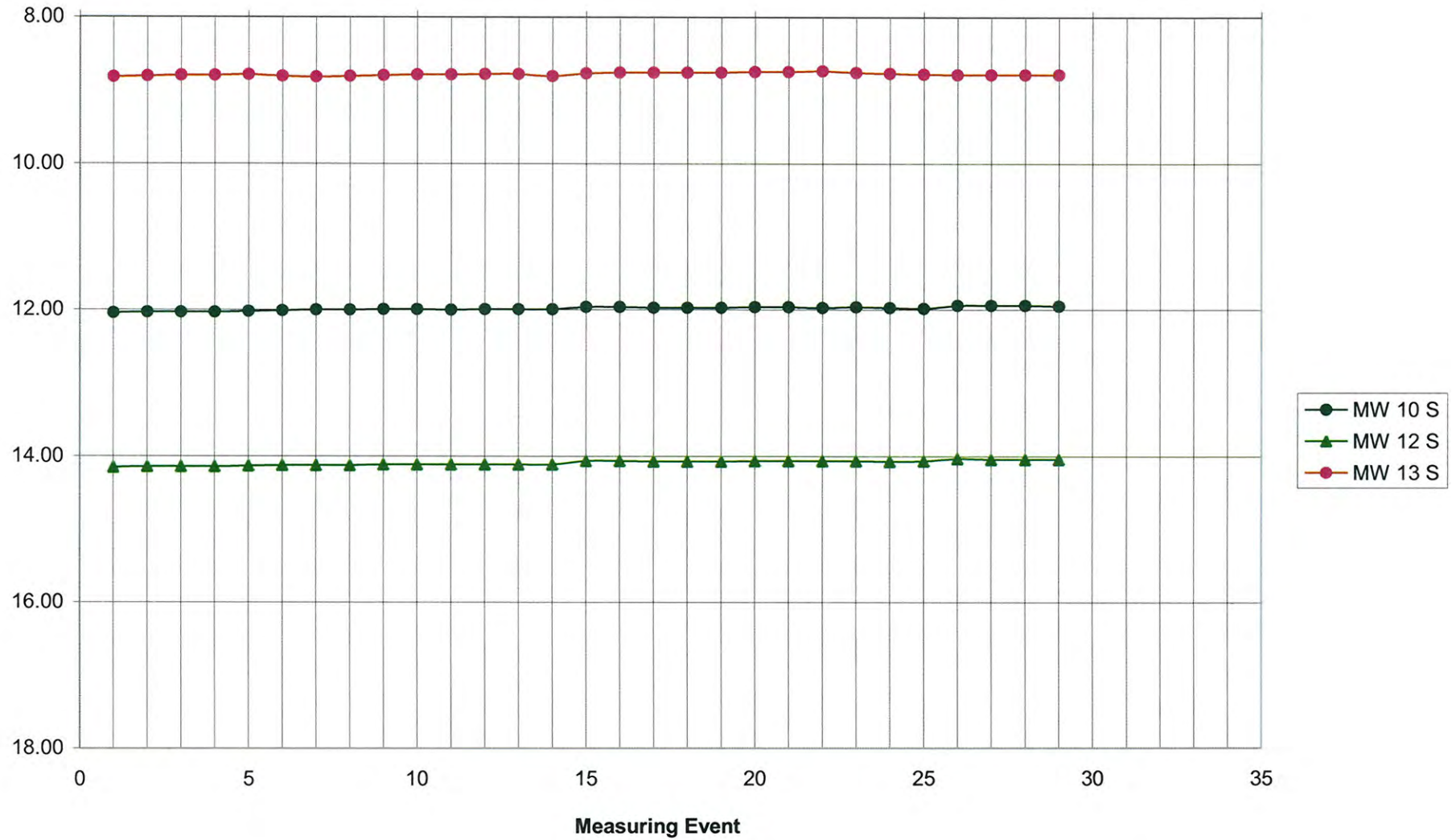


Figure 4 - Water level response in shallow monitoring wells to packer testing in MW-13D.

Response to Packer Testing of 10 D - Deep

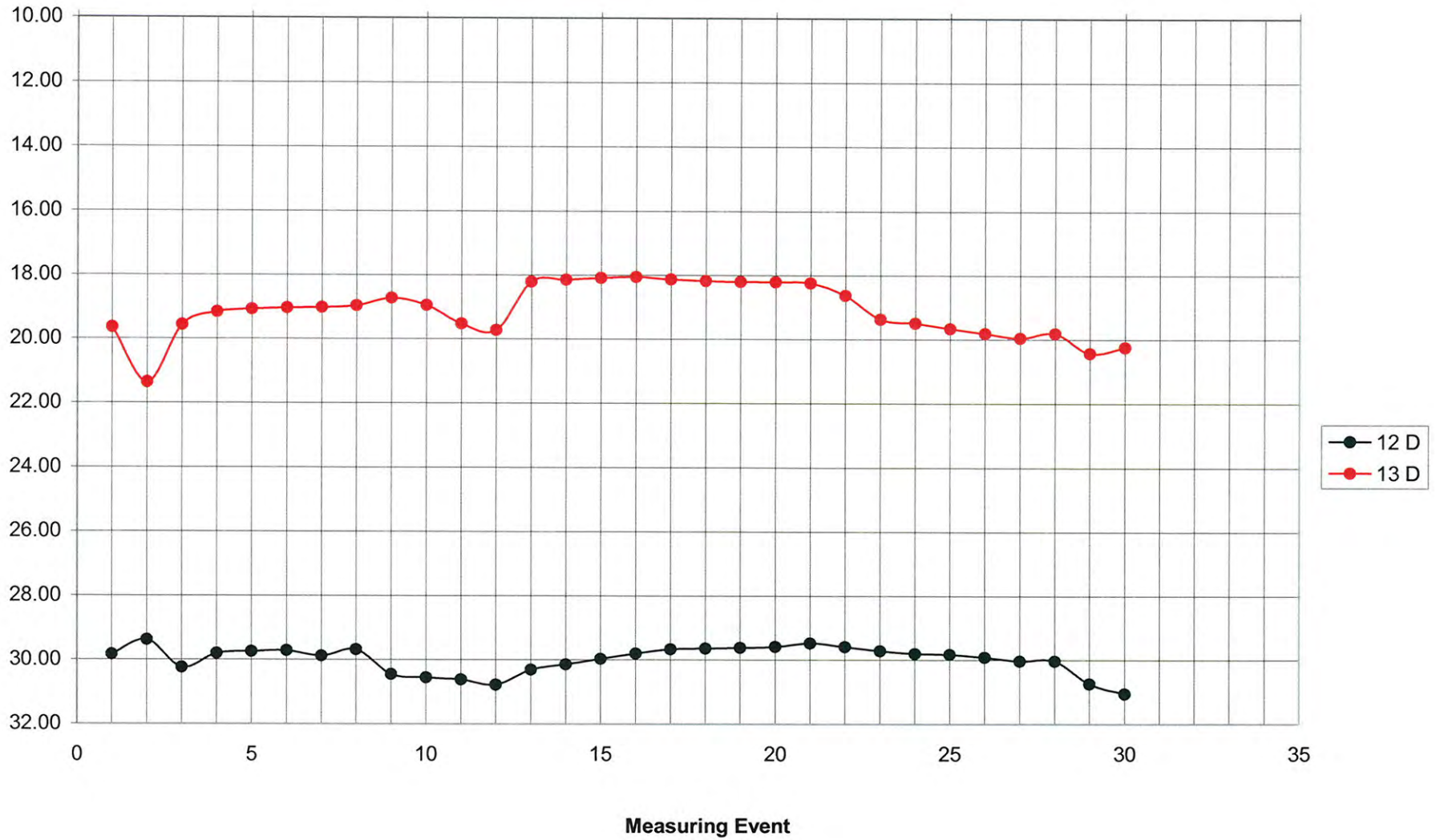


Figure 5 - Water level response in deep monitoring wells to packer testing in MW-10D.

Response to 12 D Packer Testing - Deep

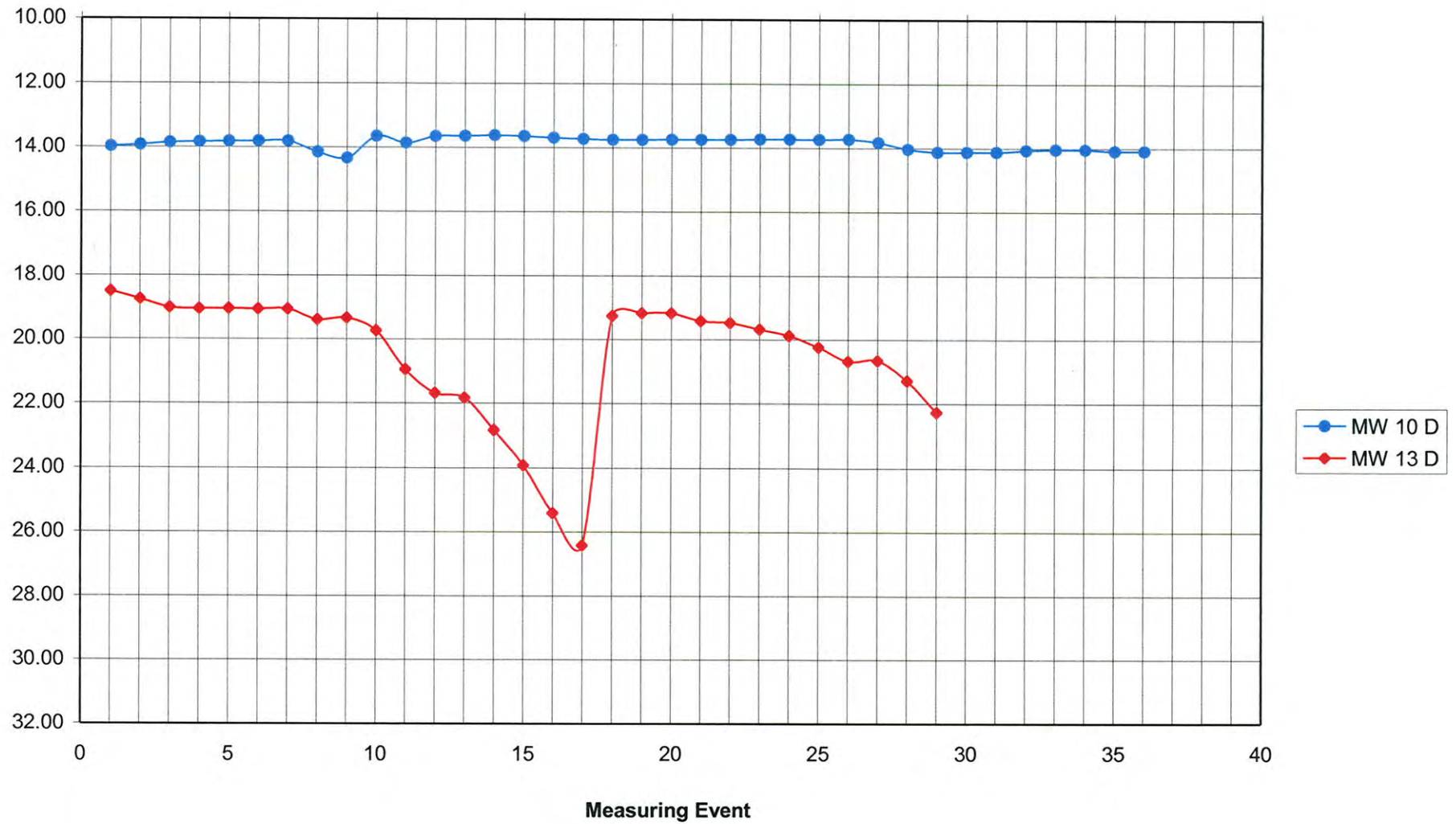


Figure 6 - Water level response in deep monitoring wells to packer testing in MW-12D.

Response to 13 D Packer Testing - Deep

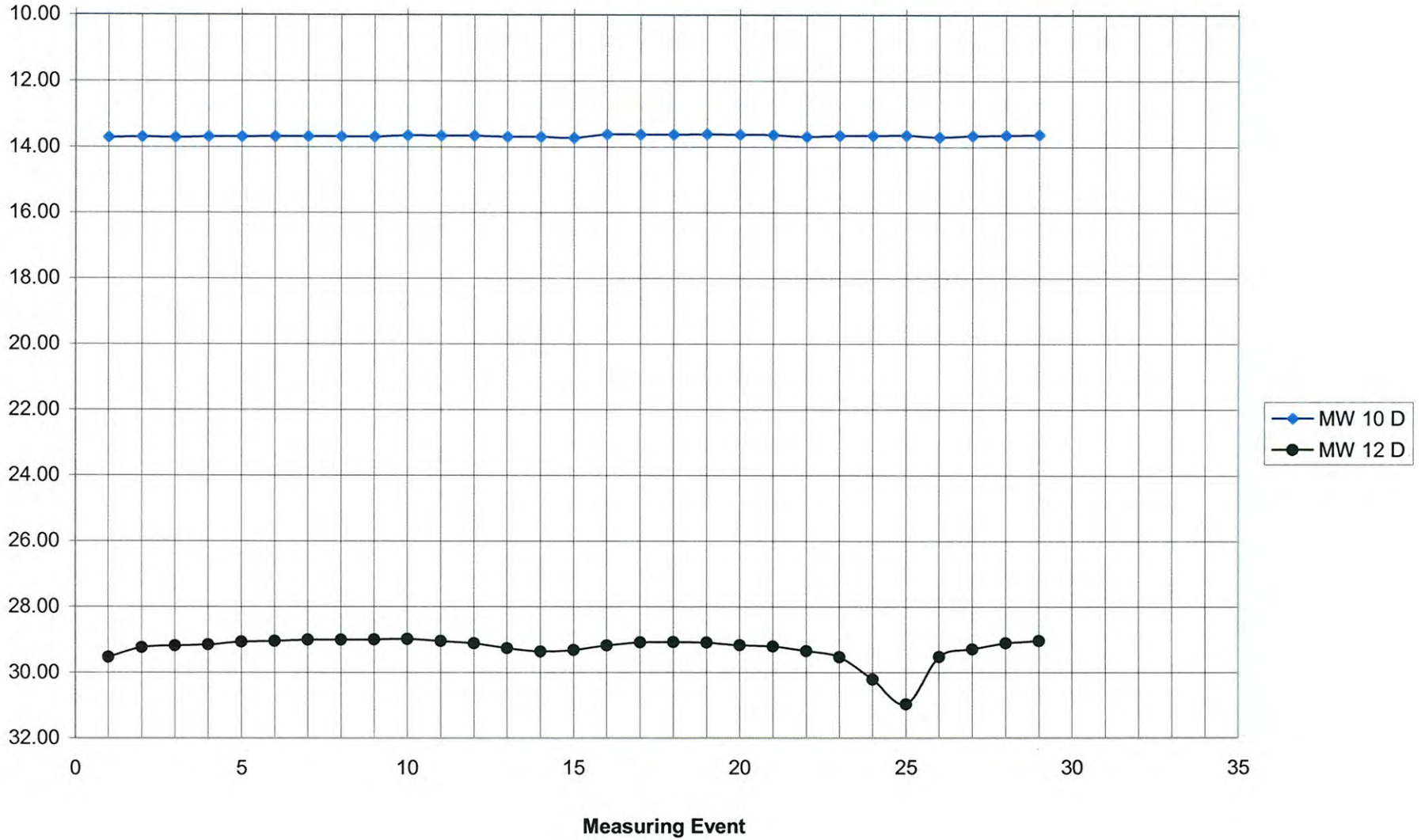


Figure 7 - Water level response in deep monitoring wells to packer testing in MW-13D.

Table 1 - MW-10D Packer Testing
Royal Farms Store No. 96
Test Conducted 1-22-13 through 1-24-13

Gauging Event	Time (min)	MW-10D	MW-10	MW-12D	MW-12	MW-13D	MW-13	Notes
1/22/2013								
1	Static	14.25	12.43	29.83	14.47	19.65	9.18	
2	240	ND	12.36	29.37	14.40	21.36	9.14	Slug Test
1/23/2013								
3	Static	13.35	13.06	30.24	15.02	19.57	9.35	
4	135	13.34	12.74	29.80	14.75	19.17	9.28	
5	165	16.03	12.68	29.74	14.70	19.08	9.27	Begin Pumping Test on Top Zone
6	178	24.64	12.66	29.71	14.67	19.04	19.24	
7	194	32.45	12.64	29.88	14.65	19.02	9.23	
8	210	37.07	12.61	29.68	14.63	18.97	9.23	Finish Pumping Test on Top Zone
9	340	24.20	12.55	30.46	14.57	18.73	9.18	
10	400	ND	12.53	30.56	14.56	18.95	9.18	
11	460	ND	12.52	30.63	14.56	19.53	9.19	
12	530	ND	12.52	30.79	14.54	19.73	9.16	
1/24/2013								
13	Static	13.96	12.40	30.31	14.42	18.21	9.11	
14	55	12.70	12.40	30.14	14.42	18.15	9.11	
15	110	12.70	12.40	29.97	14.45	18.09	9.11	Slug Test
16	160	12.80	12.41	29.80	14.43	18.06	9.11	
17	204	12.90	12.39	29.66	14.43	18.13	9.10	Begin Pumping Test on Bottom Zone
18	230	32.00	12.39	29.64	14.43	18.18	9.11	
19	247	44.50	12.39	29.61	14.42	18.20	9.10	
20	260	81.00	12.38	29.58	14.43	18.21	9.09	
21	275	112.00	12.38	29.47	14.43	18.24	9.10	Finish Pumping Test on Bottom Zone
22	315	116.00	12.37	29.58	14.42	18.63	9.09	
23	355	25.00	12.38	29.71	14.42	19.38	9.10	Begin Open Well Pumping Test
24	380	25.50	12.37	29.80	14.43	19.50	9.10	
25	395	30.50	12.37	29.82	14.43	19.67	9.10	
26	410	35.00	12.37	29.91	14.43	19.82	9.09	
27	425	39.00	12.38	30.03	14.43	19.96	9.09	End Open Well Pumping Test
28	440	35.50	12.38	30.03	14.43	19.82	9.09	
29	500	ND	12.42	30.75	14.46	20.44	9.11	
30	560	25.93	12.42	31.06	14.46	20.25	9.11	
	Distance	0	5	87	100	93	117	

Distance is measured from MW-10D (Extraction Well).
Distance and drawdown measurements in feet.
ND - No data.

Table 2 - MW-12D Packer Testing
Royal Farms Store No. 96
Test Conducted 1-25-13, 1-28-13, and 1-29-13

Gauging Event	Time (min)	MW-10D	MW-10	MW-12D	MW-12	MW-13D	MW-13	Notes
1/25/2013								
1	Static	13.97	12.29	30.75	14.34	18.50	9.02	
2	60	13.92	12.28	ND	14.34	18.75	9.03	
3	120	13.85	12.26	ND	14.32	19.02	9.01	
4	150	13.83	12.26	ND	14.33	19.06	9.01	Start Pumping Test on Top Zone
5	165	13.81	12.25	ND	14.31	19.05	8.99	
6	180	13.80	12.24	ND	14.30	19.07	8.99	
7	195	13.80	12.24	ND	14.30	19.07	8.99	Stop Pumping Test on Top Zone
8	255	14.14	12.23	ND	14.29	19.40	8.98	
9	315	14.33	12.24	ND	14.31	19.34	9.00	
1/28/2013								
10	Static	13.64	12.16	ND	14.25	19.74	8.90	
11	135	13.85	12.13	ND	14.23	20.95	8.90	
12	165	13.64	12.12	ND	14.22	21.68	8.90	Low flow sampling at top zone
13	178	13.63	12.12	ND	14.21	21.83	8.89	
14	194	13.61	12.09	ND	14.20	22.83	8.87	Low flow sampling at middle zone
15	210	13.63	12.10	ND	14.19	23.92	8.88	
16	340	13.68	12.10	ND	14.19	25.41	8.89	
17	400	13.71	12.12	ND	14.20	26.42	8.89	
1/29/2013								
18	Static	13.74	12.15	ND	14.24	19.27	8.89	
19	55	13.74	12.14	ND	14.24	19.18	8.88	
20	110	13.73	12.14	ND	14.23	19.18	8.88	Begin Pumping Test on Bottom Zone
21	160	13.73	12.14	ND	14.23	19.42	8.88	
22	204	13.73	12.14	ND	14.24	19.48	8.88	End Pumping Test on Bottom Zone
23	230	13.71	12.13	ND	14.23	19.68	8.88	
24	247	13.71	12.13	ND	14.23	19.88	8.87	
25	260	13.72	12.14	ND	14.23	20.24	8.88	
26	275	13.71	12.12	ND	14.22	20.68	8.86	
27	315	13.81	12.11	ND	14.21	20.66	8.86	
28	355	14.02	12.10	34.75	14.20	21.28	8.85	
29	380	14.11	12.08	33.38	14.19	22.26	8.84	
30	395	14.11	12.09	32.66	14.19	ND	8.86	
31	410	14.11	12.10	31.94	14.19	ND	8.87	
32	425	14.05	12.10	31.15	14.19	ND	8.87	Begin Open Well Pumping Test @ MW-13D
33	455	14.03	12.11	30.94	14.21	ND	8.86	
34	470	14.03	12.11	30.86	14.21	ND	8.85	
35	485	14.08	12.11	30.72	14.21	ND	8.87	
36	515	14.08	12.12	30.50	14.21	ND	8.89	
	Distance	87	90	0	13	183	206	

Distance is measured from MW-12D (Extraction Well).
Distance and drawdown measurements in feet.
ND - No data.

Table 3 - MW-13D Packer Testing
Royal Farms Store No. 96
Test Conducted 1-30-13 and 1-31-13

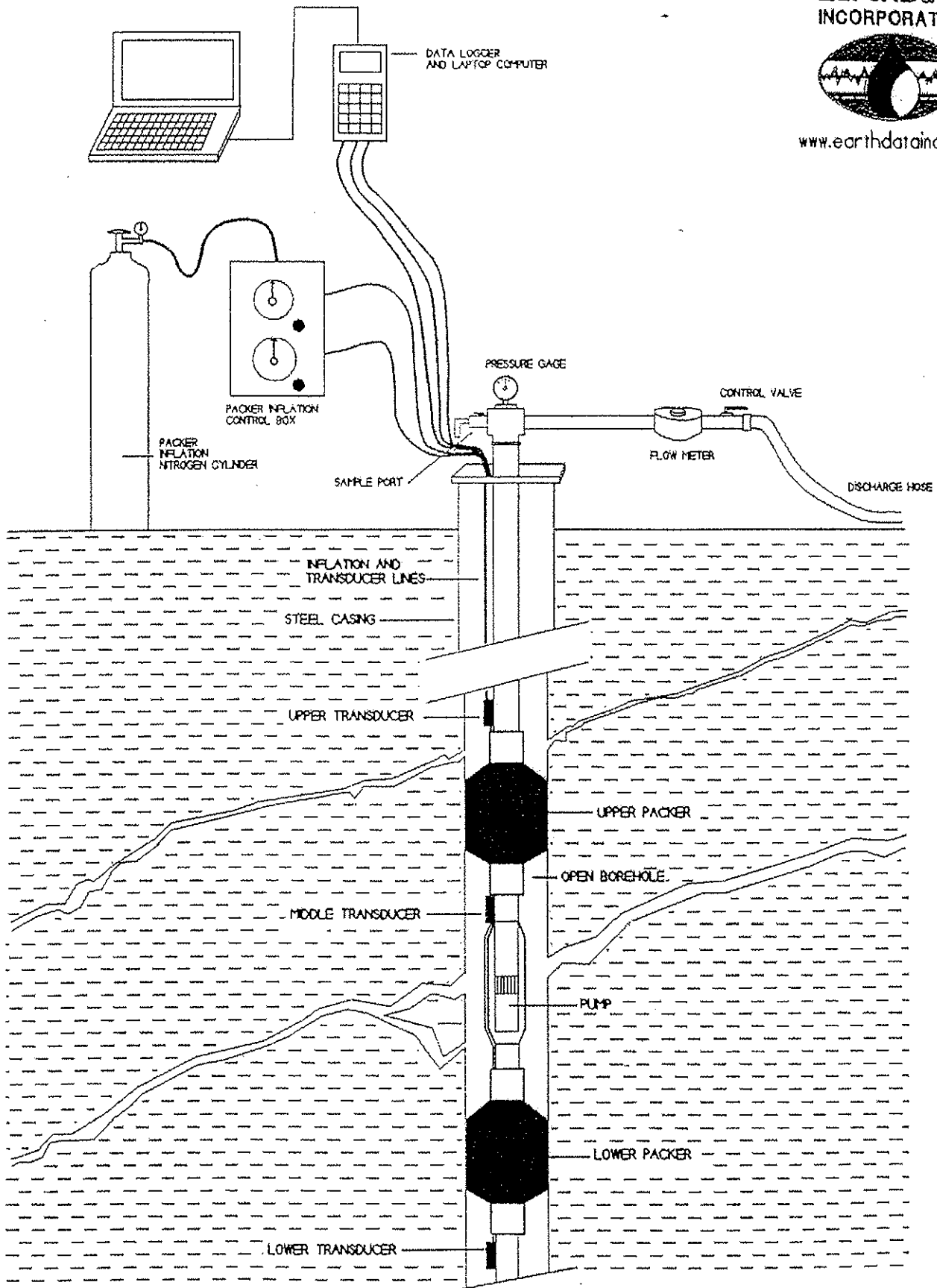
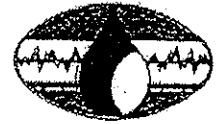
Gauging Event	Time (min)	MW-10D	MW-10	MW-12D	MW-12	MW-13D	MW-13	Notes
1/30/2013								
1	Static	13.71	12.04	29.53	14.15	19.77	8.81	
2	90	13.70	12.03	29.23	14.14	ND	8.80	
3	120	13.71	12.03	29.18	14.14	ND	8.79	
4	135	13.69	12.03	29.15	14.14	ND	8.79	Start Pumping Test on Top Zone
5	165	13.69	12.02	29.06	14.13	ND	8.78	
6	180	13.68	12.01	29.04	14.12	ND	8.80	
7	210	13.68	12.00	29.00	14.12	ND	8.81	Stop Pumping Test on Top Zone
8	270	13.68	12.00	29.00	14.12	ND	8.80	
9	330	13.69	11.99	28.99	14.11	ND	8.79	
10	405	13.65	11.99	28.98	14.11	ND	8.78	
11	435	13.66	12.00	29.04	14.11	ND	8.78	Start Pumping Test on Middle Zone
12	450	13.66	11.99	29.11	14.11	ND	8.77	
13	480	13.69	11.99	29.26	14.11	ND	8.77	Stop Pumping Test on Middle Zone
14	510	13.69	11.99	29.36	14.11	ND	8.80	
1/31/2013								
15	Static	13.72	11.96	29.31	14.06	20.00	8.76	
16	60	13.61	11.96	29.17	14.06	ND	8.75	
17	105	13.62	11.97	29.08	14.07	ND	8.75	Start Pumping Test on Bottom Zone
18	120	13.62	11.97	29.07	14.07	ND	8.75	
19	135	13.60	11.97	29.09	14.07	ND	8.75	
20	165	13.62	11.96	29.16	14.06	ND	8.74	Stop Pumping Test on Bottom Zone
21	195	13.63	11.96	29.20	14.06	ND	8.74	
22	255	13.68	11.47	29.34	14.06	ND	8.73	
23	315	13.65	11.96	29.53	14.06	26.38	8.75	
24	375	13.65	11.97	30.21	14.07	26.11	8.76	
25	435	13.64	11.98	30.97	14.06	25.90	8.77	
2/1/2013								
26	Static	13.70	11.94	29.52	14.03	32.22	8.78	Post Packer Testing Data
27	55	13.66	ND	29.29	ND	28.40	ND	
28	110	13.64	ND	29.10	ND	25.97	ND	
29	160	13.63	11.95	29.03	14.04	24.20	8.78	
	Distance	93	97	183	196	0	20	

Distance is measured from MW-13D (Extraction Well).
Distance and drawdown measurements in feet.
ND - No data.

APPENDICES

APPENDIX A

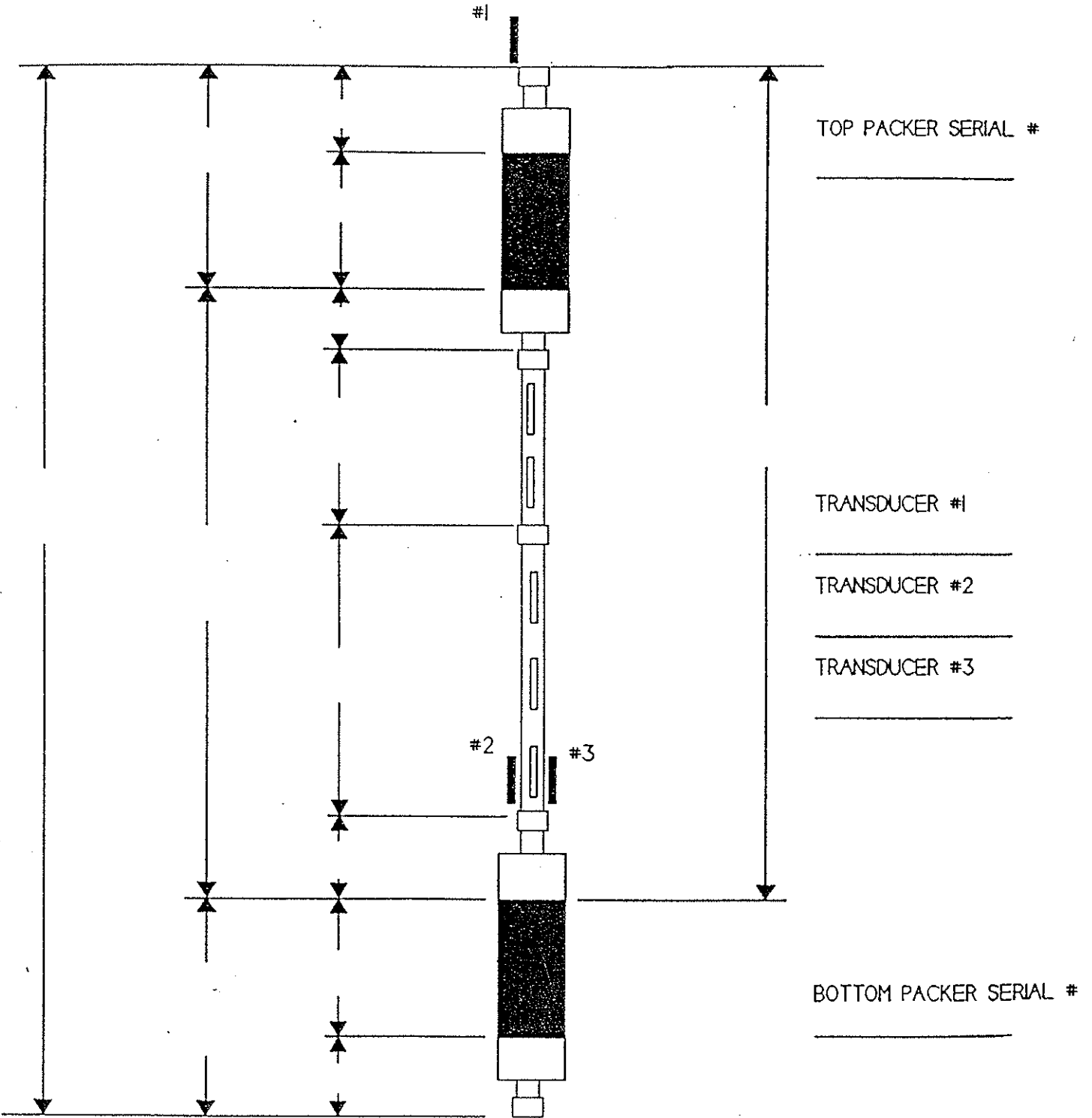
**Typical Straddle Packer
Assembly Configuration**




DISCRETE INTERVAL SAMPLING AND CHARACTERIZATION

NOTE: NOT TO SCALE

STRADDLE PACKER DIMENSIONS (UNINFLATED)



W. O. # _____	WELL # _____	DIAMETER OF PACKERS _____ in.	
JOB NAME _____	WELL DEPTH _____ ft	INJECTION PUMP _____	
DATES FROM ____/____/____ TO ____/____/____	WELL DIAMETER _____ in.	DIAMETER OF LIFT PIPE _____ in.	

APPENDIX B

**Packer Test Data
For Well MW-10D**

PACKER TESTING
ADMINISTRATIVE DATA
FOR EACH WELL

Project AEC-NORTH EAST

Well MW-100

W.O. 4396

Purpose of Testing: Sampling + hydraulic data

History of Testing:

Description of Measuring Point: Top of Casing in flush mount G.S. to M.P. _____
Elevation _____

Pre-test open hole water level: 14.25 Date: 1/22/13 Time: _____

PUMPING EQUIPMENT

Pump S/N: _____ HP: _____ Volts: _____ Phase: _____ Starter Y or N _____

Nominal Diameter of Lift Pipe: 2 Type Pipe: _____

Method of Flow Measurement: Rotameter

Disposition of Discharge: Clear

TIME MEASUREMENT

How Measured: STOP WATCH Date start 1/22/13 Date end 1/24/13

PACKER EQUIPMENT

For Wells: 6 ins in dia. Uninflated diameter: 3.5 ins. Max inflated dia: 6.25

Length of bladder: 3.33/3.30 Spread: 10.98 ft. Bladder material: Rubber

Nitrogen pressure start: 2000 psi stop: 1600 psi Amount used: 400 psi

TRANSDUCERS AND DATA LOGGER

Data Logger: Intelli logger

Transducers	upper	middle	lower		
Serial Numbers	<u>12388</u>	<u>12390</u>	<u>12382</u>		
Range	<u>0-200</u>	<u>0-200</u>	<u>0-200</u>		

Remarks:

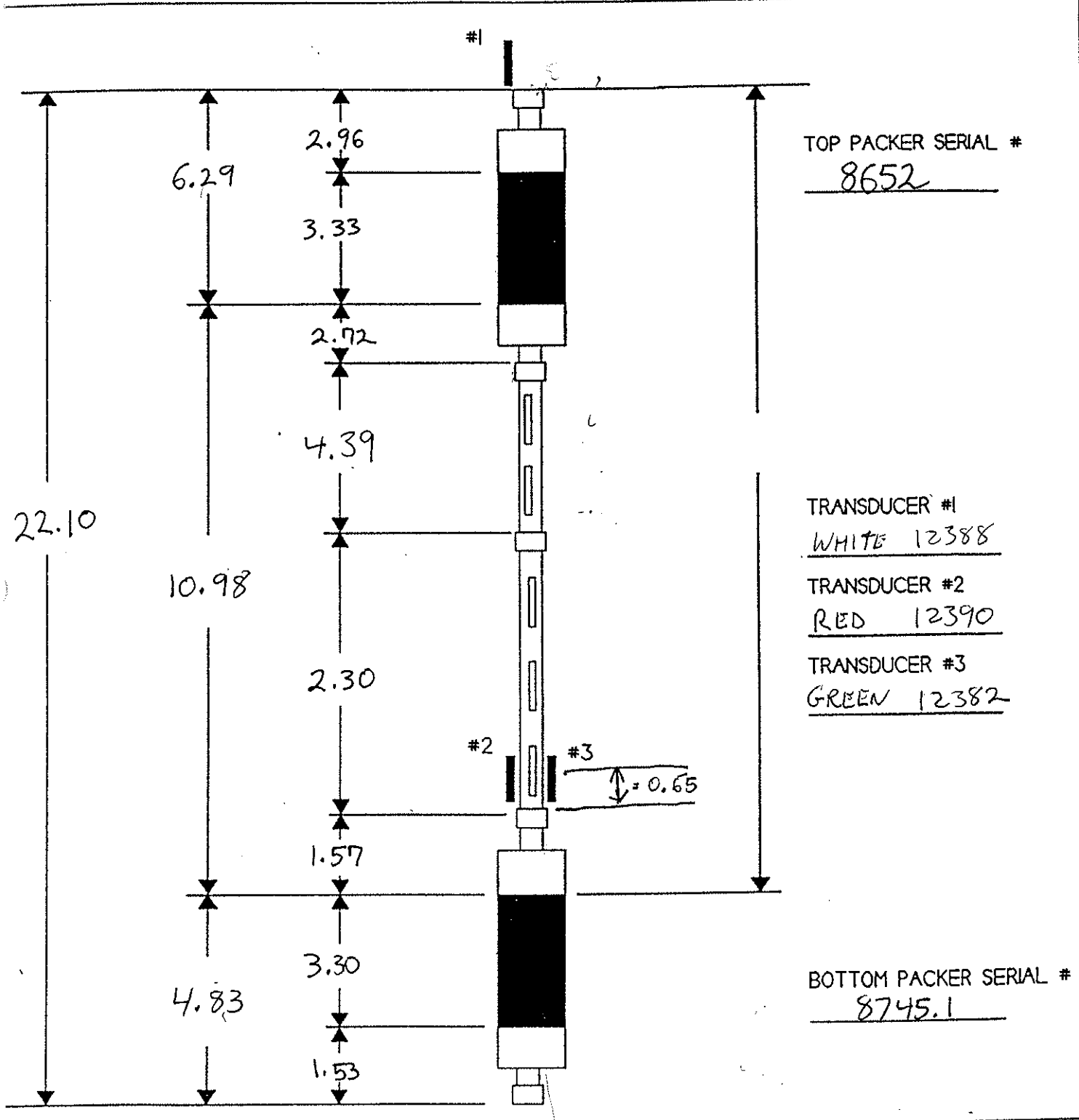
INTERVALS TESTED

	From	To	SWL	PWL	GPM	Spec Cap	Remarks/Samples
	open hole		<u>23.472</u>	<u>40.445</u>	<u>1.0</u>	<u>0.06</u>	
<u>1</u>	<u>74.35</u>	<u>85.33</u>	<u>12.93</u>	<u>N/A</u>	<u>N/A</u>	<u>-</u>	<u>No Sample - No Bottom Packer Seal</u>
<u>1b</u>	<u>71.87</u>	<u>82.85</u>	<u>11.07</u>	<u>N/A</u>	<u>N/A</u>	<u>-</u>	<u>No Sample - No Bottom Packer Seal</u>
<u>2</u>	<u>61.0</u>	<u>95.88</u>	<u>19.45</u>	<u>49.16</u>	<u>1.0</u>	<u>0.03</u>	<u>Sampled - Did Not Inflate upper Packer</u>
<u>3</u>	<u>170.0</u>	<u>180.98</u>	<u>11.394</u>	<u>127.016</u>	<u>0.25</u>	<u>0.0043</u>	<u>Sampled</u>

Personnel on test: T. Trumbull / JP Stokes

Hoist: SMERAL Generator KW: 8 Support Vehical: F-250

STRADDLE PACKER DIMENSIONS (UNINFLATED)



W. O. # <u>4396</u>	WELL # <u>MW-10D</u>	DIAMETER OF PACKERS <u>3.5</u> in.	
JOB NAME <u>A EC-NORTHEAST</u>	WELL DEPTH _____ ft	PUMP _____	
DATES FROM <u>1/22/13</u> TO _____	WELL DIAMETER <u>6</u> in.	DIAMETER OF LIFT PIPE <u>2</u> in.	

PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: OPEN-HOLE
 Well: MW-10D Diameter: 6 inch Date: 1/24/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
163.71	NOT INFLATED		162	NOT INFLATED		198

Inflation Pressures: upper packer: N/A psi lower packer: N/A psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 13.96 ft. M.P.: _____

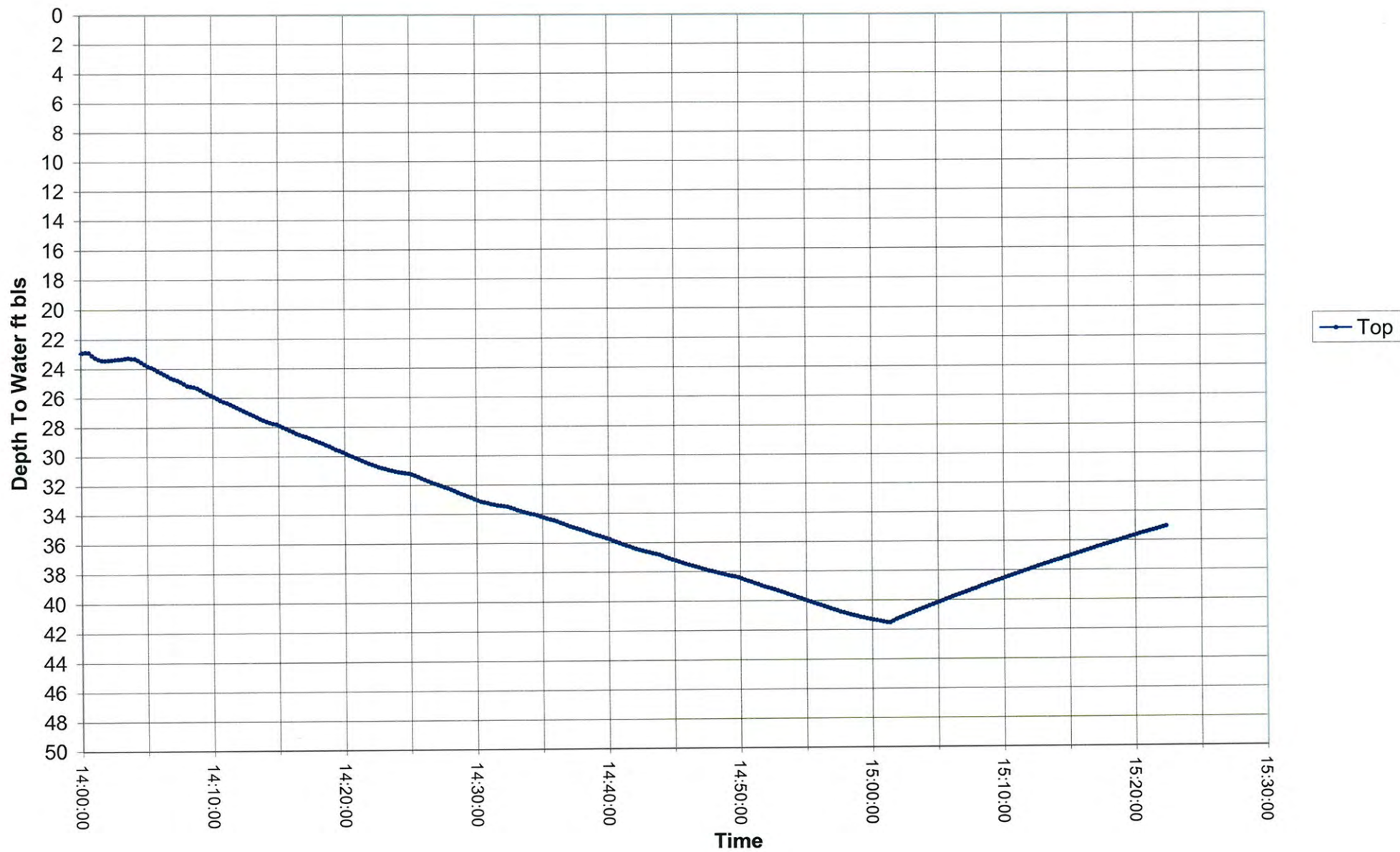
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	NOT Inflated		61.0-198	Not Inflated	
Water Level			23.878		

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	NOT inflated						
2	PUMP ON	ON	61-198	1.0	60	40.445	NO
3							
4							
5							
6							
7							
8							
9							

Remarks: See Set 3 for field data

AEC - NORTH EAST - Well MW-10D Open-Hole Pumping Test



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 1
 Well: MW-100 Diameter: 6 inch Date: 1/22/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
68.06	71.02	74.35		85.33	88.66	198

Inflation Pressures: upper packer: 250 psi lower packer: 300 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 12.9 ft. M.P.: TOC

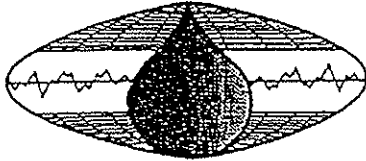
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	61 - 71.02	71.02 - 74.35	74.35 - 85.33	88.66 - 198 ^{TD}	85.33 - 88.66
Water Level	12.9	-	12.9	12.9	-

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Pre Inflation	off	74.35 - 85.33	N/A	N/A	N/A	NO
2	Inflation	off	74.35 - 85.33	N/A	N/A	N/A	NO
3	SLUG No. 1	off	74.35 - 85.33	N/A	10 mins	-	NO
4	SLUG No. 2	off	74.35 - 85.33	N/A	14 mins	-	NO
5							
6							
7							
8							
9							

Remarks:

Earth Data INCORPORATED



PACKER TESTING FIELD INFORMATION

WELL/ZONE: MW-10D Set 1
 PROJECT: AEC-NORTH EAST
 PERSONNEL: T. Trumbull / JP Stokes

DATE: 1/22/13
 CLIENT: AEC
 W.O.#: 4396

SETTING DEPTHS	DATA COLLECTION CALIBRATION		
Point A <u>68.06</u>	Configuration Filename: <u>4396MW10DZ1</u>		
Upper Packer -Top <u>71.02</u>	PRN Filename: <u>MW10DZ1</u>		
Upper Packer -Bottom <u>74.35</u>	current mA = static water level (FT)		
Pump Intake <u>N/A</u>	open air mA = transducer depth (FT)		
Lower Packer -Top <u>85.33</u>	CHANNEL 1	CHANNEL 2	CHANNEL 3
Lower Packer -Bottom <u>88.66</u>	<u>7.0869</u> mA = <u>12.73</u>	<u>7.6130</u> mA = <u>12.73</u>	<u>7.6385</u> mA = <u>12.73</u>
Assembly Bottom <u>90.16</u>	<u>5.1704</u> mA = <u>68.06</u>	<u>5.1732</u> mA = <u>76.82</u>	<u>5.1719</u> mA = <u>76.82</u>

PACKER INFLATION		Additional Calibration Notes:		
TOP	BOTTOM	<u>-18.8703x + 217.331</u> CH1		
<u>180/250</u>	<u>200/310</u>	<u>-26.2970x + 212.863</u> CH2		
		<u>-25.9831x + 211.202</u> CH3		

TEST SEQUENCE	HYDRAULIC HEAD DISTRIBUTION (FT)				
	Open Hole Static Water Level: <u>12.73</u>				
Begin Logging <u>2 : 01 : PM</u>					
Start Inflation <u>2 : 17 : PM</u>					
Begin Pumping <u>N/A</u>					
End Pumping					
Totalizer Prior					
Totalizer Post					
End Logging <u>3 : 05 : PM</u>					

PUMPING RECORD	Miscellaneous Notes:
<u>N/A</u>	Packer "T" at 2.2 ft above TOC

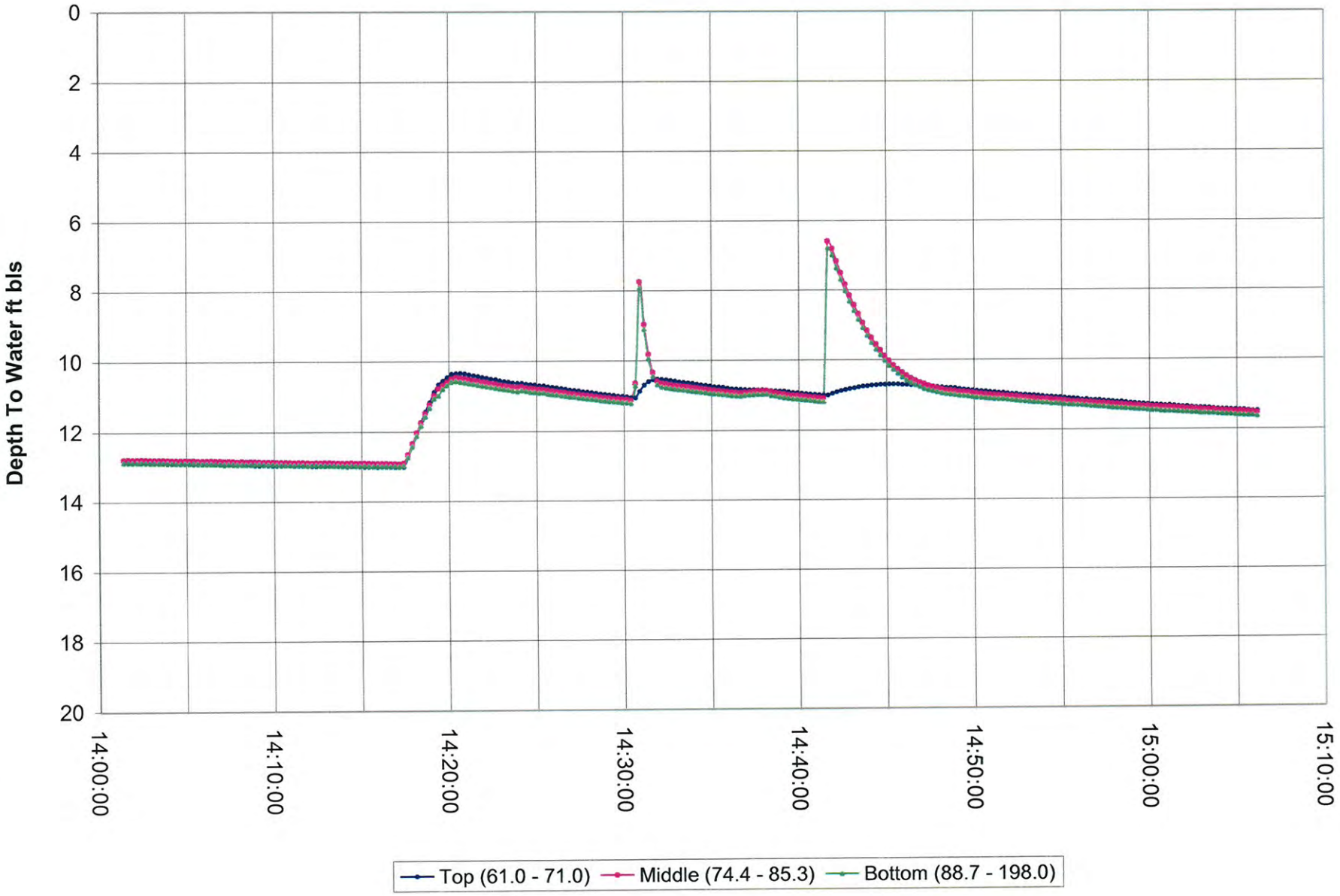
PUMPING RATE	SLUG TEST SEQUENCE
Pumping Duration	<u>Slug Test No. 1</u>
Maximum Drawdown	
Specific Capacity	
Nature of Discharge	
Time of Recovery	

RATE ADJUSTMENTS	TIME	WATER LEVEL (FT)
	Start	<u>11.110</u>
	Peak	<u>8. :</u>
	Recovery	<u>10.866</u>

Top PSI = 250 PSI
 Bottom PSI = 310 PSI

SUMMARY
 Per Slug Tests - Not a good Seal on Lower Packer
 Reset spread ~2ft higher to attempt better seal.

AEC - NORTH EAST - Well MW-10D
Set 1



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 1B
 Well: MW10D - Zone 1B Diameter: 6 inch Date: 1/22/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
65.58	68.54	71.87	N/A	82.85	87.68	198

Inflation Pressures: upper packer: 250 psi lower packer: 300 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 14.08 ft. M.P.: TOC

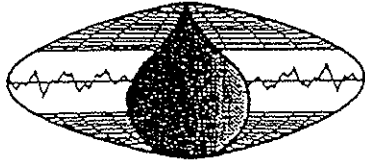
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	61.0-68.54	68.54-71.87	71.87-82.85	87.68-198	82.85-87.68
Water Level	11.075	—	10.965	11.240	—

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Preinflation	off	71.87-82.85	N/A	7	—	NO
2	inflation	off	71.87-82.85	N/A	9	—	NO
3	slug	off	71.87-82.85	N/A	15	—	NO
4							
5							
6							
7							
8							
9							

Remarks:

Earth Data INCORPORATED



PACKER TESTING FIELD INFORMATION

WELL/ZONE: MW10DZ1B
 PROJECT: AEC-NORTH EAST
 PERSONNEL: T. Trumbull / JP Stokes

DATE: 1/22/13
 CLIENT: AEC
 W.O. #: 4326

SETTING DEPTHS DATA COLLECTION CALIBRATION

Point A <u>65.58</u>	Configuration Filename: _____		
Upper Packer -Top <u>68.54</u>	PRN Filename: _____		
Upper Packer -Bottom <u>71.87</u>	current mA = static water level (FT)		
Pump Intake	open air mA = transducer depth (FT)		
Lower Packer -Top <u>82.85</u>	CHANNEL 1	CHANNEL 2	CHANNEL 3
Lower Packer -Bottom <u>87.88</u>	<u>6.9539</u> mA = <u>14.08</u>	<u>7.4792</u> mA = <u>14.08</u>	<u>7.5055</u> mA = <u>14.08</u>
Assembly Bottom	<u>5.1704</u> mA = <u>65.58</u>	<u>5.1732</u> mA = <u>80.63</u>	<u>5.1719</u> mA = <u>80.63</u>

PACKER INFEATION		Additional Calibration Notes:	
TOP	BOTTOM	<u>-28.8758</u> X + <u>214.88</u> CH1	
<u>250</u>	<u>300</u>	<u>-28.8595</u> X + <u>229.926</u> CH2	
		<u>-28.5182</u> X + <u>228.123</u> CH3	

TEST SEQUENCE HYDRAULIC HEAD DISTRIBUTION (FT)

Open Hole Static Water Level : _____	
Begin Logging <u>4:05: Pm</u>	
Start Inflation <u>4:12: Pm</u>	
Begin Pumping : : :	
End Pumping : : :	
Totalizer Prior	
Totalizer Post	
End Logging <u>4:46: Pm</u>	

	PRE-INFLATION	POST-INFLATION	PRE-PUMPING	PUMPING LEVEL	RECOVERY
1	<u>14.003</u>	<u>11.075</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
2	<u>14.004</u>	<u>10.965</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
3	<u>14.000</u>	<u>11.240</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
4					

PUMPING RECORD Miscellaneous Notes:

Pumping Zone: N/A

PUMPING RATE SEUC TEST SEQUENCE

Pumping Rate	
Pumping Duration	
Maximum Drawdown	
Specific Capacity	
Nature of Discharge	
Time of Recovery	

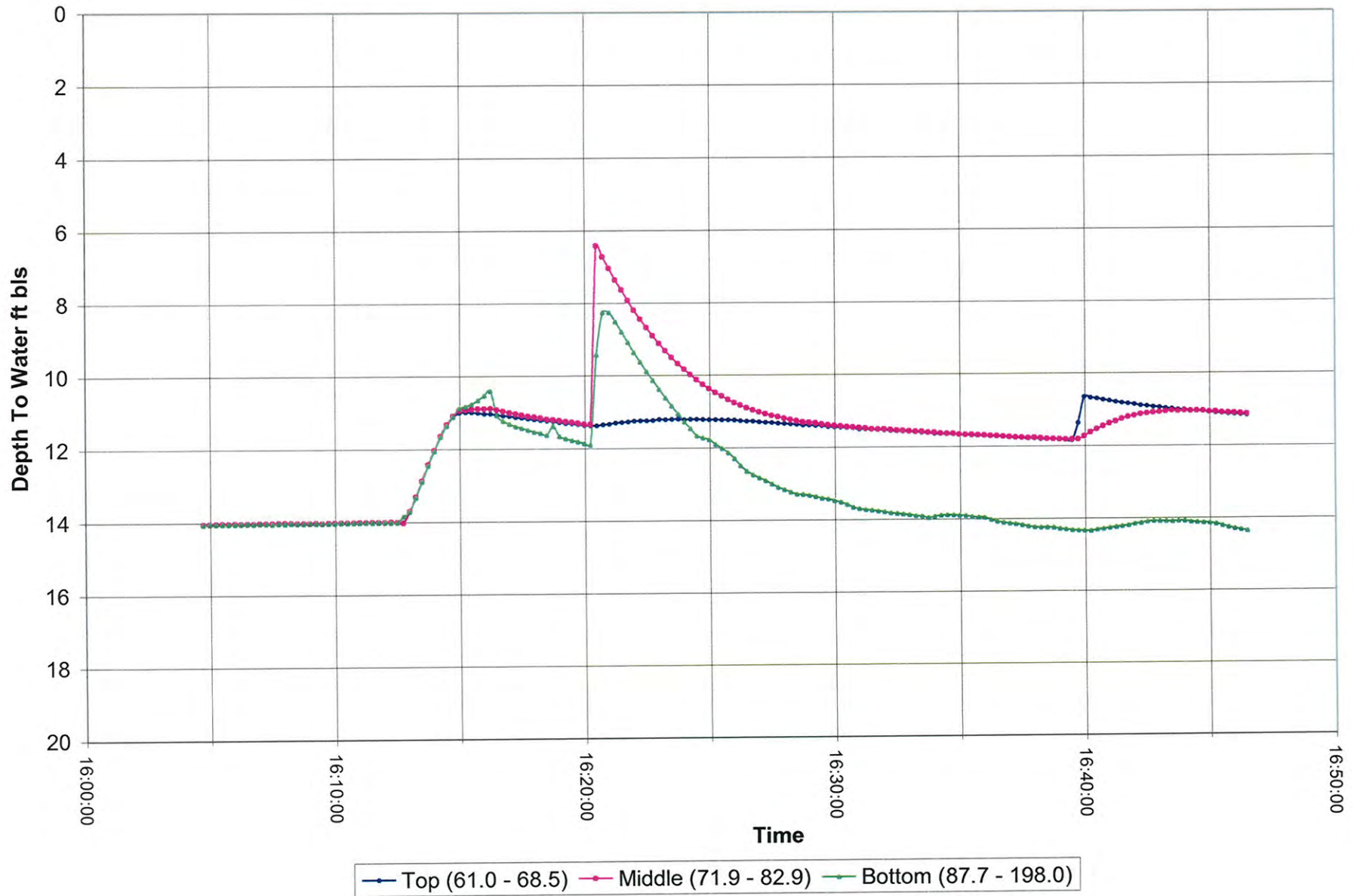
	TIME	WATER LEVEL (FT)
Start	<u>4:20: Pm</u>	<u>11.319</u>
Peak	<u>4:21: Pm</u>	<u>6.467</u>
Recovery	<u>4:35: Pm</u>	<u>11.557</u>

RATE ADJUSTMENTS

SUMMARY

2.48 feet Higher than MW10DZ1

AEC - NORTH EAST - Well MW-10D
Set 1B



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 2
 Well: MW-10D Zone 2 Diameter: 6 inch Date: 1/23/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
78.61	81.57	84.90	~76.0	95.88	99.18	198

Inflation Pressures: upper packer: N/A psi lower packer: 345 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 14.45 ft. M.P.: TOC

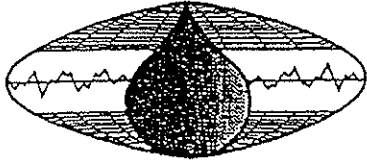
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	Not inflated	—	61 - 95.88	99.18 - 198	95.88 - 99.18
Water Level	13.48	—	13.43	19.580	—

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Pre-Inflation	off	61.0 - 95.88	N/A	N/A	N/A	No
2	Inflation	off	61.0 - 95.88	N/A	N/A	N/A	No
3	Slug	off	61.0 - 95.88	N/A	N/A	N/A	No
4	Pumping	ON	61.0 - 95.88	1.0	93	49.16	Yes
5							
6							
7							
8							
9							

Remarks:

Earth Data INCORPORATED



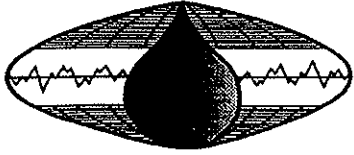
PACKER TESTING FIELD INFORMATION

WELL/ZONE: MW-10D Set 2
 PROJECT: AEC-NORTH EAST
 PERSONNEL: T Tamball / JP Stokes

DATE: 1/23/13
 CLIENT: AEC
 W.O.#: 4396

SETTING DEPTHS	DATA COLLECTION CALIBRATION				
Point A <u>78.61</u>	Configuration Filename: <u>4396 MW10D2A</u>				
Upper Packer -Top <u>81.57</u> (NOT inflated)	PRN Filename: <u>MW10D2A</u>				
Upper Packer -Bottom <u>84.90</u> (NOT inflated)	current mA = static water level (FT)				
Pump Intake <u>276</u>	open air mA = transducer depth (FT)				
Lower Packer -Top <u>95.88</u>	CHANNEL 1	CHANNEL 2	CHANNEL 3		
Lower Packer - Bottom <u>99.18</u>	<u>7.4031</u> mA = <u>14.45</u>	<u>7.930</u> mA = <u>14.45</u>	<u>7.954</u> mA = <u>14.45</u>		
Assembly Bottom <u>100.71</u>	<u>5.1704</u> mA = <u>78.61</u>	<u>5.1732</u> mA = <u>93.66</u>	<u>5.1719</u> mA = <u>93.66</u>		
PACKER INFLATION	Additional Calibration Notes:				
TOP	<u>-28.7365x + 227.189 CH1</u>		<u>-28.4695x + 240.9 CH3</u>		
BOTTOM	<u>-28.7316x + 242.294 CH2</u>				
<u>N/A</u>					
TEST SEQUENCE	HYDRAULIC HEAD DISTRIBUTION (FT)				
	Open Hole Static Water Level: <u>14.45</u>				
Begin Logging <u>9:12:Am</u>					
Start Inflation <u>9:30:Am</u>					
Begin Pumping <u>10:58:Am</u>					
End Pumping <u>12:31:Pm</u>					
Totalizer Prior <u>-</u>					
Totalizer Post <u>-</u>					
End Logging <u>12:52:Pm</u>					
PUMPING RECORD	Miscellaneous Notes:				
	<u>Packer T at 2.2 feet above TOC</u>				
Pumping Zone <u>0-95.88</u>					
Pumping Rate <u>1.0 gpm</u>	SEUG TEST SEQUENCE				
Pumping Duration <u>1hr 33min</u>					
Maximum Drawdown <u>35.73</u>		TIME	WATER LEVEL (FT)		
Specific Capacity <u>0.028</u>	Start	<u>9:53:Am</u>	<u>13.495</u>		
Nature of Discharge <u>Clear</u>	Peak	<u>9:54:Am</u>	<u>12.80</u>		
Time of Recovery	Recovery	<u>10:10:Am</u>	<u>13.280</u>		
RATE ADJUSTMENTS					
SUMMARY					

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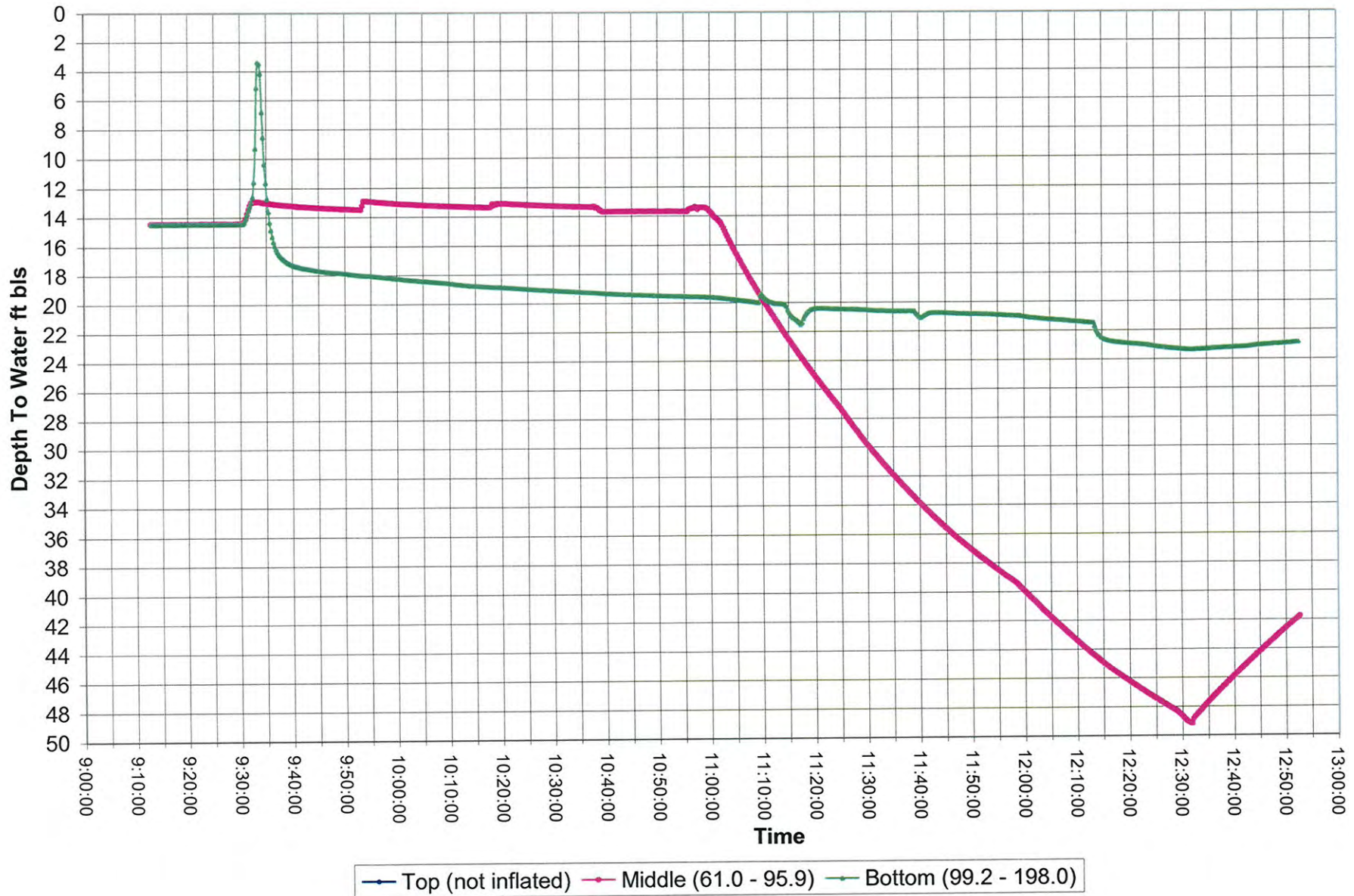
PACKER TEST INFORMATION

WELL/ZONE: MW100: Set 2
 PROJECT: AEC - NORTH EAST
 PERSONNEL: T. Trumbull / SP Stokes

DATE: 1/23/13
 CLIENT: AEC
 W.O. #: 4396
 Page 1 of

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
9:12					Start Logging
9:20		14.448	14.447	14.439	
9:22		14.437	14.434	14.433	
9:24		14.434	14.435	14.427	
9:26		14.440	14.440	14.432	
9:28		14.437	14.440	14.435	
9:30		14.437	14.432	14.435	Inflation Bottom Packer only
9:35		13.037	13.056	14.193	
9:40		13.287	13.288	17.278	
9:42		13.275	13.296	17.476	
9:44		13.353	13.346	17.597	
9:45		13.369	13.390	17.711	
9:49		13.426	13.449	17.814	
9:50		13.436	13.455	17.863	
9:52		13.466	13.495	17.987	Slug Test
9:54		12.8	12.8	18.003	
9:55		12.953	12.983	18.044	
10:10		13.244	13.280	18.571	
10:17		SET RED1-Flow Pump in			zin P.P.e
10:28		13.241	13.270	19.063	
10:30		13.251	13.295	19.097	Begin Logging Begin Pumping
10:31		13.277	13.310	19.131	Pump NOT working Pulled out as ran in hot water
10:58		13.412	13.433	19.580	Begin Pumping
11:00	0.6	13.693	13.752	19.601	
11:02		14.431	14.531	19.657	
11:04		16.588 16.234	16.307	19.771	
11:06	1.25	17.357	17.505	19.864	
11:10		19.785	19.861	19.655	
11:20	1.25	24.627	24.825	20.435	

AEC - NORTH EAST - Well MW-10D
Set 2



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 3
 Well: 10D zone 3 Diameter: 6 inch Date: 1/24/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
163.71	166.67	170.00	162	180.98	184.28	198

Inflation Pressures: upper packer: 400 psi lower packer: 400 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 13.96 ft. M.P.: TOC

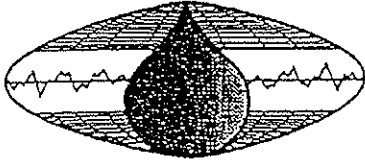
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	610 166.67	166.67-170.00	170-180.98	184.28-198	180.98-184.28
Water Level	12.879	-	11.394	15.087	-

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Pre Inflation	off	170-180.98	N/A	20	-	NO
2	Inflation	off	170-180.98	N/A	11	-	NO
3	Fix upper Packer inflation leak	off	170-180.98	N/A	6	-	NO
4	Rein. White upper packer	off	170-180.98	N/A	60	-	NO
5	Slug	off	170-180.98	N/A	5	-	NO
6	increase lower Packer Pressure	off	170-180.98	N/A	60	-	NO
7	Pump	ON	170-180.98	1/4	79	127.016	YES
8							
9							

Remarks:

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PACKER TESTING FIELD INFORMATION

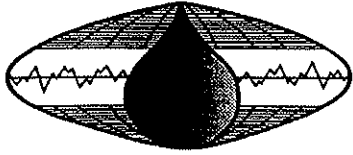
WELL/ZONE: MW-10D Set 3
 PROJECT: AEC-NORTH EAST
 PERSONNEL: M. Wojtko / T. Trumbull

DATE: 1/24/13
 CLIENT: AEC
 W.O. #: 4396

SETTING DEPTHS		DATA COLLECTION CALIBRATION				
Point A	163.71	Configuration Filename: <u>439040DZ3</u>				
Upper Packer -Top	166.67	PRN Filename: <u>MW10DZ3</u>				
Upper Packer -Bottom	170.00	current mA = static water level (FT)				
Pump Intake	165	open air mA = transducer depth (FT)				
Lower Packer -Top	180.98	CHANNEL 1	CHANNEL 2	CHANNEL 3		
Lower Packer- Bottom	184.28	10.3465 mA = 13.96'	10.8743 mA = 13.96'	10.8883 mA = 13.96'		
Assembly Bottom	185.81	5.1704 mA = 163.71'	5.1732 mA = 172.47'	5.1719 mA = 172.47'		
PACKER INFEATION		Additional Calibration Notes:				
TOP	BOTTOM	Ch1 - 26.931 x + 313.295				
400	400	Ch2 - 27.8034 x + 316.303				
		Ch3 - 27.729 x + 315.882				
TEST SEQUENCE		HYDRAULIC HEAD DISTRIBUTION (FT)				
		Open Hole Static Water Level: <u>13.96</u>				
Begin Logging	6:25: AM					
Start Inflation	8:46: AM	PRE-INFLATION	POST-INFLATION	PRE-PUMPING	PUMPING LEVEL	
Begin Pumping	11:32: AM				RECOVERY	
End Pumping	12:51: PM	1	13.929'	12.780'	12.879'	14.377'
Totalizer Prior		2	13.938'	12.450'	11.394'	127.016'
Totalizer Post		3	13.935'	15.589'	15.087'	48.761'
End Logging	3:22: PM	4				
PUMPING RECORD		Miscellaneous Notes:				
		Packer "T" at 2.2 feet above TOC				
Pumping Zone	170.0-180.98					
Pumping Rate	1/4 gpm	SEUG TEST SEQUENCE				
Pumping Duration	1:19 min					
Maximum Drawdown	115.622		TIME	WATER LEVEL (FT)		
Specific Capacity	0.0043	Start	10:02: AM	12.467		
Nature of Discharge	clear	Peak	10:03: AM	7.368		
Time of Recovery		Recovery	11:12: AM	11.394		
RATE ADJUSTMENTS						

Also: open hole (no inflator) pumping 2:00pm - 3:00pm @ 1.0 gpm						
SUMMARY						

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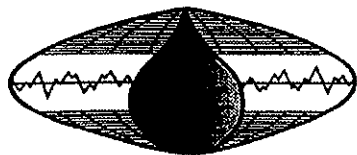
PACKER TEST INFORMATION

WELL/ZONE: 10D set 3
 PROJECT: AEC - NORTH EAST
 PERSONNEL: MW, SP, JT

DATE: 1/24/13
 CLIENT: AEC
 W.O. #: 4396
 Page 1 of 4

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
8:25		13.966	13.948	13.960	Start Recording
8:30		13.957	13.947	13.954	
8:35		13.953	13.944	13.956	
8:40		13.932	13.942	13.947	
8:45		13.927	13.936	13.938	
8:46		13.929	13.938	13.935	Inflating Packers
8:48		12.405	12.411	12.315	
8:49		11.008	11.051	10.504	
8:50		10.977	10.531	9.170	
8:57		11.626	10.663	11.771	- Deflating upper packer to fix leak at reel
9:03		13.242	12.288	14.453	- INFLATING UPPER PACKER + bumped up pressure
9:07		11.710	11.757	2.470	
9:09		11.811	11.697	13.041	
9:15		12.105	11.782	14.553	
9:20		12.267	11.875	14.044	
9:27		12.429	11.993	15.069	
9:31		12.502	12.058	15.176	
9:33		12.522	12.085	15.211	
9:39		12.603	12.170	15.336	
9:45		12.664	12.276	15.422	
9:48		12.705	12.312	15.478	
9:50		12.706	12.331	15.494	
9:53		12.732	12.380	15.544	
9:58		12.752	12.434	15.580	
10:00		12.785	12.450	15.589	
10:02		12.800	12.467	15.616	SLUG TEST
10:03		12.795	7.368	14.258	
10:04		12.766	7.560	12.733	
10:06		12.756	7.767	12.627	

Earth Data INCORPORATED



PACKER TEST INFORMATION

WELL/ZONE: 10D Set 3
 PROJECT: AEC - Northeast
 PERSONNEL: MW, II

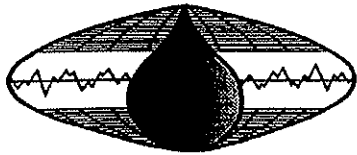
DATE: 1/24/13
 CLIENT: AEC
 W.O. #: 4396
 Page 2 of 4

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
10:07		12.745	7.937	1.047	Bumped up pressure to 450 lbs
10:10		12.743	8.264	10.598	
10:15		12.737	8.715	12.619	
10:20		12.734	9.104	13.122	
10:28		12.759	9.671	13.699	
10:36		12.780	10.100	14.081	
10:43		12.791	10.418	14.309	
10:49		12.824	10.699	14.541	
10:53		12.836	10.807	14.647	
10:56		12.840	10.960	14.756	
11:01		12.844	11.107	14.873	
11:06		12.864	11.233	14.949	
11:12		12.879	11.394	15.087	
11:21		12.914	11.629	15.328	INSERT READY FLOW
11:31		12.909	6.280	12.265	
11:32	1/4	12.910	6.319	12.320	Begin Pumping 1/4 gpm
11:35		12.923	12.739	15.117	
11:40		12.973	16.538	18.190	
11:41	1/4	12.989	17.125	18.680	bumped rate up to 1/4 gpm
11:44	adjusted ↑	13.031	20.819	20.501	bumped up
11:48	adjusted ↑	13.107	26.593	22.952	hooked up low flow sampling equipment
11:54	↑ 1/4	13.224	31.839	24.455	
11:58	1/4	13.309	36.809	25.039	
11:59	↑ 1/4	13.332	37.449	25.184	
12:02	1/4	13.377	40.211	25.566	
12:05	1/4	13.449	43.367	25.846	
12:06	↑ increased to 1/2	13.453	44.583	25.957	increased rate to 1/2 gpm
12:10		13.525	52.922	27.158	
12:15		13.644	65.322	29.890	

on lower packer

equipment

Earth Data INCORPORATED



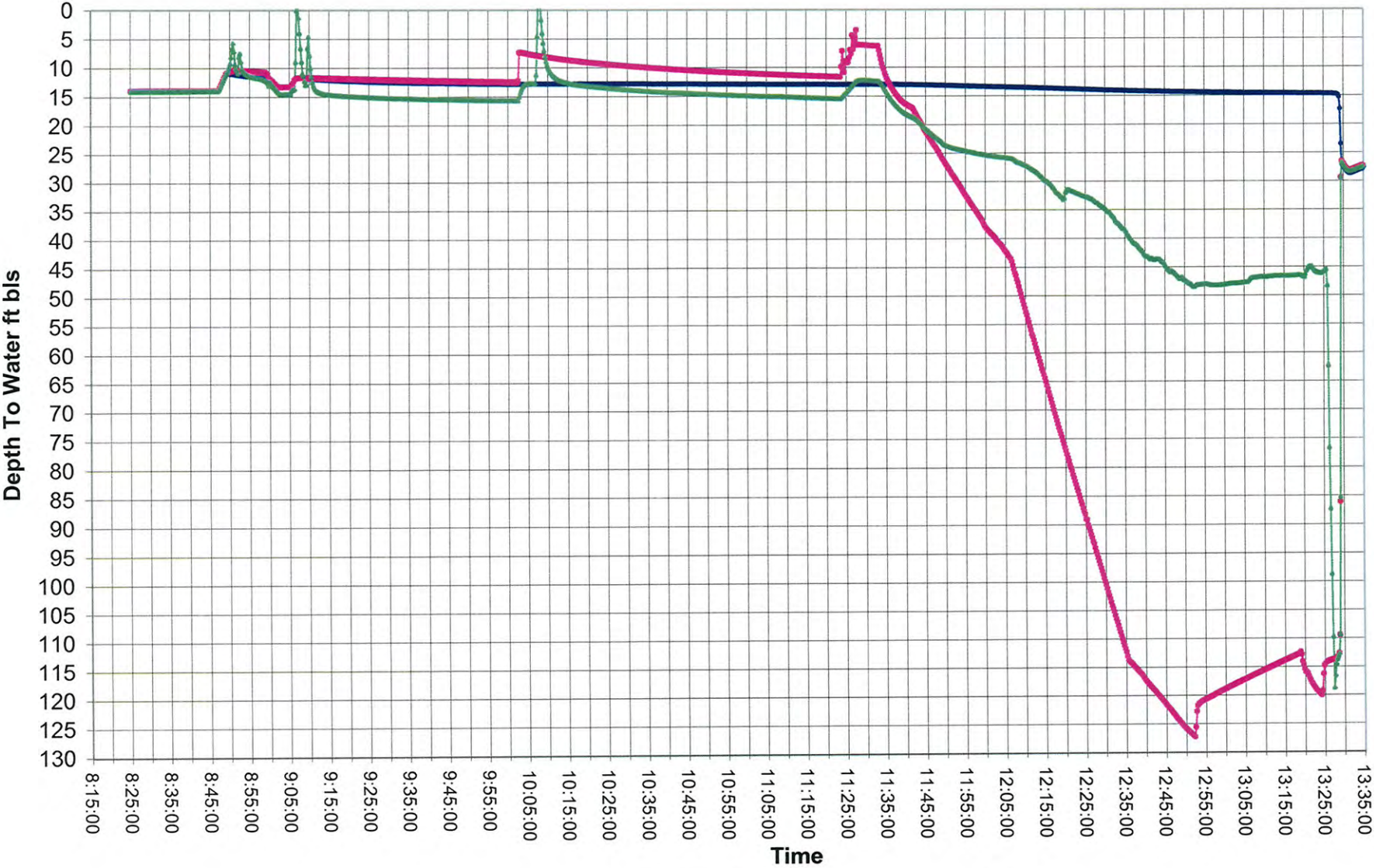
PACKER TEST INFORMATION

WELL/ZONE: 100 Set 3
 PROJECT: AEC - Northeast
 PERSONNEL: MW, TT

DATE: 1/24/13
 CLIENT: AEC
 W.O. #: 4396
 Page 3 of 4

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
12:24	1/2	13.819	81.266	31.720	
12:24	adj ↑ 1/2	13.881	88.140	32.503	
12:28	1/2	13.971	97.133	34.118	
12:35	adj ↑ 1/2	14.107	111.984	38.974	
12:36	adj ↓ (1/4)	14.125	114.145	39.932	changed pumping rate to 1/4 gpm
12:38	1/4	14.173	115.882	41.617	
12:41	1/4	14.231	118.895	43.547	
12:44	1/4	14.262	121.421	44.541	
12:48	1/4	14.334	124.524	46.856	
12:50	1/4	14.352	126.195	47.649	
12:51	—	14.377	127.016	48.261	TURND PUMP OFF
12:52		14.379	122.778	48.294	
12:54		14.401	120.912	48.056	
12:56		14.429	119.936	48.167	
1:07		14.543	116.170	46.865	
1:11		14.564	115.098	46.671	
1:16		14.582	113.400	46.552	
1:19		14.616	114.844	46.569	TURND PUMP ON FOR SAMPLES
1:20		14.611	115.837	46.716	
1:23		14.649	119.850	46.069	
1:24		14.647	117.350	46.056	TURND OFF PUMP
1:25		14.647	114.250	46.540	DEFLATED PACKERS
1:29		27.180	26.711	26.870	
1:36		27.410	26.889	27.024	
1:41		26.075	25.603	25.750	
1:53		23.878	23.472	23.616	PA - OPEN HOLE TEST
2:00	1.0	22.890	22.542	22.723	TORN ON PUMP
2:01		23.121	23.057	23.223	
2:03	↑	23.322	22.911	23.275	

AEC - NORTH EAST - Well MW-10D
Set 3



Top (61.0 - 166.7) Middle (170.0 - 181.0) Bottom (184.3 - 198.0)

APPENDIX C

**Packer Test Data
For Well MW-12D**

PACKER TESTING
ADMINISTRATIVE DATA
FOR EACH WELL

Project AEC-NORTH EAST

Well MW-120

W.O. 4396

Purpose of Testing: Sampling + hydraulic data

History of Testing:

Description of Measuring Point: TOC to top of blocks

G.S. to M.P. 1.85

Elevation _____

Pre-test open hole water level: 28.18 Date: 1/25/ Time: 10:58 Am

PUMPING EQUIPMENT

Pump S/N: Grundfos Red: Flo HP: _____ Volts: _____ Phase: _____ Starter Y or ON

Nominal Diameter of Lift Pipe: _____ Type Pipe: _____

Method of Flow Measurement: Rotameter

Disposition of Discharge: Clear

TIME MEASUREMENT

How Measured: Stop watch Date start 1/25/13 Date end 1/29/13

PACKER EQUIPMENT

For Wells: 6 ins in dia. Uninflated diameter: 3.5 ins. Max inflated dia: 6.25

Length of bladder: 3.33/3.50 Spread: 17.95 ft. Bladder material: Rubber

Nitrogen pressure start: 1600 psi stop: 1100 psi Amount used: 500 psi

TRANSDUCERS AND DATA LOGGER

Data Logger: Intelli logger

Transducers	upper	middle	lower		
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Serial Numbers	<u>12388</u>	<u>12390</u>	<u>12382</u>		
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Range	<u>0-200</u>	<u>0-200</u>	<u>0-200</u>		
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Remarks:

INTERVALS TESTED

	From	To	SWL	PWL	GPM	Spec Cap	Remarks/Samples
	open hole		<u>29.099</u>	<u>44.377</u>	<u>0.3</u>	<u><0.02</u>	<u>NO</u>
<u>1</u>	<u>59.0</u>	<u>77.95</u>	<u>25.375</u>	<u>28.534</u>	<u>0.2</u>	<u><0.06</u>	<u>YES</u>
<u>2</u>	<u>82.35</u>	<u>102.3</u>	<u>18.360</u>	<u>73.643</u>	<u>0.4</u>	<u><0.007</u>	<u>NO</u>
<u>3</u>	<u>125.35</u>	<u>160</u>	<u>19.895</u>	<u>117.308</u>	<u>0.5/1.0</u>	<u><0.01</u>	<u>NO</u>
<u>4</u>							
<u>5</u>							
<u>6</u>							
<u>7</u>							
<u>8</u>							

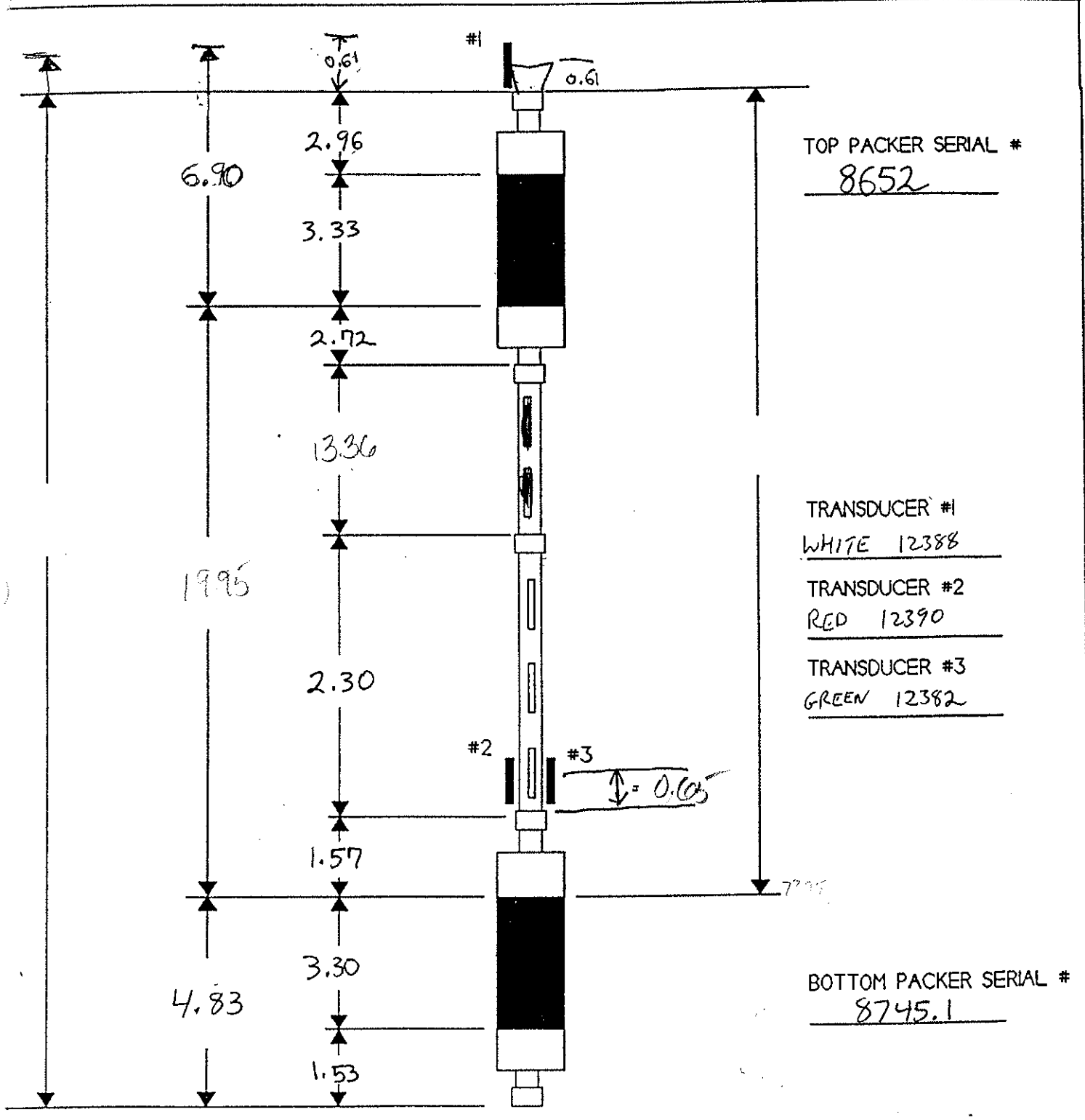
Personnel on test: T. Trumbull/JP Stokes/M. Wojtko

Hoist: Smeal

Generator KW: 8

Support Vehical: _____

STRADDLE PACKER DIMENSIONS (UNINFLATED)



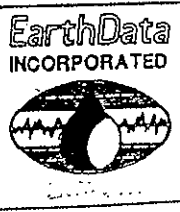
TOP PACKER SERIAL #
8652

TRANSDUCER #1
WHITE 12388

TRANSDUCER #2
RED 12390

TRANSDUCER #3
GREEN 12382

BOTTOM PACKER SERIAL #
8745.1

W. O. # <u>4396</u>	WELL # <u>12D</u>	DIAMETER OF PACKERS <u>3.5</u> in.	
JOB NAME <u>A EC-NORTHEAST</u>	WELL DEPTH _____ ft	PUMP _____	
DATES FROM ___/___/___ TO ___/___/___	WELL DIAMETER <u>6</u> in.	DIAMETER OF LIFT PIPE <u>2</u> in.	

PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: OPEN-HOLE
 Well: MW-12D Diameter: 6in Date: 1/25/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
51.1	NOT INFLATED		49.6	NOT INFLATED		160

Inflation Pressures: upper packer: N/A psi lower packer: N/A psi

Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 28.31 ft. M.P.: TOC

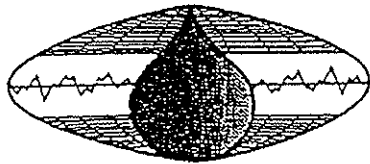
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	Not Inflated		59-160	Not Inflated	
Water Level					

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Pumping	ON	59-160	0.3	60	44.36	NO
2							
3							
4							
5							
6							
7							
8							
9							

Remarks:

Earth Data INCORPORATED

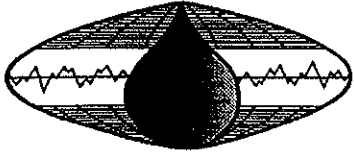


PACKER TESTING FIELD INFORMATION

WELL/ZONE: MW-12D Set 1 (op side) DATE: 1/25/13
 PROJECT: AEC-NORTH EAST CLIENT: AEC
 PERSONNEL: MW, TT W.O. #: 4396

SETTING DEPTHS		DATA COLLECTION CALIBRATION				
Point A	51.1	Configuration Filename: <u>MW12DZ1</u>				
Upper Packer -Top	54.67	PRN Filename: <u>MW12DZ1</u>				
Upper Packer -Bottom	58	current mA = static water level (FT)				
Pump Intake	—	open air mA = transducer depth (FT)				
Lower Packer -Top	77.95	CHANNEL 1	CHANNEL 2	CHANNEL 3		
Lower Packer- Bottom	81.25	5.9697 mA = 28.14'	6.4241 mA = 28.14'	6.4969 mA = 28.18'		
Assembly Bottom	82.78	5.1819 mA = 51.1'	5.1821 mA = 75.73'	5.1807 mA = 75.73'		
PACKER INFEATION		Additional Calibration Notes:				
TOP	BOTTOM	Ch1 - 29.0937 x + 201.861 Ch2 - 28.9586 x + 225.796 Ch3 - 27.7066 x + 219.269				
TEST SEQUENCE		HYDRAULIC HEAD DISTRIBUTION (FT)				
Begin Logging		Open Hole Static Water Level : _____				
Start Inflation		PRE- INFLATION	POST- INFLATION	PRE- PUMPING	PUMPING LEVEL	RECOVERY
Begin Pumping		1	28.427'	29.115'	44.411'	42.170'
End Pumping		2	28.441'	29.099'	44.377'	42.115'
Totalizer Prior		3	28.534'	29.491'	44.050'	41.972'
Totalizer Post		4				
End Logging						
PUMPING RECORD		Miscellaneous Notes: Reference at top of blocks = 1.85 above TOC				
Pumping Zone	Open Hole					
Pumping Rate	0.3					
Pumping Duration	60 min	N/A				
Maximum Drawdown	15.274'			TIME	WATER LEVEL (FT)	
Specific Capacity	< 0.02 gpm/ft	Start	:	:	N/A	
Nature of Discharge		Peak	:	:	N/A	
Time of Recovery		Recovery	:	:	N/A	
RATE ADJUSTMENTS						
Open Hole Test		SUMMARY				

Earth Data INCORPORATED



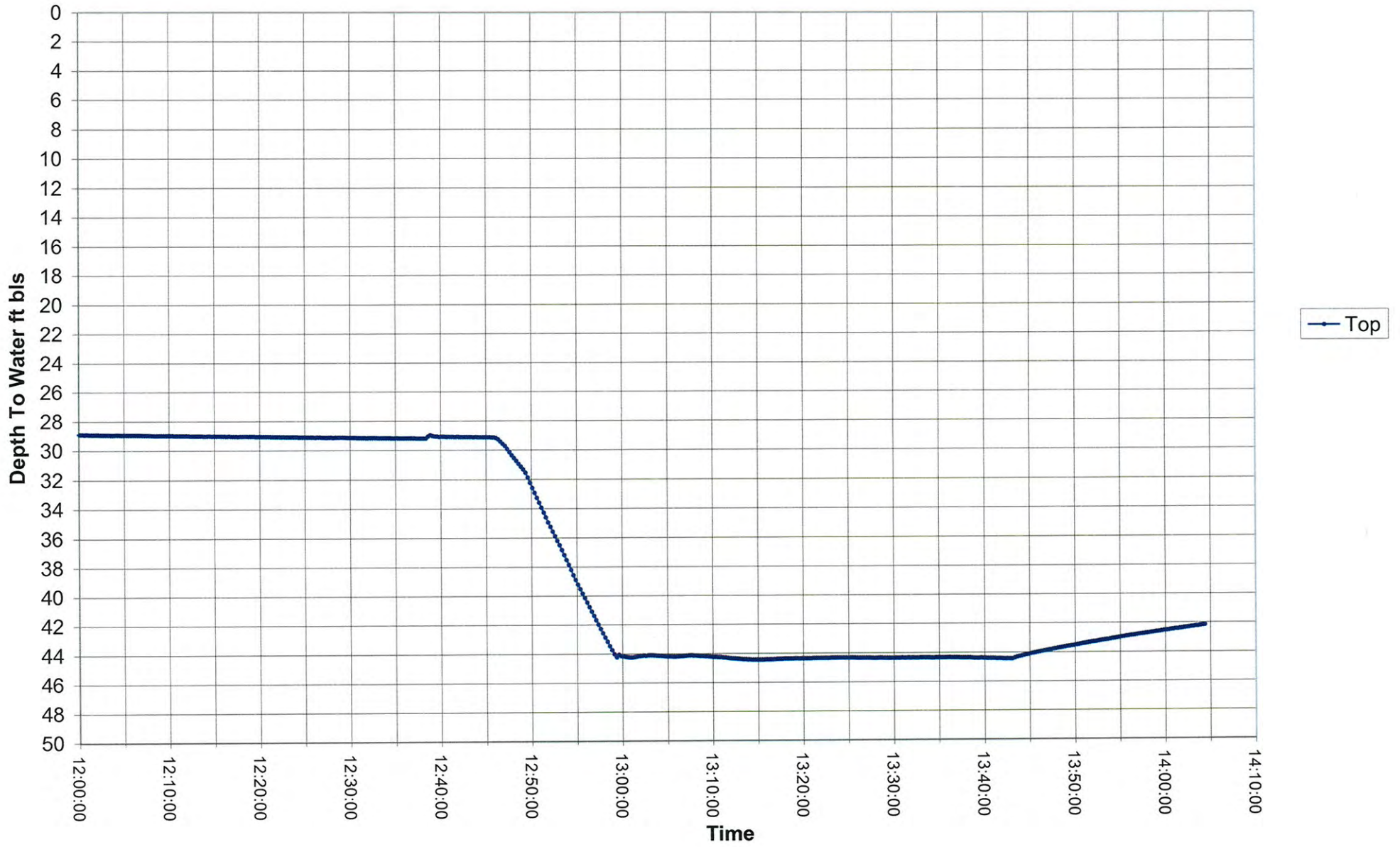
PACKER TEST INFORMATION

open Hole

WELL/ZONE: MW 12D Set 1 DATE: 1/25/13
 PROJECT: AEC - NORTH EAST CLIENT: AEC
 PERSONNEL: MW, TT W.O. #: 4396
 Page 1 of

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
11:06		28.317	28.309	28.374	START RECORDING
11:11		28.370	28.371	28.464	
11:13		28.395	28.395	28.490	
11:15		28.427	28.441	28.534	
11:18		28.463	28.472	28.599	
11:21		28.508	28.504	28.664	
11:23		28.524	28.521	28.700	
11:34		28.632	28.640	28.854	
11:51		28.813	28.812	29.052	
12:01		28.913	28.909	29.183	
12:10		28.965	28.962	29.219	
12:19		29.057	29.043	29.375	
12:24		29.102	29.090	29.435	
12:44		29.115	29.099	29.491	
12:45	1+gpm	29.128	29.107	29.508	BEGIN MINI PUMP TEST ON OPEN HOLE
12:47		29.713	29.699	30.107	
12:48		30.866	30.851	31.180	
12:51		34.576	34.591	34.767	
12:53		36.355	36.326	36.410	
12:54		37.686	37.683	37.682	
12:57		42.008	42.032	41.763	
12:59	v	43.877	43.919	43.507	
1:00	v Adj to 100cc	44.161	44.173	43.712	Test kept about 46' Top OF BONDERS ON WELL
1:01		44.226	44.219	43.749	
1:10	.49	44.221	44.212	43.800	
1:19	.32	44.311	44.306	43.908	
1:20	.32	44.326	44.297	43.907	
1:22	.32	44.323	44.278	43.877	
1:25	.32	44.320	44.283	43.925	

AEC - NORTH EAST - Well MW-12D
Open-Hole Pumping Test



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 1
 Well: MW-12D Diameter: 6 inch Date: 1/28/13

DEPTHS

Point A	Upper Packer Top	Upper Packer Bottom	Pump Intake	Lower Packer Top	Lower Packer Bottom	Well Depth
51.10	54.67	58.00	~ 53.17	77.95	81.25	160

Inflation Pressures: upper packer: N/A psi lower packer: 370 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 28.15 ft. M.P.: TOC

	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	Top Packer Not inflated	-	0 - 77.95	81.25 - 160	77.95 - 81.25
Water Level	28.13	-	28.13	28.14	-

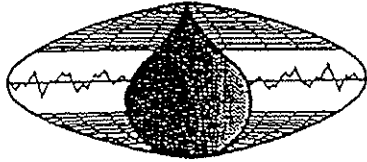
TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Preinflation	OFF	59 - 77.95	N/A	10	-	No
2	Inflation	OFF	59 - 77.95	N/A	11	-	No
3	Slug	OFF	59 - 77.95	N/A	6	-	No
4	Pumping	ON	59 - 77.95	0.2	20	28.53	YES
5	Recovery	OFF	59 - 77.95	N/A	30	28.55	NO
6							
7							
8							
9							

Remarks:

Earth Data

INCORPORATED

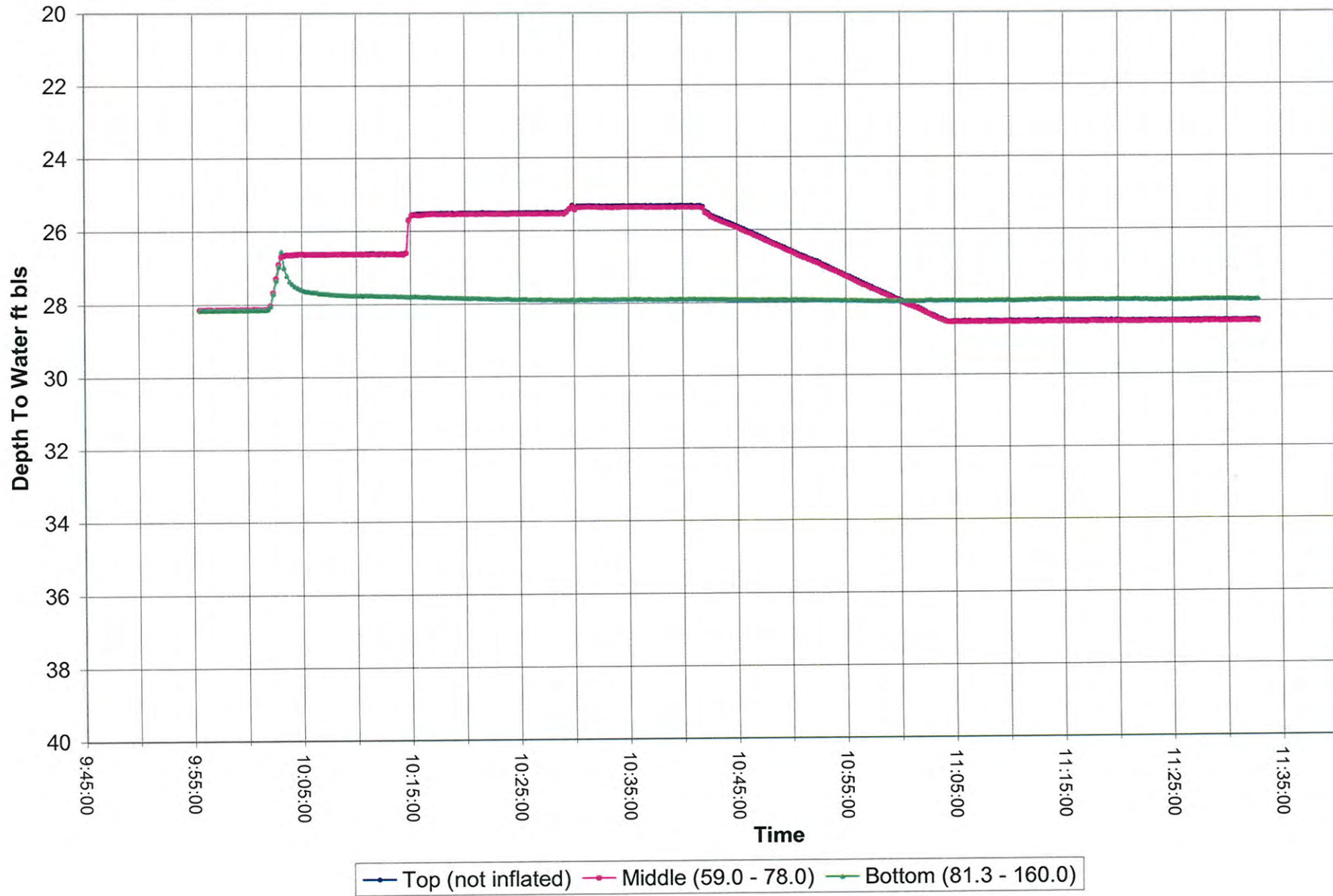


PACKER TESTING FIELD INFORMATION

WELL/ZONE: 12D / set 1 DATE: 1/28/13
 PROJECT: AEC-NORTH EAST CLIENT: AEC
 PERSONNEL: T. Trumbull / JP Stokes W.O.#: 4396

SETTING DEPTHS		DATA COLLECTION CALIBRATION					
Point A	51.10	Configuration Filename: <u>4396raw12D Z1B</u>					
Upper Packer -Top	54.67	PRN Filename: <u>MW12D Z1B</u>					
Upper Packer -Bottom	58.00	current mA = static water level (FT)					
Pump Intake	53.17	open air mA = transducer depth (FT)					
Lower Packer -Top	77.95	CHANNEL 1	CHANNEL 2	CHANNEL 3			
Lower Packer -Bottom	81.25	5.9678 mA = 28.15'	6.8239 mA = 28.15'	6.8646 mA = 28.15'			
Assembly Bottom	82.78	5.1819 mA = 51.10'	5.1821 mA = 75.73'	5.1807 mA = 75.73'			
PACKER INFEATION		Additional Calibration Notes:					
TOP	BOTTOM	CH1: -29.2022 x + 202.423 CH3: -28.2556 x + 222.115					
-	370	CH2: -28.9804 x + 225.909					
TEST SEQUENCE		HYDRAULIC HEAD DISTRIBUTION (FT)					
		Open Hole Static Water Level: <u>28.15</u>					
Begin Logging	9:55 : Am	PRE- INFLATION	POST- INFLATION	PRE- PUMPING	PUMPING LEVEL	RECOVERY	
Start Inflation	10:01 : Am						
Begin Pumping	10:42 : Am	1	28.132	26.16	25.315	28.1492	NONE
End Pumping	11:04 : Am	2	28.136	26.651	25.375	28.534	NONE
Totalizer Prior		3	28.146	27.775	27.892	27.949	NONE
Totalizer Post		4					
End Logging	11:32 : Am	Miscellaneous Notes:					
		SW: 1.85 ft above TUC					
PUMPING RECORD		SEUC TEST SEQUENCE					
Pumping Zone	58.00 - 77.95			TIME	WATER LEVEL (FT)		
Pumping Rate	0.2	Start		10:14 : Am	26.651		
Pumping Duration	20 min	Peak		10:20 :	25.542		
Maximum Drawdown	3.16	Recovery		:	N/A		
Specific Capacity	20.06						
Nature of Discharge							
Time of Recovery							
RATE ADJUSTMENTS							
SUMMARY							

AEC - NORTH EAST - Well MW-12D
Set 1



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: _____ Set No.: 2
 Well: MW-12D Diameter: 6 inch Date: 1/28/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
75.45	79.02	82.35	-74	102.30	105.60	160

Inflation Pressures: upper packer: 340 psi lower packer: 350 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 28.15 ft. M.P.: TOC

	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	59-79.02	79.02-82.35	82.35-102.30	105.60-160	102.30-105.60
Water Level	25.448	-	25.264	27.903	-

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Preinflation	off	82.35-102.30	N/A	10	-	NO
2	Inflation	off	82.35-102.30	N/A	15	-	NO
3	SLug	off	82.35-102.30	N/A	30	-	NO
4	Pump	ON	82.35-102.30	0.2/0.4	30	73.843	NO
5							
6							
7							
8							
9							

Remarks:

Earth Data INCORPORATED



PACKER TESTING FIELD INFORMATION

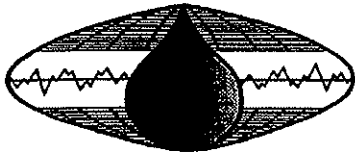
WELL/ZONE: MW12D/set. 2
 PROJECT: AEC-NORTH EAST
 PERSONNEL: T. Trumbull/JP Stokes

DATE: 1/28/13
 CLIENT: AEC
 W.O.#: 4396

SETTING DEPTHS		DATA COLLECTION CALIBRATION					
Point A	75.45	Configuration Filename: <u>4396mw12D22</u>					
Upper Packer -Top	79.02	PRN Filename: <u>MW12D22</u>					
Upper Packer -Bottom	82.35	current mA = static water level (FT)					
Pump Intake	~74	open air mA = transducer depth (FT)					
Lower Packer -Top	102.30	CHANNEL 1	CHANNEL 2	CHANNEL 3			
Lower Packer -Bottom	105.60	6.7972 mA = 28.41'	7.6546 mA = 28.41'	7.6881 mA = 28.41'			
Assembly Bottom	107.13	5.1819 mA = 75.45'	5.1821 mA = 100.08'	5.1807 mA = 100.08'			
PACKER INFLATION		Additional Calibration Notes:					
TOP	BOTTOM	CH1: -29.1215X + 226.355					
340	350	CH2: -28.9869X + 250.293					
TEST SEQUENCE		HYDRAULIC HEAD DISTRIBUTION (FT)					
		Open Hole Static Water Level: <u>28.41</u>					
Begin Logging	12: 34 : pm	PRE- INFLATION	POST- INFLATION	PRE- PUMPING	PUMPING LEVEL	RECOVERY	
Start Inflation	12: 44 : pm						
Begin Pumping	1: 52 : pm	1	28.405	25.448	25.288	25.507	25.877
End Pumping	2: 22 : pm	2	28.411	25.264	18.380	73.643	65.874
Totalizer Prior		3	28.405	27.903	28.181	28.706	29.074
Totalizer Post		4					
End Logging	3: 36 : pm	Miscellaneous Notes:					
PUMPING RECORD		Packer "T" at 1.85 feet above TOC					
Pumping Zone	82.35-102.30						
Pumping Rate	0.2/0.4	SPECIFIC TEST SEQUENCE					
Pumping Duration	30 min						
Maximum Drawdown	55.26	TIME		WATER LEVEL (FT)			
Specific Capacity	< 0.007	Start	1:00 : pm	25.264			
Nature of Discharge	clear	Peak	1:01 : pm	19.773			
Time of Recovery	> 73 minutes	Recovery	1:42 : pm	20.734			
RATE ADJUSTMENTS		0.2 gpm (1:52-2:04 pm) 0.4 gpm (2:04 pm-2:23 pm)					
SUMMARY							

Earth Data

INCORPORATED

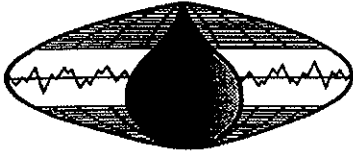


PACKER TEST INFORMATION

WELLZONE: MW12D / Set 2 DATE: 1/28/13
 PROJECT: AEC-NORTH EAST CLIENT: AEC
 PERSONNEL: T. Trumbull / JP Stokes W.O. #: 4396
 Page 1 of 2

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
12:34 pm		28.420	28.407	28.422	
12:41		28.410	28.416	28.422	
12:44		28.405	28.411	28.405	Begin inflation @ 12:45
12:50		25.459	25.260	27.630	
12:55		25.458	25.260	27.807	
12:58		25.450	25.269	27.895	
1:00 pm		25.448	25.264	27.903	Slug Test 1gal.
1:01		25.440	19.773	27.93	
1:04		25.426	19.824	27.955	
1:05		25.413	19.855	27.986	
1:10		25.395	20.023	28.030	
1:19		25.382	20.278	28.107	
1:29		25.343	20.483	28.115	
1:35		25.328	20.578	28.131	
1:42		25.325	20.734	28.145	Insert Pump
1:50		25.300	18.318	28.184	
1:52		25.288	18.380	28.181	Start Pump
1:54	0.2	25.298	22.496	28.208	
1:56		25.289	23.700	28.211	
1:58		25.276	27.048	28.198	
2:00	0.2	25.279	29.012	28.201	
2:04	0.2	25.307	35.268	28.230	Begin Rate increase
2:05	0.4	25.320	38.071	28.218	
2:08		25.336	44.063	28.233	
2:10	0.4	25.375	48.749	28.391	
2:12		25.390	52.795	28.639	
2:15		25.422	58.711	28.655	
2:16		25.435	61.109	28.656	
2:18		25.462	65.053	28.670	

Earth Data INCORPORATED



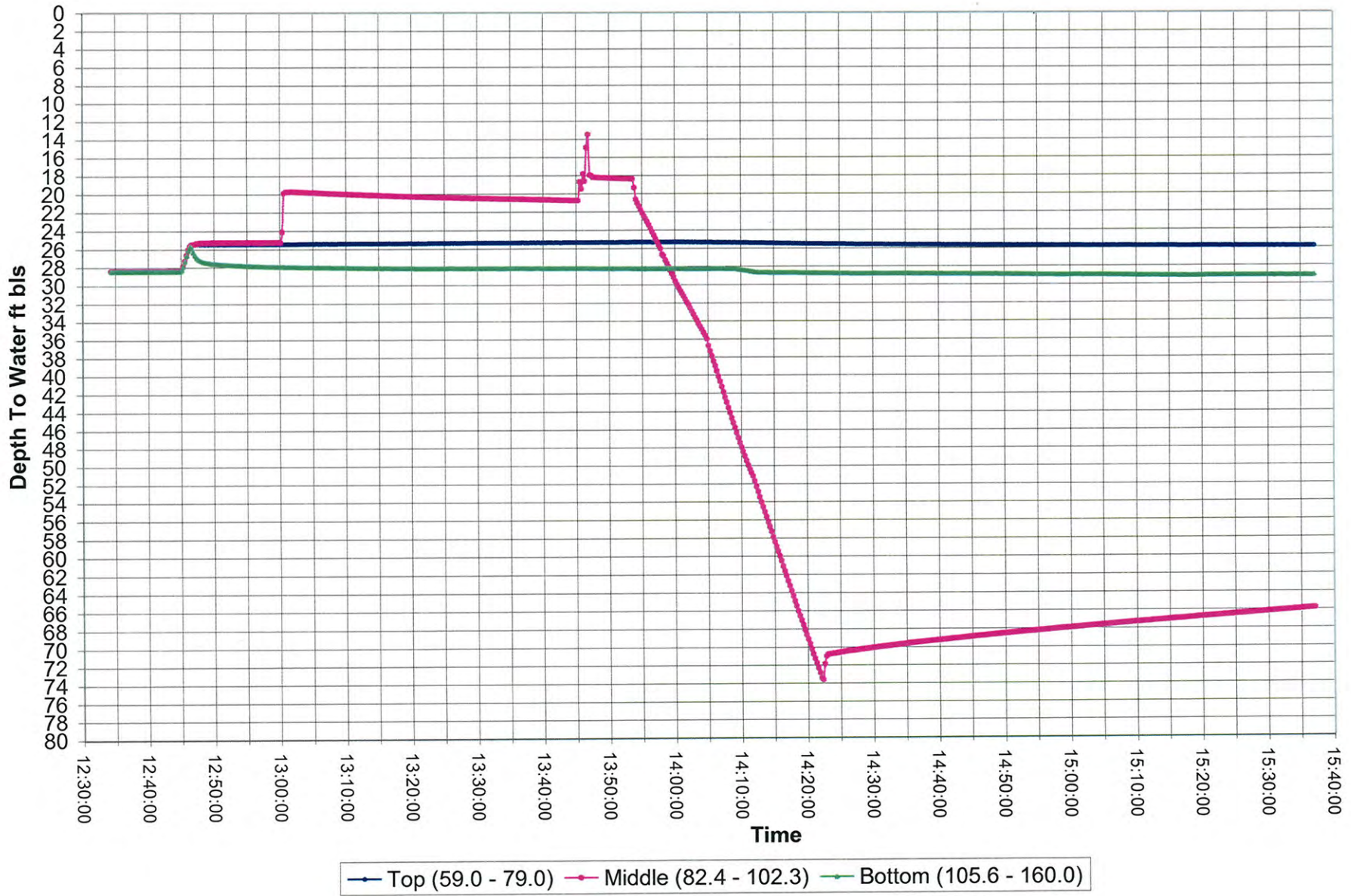
PACKER TEST INFORMATION

WELL/ZONE: MW-12D/Set 2
 PROJECT: AEC-NORTH, EAST
 PERSONNEL: T. Trumbull / JP Stokes

DATE: 1/28/13
 CLIENT: AEC
 W.O. #: 4396
 Page 2 of 2

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
2:20pm	0.4	25.487	70.122	28.699	
2:21		25.500	72.395	28.708	
2:22		25.504	73.643	28.706	Pump dewatered - Begin Recovery
2:23		25.520	70.739	28.718	Check valve failure - shut off valve
2:26		25.550	70.434	28.746	
2:30		25.586	70.063	28.752	
2:32		25.596	69.873	28.763	
2:34		25.617	69.616	28.774	
2:42		25.651	69.040	28.822	
2:44		25.664	68.902	28.826	
2:50		25.697	68.511	28.871	
2:53		25.714	68.323	28.904	
2:55		25.722	68.227	28.915	
3:02		25.761	67.787	28.945	
3:04		25.761	67.641	28.954	
3:06		25.772	67.538	28.983	
3:08		25.773	67.440	28.988	
3:10		25.787	67.315	29.022	
3:13		25.803	67.131	29.041	
3:17		25.814	66.907	29.071	
3:25		25.831	66.487	29.040	
3:34		25.864	65.992	29.078	
3:36		25.877	65.874	29.074	Stopped Data Logger No Sample

AEC - NORTH EAST - Well MW-12D
Set 2



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: Set 3
 Well: MW-12D Diameter: 6 inch Date: 1/29/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
118.45	122.02	125.35	~117	145.3	148.6	160

Inflation Pressures: upper packer: 365 psi lower packer: - psi
 Time required to evacuate one isolated interval + lift pipe: mins

WATER LEVELS

Open Hole Water Level: 29.17 ft. M.P.: TOC

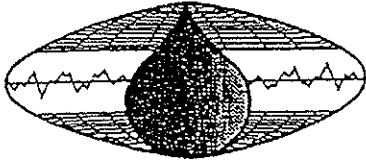
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	59 - 122.02	122.02 - 125.35	125.35 - 160	Bottom Not Inflated	145.3 - 148.6
Water Level	27.996	-	29.13	29.14	

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Preinflation	off	125.35-160	N/A	10	-	NO
2	Inflation	off	125.35-160	N/A	20	-	NO
3	slug	off	125.35-160	N/A	10	-	NO
4	Pumping	ON	125.35-160	0.5/1.0	27	117	NO
5	Recovery	off	125.35-160	N/A	68	96.29	NO
6							
7							
8							
9							

Remarks:

Earth Data INCORPORATED



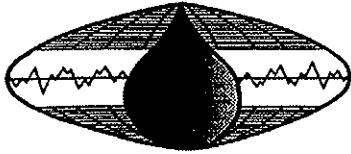
PACKER TESTING FIELD INFORMATION

WELL/ZONE: mw-12D/Set 3
 PROJECT: AEC-NORTH EAST
 PERSONNEL: T. Trumbull / SP Stokes

DATE: 1/29/13
 CLIENT: AEC
 W.O. #: 4396

SETTING DEPTHS	DATA COLLECTION CALIBRATION		
Point A <u>118.45</u>	Configuration Filename: <u>4396mw12D23</u>		
Upper Packer -Top <u>122.02</u>	PRN Filename: <u>mw12D23</u>		
Upper Packer -Bottom <u>125.35</u>	current mA = static water level (FT)		
Pump Intake <u>~117</u>	open air mA = transducer depth (FT)		
Lower Packer -Top <u>145.3</u>	CHANNEL 1	CHANNEL 2	CHANNEL 3
Lower Packer -Bottom <u>148.6</u>	<u>8.2559</u> mA = <u>29.17</u>	<u>9.1147</u> mA = <u>29.17</u>	<u>9.1311</u> mA = <u>29.17</u>
Assembly Bottom <u>150.13</u>	<u>5.1819</u> mA = <u>118.45</u>	<u>5.1821</u> mA = <u>143.08</u>	<u>5.1807</u> mA = <u>143.08</u>
PACKER INFLATION		Additional Calibration Notes:	
TOP	BOTTOM	CH1: $-29.0436x + 266.951$ CH3: $-28.8351x + 292.466$ CH2: $-28.9656x + 293.182$	
<u>365</u>	<u>-</u>		
TEST SEQUENCE	HYDRAULIC HEAD DISTRIBUTION (FT)		
	Open Hole Static Water Level: <u>29.17</u>		
Begin Logging <u>8:10:Am</u>			
Start Inflation <u>8:20:Am</u>	PRE- INFLATION	POST- INFLATION	PRE- PUMPING
Begin Pumping <u>9:10:Am</u>			PUMPING LEVEL
End Pumping <u>9:37:Am</u>	1	2	3
Totalizer Prior	2	3	4
Totalizer Post	3	4	
End Logging <u>10:46:Am</u>	4		
PUMPING RECORD	Miscellaneous Notes:		
Pumping Zone <u>125.35-160</u>			
Pumping Rate <u>0.5/1.0</u>	SLUG TEST SEQUENCE		
Pumping Duration <u>27min</u>		TIME	WATER LEVEL (FT)
Maximum Drawdown <u>97.41</u>	Start	<u>8:40:Am</u>	<u>27.587</u>
Specific Capacity <u><0.01</u>	Peak	<u>8:41:Am</u>	<u>22.349</u>
Nature of Discharge <u>Clear</u>	Recovery	<u>9:10:Am</u>	<u>N/A</u>
Time of Recovery			
RATE ADJUSTMENTS			
SUMMARY			

Earth Data INCORPORATED

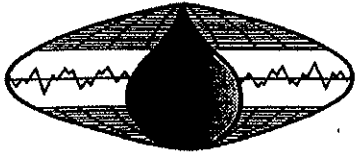


PACKER TEST INFORMATION

WELL/ZONE: MW-120/Set 3 DATE: 1/29/13
 PROJECT: AEC-NORTH EAST CLIENT: AEC
 PERSONNEL: T. Trumbull/JP Stokes W.O.#: 4396
 Page 1 of

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
8:10am					Begin Logger
8:12am		29.156	29.134	29.150	
8:15		29.144	29.135	29.138	
8:17		29.135	29.133	29.138	
8:18		29.132	29.125	29.137	
8:20		29.133	29.125	29.140	Begin TOP Packer Inflation
8:22		27.701	27.564	27.560	
8:25		27.779	27.485	27.513	
8:30		27.886	27.510	27.533	
8:32		27.914	27.527	27.548	
8:35		27.957	27.549	27.583	
8:38		27.980	27.571	27.608	
8:40		27.985	27.587	27.619	Slug 1 Gal
8:41		27.985	22.349	22.419	
8:45		27.984	22.529	22.609	
8:48		27.982	22.756	22.836	
8:50		27.978	22.863	22.928	lowering
8:52		27.983	22.967	23.029	Begin lowering Pump
9:00		27.984	19.417	19.520	
9:05		27.983	19.685	19.782	
9:10		27.996	19.895	19.974	START PUMP
9:11	0.5	27.995	23.692	23.934	
9:12		27.999	27.065	27.399	
9:14		27.996	32.281	37.343	
9:19		28.071	47.362	47.558	
9:20	0.5	28.082	48.765	49.024	
9:22		28.111	54.407	54.548	
9:24		28.148	59.972	60.028	
9:26	0.5	28.181	65.433	65.441	

Earth Data INCORPORATED



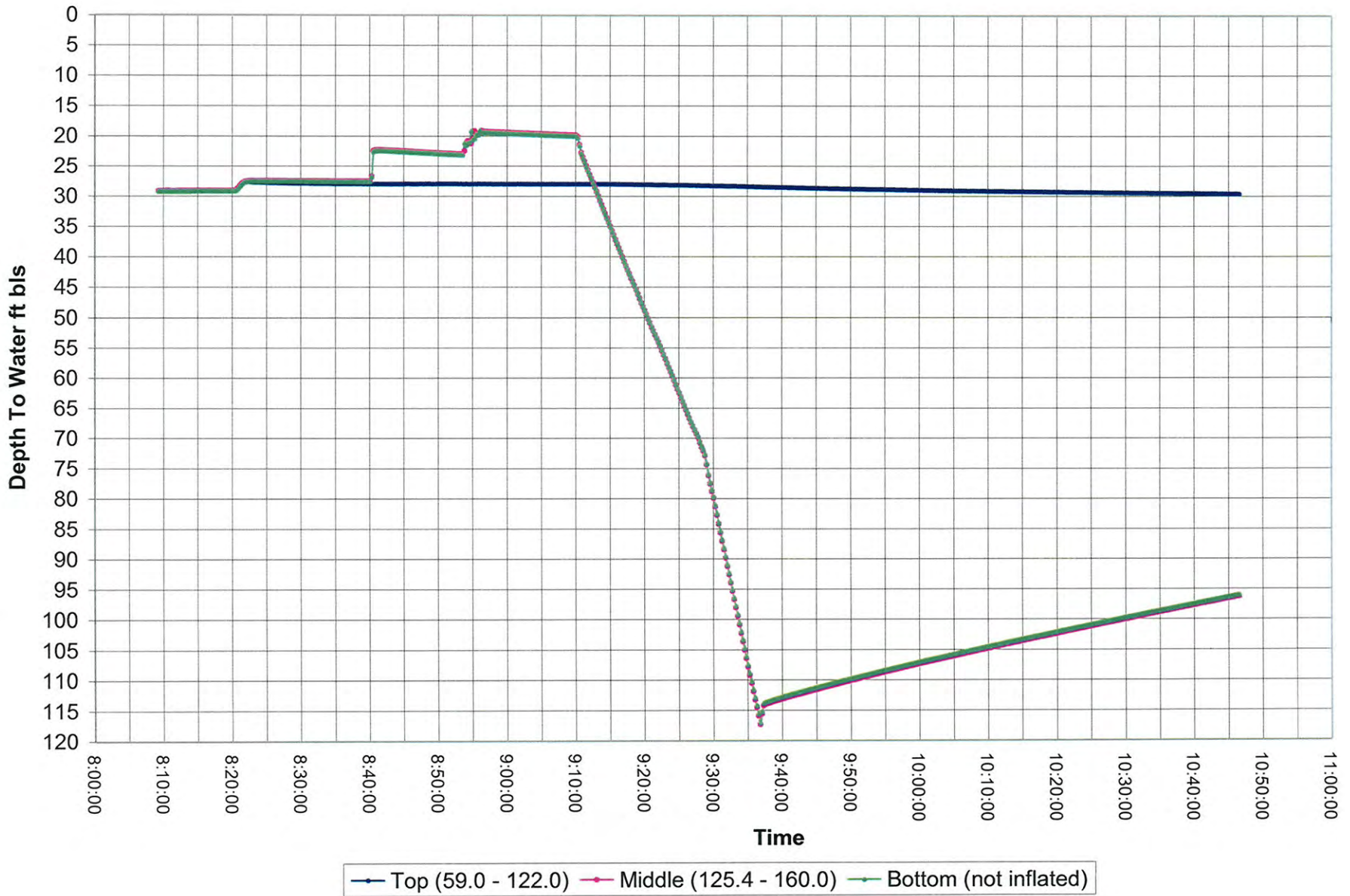
PACKER TEST INFORMATION

WELL/ZONE: MW-12D/Set 2
 PROJECT: AEC - NORTHEAST
 PERSONNEL: J. Trumbull/SP Sticks

DATE: 1/29/13
 CLIENT: AEC
 W.O. #: 4396
 Page 2 of

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
9:28	0.5	28.228	69.857	69.886	
9:29	1.0	28.263	76.510	76.675	Rate Increase
9:30		28.285	80.749	80.706	
9:32	1.0	28.318	92.787	92.877	
9:34		28.358	101.824	101.866	
9:35		28.391	107.538	107.539	
9:36		28.4	113.751	113.121	
9:37		28.458	117.308	119.28	Pump dewatered - begin Recovery
9:38		28.488	113.825	112.79	Chased Valves.
9:40		28.555	112.986	112.540	
9:42		28.572	112.489	112.062	
9:48		28.736	110.632	110.223	
9:53		28.847	109.137	108.734	
9:57		28.950	107.887	107.478	
10:00			104.435	100	
10:17		29.269	102.859	102.506	
10:22		29.325	101.867	101.501	
10:25		29.378	100.954	100.578	
10:30		29.432	99.973	99.604	
10:34		29.486	99.003	98.670	
10:36		29.508	98.565	98.218	
10:38		29.532	98.122	97.790	
10:40		29.559	97.503	97.177	
10:46		29.622	96.295	95.992	Stop Recorder

AEC - NORTH EAST - Well MW-12D
Set 3



APPENDIX D

**Packer Test Data
For Well MW-13D**

PACKER TESTING
ADMINISTRATIVE DATA
FOR EACH WELL

Project AEC-NORTH EAST

Well MW-13D

W.O. 4396

Purpose of Testing: Sampling and hydraulic data

History of Testing:

Description of Measuring Point: TOC to top of blocks TOC ~~to~~ to M.P. 1.73
Elevation _____

Pre-test open hole water level: _____ Date: _____ Time: _____

PUMPING EQUIPMENT

Pump S/N: Ground Pros Redi-Flow HP: _____ Volts: _____ Phase: _____ Starter Y or N _____

Nominal Diameter of Lift Pipe: _____ Type Pipe: _____

Method of Flow Measurement: Rotameter

Disposition of Discharge: _____

TIME MEASUREMENT

How Measured: Stop Watch Date start 1/29/13 Date end 1/31/13

PACKER EQUIPMENT

For Wells: 6 ins in dia. Uninflated diameter: 3.5 ins. Max inflated dia: 6.25

Length of bladder: 3.33/3.30 Spread: 17.24 ft. Bladder material: Rubber

Nitrogen pressure start: 1100 psi stop: 500 psi Amount used: 600 psi

TRANSDUCERS AND DATA LOGGER

Data Logger:

Transducers	upper	middle	lower		
Serial Numbers	<u>12388</u>	<u>12390</u>	<u>12382</u>		
Range	<u>0-200</u>	<u>0-200</u>	<u>0-200</u>		

Remarks:

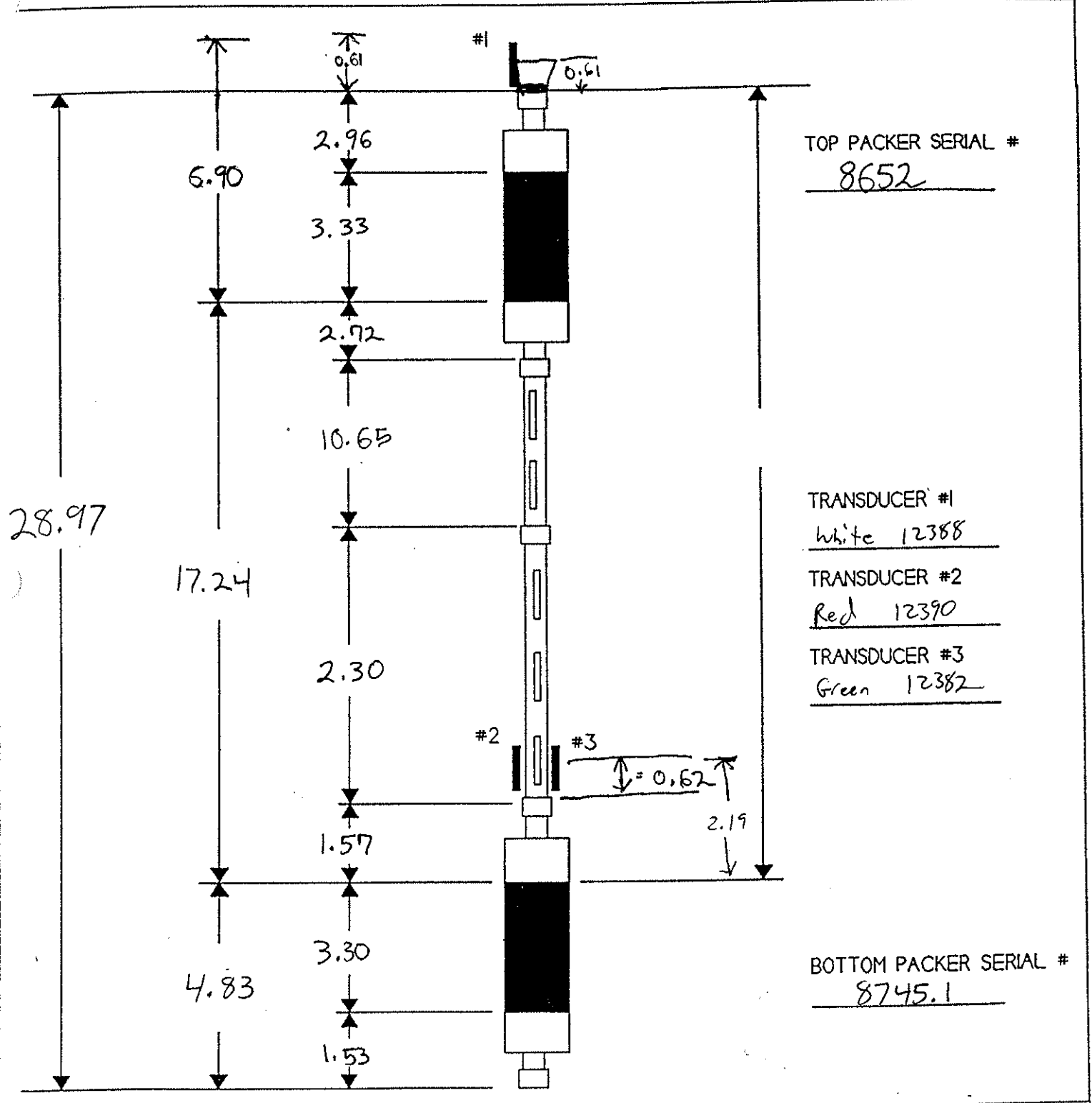
INTERVALS TESTED

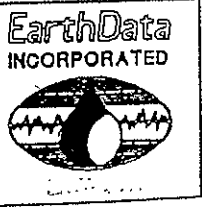
	From	To	SWL	PWL	GPM	Spec Cap	Remarks/Samples
	open hole		<u>27.88</u>	<u>48.035</u>	<u>3.0</u>	<u>0.12 ^{92%}</u>	
<u>1</u>	<u>56.14</u>	<u>73.38</u>	<u>8.52</u>	<u>44.25</u>	<u>0.4</u>	<u>0.01 ^{92%}</u>	<u>Sampled</u>
<u>2</u>	<u>116.92</u>	<u>134.16</u>	<u>22.23</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>Reset to smaller bore hole</u>
<u>2b</u>	<u>117.99</u>	<u>135.23</u>	<u>22.13</u>	<u>43.19</u>	<u>1.5</u>	<u>0.07 ^{92%}</u>	<u>Sampled</u>
<u>3</u>	<u>139.04</u>	<u>156.28</u>	<u>19.85</u>	<u>50.41</u>	<u>0.45</u>	<u>0.015 ^{92%}</u>	<u>Sampled</u>

Personnel on test: T. Trumbull / SP Stokes

Hoist: SMERL Generator KW: 4 Support Vehical: _____

STRADDLE PACKER DIMENSIONS (UNINFLATED)



W. O. # <u>4396</u>	WELL # <u>MW-13D</u>	DIAMETER OF PACKERS <u>3.5</u> in.	
JOB NAME <u>A EC-NORTHEAST</u>	WELL DEPTH _____ ft	PUMP _____	
DATES FROM ___/___/___ TO ___/___/___	WELL DIAMETER <u>6</u> in.	DIAMETER OF LIFT PIPE <u>2</u> in.	

PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: OPEN-HOLE
 Well: MW-13D Diameter: 6 in Date: 1/29/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
49.24	Not Inflated		49.0	Not Inflated		181

Inflation Pressures: upper packer: N/A psi lower packer: N/A psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 22.86 ft. M.P.: _____

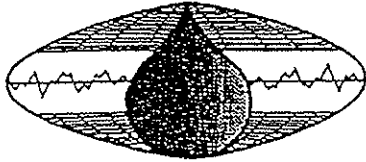
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	Not Inflated		59-181	Not Inflated	
Water Level					

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Pumping	ON	59-181	3.0	37	47.81	NO
2							
3							
4							
5							
6							
7							
8							
9							

Remarks:

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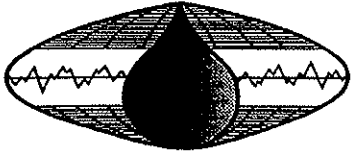


PACKER TESTING FIELD INFORMATION

WELL/ZONE: MW-13D / Zone / OPEN Hole DATE: 1/29/13
 PROJECT: AEC-NORTH EAST CLIENT: AEC
 PERSONNEL: T. Trumbull / JP Stokes W.O.#: 4396

SETTING DEPTHS		DATA COLLECTION CALIBRATION				
Point A	49.24	Configuration Filename: <u>4396mw13Dopn1</u>				
Upper Packer -Top	52.81	PRN Filename: <u>MW13DZ1open</u>				
Upper Packer -Bottom	56.14	current mA = static water level (FT)				
Pump Intake	~50	open air mA = transducer depth (FT)				
Lower Packer -Top	73.38	CHANNEL 1	CHANNEL 2	CHANNEL 3		
Lower Packer- Bottom	76.68	6.1003 mA = 22.43'	6.8609 mA = 22.43'	6.9615 mA = 22.43'		
Assembly Bottom	78.21	5.1640 mA = 49.24	5.1673 mA = 71.19'	5.1680 mA = 71.19'		
PACKER INFLATION		Additional Calibration Notes:				
TOP	BOTTOM	CH1: -26.634X + 197.106 CH3 - 27.1871X + 211.693				
N/A	N/A	CH2: -287907X + 219.96				
TEST SEQUENCE		HYDRAULIC HEAD DISTRIBUTION (FT)				
Begin Logging		Open Hole Static Water Level: <u>22.43</u>				
Start Inflation		PRE- INFLATION	POST- INFLATION	PRE- PUMPING	PUMPING LEVEL	RECOVERY
Begin Pumping		1	N/A	M/A	22.861	47.814
End Pumping		2	N/A	N/A	22.878	48.035
Totalizer Prior		3	N/A	N/A	22.853	45.635
Totalizer Post		4	-	-		
End Logging						
PUMPING RECORD		Miscellaneous Notes:				
Pumping Zone		NO SAMPLE				
Pumping Rate						
Pumping Duration						
Maximum Drawdown						
Specific Capacity						
Nature of Discharge						
Time of Recovery						
RATE ADJUSTMENTS						
SUMMARY		OPEN HOLE Test				

Earth Data INCORPORATED



PACKER TEST INFORMATION

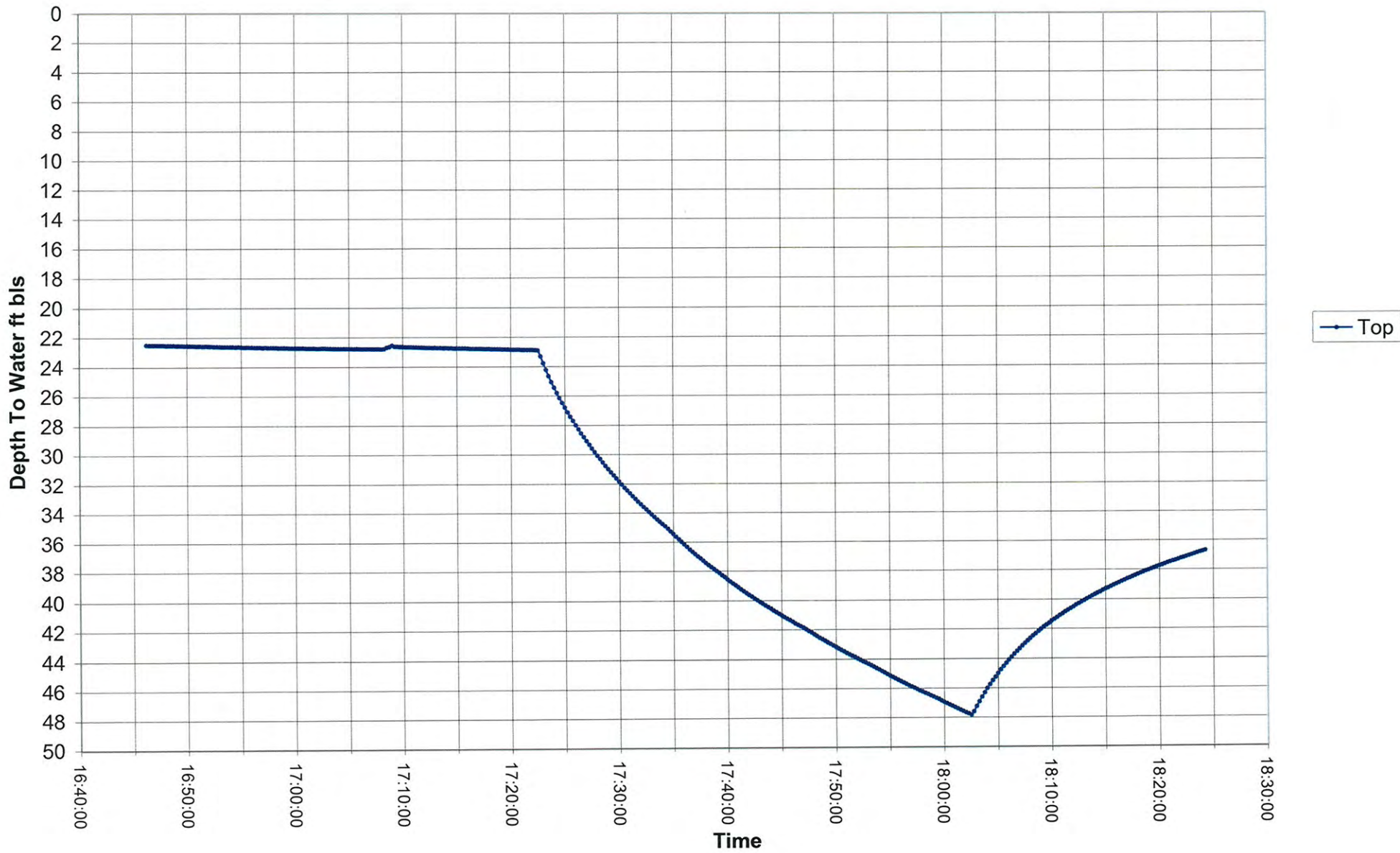
WELL/ZONE: MW13D~~2~~ - Zone 1 open
 PROJECT: AEC - NORTH EAST
 PERSONNEL: T. Trumbull / JP Stokes

DATE: 1/29/13
 CLIENT: AEC
 W.O. #: 4396
 Page 1 of

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
4:46		22.507	22.511	22.511	Start Recorder
4:48		22.523	22.530	22.521	
4:50		22.560	22.556	22.551	
4:52		22.584	22.594	22.590	
5:04		22.767	22.771	22.748	
5:07		22.781	22.793	22.772	Inserting Pump
5:13		22.726	22.724	22.721	
5:20		22.836	22.847	22.818	
5:22		22.861	22.878	22.853	START PUMP
5:23	3.0	23.954	23.815	23.694	
5:25	3.0	23.309	26.986	27.032	
5:27	3.0	29.581	29.552	29.092	
5:30		31.906	31.886	31.194	
5:33		34.572	34.607	33.665	
5:35	3.0	35.587	35.597	34.585	
5:37		36.895	36.913	35.751	
5:40	3.0	38.601	38.638	37.355	
5:43		40.156	40.242	38.738	
5:45	3.0	41.057	41.133	39.546	
5:47		42.065	42.139	40.486	
5:50	3.0	43.200	43.290	41.484	
5:53		44.373	44.768	41.625	
5:56		45.671	45.903	43.673	
5:59					
6:00	3.0	46.976	47.092	44.854	
6:02		47.814	48.035	45.635	Pump Deatered
6:05		44.395	44.585	42.444	
6:07		42.941	43.124	41.204	
6:10		41.413	41.327	39.653	

6:12 40.487 40.207 38.985
 6:19 37.883 37.912 36.622
 6:20 37.663 37.538 36.431
 6:24 36.703 36.774 35.503 Stop Logger

**AEC - NORTH EAST - Well MW-13D
Open-Hole Pumping Test**



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 1
 Well: MW-13D Diameter: 6 inch Date: 1/30/13

DEPTHS

Point A	Upper Packer Top	Upper Packer Bottom	Pump Intake	Lower Packer Top	Lower Packer Bottom	Well Depth
49.24	52.81	56.14	~ 48	73.38	76.68	181

Inflation Pressures: upper packer: 330 psi lower packer: 340 psi

Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 19.74 ft. M.P.: TOC

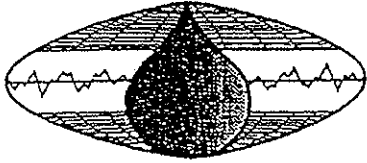
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	In Casing	52.81 - 56.14	56.14 - 73.38	76.68 - 181	73.38 - 76.68
Water Level	16.734	-	8.518	20.862	

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Preinflation	off	56.14-73.38	N/A	15	-	No
2	Inflation	off	56.14-73.38	N/A	45	-	No
3	Slug	off	56.14-73.38	N/A	15	-	No
4	Pumping	ON	56.14-73.38	8.4	90	46.45	YES
5							
6							
7							
8							
9							

Remarks:

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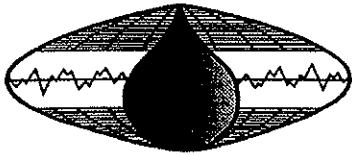
PACKER TESTING FIELD INFORMATION

WELL/ZONE: MW13D / Set. 1
 PROJECT: AEC-NORTH EAST
 PERSONNEL: T. Trumbull / J.P. Sobres

DATE: 1/30/13
 CLIENT: AEC
 W.O.#: 4396

SETTING DEPTHS	DATA COLLECTION CALIBRATION				
Point A <u>49.24</u>	Configuration Filename: <u>4396mw13D21</u>				
Upper Packer -Top <u>52.81</u>	PRN Filename: <u>MW13D21</u>				
Upper Packer -Bottom <u>56.14</u>	current mA = static water level (FT)				
Pump Intake <u>48</u>	open air mA = transducer depth (FT)				
Lower Packer -Top <u>73.38</u>	CHANNEL 1	CHANNEL 2	CHANNEL 3		
Lower Packer - Bottom <u>76.68</u>	6.1833 mA = 19.74	6.9457 mA = 19.74	7.0191 mA = 19.74		
Assembly Bottom	5.1640 mA = 49.24	5.1673 mA = 71.19	5.1680 mA = 71.19		
PACKER INFEATION		Additional Calibration Notes:			
TOP	BOTTOM	CH1: $-28.9414x + 198.694$ CH3: $-27.943x + 214.831$			
<u>330</u>	<u>340</u>	CH2: $-28.9305x + 220.683$			
TEST SEQUENCE	HYDRAULIC HEAD DISTRIBUTION (FT)				
	Open Hole Static Water Level: <u>19.74</u>				
Begin Logging <u>8:00 : Am</u>					
Start Inflation <u>8:15 : Am</u>					
Begin Pumping <u>9:33 : Am</u>					
End Pumping <u>11:02 : Am</u>					
Totalizer Prior					
Totalizer Post					
End Logging <u>11:25 : Am</u>					
PUMPING RECORD	Miscellaneous Notes:				
	Reference above TX: <u>1.73 ft</u>				
Pumping Zone <u>56.14-73.38</u>					
Pumping Rate <u>0.25/0.4</u>	SEUC TEST SEQUENCE				
Pumping Duration <u>90 m.'ns</u>					
Maximum Drawdown <u>38.35'</u>		TIME	WATER LEVEL (FT)		
Specific Capacity <u>0.01 gpm/ft</u>	Start	<u>9:00 : Am</u>	<u>11.008</u>		
Nature of Discharge <u>Clear</u>	Peak	<u>9:01 : Am</u>	<u>5.636</u>		
Time of Recovery	Recovery	<u>9:12 : Am</u>	<u>7.910</u>		
RATE ADJUSTMENTS					
SUMMARY					

Earth Data INCORPORATED



PACKER TEST INFORMATION

WELL/ZONE: MW13d Sect 1
 PROJECT: AEC - NORTH EAST
 PERSONNEL: T. Trumbull / SP Stokes

DATE: 1/30/13
 CLIENT: AEC
 W.O. #: 4396
 Page 1 of 3

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
8:00 Am		19.746	19.740	19.740	Start Recorder
8:03		19.733	19.730	19.737	
8:07		19.716	19.721	19.729	
8:10		19.713	19.714	19.723	
8:12		19.701	19.716	19.718	
8:15		19.695	19.699	19.717	Begin Packer Inflation
8:17		16.966	16.243	19.250	
8:20		16.945	15.230	19.739	
8:22		16.933	14.160	19.981	
8:30		16.914	13.431	20.117	
8:37		16.905	12.416	20.304	middle channel we increasing
8:40		16.898	12.303	20.345	waiting until 9am for more equalized level
8:43		16.887	11.976	20.370	
8:45		16.888	11.815	20.405	
8:48		16.868	11.571	20.464	
8:52		16.871	11.394	20.525	
8:56		16.854	11.145	20.584	
8:58		16.841	11.087	20.608	
9:00		16.839	11.008	20.640	Slug Test 1Gal
9:01 Am		16.841	5.636	20.630	
9:03		16.835	6.139	20.669	
9:06 Am		16.808	7.077	20.716	
9:10 Am		16.788	7.664	20.735	
9:12		16.787	7.910	20.755	Setting Pump
9:17		16.766	6.745	20.792	
9:20		16.766	7.248	20.819	
9:23		16.760	7.705	20.836	
9:26		16.753	8.073	20.852	
9:29		16.745	8.264	20.873	

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PACKER TEST INFORMATION

WELL/ZONE: MW13D / Sect 1
 PROJECT: AEC - North East
 PERSONNEL: T. Trumbull / JP Stokes

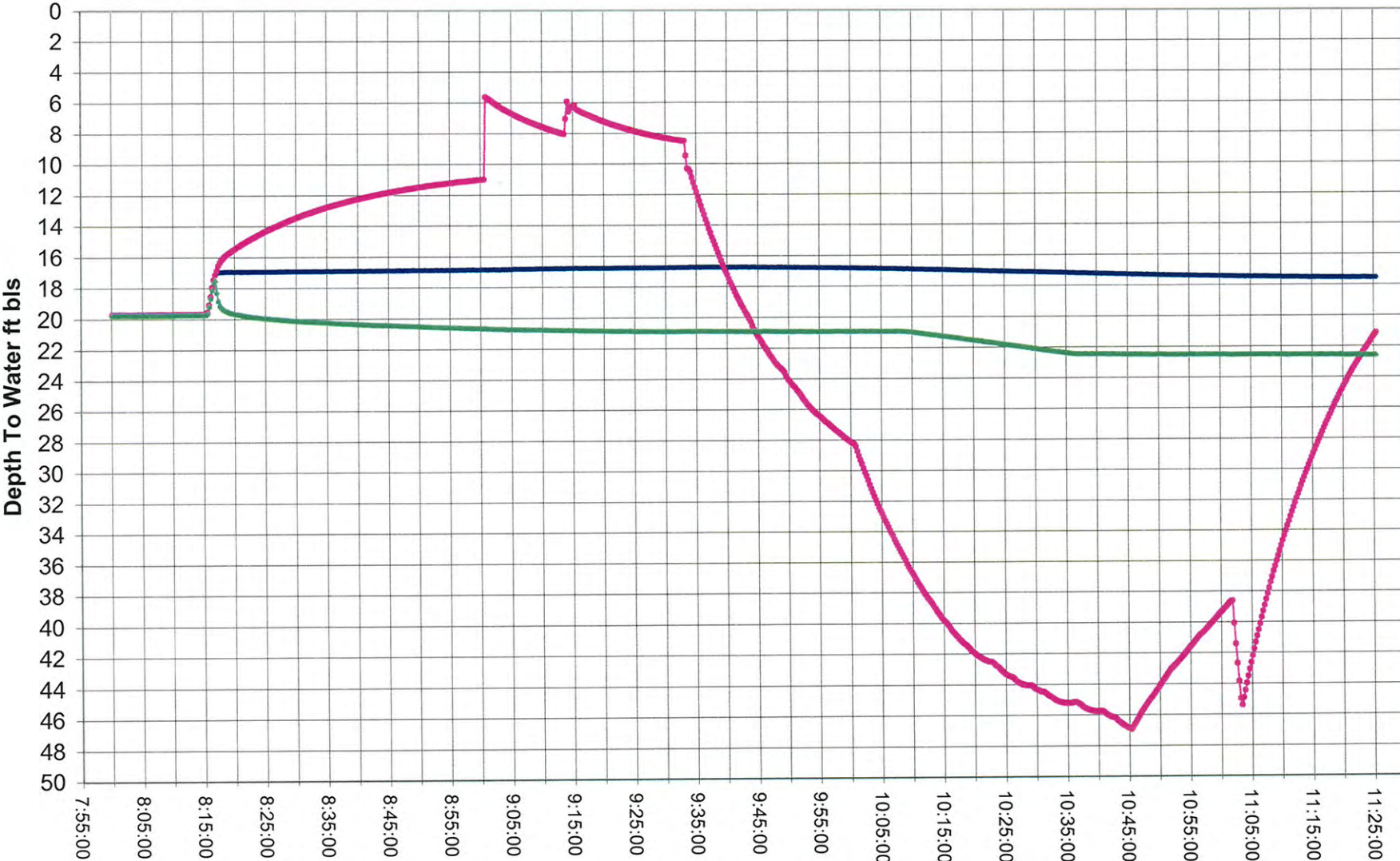
DATE: 1/30/13
 CLIENT: AEC
 W.O. #: 4396
 Page 2 of 3

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
9:30		16.739	28.349	20.873	
9:33	0.25	16.734	8.518	20.862	Start Pump
9:35	0.25	16.732	18.813	20.854	
9:37		16.720	14.387	20.856	
9:39			16.260		
9:40		16.722	14.220	20.874	
9:42		16.732	19.032	20.869	
9:47		16.745	22.555	20.883	
9:50	0.25	16.758	24.217	20.885	
9:56		16.798	27.107	20.909	
10:00	0.25	16.806	28.262	20.898	increasing to 0.4 gpm
10:03	0.4	16.826	30.820	20.901	
10:07		16.860	34.430	20.914	
10:15	0.4	16.941	39.893	21.252	
10:17		16.967	40.976	21.363	
10:20		17.007	42.015	21.525	
10:24		17.051	43.064	21.752	
10:26		17.075	43.702	21.875	
10:30		17.103	44.470	22.114	
10:34		17.144	45.160	22.295	
10:36	0.4	17.181	45.286	22.429	open valve to maintain 0.4 gpm
10:49		17.203	45.727	22.433	
10:42		17.237	46.092	22.439	
10:44		17.256	46.639	22.446	
10:45	0.4	17.269	46.866	22.449	decrease rate to 0.25 ^{begin} Procedure ^{Low flow sampling}
10:46	0.25	17.292	45.931	22.446	
10:50		17.339	43.632	22.462	
10:55		17.373	41.460	22.476	
11:00	0.25	17.420	39.067	22.485	

70als.

25gals

AEC - NORTH EAST - Well MW-13D
Set 1



—●— Top (in casing) —●— Middle (56.1 - 73.4) —●— Bottom (76.7 - 181.0)

PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 2
 Well: MW-130 Diameter: 6 inch Date: 1/30/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
110.02	113.59	116.92	~109	134.16	137.36	181

Inflation Pressures: upper packer: 360 psi lower packer: 370 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 20.34 ft. M.P.: TOC

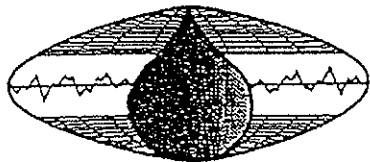
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	59 - 113.59	113.59 - 116.92	116.92 - 134.16	137.36 - 181	134.16 - 137.36
Water Level	17.641	-	22.235	22.936	-

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Preinflation	off	116.92-134.16	N/A	15	-	NO
2	Inflation	off	116.92-134.16	N/A	20	-	NO
3	Slug	off	116.92-134.16	N/A	15	-	NO
4	NO PUMPING						
5							
6							
7							
8							
9							

Remarks:

Earth Data INCORPORATED



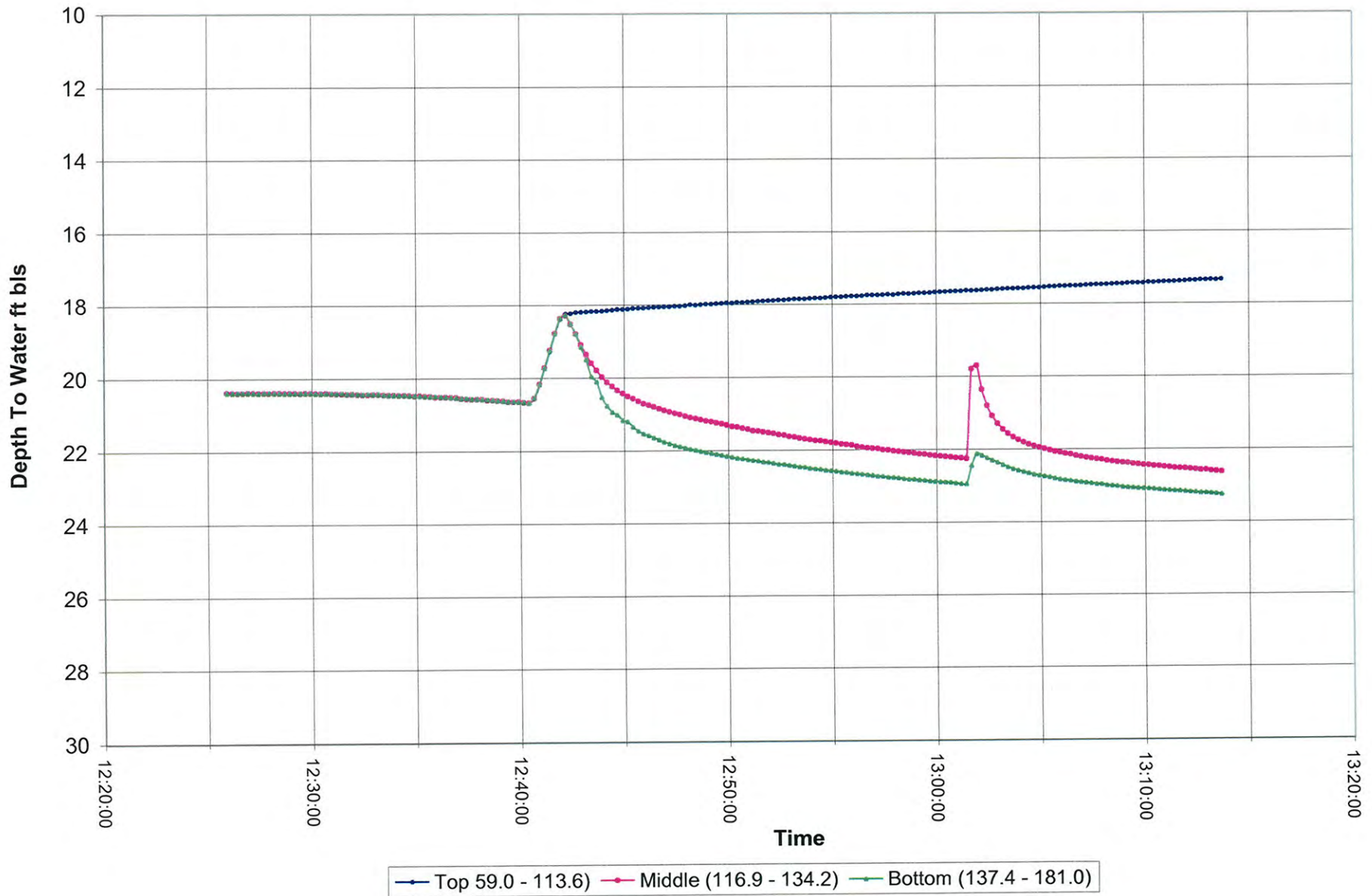
PACKER TESTING FIELD INFORMATION

WELL/ZONE: MW-13D / Set 2
 PROJECT: AEC-NORTH EAST
 PERSONNEL: T. Trumbull / JP Stokes

DATE: 1/30/13
 CLIENT: AEC
 W.O. #: 4396

SETTING DEPTHS		DATA COLLECTION CALIBRATION				
Point A	110.02	Configuration Filename: <u>4396mw13d22</u>				
Upper Packer -Top	113.59	PRN Filename: _____				
Upper Packer -Bottom	116.92	current mA = static water level (FT)				
Pump Intake	109	open air mA = transducer depth (FT)				
Lower Packer -Top	134.16	CHANNEL 1	CHANNEL 2	CHANNEL 3		
Lower Packer - Bottom	137.36	8.2548 mA = 20.34'	9.0193 mA = 20.34'	9.0386 mA = 20.34'		
Assembly Bottom	138.89	5.1640 mA = 110.02'	5.1673 mA = 131.97'	5.1680 mA = 131.97'		
PACKER INFLATION		Additional Calibration Notes:				
TOP	BOTTOM	CH 1: -29.0191x + 259.854 CH 3: -28.8405x + 281.018				
360	370	CH 2: -28.9797x + 281.717				
TEST SEQUENCE		HYDRAULIC HEAD DISTRIBUTION (FT)				
Begin Logging		Open Hole Static Water Level: _____				
Start Inflation		PRE- INFLATION	POST- INFLATION	PRE- PUMPING	PUMPING LEVEL	
Begin Pumping		RECOVERY				
End Pumping		1	20.665	17.641	N/A	N/A
Totalizer Prior		2	20.669	22.235	N/A	N/A
Totalizer Post		3	20.660	22.936	N/A	N/A
End Logging		4				
PUMPING RECORD		Miscellaneous Notes:				
Pumping Zone		N/A				
Pumping Rate		SPECIFIC TEST SEQUENCE				
Pumping Duration						
Maximum Drawdown			TIME	WATER LEVEL (FT)		
Specific Capacity		Start	1:00: Pm	22.235		
Nature of Discharge		Peak	1:01: Pm	18.982		
Time of Recovery		Recovery	:	:	-	
RATE ADJUSTMENTS						
<u>Not good</u>						
SUMMARY						
- Not good seal on bottom packer attempting to lower 1 foot.						

AEC - NORTH EAST - Well MW-13D
Set 2



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 2B
 Well: MW-13D Zone 2B Diameter: 6 inch Date: 1/30/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
111.09	114.66	117.99	~116	135.23	138.53	181

Inflation Pressures: upper packer: 360 psi lower packer: 370 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 22.13 ft. M.P.: TOC

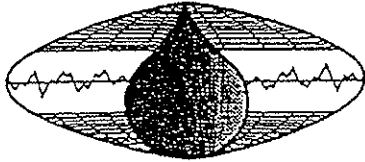
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	59- 114.66	114.66- 117.99	117.99-135.23	138.53-181	135.23-138.53
Water Level	18.917	-	22.050	23.126	-

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Preinflation	OFF	117.99-135.23	N/A	13	-	NO
2	Inflation	OFF	117.99-135.23	N/A	13	-	NO
3	SLUG	OFF	117.99-135.23	N/A	10	-	NO
4	Pump	ON	117.99-135.23	1.5	70	-	YES
5							
6							
7							
8							
9							

Remarks:

Earth Data INCORPORATED



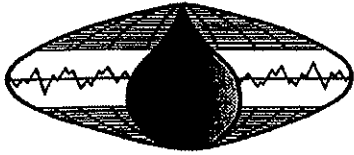
PACKER TESTING FIELD INFORMATION

WELL/ZONE: MW13D/Set 2B
 PROJECT: AEC - North East
 PERSONNEL: _____

DATE: 1/30/03
 CLIENT: AEC
 W.O. #: 4396

SETTING DEPTHS		DATA COLLECTION CALIBRATION				
Point A	111.09	Configuration Filename: <u>4396MW13D22B</u>				
Upper Packer -Top	114.66	PRN Filename: <u>mw13d22B</u>				
Upper Packer -Bottom	117.99	current mA = static water level (FT)				
Pump Intake	~116	open air mA = transducer depth (FT)				
Lower Packer -Top	135.23	CHANNEL 1	CHANNEL 2	CHANNEL 3		
Lower Packer -Bottom	138.53	8.2274 mA = 22.13'	8.9915 mA = 22.13'	9.0110 mA = 22.13'		
Assembly Bottom	140.06	5.1640 mA = 111.09	5.1673 mA = 133.04	5.1680 mA = 133.04		
PACKER INFLECTION		Additional Calibration Notes:				
TOP	BOTTOM	CH1: -29.0396x + 261.051 CH-3 -28.8603x + 282.19				
360	370	CH2: -29.0021x + 282.903				
TEST SEQUENCE		HYDRAULIC HEAD DISTRIBUTION (FT)				
		Open Hole Static Water Level: <u>22.13</u>				
Begin Logging	1 : 45 : pm					
Start Inflation	1 : 57 : pm	PRE- INFLATION	POST- INFLATION	PRE- PUMPING	PUMPING LEVEL	RECOVERY
Begin Pumping	2 : 35 : pm					
End Pumping	3 : 46 : pm	1 22.063'	18.917'	17.939'	17.737'	'
Totalizer Prior		2 22.067'	22.050'	21.988'	43.186'	'
Totalizer Post		3 22.074'	23.126'	23.089'	37.790'	'
End Logging	4 : 06 : pm	4				
PUMPING RECORD		Miscellaneous Notes:				
Pumping Zone	117.99-135.23					
Pumping Rate	1.0/1.5	SPECIFIC TEST SEQUENCE				
Pumping Duration	70					
Maximum Drawdown	21.20'		TIME	WATER LEVEL (FT)		
Specific Capacity	0.07 gpm/ft	Start	2:10 : pm	22.050		
Nature of Discharge	Clear	Peak	2:11 : pm	18.870		
Time of Recovery		Recovery	2:17 : pm	21.807		
RATE ADJUSTMENTS						
SUMMARY						

Earth Data INCORPORATED



PACKER TEST INFORMATION

WELL/ZONE: MW13D - Set 2B
 PROJECT: AEC - NORTH EAST
 PERSONNEL: T. Trumbull / JP Stokes

DATE: 1/30/13
 CLIENT: AEC
 W.O. #: 4396
 Page 1 of 2

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
1:45pm		22.139	22.117	22.120	
1:50pm		22.104	22.106	22.110	
1:55pm		22.073	22.090	22.076	↑
1:57		22.083	22.067	22.074	Begin In Flats
2:00		19.331	21.233	22.336	
2:05		19.128	21.855	22.974	
2:10		18.917	22.050	23.126	Slug 1 Gal.
2:11		18.878	18.870	22.386	
2:17		18.626	21.807	22.929	
2:19					Inserted Pump
2:24		18.323	21.719	22.905	
2:29		18.161	21.902	23.030	
2:32		18.030	21.962	23.061	
2:35		18.939	21.988	23.089	START Pumping
2:36	1.0	17.889	23.511	23.540	
2:37		17.886	24.909	24.030	
2:40		17.786	26.978	25.236	
2:42		17.741	27.548	25.642	
2:45	1.0	17.691	28.390	26.205	increase Rate to 1.5gpm
2:47	1.5	17.664	30.236	27.106	
2:50		17.618	32.072	28.436	
2:53	1.5	17.600	32.990	29.106	
2:55		17.591	33.552	29.551	
3:00		17.555	34.983	30.712	
3:08		17.538	36.669	32.165	
3:10	1.5	17.540	37.051	32.507	
3:15		17.578	38.113	33.426	
3:20		17.599	39.176	34.383	
3:23pm	1.5	17.600	39.956	35.091	

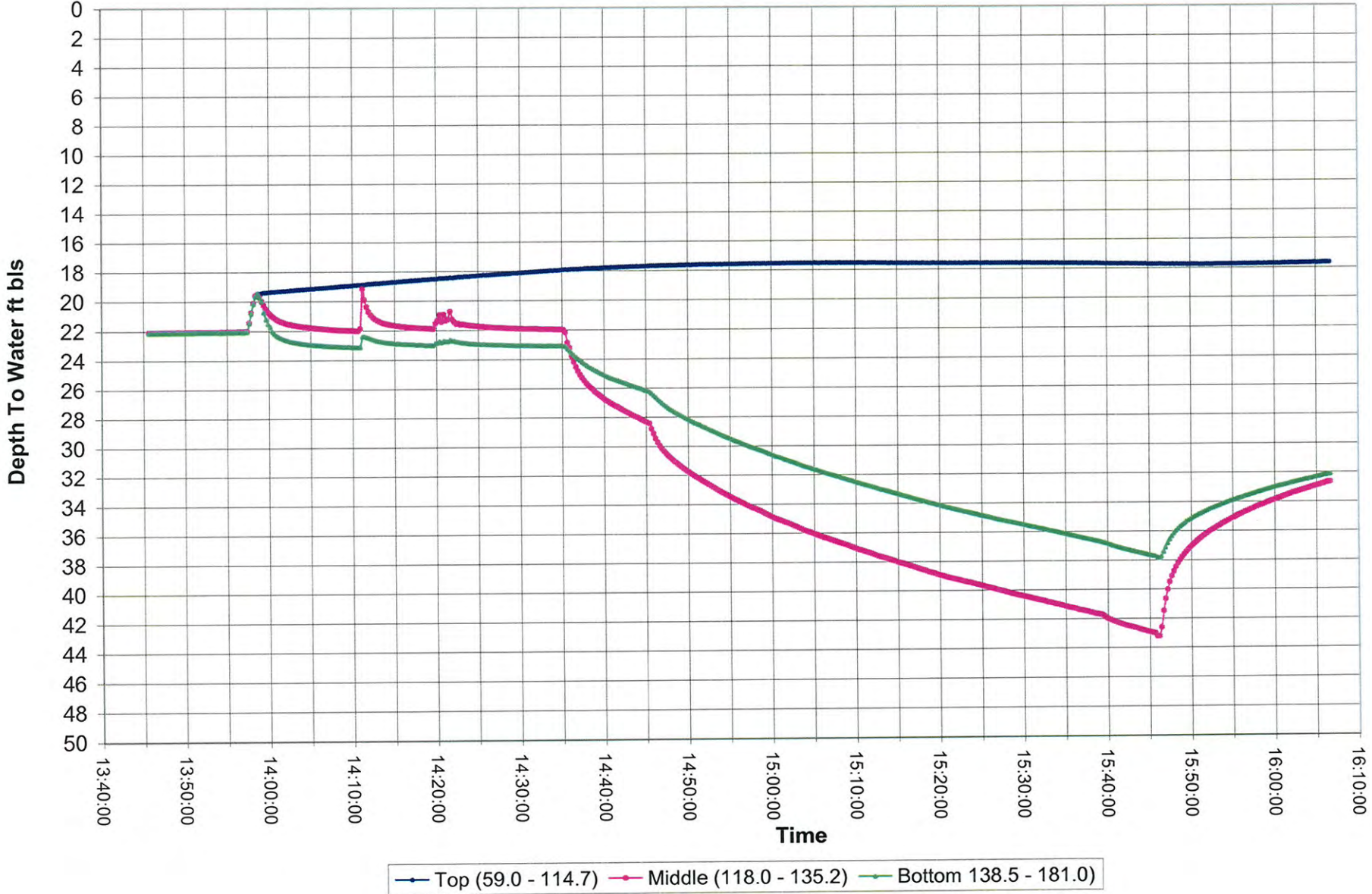
1:55

10 gal

32.5 gals

32.5 gals

AEC - NORTH EAST - Well MW-13D
Set 2B



PACKER TESTING - EACH SETTING

Project AEC-NORTH EAST W.O.: 4396 Set No.: 3
 Well: MW-13D Zone3 Diameter: 6 inch Date: 1/31/13

DEPTHS

Point A	Upper Packer		Pump Intake	Lower Packer		Well Depth
	Top	Bottom		Top	Bottom	
132.14	135.71	139.04	~129.5	156.28	159.58	181

Inflation Pressures: upper packer: 370 psi lower packer: 380 psi
 Time required to evacuate one isolated interval + lift pipe: _____ mins

WATER LEVELS

Open Hole Water Level: 20.13 ft. M.P.: TOC

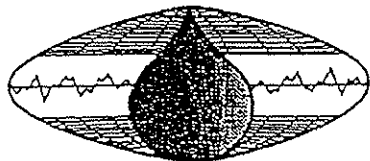
	Upper Isolated	Upper Composite	Isolated Zone	Lower Isolated	Lower Composite
from - to	59 - 135.71	135.71 - 139.04	139.04 - 156.28	159.58 - 181	156.28 - 159.58
Water Level	19.849	-	20.651	6.388	-

TEST SEQUENCE

Step	Packer(s) Inflated	Pump on/off	Zone Tested	Yield gpm	Duration (mins)	Pumping Level	Sampled yes/no
1	Preinflation	off	139.04 - 156.28	N/A	21	-	No
2	inflation	off	139.04 - 156.28	N/A	35	-	NO
3	slug	off	139.04 - 156.28	N/A	20	-	NO
4	Pump	ON	139.04 - 156.28	N/A	88	50.407	YES
5							
6							
7							
8							
9							

Remarks:

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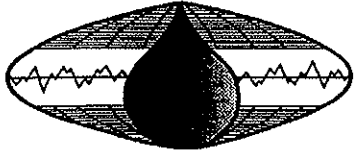
PACKER TESTING FIELD INFORMATION

WELL/ZONE: mw13D Set 3
 PROJECT: AEC-NORTH EAST
 PERSONNEL: J. Trumbull / JP Stokes

DATE: 1/31/13
 CLIENT: AEC
 W.O. #: 4396

SETTING DEPTHS		DATA COLLECTION CALIBRATION				
Point A	<u>132.14</u>	Configuration Filename: <u>4396mw13DZ3</u>				
Upper Packer -Top	<u>135.71</u>	PRN Filename: <u>mw13DZ3</u>				
Upper Packer -Bottom	<u>139.04</u>	current mA = static water level (FT)				
Pump Intake	<u>129.5</u>	open air mA = transducer depth (FT)				
Lower Packer -Top	<u>156.28</u>	CHANNEL 1	CHANNEL 2	CHANNEL 3		
Lower Packer- Bottom	<u>159.58</u>	9.1228 mA = 20.13'	9.8886 mA = 20.13'	9.9076 mA = 20.13'		
Assembly Bottom	<u>161.11</u>	5.1640 mA = 132.14'	5.1673 mA = 154.09'	5.1680 mA = 154.09'		
PACKER INFLATION		Additional Calibration Notes:				
TOP	BOTTOM	CH:1 -28,2939X+276.25				
<u>370</u>	<u>380</u>	CH:2 -28,3735X+300.705				
TEST SEQUENCE		HYDRAULIC HEAD DISTRIBUTION (FT)				
		Open Hole Static Water Level: <u>20.13</u>				
Begin Logging	<u>8:30:Am</u>	PRE- INFLATION	POST- INFLATION	PRE- PUMPING	PUMPING LEVEL	RECOVERY
Start Inflation	<u>8:51:Am</u>	1	20.450'	19.849'	20.026'	24.091'
Begin Pumping	<u>10:08:Am</u>	2	20.459'	20.651'	19.845'	50.407'
End Pumping	<u>11:37:Am</u>	3	20.460'	6.388'	15.727'	38.706'
Totalizer Prior		4				
Totalizer Post						
End Logging	<u>12:04:Pm</u>					
PUMPING RECORD		Miscellaneous Notes:				
Pumping Zone	<u>139.04-156.28</u>					
Pumping Rate	<u>0.3/0.45</u>	SLUG TEST SEQUENCE				
Pumping Duration	<u>88</u>					
Maximum Drawdown	<u>30.56'</u>		TIME	WATER LEVEL (FT)		
Specific Capacity	<u>0.015</u>	Start	<u>9:25:Am</u>	<u>20.651'</u>		
Nature of Discharge		Peak	<u>9:26:Am</u>	<u>15.823'</u>		
Time of Recovery		Recovery	<u>9:48:Am</u>	<u>20.497'</u>		
RATE ADJUSTMENTS						
SUMMARY						

Earth Data INCORPORATED



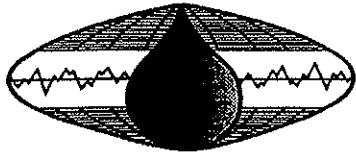
PACKER TEST INFORMATION

WELL/ZONE: MW-13D Set -3
 PROJECT: AEC - NORTH EAST
 PERSONNEL: _____

DATE: 1/31/13
 CLIENT: AEC
 W.O. #: 4396
 Page 1 of 3

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
8:30 Am		20.243	20.228	20.231	Start Recorder
8:35 Am		20.287	20.274	20.290	
8:40 Am		20.323	20.312	20.326	
8:43 Am		20.351	20.348	20.352	
8:46 Am		20.393	20.389	20.404	
8:48 Am		20.420	20.422	20.429	
8:51 Am		20.450	20.459	20.460	Begin Inflow
8:55		18.728	18.083	-228	
9:00		19.252	18.664	-192.025	
9:02		19.410	19.237	-103.465	
9:05		19.516	19.558	-62.5	
9:06		19.549	19.646	-56.789	
9:10		19.541	19.968	-31.270	
9:12		19.703	20.134	-20.003	
9:15		19.766	20.322	-8.819	
9:18		19.804	20.410	-3.385	
9:20		19.822	20.509	1.026	
9:22		19.840	20.573	3.630	
9:25		19.849	20.651	6.388	SLUG 1 gal
9:26		19.857	15.823	6.677	
9:28		19.808	16.991	7.855	
9:30		19.787	17.678	8.746	
9:35		19.778	18.832	10.820	
9:40		19.799	19.600	12.639	
9:48		19.915	20.318	14.548	
9:51		19.956	20.497	15.103	Inserting Pump
10:01		20.002	18.918	15.163	
10:03		20.004	19.216	15.281	

Earth Data INCORPORATED



PACKER TEST INFORMATION

WELLZONE: mw13D Set: 3
 PROJECT: AEC - North East
 PERSONNEL: T. Trumbull / JP Stokes

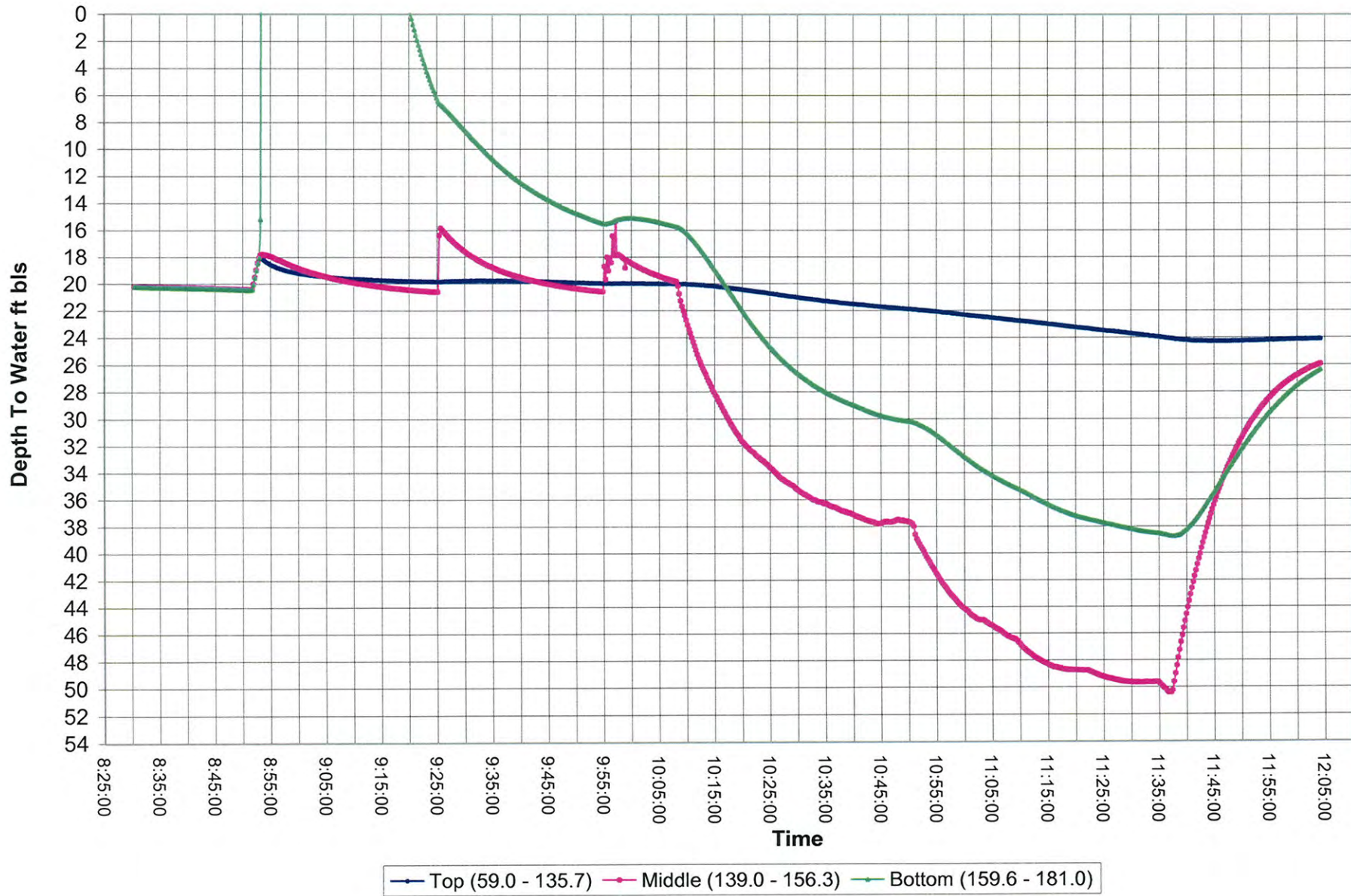
DATE: 1/31/13
 CLIENT: AEC
 W.O. #: 4396
 Page 2 of 3

TIME	PUMPING RATE (gpm)	TRANS #1	TRANS #2	TRANS #3	COMMENTS
10:08		20.026	19.845	15.727	Restart Pump
10:09		20.022	21.590	15.971	
10:10	0.3	20.068	23.428	44.099	
10:12		20.116	25.970	17.645	
10:14		20.172	27.431	18.535	
10:15		20.281	28.766	19.506	
10:17		20.332	30.130	20.668	
10:22		20.533	32.132	22.708	
10:25	0.3	20.757	33.628	24.767	
10:30		21.044	35.312	26.732	
10:35		21.313	36.312	28.096	
10:42		21.621	37.496	29.368	
10:48	0.3	21.849	37.481	30.064	
10:50		21.913	37.690	30.219	Increase Rate to 0.45
10:53		22.030	40.332	30.737	
11:00	0.45	22.351	44.249	32.985	
11:05		22.591	45.631	34.459	
11:08	0.45	22.720	46.338	34.972	
11:13		22.933	47.890	35.952	
11:16	0.45	23.090	48.584	36.680	
11:18		23.217	48.739	37.099	Begin low flow parameters
11:21		23.329	48.776	37.363	
11:23		23.424	48.943	37.535	
11:25		23.508	49.253	37.713	
11:30		23.731	49.662	38.193	
11:33		23.877	49.664	38.417	
11:34	0.45	23.953	49.641	38.475	Begin Sampling
11:37		24.091	50.407	38.706	Stop Pump
11:38		24.139	48.694	38.684	

regals

26
8-15

AEC - NORTH EAST - Well MW-13D
Set 3



ATTACHMENT C

PURGING LOGBOOK FORM GROUNDWATER SAMPLES

WELL ID MW-10D SAMPLE NO. 10D-22
 WELL/SITE DESCRIPTION Rf-96

DATE 1 / 23 / 13 TIME 1200 AIR TEMP. _____

WELL DEPTH 200 ft CASING HEIGHT 61 ft
 WATER DEPTH _____ ft WELL DIAMETER _____ in
 WATER COL. HEIGHT _____ ft SANDPACK DIAM. _____ in
 EQUIVALENT VOLUME OF STANDING WATER _____ (gal) (L)
 PUMP RATE 1.25 gal (gpm) (lpm)
 PUMP TIME _____ min
 WELL WENT DRY? Yes No PUMP TIME _____ min
 VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min
 PURGE AGAIN? Yes No TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed	pH	Cond	Temp	ORP	Turb	DO	Depth to Water from TOC	Pump Rate
1.23.12	12:09		6.99	.316	14.03	-39	69.0	0.61		
	12:12		6.98	.305	14.17	-56	63.5	0.00		
	12:15		6.98	0.297	14.46	-66	60.7	0.00		
	12:18		6.94	.289	14.55	-71	56.9	0.00		
	12:21		6.97	.284	15.06	-73	53.3	0.00		
	12:24		6.97	.280	14.91	-73	51.1	0.00		
	12:27		6.98	.275	14.57	-73	46.2	0.00		
	12:30		6.96	.271	14.49	-72	44.9	0.00		

COMMENTS Sample Interval 61-95

SIGNATURE _____

PURGING LOGBOOK FORM GROUNDWATER SAMPLES

WELL ID MW-100
WELL/SITE DESCRIPTION PF-96

SAMPLE NO. 100-23

DATE 1 / 24 / 13

TIME _____

AIR TEMP. _____

WELL DEPTH 200 ft CASING HEIGHT 61 ft
 WATER DEPTH _____ ft WELL DIAMETER _____ in
 WATER COL. HEIGHT _____ ft SANDPACK DIAM. _____ in
 EQUIVALENT VOLUME OF STANDING WATER _____ (gal) (L)
 PUMP RATE 14 gal (gpm) (lpm)
 PUMP TIME _____ min
 WELL WENT DRY? () Yes () No PUMP TIME _____ min
 VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min
 PURGE AGAIN? () Yes () No TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed	pH	Cond	Temp	ORP	Turb	DO	Depth to Water from TOC	Pump Rate
12-13	11:50		6.82	0.367	10.85	-9	26.9	1.42	13'	
	11:54		6.47	.345	11.17	-96	22.0	0.00		
	12:02		7.13	.345	10.93	-114	20.3	0.00		
	12:09		7.17	.346	10.88	-130	24.1	0.00		
	12:17		7.12	.357	13.90	-146	48.5	0.00		
	12:22		7.20	.333	14.12	-152	38.6	0.00		
	12:26		7.12	.325	14.69	-151	33.4	0.00		
	12:30		7.16	.307	14.61	-150	31.6	0.00	87'	
	12:36		7.18	.261	15.52	-143	25.1	0.00		
	12:43		7.23	.224	12.79	-133	22.0	0.00		
	12:46		7.21	.229	12.60	-123	21.1	0.04	121	
	12:49		7.19	.223	13.05	-120	22.2	0.25		

COMMENTS Sample Interval 170-200 ft

SIGNATURE _____

PURGING LOGBOOK FORM GROUNDWATER SAMPLES

WELL ID MW-12-D
WELL/SITE DESCRIPTION _____

SAMPLE NO. 12D-71

DATE 1 / 28 / 13

TIME 10:40

AIR TEMP. 30°

WELL DEPTH 160 ft
 WATER DEPTH _____ ft
 WATER COL. HEIGHT _____ ft
 EQUIVALENT VOLUME OF STANDING WATER _____ (gal) (L)
 PUMP RATE 1/4 gal/min (gpm) (lpm)
 PUMP TIME _____ min
 WELL WENT DRY? Yes No
 VOL. REMOVED _____ (gal) (L)
 PURGE AGAIN? Yes No

CASING HEIGHT 59 ft
 WELL DIAMETER _____ in
 SANDPACK DIAM. _____ in
 PUMP TIME _____ min
 RECOVERY TIME _____ min
 TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed	pH	Cond	Temp	ORP	Turb	DO	Depth to Water from TOC	Pump Rate
1/28/13	10:50		7.05	.525	12.34	-63	48.9	0.02		
	10:53		7.10	.535	12.54	-41	48.6	0.00		
	10:56		7.05	.544	12.70	-42	48.1	0.00		
	10:57		7.00	.547	12.58	-41	48.4	0.00		
	11:02		7.02	.540	12.46	-43	48.1	0.00		

COMMENTS Packed interval casing to 75'

SIGNATURE _____

PURGING LOGBOOK FORM GROUNDWATER SAMPLES

WELL ID MW-R-D
WELL/SITE DESCRIPTION DF-96

SAMPLE NO. 120-22 (no sample)

DATE 1/28/13

TIME _____

AIR TEMP. 30°

WELL DEPTH 160 ft CASING HEIGHT 50 ft
 WATER DEPTH _____ ft WELL DIAMETER _____ in
 WATER COL. HEIGHT _____ ft SANDPACK DIAM. _____ in
 EQUIVALENT VOLUME OF STANDING WATER _____ (gal) (L)
 PUMP RATE _____ (gpm) (lpm)
 PUMP TIME _____ min
 WELL WENT DRY? () Yes () No PUMP TIME _____ min
 VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min
 PURGE AGAIN? () Yes () No TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed	pH	Cond	Temp	ORP	Turb	DO	Depth to Water from TOC	Pump Rate
128.12	14:00		6.95	.580	12.73	-34	59.3	0.53		
	14:03		6.96	.575	13.31	-45	67.3	0.00		
	14:06		6.99	.569	13.73	-50	71.7	0.00		
	14:09		6.90	.530	15.43	-59	70.1	0.00		
	14:12		6.94	.490	15.69	-64	70.5	0.07		
	14:15		7.04	.489	16.00	-69	73.0	0.91		

COMMENTS packout between 92' - 102'

SIGNATURE _____

PURGING LOGBOOK FORM GROUNDWATER SAMPLES

WELL ID 116-12-D SAMPLE NO. 120-23
 WELL/SITE DESCRIPTION RD-96

DATE 1/29/13 TIME 09:50 AIR TEMP. 40'

WELL DEPTH 160 ft CASING HEIGHT 59 ft
 WATER DEPTH _____ ft WELL DIAMETER _____ in
 WATER COL. HEIGHT _____ ft SANDPACK DIAM. _____ in
 EQUIVALENT VOLUME OF STANDING WATER _____ (gal) (L)
 PUMP RATE _____ (gpm) (lpm)
 PUMP TIME _____ min
 WELL WENT DRY? () Yes () No PUMP TIME _____ min
 VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min
 PURGE AGAIN? () Yes () No TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed	pH	Cond	Temp	ORP	Turb	DO	Depth to Water from TOC	Pump Rate
1-29-13	09:15		7.09	.609	14.41	-48	46.5	0.47		
	09:18		7.19	.607	14.90	-60	56.1	0.00		
	09:21		7.18	.605	15.45	-91	59.7	0.00		
	09:24		7.15	.602	15.91	-93	60.0	0.00		
	09:27		7.12	.601	16.33	-95	62.9	0.00		
	09:30		7.00	.595	16.47	-91	63.7	0.00		
	09:33		7.15	.554	17.62	-99	63.5	0.00		

COMMENTS Packed interval 126 to B.O.W.

SIGNATURE _____

PURGING LOGBOOK FORM GROUNDWATER SAMPLES

WELL ID MP-13-D SAMPLE NO. 13D-21
 WELL/SITE DESCRIPTION R5-96

DATE 1 / 30 / 13 TIME 09:45 AIR TEMP. 50°

WELL DEPTH 180 ft CASING HEIGHT 59 ft
 WATER DEPTH _____ ft WELL DIAMETER _____ in
 WATER COL. HEIGHT _____ ft SANDPACK DIAM. _____ in
 EQUIVALENT VOLUME OF STANDING WATER _____ (gal) (L)
 PUMP RATE _____ (gpm) (lpm)
 PUMP TIME _____ min
 WELL WENT DRY? Yes No PUMP TIME _____ min
 VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min
 PURGE AGAIN? Yes No TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed	pH	Cond	Temp	ORP	Turb	DO	Depth to Water from TOC	Pump Rate
1/30/13	10:50		6.61	.258	18.88	-47	4.0	0.00		
	10:53		6.60	.258	19.32	-47	4.4	0.00		
	10:56		6.60	.258	19.39	-47	5.0	0.00		
	10:59		6.60	.257	19.31	-46	4.7	0.00		
	11:02		6.59	.257	19.28	-46	4.2	0.00		

COMMENTS Packed interval 56'-73'

SIGNATURE _____

PURGING LOGBOOK FORM GROUNDWATER SAMPLES

WELL ID NW-13-D SAMPLE NO. 13D-ZZ
 WELL/SITE DESCRIPTION _____

DATE 1/30/13 TIME 13:00 AIR TEMP. 50°

WELL DEPTH 180 ft CASING HEIGHT 59 ft
 WATER DEPTH _____ ft WELL DIAMETER _____ in
 WATER COL. HEIGHT _____ ft SANDPACK DIAM. _____ in
 EQUIVALENT VOLUME OF STANDING WATER _____ (gal) (L)
 PUMP RATE _____ (gpm) (lpm)
 PUMP TIME _____ min
 WELL WENT DRY? () Yes () No PUMP TIME _____ min
 VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min
 PURGE AGAIN? () Yes () No TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed	pH	Cond	Temp	ORP	Turb	DO	Depth to Water from TOC	Pump Rate
1/30/13	15:35		6.25	258	16.98	-10	2.9	0.0		
	15:38		6.22	258	16.96	-7	3.0	0.0		
	15:41		6.24	259	16.96	-9	3.0	0.0		
	15:44		6.31	259	16.98	-12	2.9	0.0		
	15:47		6.26	259	16.92	-11	2.8	0.0		

COMMENTS Packed interval 117'-134'

SIGNATURE _____

MW-13-D Zone 3 Snake 13D-23 1.31.13

Reckel interval 139 - 156

Time	Temp	pH	ORP	Cond.	Turb.	DO
11:22	16.30	6.75	-72	.274	8.3	0.0
11:25	16.44	6.73	-70	.272	8.9	0.0
11:28	16.53	6.70	-67	.271	8.8	0.0
11:31	16.27	6.69	-65	.270	9.1	0.0
11:33	16.20	6.70	-65	.268	9.1	0.0

11:33

ATTACHMENT D

Petroleum Management, Inc.

5218 Curtis Avenue ♦ Baltimore, Maryland 21226 ♦ Phone 410-354-0200 ♦ Fax 410-354-0201

MD. Oil Operations No: 2008-OPT-29545
 MD. Oil Operations No: 2011-OPT-38311
 EPA Identification No: MDR-000518975
 EPA Identification No: MDR-000525278
 Federal ID No: 52-2014538

Bill of Lading/Manifest

No 5993

Generator/Shipper: <i>Recycle Forum</i>		Billing Name: <i>Advantage Environmental</i>	
Site Address: <i>500 Rt 40</i>		Address:	
City: <i>North East</i>	State: <i>MD</i>	Zip:	
Phone: ()	Contact:	Phone: ()	Contact:

Purchase Order NO:

MATERIAL CHARACTERIZATION (CHECK ALL THAT APPLY):

Description:	Gallons	Description:	Gallons	Description:	Gallons
Gasoline, 3, UN1203, PGII		Hazardous Waste, Liquid, 9 NA3082, PGIII		JP#4	
#2 Fuel Oil, 3, NA1993, PGIII		Hazardous Waste, Solid, 9 NA3077, PGIII		JP#5	
#4 Fuel Oil, 3 NA1993, PGIII		Paint Thinners, 3, UN1263, PGI		Jet A	
#6 Fuel Oil, 3, NA1993, PGIII		Ethylene Glycol, 9, UN3082, PGIII		Sludge	
Diesel, 3, NA1993, PGIII		Lube Oil		Petroleum Contaminated Water	<i>410</i>
Flammable Liquids, NOS, 3, UN1993, PGI		Waste Oil		Other:	
Corrosive Liquids, NOS, 8, UN1760, PGII		Kerosene		Other:	
No. of Drums		No. of Tanks:		Other:	
Scale Weights (Soil): Total: (Tons)		Tare: (Tons)		Net: (Tons)	

Service Description: *p/o p/c all carbon plus tank*

PLACARDS TENDERED: YES NO EMERGENCY CONTACT (301) 860-0300

Generator/Shipper Certification Statement
 As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCB'S). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Petroleum Management, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

Generator/Shipper Authorized Agent (Print) *James Wirth* Date of Service *1/31/12*

Generator/Shipper Authorized Agent Signature *James Wirth*

HAULER/CARRIER INFORMATION

Co. Name Petroleum Management, Inc.		Driver Name (print) <i>Keith Wood</i>	
Street 5218 Curtis Avenue		Driver Signature <i>[Signature]</i>	
City Baltimore	State MD	Zip 21226	Phone <i>(410) 354-0200</i>

The above mentioned materials have been received by this facility and will be handled in accordance with all applicable rules and regulations. All quantities are subject to final verification by this facility and are indicated in far right box.

RECEIVING FACILITY ACCEPTANCE

Facility Name: _____

Acceptance Signature: _____

Phone: _____ Total Quantity Received: _____

White - Original Yellow - Transporter Pink - Facility Gold - Customer

p/o @ 500 Gallon Tank with PCW

p/o @ decontainment area

Title / Name	Equipment Type/ Number	Start Time	Stop Time	Total Hours
Keth	VACT-4	1100	300	4

Materials:

Description	Quantity

SubContractors:

Disposal:

	Amount in Gallons	Manifest Number
Liquid Disposal PCW	400	
Sludge Disposal		
Other		

Petroleum Management

Print Name: Keth Hagedorn
 Signature: [Signature]
 Date: 1/31/13

Client

Print Name: James Wolf
 Signature: [Signature]
 Date: 1.31.13

Petroleum Management, Inc.

MD, Oil Operations No: 2008-OPT-29545
 MD, Oil Operations No: 2011-OPT-38311
 EPA Identification No: MDR-000518975
 EPA Identification No: MDR-000525278
 Federal ID No: 52-2014536

5218 Curtis Avenue ♦ Baltimore, Maryland 21226 ♦ Phone 410-354-0200 ♦ Fax 410-354-0201

Bill of Lading/Manifest

No 5970

Generator/Shipper: Royal Farms			Billing Name: ADLANTIC ENVIRONMENTAL		
Site Address: 300 (P) 40			Address:		
City: NORTH EAST	State: MD	Zip:	City:	State:	Zip:
Phone: ()	Contact:		Phone: ()	Contact:	

Purchase Order NO:

MATERIAL CHARACTERIZATION (CHECK ALL THAT APPLY):

Description:	Gallons	Description:	Gallons	Description:	Gallons
Gasoline, 3, UN1203, PGII		Hazardous Waste, Liquid, 9 NA3082, PGIII		JP#4	
#2 Fuel Oil, 3, NA1993, PGIII		Hazardous Waste, Solid, 9 NA3077, PGIII		JP#5	
#4 Fuel Oil, 3 NA1993, PGIII		Paint Thinners, 3, UN1263, PGI		Jet A	
#6 Fuel Oil, 3, NA1993, PGIII		Ethylene Glycol, 9, UN3082, PGIII		Sludge	
Diesel, 3, NA1993, PGIII		Lube Oil		Petroleum Contaminated Water	250
Flammable Liquids, NOS, 3, UN1993, PGI		Waste Oil		Other:	
Corrosive Liquids, NOS, 8, UN1760, PGII		Kerosene		Other:	
No. of Drums		No. of Tanks:		Other:	
Scale Weights (Soil): Total: (Tons)		Tare: (Tons)		Net: (Tons)	

Service Description: **P/O @ 500 Gallon Poly Tank**

PLACARDS TENDERED: YES **NO** EMERGENCY CONTACT (301) 860-0300

Generator/Shipper Certification Statement
 As the generator or shipper, I hereby certify that this material is properly classified and does not contain Polychlorinated Biphenyls (PCB'S). To the best of my knowledge it has not been mixed, combined or blended in any amount with any other material defined as hazardous waste under applicable law. Generator/Shipper agrees to indemnify and hold Petroleum Management, Inc. harmless for any damages arising from or in any way relating to a breach of this Certification Statement.

X Generator/Shipper Authorized Agent (Print) **James Wolf** Date of Service **1/20/13**
X Generator/Shipper Authorized Agent Signature **[Signature]**

HAULER/CARRIER INFORMATION

Co. Name Petroleum Management, Inc.		Driver Name (print) Keith HESS	
Street 5218 Curtis Avenue		Driver Signature [Signature]	
City Baltimore	State MD	Zip 21226	Phone (410) 354-0200

The above mentioned materials have been received by this facility and will be handled in accordance with all applicable rules and regulations. All quantities are subject to final verification by this facility and are indicated in far right box.

RECEIVING FACILITY ACCEPTANCE	
Facility Name	
Acceptance Signature	
Phone	Total Quantity Received

White - Original Yellow - Transport Pink - Facility Gold - Customer



Petroleum Management, Inc.



Day: Friday

Date: 1/25/13

Job Location: Royal Farms
500 Rt 410
North East MD

Bill To: ADVantage Environmental

Contact: _____
Phone: _____

Contact: _____
Phone: _____

JOB DESCRIPTION:

P/O @ 500 Gallon Poly Tank

Title / Name	Equipment Type / Number	Start Time	Stop Time	Total Hours
<u>Keith</u>	<u>MAC 114</u>	<u>2:00</u>	<u>6:00</u>	<u>4</u>

Materials:

Description	Quantity

SubContractors:

Disposal:

	Amount in Gallons	Manifest Number
<u>Liquid Disposal PCW</u>	<u>250</u>	<u>5970</u>
<u>Sludge Disposal</u>		
<u>Other</u>		

Petroleum Management

Print Name: Keith Keith
Signature: [Signature]
Date: 1/25/13

Client

Print Name: James Wolf
Signature: [Signature]
Date: 1.25.13