

ADDENDUM 2.7-D
PUMP TEST REPORT

**RENO CREEK PROJECT
REGIONAL HYDROLOGIC TEST REPORT
DN401, TFN 5 4/150**

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THE RENO CREEK PROJECT



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EXECUTIVE SUMMARY

AUC, LLC plans to develop and extract uranium from in-situ recovery (ISR) production units within sands of the Wasatch Formation located at the Reno Creek Project. To support State and Federal permit applications necessary for the project, AUC has completed four regional multi-well and ten single-well pump tests at the project. The production zone aquifer (PZA) in the project area is geologically confined, but occurs under fully and partially saturated conditions. A summary of the results of the pump tests follows. Detailed discussion of the testing is included in this report.

- ❑ Multi-well pump testing performed in the PZA has demonstrated hydraulic communication between the PZA pumping well and the surrounding PZA monitor wells.
- ❑ Geologic data for the project indicate that the overlying and underlying confining aquitards are continuous throughout the area. No responses were observed in the shallow water table unit, overlying aquifer or underlying units during any of the multi-well pump tests performed, indicating that the PZA is hydraulically isolated from these adjacent stratigraphic units.
- ❑ Single-well pump tests were performed on wells screened within the shallow water table unit, overlying aquifer and underlying units in the project area to evaluate the transmissivity of these units in the area.
- ❑ Single-well testing data collected from wells completed in the shallow water table unit and underlying unit exhibited extremely low well yields and hydraulic conductivities. Based on these testing results, it was determined that these units do not meet the definition of an aquifer according to 10 CFR Part 40, Appendix A, which states: *“Aquifer means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.”* Additionally, the testing data show that these units do not meet the following definition of an aquifer per DEQ/LQD (Guideline 8 Hydrology Coal and Non-Coal): *“A zone, stratum, or group of strata that stores and transmits water in sufficient quantities for a specific use.”*
- ❑ The pump test results provide sufficient aquifer characterization of the PZA to support State and Federal permit applications and demonstrate that the PZA has sufficient geologic confinement and transmissivity for ISR operations. Test results are similar to historical testing conducted in the project area.

1.0 INTRODUCTION

1.1 Background

The Reno Creek Project is located in the central Powder River Basin in Campbell County, Wyoming. The project is located in all or parts of Sections 35 and 36 of T43N, R74W, Sections 1 and 12 T42N, R74W, Sections 21, 22 and 27 through 34 of T43N, 73W and Section 6 of T42N, 73W. AUC, LLC (AUC) plans to develop and extract uranium from within the mineralized production zone aquifer (PZA) of the lower Wasatch Formation. Figure 1-1 shows the project area and its relationship to the Powder River Basin.

This report presents the regional hydrogeologic testing performed for the project to support a Wyoming Department of Environmental Quality (WDEQ) Class III Underground Injection Control (UIC) Permit to Mine application and a U.S. Nuclear Regulatory Commission (NRC) Source Materials License application for the project.

A Pump Test Plan was submitted to and approved by the Wyoming Department of Environmental Quality/Land Quality Division (WDEQ/LQD) and the NRC in the fall of 2010. In accordance with the approved Pump Test Plan, testing was conducted during 2010 and 2011 to evaluate the hydrologic characteristics of the PZA and demonstrate geologic and hydrologic isolation between the PZA and overlying aquifer and the underlying unit.

This report provides a summary of hydrologic testing activities conducted in the PZA, the shallow water table unit (SM unit), the overlying aquifer and the underlying unit at the project area. Hydrologic testing included multi-well pump tests in the PZA and single-well pump tests in the shallow water table unit, overlying aquifer, and underlying unit at four well clusters in the project area. These include the PZM1, PZM3, PZM4, and PZM5 well clusters. Figure 1-2 shows the project area outline, the general location of the ore bodies, and locations of the pump test well clusters and additional new wells installed as part of the hydrogeologic characterization program.

1.2 Hydrologic Testing Objectives

The objectives of the hydrologic testing conducted at the four well clusters were to:

1. Evaluate the hydrologic characteristics (hydraulic conductivity [K], transmissivity [T] and storativity [S]) of the PZA;
2. Evaluate T and K of the water table unit (where present), overlying aquifer, and underlying unit;
3. Demonstrate hydrologic communication between the PZA pumping well and the surrounding PZA observation wells;
4. Demonstrate isolation between the PZA and the overlying aquifer and underlying unit for the purposes of ISR mining; and
5. Evaluate the presence of hydrologic boundaries, if any, within the PZA over the area

investigated by the pump test.

The testing procedures and results are presented and discussed in this report.

To facilitate the geological and hydrogeological characterization, the following activities were conducted at the project during 2010 and 2011:

- Drilled and logged 10 stratigraphic holes to the Badger Coal for geologic control;
- Installed 41 new monitor wells including:
 - 4 wells in the Shallow Water Table Zone (SM wells)
 - 7 wells in the Overlying Aquifer (OM wells)
 - 2 Piezometers in the Overlying Aquitard (OAM piezometers)
 - 21 wells in the Production Zone Aquifer (PZM wells)
 - 7 wells in the Underlying Unit (UM wells)
- Conducted monthly water level monitoring;
- Performed baseline water quality sampling;
- Completed 4 multi-well pump tests in the Production Zone Aquifer;
- Completed 2 single-well pump tests in the Shallow Water Table Unit;
- Completed 4 single-well pump tests in the Overlying Aquifer; and
- Completed 4 single-well pump tests in the Underlying Unit.

1.3 Report Organization

The results of hydrologic testing conducted in the project area are included within this report. This report includes the following sections, as summarized below:

- 1.0 Introduction
- 2.0 Site Characterization
- 3.0 Monitor Well Locations, Installation, and Completion
- 4.0 Pump Test Design and Procedures
- 5.0 Barometric Pressure Correlations and Corrections
- 6.0 Analytical Methods
- 7.0 Summary and Conclusions

- 8.0 PZM1 Hydrologic Testing Summary and Results
- 9.0 PZM3 Hydrologic Testing Summary and Results
- 10.0 PZM4 Hydrologic Testing Summary and Results
- 11.0 PZM5 Hydrologic Testing Summary and Results
- 12.0 References

Field activities for the hydrologic evaluations were jointly performed by Petrotek Engineering Corporation (Petrotek) and AUC personnel. Geologic interpretations were performed by AUC geologists. Aquifer test analyses were performed by Petrotek, and this summary report was prepared by Petrotek.

2.0 SITE CHARACTERIZATION

2.1 Hydrostratigraphy

The project area is underlain by the lower portion of the early Eocene age Wasatch Formation. The total thickness of the Wasatch at the site is approximately 600 feet. At the project, the Wasatch-Fort Union contact is generally considered as the top of the Roland/Badger coal.

The following summary provides the stratigraphic nomenclature and acronyms with descending depth for the units of interest present in the Wasatch Formation at the project.

- SM Unit (SM wells): The shallow water table unit is present in some locations. Based on geologic and hydrologic data, this unit does not meet the requirements of an aquifer in the project area.
- Overlying Aquifer (OM wells): Overlying aquifer relative to the production zone. This aquifer represents the uppermost aquifer observed in the project area.
- OA Aquitard (OAM wells): The confining unit provides isolation between the production zone and overlying aquifer. This unit also contains the upper and lower Felix Coal seams and is continuous across the entire project area.
- PZA Aquifer (PZM wells): The production zone aquifer is the host for uranium mineralization at the project. This unit is a discrete, continuous unit across the entire project area, and contains discontinuous internal, unnamed mudstone intervals.
- UA Aquitard: Confining unit providing isolation between the production zone and underlying unit. This unit is continuous across the entire project area.
- Underlying Unit (UM wells): The underlying unit is comprised of lenticular and discontinuous sandstone within the UA aquitard. This unit is separate from, and underlies the production zone. Based on geologic and hydrologic data, this unit does not meet the requirements of an aquifer in the project area.

Figures 2-1 through 2-4 present the stratigraphic section in the vicinities of the PZM1, PZM3, PZM4, and PZM5 well clusters, as defined by geophysical logs from stratigraphic test holes that extend to the Badger Coal. An isopach map of the PZA across the project area is presented on Figure 2-5. A structure map of the bottom of the Felix Coal across the project area is presented on Figure 2-6. Isopach maps of the overlying and underlying aquitards are presented in Figures 2-7 and 2-8, respectively. A hydrostratigraphic cross section index map and ore body hydrostratigraphic cross-sections are presented as Figures 2-9 through 2-15.

2.2 Shallow Water Table Unit (SM UNIT)

In some locations of the project area, a shallow perched water table was encountered, referred to as the SM unit. These locations include wells SM3, SM5, SM6 and SM7 as shown on Figure 1-2. Shallow temporary borings were also drilled at the PZM1, PZM2 and PZM4 well cluster locations, but no water was observed at these locations. The SM unit is not continuous across the site; where present, the sand is partially saturated, approximately 10 to 20 feet thick, and occurs between 40 and 80 feet below ground surface (ft bgs).

Single-well pump tests were conducted at the pump test clusters (SM3 and SM5). Based upon the extremely low well yields and hydraulic conductivities at wells completed in this perched water table unit, the SM unit does not meet the definition of an aquifer because:

1. According to 10 CFR Part 40, Appendix A:

“Aquifer means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.” and,

2. The definition of an aquifer per DEQ/LQD Guideline 8 Hydrology Coal and Non-Coal states:

“A zone, stratum, or group of strata that stores and transmits water in sufficient quantities for a specific use”

The data from the single well testing performed at SM3 and SM5 support the conclusion that the SM unit does not meet the definition of an aquifer within the project area.

2.3 Overlying Aquifer

The overlying aquifer appears continuous on a local scale within the PZM well clusters, but does not correlate with greater distances across the site and is not continuous across the project area based on geologic and potentiometric data. The overlying aquifer is partially saturated near the PZM1 cluster, and fully saturated at clusters PZM3, PZM4, and PZM5. At the PZM1 cluster, the overlying aquifer is approximately 60 feet thick, occurring at depths of approximately 155 to 215 ft bgs. At the PZM3 cluster, the overlying aquifer is approximately 20 feet thick at depths between 150 to 170 ft bgs. In the central project area at the PZM4 cluster, the overlying aquifer is approximately 60 feet thick, occurring between depths of 125 to 185 ft bgs. In the western PZM5 cluster, the overlying aquifer is substantially thinner (12 feet thick), occurring between depths of 70 to 82 ft bgs.

The overlying aquifer is the uppermost aquifer observed within the project area. A potentiometric surface map of this aquifer could not be constructed due to the discontinuous nature of this aquifer across the project area. A map of observed water level elevations in the overlying aquifer is presented in Figure 2-16.

Within the project area, the overlying aquifer is considered the uppermost aquifer. Based on the depth to the top of the overlying aquifer, which ranges between approximately 70 and 155 ft bgs, and the observed sequence of finer grained silt and shale that overlies this

aquifer, the overlying aquifer is isolated from the surface water drainages present in the project area.

2.4 Overlying Aquitard

The OA aquitard is a laterally continuous sequence of clays and silts, including the Felix Coal. There is a minimum thickness of approximately 25 feet observed in the OA aquitard across the project area. The Felix Coal is one or two laterally continuous marker beds lying in the lower portion of the OA aquitard. These coal seams are separated from the underlying PZA and overlying aquifer by continuous mudstone units present in varying thicknesses across the site. Over the eastern $\frac{3}{4}$ of the project area, there are Upper and Lower Felix Coal seams, separated by approximately 5 feet of mudstone. The Upper Felix Coal seam pinches out or climbs in the section between ore body areas 2 and 1 (Figure 2-9) in the western $\frac{1}{4}$ of the project area (see Figures 2-11 and 2-10), where there is only one seam of the Felix present. These coal seams range between five and 10 feet in thickness. Piezometers were installed in the Upper and Lower Felix coal seams at the PZM4 cluster to evaluate the hydrologic properties of these coal seams. Based on the lack of yield in these wells, it was determined that these coal seams do not qualify as aquifers.

Total thickness of the OA aquitard is approximately 45 feet thick, 85 feet thick, 35 feet thick, and 100 feet thick at the PZM1, PZM3, PZM4 and PZM5 clusters, respectively. An isopach map of the OA aquitard is presented as Figure 2-7 and shows the lateral continuity of this aquitard across the project area.

2.5 Production Zone Aquifer

The production zone aquifer (PZA) is a discrete and continuous aquifer across the project area. The sand occurs between the depths of approximately 260 to 380 ft bgs at the PZM1 cluster, 270 to 420 ft bgs at the PZM3 cluster, 220 to 380 ft bgs at PZM4 cluster, and 180 to 330 ft bgs at the PZM5 cluster. Based on the isopach map of the PZA across the site, thicknesses range between approximately 75 to 200 feet (Figure 2-5).

A potentiometric surface map of the PZA is presented as Figure 2-17. Across the entire project area, the direction of groundwater flow within the PZA is to the northeast with a gradient of 13.8 feet per mile. Potentiometric surface maps of the PZA for the individual pump test well cluster areas are presented in Sections 8.0 through 11.0. The individual potentiometric surface maps are consistent with the regional potentiometric surface map (Figure 2-17).

Geologic confinement of the PZA by the overlying and underlying aquitards exists across the entire project area. Aquifer conditions transition from fully saturated in the western portion of the project area to partially saturated conditions in the eastern portion of the project area, as shown by the approximate boundary line on Figure 1-2. Based on available information to date, partially saturated conditions exist in approximately 30 percent of the project area. At PZM1 and PZM3, the saturated thickness of the PZA is approximately 94 feet and 109 feet respectively, and total sand thickness at these locations is approximately 125 feet and 165 feet, respectively. As shown in the hydrostratigraphic cross sections

(Figures 2-10 through 2-15), there is an unidentified mudstone unit that is present in some portions of the project area that divides the PZA into upper and lower sand units. At the PZM4 cluster, there is a difference of approximately four to five feet in potentiometric elevation between the upper PZA and lower PZA. Further characterization of the impacts of this mudstone unit will be addressed in production unit-scale hydrologic testing at a later date.

Uranium mineralization occurs most frequently in the lower portion of the PZA, or in the lower PZA where present. Sands in the PZA that host the uranium mineralization are commonly cross-bedded, graded sequences fining upward from very coarse at the base to fine grained at the top.

2.6 Underlying Aquitard

The underlying UA aquitard is a laterally continuous sequence of undifferentiated mudstones and clays, with discontinuous and often lenticular sandstones that is approximately 300 to 400 feet thick extending from the base of the PZA to the top of the Badger Coal. Within the project area, this aquitard includes a discontinuous underlying unit, which is described below. The thickness of the UA aquitard above the underlying unit is approximately 60 feet, 35 feet, 35 feet, and 105 feet thick at well clusters PZM1, PZM3, PZM4, and PZM5. An isopach map of the UA aquitard is presented in Figure 2-8.

2.7 Underlying Unit

The underlying unit (UM wells) within the project area is comprised of discontinuous sandstones that are not continuous or hydraulically connected across the project area. Where present, the underlying unit is generally on the order of 10 to 20 feet thick, occurring between depths of 415 to 480 ft bgs and is fully saturated (see cross-sections included as (Figures 2-10 through 2-15).

Single-well pump tests were conducted at UM1, UM3R, UM4 and UM5. Based upon the extremely low well yields and hydraulic conductivities at wells completed in this unit, the underlying unit does not meet the definition of an aquifer because:

1. According to 10 CFR Part 40, Appendix A:

“Aquifer means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.” and,

2. The definition of an aquifer per DEQ/LQD Guideline 8 Hydrology Coal and Non-Coal states:

“A zone, stratum, or group of strata that stores and transmits water in sufficient quantities for a specific use”

The data from the single well testing performed at UM1, UM3R, UM4 and UM5 support the conclusion that the underlying unit does not meet the definition of an aquifer within the project area.

2.8 Geologic Structure

At the Project, the Wasatch generally dips to the northwest at approximately 0.5 to 1 degrees (seen in the structure of the Felix Coal marker bed in Figure 2-6). Based on local structure contour maps and available published literature, there are no observed or mapped faults in the general vicinity. In general, faulting observed in Wasatch-age sediments is limited to areas along the edge of the Powder River Basin.

3.0 MONITOR WELL LOCATIONS, INSTALLATION, AND COMPLETION

3.1 Well Locations

All of the monitor wells utilized during pump testing at the four well cluster locations are shown on Figure 1-2; this figure also includes additional wells that were used for establishing baseline conditions for water quality.

3.2 Well Installation and Completion

All of the wells installation activities were performed under WDEQ/LQD Drilling Notification Permit No. DN401, TFN 5 4/150 and were constructed and developed using standard water well construction techniques, including air lifting, pumping, swabbing, and/or surging. Specific data related to well location, construction and completion interval are provided in Table 3-1.

4.0 PUMP TEST DESIGN, EQUIPMENT AND PROCEDURES

4.1 Test Design

The following section presents the general pump test design and procedures for all of the tests conducted at the project area during 2010 and 2011. Details on the single-well tests performed in the overlying and underlying aquifers are presented at the end of this section.

As mentioned above, 4 multi-well pump tests were conducted by pumping one well and monitoring wells completed in the PZA at distance. Observation wells completed in the SM unit (where present), overlying aquifer and underlying unit were also monitored during testing. Testing was conducted to evaluate the following:

1. Evaluate the hydrologic characteristics (including T and S) of the PZA within the test area;
2. Demonstrate hydrologic communication between the PZA pumping well and surrounding PZA monitor wells;
3. Demonstrate isolation between the PZA and the SM unit, overlying aquifer and underlying unit for the purposes of ISR mining; and
4. Evaluate the presence or absence of hydrologic boundaries in the PZA within the test area.

Additionally, 10 single-well tests were also performed in the SM unit (2 tests), overlying aquifer (4 tests) and underlying unit (4 tests) to determine specific capacity, hydraulic conductivity and transmissivity of those hydrologic units.

4.2 Pump Test Equipment

Aquifer testing was performed utilizing a combination of Grundfos submersible pumps utilizing the following models: 10S15-21 (1.5 HP), 40S50-15 (5 HP) and the RediFlo2. Electrical submersible pumps were powered by portable diesel and gasoline generators. Flow from the pump was controlled with a manual gate valve. Surface flow monitoring equipment included two 1.5" turbine meters (Bürkert Type 8035 Inline Paddlewheel Flow transmitter, provided by AUC) that display total flow in gallons and instantaneous flow in gallons per minute. Temporary Discharge Permits were secured from WDEQ/WQD for each of the four multi-well tests to land apply produced fluids downgradient of the pumping well. The single-well tests did not require a Temporary Discharge Permit from WDEQ/WQD since these fluids were discharged into existing mud pits.

Water levels in all wells monitored during the multi-well and single-well tests were instrumented with vented In-Situ LevelTROLL[®] data-logging transducers and continuously monitored for the duration of the test. For the single-well tests performed in the SM unit, overlying aquifer, and underlying unit wells, water level monitoring was only conducted in the pumping well.

The pressure rating of the transducers in the observation wells was 30 psi and 100 psi for the pumping wells. Typically, the transducers were programmed to record depth to water at 5 minute intervals (during background monitoring, and the pumping and recovery periods). Barometric pressure was also monitored during testing activities with an In-Situ BaroTROLL[®] to assess the effects barometric pressure on groundwater.

Prior to each test, AUC personnel installed the monitoring equipment and Petrotek verified the datalogger programming and equipment layout. Step-rate tests were performed on the multi-well test pumping wells to assess maximum long-term pumping rate. During testing activities AUC personnel collected the datalogger downloads and transferred the data to Petrotek for review/QA/QC and analysis.

4.3 Background Monitoring, Test Procedures, and Data Collection

The general testing procedures were as follows:

1. Install In-Situ LevelTROLL[®] data-logging transducers (vented) in wells to record changes in water levels during tests. Verify setting depths and head readings with manual water level measurements;
2. Measure and record background water levels and barometric pressure for a minimum of 96 hours prior to the test (for multi-well tests only);
3. Run the pumping well at a constant rate (or as close as practical); and,
4. Record water levels and barometric pressure throughout background, pumping, and recovery periods.

5.0 BAROMETRIC PRESSURE CORRECTIONS

5.1 Vented Monitoring Equipment

As mentioned above, vented In-Situ LevelTROLL[®] dataloggers were used to monitor water levels during all testing performed. Vented equipment eliminates the barometric impact on the sensor, but does not correct the water level measurements for barometric effects on the aquifer. In this regard, the vented LevelTROLLS[®] are barometrically *compensated*, but not *corrected*. If significant variations in water levels or barometric pressure are observed, the data may require correction for fluctuations in water levels associated with changes in barometric pressure. Barometric pressure was monitored with an In-Situ BaroTROLL[®] during testing activities.

5.2 Barometric Efficiency

Barometric efficiency (BE) was evaluated for all wells monitored during the multi-well pump tests. Results of this evaluation indicate that the PZA and overlying aquifer can be highly efficient with respect to barometric pressure (BP) fluctuations. Corrections for BP fluctuations were applied to the multi-well test data.

BE quantifies the response in observed water level in a well to changes with respect to BP. Background water level data prior to testing were utilized and plotted against BP. It is necessary to convert barometric pressure (reported in units of inches of mercury) to equivalent units of feet of water (ft H₂O; where 1 inch of mercury equals 1.1329 feet of water). Plotting depth to water versus BP, both in units of ft H₂O, a linear regression trendline was utilized in Microsoft Excel. The slope of this trendline (i.e., $y = mx + b$; where m = slope) defines the BE for a particular well. Raw water level plots versus BP are contained in Appendix A. Examples of BE evaluations are contained in Appendix B.

The BE of the PZA aquifer varies across the project as follows: at PZM1 ranges from 0.81 to 0.96, at PZM3 ranges from 0.82 to 0.87, at PZM4D ranges from 0.46 to 0.78 and at PZM5 ranges from 0.0 to 0.57.

5.3 Barometric Corrections

The BE correction is applied to all water level data for a well, starting at the beginning of background monitoring and applied through the end of recovery data. Details of correcting water level for barometric pressure follow.

To account for the water level changes due to barometric changes, water levels were corrected using the following formula in Microsoft Excel.

$$\text{Corrected DTW} = \text{DTW} - (\text{BP2} - \text{BP1}) \text{ BE}$$

Where, DTW is the current depth to water, BP1 is the initial BP converted to feet of water, BP2 is the current BP as feet of water and BE is the barometric efficiency of a well. An example of pre and post barometrically corrected water levels from the PZM1 test is shown on Figure 5-1. Raw water level data are contained in Appendix C.

6.0 TEST ANALYSIS

6.1 Analytical Methods

Drawdown data collected from monitor wells (instrumented with Level TROLLS®) were graphically analyzed to determine aquifer properties of transmissivity (T) and storativity (S). The primary drawdown analysis method used was Theis (1935). At the PZM1 and PZM3 well clusters, where the production zone aquifer is partially saturated, the primary drawdown analysis method used was Theis with an applied Jacob correction for the partially saturated aquifer conditions, which is explained below. The correction applied for partially saturated conditions according to Jacob (1946) corrects observed drawdown by the following equation:

$$s' = s - (s^2 / 2*B)$$

Where s' is corrected drawdown, s is observed drawdown, and B is the initial saturated aquifer thickness.

The Theis recovery (1935) analysis was also performed on the pumping well and observation wells. Theis recovery analysis was performed utilizing pre-Jacob corrected drawdown data. The evaluation method for partially saturated aquifer conditions requires a match of late-time data to be valid (Kruseman and De Ridder, 2000).

The test data were analyzed using the Theis method, which is a typical analytical approach to evaluate aquifer characteristics. Assumptions inherent in this method include:

- ❑ The aquifer is partially saturated and has apparent infinite extent; fully saturated (confined) conditions assumed for late-time recovery data;
- ❑ The aquifer is homogeneous and isotropic, and of uniform saturated thickness over the area influenced by pumping;
- ❑ The potentiometric surface is horizontal prior to pumping;
- ❑ The well is pumped at a constant rate;
- ❑ The pumping well is fully penetrating; and,
- ❑ Well diameter is small, so well storage is negligible.

These assumptions are reasonably satisfied, with the exception of the uniform thickness of the aquifer, which does not likely vary by a significant degree within the vicinity of the pump test well clusters. Locally, the PZA is not homogeneous and isotropic; however, over the scale of the pump tests, the aquifer can be treated in this manner.

6.2 Software

The software used to graphically analyze the data was AQTESOLV (Version 4.5, HydroSOLVE, 2010).

7.0 SUMMARY AND CONCLUSIONS

7.1 Reno Creek Project Hydrogeology Characterization

The level of characterization of the hydrogeology within project area is substantial. The results of testing conducted by AUC in 2010 and 2011 strongly supports that the PZA is in hydraulic communication at well cluster testing locations and has been adequately characterized for the purposes of this license application. Additional hydrologic testing was also conducted on the water table (SM unit, where present), the overlying aquifer, and the underlying unit at the four well cluster locations. The results of testing indicate that overlying and underlying confinement with respect to the PZA is sufficient and no hydraulic responses were observed in the overlying aquifer or the underlying unit during any testing activities. A summary of results follow. Detailed information pertaining to testing performed at well clusters PZM1, PZM3, PZM4 and PZM5 is contained in Sections 8.0 through 11.0. A summary of aquifer properties derived from the 2010 and 2011 pump tests is presented in Table 7-1.

7.2 Production Zone Aquifer

Multi-well tests were performed in the PZA at the PZM1, PZM3, PZM4 and PZM5 well clusters to provide adequate characterization of the PZA to support NRC Source Material License and WDEQ/LQD Permit to Mine applications. Results of the PZA hydrologic characterization includes:

- The PZA is a discrete and continuous aquifer and is geologically confined across the entire project area;
- The PZA is fully saturated in the western two thirds of the project and transitions to partially saturated conditions in the eastern third of the project;
- Calculated transmissivities vary across the site, between 20 ft²/day to 1,428 ft²/day; calculated hydraulic conductivities range between 0.3 ft/day and 13 ft/day;
- Aquifer properties of the PZA are similar to other ISR facilities in the western United States where ISR uranium operations have been successfully performed;
- Based on the results of testing, no hydrologic boundaries were detected in the PZA;
- The results of the testing demonstrate that the PZA monitor wells and pumping well are in hydraulic communication; and,
- In some areas of the PZA such as at the PZM4 and PZM5 clusters, an unidentified mudstone exists that bifurcates the production zone aquifer. Detailed characterization of this unit will be performed on a production unit scale basis.

7.3 SM Unit

In an attempt to characterize all potentially affected aquifers and as described in Section 2.2, AUC installed four shallow monitor wells in the SM unit to assess water table

conditions across the project area (SM3, SM5, SM6 and SM7). Single-well tests were performed on the SM unit at the SM3 and SM5 locations. Results of the SM unit characterization include:

- The SM unit is not continuous across the project area;
- When present, the SM unit is partially saturated;
- Where testing was conducted, the SM unit exhibits low specific capacity with values of 0.07 to 0.13 gallons per minute per foot of drawdown;
- The SM unit exhibits low transmissivity and hydraulic conductivity values between 0.01 to 0.3 ft²/day and 0.002 to 0.02ft/day, respectively; and
- Based on the lack of sustainable well yields and extremely low values of transmissivity and hydraulic conductivity calculated from the two single-well tests performed in the SM unit, this unit does not meet the definition of an aquifer per NRC (10 CFR Part 40, Appendix A) or DEQ/LQD (Guideline 8 Hydrology Coal and Non-Coal).

7.4 Overlying Aquifer

Single-well tests were performed on the overlying aquifer at four locations (OM1, OM3, OM4 and OM5). Results of the overlying aquifer characterization include:

- Based on geologic and potentiometric data, the overlying aquifer is not continuous across the project area;
- Although the overlying aquifer is encountered on a local scale within the PZA well clusters, it does not correlate stratigraphically for greater distances across the site;
- The overlying aquifer is partially saturated at OM1 cluster and fully saturated at clusters OM3, OM4, and OM5;
- Based on geologic and pump testing data, the overlying aquifer is isolated from the PZA; and
- Calculated transmissivities and hydraulic conductivities of the overlying aquifer vary widely across the site and range from between 0.05 ft²/day to 262 ft²/day and between 0.005 ft/day and 3.3 ft/day, respectively.

7.5 Underlying Unit

Single-well tests were performed on the underlying unit at four locations (UM1, UM3R, UM4 and UM5). Results of the underlying unit characterization include:

- The underlying unit is not continuous across the project area;
- When present, the underlying unit is fully saturated;

- The underlying unit exhibits a very low specific capacity with values ranging from 0.02 – 0.06 gallons per minute per foot of drawdown;
- Where testing was conducted, the underlying unit also exhibits low transmissivity and hydraulic conductivity values between 0.014 to 0.3 ft²/day and 0.001 to 0.02ft/day, respectively;
- Calculated transmissivities and hydraulic conductivities of the underlying unit vary widely across the site and range from between 0.07 ft²/day to 0.44 ft²/day and between 0.005 ft/day and 0.02 ft/day, respectively.
- Due to the lack of sustainable well yields and extremely low values of transmissivity and hydraulic conductivity calculated from the four single-well tests performed in the underlying unit, this unit does not meet the definition of an aquifer per NRC (10 CFR Part 40, Appendix A) or DEQ/LQD (Guideline 8 Hydrology Coal and Non-Coal).

8.0 PZM1 HYDROLOGIC TESTING SUMMARY AND RESULTS

8.1 PZM1 Test Layout

The PZA at the PZM1 cluster is geologically confined and partially saturated (Figure 2-17). For the multi-well pump test conducted at the PZM1 cluster, AUC monitored three PZA monitor wells, located 58, 81, and 235 feet from the pumping well (wells PZM9, PZM8, and PZM10, respectively), and monitored an overlying aquifer well (OM1) and a single underlying unit well (UM1) to evaluate hydraulic isolation between the PZA and adjacent units (Figure 8-1).

The following sections discuss the results of pump testing in the PZA, and responses in the overlying and underlying aquifers for the pump test conducted at the PZM1 cluster. Results of the single well pump tests in the overlying and underlying aquifers are presented at the end of this section.

8.2 Background Trends

Water level stability data collected prior to the start of pump testing are displayed from December 2 to the end of recovery monitoring on December 9, 2010. Plots of the background, pumping, and recovery data for wells completed in the PZA are presented in Figure 8-2. Water level data for the overlying aquifer and underlying unit are presented in Figure 8-3 and 8-4, respectively. With the exception of the underlying unit, all of the water level data in the figures above have been corrected for barometric pressure.

Water level versus barometric pressure plots and barometric efficiency (BE) evaluations for all wells monitored during the test are presented in Appendices A and B, respectively. Raw water levels are presented in Appendix C. The BE of the PZA at the PZM1 cluster is high and ranges from 0.81 to 0.96.

Prior to start of the pump test, water levels were stable to slightly increasing in the PZA. Water levels in the overlying aquifer were rising slightly during background monitoring. Water levels in the underlying unit were rising at a slightly higher rate during background monitoring. There is no evidence that these trends are due to any artificial factors, and therefore most likely represent a natural aquifer response (i.e., seasonal fluctuations).

A potentiometric surface map of the PZA at the PZM1 cluster is presented as Figure 8-5. Similar to the regional PZA potentiometric surface map presented in Figure 2-17, the direction of groundwater flow is to the northeast with a gradient of approximately 13.9 feet per mile.

8.3 PZM1 Pump Test Duration and Rate

The pump test at PZM1 was started at 16:35 on December 6, 2010 and was terminated at 11:50 on the December 9. The total length of pumping was 2,595 minutes (1.8 days) and the average pumping rate was 8.9 gpm.

8.4 Production Zone Aquifer Response

Drawdown observed in the PZA monitor wells is presented on Figure 8-2. Drawdown values presented on this figure represent barometrically corrected water level measurements from the start of testing to the end of recovery monitoring on December 9, 2010. Table 8-1 presents the observed drawdown in the PZA wells at the end of pumping. Total drawdown observed in the pumping well was 46.8 ft; drawdown observed in wells PZM9, PZM8, and PZM10 were 1.4 feet, 1.6 feet, and 0.5 feet, respectively. As shown in Figure 8-6, drawdown does not correspond directly to distance from the pumping well in wells PZM9 and PZM8, located 58 and 81 feet from the pumping well, respectively. It is likely that aquifer heterogeneities, which are not unexpected in the fluvial depositional environment of the lower Wasatch, are the cause for this asymmetrical radial drawdown response.

8.5 Production Zone Aquifer Results

Transmissivity (T) results from drawdown data in the observation wells PZM9, PZM8, and PZM10 were 427, 559 and 694 ft²/d. Theis recovery analysis of T for the pumping well PZM1 was calculated to be 389 ft²/d, and T ranged between 469 to 710 ft²/d for the three observation wells from recovery data (Table 8-2). Calculated storativity values for the three observation wells ranged between 6.0×10^{-4} to 5.0×10^{-3} . Calculated hydraulic conductivities (based on 94 foot saturated thickness at the pumping well) ranged from 4.5 to 7.4 ft/day from drawdown data, and from 4.1 to 7.6 ft/day from recovery data. Type curve matches were performed utilizing BP corrected drawdown data.

Raw water level data, type-curve matches and well construction details are contained in Appendices C, D and E respectively.

8.6 PZM1 Cluster Vertical Gradient

Vertical gradients were calculated at the PZM1 cluster and presented in Table 8-3. Hydraulic head decreases with depth from the overlying aquifer down to the underlying unit. At the PZM1 cluster, the head in the overlying aquifer is approximately 109 feet higher than the PZA aquifer; and the head in the PZA is approximately 11 feet higher than the head in the underlying unit. The observed differences in heads described above further supports the fact that the PZA is hydraulically isolated from adjacent overlying and underlying units at the PZM1 cluster.

8.7 Overlying and Underlying Response

Hydrographs of the overlying aquifer well, OM1, and underlying unit well, UM1, are shown in Figures 8-3 and 8-4, respectively. No drawdown response was observed at either well in response to pumping from PZM1. Slightly increasing water level trends observed during background monitoring in both wells appear to continue throughout the period of pumping, and therefore demonstrates hydraulic isolation between the overlying aquifer and underlying unit with respect to the PZA at this location.

8.8 Overlying and Underlying Single-Well Pump Test Results

For the single-well tests conducted in the overlying (OM1) and underlying (UM1) wells, water levels were only monitored in the pumping wells.

Overlying Aquifer Single-well Pump Test

A single-well test was conducted in the overlying aquifer at well OM1 on October 5, 2011 and water levels in the pumping well were monitored. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL®. The overlying aquifer well OM1 was pumped at an average rate of 3.3 gpm for 75 minutes, resulting in 19.3 feet of drawdown. A hydrograph of the pump test water level data is presented in Figure 8-7.

Recovery data were evaluated according to Theis (1935) and transmissivity was determined by a straight-line fit, the results of which are summarized in Table 8-2. A T value of 39 ft²/day was calculated in the aquifer at this location; hydraulic conductivity, based on 38 feet of saturated thickness, is approximately 1.0 ft/day.

Underlying Unit Single-well Pump Test

A single-well test was conducted in the underlying unit at well UM1 on October 24, 2011. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL®. The underlying unit at well UM1 was pumped at an average rate of 6.1 gpm for 12 minutes, resulting in approximately 98 feet of drawdown. Pumping was terminated as the water level approached the level of the pump in the well. Based on the hydrograph of water level during testing presented in Figure 8-8, it appears that much of the water removed during the short test was from wellbore storage.

Recovery data were analyzed by a straight-line fit according to Theis (1935), the results of which are presented in Table 8-2. A T value of 0.1 ft²/d was calculated at the underlying unit at this location; hydraulic conductivity, based on 17 feet of saturated thickness, is approximately 0.01 ft/day at this location. Based on the lack of sustainable yield, very slow recovery, and very low transmissivity calculated at UM1, the underlying unit does not meet the definition of an aquifer at this location.

Raw water level data, type-curve matches and well construction details are contained in are contained in Appendices C, D and E respectively.

9.0 PZM3 HYDROLOGIC TESTING SUMMARY AND RESULTS

9.1 PZM3 Test Layout

The PZA at the PZM3 cluster is geologically confined and partially saturated (Figure 2-17). For the multi-well pump test conducted at PZM3, three additional PZA observation wells were monitored, PZM11, PZM12, and PZM13 (Figure 9-1). These wells are located 52 feet, 102 feet, and 199 feet from the pumping well, respectively. Water levels in the overlying SM3 and OM3 wells and in the underlying UM3R wells were also monitored during testing to demonstrate hydraulic isolation between the PZA and adjacent units.

The following sections discuss the results of pump testing in the PZA, and responses in the overlying and underlying aquifers for the pump test conducted at the PZM3 cluster. Results of the single well pump tests in the overlying and underlying aquifers are presented at the end of this section.

9.2 Background Trends

Water level stability data collected prior to the start of pump testing are displayed from October 13, 2011 to the end of recovery monitoring on October 24, 2011. Plots of the background, pumping, and recovery data for wells completed in the PZA are presented in Figure 9-2. Water level data for the SM unit, overlying aquifer and underlying unit are presented in Figures 9-3, 9-4 and 9-5, respectively. With the exception of the underlying unit, all of the water level data in the figures above have been corrected for barometric pressure.

Water level versus barometric pressure plots and barometric efficiency (BE) evaluations for all wells monitored during the test are presented in Appendices A and B, respectively. Raw water levels are presented in Appendix C. The BE of the PZA at the PZM3 cluster is high and ranges from 0.82 to 0.87.

Prior to start of the pump test, water levels were fairly stable in the PZA. Water levels in the SM Unit and overlying aquifer were decreasing slightly during background monitoring. Water levels in the underlying unit were decreasing prior to the start of test and continued that trend during the pumping and recovery portions of the test. The steady decreasing trend observed in the underlying unit possibly reflects the impacts of well development and shows that the well had not reached equilibrium. Water levels in the underlying unit reached a quasi- equilibrium level of about 315.7 ft below top of casing (btoc) on October 24, 2011.

A potentiometric surface map of the PZA at the PZM3 cluster is presented as Figure 9-6. Similar to the regional PZA potentiometric surface map presented in Figure 2-17, the direction of groundwater flow is to the northeast with a gradient of approximately 15.1 feet per mile.

9.3 Pump Test Duration and Rate

The pump test at PZM3 was started at 17:20 on October 18, 2011 and was terminated at

14:28 on the October 21. The total length of pumping was 4,149 minutes (2.88 days) and the average pumping rate was 9.9 gpm.

9.4 Production Zone Aquifer Response

Drawdown observed in the PZA monitor wells is presented on Figure 9-2. Drawdown values presented on this figure represent barometrically corrected water level measurements from the start of testing to the end of recovery monitoring on October 18, 2011. Table 9-1 presents the observed drawdown in the PZA wells at the end of pumping. Total drawdown observed in the pumping well was 32.1 ft; drawdown observed in wells PZM11, PZM12, and PZM13 were 3.1 feet, 1.5 feet, and 0.7 feet, respectively. Figure 9-7, presents drawdown observed in the pumping well and wells PZM11, PZM12 and PZM13.

9.5 Production Zone Aquifer Results

Transmissivity (T) results from drawdown data in the observation wells PZM11, PZM12, and PZM13 were 587, 830, and 1,327 ft²/d. Theis recovery analysis of T for the pumping well PZM3 was calculated to be 588 ft²/d, and T ranged between 748 to 1,131 ft²/d for the three observation wells from recovery data (Table 9-2). Calculated storativity values for the three observation wells ranged between 1.0 x 10⁻⁵ to 8.3 x 10⁻⁴. Calculated hydraulic conductivities (based on 109 foot saturated thickness at the pumping well) ranged from 5.4 to 12.2 ft/day from drawdown data, and from 5.4 to 10.4 ft/day from recovery data. Type curve matches were performed utilizing BP corrected drawdown data.

Raw water level data, type-curve matches and well construction details are contained in Appendices C, D and E respectively.

9.6 PZM3 Cluster Vertical Gradient

Vertical gradients calculated at the PZM3 cluster are presented in Table 9-3. Hydraulic head decreases with depth from the SM unit down to the underlying unit. At the PZM3 cluster, the head in the SM unit is approximately 63 feet higher than the head in the overlying aquifer; the head in the overlying aquifer is approximately 166 feet higher than the head in the PZA; and the head in the PZA is approximately 19 feet higher than the head in the underlying unit. The observed differences in heads described above further supports the fact that the PZA is hydraulically isolated from adjacent overlying and underlying units at the PZM3 cluster.

9.7 Overlying and Underlying Response

Hydrographs of the SM unit well, SM3, overlying aquifer well, OM3 and underlying unit well, UM3R, are shown in Figures 9-3, 9-4 and 9-5, respectively. No drawdown was observed in any of these wells in response to pumping from PZM3, demonstrating hydraulic isolation between the overlying and underlying units with respect to the PZA at this location.

9.8 Overlying and Underlying Single-Well Pump Test Results

For the single-well tests conducted in the SM unit, overlying aquifer and underlying unit

wells at the PZM 3 cluster, water levels were only monitored in the pumping wells.

SM Unit Single-well Pump Test

A single-well test was conducted in the water table SM unit at well SM3 on September 27, 2011. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL[®]. The well was pumped at an average rate of 0.6 gpm for 19 minutes until water reached the pump intake, resulting in a drawdown of approximately 8.4 feet. A hydrograph of the pump test water level data is presented in Figure 9-8. Based on this hydrograph, most of the water came from wellbore storage; the water level only recovered to within 4.3 feet of initial static water level after approximately 2.85 days.

Recovery data were evaluated by a straight-line fit according to Theis (1935) to evaluate transmissivity. Transmissivity was calculated to be 0.014 ft²/day; hydraulic conductivity, based on 9 feet of saturated thickness, is approximately 0.002 ft/day (Table 9-2) in the SM unit at this location. Based on these data, and the lack of sustainable yield in this well, the SM unit does not meet the definition of an aquifer at this location.

Overlying Aquifer Single-well Pump Test

A single-well test was conducted in the overlying aquifer at well OM3 on September 27, 2011. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL[®]. The well was pumped an average rate of 2.6 gpm for 28 minutes, resulting in approximately 23.7 feet of drawdown. A hydrograph of pump test water level data is presented in Figure 9-9.

Transmissivity by a straight-line fit of recovery data according to Theis was calculated to be 0.049 ft²/day. Hydraulic conductivity, based on 10 feet of saturated thickness, is approximately 0.005 ft/day (Table 9-2) in the overlying aquifer at this location.

Underlying Unit Single-well Pump Test

A single-well test was conducted in the underlying unit at well UM3R on November 4, 2011. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL[®]. The well was pumped an average of 1.9 gpm for 27 minutes, resulting in approximately 104 feet of drawdown. A hydrograph of the pump test water level data is presented in Figure 9-10. Based on this hydrograph, most of the withdrawn water is from wellbore storage. Recovery in this well after just over 3 days was only within approximately one foot of the initial static water level.

Calculated transmissivity of the recovery data according to Theis is 0.074 ft²/d. Hydraulic conductivity based on 14 feet of saturated thickness is approximately 0.005 ft/day (Table 9-2). Based on these data and lack of sustainable yield observed at this well, the underlying unit does not meet the definition of an aquifer at this location.

Raw water level data, type-curve matches and well construction details are contained in Appendices C, D and E respectively.

9.9 Example of a Leaky Well – UM3

Well UM3R is the replacement well for the initially installed underlying unit well UM3. During a step-rate test conducted in well PZM3 on September 14, 2011, UM3 was observed to be in communication with the PZA. Figure 9-11 illustrates the water level response observed in well UM3 (located 31 feet from the pumping well) and the response in well PZM11 (located 52 feet from the pumping well) versus the water level in the PZM3 pumping well. The scale of drawdown during testing is similar in the responses observed at the PZM11 well and the UM3 well (approximately three feet from the pumping well), which indicates that well UM3 was in direct communication to the PZA. This figure is illustrative of a response resulting from faulty well construction.

Based on field reports by AUC, it was concluded that well UM3 was irreparably damaged during well completion. After the UM3 well casing was cemented and allowed to cure, the underlying unit was under-reamed to total depth. During the under-reaming, the two blades were bent while reaming through a four to five feet thick hard carbonate layer immediately above the underlying unit. After reaching total depth, the damaged under-reaming blades could not be retracted into the bit. Withdrawal of the bit resulted in gouging and distortion of the inside of the well casing, but it was unknown if structural integrity of the well casing was compromised. The UM3 well was completed, but the step test conducted at PZM3, indicated that the well casing across the intended underlying unit completion interval was compromised and had direct communication with the PZA. Based on these data, the well was properly plugged and abandoned in accordance with the Wyoming State Engineer's Office document, "Regulations and Instructions Part III, Water Well Minimum Construction standards, Chapter 4, Section 4, Water Well Plugging and Abandonment" Revised February 2010, and replaced with well UM3R.

It is noted that this response shows what direct communication between adjacent aquifers would look like if a direct hydrologic pathway (e.g., poor well completion) existed. This type of response has not been observed anywhere else in the project area during any of the hydrologic investigations.

10.0 PZM4D HYDROLOGIC TESTING SUMMARY AND RESULTS

10.1 PZM4D Test Layout

As mentioned in Section 2.5, the PZA at the PZM4 cluster is bifurcated by an unidentified mudstone and occurs as separate upper and lower PZAs (Figure 2-11). Somewhere between the pumping well (PZM4D) and PZM17, located approximately 2,800 to the southwest, this unidentified mudstone pinches out to where the upper and lower PZA coalesce to form one PZA. Further characterization of the impacts of this mudstone unit will be addressed in production unit-scale hydrologic testing at a later date.

The PZA at the PZM4D cluster is geologically confined and fully saturated. For the multi-well pump test conducted at well PZM4D, two additional wells completed in the lower PZA (PZM16 and PZM15) were monitored during testing. Well PZM4, completed in the upper PZA and located 57 feet from the pumping well, was also monitored during testing. Wells PZM17 and PZM14, located approximately 2,800 feet southwest and 6,200 feet northeast of the PZM4D pumping well, respectively, were also monitored during testing. As mentioned above, the PZA at well PZM17 appears continuous and the unidentified mudstone observed at the pumping well is not present. At well PZM14, the completion zone appears to correspond to the upper portion of the PZA, but the lateral continuity of the unidentified mudstone that bifurcates the PZA has not been established at distance from the PZM4 cluster.

Water levels in the overlying aquifer at well OM4 and water levels in the underlying unit at well UM4 were monitored during testing to demonstrate hydraulic isolation between the PZA and these adjacent units. Piezometers OAM4S and OAM4D, completed in the upper and lower Felix Coals of the OA aquitard, respectively, were also monitored during testing. Single-well tests were conducted in wells OM4 and UM4 in the overlying aquifer and underlying unit, respectively. Locations of all wells utilized during the PZM4D test are presented on Figure 10-1.

10.2 Background Trends

Water level stability data collected prior to the start of pump testing are displayed from August 3 to the end of recovery monitoring on August 21, 2011. Plots of the background, pumping, and recovery data for wells completed in the PZA are presented in Figures 10-2 through 10-6. Water level data for the overlying aquifer, piezometers completed in the upper and lower Felix Coal seams of the overlying aquitard and the underlying unit are presented in Figures 10-6 through 10-9, respectively. All of the water level data in the figures above have been corrected for barometric pressure.

Water level versus barometric pressure plots and barometric efficiency (BE) evaluations for all wells monitored during the test are presented in Appendices A and B, respectively. Raw water levels are presented in Appendix C. The BE of the PZA at the PZM4D cluster is moderate and ranges from 0.46 to 0.78.

Prior to start of the pump test, water levels were slightly increasing in the PZA. Water levels

in the overlying aquifer, upper and lower Felix Coal Seams and underlying unit were fairly stable during background monitoring.

A potentiometric surface map of the PZA at the PZM4D cluster is presented as Figure 10-10. Similar to the regional PZA potentiometric surface map presented in Figure 2-17, the direction of groundwater flow is to the northeast with a gradient of approximately 28.0 feet per mile. As shown in Figure 10-10, PZM4D is located approximately 4,300 west of the boundary where the PZA transitions from fully saturated to partially saturated conditions. It is noted that the elevation of the upper PZA (PZM4) is approximately 4 feet higher than the lower PZA (PZM4D) at the PZM4D well cluster.

10.3 Pump Test Duration and Rate

During the pump test conducted in pumping well PZM4D between August 9 and August 16, 2011, there was an issue with the pump at approximately 8,375 minutes into the test (5.82 days, on August 15, 2011). This is visible on the hydrographs showing water level data from the pumping well. Based on water level data, there was a dramatic drop in pumping rate (to 6 gpm) for approximately two hours. It does not appear that the pump shut off, but no explanation is possible to characterize this problem based on the available field data. The pump test was conducted for a total of 10,050 minutes (6.98 days) until the pump was shut off; the average pumping rate over this interval is approximately 14.1 gpm. Drawdown data from testing were analyzed for all data up to 8,375 minutes utilizing a pumping rate of 17.6 gpm. The pumping rate utilized for analysis of recovery data was 14.1 gpm.

10.4 Production Zone Aquifer Response

Total drawdown observed in the pumping well PZM4D was 119.2 feet at the time of test shut-in; drawdown observed in wells PZM16, PZM15, and PZM17 were 1.2 feet, 4.5 feet, and 0.3 feet, respectively (Table 10-1). Figures 10-2 through 10-5 show the relative water levels of observation wells PZM16, PZM15, PZM17, and PZM14, respectively, versus water level in the pumping well. No response was observed in well PZM14, located almost 6,200 feet northeast of the pumping well. Figure 10-6 presents water level data in the upper PZA at PZM4 versus water level data in the pumping well PZM4D. Figure 10-11, presents drawdown observed in the pumping well and wells PZM16, PZM15 and PZM17.

It is noted that the drawdown does not correspond directly with distance in the observation wells (Table 10-1 and Figure 10-11), as the drawdown observed in well PZM15 (approximately 1,800 feet east of PZM4D) was 4.5 feet, but only 1.2 feet in well PZM16 (located approximately 1,300 feet south of PZM4D). Drawdown observed in the upper PZA at well PZM4 (located 57 feet from the pump wells) was only 0.6 feet, indicating that the upper PZA at this location is not in direct hydraulic communication with the lower PZA (which is also supported by potentiometric data and the approximate four foot difference in head observed in the upper and lower PZM).

10.5 Production Zone Aquifer Results

Aquifer characteristics of transmissivity (T) and storativity (S) were evaluated in the PZA aquifer and are summarized in Table 10.2. Drawdown data (up to 8,375 minutes, before pump problems) were analyzed according to Theis for wells PZM16 and PZM15. Recovery data were analyzed for the PZM4D pumping well and observation wells. Transmissivity results from the drawdown data at well PZM16 was 229 ft²/day and a calculated storativity of 8.7×10^{-4} . At well PZM15, T from drawdown was 57 ft²/day, and a calculated S value of 1.3×10^{-4} . Transmissivity evaluated from recovery data was in good agreement with the drawdown data, 286 ft²/day at PZM16 and 63 ft²/day at PZM15. Transmissivity from recovery data in the pumping well was 31 ft²/day, approximately half that observed at PZM15 and significantly less than at PZM16. A definitive analysis of PZM17 could not be conducted due to the later time data (due to pump problems), but the data suggest that the transmissivity in this well is higher than at well PZM16. Type curve matches were performed utilizing BP corrected drawdown data.

Based on the observed drawdown and calculated transmissivities, it appears that the PZA is more conductive to the south of pumping well PZM4D (at well PZM16) versus data to the east at well PZM15. The drawdown at PZM16 is almost four times less than that observed at PZM15, even though PZM16 is closer to the pumping well, and transmissivity at PZM16 is approximately four times greater than at PZM15. Preliminary results at PZM17 to the southwest also suggest a more transmissive PZA in this location. The increase in T observed west of PZM4D is likely a function of increasing sand thickness where the bifurcation of the PZA by the unidentified mudstone pinches out. The mudstone in the PZA at PZM4 area was not observed in PZM17.

Raw water level data, type-curve matches and well construction details are contained in Appendices C, D and E respectively.

10.6 PZM4D Cluster Vertical Gradient

Vertical gradients calculated at the PZM4D cluster are presented in Table 10-3. Hydraulic head decreases with depth from the overlying aquifer down to the underlying unit. At the PZM4D cluster, the head in the overlying aquifer is approximately 53 feet higher than the head in the upper PZA; the head in the upper PZA is approximately 4 feet higher than the head in the lower PZA; and the head in the lower PZA is approximately 4 feet higher than the head in the underlying unit. The observed differences in heads described above further supports the fact that the PZA is hydraulically isolated from adjacent overlying and underlying units at the PZM4D cluster.

10.7 Overlying and Underlying Response

Hydrographs of the overlying aquifer well, OM4, piezometers completed in the upper and lower Felix Coal seams, OAM4S and OAM4D, respectively, and underlying unit well, UM4, are shown in Figures 10-7, 10-8 and 10-9, respectively. No drawdown was observed in any of these wells in response to pumping from PZM4D, demonstrating hydraulic isolation between the overlying and underlying units with respect to the PZA at this location. There is

an apparent rise in water levels observed in the overlying aquifer, Felix coal piezometers and underlying unit that is coincident with pumping. This is likely related to the “Noordbergum effect” or “reverse water-level fluctuation” that occurs in layered geologically confined and fully saturated aquifer systems (Hsieh, 1996). Conventional groundwater theory does not account for this effect, and is explained by poroelastic theory. Poroelastic theory considers that “drawing down an aquifer produces time-dependent volumetric contraction and, hence, induced increases in pore pressure in the aquifer, adjacent confining layers, and adjacent aquifers” (Wang, 2000). This observed water level increase is not due to hydraulic communication between the PZA and adjacent units.

10.8 Overlying and Underlying Single-Well Pump Test Results

For the single-well tests conducted overlying aquifer and underlying unit wells at the PZM4D cluster, water levels were only monitored in the pumping wells.

Overlying Aquifer Single-well Pump Test

A single-well pump test was conducted on September 29, 2011 in the overlying aquifer at well OM4. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL[®]. The well was pumped at an average rate of 3.5 gpm for 95 minutes and subsequently pumped at an average rate of 3.8 gpm for 94 minutes, for a total of 189 minutes, resulting in 100.5 feet of drawdown. A hydrograph of water level data from well OM4 is presented in Figure 10-12.

Recovery data were analyzed by a straight-line fit according to Theis (1935) that accounts for the variable pumping rate in the well, the results of which are presented in Table 10-2. A transmissivity value of 262 ft²/d was calculated from the data. Calculated hydraulic conductivity based on 82 feet of saturated thickness is approximately 3.2 ft/d.

Underlying Unit Single-well Pump Test

A single-well pump test was conducted in the underlying unit at well UM4 on October 14, 2011. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL[®]. The well was pumped at an average rate of 6.1 gpm for 23 minutes, resulting in 188 feet of drawdown. A hydrograph of the water level data is presented in Figure 10-13. Based on this hydrograph, most of the withdrawn water is from wellbore storage.

Recovery data were analyzed by a straight-line Theis fit, the results of which are presented in Table 10-2. Calculated transmissivity in the well was determined to be 0.22 ft²/d, and based on a saturated thickness of 17 feet, hydraulic conductivity was calculated to be 0.013 ft/d. Based on these data and the lack of sustainable yield observed in this well, the underlying unit does not meet the definition of an aquifer at this location.

Raw water level data, type-curve matches and well construction details are contained in Appendices C, D and E respectively.

10.9 Upper and Lower Felix Coal Piezometers

As mentioned above, piezometers were installed in the Upper and Lower Felix Coal seams (wells OA4S and OA4D, respectively) to evaluate the characteristics in the Felix within the overlying OA aquitard. During development of these wells, the Upper and Lower Felix coal seams yielded less than 0.25 gpm and 1.0 gpm, respectively, and went dry. Based on this, the Upper and Lower Felix Coals are not considered aquifers because:

- The definition of an aquifer per NRC, 10 CFR Part 40 Appendix A, states: “Aquifer means a geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs”, and
- The definition of an aquifer per Wyoming DEQ/LQD Guideline 8 Hydrology Coal and Non-Coal states: “A zone, stratum, or group of strata that stores and transmits water in sufficient quantities for a specific use”.

Based on the lack of sustainable yield in these coal seams, the Felix Coal is not considered an aquifer at the project area.

11.0 PZM5 HYDROLOGIC TESTING SUMMARY AND RESULTS

11.1 PZM5 Test Layout

As mentioned in Section 2.5, in some parts of the project area, the PZA is bifurcated by an unidentified mudstone and occurs as separate upper and lower PZAs (Figure 2-10). In the area near the PZM5 cluster, the unidentified mudstone is present forming an upper and lower PZA. The upper and lower PZA at the PZM5 cluster are geologically confined and fully saturated.

At the PZM5 cluster, the pumping well (PZM5) is completed across the entire PZA interval, with the screen placed across the lower PZA and sanded up to the top of the upper PZA. Observation wells PZM20 and PZM19 (located 499 feet and 1,048 feet north of PZM5, respectively) are completed with 20 foot screen intervals in the lower PZA. Well PZM18 is located 2,085 feet north of PZM5 and is completed in the upper PZA. Well PZM6 (2,085 feet northwest of PZM5) is completed in the lower PZA, but based on the log for this well, the upper PZA is not present at well PZM6. The BLM All Night Creek well ANCVSS, located 4,025 feet west of PZM5, was also monitored that is completed at a depth corresponding to the lower PZA. Further characterization of the impacts of this mudstone unit will be addressed in production unit-scale hydrologic testing at a later date.

Water levels in the SM unit (SM5), overlying aquifer (OM5) and the underlying unit (UM5) wells were monitored during testing to demonstrate hydraulic isolation between the PZA and these adjacent units. Single-well tests were conducted in wells SM5, OM5 and UM5 in the SM unit, overlying aquifer and underlying unit, respectively. Locations of all wells utilized during the PZM5 test are presented on Figure 11-1.

11.2 Background Trends

Water level stability data collected prior to the start of pump testing are displayed from January 27 to the end of recovery monitoring on March 7, 2011. This period of monitoring includes the first attempt at performing the pump test at PZM5 which was started on February 7 and unexpectedly terminated on February 9 due to generator problems. Water levels recovered for approximately 7 days before the second PZM5 pump test was performed. Plots of the background, pumping, and recovery data for wells completed in the PZA are presented in Figures 11-2 and 11-3. Water level data for the SM unit, overlying aquifer and the underlying unit are presented in Figures 11-4 through 11-6, respectively. All of the water level data in the figures above have been corrected for barometric pressure.

Water level versus barometric pressure plots and barometric efficiency (BE) evaluations for all wells monitored during the test are presented in Appendices A and B, respectively. Raw water levels and BP corrected water levels are presented in Appendix C. The BE of the PZA at the PZM5 cluster is highly variable and ranges from 0.0 to 0.57.

Prior to start of the pump test, water levels were slightly increasing in the PZA. Water levels in the SM unit, overlying aquifer and underlying unit were slightly decreasing during background monitoring.

A potentiometric surface map of the PZA for the PZM5 pump test is presented as Figure 11-7. Similar to the regional PZA potentiometric surface map presented in Figure 2-17, the direction of groundwater flow is to the northeast with a gradient of approximately 23.8 feet per mile. As shown in Figure 11-7, no substantial head differentials were observed between wells completed in the upper and lower PZAs.

11.3 Pump Test Duration and Rate

The second PZM5 pump test was conducted from February 16 through 24, after allowing approximately 7 days of recovery following the first failed attempt. The pumping well (PZM5) was pumped at an average rate of 10 gpm for 11,393 minutes (7.91 days).

11.4 Production Zone Aquifer Response

Total drawdown observed in the pumping well was 102.1 feet; drawdown observed in observation wells PZM20, PZM19, PZM18, PZM6, and BLM ANCVSS were 11.7 feet, 4.3 feet, 0.8 feet, 0.9 feet, and 0.2 feet, respectively, and are summarized in Table 11-1. Figures 11-2 and 11-3 show the relative water levels of these observation wells versus the pumping well. Figure 11-8, presents drawdown observed in the pumping well and wells PZM20, PZM19, PZM18, PZM6, and BLM ANCVSS.

11.5 Production Zone Aquifer Results

In order to account for the completion interval of the PZM5 pumping well, which is completed across the entire PZA, an estimated flow was apportioned for the lower sand of the PZM. This was necessary to complete analysis of observation wells PZM20 and PZM19, both of which are completed in the lower PZA. Flow in the lower PZA was estimated at seven gpm (of the total 10 gpm that was pumped) based on the curve match provided by Theis drawdown analysis. Because of the need to estimate flow in the lower PZA, the PZM5 pump test analysis is considered more qualitative than quantitative.

Aquifer characteristics of transmissivity (T) and storativity (S) evaluated in the pumping well and two closest observation wells PZM20 and PZM19 are summarized in Table 11-2. Based on the drawdown observed in these two observation wells, it was determined that the drawdown data match a leaky confined model, as the change in drawdown at later time decreased. This could be due to well construction, a change in T, or both. Based on geologic information during drilling, it was observed that in the area west of PZM5, the PZA is coarser grained and gravel deposits were noted. It is postulated that at later time, a higher transmissive portion of the aquifer (i.e., more permeable sand) is encountered, thus decreasing the rate of drawdown with time for these observation wells. A Theis curve match was attempted on the data, but a defensible match could not be made to account for the late time data. The Hantush-Jacob analytical method (1954), which assumes a leaky confined aquifer with no aquitard storage, was utilized on the drawdown and this solution provided a good match for mid- to late-time data. A Cooper-Jacob straight-line match was also evaluated on the drawdown data at well PZM20. A straight-line Theis recovery analysis was conducted on the recovery data at the pumping well and PZM20 and PZM19.

Based on the recovery analysis of data at the pumping well PZM5, a transmissivity value of 61.8 ft²/day was calculated. Using a sand thickness of 132 feet at this location, the calculated hydraulic conductivity is 0.5 ft/day. For well PZM20, transmissivity from the leaky solution for drawdown is 20.2 ft²/day, the straight-line analysis transmissivity is 26.7 ft²/day, and the recovery data analysis indicates a transmissivity value of 31.0 ft²/day. Based on a sand thickness of 47 feet at this well, hydraulic conductivity is between 0.4 and 0.7 ft/day from these analyses. At well PZM19, transmissivity from the leaky solution for drawdown is 26.0 ft²/day and 47.0 ft²/day from the recovery analysis. Using a sand thickness of 56 feet at this well, hydraulic conductivity at PZM19 is between 0.5 ft/day and 0.8 ft/day. Calculated storativity values for the two observations wells range between 6.5×10^{-5} and 1.1×10^{-4} .

Raw water level data, type-curve matches and well construction details are contained in Appendices C, D and E respectively.

11.6 PZM5 Cluster Vertical Gradient

Vertical hydraulic gradients calculated at the PZM5 cluster are presented in Table 11-3. Hydraulic head decreases with depth from the SM unit down to the underlying unit. At the PZM5 cluster, the head in the SM unit is approximately 3 feet higher than the head in the overlying aquifer; the head in the overlying aquifer is approximately 91 feet higher than the head in the PZA; and the head in the PZA is approximately 36 feet higher than the head in the underlying unit. The observed differences in heads described above further supports the fact that the PZA is hydraulically isolated from adjacent overlying and underlying units at the PZM5 cluster.

11.7 Overlying and Underlying Response

Hydrographs of the SM unit well, SM5, overlying aquifer well, OM5 and underlying unit well, UM5, are shown in Figures 11-4, 11-5, and 11-6, respectively. No drawdown was observed in any of these wells in response to pumping from PZM5, demonstrating hydraulic isolation between the overlying and underlying units with respect to the PZA at this location. An apparent rise in water levels that is coincident with pumping in PZM5 was observed in wells SM5 and OM5 is believed to be associated with the “Noordbergum effect”, previously described in Section 10.7. The observed increase in water level coincident with pumping in PZM5 is not due to hydraulic communication between the PZA and the overlying aquifer and SM unit.

11.8 Overlying and Underlying Single-Well Pump Test Results

For the single-well tests conducted overlying aquifer and underlying unit wells at the PZM5 cluster, water levels were only monitored in the pumping wells.

SM Unit Single-well Pump Test

A single-well pump test was conducted on October 4, 2011 in the water table SM unit at well SM5. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL[®]. The well was pumped at an average rate of 1.7 gpm for nine minutes. A hydrograph of water level data is presented in Figure 11-9. The rapid decline in water level

indicates that most of the water removed was from wellbore storage. Water level recovery data were utilized for transmissivity determination.

Transmissivity was determined by a straight-line fit to recovery data according to Theis; results are summarized in Table 11-2. A T value of $0.26 \text{ ft}^2/\text{day}$ was determined for the SM unit at this location, and hydraulic conductivity was calculated at 0.019 ft/day . Based on these data and the lack of sustainable yield observed at this well, the SM unit does not meet the definition of an aquifer at this location.

Overlying Aquifer Single-well Pump Test

A single-well pump test was conducted on September 30, 2011 in the overlying aquifer at well OM5. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL[®]. The well was pumped at an average rate of 3.3 gpm for 135 minutes, resulting in 22.7 feet of drawdown. A hydrograph of water level data from well OM5 is presented in Figure 11-10.

Transmissivity was determined by a straight-line fit to recovery data according to Theis, the results of which are summarized in Table 11-2. A T value of $39.1 \text{ ft}^2/\text{day}$ was determined and hydraulic conductivity is approximately 3.3 ft/day .

Underlying Unit Single-well Pump Test

A single-well pump test was conducted in the underlying unit at well UM5 on October 18, 2011. Water levels in the pumping well were monitored with a vented In-Situ LevelTROLL[®]. The well was pumped at an average rate of 4.3 gpm for 27 minutes, resulting in 142.7 feet of drawdown. The rapid decline in water level indicates that most of the water removed was from wellbore storage. Water level recovery data were utilized for transmissivity determination. A hydrograph of water level data from well UM5 is presented in Figure 11-11.

Transmissivity was determined by a straight-line fit to recovery data, the results of which are summarized in Table 11-2. A T value of $0.44 \text{ ft}^2/\text{day}$ was determined and hydraulic conductivity in the underlying unit at this location is approximately 0.024 ft/day . Based on these data and the lack of sustainable yield observed in this well, the underlying unit does not meet the definition of an aquifer at this location.

Raw water level data, type-curve matches and well construction details are contained in Appendices C, D and E respectively.

12.0 REFERENCES

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Table 3-1
Well Completion Details
Reno Creek Project

| Well ID | Pump Test Cluster/ Purpose | Screened Interval | NAD 83 UTM Z13N Easting (m) | NAD 83 UTM Z13N Northing (m) | TOC Elev (ft amsl) | Ground Surf Elev (ft amsl) | Casing Material | Casing Nominal ID (in) | Casing Nominal OD (in) | Casing Depth (ft) | Type of Centralizers | Number of Centralizers | Annular Seal Material | Grout Weight (lbs/gal) | Top of Filter Pack (ft) | Top of Screen (ft) | Bottom of Screen (ft) | Ream Bit Diameter (in) | Total Ream Depth (ft) | Screen O.D. (in) | Screen type | Screen Diameter (in) | Screen slot size (in) |
|----------------------|-------------------------------|-------------------------------|-----------------------------------|------------------------------------|-----------------------|----------------------------------|------------------------------|------------------------------|------------------------------|----------------------|----------------------|---------------------------|-----------------------|------------------------------|-------------------------------|--------------------------|--------------------------|------------------------------|-----------------------------|---------------------|------------------|----------------------------|-----------------------------|
| OM1 | PZM1 | Overlying Aquifer | 450,012.64 | 4,835,767.75 | 5,229.94 | 5,227.44 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 190.5 | Stainless Steel | 6 | Cement w/ bentonite | 14.5 | 182 | 191 | 211 | 9 | 211 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM1(Pumping Well) | PZM1 | Production Zone Aquifer | 450,020.53 | 4,835,774.59 | 5,230.87 | 5,228.77 | SDR 17 PVC spline and groove | 5 | 5.563 | 354 | Stainless Steel | 11 | Cement w/ bentonite | 14.4 | 288 | 354 | 384 | 9.875 | 384 | 6.078 | W.O.P PVC | 5 | 0.03 |
| PZM10 | PZM1 | Production Zone Aquifer | 449,950.24 | 4,835,761.90 | 5,228.64 | 5,225.84 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 300 | Stainless Steel | 9 | Cement w/ bentonite | 14.5 | 295 | 300 | 320 | 9 | 320 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM8 | PZM1 | Production Zone Aquifer | 450,025.08 | 4,835,750.34 | 5,227.18 | 5,224.38 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 305 | Stainless Steel | 10 | Cement w/ bentonite | 14.5 | 288 | 305 | 340 | 9 | 340 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM9 | PZM1 | Production Zone Aquifer | 450,033.27 | 4,835,786.67 | 5,230.71 | 5,228.31 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 310 | Stainless Steel | 9 | Cement w/ bentonite | 14.6 | 304 | 310 | 330 | 9 | 330 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| UM1 | PZM1 | Underlying Unit | 450,018.14 | 4,835,759.96 | 5,228.51 | 5,226.01 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 430 | Stainless Steel | 12 | Cement w/ bentonite | 14.4 | 420 | 430 | 450 | 9 | 450 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| SM3 | PZM3 | Shallow Water Table Unit | 448,983.47 | 4,834,242.53 | 5,260.94 | 5,258.24 | SCH 40 PVC belled glue joint | 4 | 4.5 | 50 | Stainless Steel | 3 | Cement w/ bentonite | 14.3 | 44 | 50 | 80 | 8.75 | 80 | 4.5 | Factory Slot PVC | 4 | 0.03 |
| OM3 | PZM3 | Overlying Aquifer | 448,966.40 | 4,834,246.63 | 5,262.27 | 5,259.97 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 150 | Stainless Steel | 6 | Cement w/ bentonite | 14.2 | na | 150 | 170 | 8.75 | 160 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| PZM11 | PZM3 | Production Zone Aquifer | 448,993.33 | 4,834,253.77 | 5,257.53 | 5,255.23 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 365 | Stainless Steel | 10 | Cement w/ bentonite | 14.3 | na | 365 | 385 | 8.75 | 385 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| PZM12 | PZM3 | Production Zone Aquifer | 448,959.27 | 4,834,227.03 | 5,257.94 | 5,255.44 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 370 | Stainless Steel | 11 | Cement w/ bentonite | 14.3 | na | 370 | 390 | 8.75 | 390 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| PZM13 | PZM3 | Production Zone Aquifer | 448,934.25 | 4,834,294.74 | 5,260.51 | 5,258.19 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 357 | Stainless Steel | 10 | Cement w/ bentonite | 14.3 | na | 357 | 377 | 8.75 | 377 | 3.5 | Factory Slot PVC | 3 | 0.02 |
| PZM3 (Pumping Well) | PZM3 | Production Zone Aquifer | 448,977.53 | 4,834,252.22 | 5,261.99 | 5,259.64 | SDR 17 PVC spline and groove | 5 | 5.563 | 372 | Stainless Steel | 11 | Cement w/ bentonite | 14.3 | 285 | 372 | 412 | 9.875 | 415 | 6.025 | W.O.P PVC | 5 | 0.03 |
| UM3R | PZM3 | Underlying Unit | 448,972.61 | 4,834,234.63 | 5,260.88 | 5,258.28 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 459 | Stainless Steel | 13 | Cement w/ bentonite | 14.3 | na | 459 | 479 | 8.75 | 480 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| OAM4D | PZM4 | Over Aquitard (L. Felix) | 446,891.37 | 4,835,418.40 | 5,121.19 | 5,118.29 | SCH 40 PVC belled glue joint | 4 | 4.5 | 201 | Stainless Steel | 6 | Cement w/ bentonite | 13.1 | 198 | 201 | 206 | 8.75 | 208 | 4.5 | Factory Slot PVC | 4 | 0.03 |
| OAM4S | PZM4 | Over Aquitard (U. Felix) | 446,875.72 | 4,835,417.14 | 5,119.30 | 5,117.10 | SCH 40 PVC belled glue joint | 4 | 4.5 | 191 | Stainless Steel | 6 | Cement w/ bentonite | 13.1 | na | 191 | 194 | 8.75 | 196 | 4.5 | Factory Slot PVC | 4 | 0.03 |
| OM4 | PZM4 | Overlying Aquifer | 446,885.57 | 4,835,402.26 | 5,118.72 | 5,116.02 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 157 | Stainless Steel | 5 | Cement w/ bentonite | 14.5 | 151 | 157 | 177 | 9 | 180 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM14 | PZM4 | Production Zone Aquifer | 448,631.93 | 4,836,132.02 | 5,146.36 | 5,143.86 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 327 | Stainless Steel | 9 | Cement w/ bentonite | 14.5 | 319 | 327 | 347 | 9 | 347 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM15 | PZM4 | Production Zone Aquifer | 447,426.65 | 4,835,456.68 | 5,189.17 | 5,186.77 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 420 | Stainless Steel | 12 | Cement w/ bentonite | 14.5 | 403 | 420 | 440 | 9 | 443 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM16 | PZM4 | Production Zone Aquifer | 446,868.00 | 4,835,031.05 | 5,112.56 | 5,109.76 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 295 | Stainless Steel | 9 | Cement w/ bentonite | 14.5 | 277 | 295 | 315 | 9 | 318 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM17 | PZM4 | Production Zone Aquifer | 446,292.35 | 4,834,801.05 | 5,104.46 | 5,101.62 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 296 | Stainless Steel | 9 | Cement w/ bentonite | 14.5 | 289 | 296 | 316 | 9 | 319 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM4 | PZM4 | Upper Production Zone Aquifer | 446,880.12 | 4,835,407.82 | 5,118.83 | 5,116.03 | SDR 17 PVC spline and groove | 5 | 5.563 | 235 | Stainless Steel | 5 | Cement w/ bentonite | 14.3 | na | 235 | 255 | 9.875 | 266 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| PZM4D (Pumping Well) | PZM4 | Lower Production Zone Aquifer | 446,888.05 | 4,835,423.13 | 5,120.47 | 5,118.47 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 311 | Stainless Steel | 9 | Cement w/ bentonite | 14.3 | na | 311 | 371 | 9 | 325 | 3.5 | W.O.P PVC | 3 | 0.03 |
| UM4 | PZM4 | Underlying Unit | 446,885.23 | 4,835,413.09 | 5,120.17 | 5,117.67 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 410 | Stainless Steel | 12 | Cement w/ bentonite | 14.5 | 404 | 410 | 430 | 9 | 434 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| SM5 | PZM5 | Shallow Water Table Unit | 444,508.65 | 4,833,523.55 | 5,115.90 | 5,114.20 | SCH 40 PVC belled glue joint | 4 | 4.5 | 30 | Stainless Steel | 2 | Cement w/ bentonite | 14.2 | 24 | 30 | 50 | 8.75 | 50 | 4.5 | Factory Slot PVC | 4 | 0.03 |
| OM5 | PZM5 | Overlying Aquifer | 444,509.29 | 4,833,511.60 | 5,115.94 | 5,113.34 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 69 | Stainless Steel | 3 | Cement w/ bentonite | 14.5 | 64 | 69 | 84 | 9 | 84 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM18 | PZM5 | Production Zone Aquifer | 444,551.66 | 4,834,153.18 | 5,142.89 | 5,139.99 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 250 | Stainless Steel | 8 | Cement w/ bentonite | 14.5 | 243 | 250 | 270 | 9 | 270 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM19 | PZM5 | Production Zone Aquifer | 444,531.96 | 4,833,837.72 | 5,140.41 | 5,137.51 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 312 | Stainless Steel | 9 | Cement w/ bentonite | 14.4 | 306 | 312 | 332 | 9 | 335 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| PZM20 | PZM5 | Production Zone Aquifer | 444,386.76 | 4,833,621.39 | 5,138.49 | 5,135.69 | SDR 17 PVC spline and groove | 5 | 5.563 | 312 | Stainless Steel | 9 | Cement w/ bentonite | 14.5 | na | 312 | 332 | 9.875 | 312 | 4.5 | Factory Slot PVC | 4 | 0.03 |
| PZM5 (Pumping Well) | PZM5 | Production Zone Aquifer | 444,500.11 | 4,833,519.92 | 5,115.12 | 5,113.22 | SDR 17 PVC spline and groove | 5 | 5.563 | 260 | Stainless Steel | 9 | Cement w/ bentonite | 14.6 | 182 | 260 | 330 | 9.875 | 331 | 5.75 | W.O.P PVC | 5 | 0.03 |
| PZM6 | PZM5 | Production Zone Aquifer | 443,796.94 | 4,833,944.84 | 5,184.59 | 5,181.79 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 335 | Stainless Steel | 9 | Cement w/ bentonite | 14.5 | 329 | 335 | 355 | 9.875 | 359 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| UM5 | PZM5 | Underlying Unit | 444,499.68 | 4,833,529.21 | 5,116.67 | 5,113.67 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 424 | Stainless Steel | 12 | Cement w/ bentonite | 14.4 | 418 | 424 | 444 | 9 | 445 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| OM2 | Baseline Well | Overlying Aquifer | 449,474.19 | 4,834,655.12 | 5,258.68 | 5,256.38 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 201 | Stainless Steel | 7 | Cement w/ bentonite | 14.4 | na | 201 | 221 | 8.75 | 211 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| PZM2 | Baseline Well | Lower Production Zone Aquifer | 449,471.85 | 4,834,673.21 | 5,257.39 | 5,255.19 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 350 | Stainless Steel | 11 | Cement w/ bentonite | 14.4 | na | 350 | 370 | 8.75 | 360 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| UM2 | Baseline Well | Underlying Unit | 449,467.36 | 4,834,656.74 | 5,259.45 | 5,256.95 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 423 | Stainless Steel | 13 | Cement w/ bentonite | 14.3 | na | 423 | 443 | 8.75 | 433 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| SM6 | Baseline Well | Shallow Water Table Unit | 443,806.22 | 4,833,944.88 | 5,183.20 | 5,180.40 | SCH 40 PVC belled glue joint | 4 | 4.5 | 60 | Stainless Steel | 3 | Cement w/ bentonite | 14.3 | 54 | 60 | 80 | 8.75 | 80 | 4.5 | Factory Slot PVC | 4 | 0.03 |
| OM6 | Baseline Well | Overlying Aquifer | 443,799.99 | 4,833,933.40 | 5,185.60 | 5,182.70 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 227 | Stainless Steel | 7 | Cement w/ bentonite | 14.5 | 219 | 227 | 237 | 9 | 238 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| UM6 | Baseline Well | Underlying Unit | 443,796.29 | 4,833,954.10 | 5,183.46 | 5,181.06 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 415 | Stainless Steel | 12 | Cement w/ bentonite | 14.5 | NA | 415 | 435 | 9 | 435 | 4.95 | Factory Slot PVC | 4.5 | 0.03 |
| SM7 | Baseline Well | Shallow Water Table Unit | 445,099.77 | 4,832,403.42 | 5,176.73 | 5,174.23 | SCH 40 PVC belled glue joint | 4 | 4.5 | 55 | Stainless Steel | 3 | Cement w/ bentonite | 14.2 | 50 | 55 | 75 | 8.75 | 78 | 4.5 | Factory Slot PVC | 4 | 0.03 |
| OM7 | Baseline Well | Overlying Aquifer | 445,114.05 | 4,832,384.84 | 5,176.20 | 5,173.50 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 130 | Stainless Steel | 5 | Cement w/ bentonite | 14.5 | na | 130 | 150 | 8.75 | 140 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| PZM7 | Baseline Well | Production Zone Aquifer | 445,114.61 | 4,832,395.37 | 5,176.66 | 5,173.76 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 298 | Stainless Steel | 9 | Cement w/ bentonite | 14.3 | na | 298 | 318 | 8.75 | 309 | 3.5 | Factory Slot PVC | 3 | 0.03 |
| UM7 | Baseline Well | Underlying Unit | 445,114.00 | 4,832,405.15 | 5,176.66 | 5,174.06 | SDR 17 PVC spline and groove | 4.5 | 4.95 | 385 | Stainless Steel | 12 | Cement w/ bentonite | 14.3 | na | 385 | 405 | 8.75 | 405 | 3.5 | Factory Slot PVC | 3 | 0.03 |

Table 7-1. Summary of Pump Test Results

| Average Aquifer Properties for Production Zone Aquifer | | | | | |
|--|------------------------|----------|----------|------------------------|----------|
| | Drawdown | | | Recovery | |
| Test Name | T (ft ² /d) | K (ft/d) | S | T (ft ² /d) | K (ft/d) |
| PZM1 | 560 | 6.0 | 2.90E-03 | 588 | 6.3 |
| PZM3 | 914 | 8.4 | 3.50E-04 | 804 | 7.4 |
| PZM4D | 143 | 1.4 | 5.00E-04 | 126 | 1.3 |
| PZM5 | 27 | 0.6 | 6.50E-05 | 47 | 0.7 |

Average based on all observation wells.

| Aquifer Properties for 10 Single-well Tests | | | |
|---|-------------|------------------------|----------|
| | | Recovery | |
| Well Name | Aquifer | T (ft ² /d) | K (ft/d) |
| SM3 | Water Table | 0.014 | 0.002 |
| SM5 | Water Table | 0.26 | 0.019 |
| OM1 | Overlying | 39 | 1.0 |
| OM3 | Overlying | 0.049 | 0.005 |
| OM4 | Overlying | 262 | 3.2 |
| OM5 | Overlying | 39.1 | 3.3 |
| UM1 | Underlying | 0.1 | 0.01 |
| UM3R | Underlying | 0.074 | 0.005 |
| UM4 | Underlying | 0.22 | 0.013 |
| UM5 | Underlying | 0.44 | 0.024 |

Table 8-1. PZM1 Pump Test Drawdown Summary, Reno Creek Project

| Well Name | Well Type | Monitored Sand | Distance from PW (feet) | Observed Drawdown at Shut-in (feet) |
|------------------|------------------|-------------------------|--------------------------------|--|
| PZM1 | Pumping | Production Zone Aquifer | 0 | 46.8 |
| PZM9 | Observation | Production Zone Aquifer | 58 | 1.4 |
| PZM8 | Observation | Production Zone Aquifer | 81 | 1.6 |
| PZM10 | Observation | Production Zone Aquifer | 235 | 0.5 |
| OM1 | Observation | Overlying Aquifer | 34 | No Response |
| UM1 | Observation | Underlying Unit | 48 | No Response |

Notes:

Drawdown is calculated from BP corrected water level data.

**Table 8-2. PZM1 Pump Test Analytical Results Summary,
Reno Creek Project**

| Well Name | Well Type | Distance from PW (feet) | Theis Drawdown, Jacob Corrected | | | Theis Recovery | |
|------------------|-----------|----------------------------|---------------------------------|------------|----------------|------------------------|------------|
| | | | T (ft ² /d) | K (ft/d) | S | T (ft ² /d) | K (ft/d) |
| PZM1 | Pump | 0 | -- | -- | -- | 389 | 4.1 |
| PZM9 | Obs. | 58 | 427 | 4.5 | 5.0E-03 | 469 | 5.0 |
| PZM8 | Obs. | 81 | 559 | 5.9 | 6.0E-04 | 586 | 6.2 |
| PZM10 | Obs. | 235 | 694 | 7.4 | 3.2E-03 | 710 | 7.6 |
| Averages: | | | 560 | 6.0 | 2.9E-03 | 588 | 6.3 |

Notes:

Hydraulic conductivity (K) based on 94 ft saturated PZM aquifer thickness.

Drawdown data from PZM1 could not be analyzed.

Jacob correction ($s' = s - s^2/2B$; s = drawdown, B = saturated thickness, s' = corrected drawdown) for partially saturated conditions applied to Theis drawdown data.

Theis recovery analysis conducted assuming saturated conditions. Late-time data were evaluated for recovery.

Single-well Testing

| Well Name | Aquifer/Unit | Saturated Thickness (feet) | Theis Recovery | |
|-----------|--------------|-------------------------------|------------------------|----------|
| | | | T (ft ² /d) | K (ft/d) |
| OM1 | Overlying | 38 | 39 | 1.0 |
| UM1 | Underlying | 17 | 0.10 | 0.01 |

**Table 8-3. Vertical Gradients at PZM1 Well Cluster,
Reno Creek Project**

| Well Cluster | Well ID | Date / Time | Aquifer/Unit | Depth to Water (ft btoc) | TOC Elev (ft amsl) | GW Elev (ft amsl) | Screen Top Elev (ft amsl) | Screen Midpoint Elev (ft amsl) | Screen Bottom Elev (ft amsl) | Head Differential, Adjacent Units (ft) | Vertical Gradient* (ft/ft) |
|--------------|---------|-----------------|--------------|-----------------------------|-----------------------|----------------------|---------------------------------|---|------------------------------------|---|----------------------------------|
| PZM1 | OM1 | 12/6/2010 16:30 | Overlying | 179.30 | 5,229.94 | 5,050.64 | 5,039.44 | 5,029.44 | 5,019.44 | -- | -- |
| PZM1 | PZM1 | 12/6/2010 16:30 | PZA | 288.79 | 5,230.87 | 4,942.08 | 4,876.87 | 4,861.87 | 4,846.87 | -108.56 | -0.65 |
| PZM1 | UM1 | 12/6/2010 16:30 | Underlying | 297.52 | 5,228.51 | 4,930.99 | 4,798.51 | 4,788.51 | 4,778.51 | -11.09 | -0.15 |

Notes:

ft btoc - feet below top of casing

ft amsl - feet above mean sea level

* Negative values indicate a downward hydraulic gradient (head decreases with depth). Gradient calculated with respect to screen midpoint elevation for respective aquifers.

Table 9-1. PZM3 Pump Test Drawdown Summary, Reno Creek Project

| Well Name | Well Type | Monitored Sand | Distance from PW (feet) | Observed Drawdown at Shut-in (feet) |
|------------------|------------------|-------------------------|--------------------------------|--|
| PZM3 | Pumping | Production Zone Aquifer | 0 | 32.1 |
| PZM11 | Observation | Production Zone Aquifer | 52 | 3.1 |
| PZM12 | Observation | Production Zone Aquifer | 102 | 1.5 |
| PZM13 | Observation | Production Zone Aquifer | 199 | 0.7 |
| SM3 | Observation | SM Unit | 37 | No Response |
| OM3 | Observation | Overlying Aquifer | 41 | No Response |
| UM3R | Observation | Underlying Unit | 60 | No Response |

Notes:

Drawdown is calculated from BP corrected water level data.

**Table 9-2. PZM3 Pump Test Analytical Results Summary,
Reno Creek Project**

| Well Name | Well Type | Distance from PW (feet) | Theis Drawdown, Jacob Corrected | | | Cooper Jacob Drawdown, Jacob Corrected | | | Theis Recovery | |
|------------------|-----------|----------------------------|------------------------------------|------------|----------------|---|------------|----------------|------------------------|------------|
| | | | T (ft ² /d) | K (ft/d) | S | T (ft ² /d) | K (ft/d) | S | T (ft ² /d) | K (ft/d) |
| PZM3 | Pump | 0 | -- | -- | -- | -- | -- | -- | 588 | 5.4 |
| PZM11 | Obs. | 52 | 587 | 5.4 | 1.0E-05 | 535 | 4.9 | 2.7E-05 | 748 | 6.9 |
| PZM12 | Obs. | 102 | 830 | 7.6 | 2.0E-04 | 841 | 7.7 | 1.9E-04 | 748 | 6.9 |
| PZM13 | Obs. | 199 | 1327 | 12.2 | 8.3E-04 | 1428 | 13.1 | 6.2E-04 | 1131 | 10.4 |
| Averages: | | | 914 | 8.4 | 3.5E-04 | 934 | 8.6 | 2.8E-04 | 804 | 7.4 |

Notes:

109 ft saturated PZM aquifer thickness.

Drawdown data from PZM3 could not be analyzed.

Jacob correction for partially saturated conditions applied to Theis drawdown data.

Theis recovery analysis conducted assuming confined conditions. Late-time data were evaluated for recovery.

Single-well Testing

| Well Name | Aquifer/Unit | Saturated Thickness (feet) | Theis Recovery | |
|-----------|--------------|-------------------------------|------------------------|----------|
| | | | T (ft ² /d) | K (ft/d) |
| SM3 | Water Table | 9 | 0.014 | 0.002 |
| OM3 | Overlying | 10 | 0.049 | 0.005 |
| UM3R | Underlying | 14 | 0.074 | 0.005 |

**Table 9-3. Vertical Gradients at PZM3 Well Cluster,
Reno Creek Project**

| Well Cluster | Well ID | Date / Time | Aquifer/Unit | Depth to Water (ft btoc) | TOC Elev (ft amsl) | GW Elev (ft amsl) | Screen Top Elev (ft amsl) | Screen Midpoint Elev (ft amsl) | Screen Bottom Elev (ft amsl) | Head Differential, Adjacent Units (ft) | Vertical Gradient* (ft/ft) |
|--------------|---------|-----------------|--------------|-----------------------------|-----------------------|----------------------|---------------------------------|---|------------------------------------|---|----------------------------------|
| PZM3 | SM3 | 8/21/2012 10:42 | SM Unit | 71.66 | 5,260.94 | 5,189.28 | 5,210.94 | 5,180.94 | 5,180.94 | -- | -- |
| PZM3 | OM3 | 8/21/2012 10:38 | Overlying | 135.87 | 5,262.27 | 5,126.40 | 5,112.27 | 5,102.27 | 5,092.27 | -62.88 | -0.67 |
| PZM3 | PZM3 | 8/21/2012 10:54 | PZA | 301.54 | 5,261.99 | 4,960.24 | 4,889.99 | 4,869.99 | 4,849.99 | -165.45 | -0.71 |
| PZM3 | UM3R | 8/21/2012 10:32 | Underlying | 318.92 | 5,260.88 | 4,941.96 | 4,801.88 | 4,791.88 | 4,781.88 | -18.49 | -0.24 |

Notes:

ft btoc - feet below top of casing

ft amsl - feet above mean sea level

* Negative values indicate a downward hydraulic gradient (head decreases with depth). Gradient calculated with respect to screen midpoint elevation for respective aquifers.

Table 10-1. PZM4D Pump Test Drawdown Summary, Reno Creek Project

| Well Name | Well Type | Monitored Zone | Distance from PW (feet) | Observed Drawdown at Shut-in (feet) |
|------------------|------------------|-------------------------------|--------------------------------|--|
| PZM4D | Pumping | Lower Production Zone Aquifer | 0 | 119.2 |
| PZM16 | Observation | Lower Production Zone Aquifer | 1,288 | 1.2 |
| PZM15 | Observation | Lower Production Zone Aquifer | 1,771 | 4.5 |
| PZM17 | Observation | Production Zone Aquifer | 2,827 | 0.3 |
| PZM14 | Observation | Production Zone Aquifer | 6,178 | No Response |
| PZM4 | Observation | Upper Production Zone Aquifer | 57 | 0.6 |
| OAM4S | Observation | Upper Felix Coal | 45 | No Response |
| OAM4D | Observation | Lower Felix Coal | 19 | No Response |
| OM4 | Observation | Overlying Aquifer | 69 | No Response |
| UM4 | Observation | Underlying Unit | 34 | No Response |

Notes:

Drawdown is calculated from BP corrected water level data.

Table 10-2. PZM4D Pump Test Analytical Results Summary, Reno Creek Project

| Well Name | Well Type | Distance from PW (feet) | Theis Drawdown | | | Theis Recovery | |
|------------------|-----------|----------------------------|------------------------|------------|----------------|------------------------|------------|
| | | | T (ft ² /d) | K (ft/d) | S | T (ft ² /d) | K (ft/d) |
| PZM4D | Pump | 0 | -- | -- | -- | 31 | 0.3 |
| PZM16 | Obs. | 1288 | 229 | 2.3 | 8.7E-04 | 286 | 2.9 |
| PZM15 | Obs. | 1771 | 57 | 0.6 | 1.3E-04 | 63 | 0.6 |
| PZM17 | Obs. | 2827 | -- | -- | -- | -- | -- |
| Averages: | | | 143 | 1.4 | 5.0E-04 | 126 | 1.3 |

Notes:

98.75 ft saturated PZM aquifer thickness.

Drawdown data from PZM4 could not be analyzed.

Drawdown analysis performed on data from 0 - 8,375 minutes prior to pump problems.

Unable to perform analysis of PZM17 with any level of certainty.

Theis recovery analyses are based on an average test rate of 14.1 gpm which includes pump problems.

Single-well Testing

| Well Name | Aquifer/Unit | Saturated Thickness (feet) | Theis Recovery | |
|-----------|--------------|-------------------------------|------------------------|----------|
| | | | T (ft ² /d) | K (ft/d) |
| OM4 | Overlying | 82 | 262 | 3.2 |
| UM4 | Underlying | 17 | 0.22 | 0.013 |

**Table 10-3. Vertical Gradients at PZM4 Well Cluster,
Reno Creek Project**

| Well Cluster | Well ID | Date / Time | Aquifer/Unit | Depth to Water (ft btoc) | TOC Elev (ft amsl) | GW Elev (ft amsl) | Screen Top Elev (ft amsl) | Screen Midpoint Elev (ft amsl) | Screen Bottom Elev (ft amsl) | Head Differential, Adjacent Units (ft) | Vertical Gradient* (ft/ft) |
|--------------|---------|---------------|--------------|-----------------------------|-----------------------|----------------------|---------------------------------|---|------------------------------------|---|----------------------------------|
| PZM4 | OM4 | 8/9/2011 9:30 | Overlying | 94.24 | 5,118.72 | 5,024.48 | 4,961.72 | 4,951.72 | 4,941.72 | -- | -- |
| PZM4 | PZM4 | 8/9/2011 9:30 | UPZA | 146.90 | 5,118.83 | 4,971.93 | 4,883.83 | 4,873.83 | 4,863.83 | -52.55 | -0.67 |
| PZM4 | PZM4D | 8/9/2011 9:30 | LPZA | 152.61 | 5,120.47 | 4,967.86 | 4,809.47 | 4,779.47 | 4,749.47 | -4.07 | -0.04 |
| PZM4 | UM4 | 8/9/2011 9:30 | Underlying | 155.98 | 5,120.17 | 4,964.19 | 4,710.17 | 4,700.17 | 4,690.17 | -3.67 | -0.05 |

Notes:

ft btoc - feet below top of casing

ft amsl - feet above mean sea level

* Negative values indicate a downward hydraulic gradient (head decreases with depth). Gradient calculated with respect to screen midpoint elevation for respective aquifers.

**Table 11-1. PZM5 Pump Test Drawdown Summary
Reno Creek Project**

| Well Name | Well Type | Monitored Sand | Distance from PW (feet) | Observed Drawdown at Shut-in (feet) |
|------------------|------------------|-------------------------|------------------------------------|--|
| PZM5 | Pumping | Production Zone Aquifer | 0 | 102.1 |
| PZM20 | Observation | Production Zone Aquifer | 499 | 11.7 |
| PZM19 | Observation | Production Zone Aquifer | 1,048 | 4.3 |
| PZM18 | Observation | Production Zone Aquifer | 2,085 | 0.8 |
| PZM6 | Observation | Production Zone Aquifer | 2,696 | 0.9 |
| BLM ANCVS | Observation | Production Zone Aquifer | 4,026 | 0.2 |
| SM5 | Observation | SM unit | 30 | No Response |
| OM5 | Observation | Overlying Aquifer | 41 | No Response |
| UM5 | Observation | Underlying Unit | 31 | No Response |

Notes:

Drawdown is calculated from BP corrected water level data.

**Table 11-2. PZM5 Pump Test Analytical Results Summary
Reno Creek Project**

| Well Name | Well Type | Distance from PW (feet) | Completed Thickness | Drawdown, Leaky (Hantush-Jacob) | | | Drawdown (Cooper-Jacob) | | | Theis Recovery | |
|------------------|-----------|----------------------------|------------------------|------------------------------------|------------|----------------|----------------------------|------------|----------------|------------------------|------------|
| | | | | T (ft ² /d) | K (ft/d) | S | T (ft ² /d) | K (ft/d) | S | T (ft ² /d) | K (ft/d) |
| PZM5 | Pump | 0 | 132 | -- | -- | -- | -- | -- | -- | 61.8 | 0.5 |
| PZM20 | Obs. | 499 | 47 | 20.2 | 0.4 | 7.9E-05 | 26.7 | 0.6 | 6.5E-05 | 31.0 | 0.7 |
| PZM19 | Obs. | 1048 | 56 | 26.0 | 0.5 | 1.1E-04 | Not Valid | Not Valid | Not Valid | 47.0 | 0.8 |
| Averages: | | | | 23 | 0.4 | 9.4E-05 | 27 | 0.6 | 6.5E-05 | NA | 0.7 |

Notes:

Pumping rate for PZM5 well is 10 gpm; 7 gpm flow apportioned for wells PZM20 and PZM19, which are completed in lower sand of PZM. Pumping well completed across Cooper-Jacob requirement for $u < 0.05$ not met at well PZM19, therefore solution not valid.

Hydraulic conductivity values based on completed sand thickness.

Single-well Testing

| Well Name | Aquifer/Unit | Saturated Thickness (feet) | Theis Recovery | |
|-----------|--------------|----------------------------------|------------------------|----------|
| | | | T (ft ² /d) | K (ft/d) |
| SM5 | Water Table | 14 | 0.26 | 0.019 |
| OM5 | Overlying | 12 | 39.1 | 3.3 |
| UM5 | Underlying | 18 | 0.44 | 0.024 |

**Table 11-3. Vertical Gradients at PZM5 Well Cluster,
Reno Creek Project**

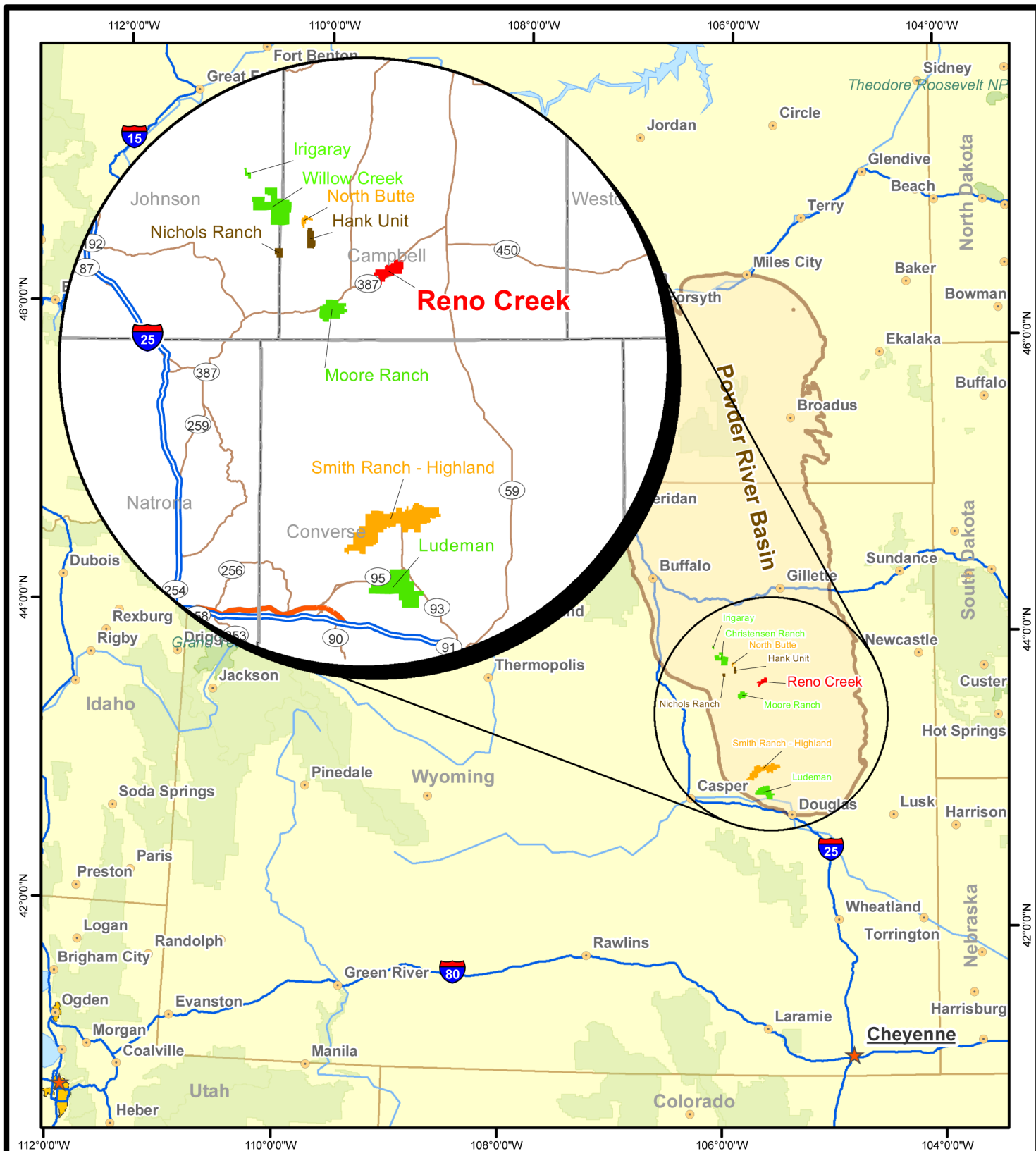
| Well Cluster | Well ID | Date / Time | Aquifer/Unit | Depth to Water (ft btoc) | TOC Elev (ft amsl) | GW Elev (ft amsl) | Screen Top Elev (ft amsl) | Screen Midpoint Elev (ft amsl) | Screen Bottom Elev (ft amsl) | Head Differential, Adjacent Units (ft) | Vertical Gradient* (ft/ft) |
|--------------|---------|----------------|--------------|-----------------------------|-----------------------|----------------------|---------------------------------|---|------------------------------------|---|----------------------------------|
| PZM5 | SM5 | 2/16/2011 9:30 | SM Unit | 36.13 | 5,115.90 | 5,079.77 | 5,085.90 | 5,075.90 | 5,065.90 | -- | -- |
| PZM5 | OM5 | 2/16/2011 9:30 | Overlying | 38.89 | 5,115.94 | 5,077.05 | 5,046.94 | 5,039.44 | 5,031.94 | -2.72 | -0.07 |
| PZM5 | PZM5 | 2/16/2011 9:30 | PZA | 128.68 | 5,115.12 | 4,986.44 | 4,853.22 | 4,818.22 | 4,783.22 | -90.61 | -0.41 |
| PZM5 | UM5 | 2/16/2011 9:30 | Underlying | 165.85 | 5,116.67 | 4,950.82 | 4,692.67 | 4,682.67 | 4,672.67 | -35.62 | -0.26 |
| | | | | | | | | | | | |

Notes:

ft btoc - feet below top of casing

ft amsl - feet above mean sea level

* Negative values indicate a downward hydraulic gradient (head decreases with depth). Gradient calculated with respect to screen midpoint elevation for respective aquifers.



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Figure 1-1
Reno Creek Project
Location Map

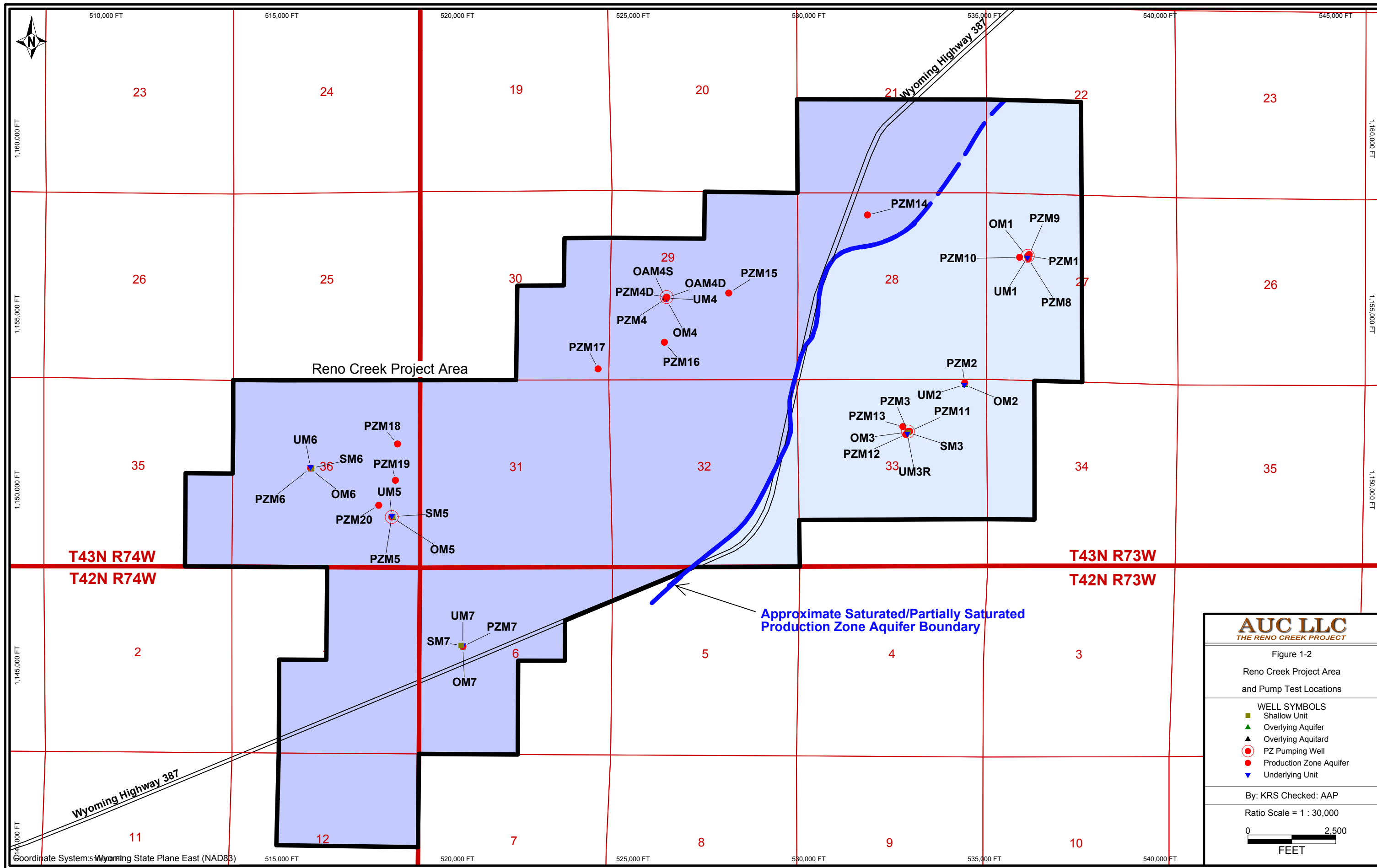
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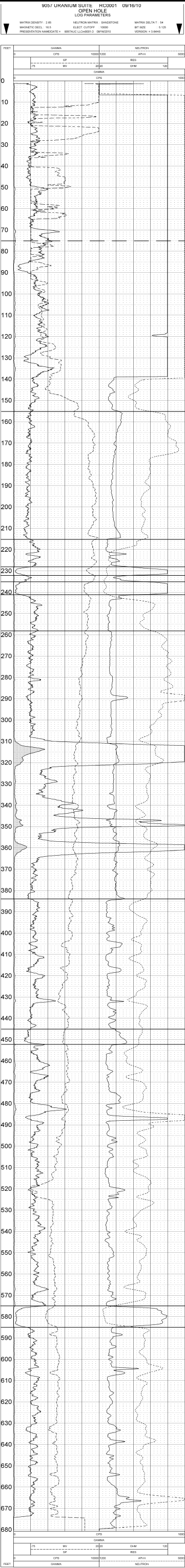
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Projection: Wyoming State Plane East, NAD83 (feet)

0 25 50 75 100 Miles



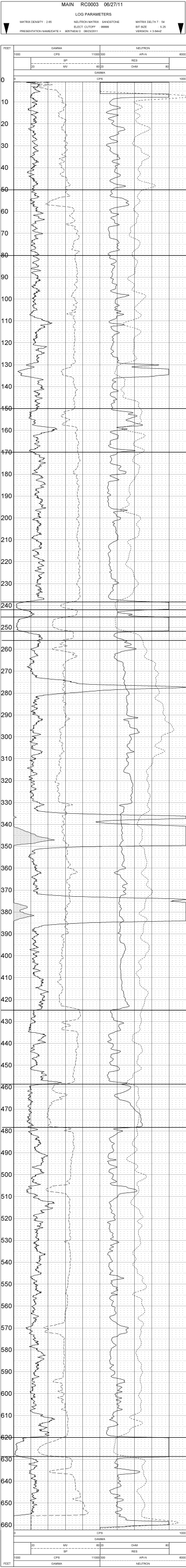


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Figure 2-1
Typical Geophysical Log
RC0001 (East, PZM1 Cluster)

| | | |
|----------------------|---------------------|--------------|
| Scale: See Log Scale | Date: November 2011 | |
| PTRpt_Fig_02-01.ai | By: KRS | Checked: AAP |

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Figure 2-2
Typical Geophysical Log
RC0003 (Southeast, PZM3 Cluster)

Scale: See Log Scale

Date: January 2012

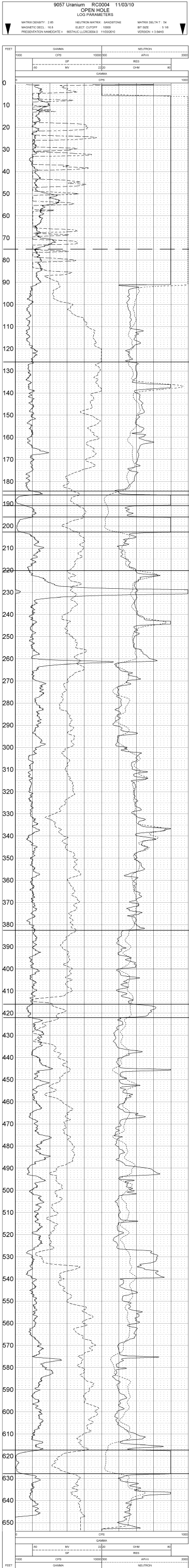
PTRpt_Fig_02-02.ai

By: KRS

Checked: AAP

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Figure 2-3
Typical Geophysical Log
RC0004 (Central, PZM4D Cluster)

Scale: See Log Scale

Date: January 2012

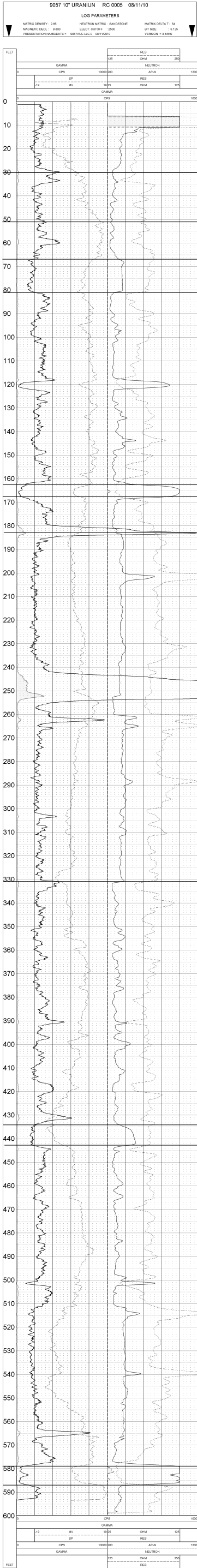
PTRpt_Fig_02-03.ai

By: KRS

Checked: AAP

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SM Unit (SM wells)

Overlying Aquifer (OM wells)

Overlying Aquitard

Lower Felix Coal

Production Zone Aquifer (PZM wells)

Underlying Aquitard

UM Unit (UM wells)

Badger Coal

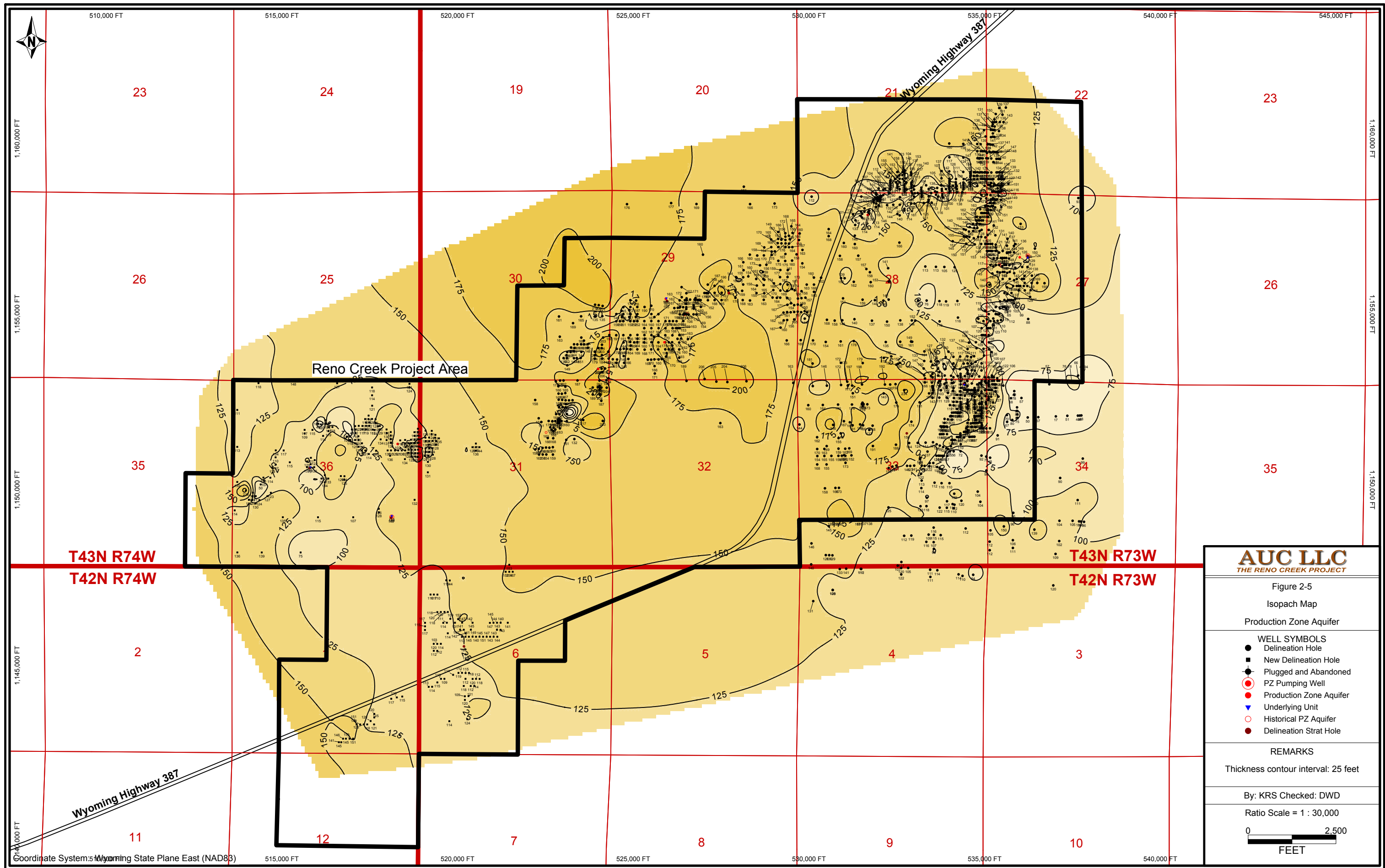
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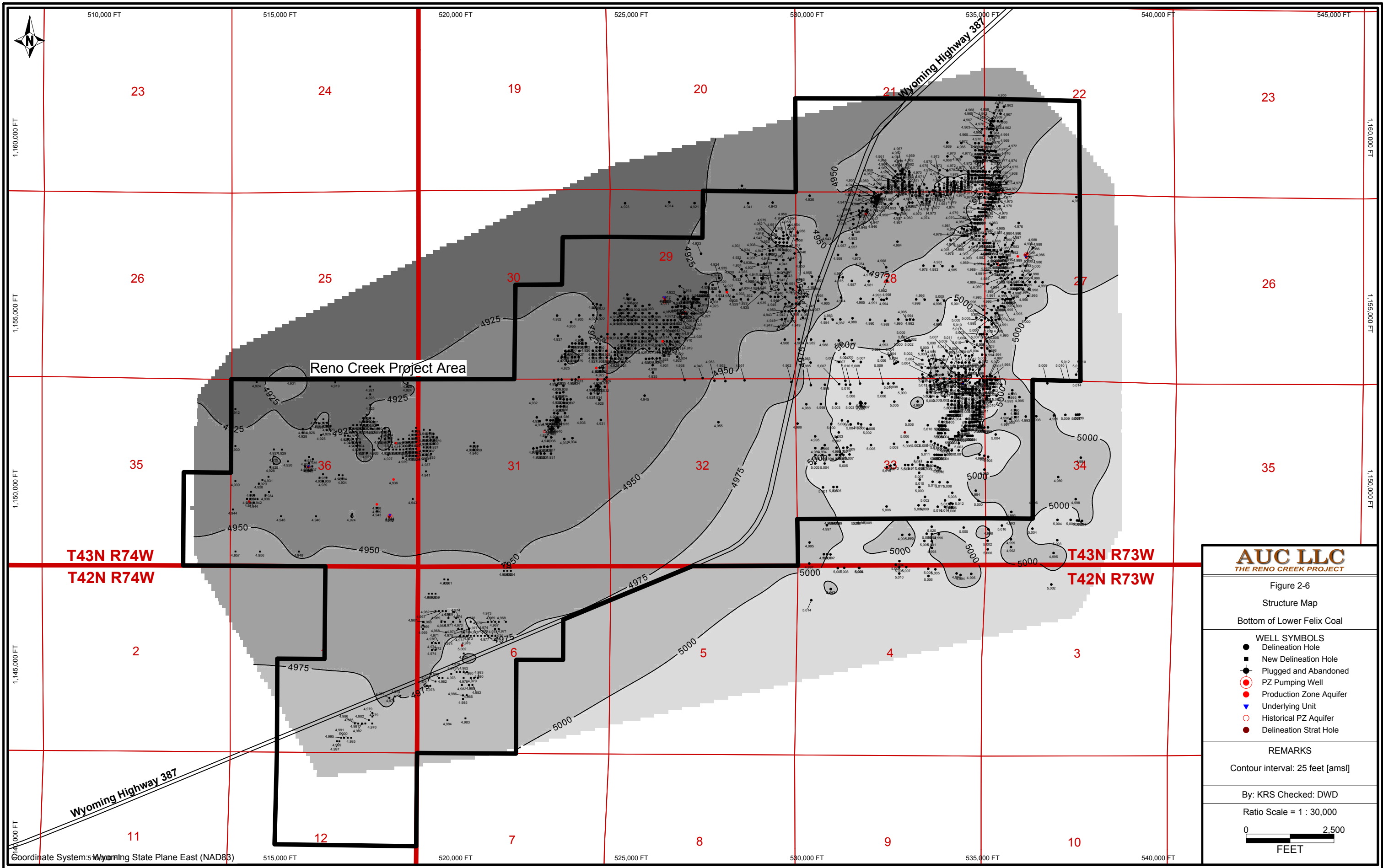
Figure 2-4
Typical Geophysical Log
RC0005 (West, PZM5 Cluster)

| | | |
|----------------------|--------------------|--------------|
| Scale: See Log Scale | Date: January 2012 | |
| PTRpt_Fig_02-04.ai | By: KRS | Checked: AAP |

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Figure 2-6
Structure Map
Bottom of Lower Felix Coal

WELL SYMBOLS

- Delineation Hole
- New Delineation Hole
- ⬮ Plugged and Abandoned
- PZ Pumping Well
- Production Zone Aquifer
- ▼ Underlying Unit
- ◊ Historical PZ Aquifer
- Delineation Strat Hole

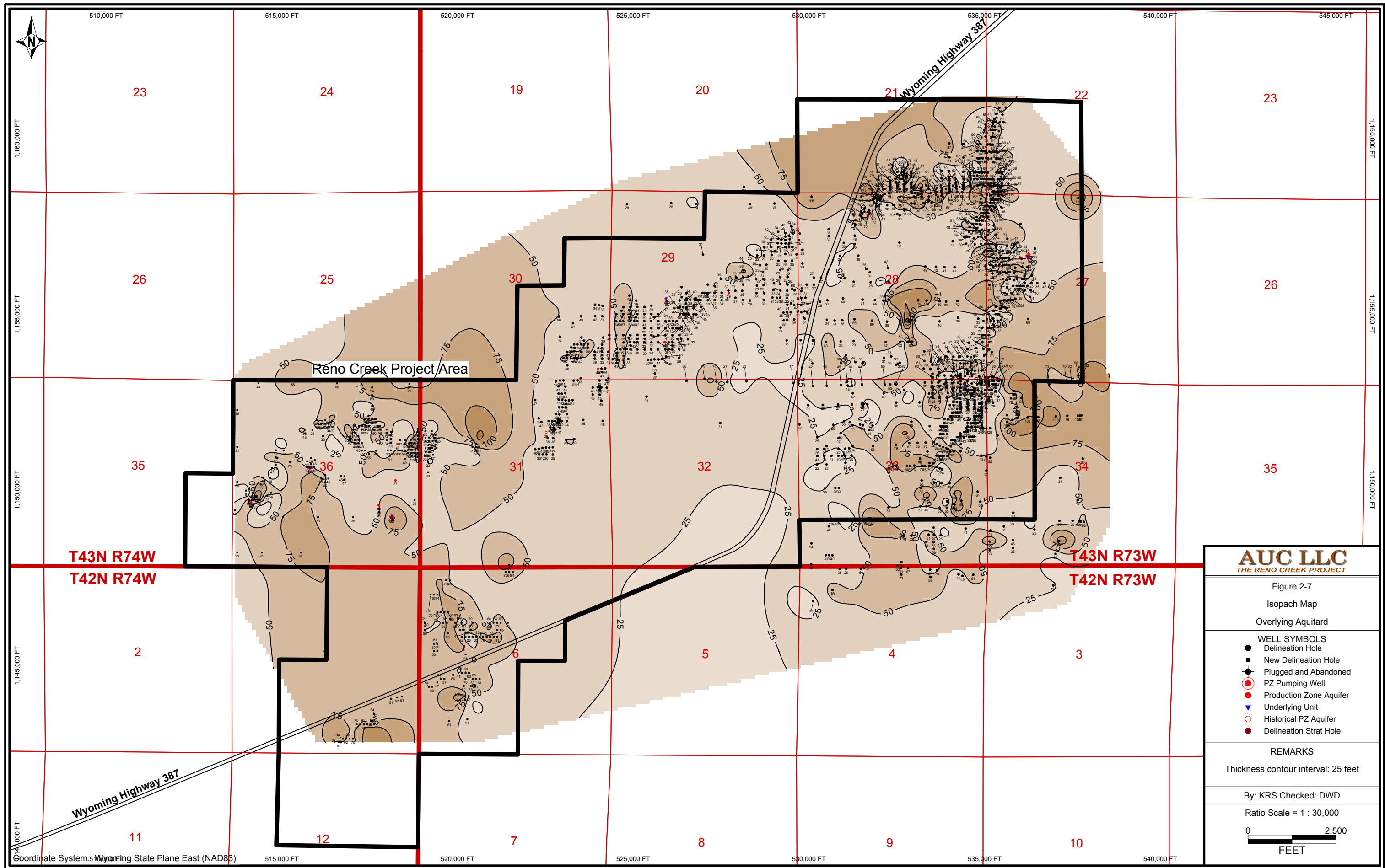
REMARKS
Contour interval: 25 feet [amsl]

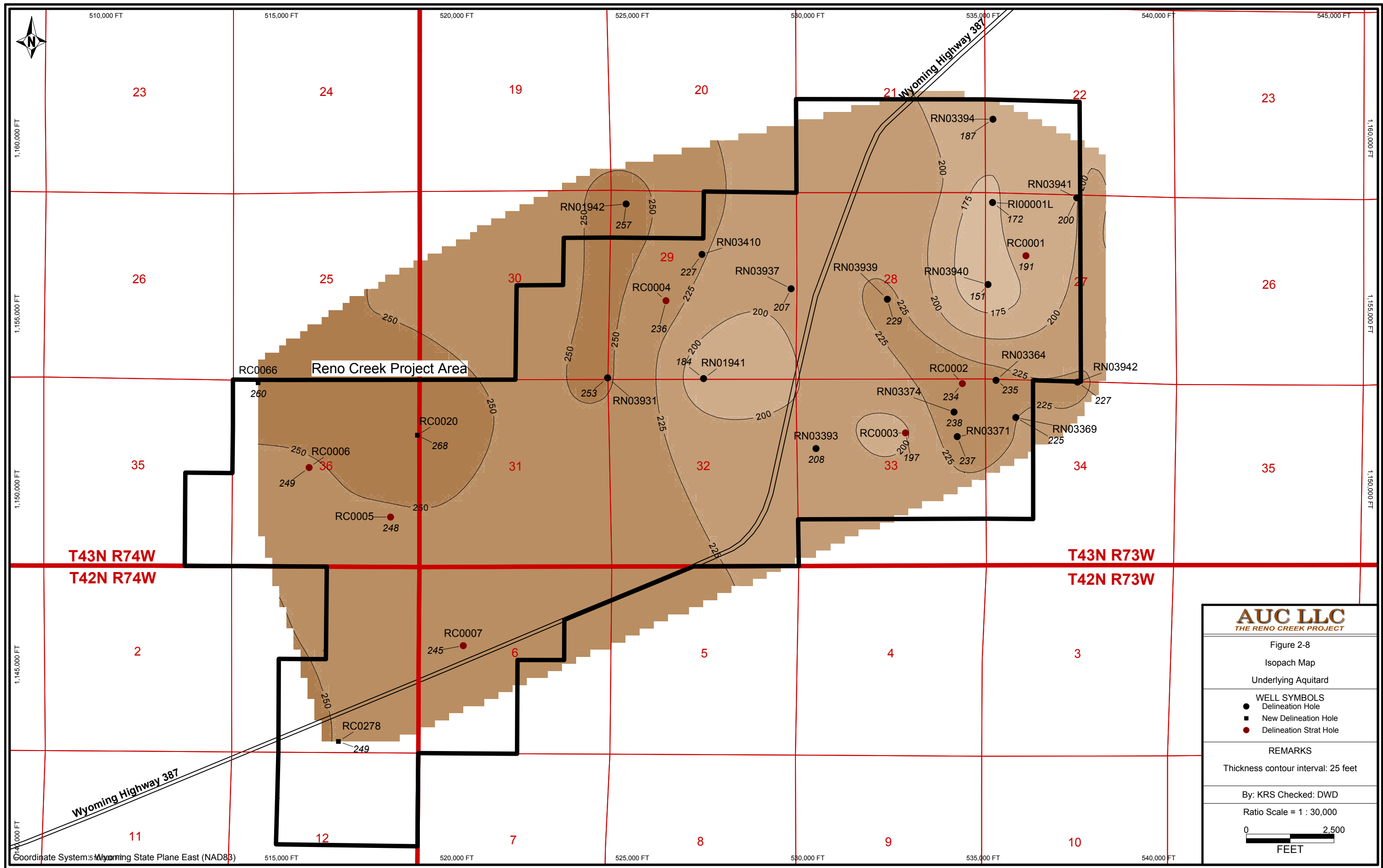
By: KRS Checked: DWD

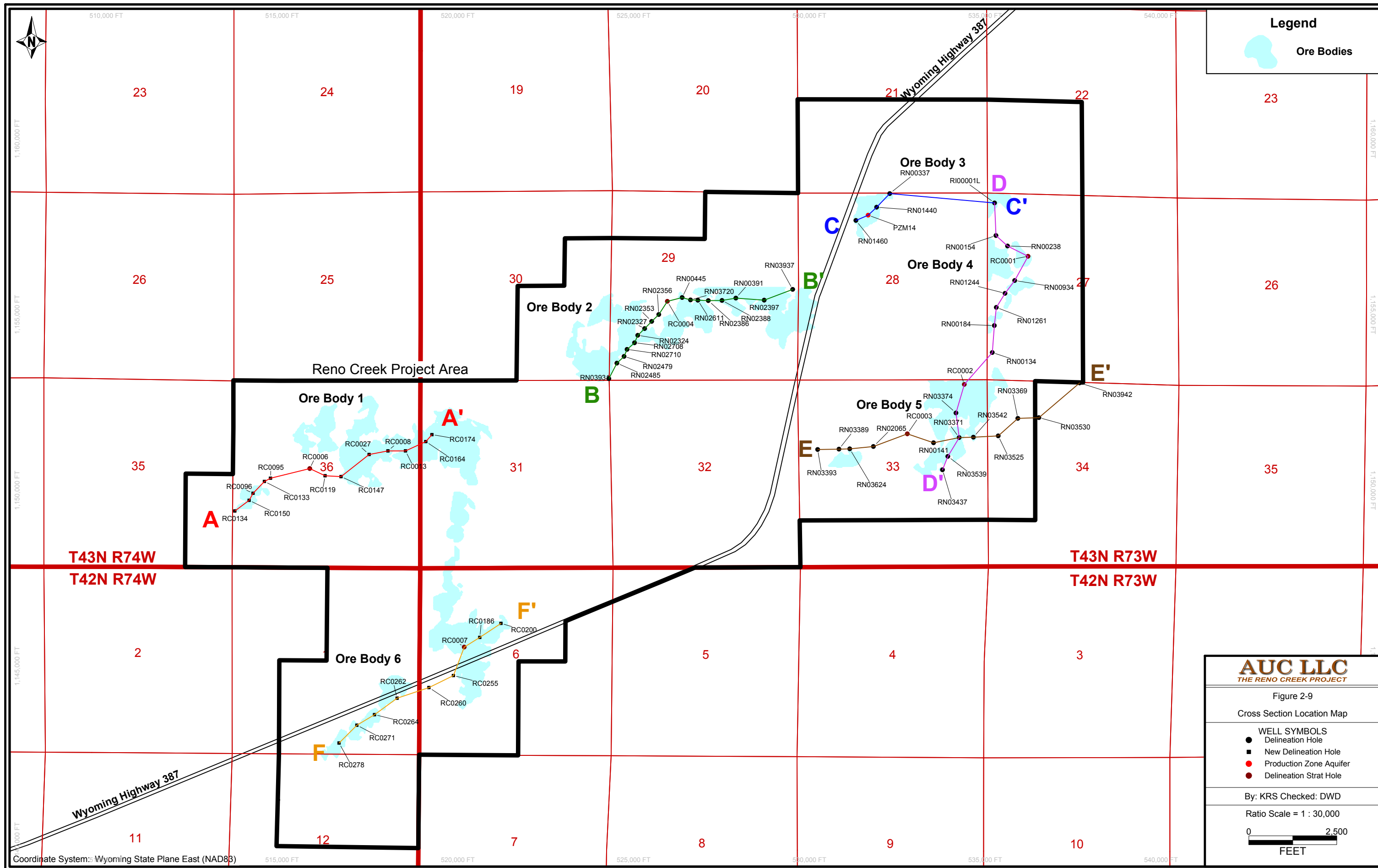
Ratio Scale = 1 : 30,000

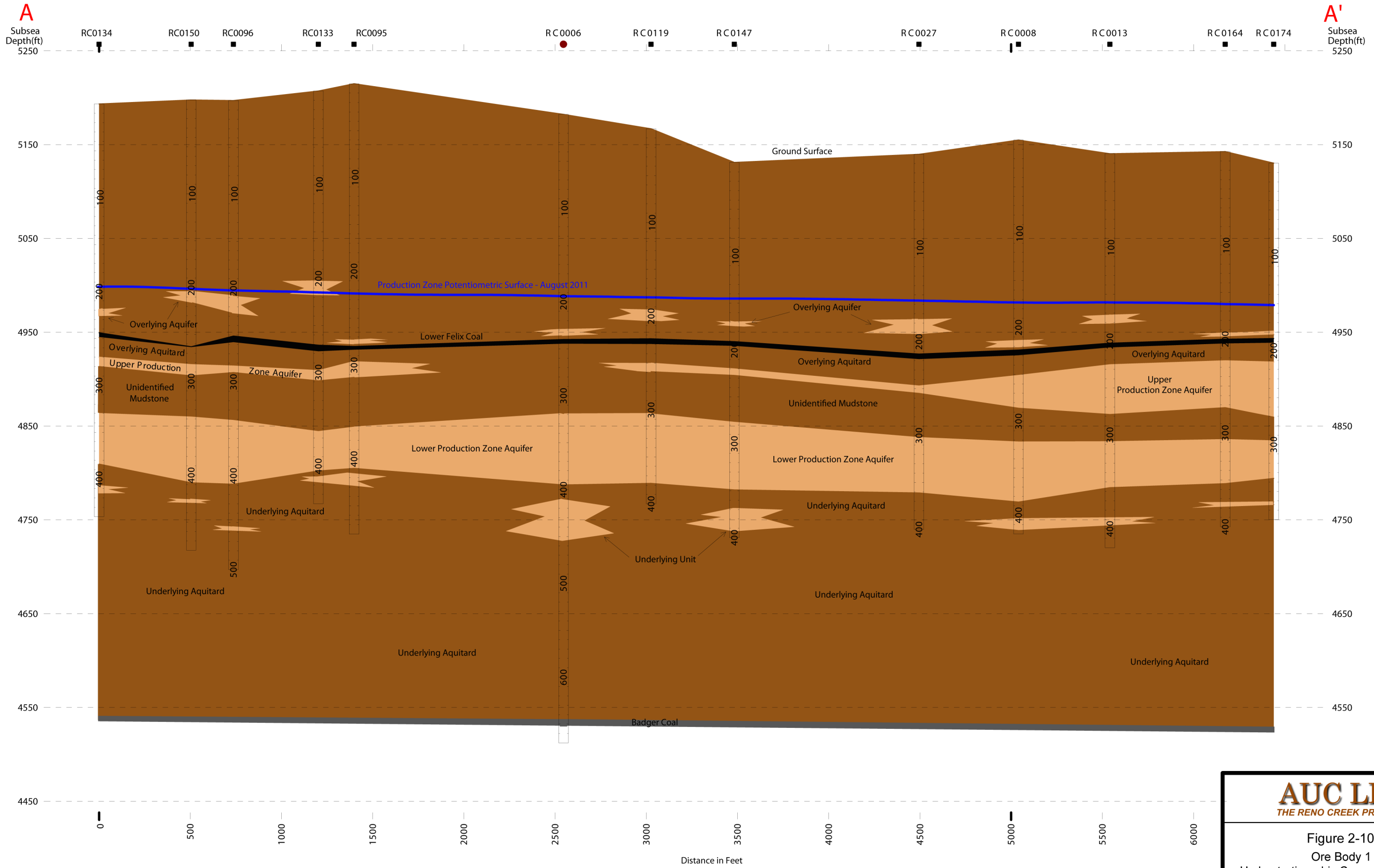
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FEET









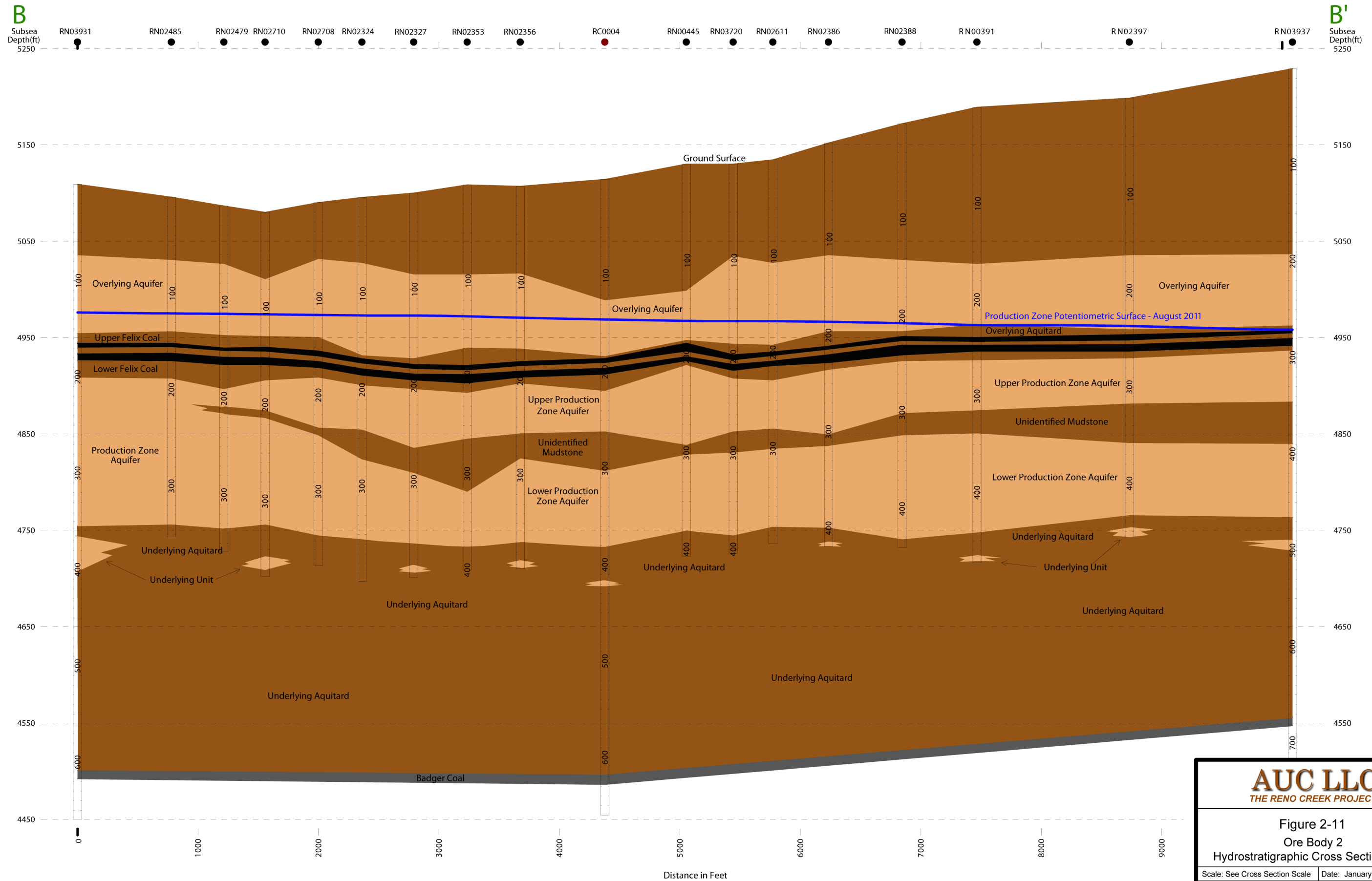
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Figure 2-10
Ore Body 1
Hydrostratigraphic Cross Section A -A'

| | | |
|--------------------------------|--------------------|--------------|
| Scale: See Cross Section Scale | Date: January 2012 | |
| PTRpt_Fig_02-10.ai | By: KRS | Checked: AAP |

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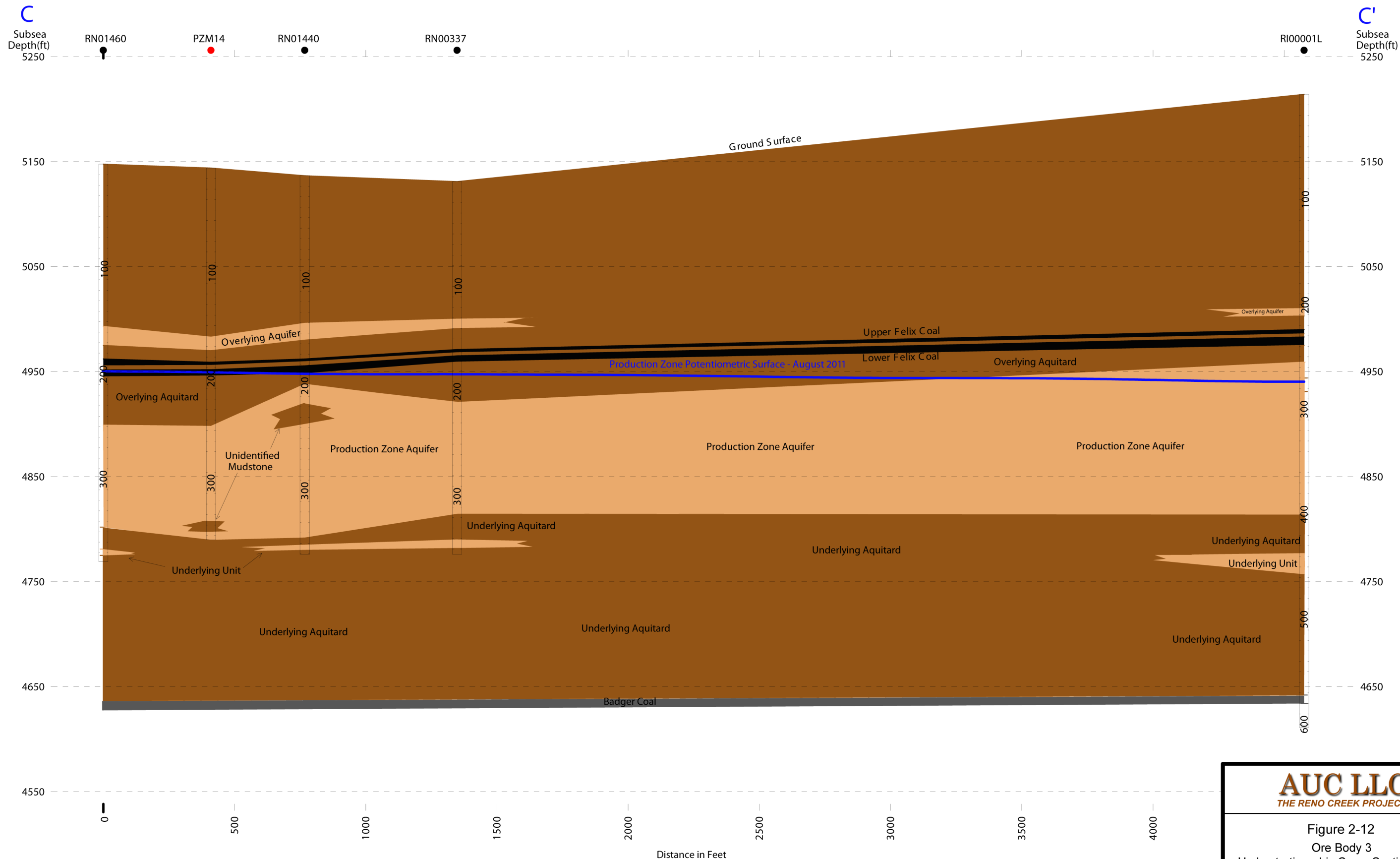


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Figure 2-11
Ore Body 2
Hydrostratigraphic Cross Section B -B'

| | | |
|--------------------------------|--------------------|--------------|
| Scale: See Cross Section Scale | Date: January 2012 | |
| PTRpt_Fig_02-11.ai | By: KRS | Checked: AAP |

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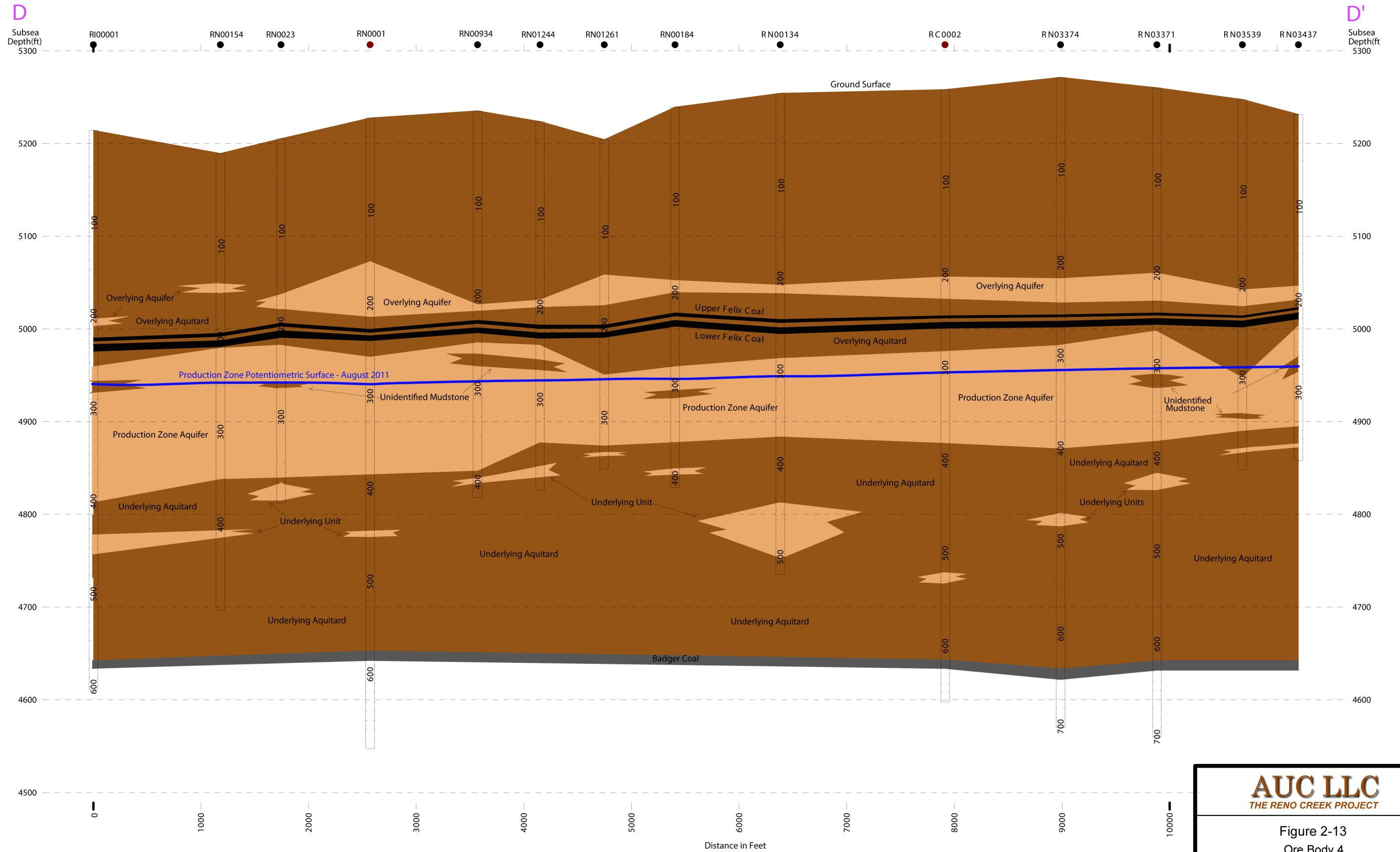
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Figure 2-12
Ore Body 3
Hydrostratigraphic Cross Section C - C'

| | | |
|--------------------------------|--------------------|--------------|
| Scale: See Cross Section Scale | Date: January 2012 | |
| PTRpt_Fig_02-12.ai | By: KRS | Checked: AAP |

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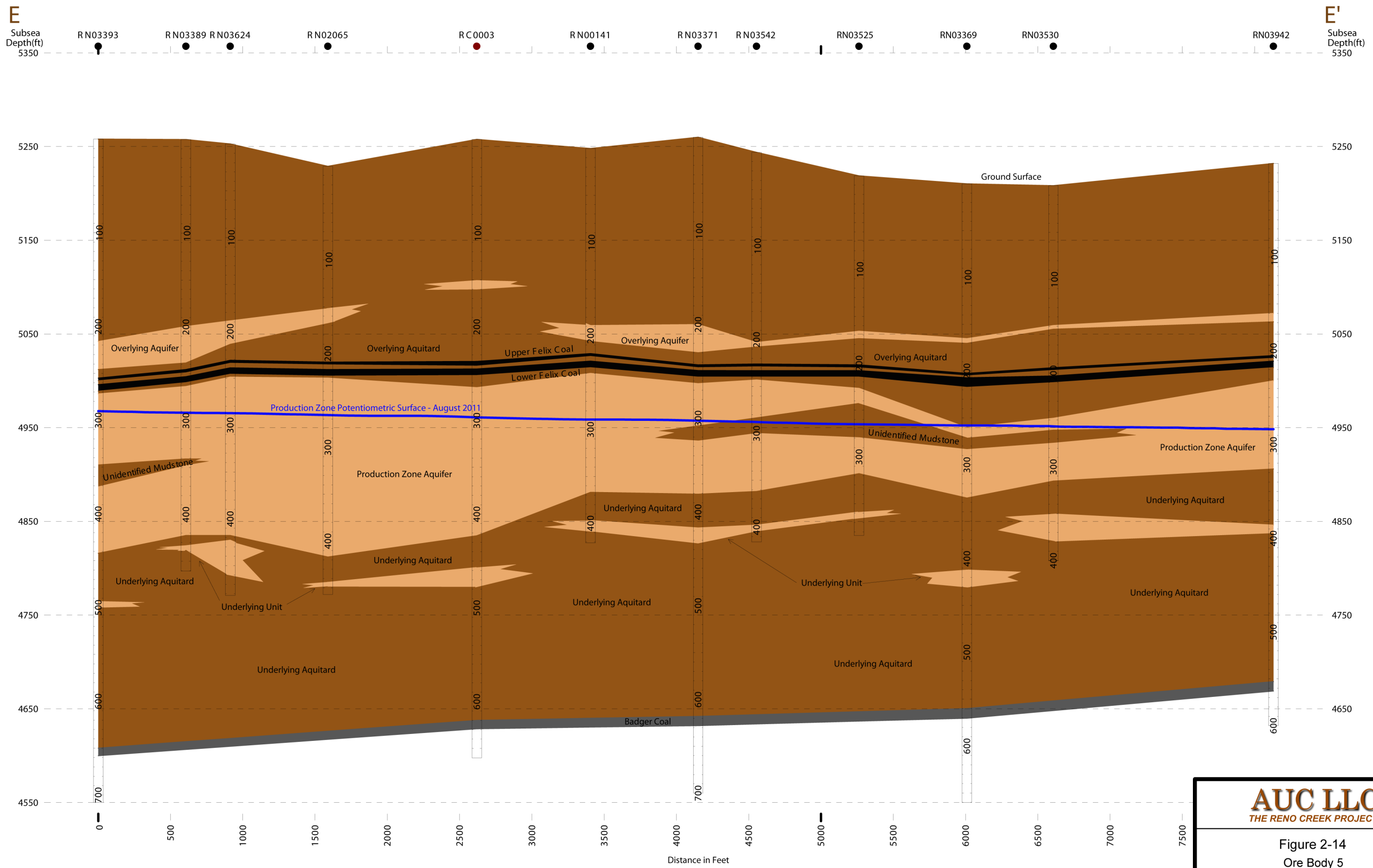


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Figure 2-13
Ore Body 4
Hydrostratigraphic Cross Section D - D'

| | | |
|--------------------------------|--------------------|--------------|
| Scale: See Cross Section Scale | Date: January 2012 | |
| PTRpt_Fig_02-13.ai | By: KRS | Checked: AAP |

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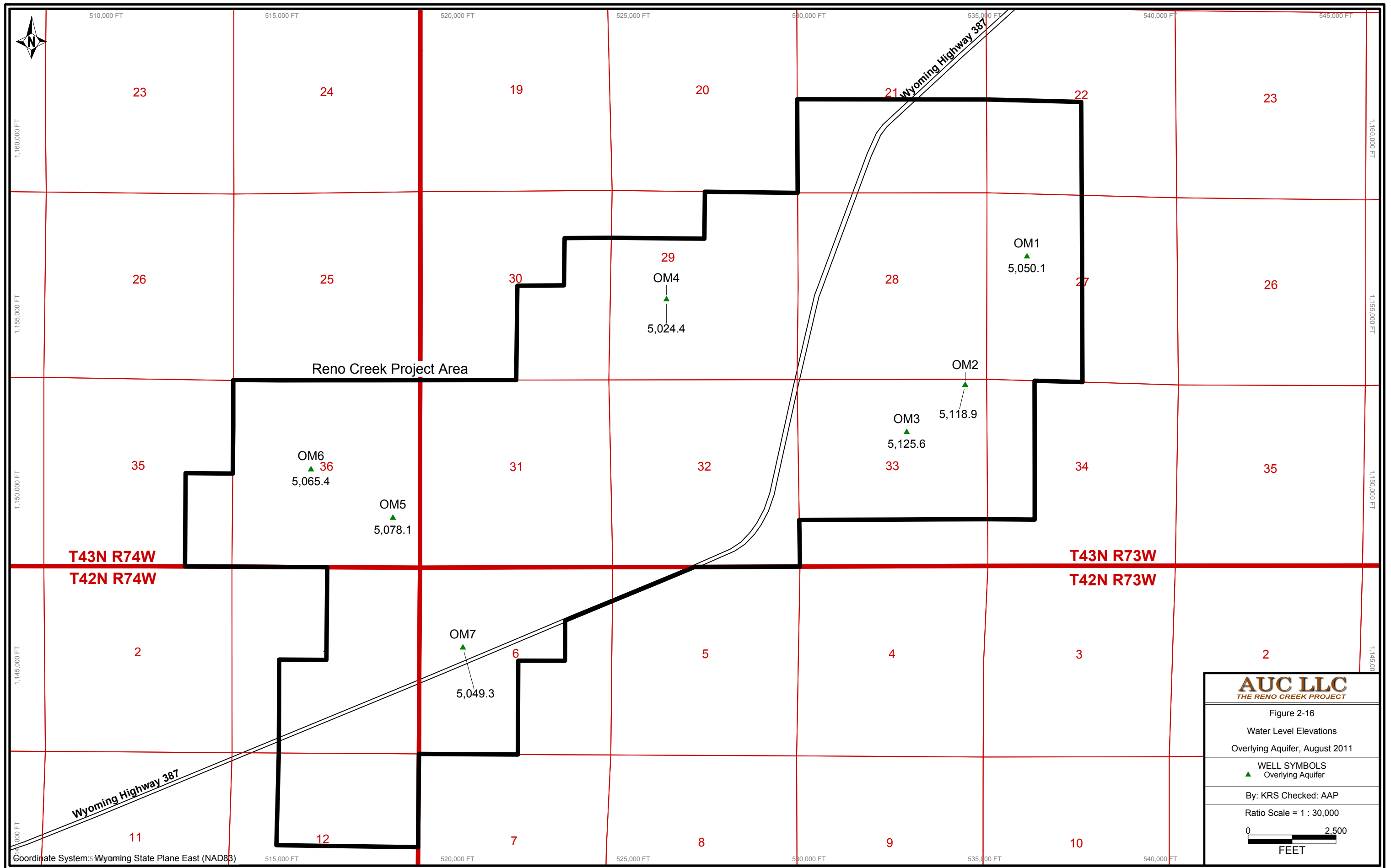
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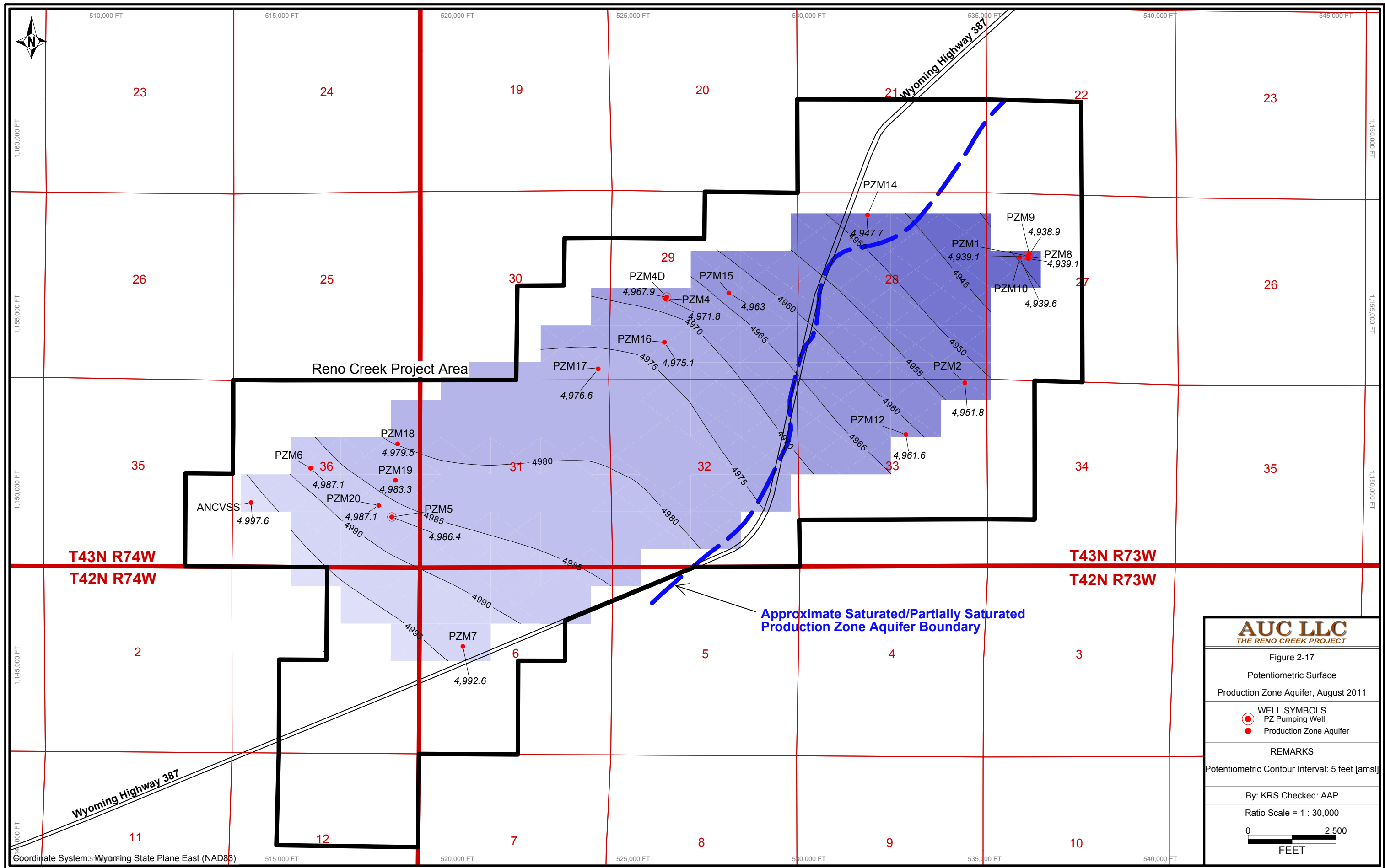
Figure 2-14
Ore Body 5
Hydrostratigraphic Cross Section E - E'

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|--------------------------------|--------------------|--------------|
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| PTRpt_Fig_02-14.ai | By: KRS | Checked: AAP |

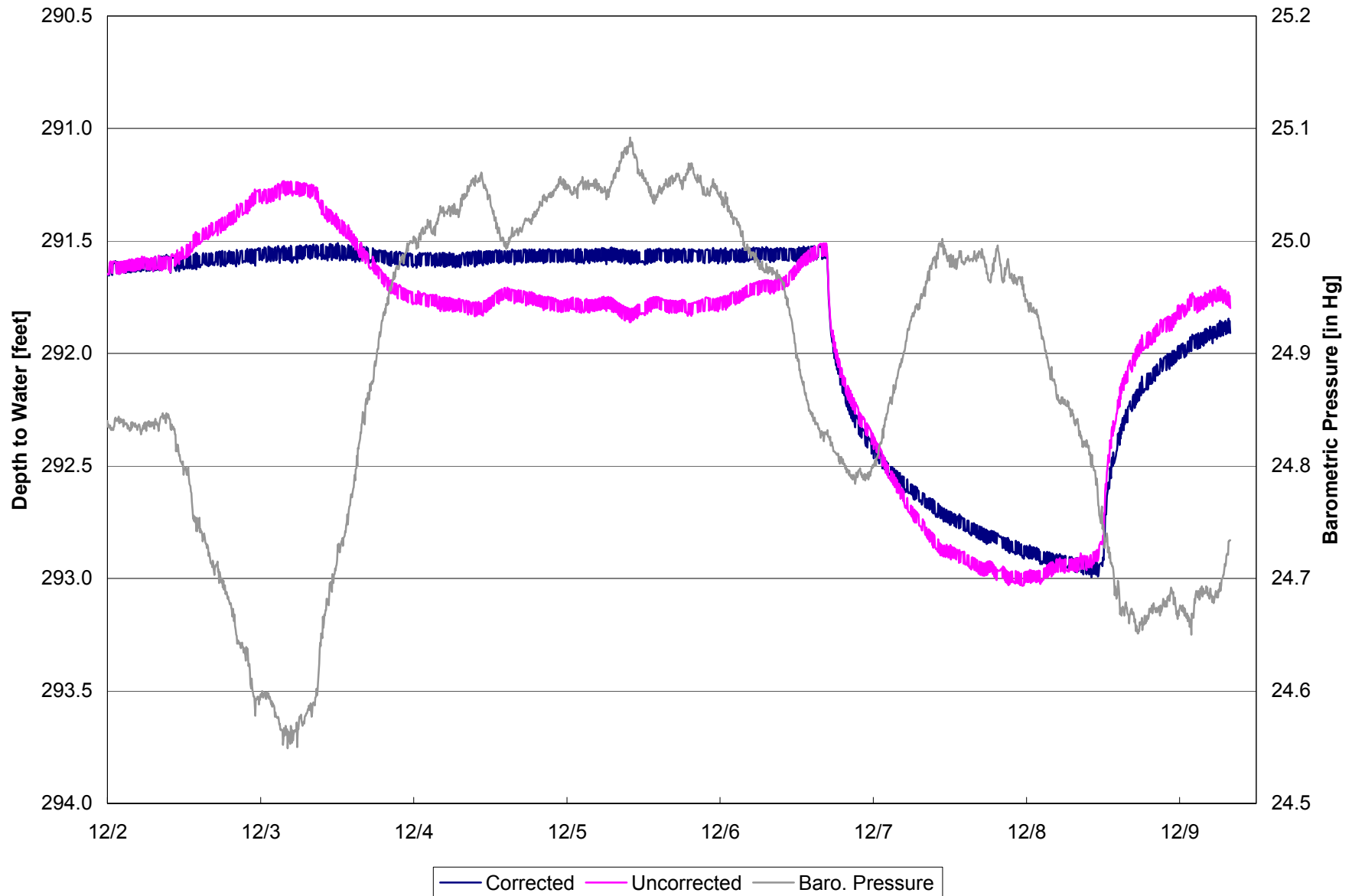
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**Figure 5-1. Example of Barometrically Corrected Water Levels
PZM-1 Pump Test, Reno Creek Project**



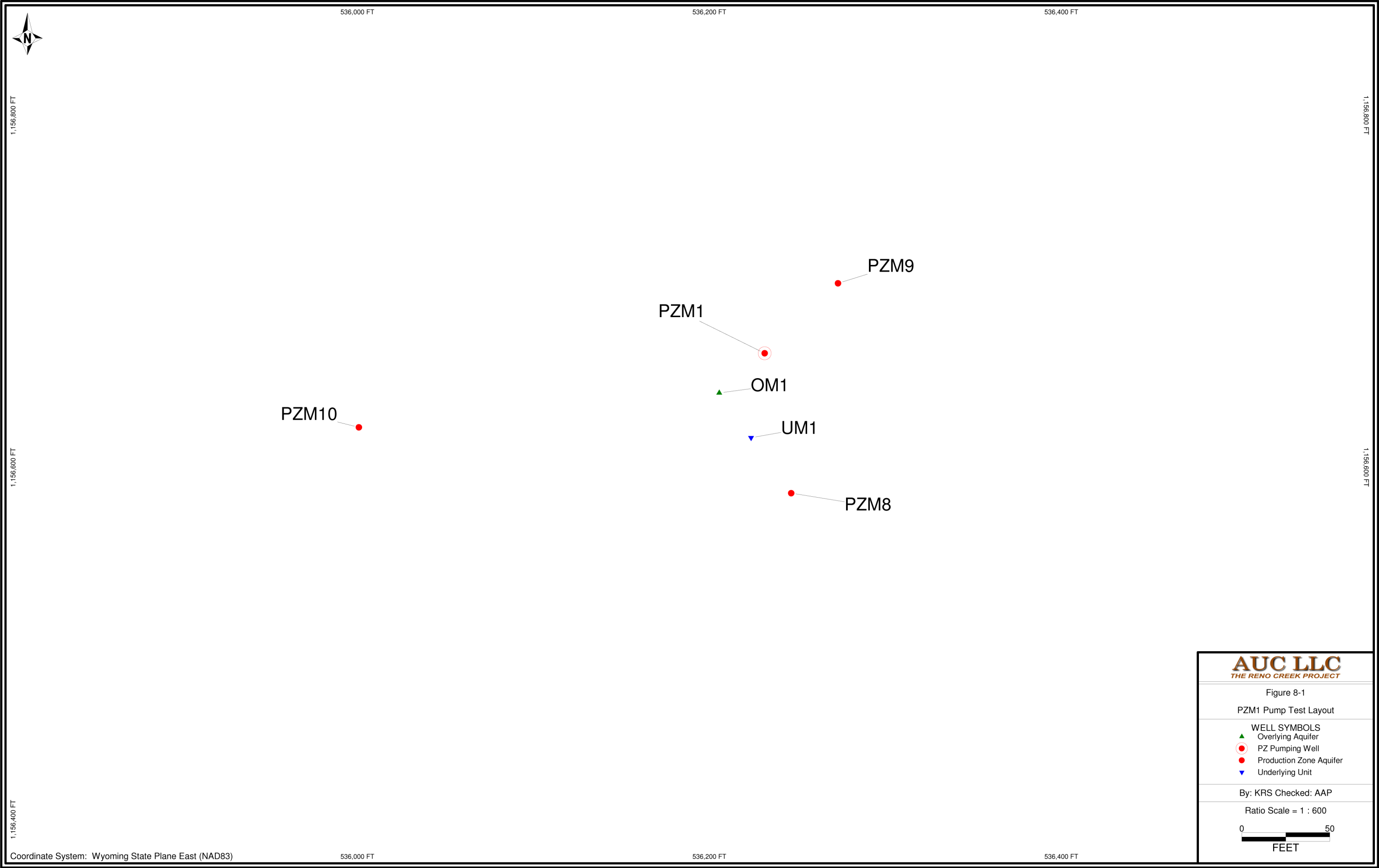
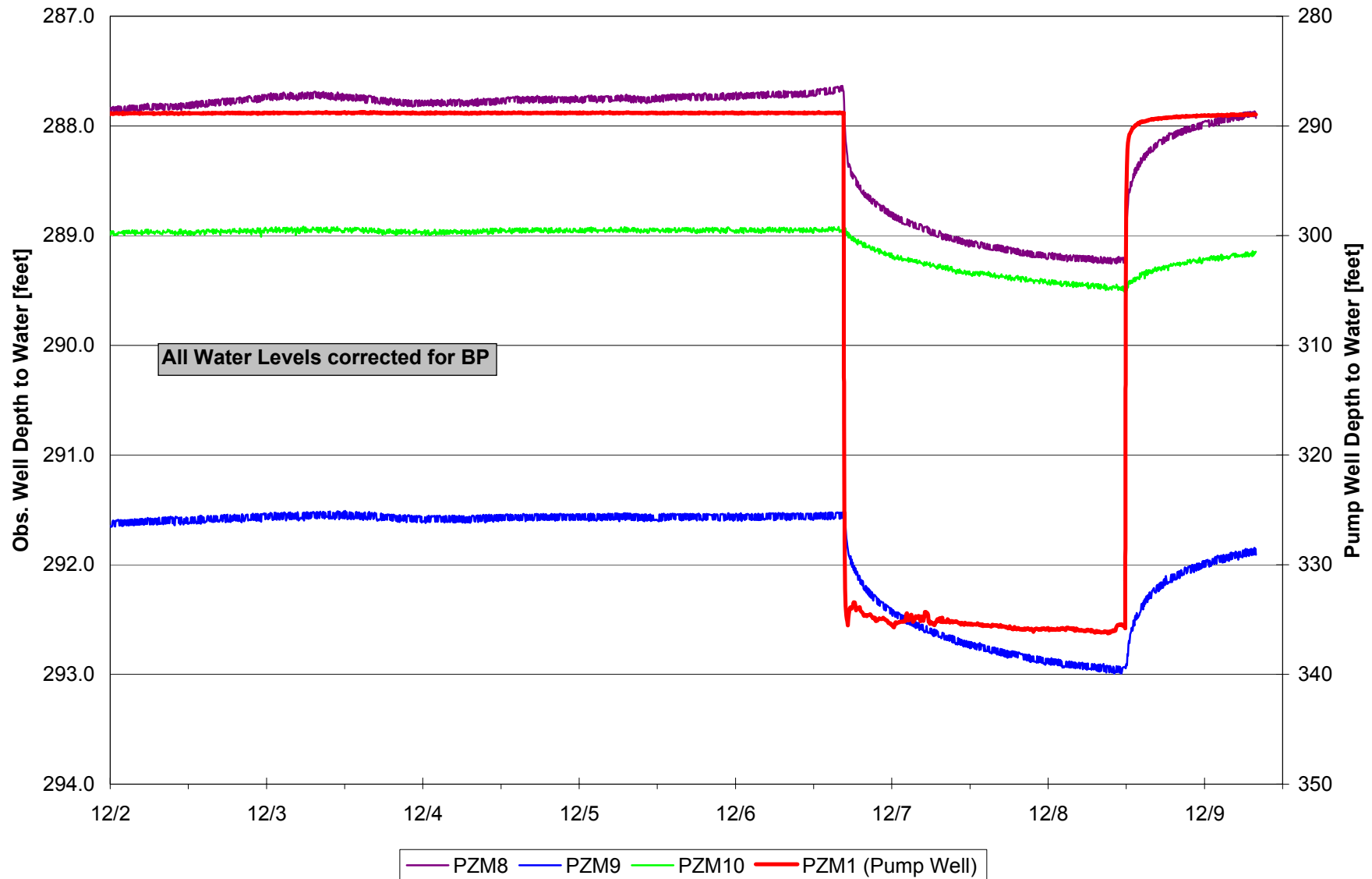
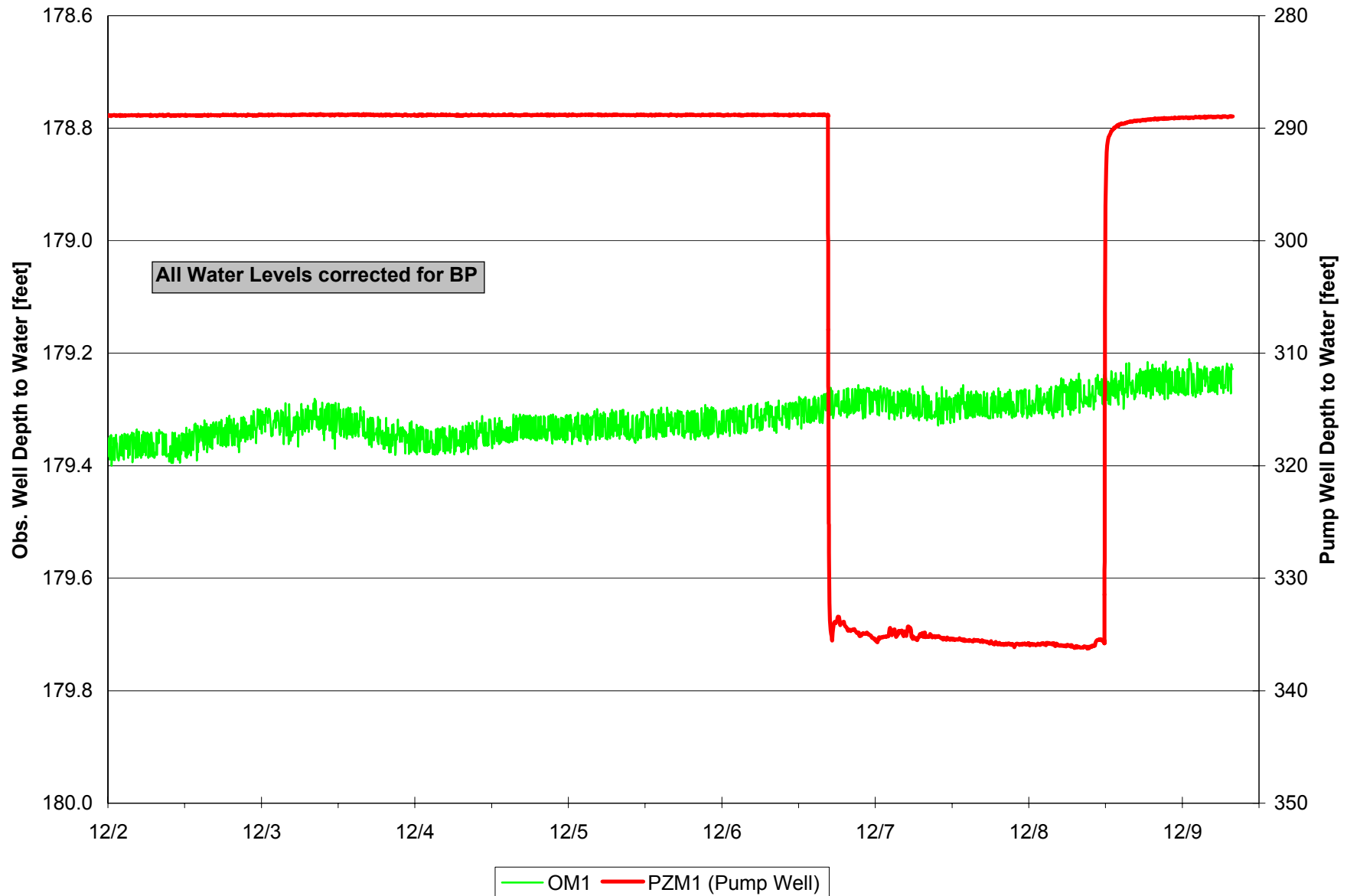


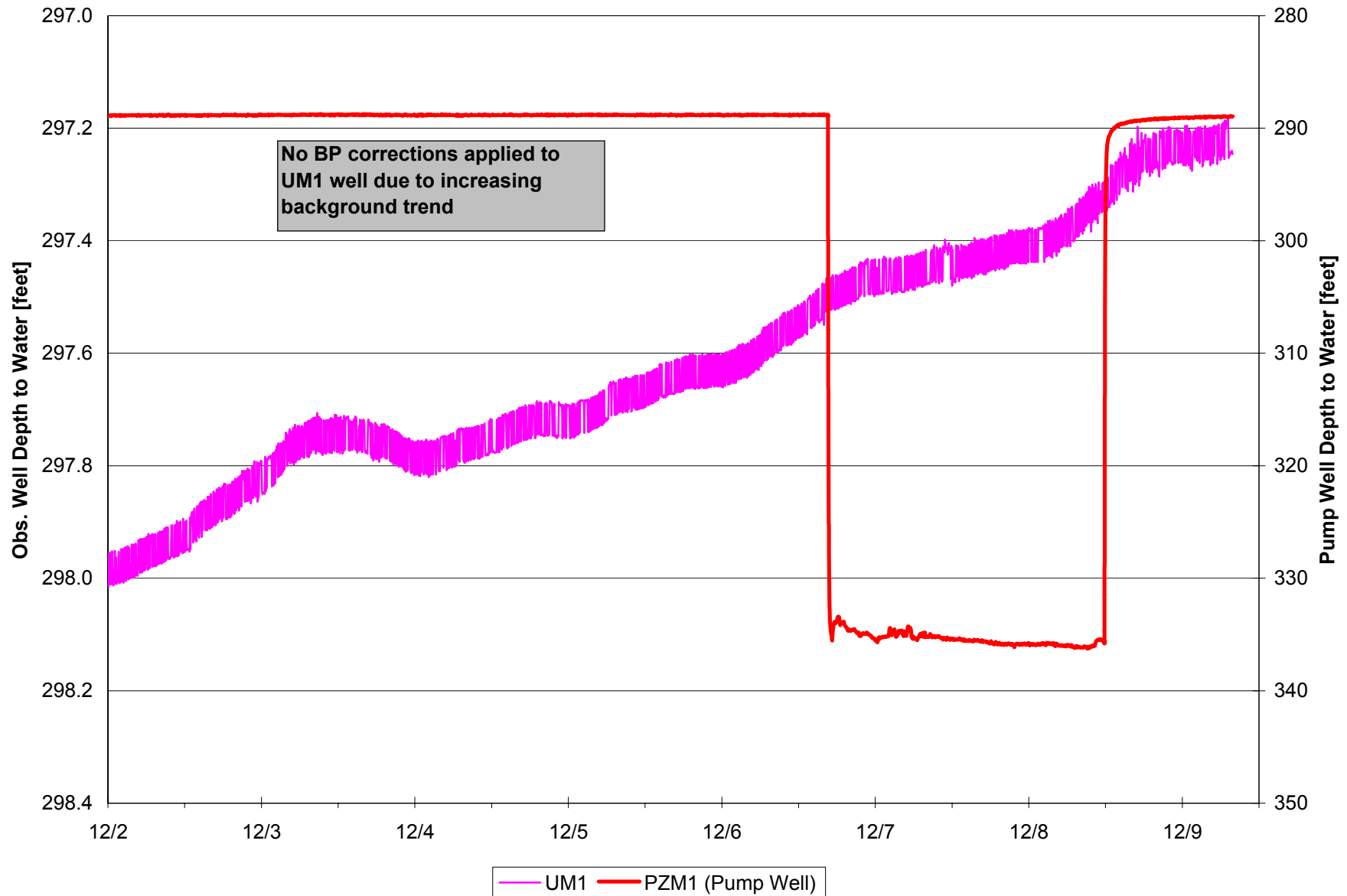
Figure 8-2. Production Zone Observation Wells PZM8, PZM9 and PZM10
vs. Pumping Well Water Level Data
PZM1 Pump Test, Reno Creek Project

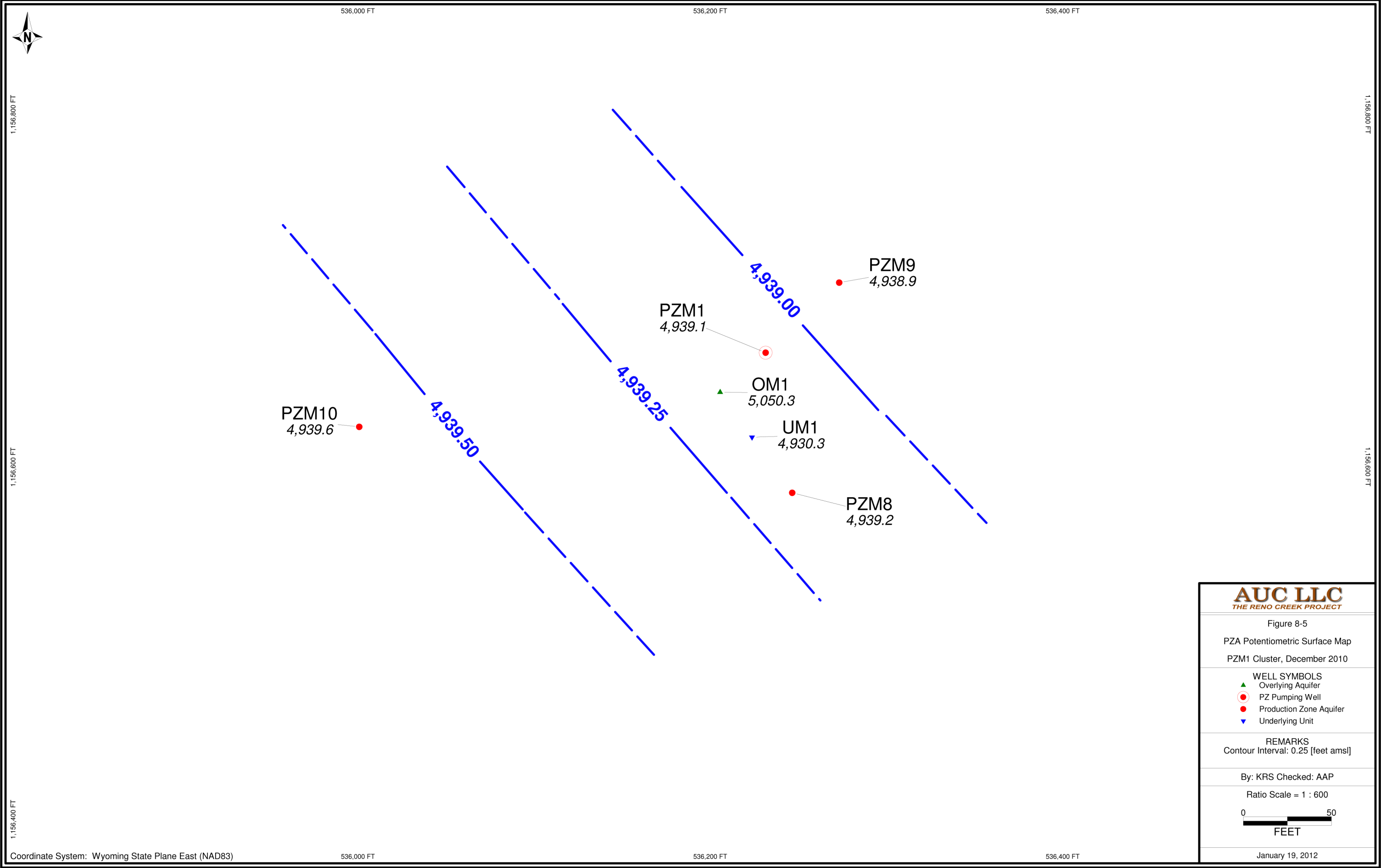


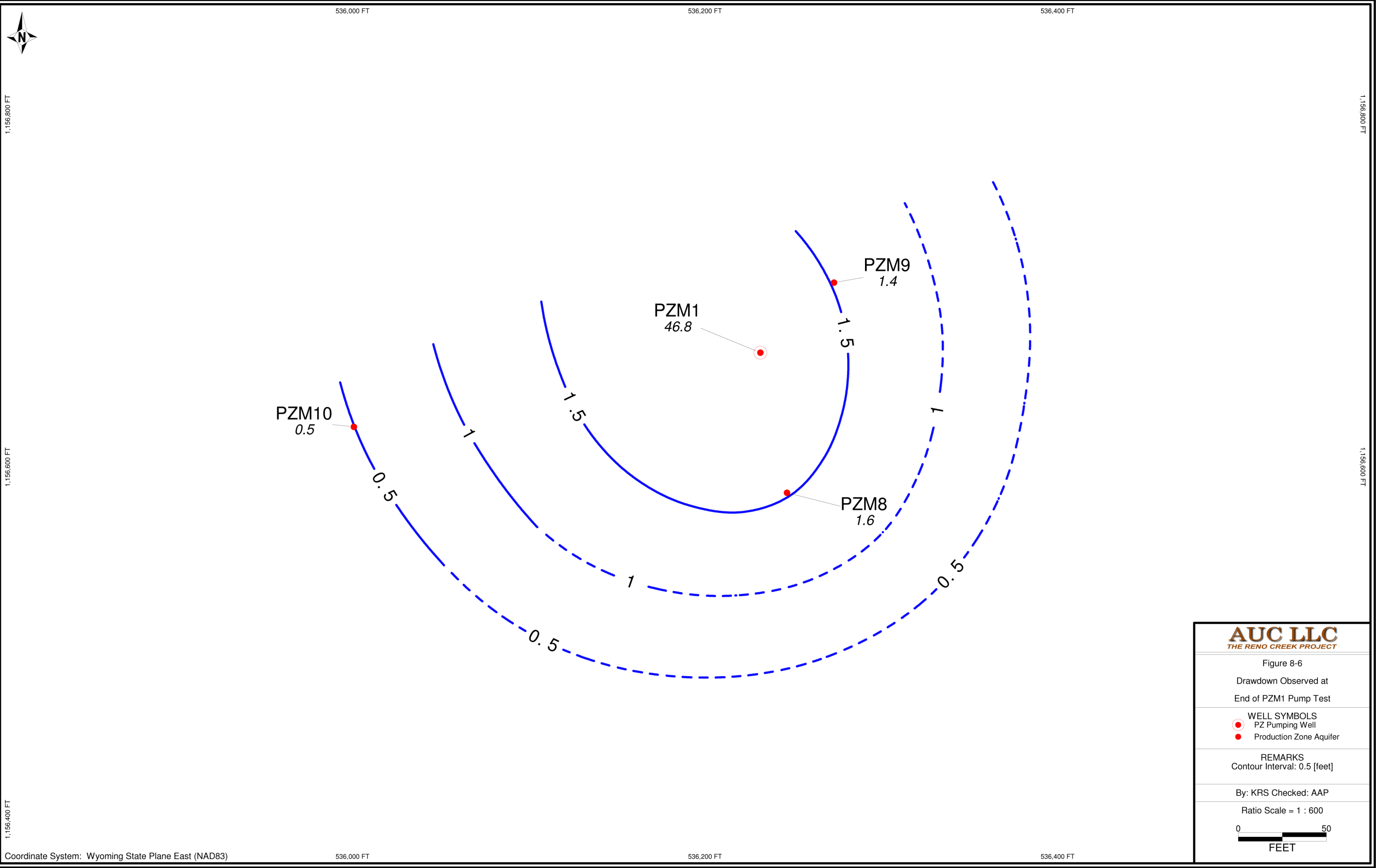
**Figure 8-3. Overlying Aquifer Observation Well OM1 vs. Pumping Well Water Level Data
PZM1 Pump Test, Reno Creek Project**



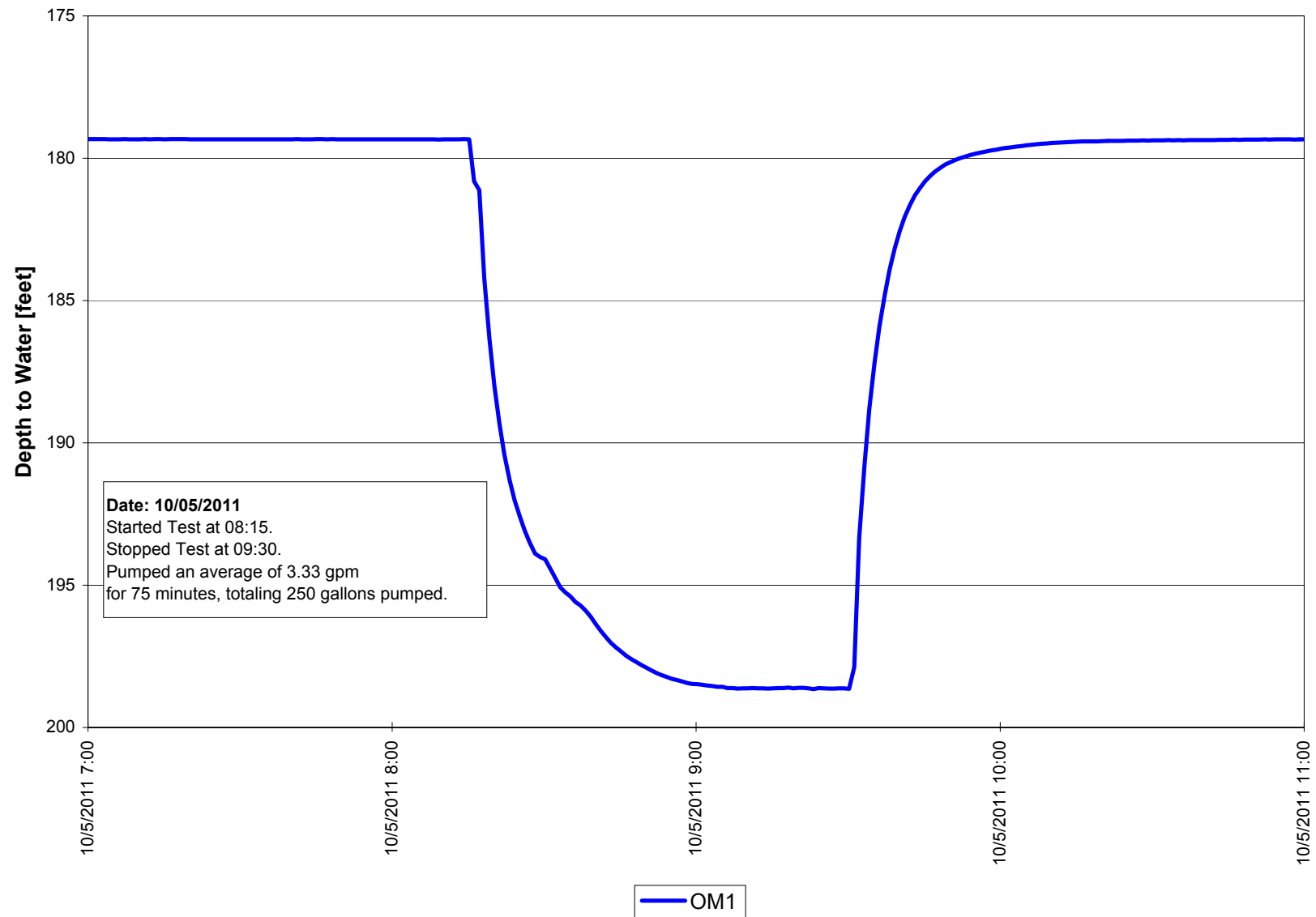
**Figure 8-4. Underlying Unit Observation Well UM1 vs. Pumping Well Water Level Data
PZM1 Pump Test, Reno Creek Project**



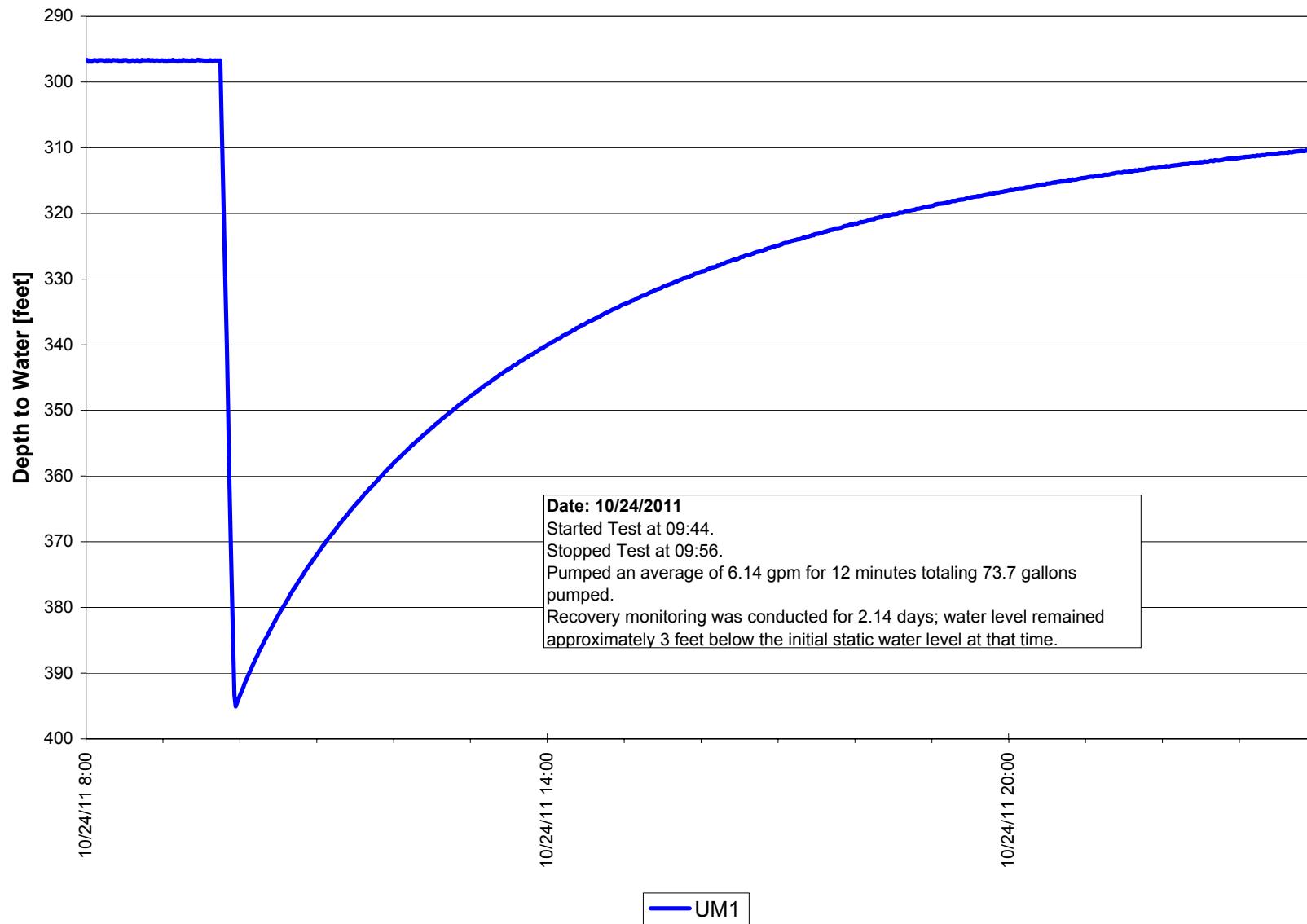


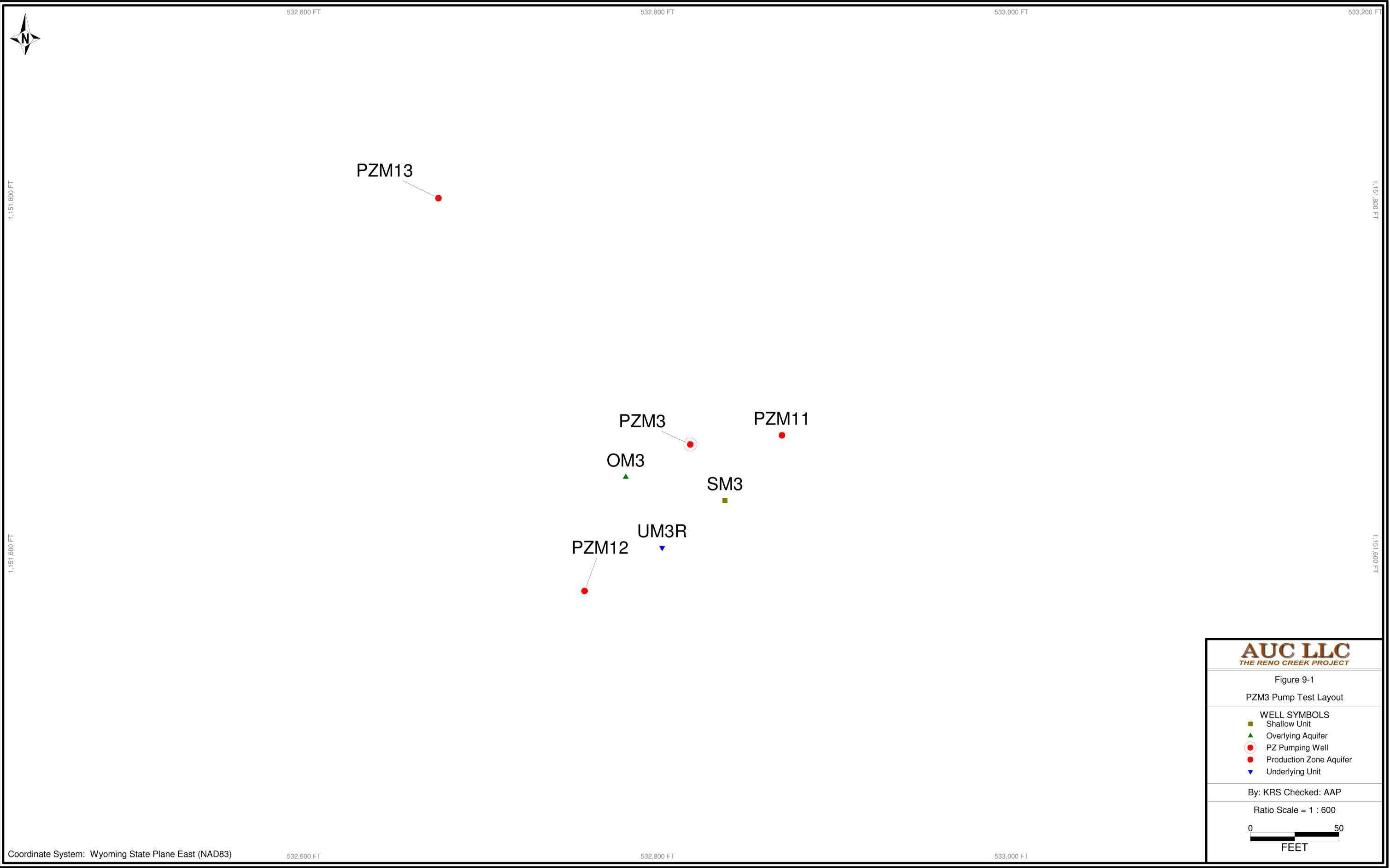


**Figure 8-7. OM1 Single-well Test Water Level Data
Reno Creek Project**

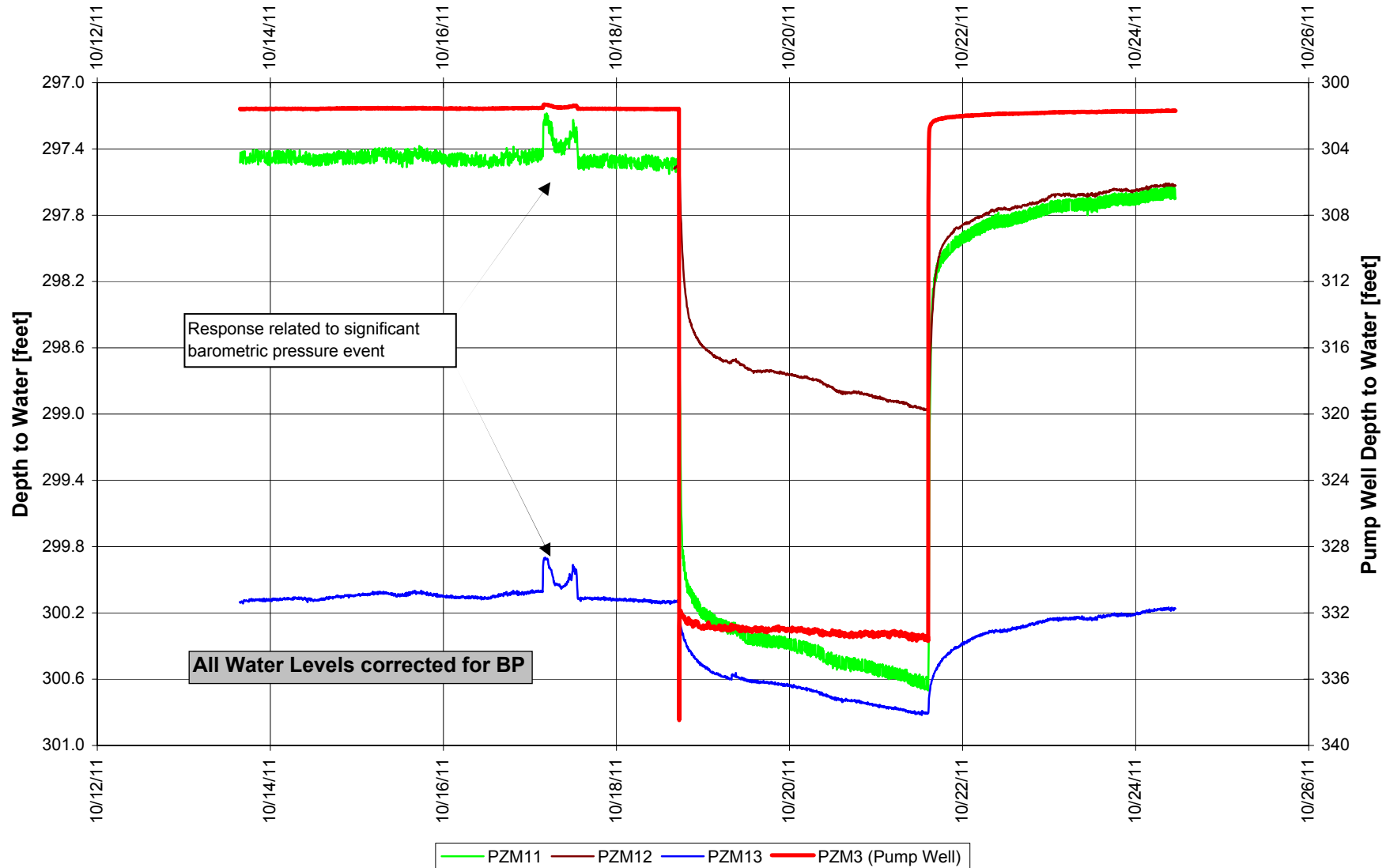


**Figure 8-8. UM1 Single-well Test Water Level Data
Reno Creek Project**

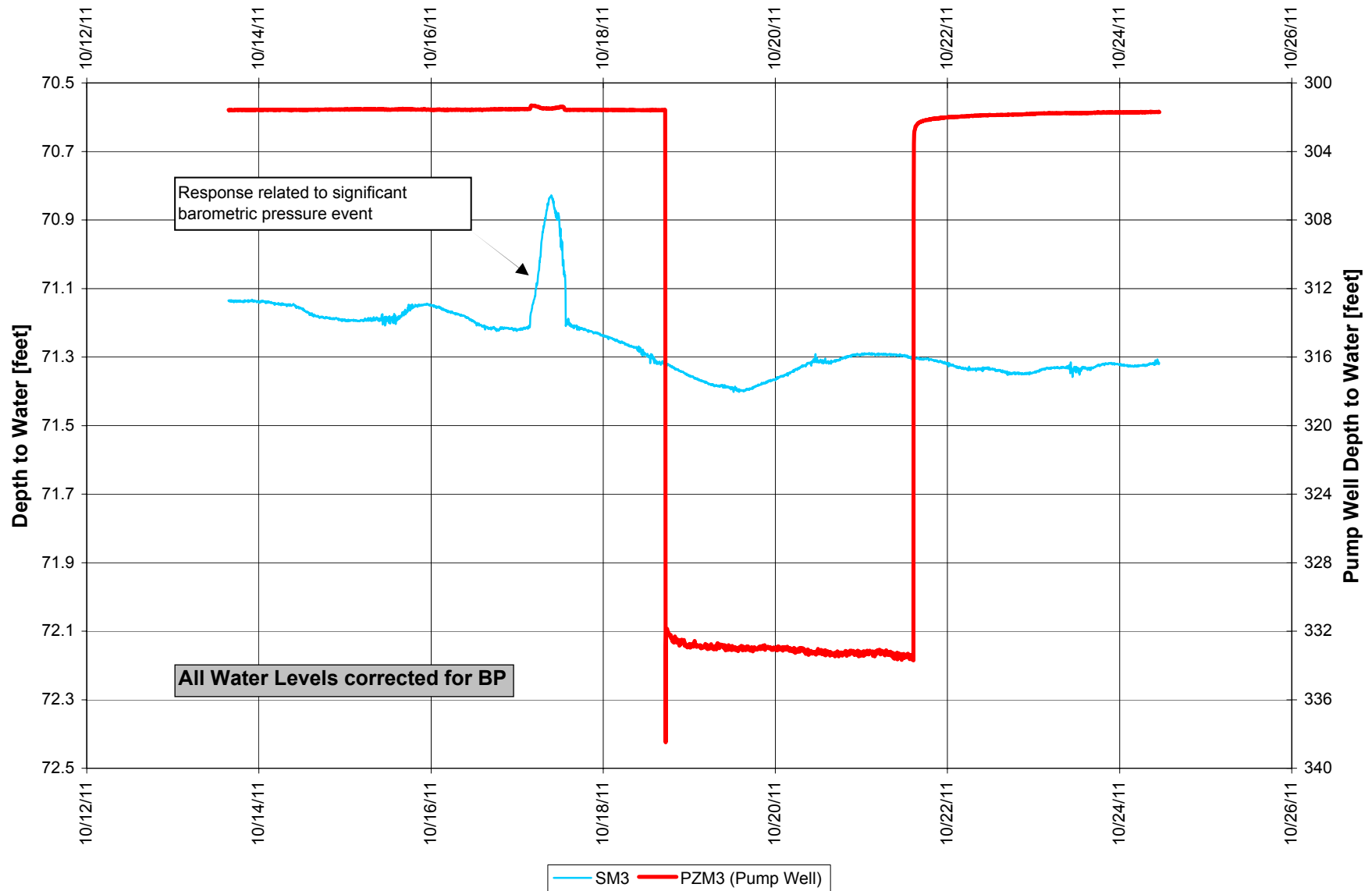




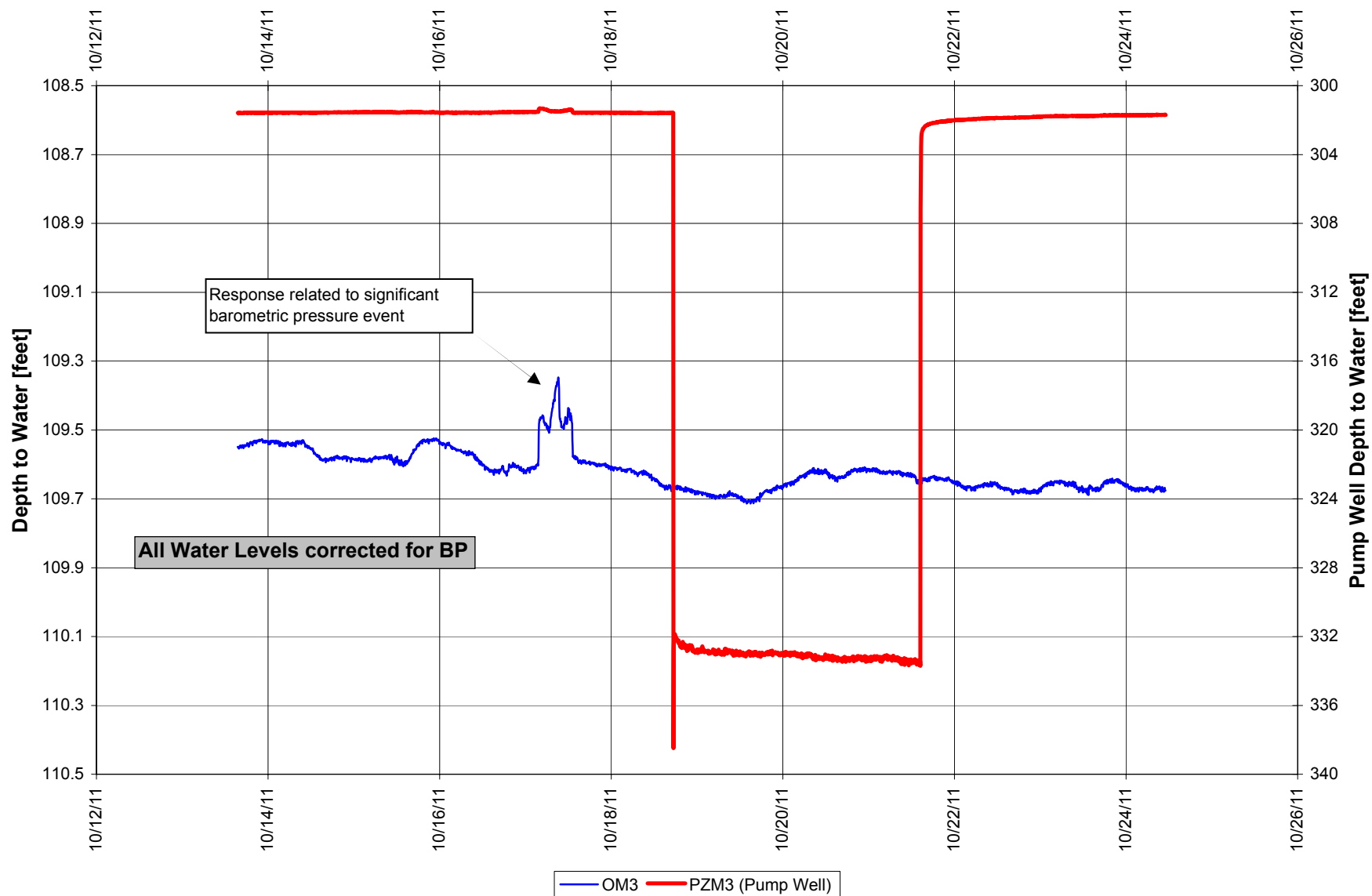
**Figure 9-2. Production Zone Observation Wells PZM8, PZM9 and PZM10
vs. Pumping Well Water Level Data
PZM3 Pump Test, Reno Creek Project**



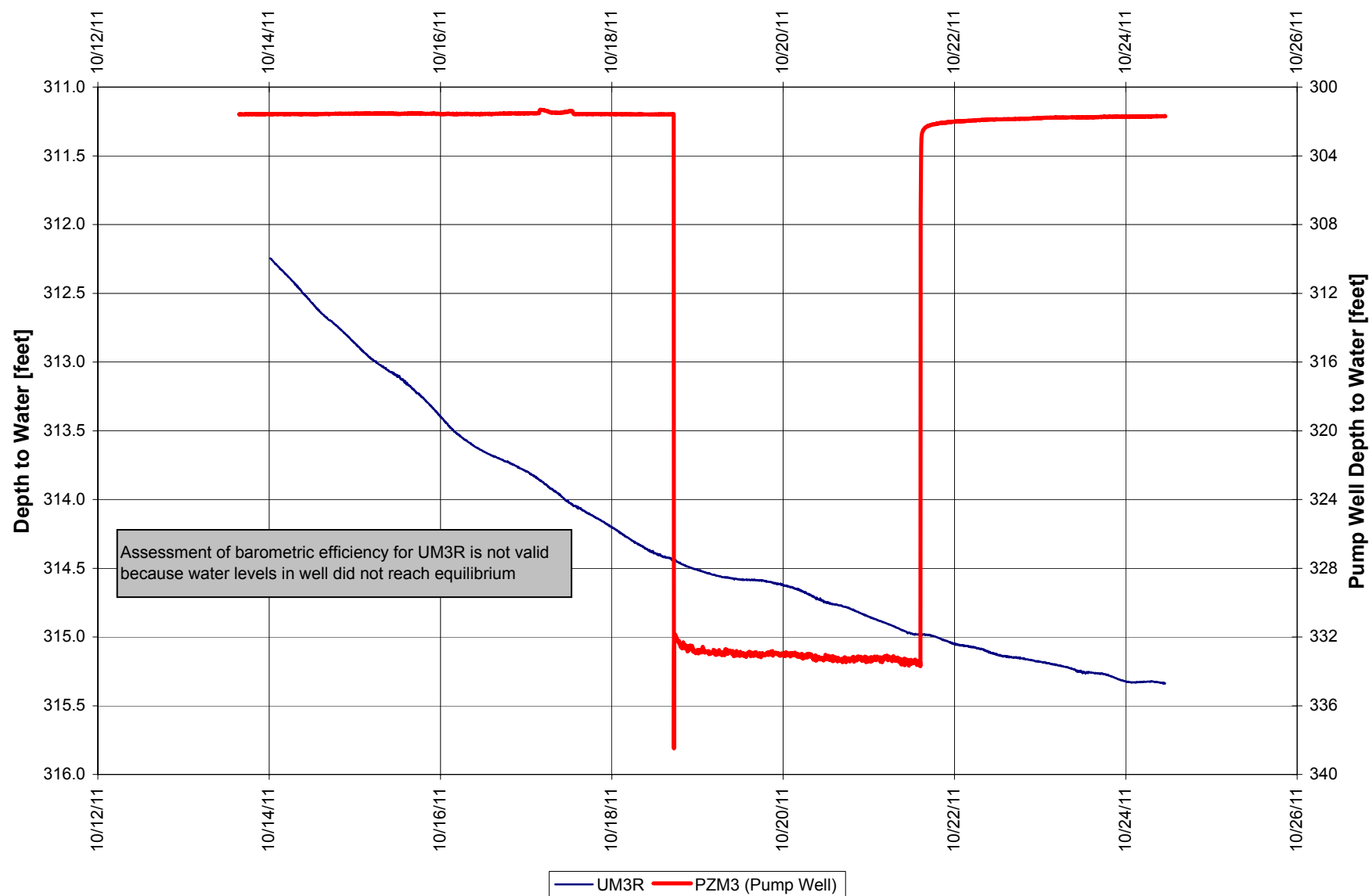
**Figure 9-3. SM Unit Well SM3 vs. Pumping Well Water Level Data
PZM3 Pump Test, Reno Creek Project**

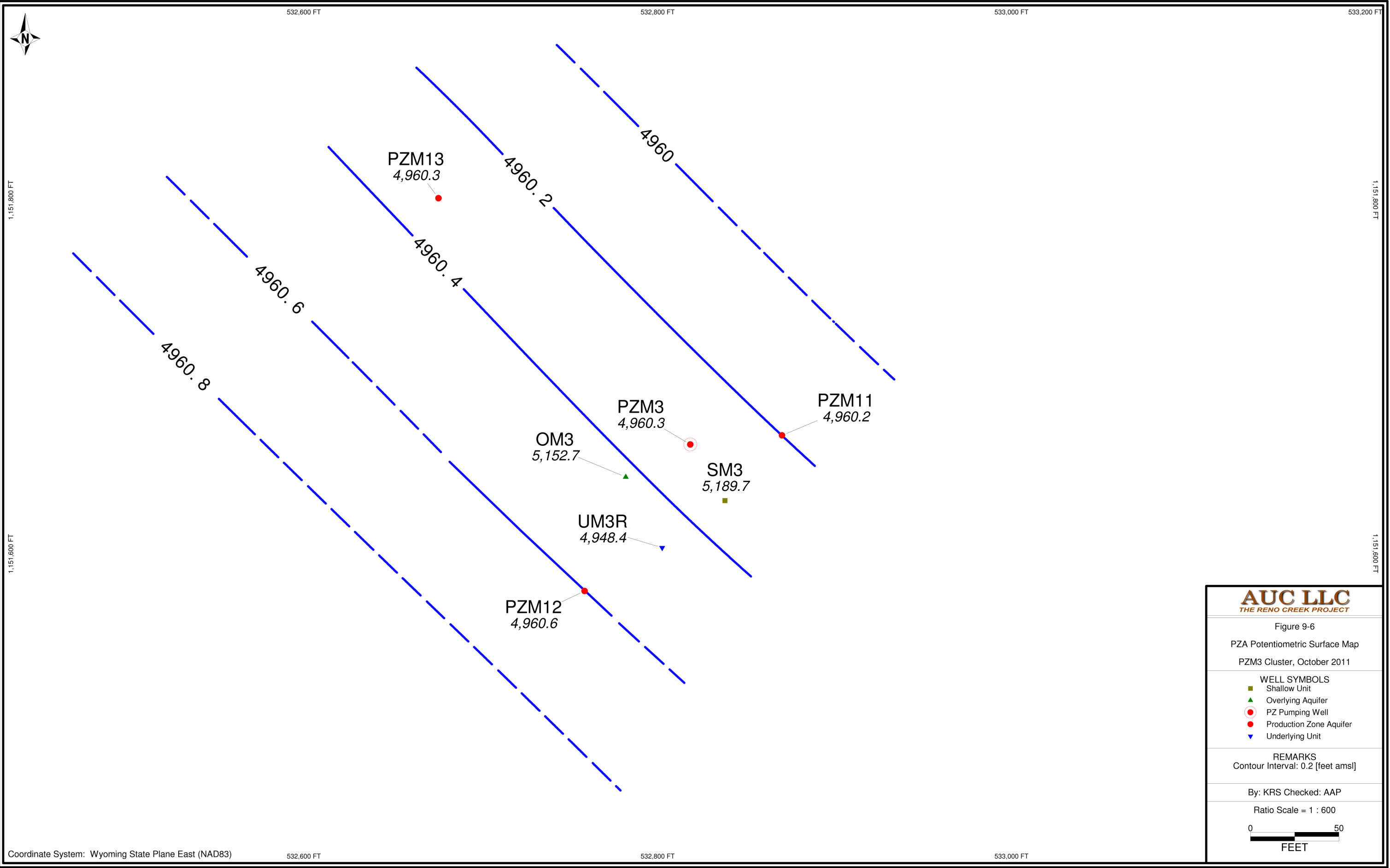


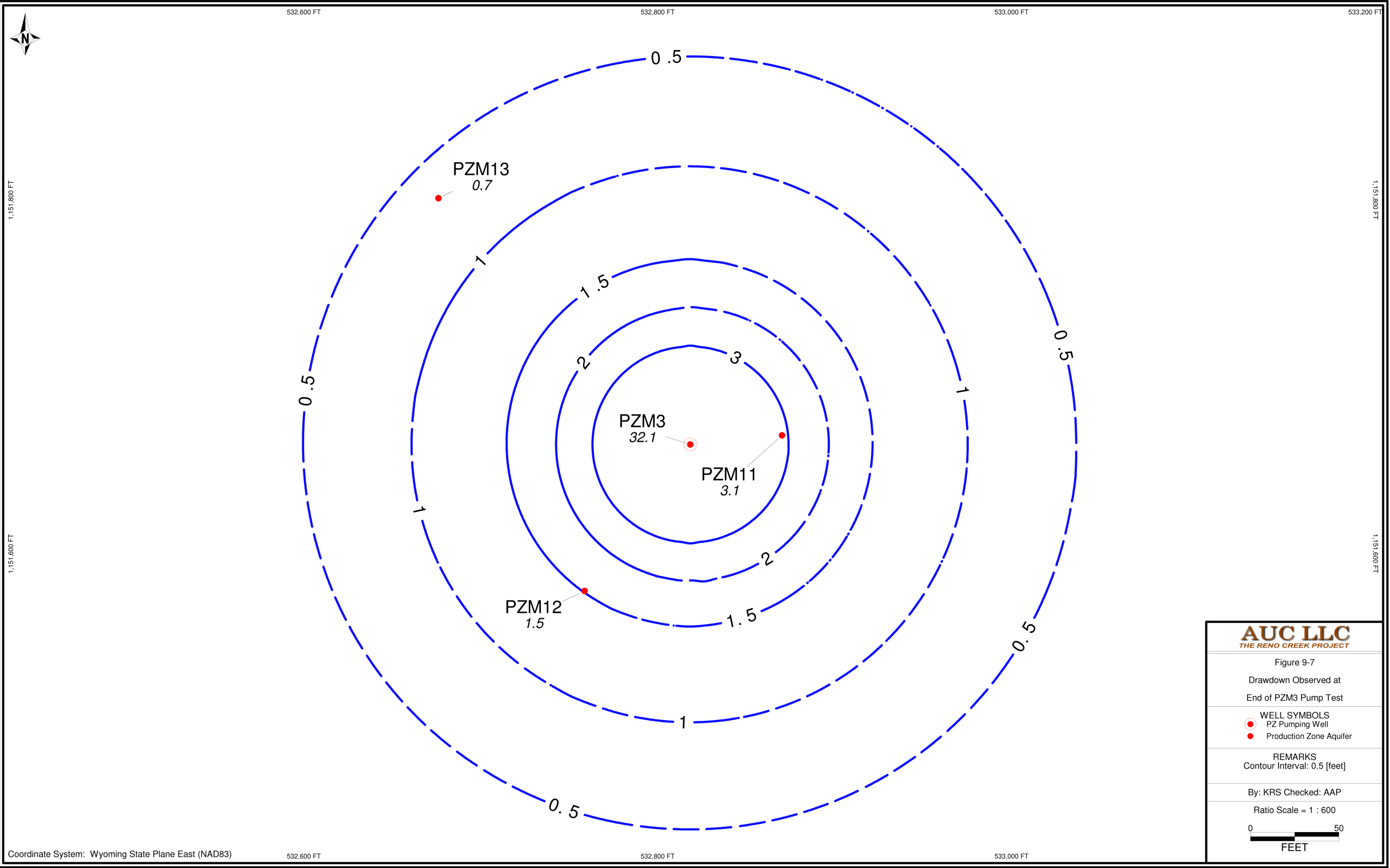
**Figure 9-4. Overlying Aquifer Well OM3 vs. Pumping Well Water Level Data
PZM3 Pump Test, Reno Creek Project**



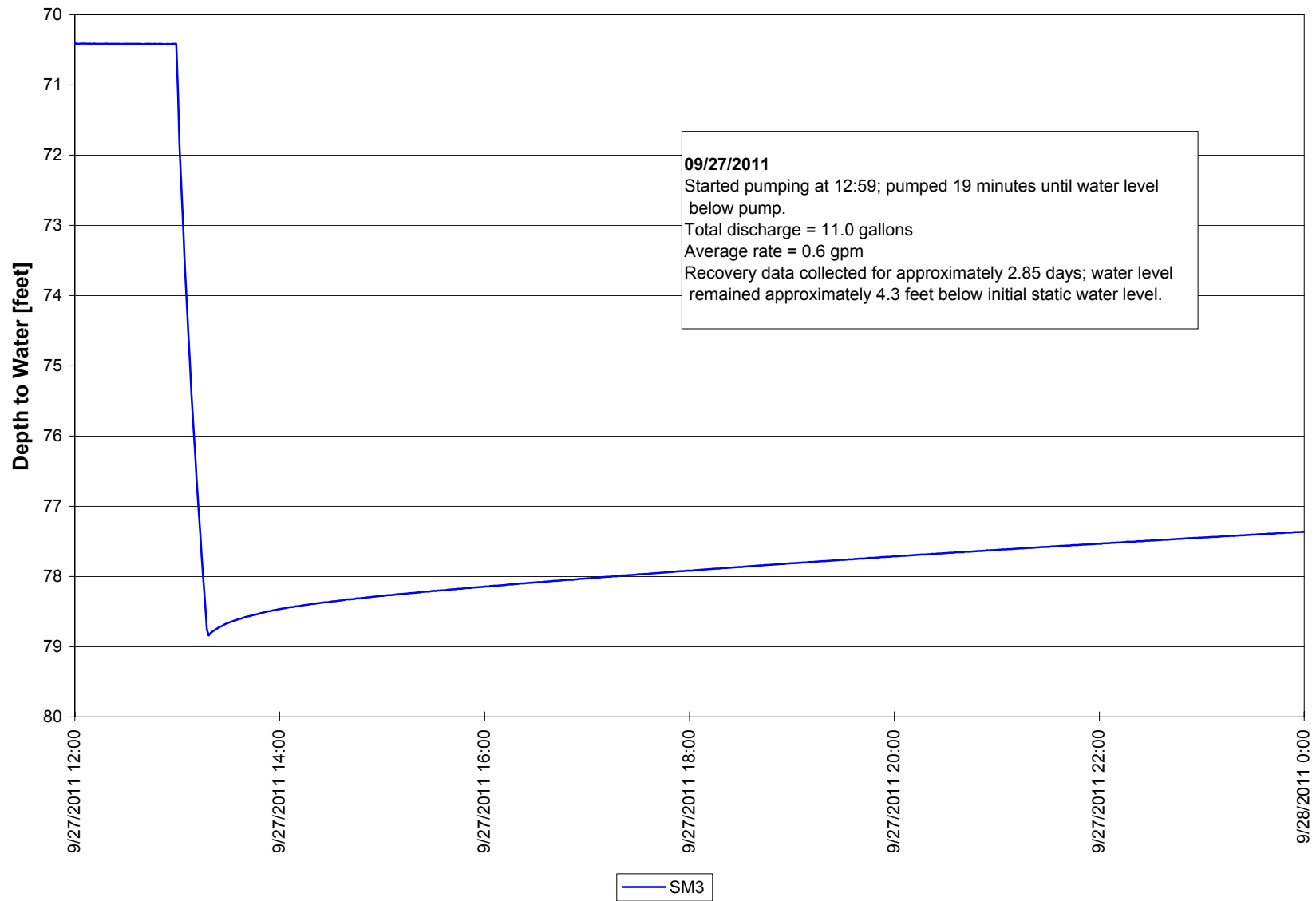
**Figure 9-5. Underlying Unit Well UM3R vs. Pumping Well Water Level Data
PZM3 Pump Test, Reno Creek Project**



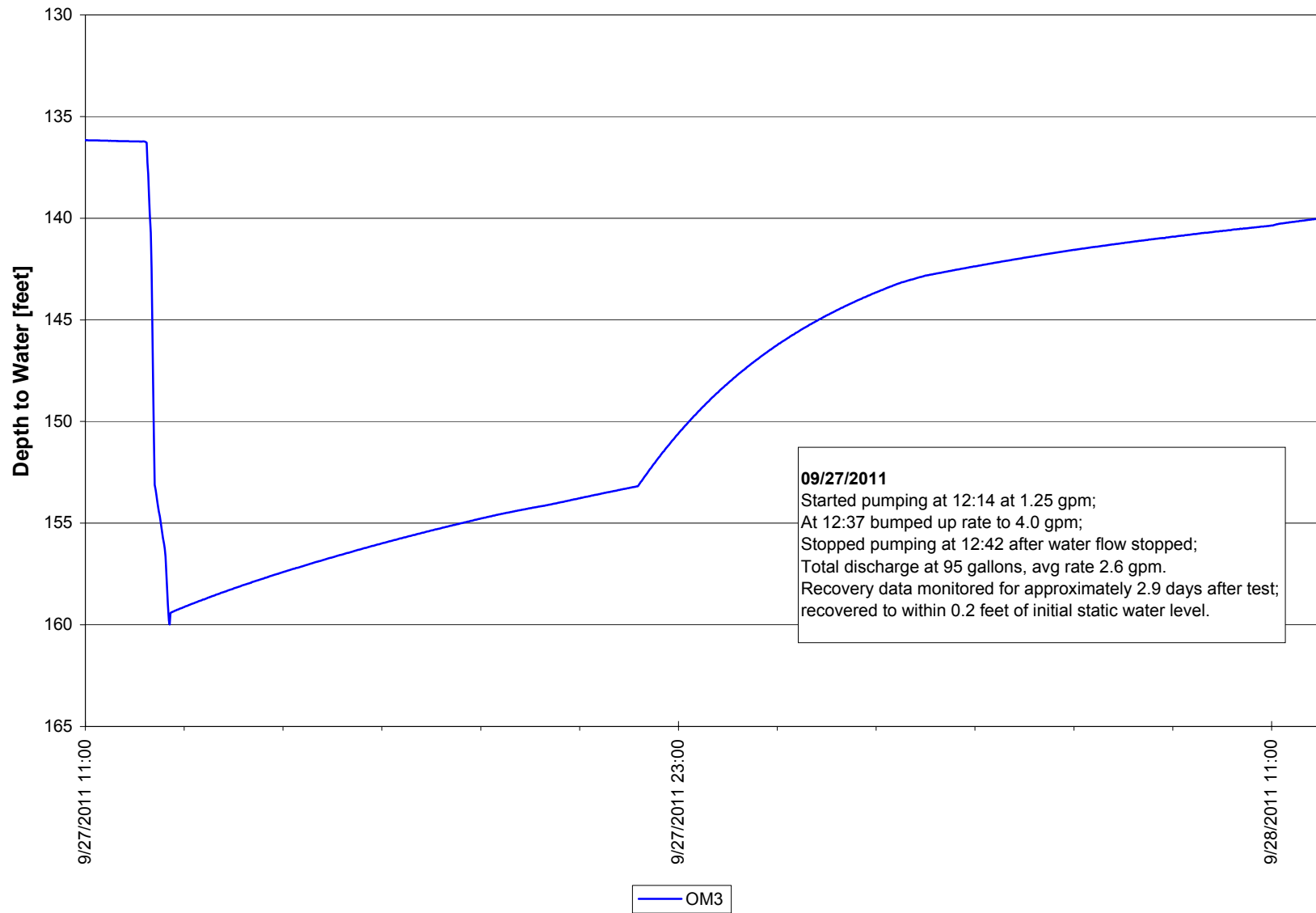




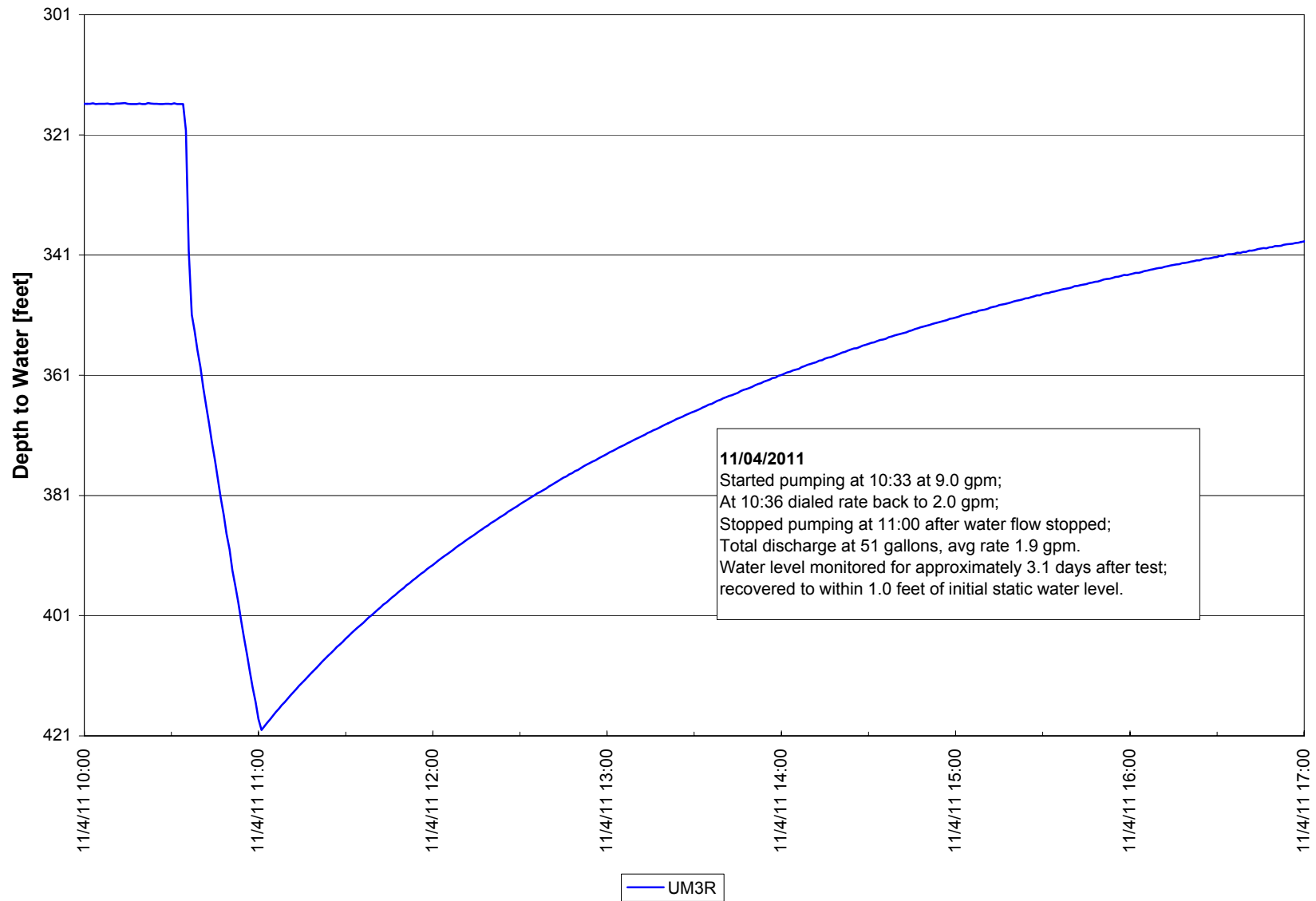
**Figure 9-8. SM3 Single-well Test Water Level Data
Reno Creek Project**



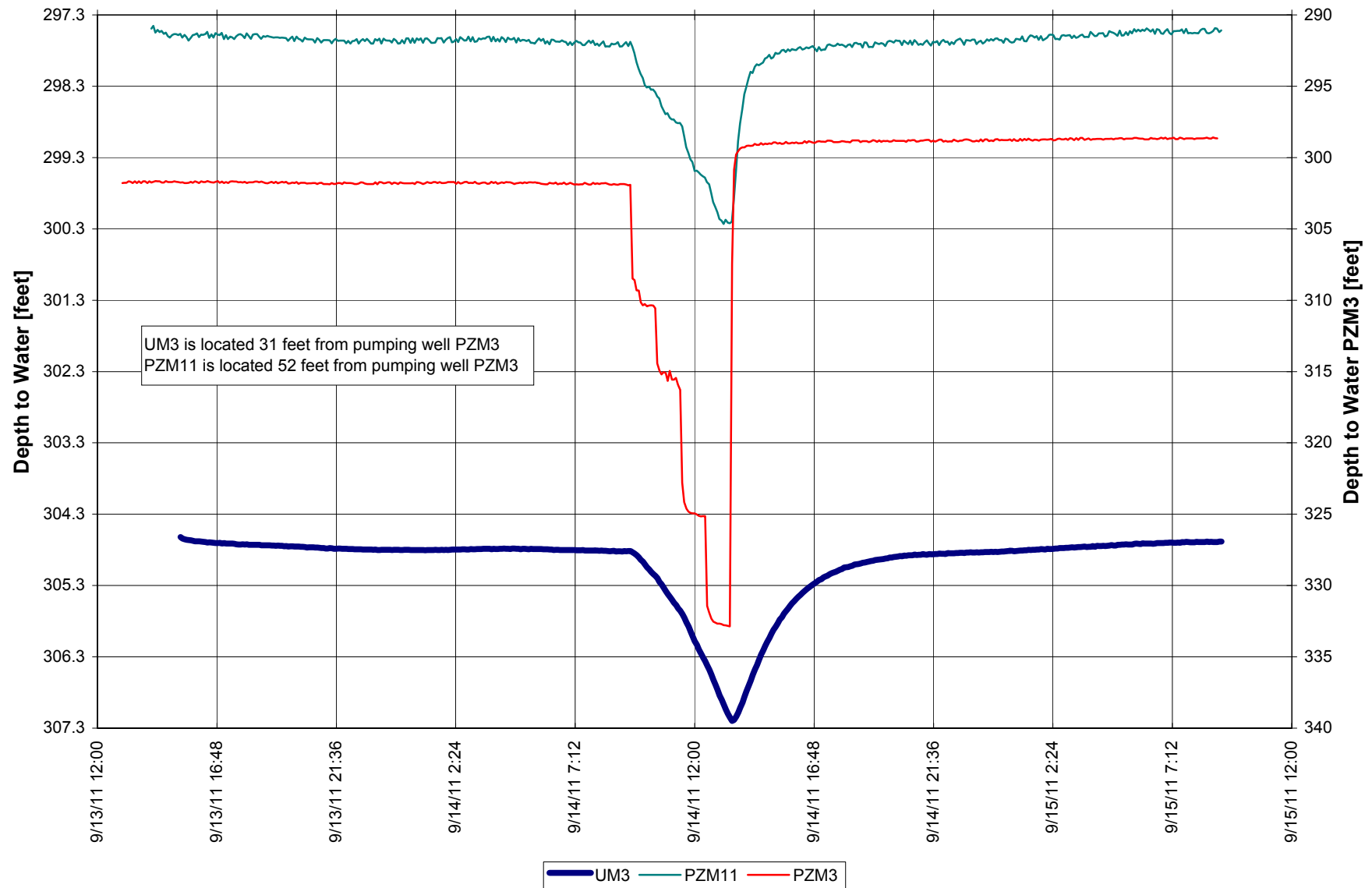
**Figure 9-9. OM3 Single-well Test Water Level Data
Reno Creek Project**



**Figure 9-10. UM3R Single-well Test Water Level Data
Reno Creek Project**



**Figure 9-11. Example of a Leaky Well Observed at UM3 during PZM3 Step-Drawdown Test
Reno Creek Project**



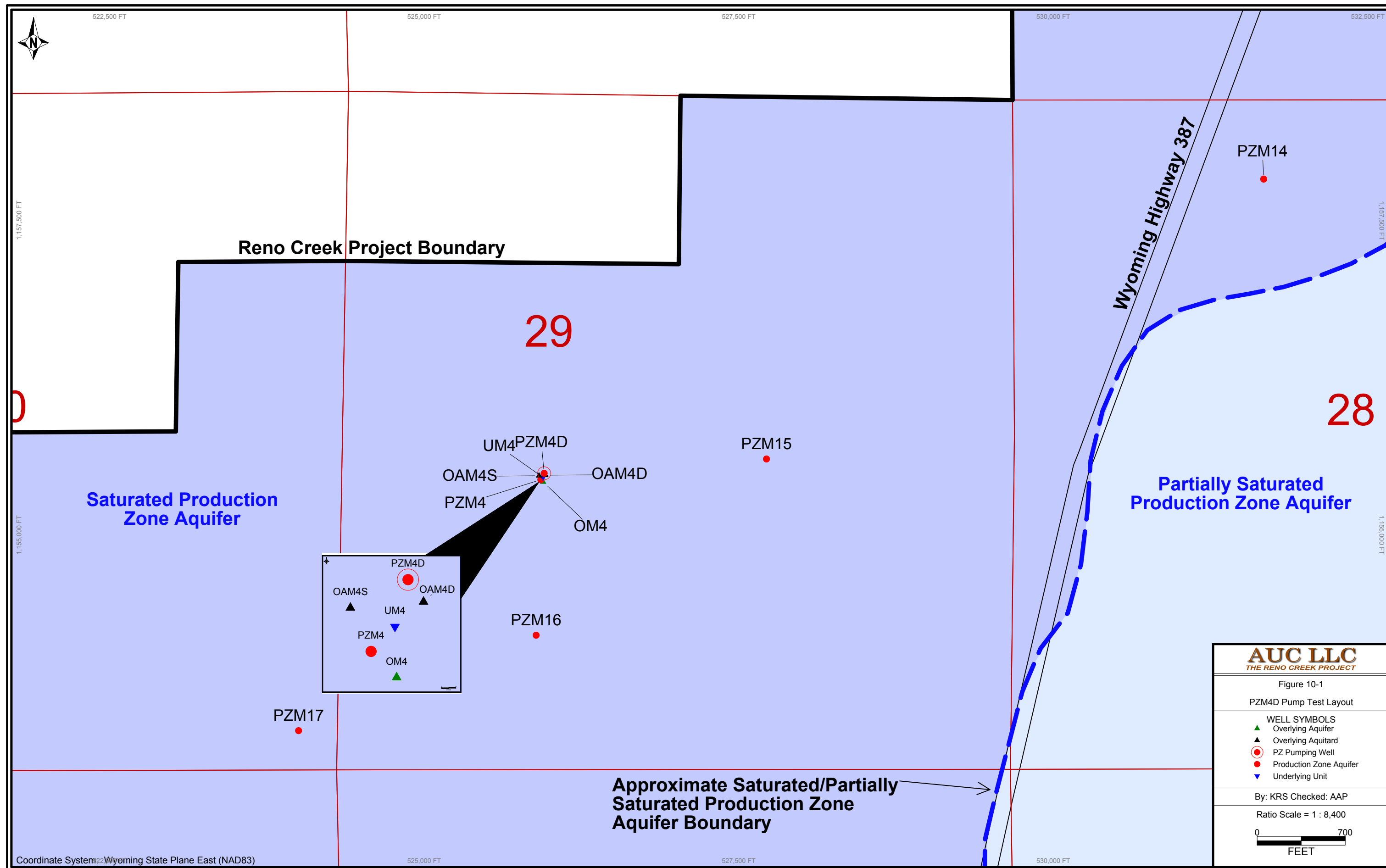
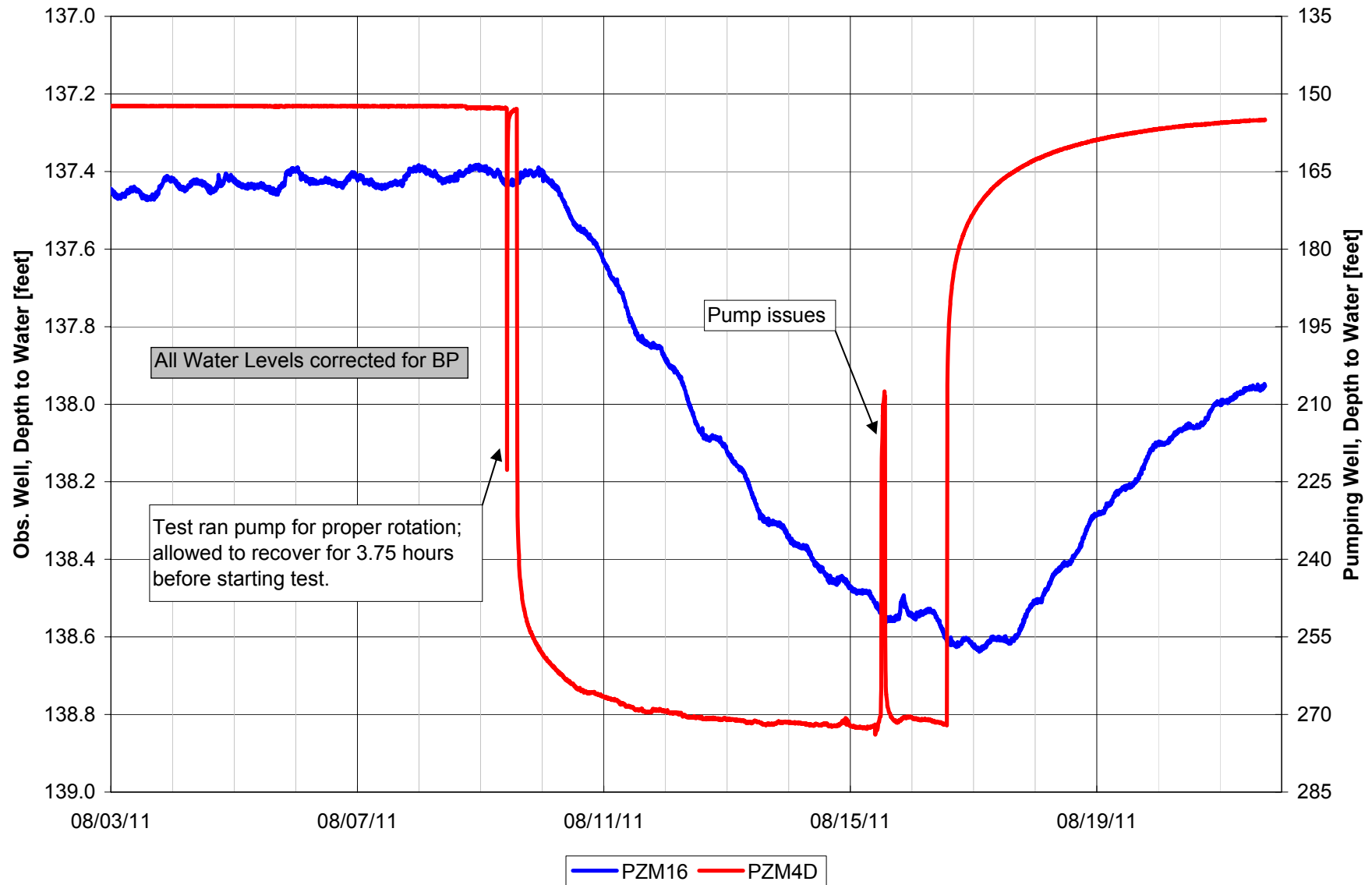
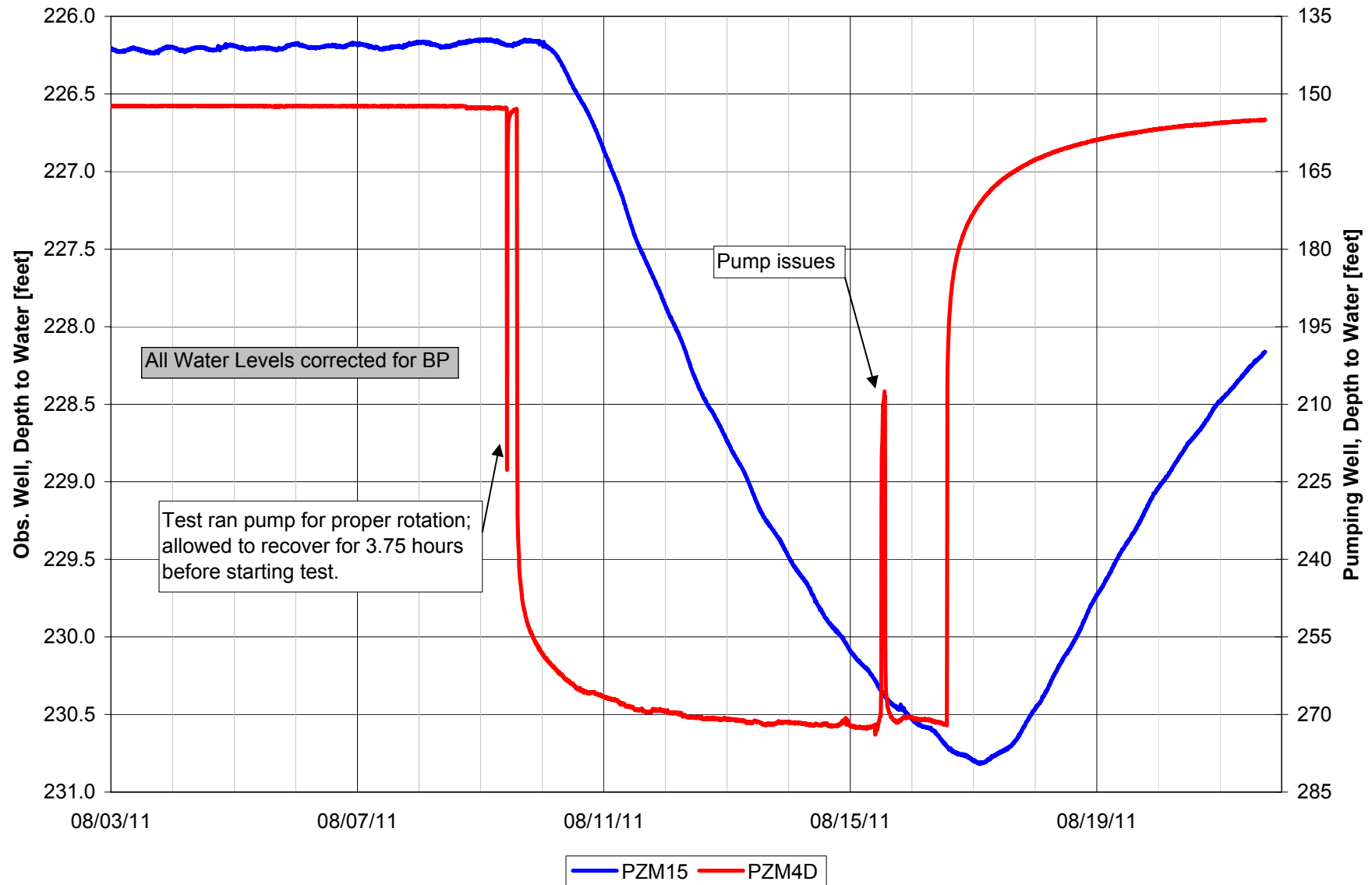


Figure 10-2. Production Zone Observation Well PZM16 vs. Pumping Well Water Level Data, PZM4D Pump Test, Reno Creek Project

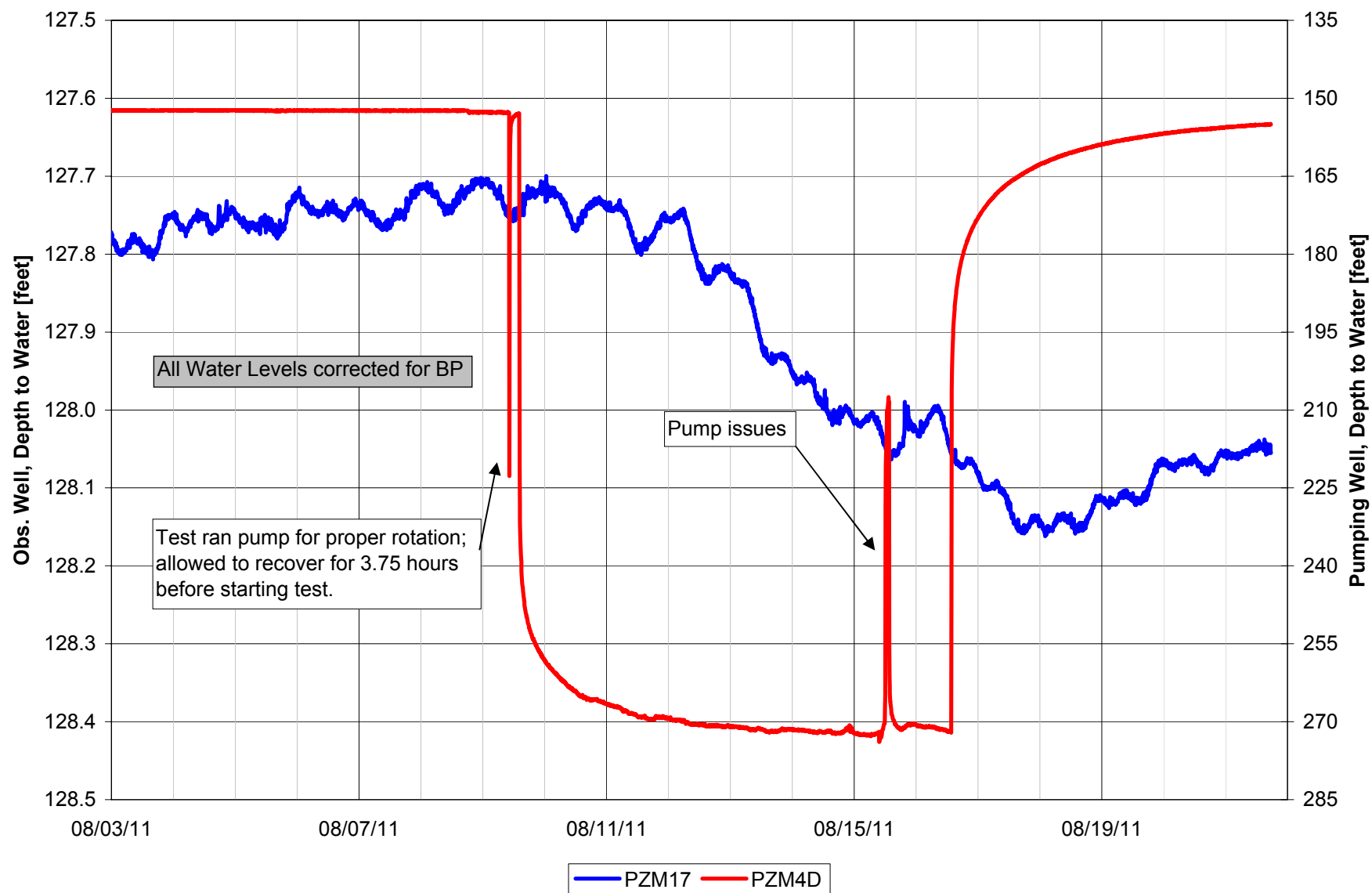


**Figure 10-3. Production Zone Observation Well PZM15 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project**

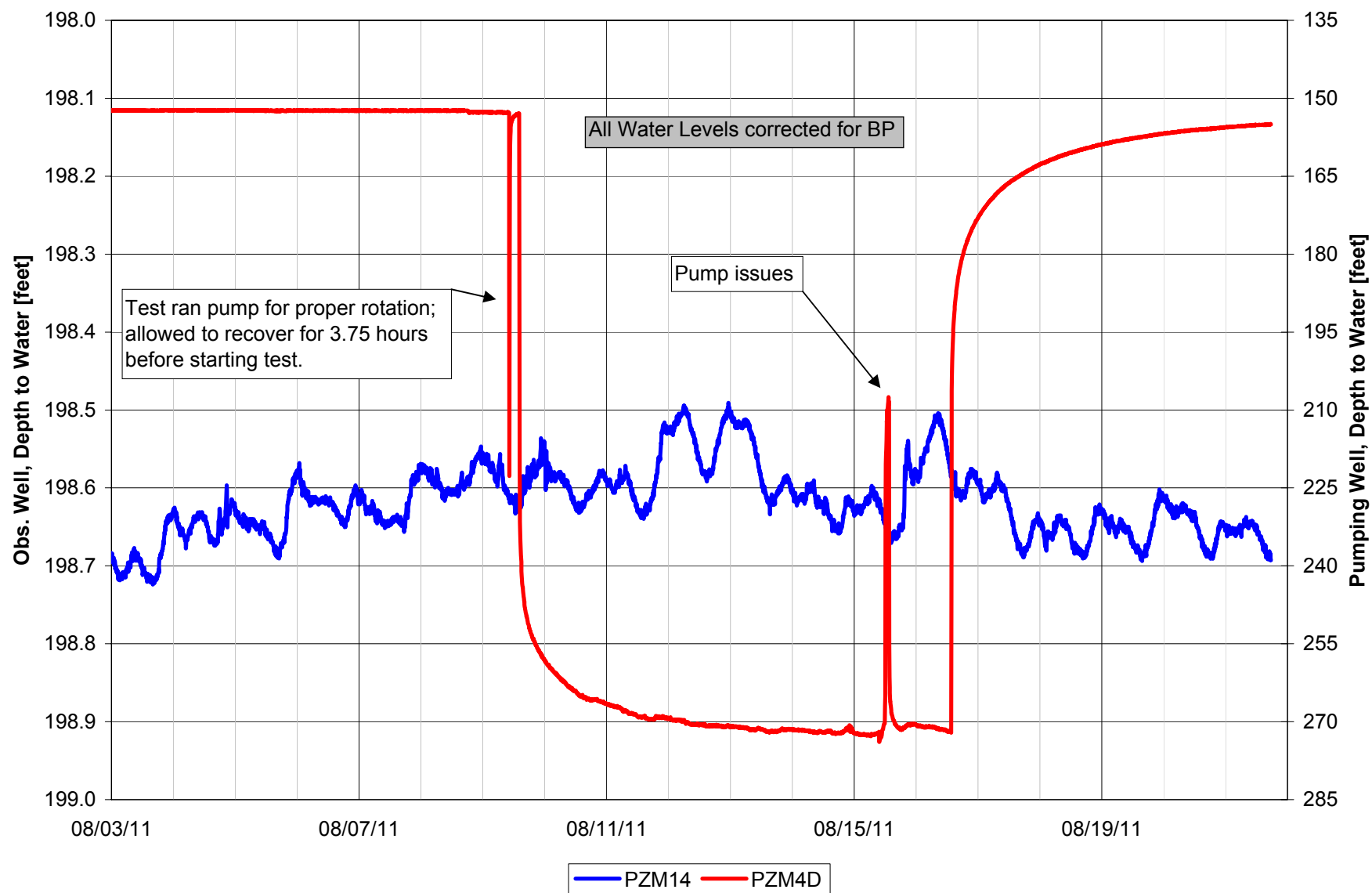


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**Figure 10-4. Production Zone Observation Well PZM17 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project**

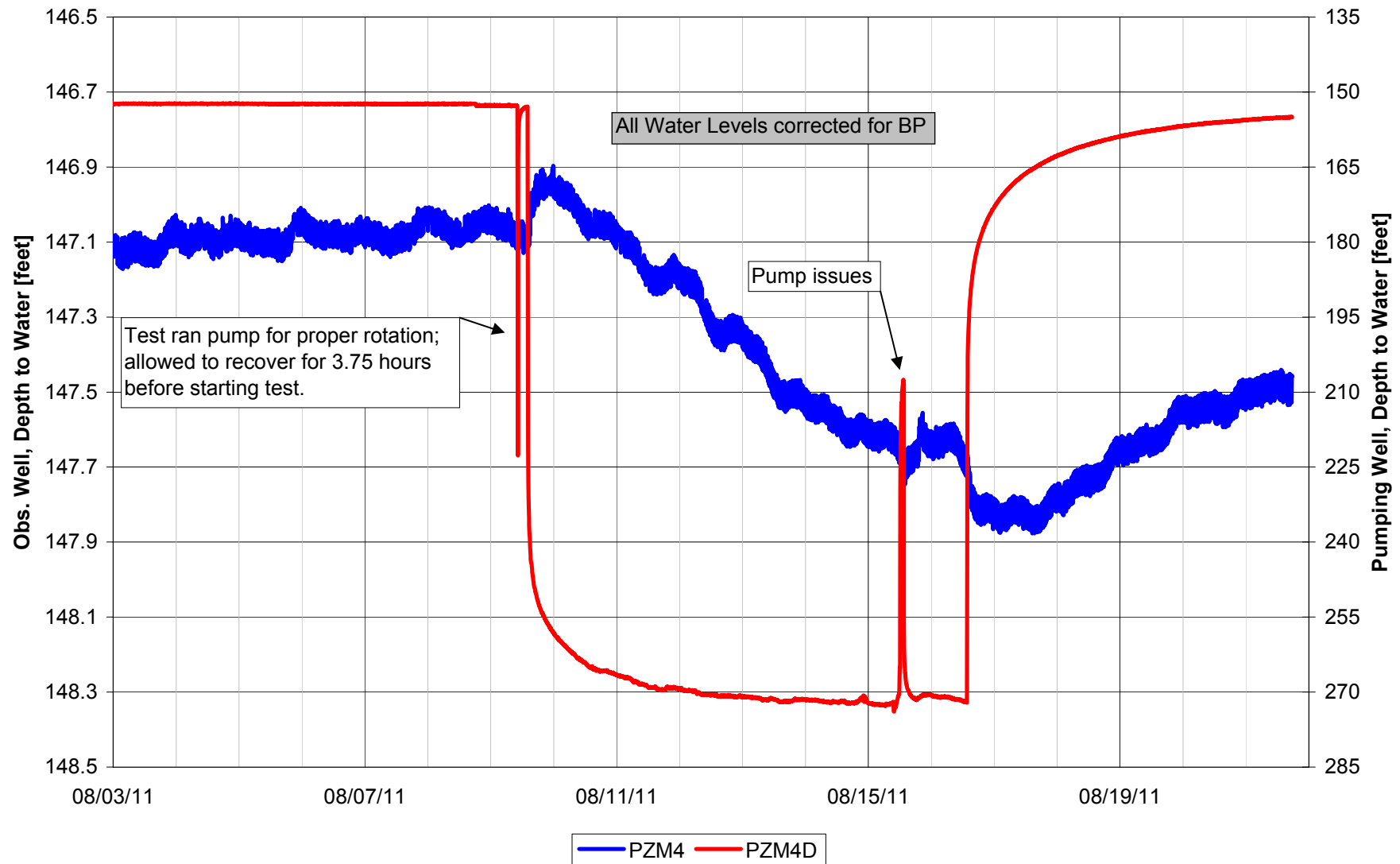


**Figure 10-5. Production Zone Observation Well PZM14 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project**

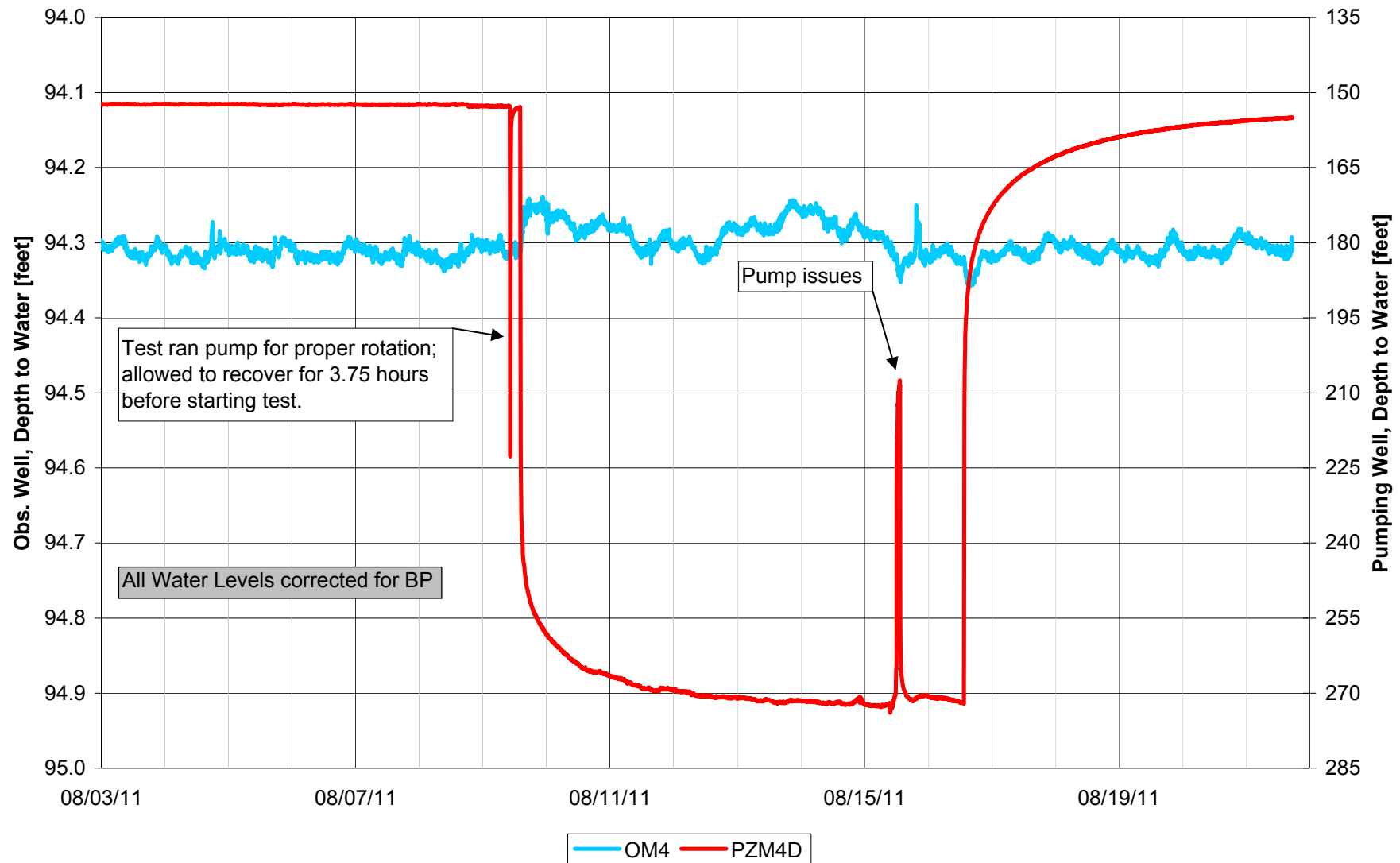


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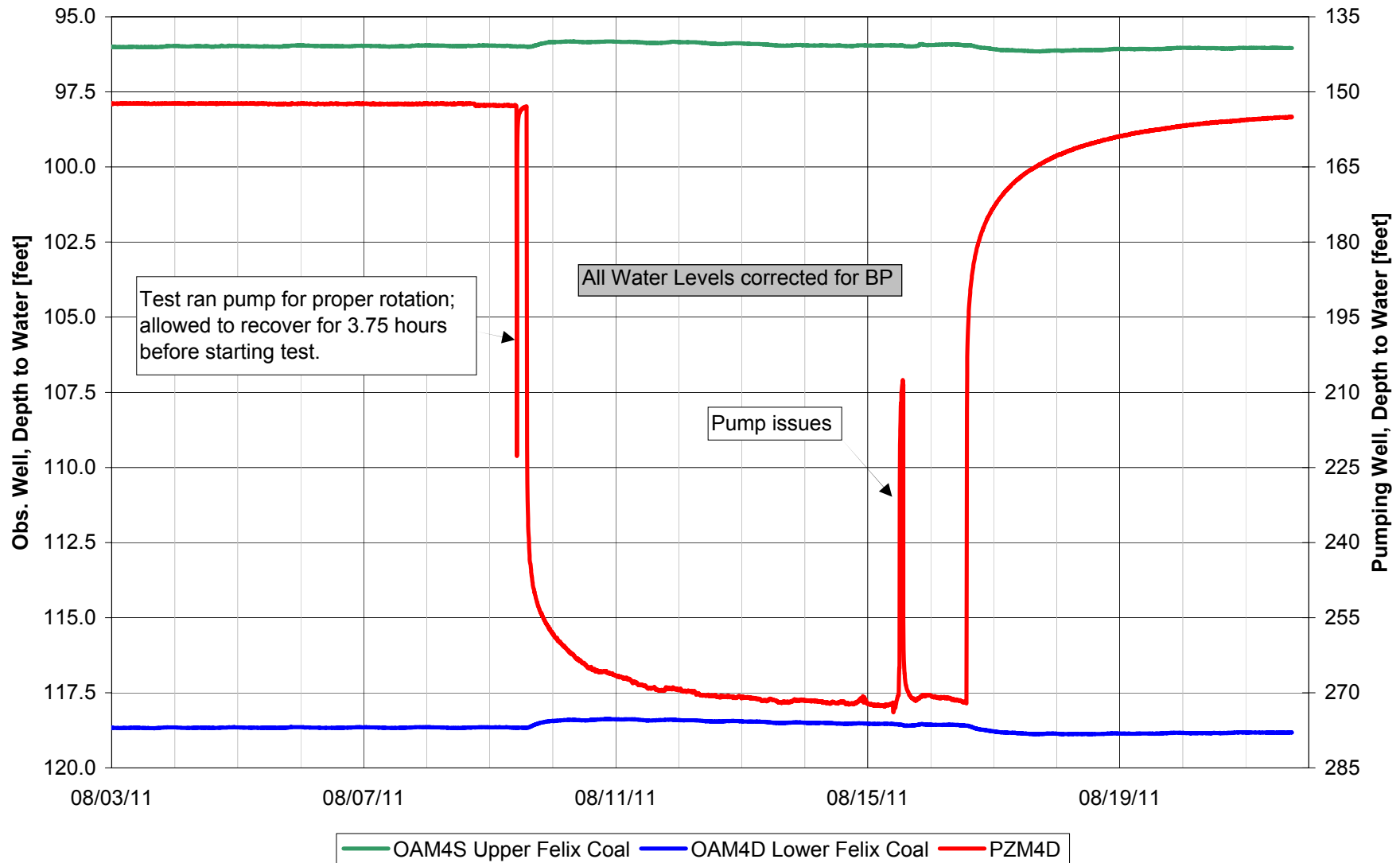
**Figure 10-6. Upper Production Zone Observation Well PZM4 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project**



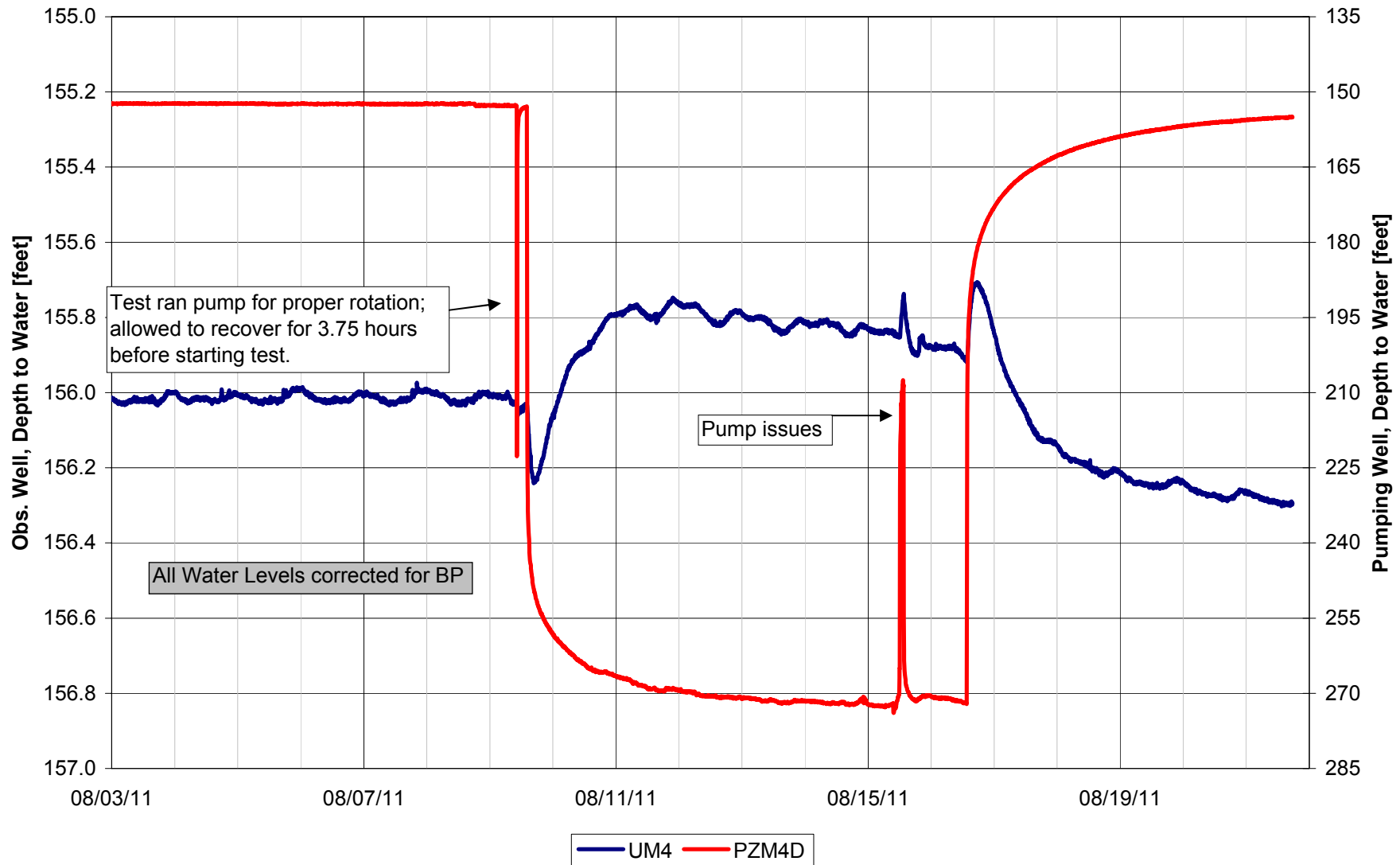
**Figure 10-7. Overlying Aquifer Observation Well OM4 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project**

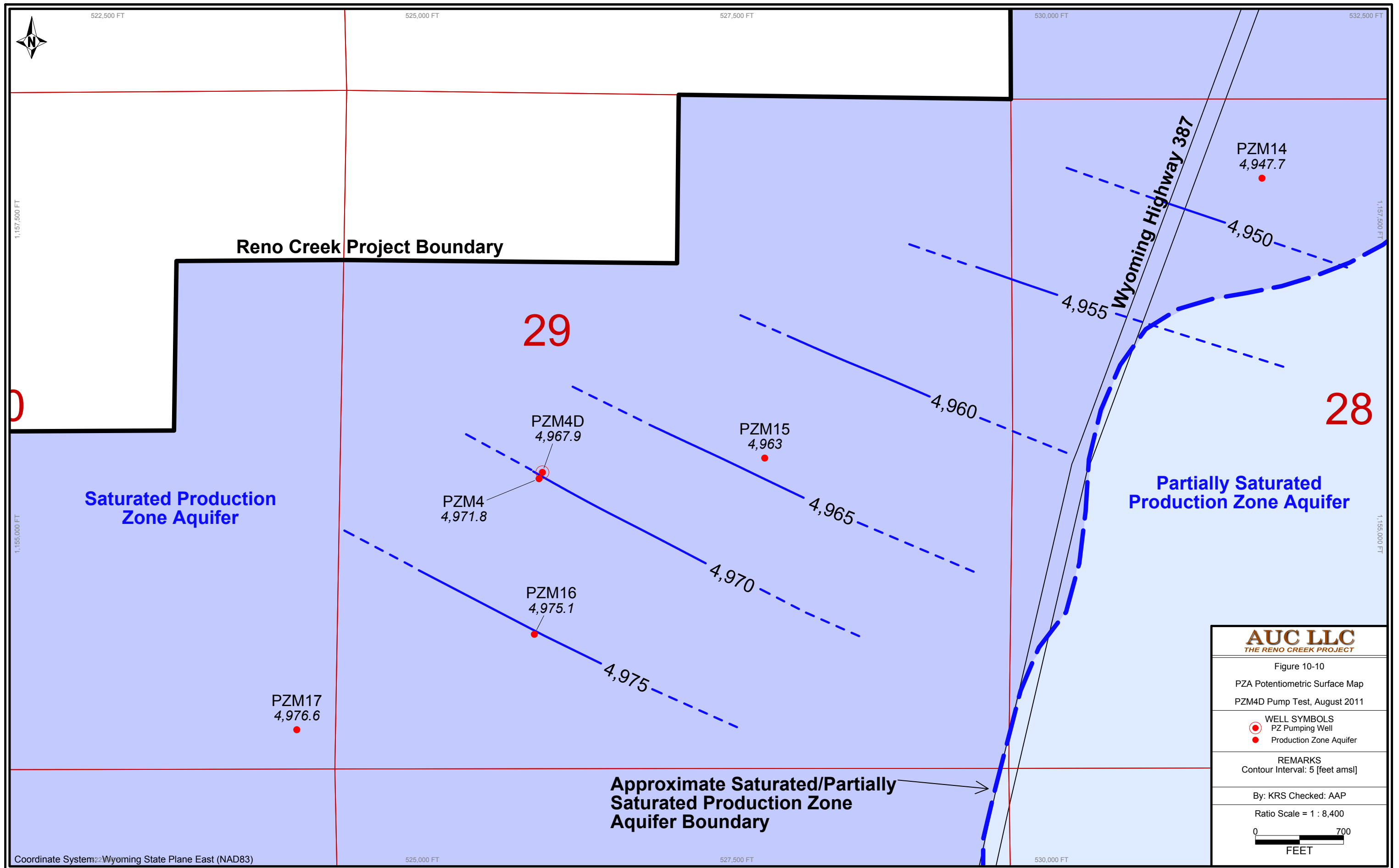


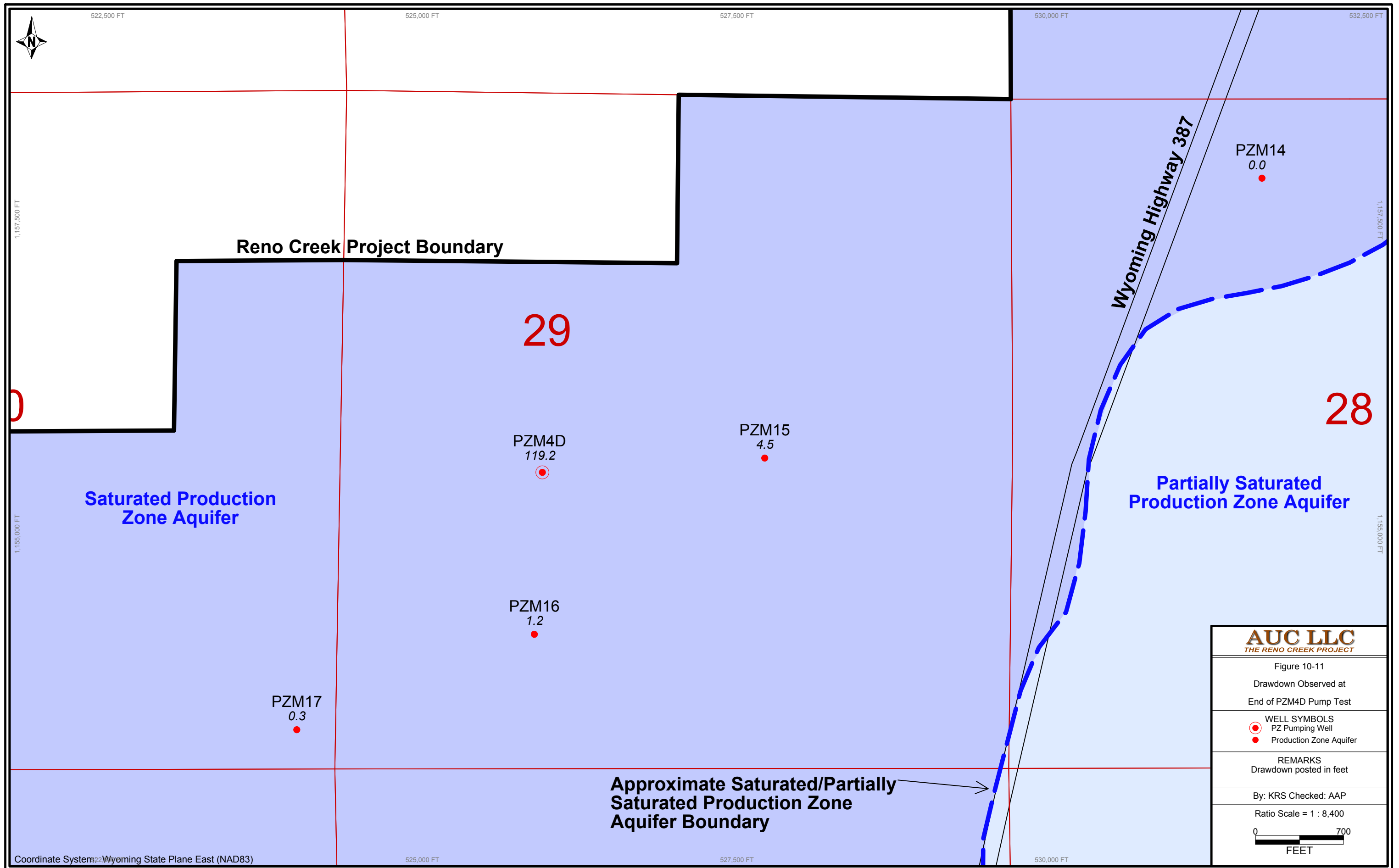
**Figure 10-8. Upper and Lower Felix Coal Piezometers OAM4S and OAM4D
vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project**



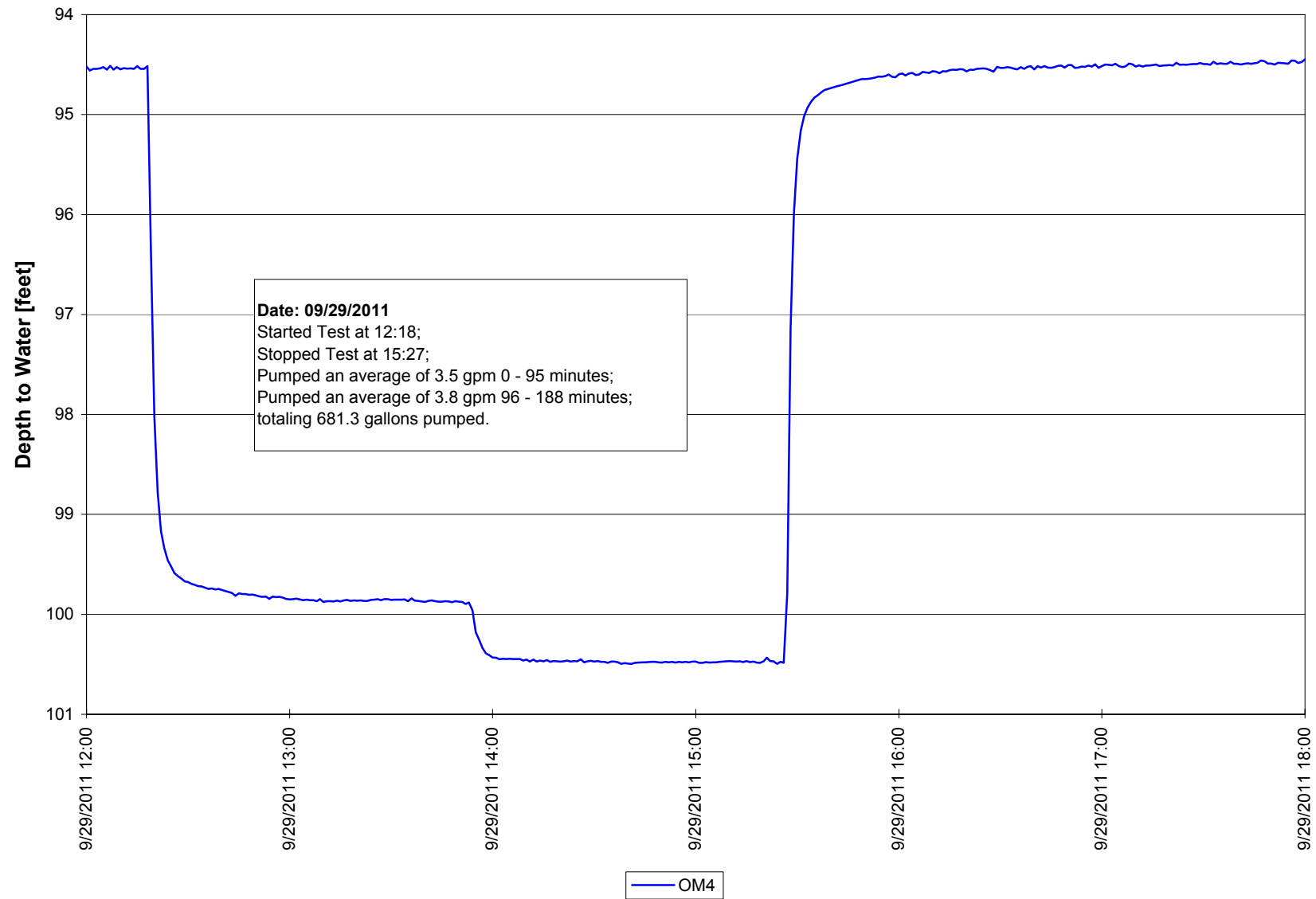
**Figure 10-9. Underlying Unit Observation Well UM4 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project**



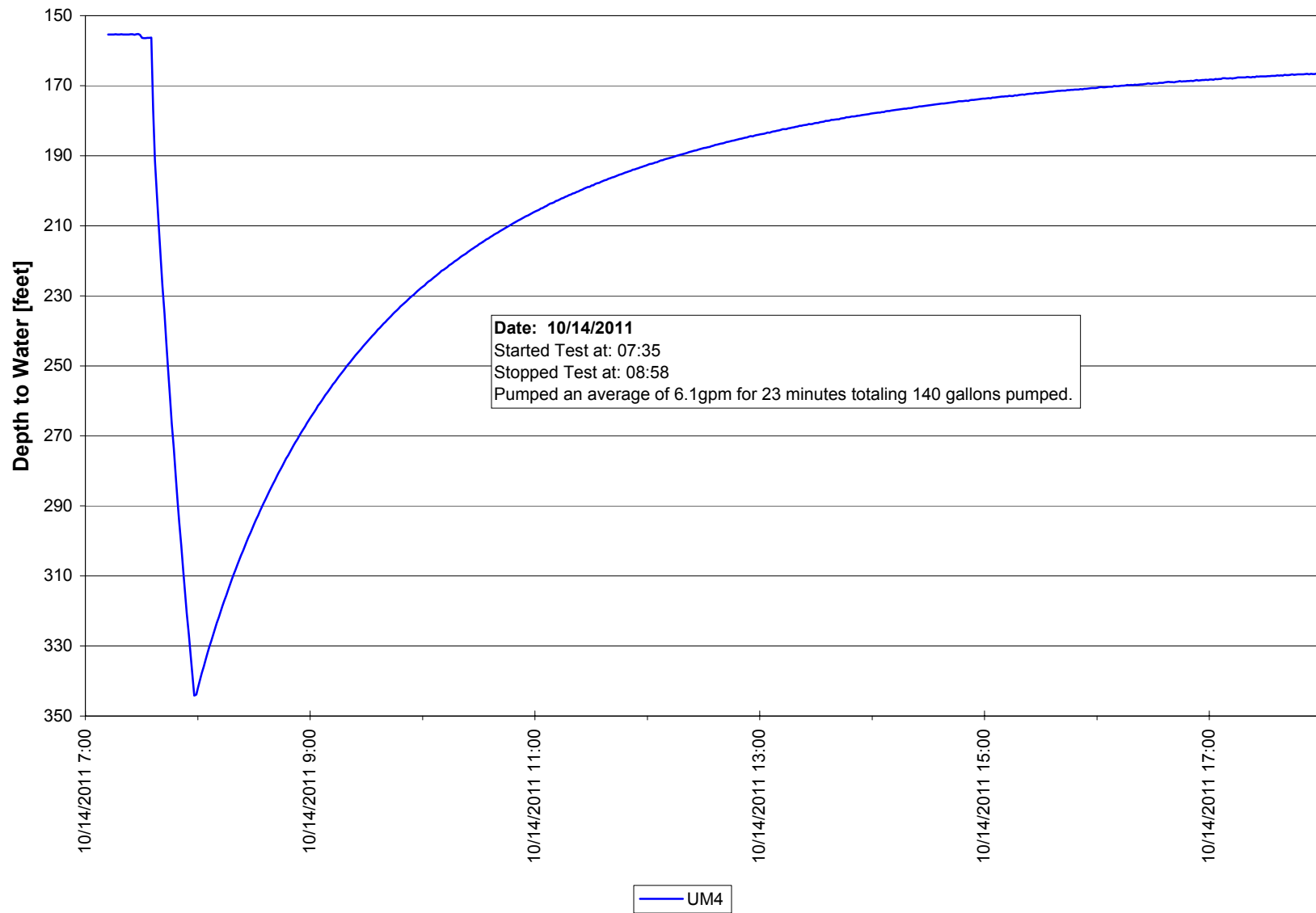


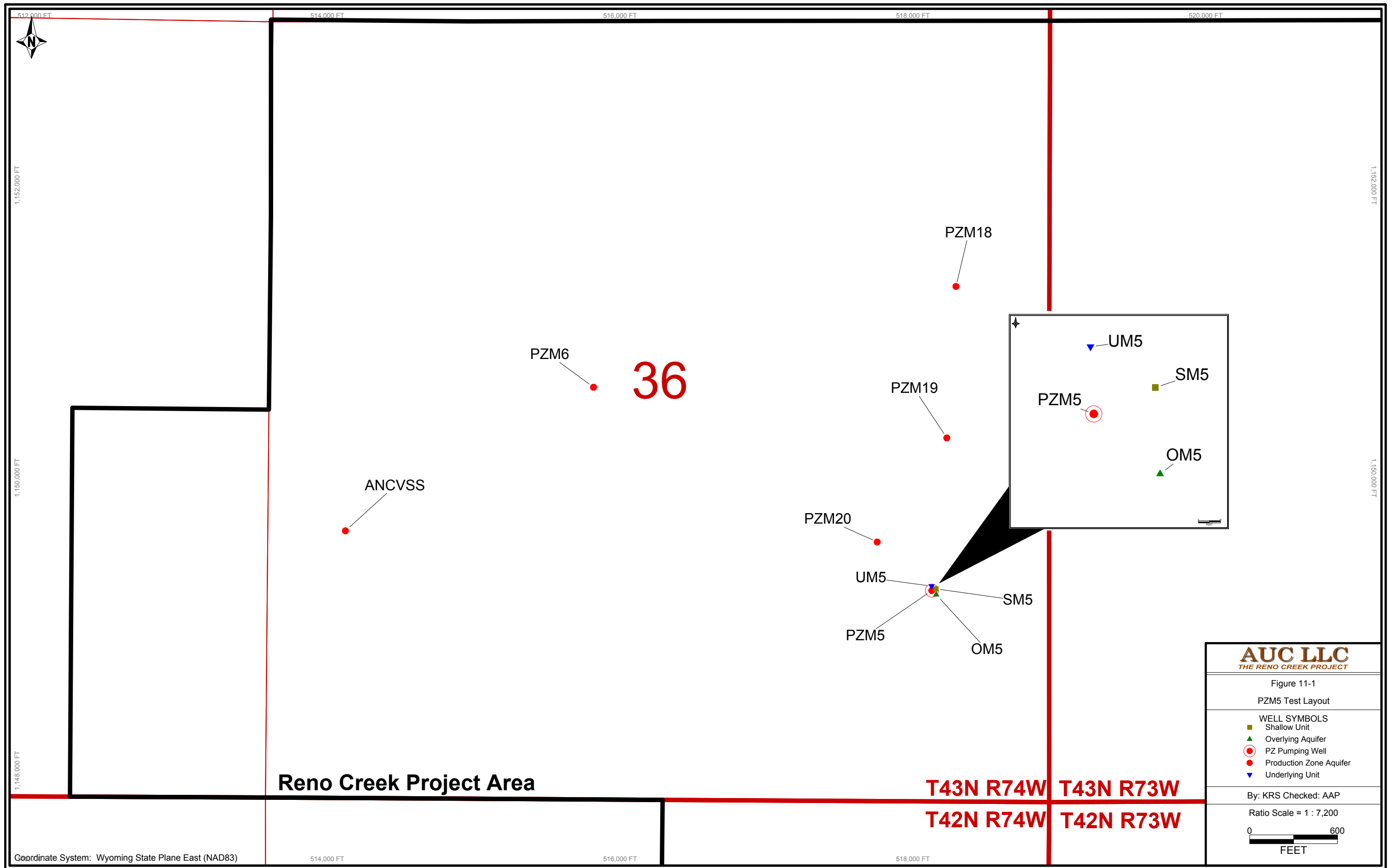


**Figure 10-12. OM4 Single-well Test Water Level Data
Reno Creek Project**

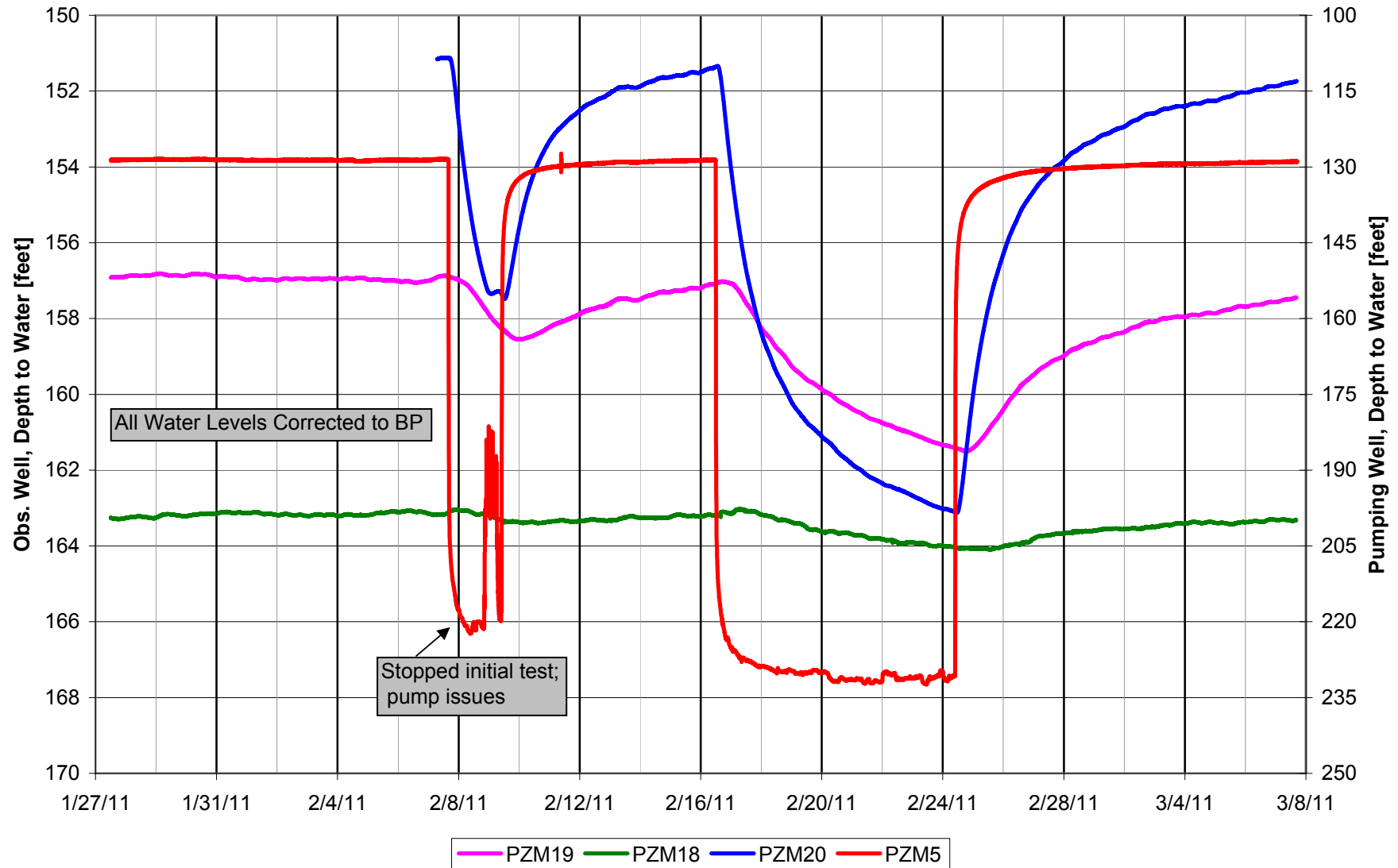


**Figure 10-13. UM4 Single-well Test Water Level Data
Reno Creek Project**

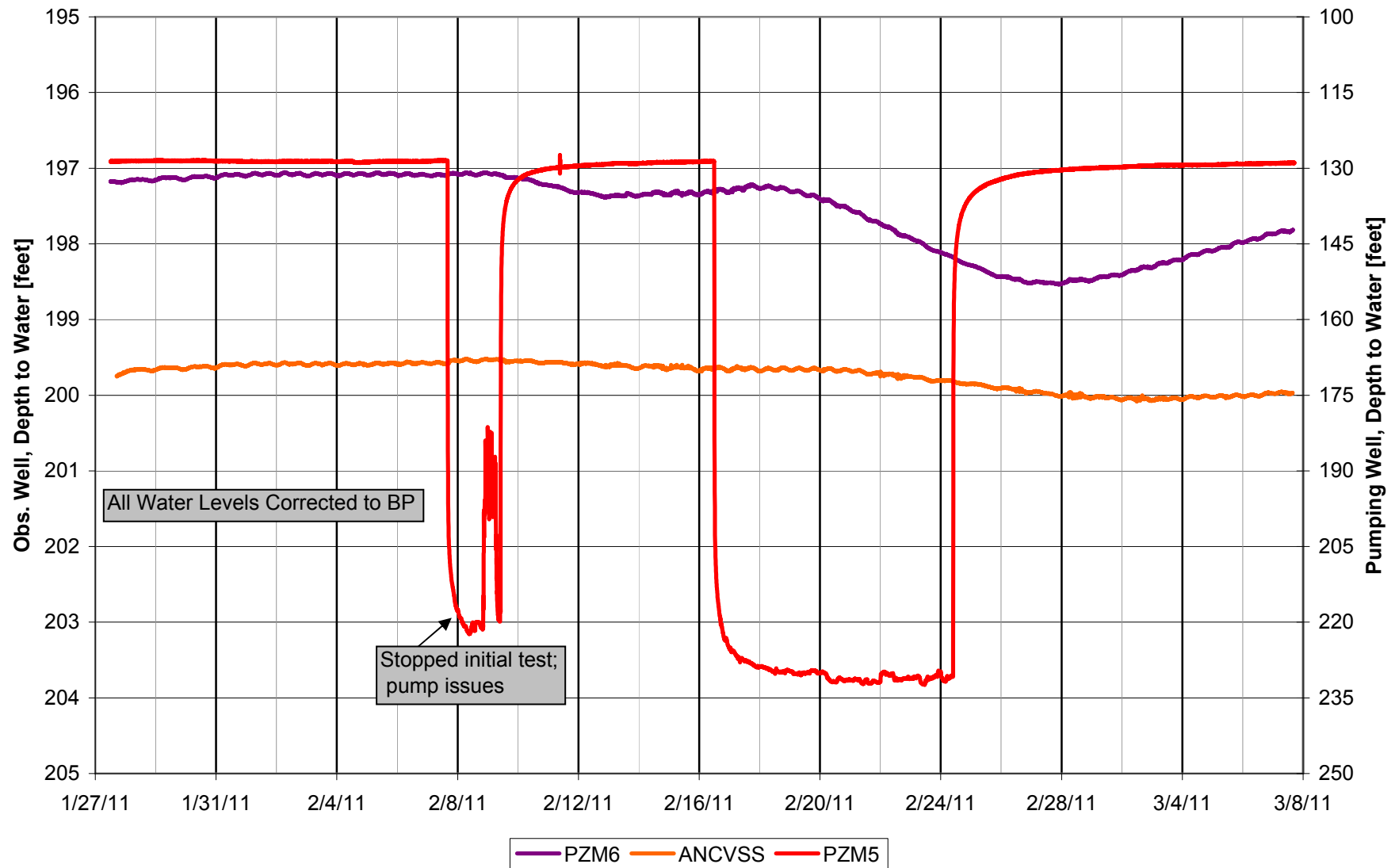




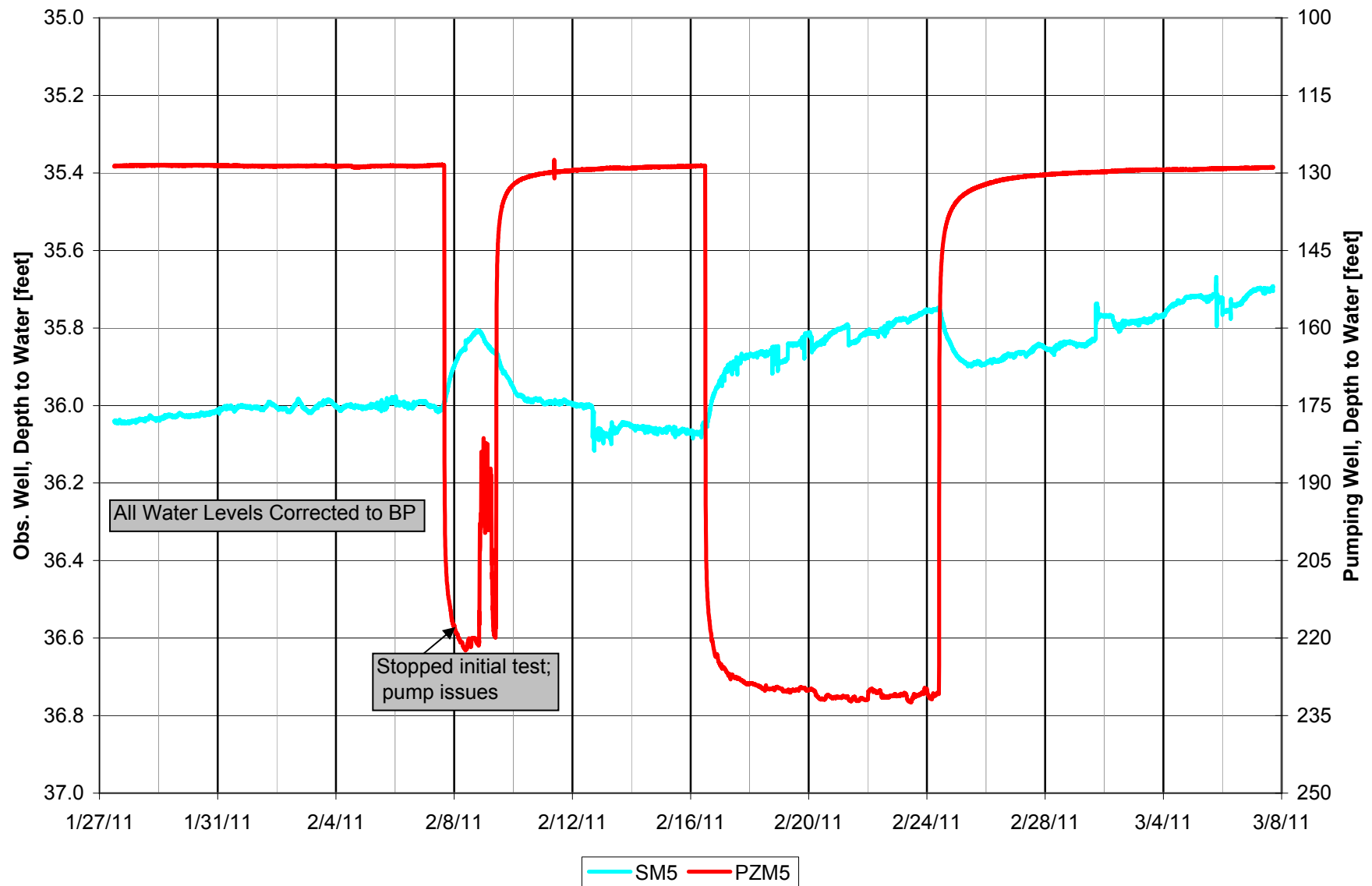
**Figure 11-2. Production Zone Observation Wells PZM18, PZM19 and PZM20
vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project**



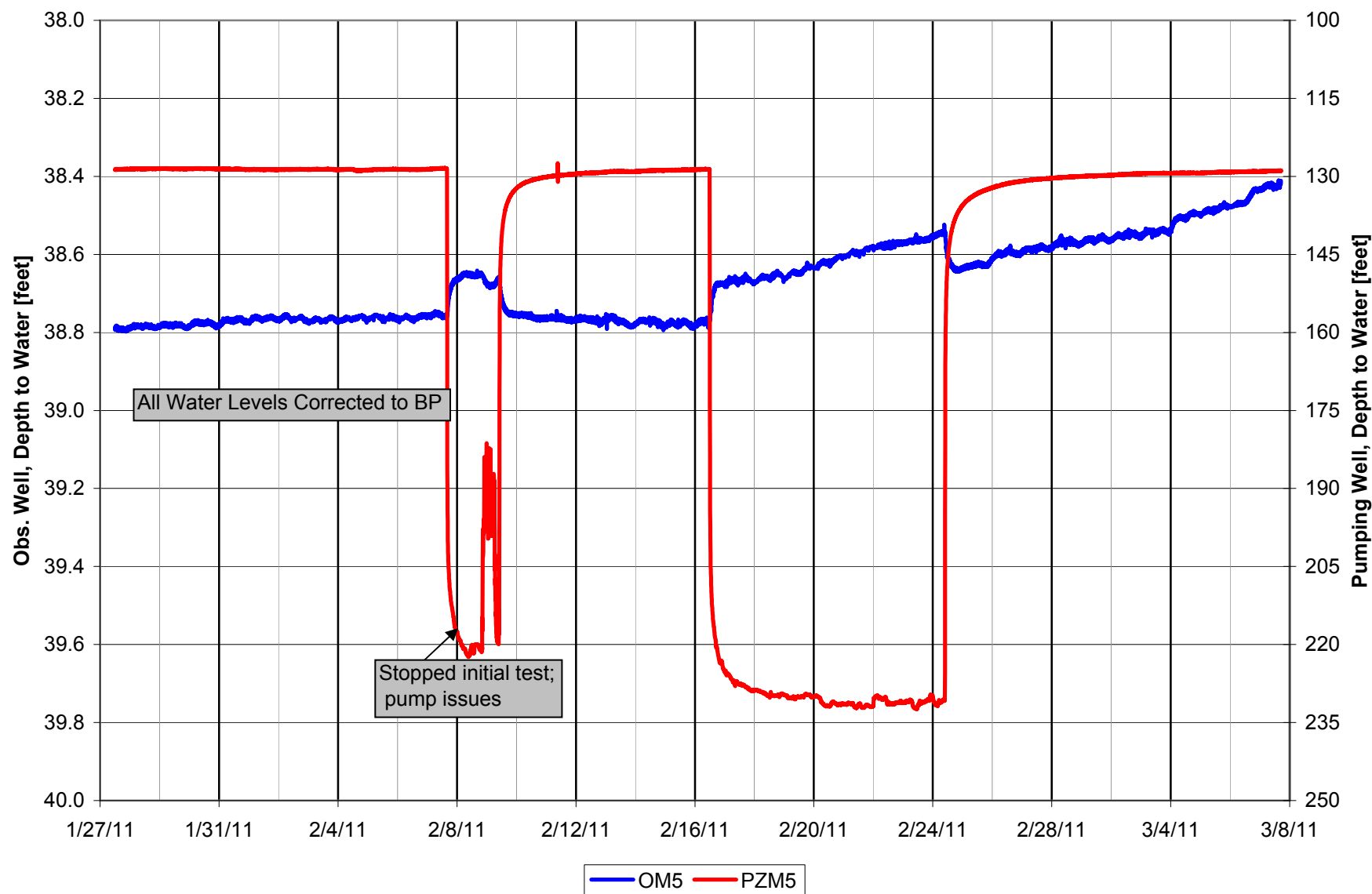
**Figure 11-3. Production Zone Observation Wells PZM6 and BLM ANCVSS
vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project**



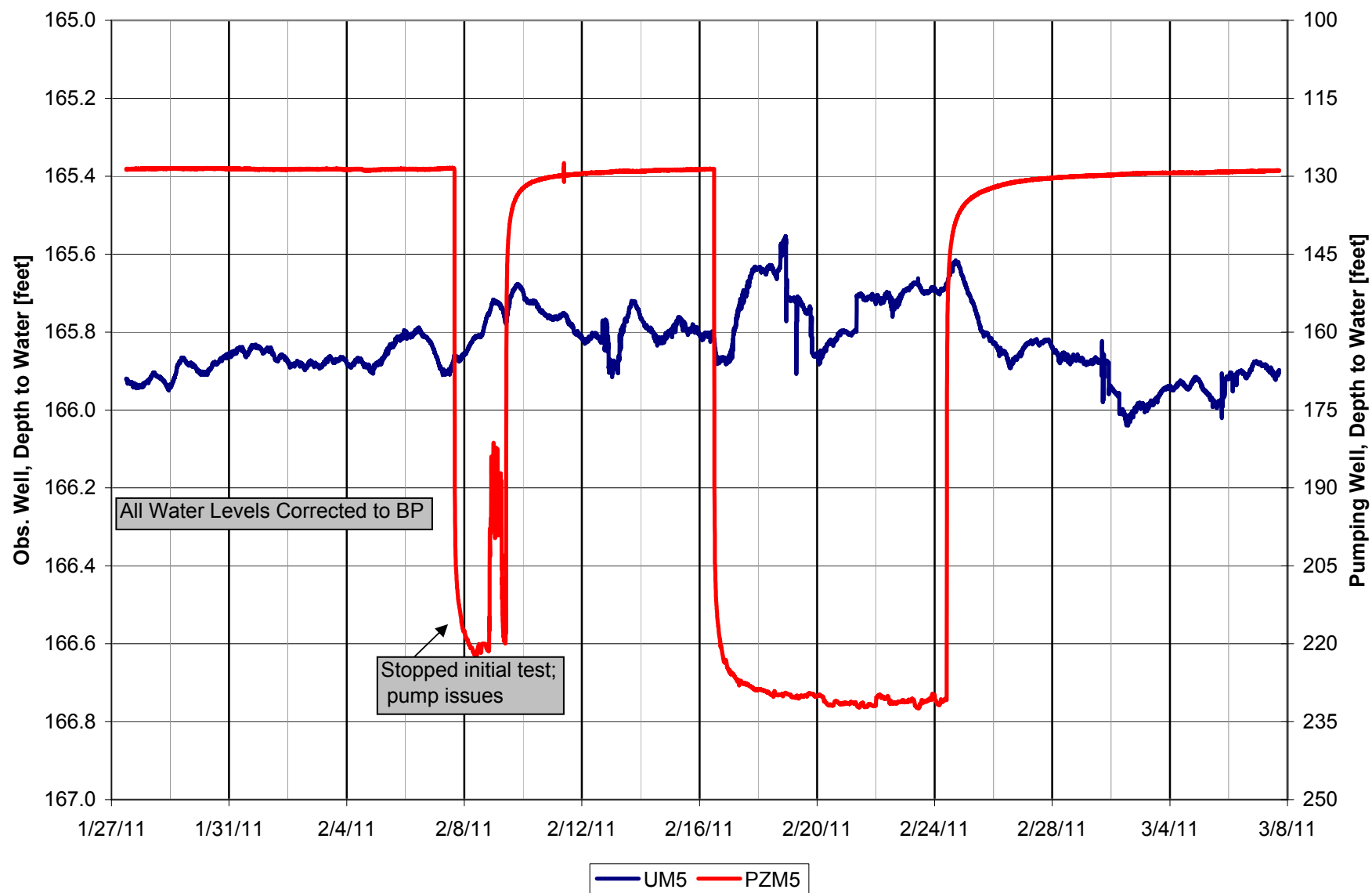
**Figure 11-4. Shallow Water Table Unit Well SM5 vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project**

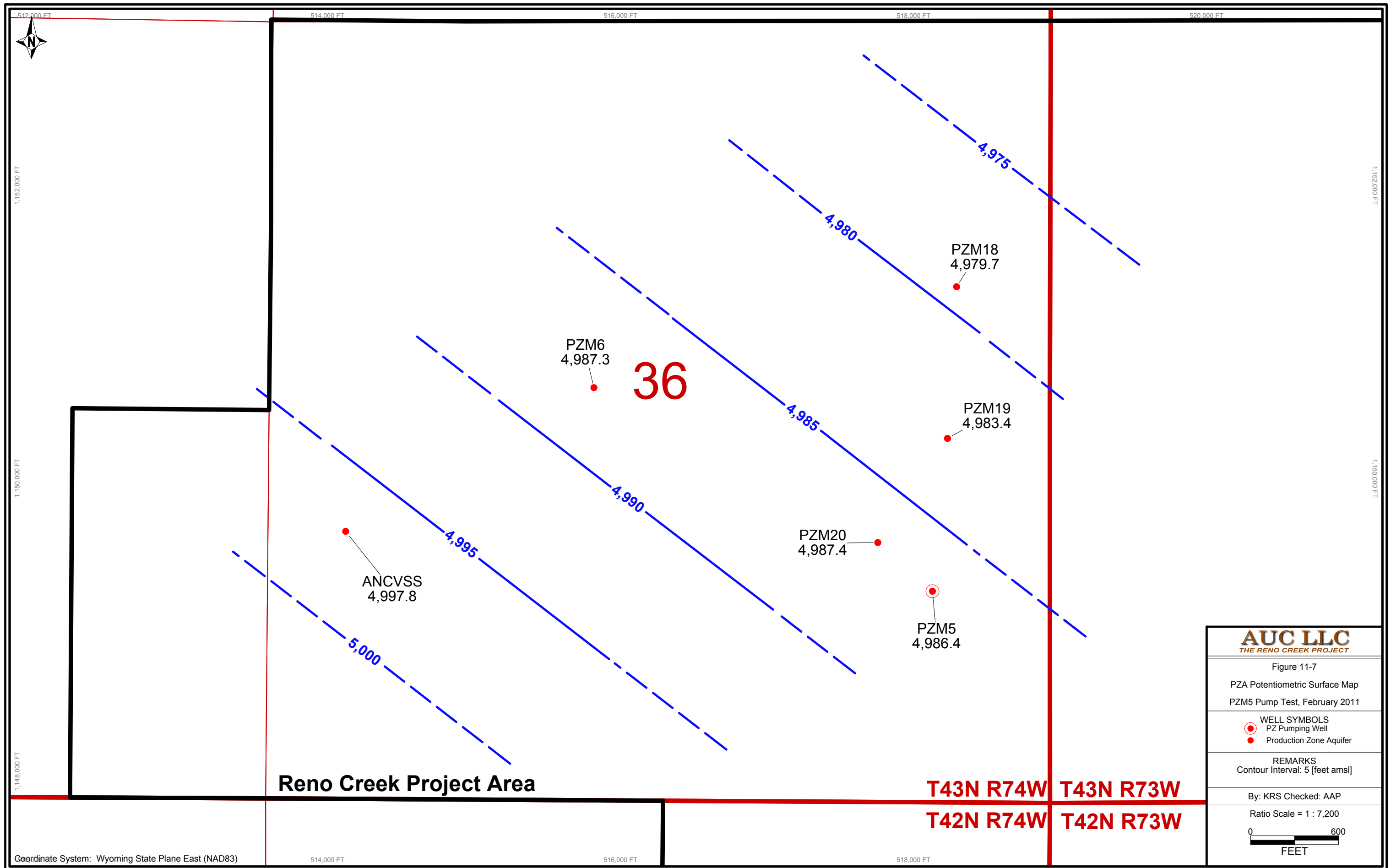


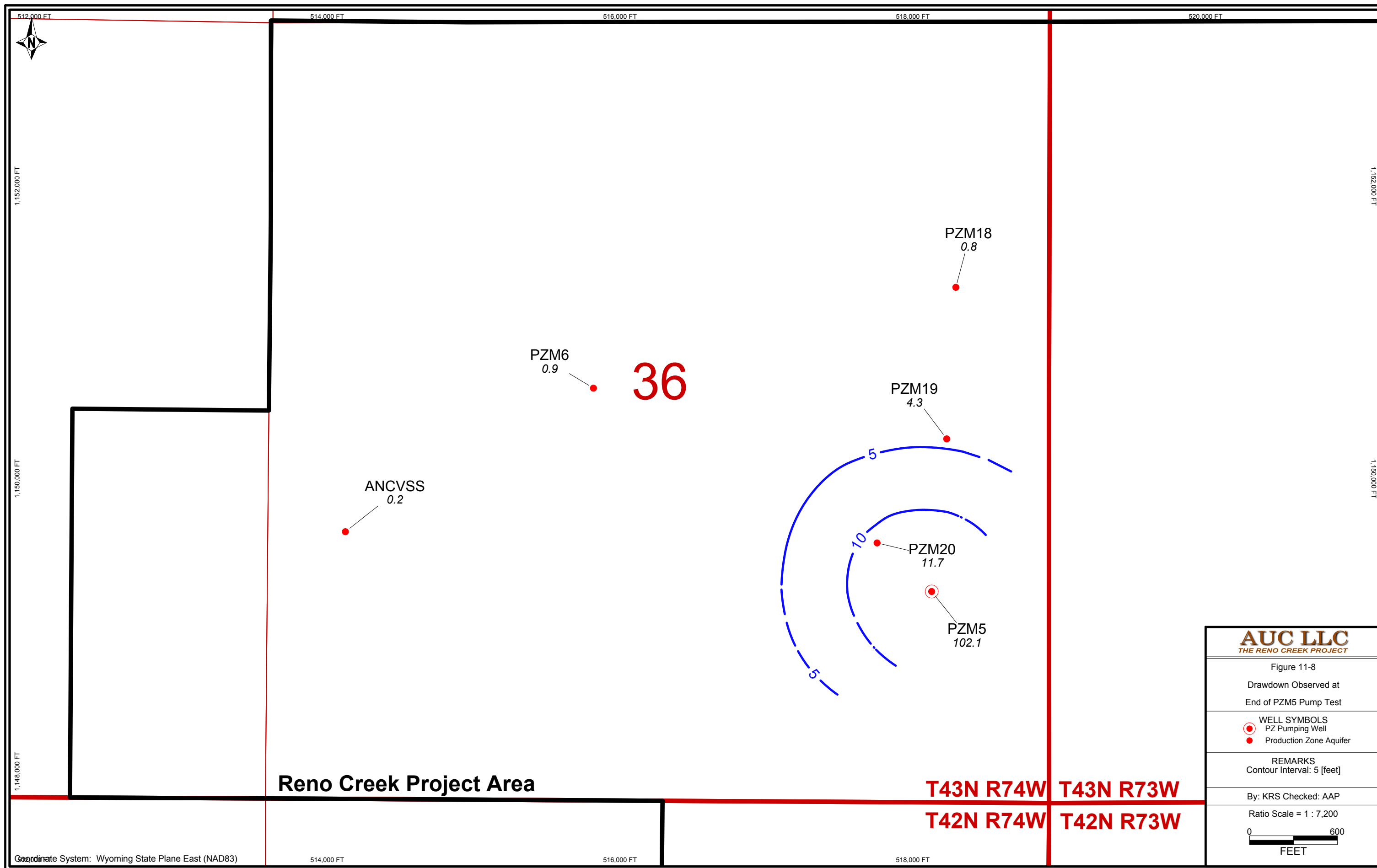
**Figure 11-5. Overlying Aquifer Observation Well OM5 vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project**



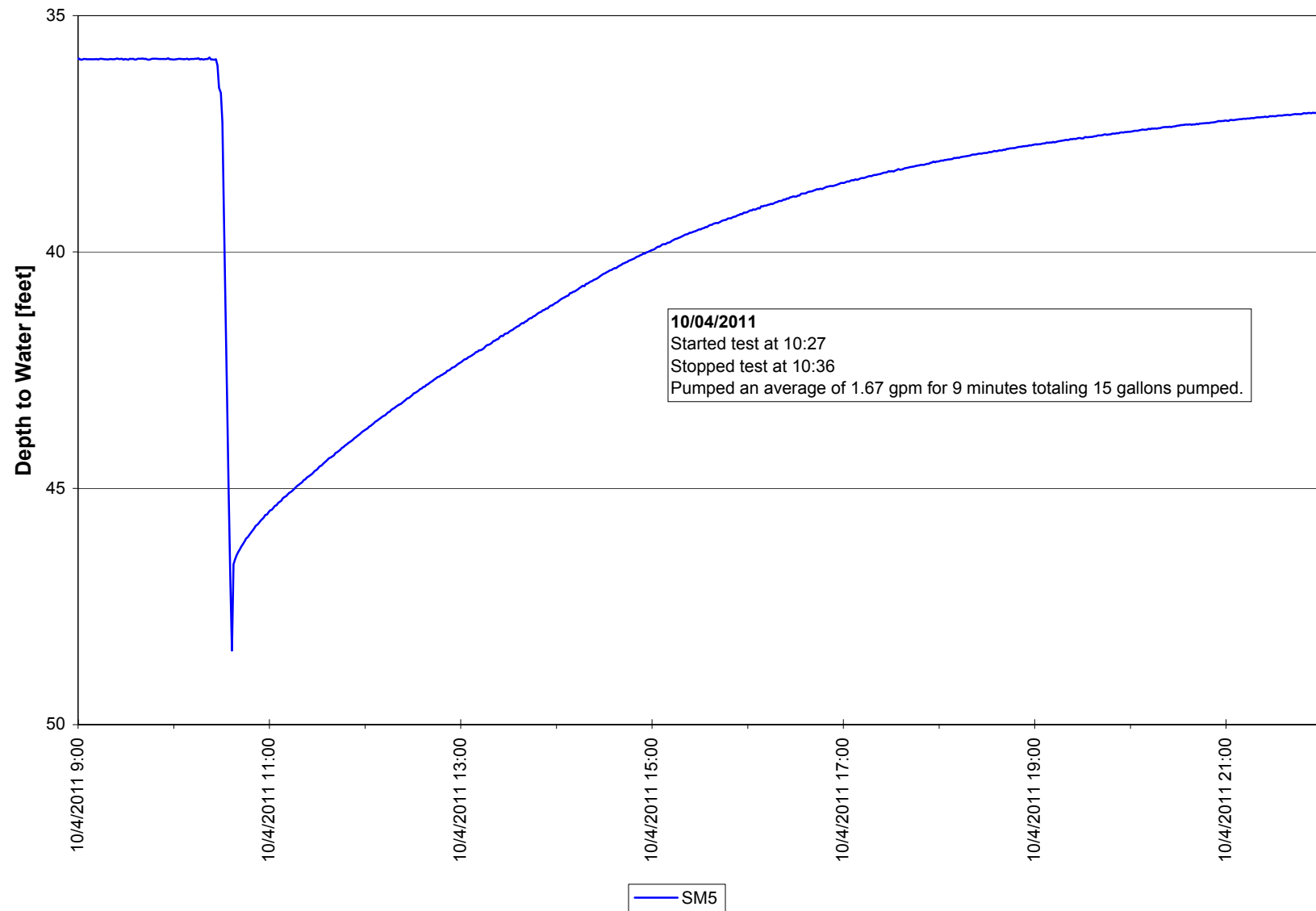
**Figure 11-6. Underlying Unit Observation Well UM5 vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project**



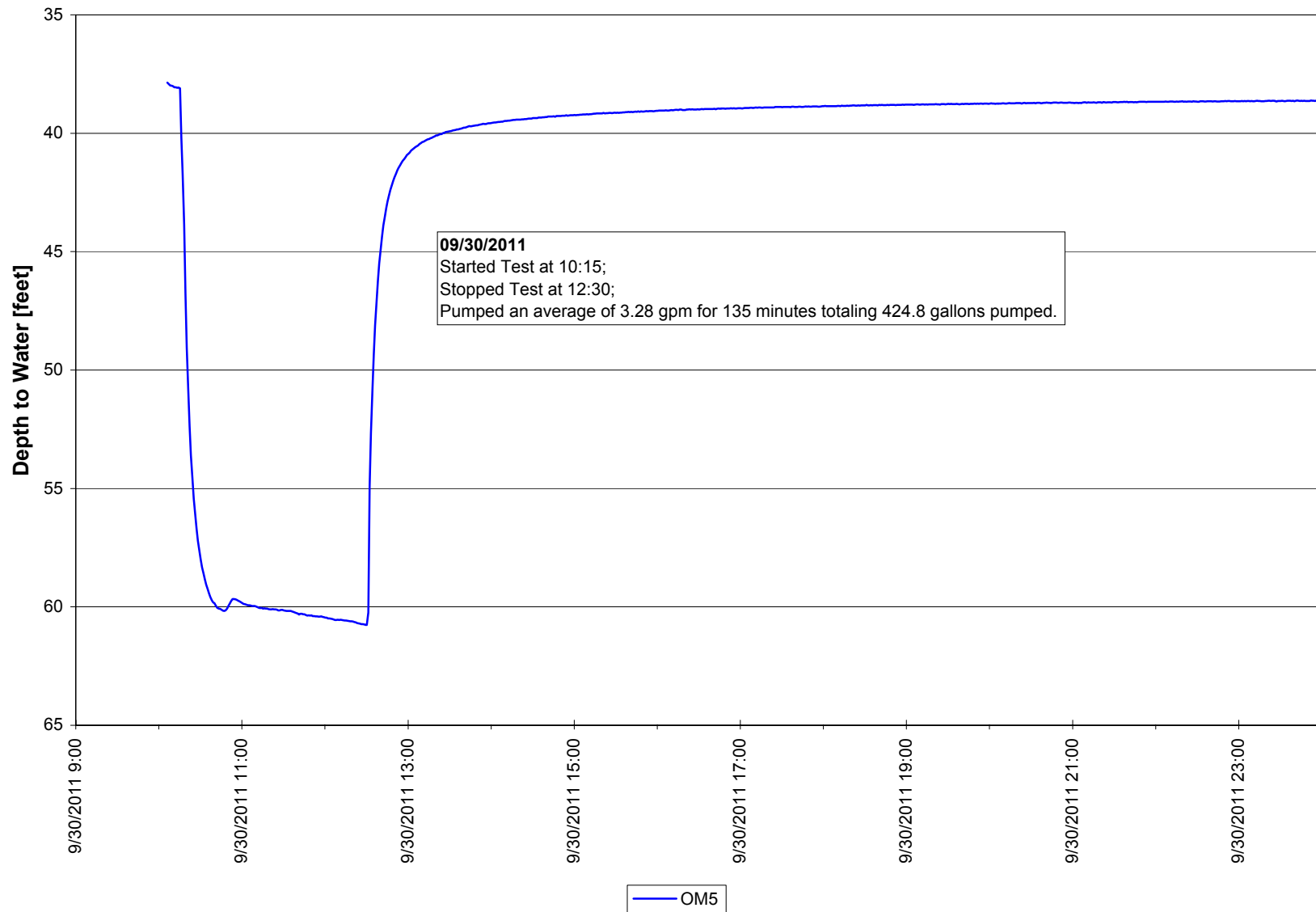




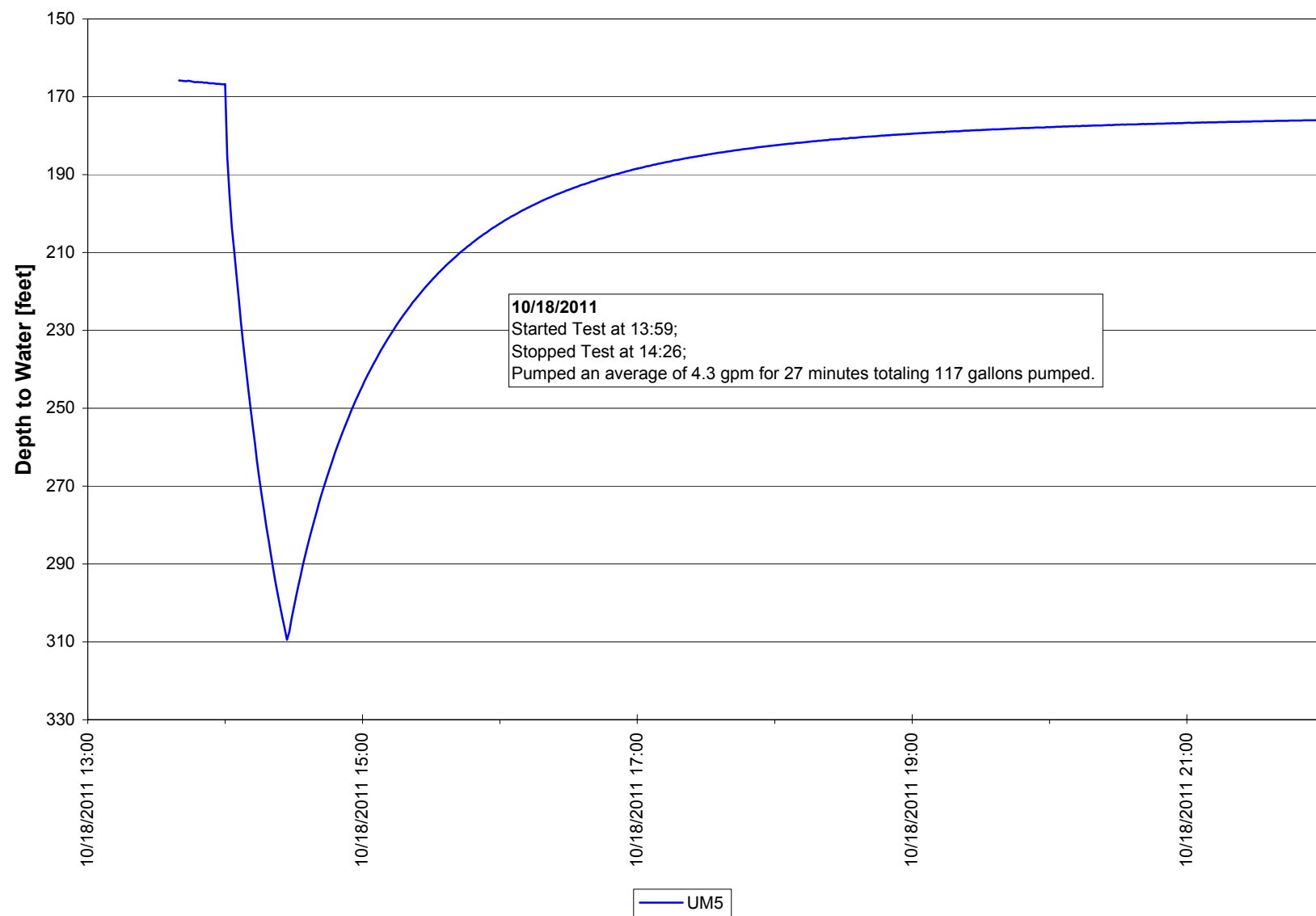
**Figure 11-9. SM5 Single-well Test Water Level Data
Reno Creek Project**



**Figure 11-10. OM5 Single-well Test Water Level Data
Reno Creek Project**



**Figure 11-11. UM5 Single-well Test Water Level Data
Reno Creek Project**



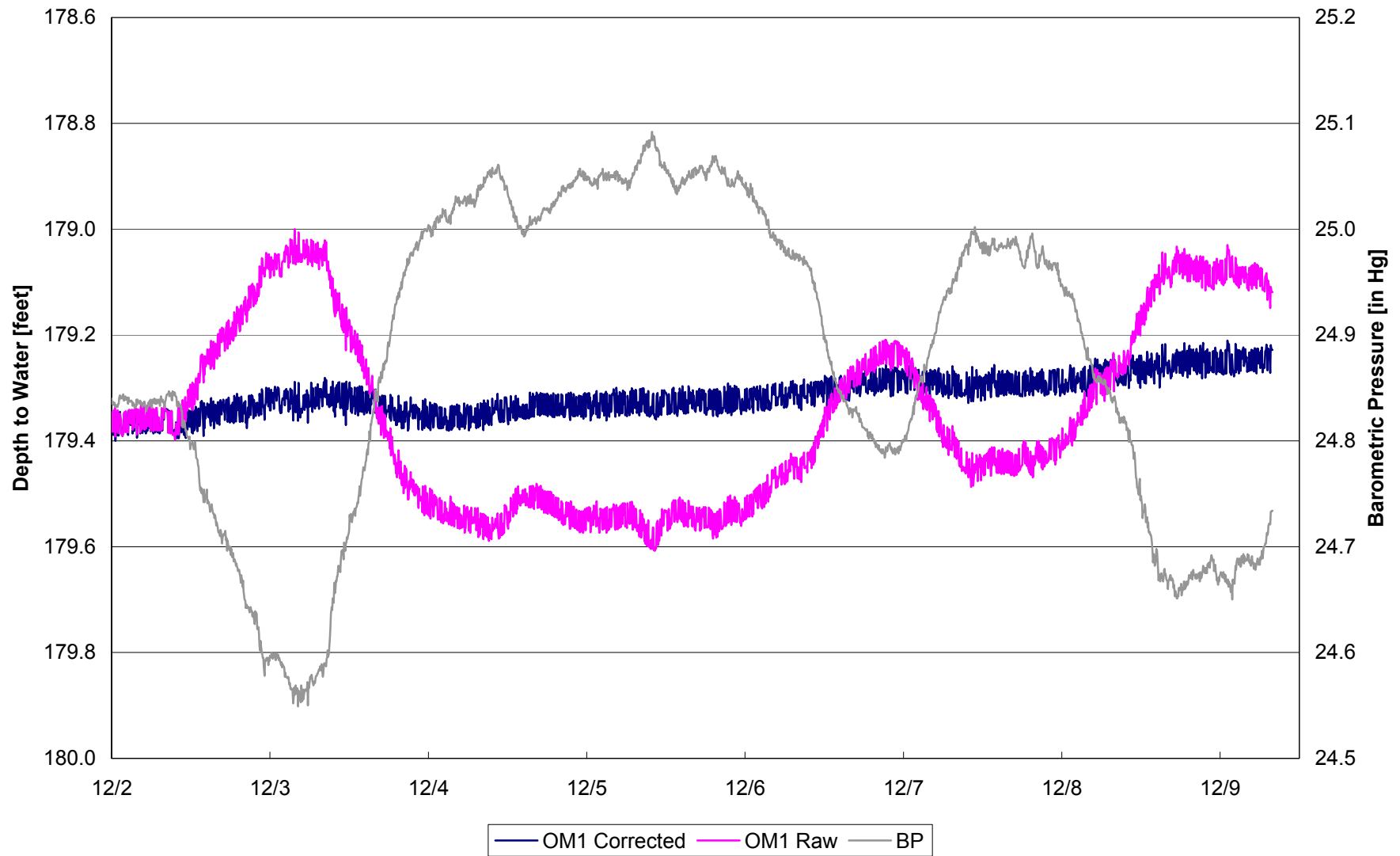
APPENDIX A

WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

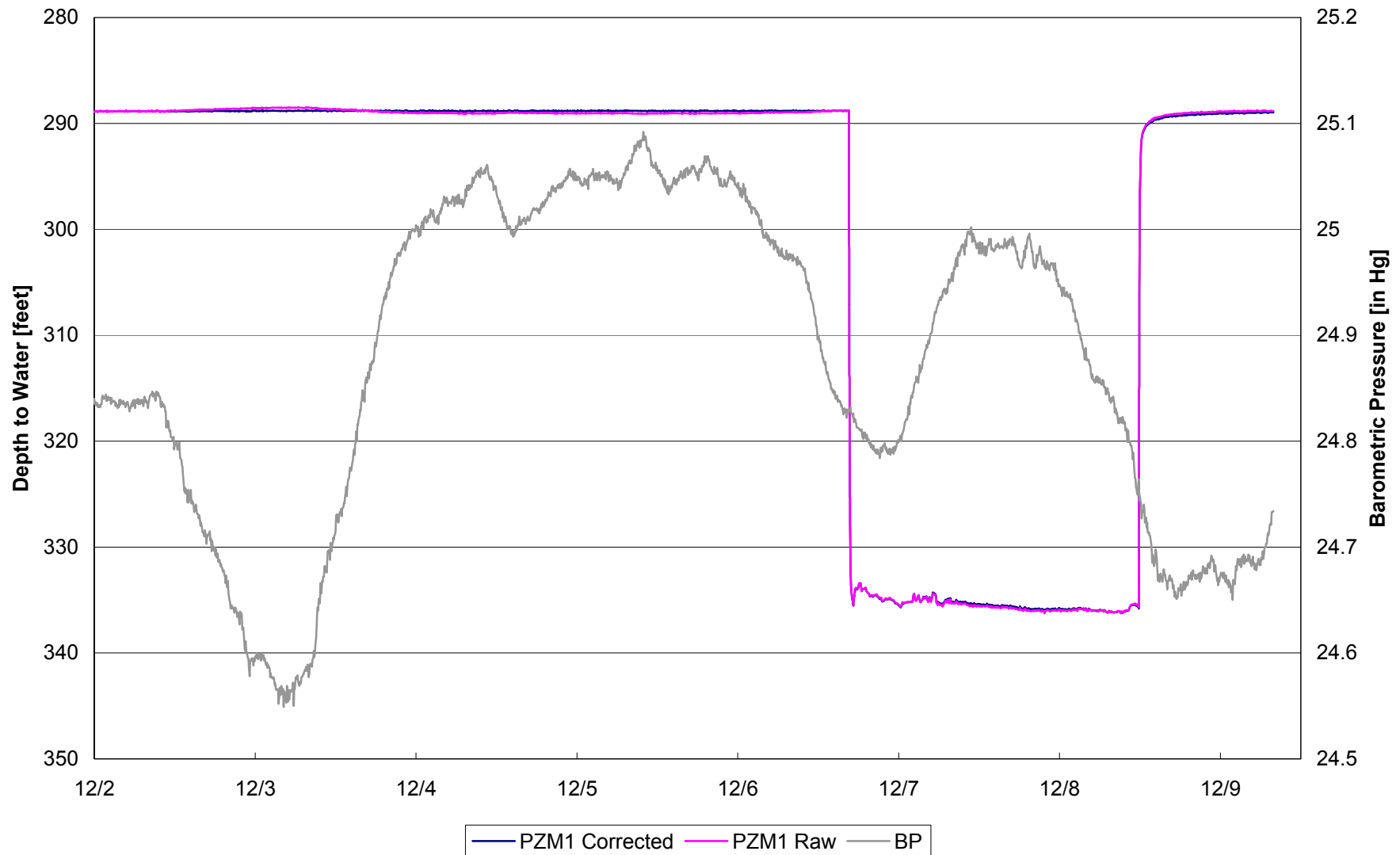
PZM1 PUMP TEST

WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

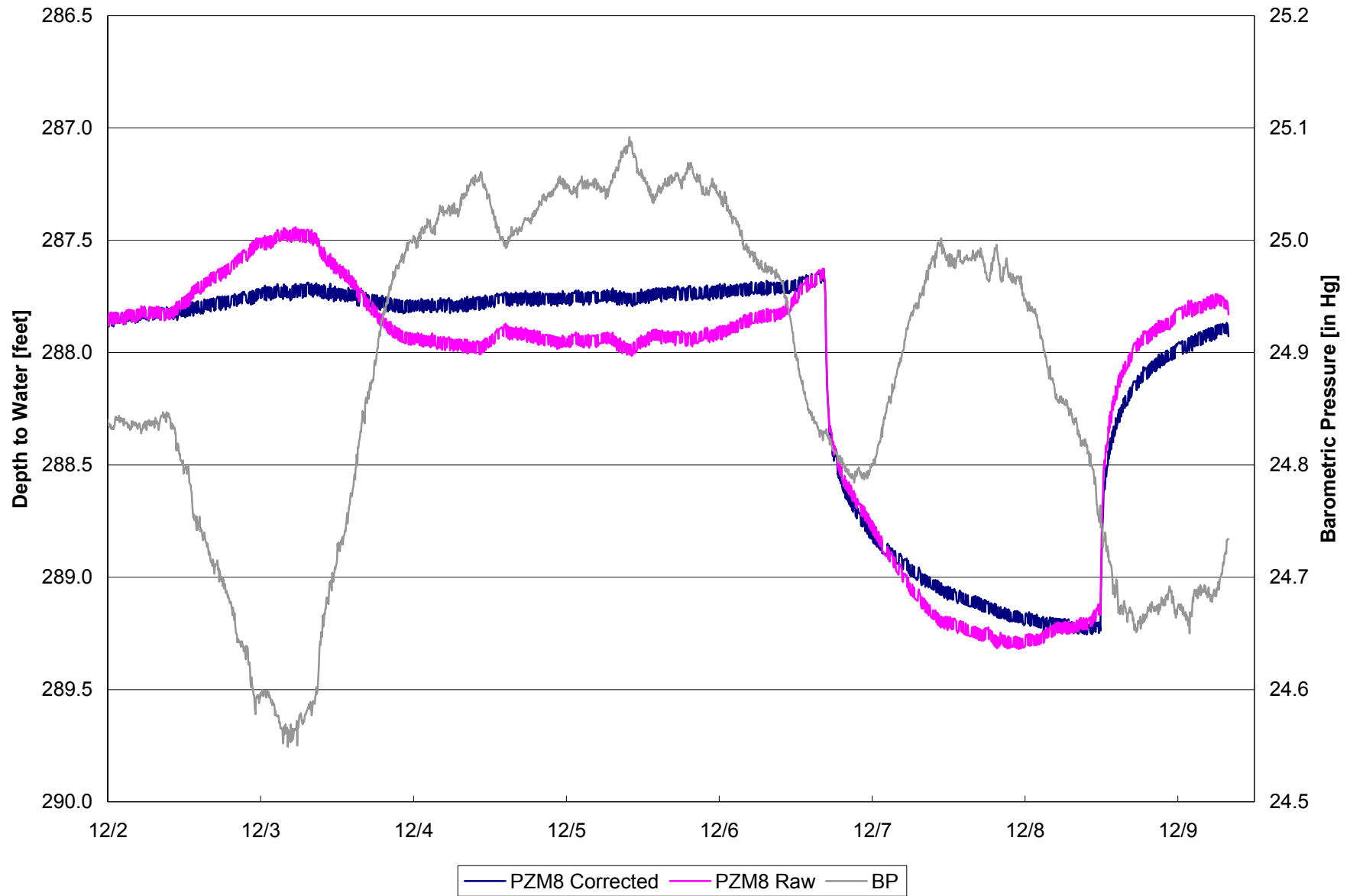
**Barometric Corrections to Water Level, OM1
PZM1 Pump Test, AUC Reno Creek Project**



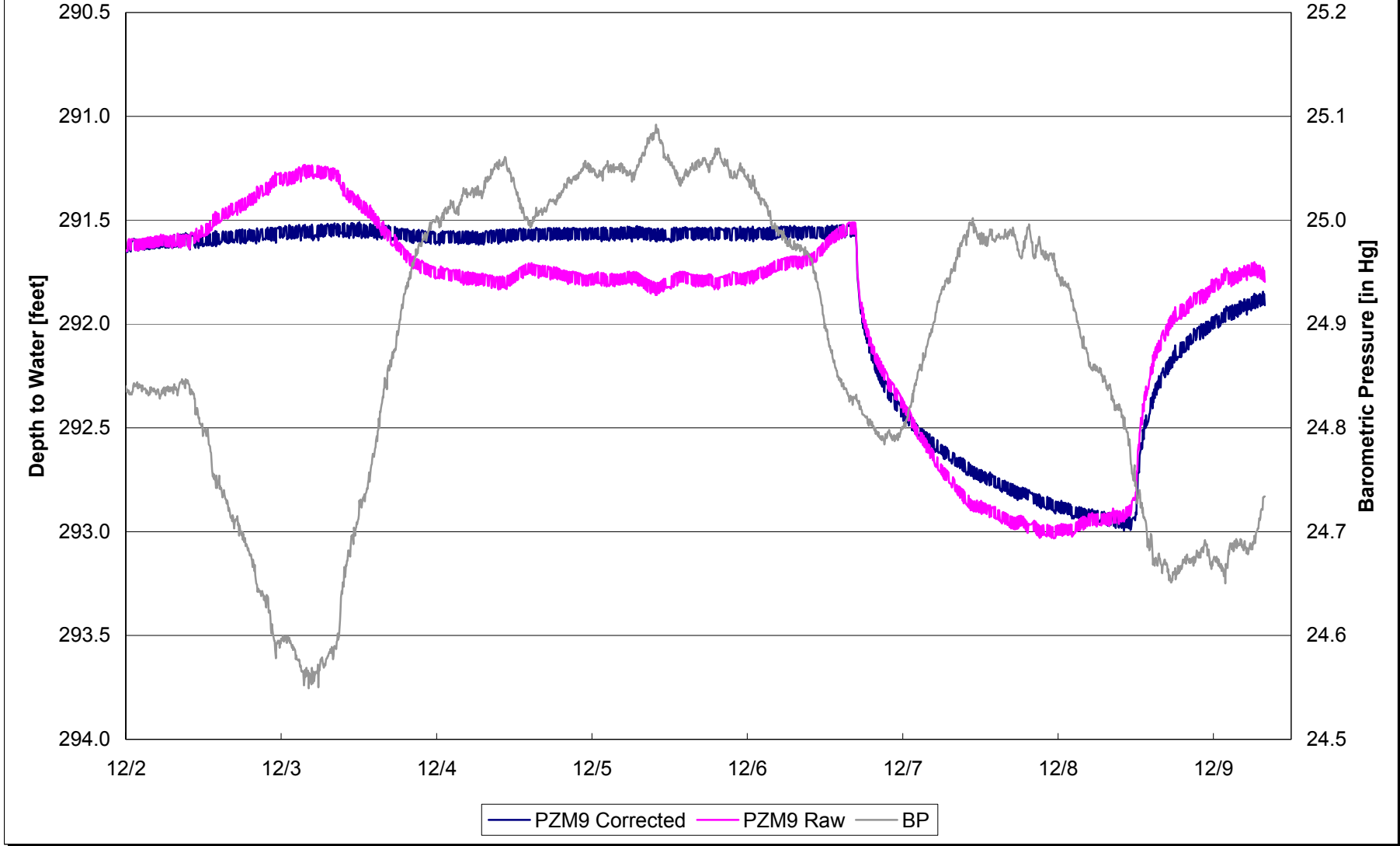
Barometric Corrections to Water Level, PZM1 (Pumping Well)
PZM1 Pump Test, AUC Reno Creek Project



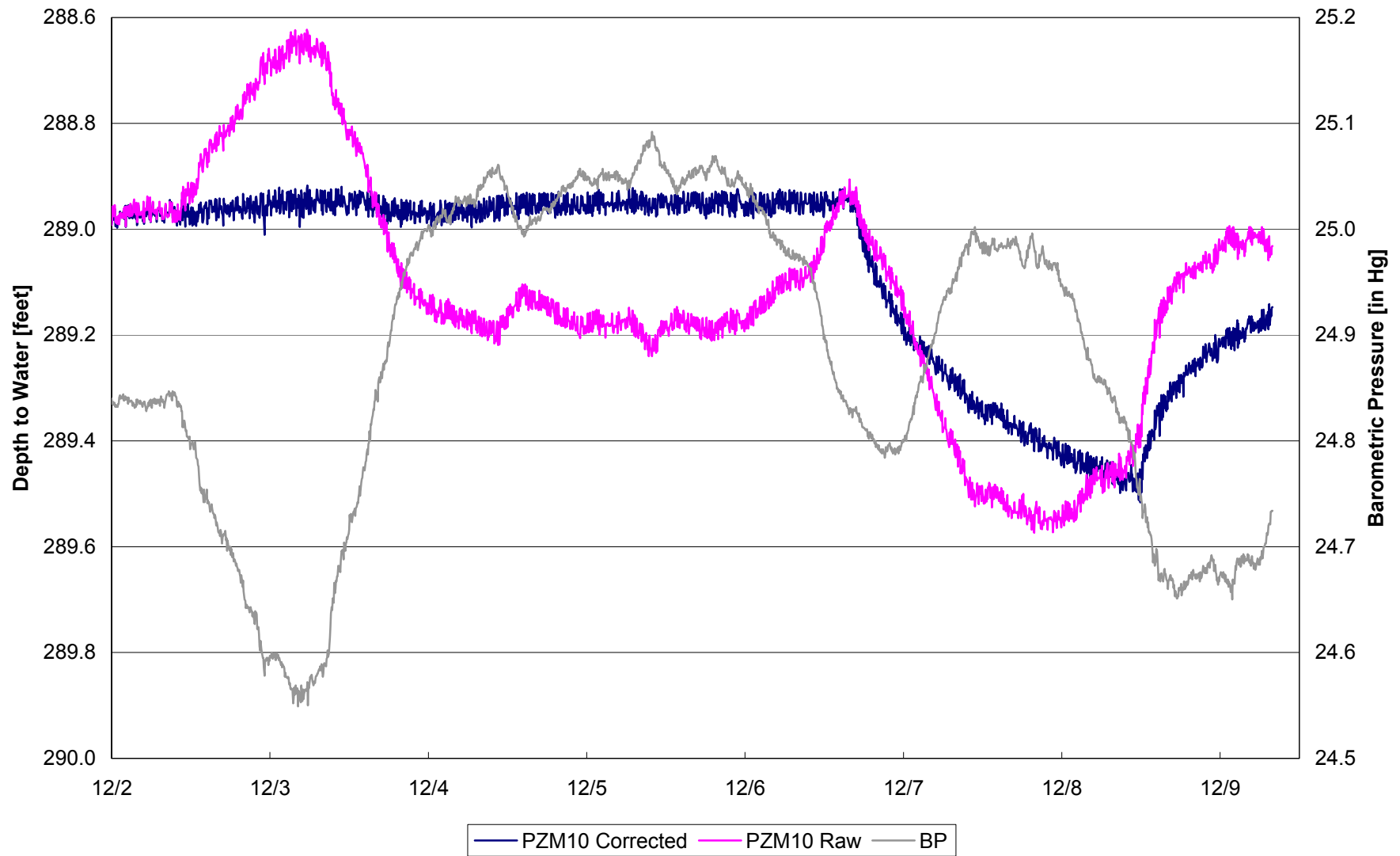
**Barometric Corrections to Water Level, PZM8
PZM1 Pump Test, AUC Reno Creek Project**



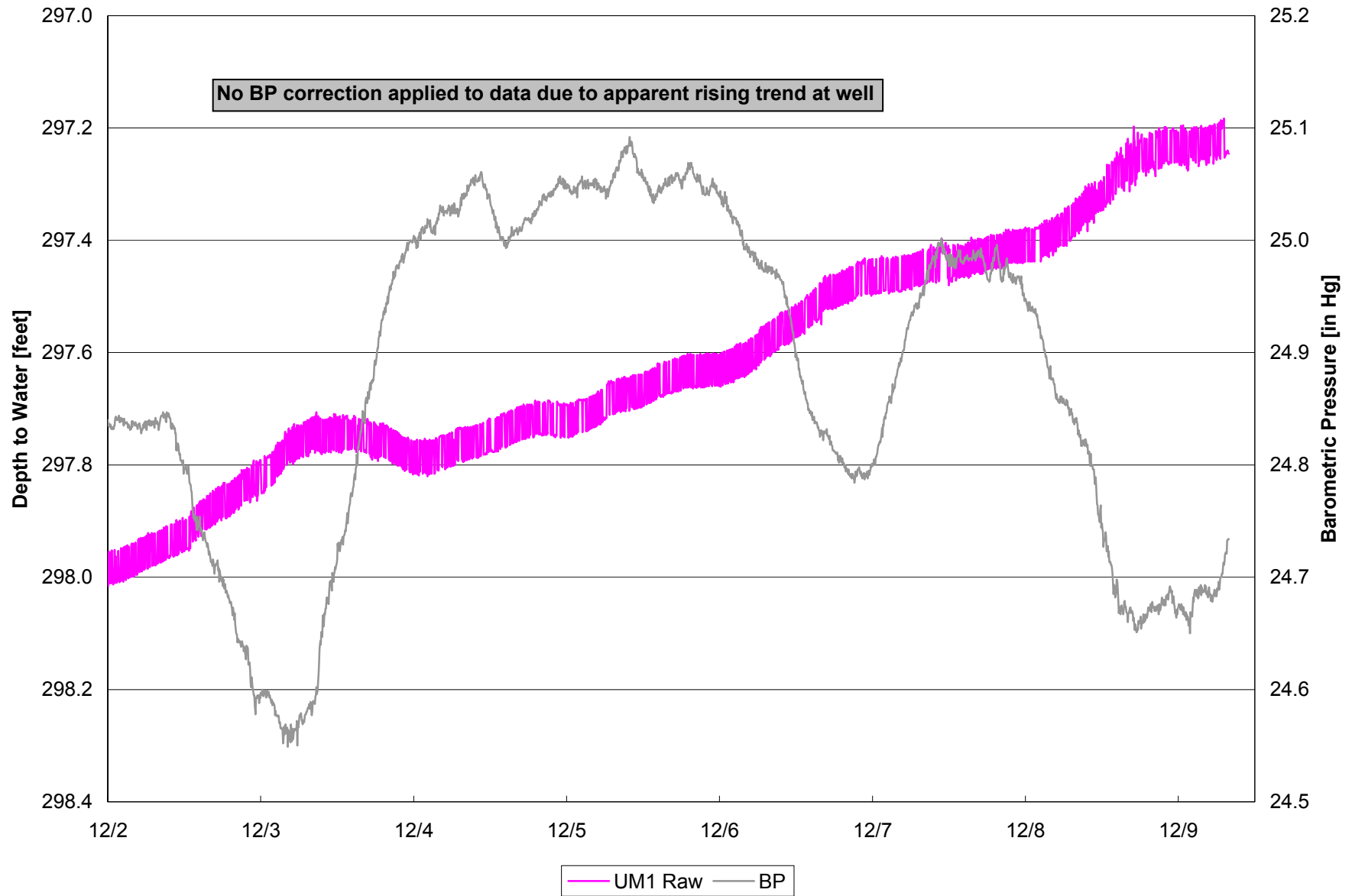
Barometric Corrections to Water Level, PZM9
PZM1 Pump Test, AUC Reno Creek Project



**Barometric Corrections to Water Level, PZM10
PZM1 Pump Test, AUC Reno Creek Project**



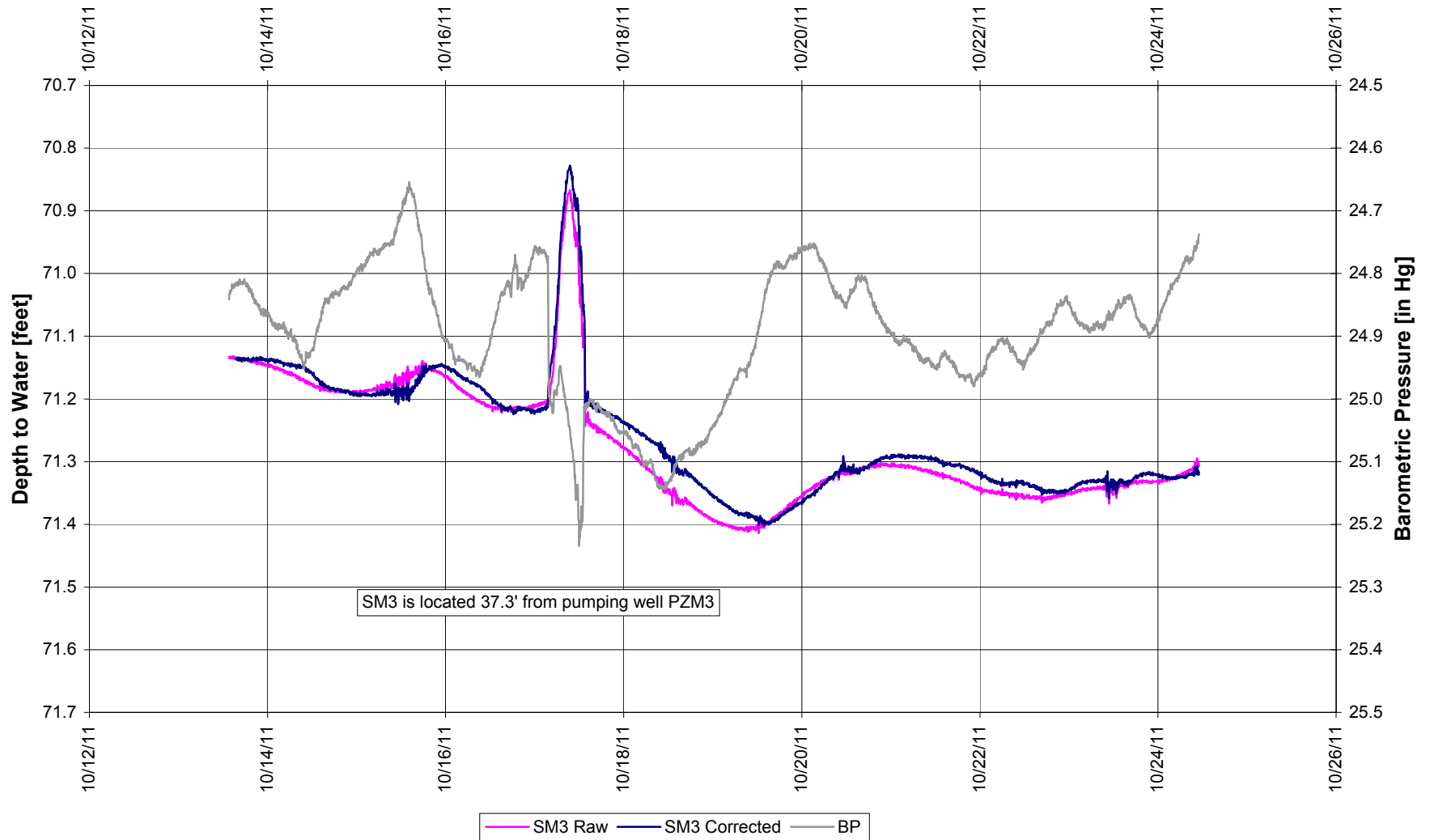
**Barometric Corrections to Water Level, UM1
PZM1 Pump Test, AUC Reno Creek Project**



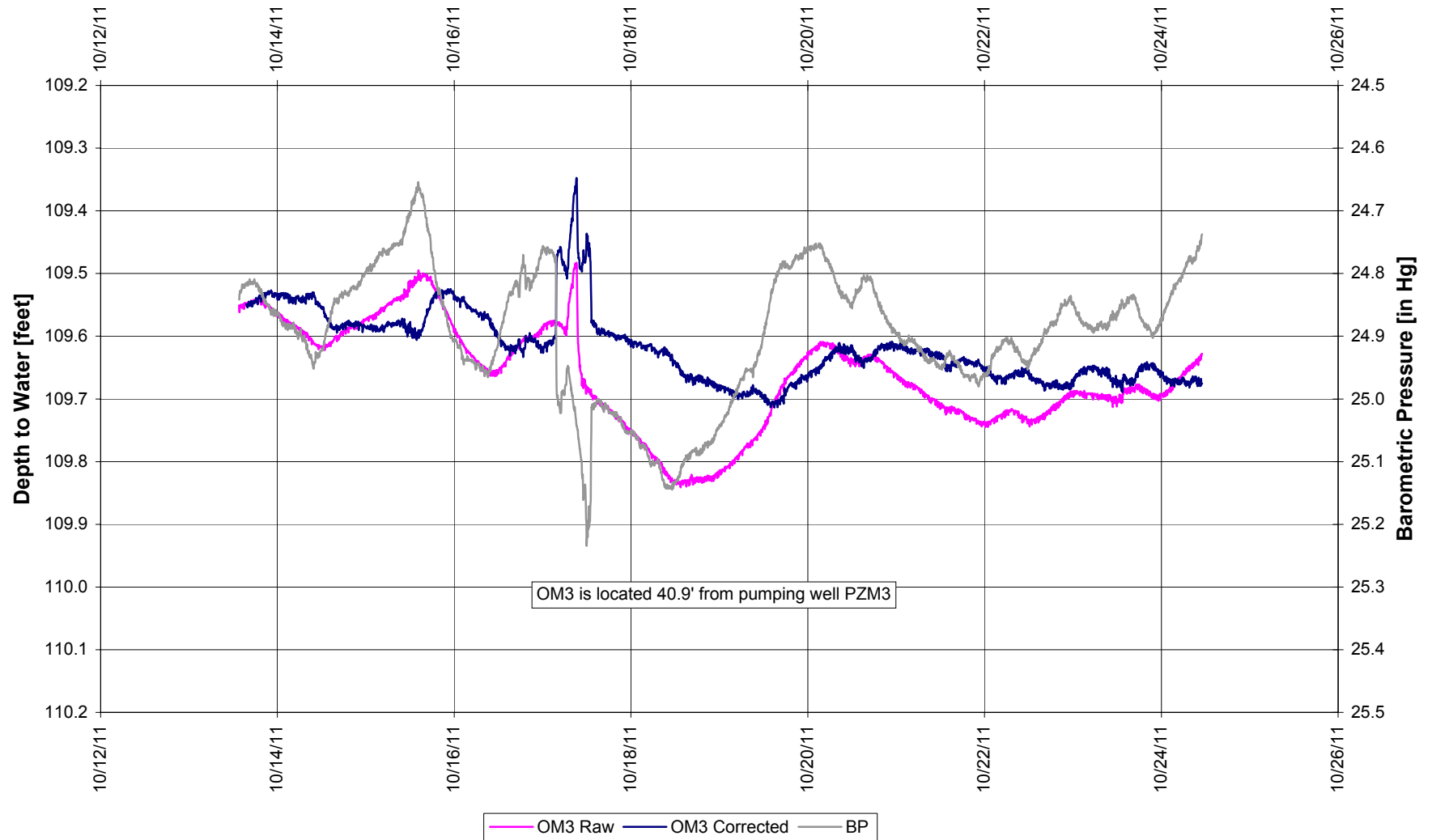
PZM3 PUMP TEST

WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

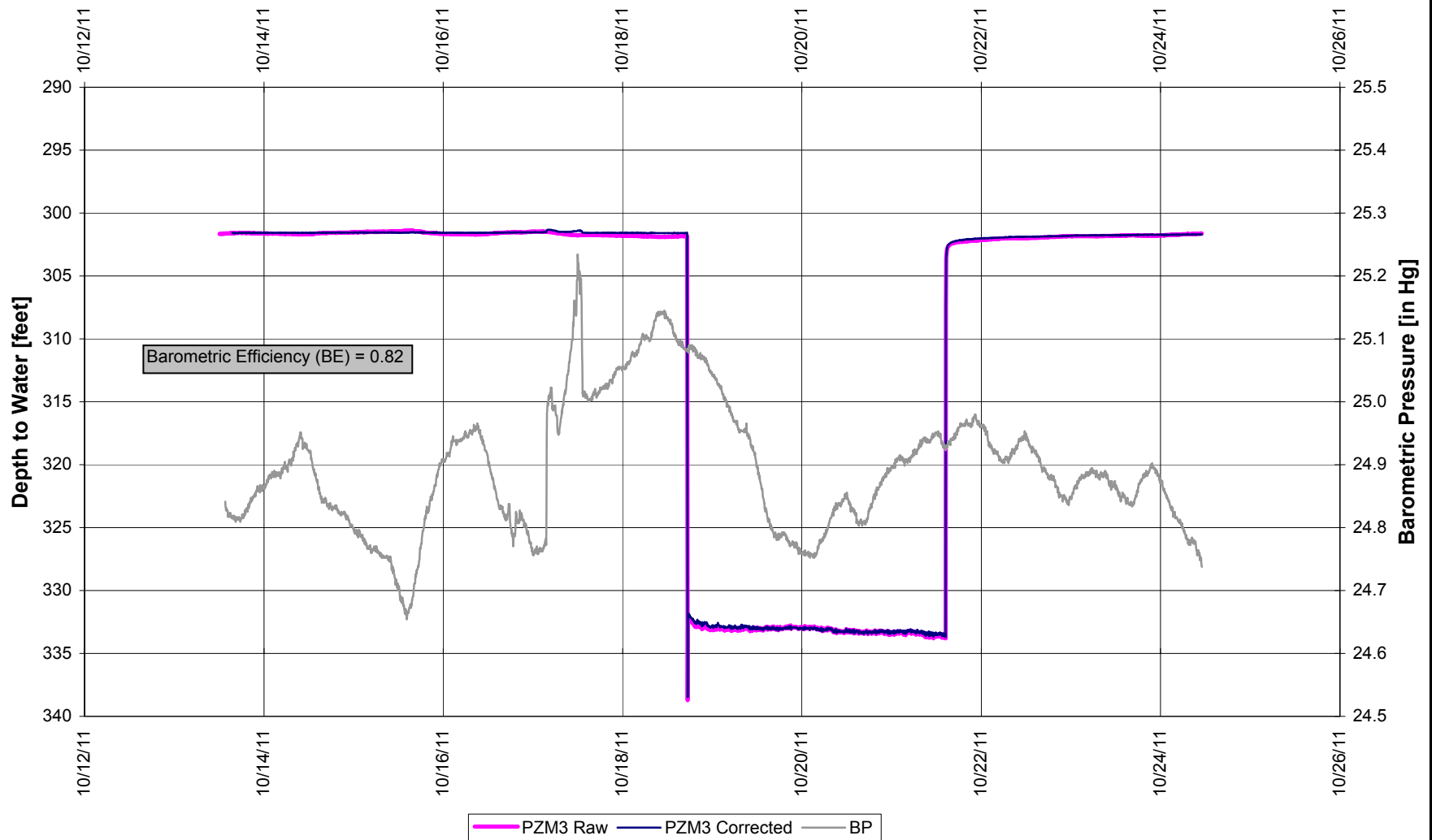
Barometric Corrections to Water Level, SM3 PZM3 Pump Test, AUC Reno Creek Project



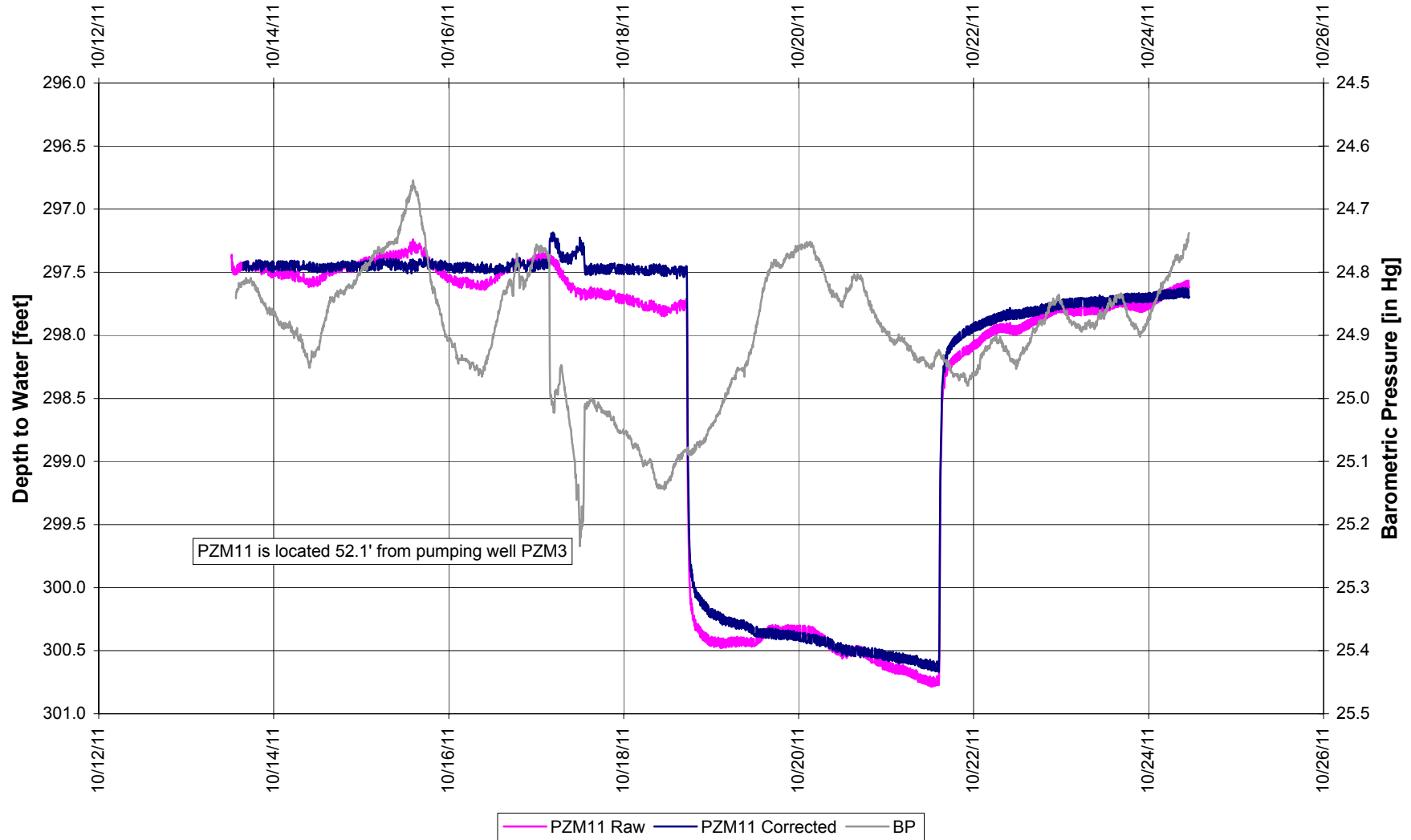
Barometric Corrections to Water Level, OM3 PZM3 Pump Test, AUC Reno Creek Project



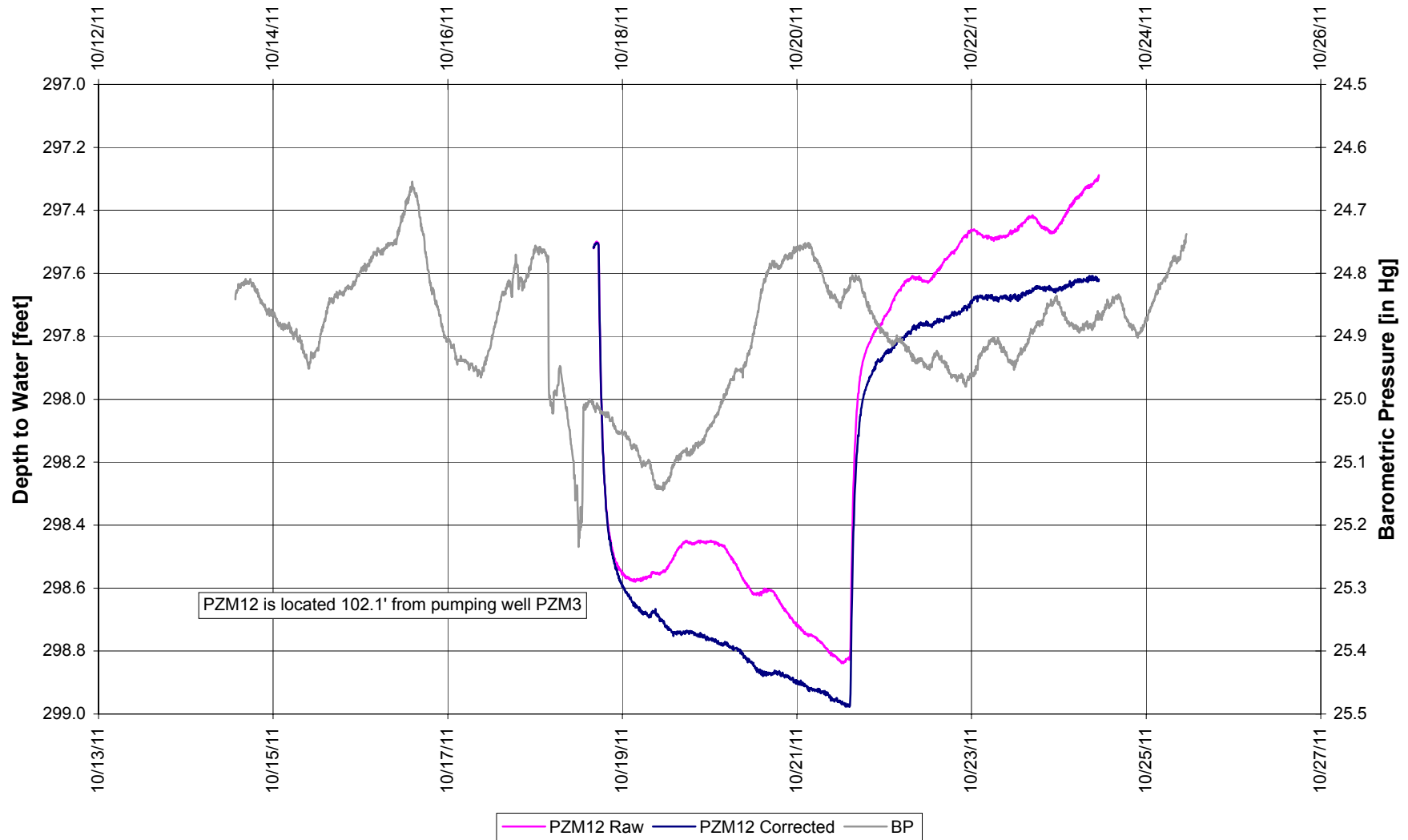
**Barometric Corrections to Water Level, PZM3 (Pumping Well)
PZM3 Pump Test, AUC Reno Creek Project**



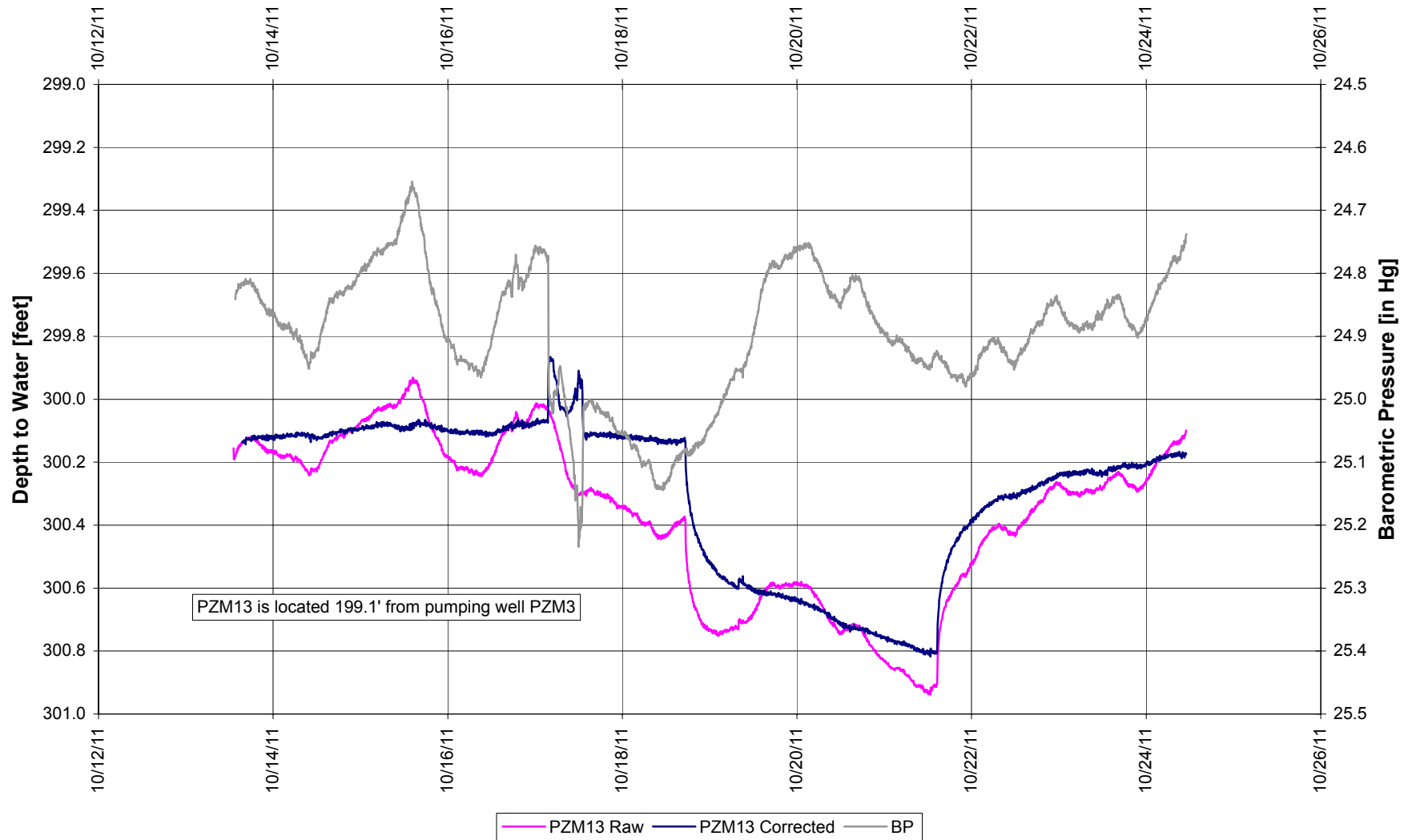
Barometric Corrections to Water Level, PZM11 PZM3 Pump Test, AUC Reno Creek Project



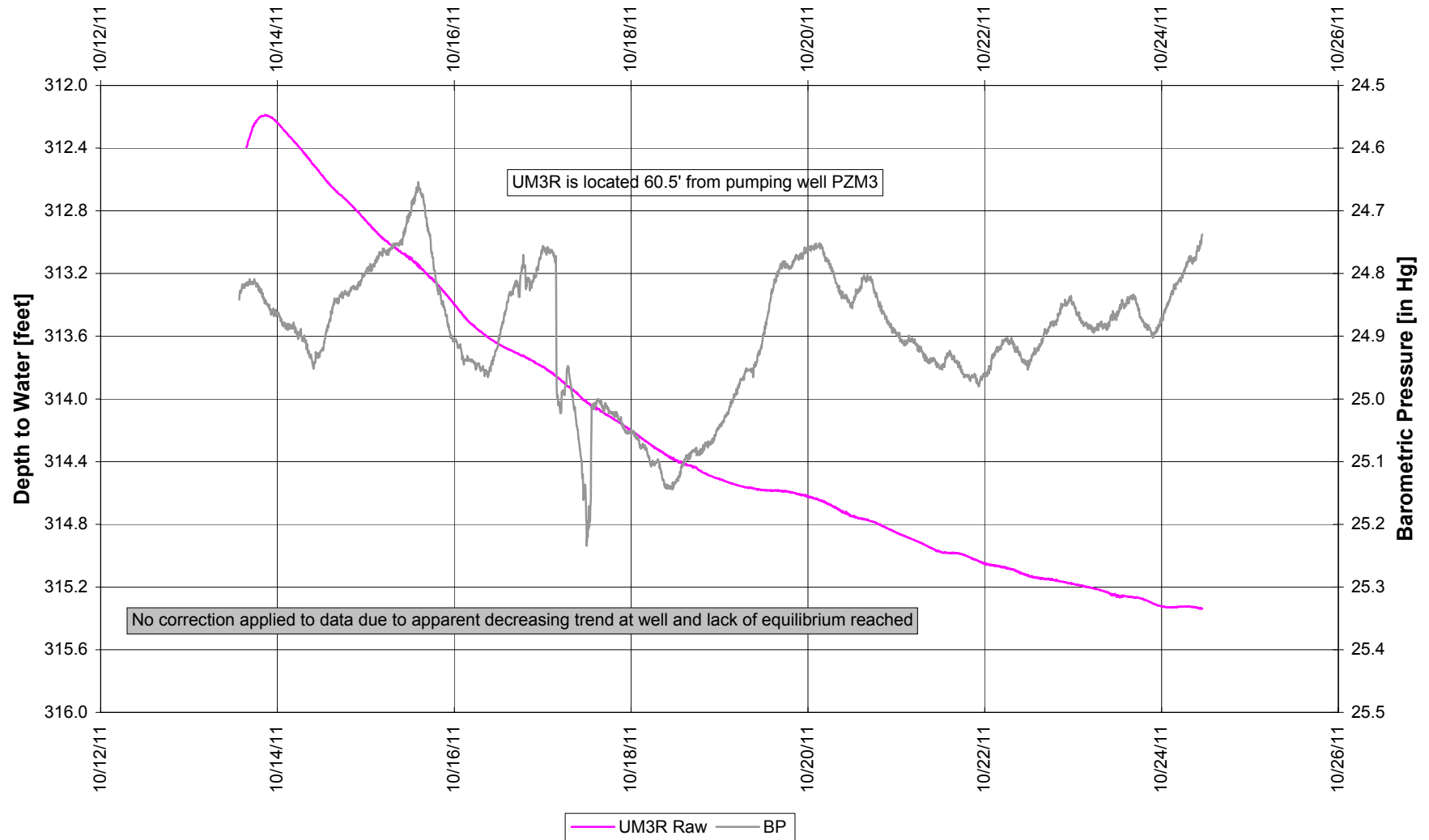
**Barometric Corrections to Water Level, PZM12
PZM3 Pump Test, AUC Reno Creek Project**



**Barometric Corrections to Water Level, PZM13
PZM3 Pump Test, AUC Reno Creek Project**



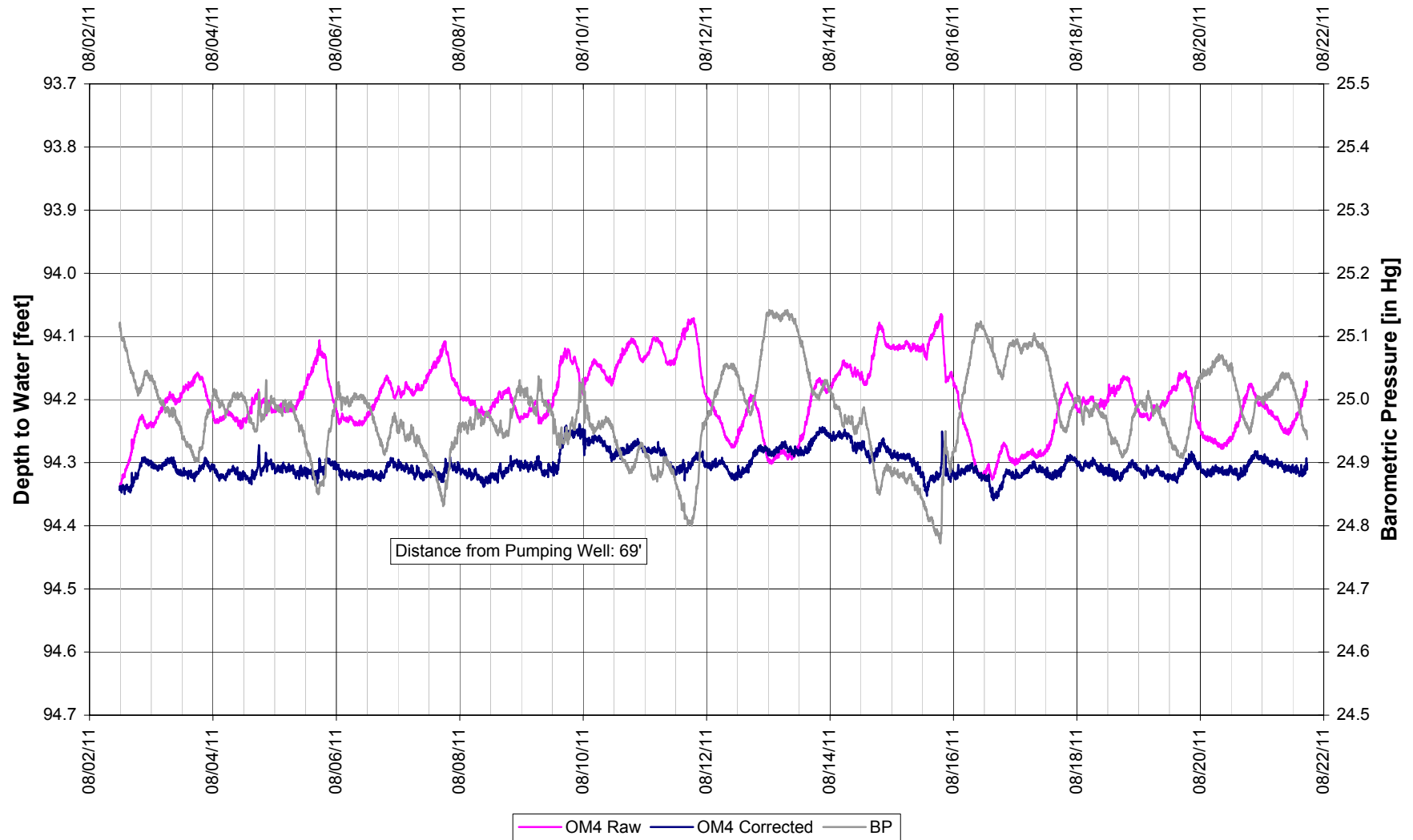
Barometric Corrections to Water Level, UM3R PZM3 Pump Test, AUC Reno Creek Project



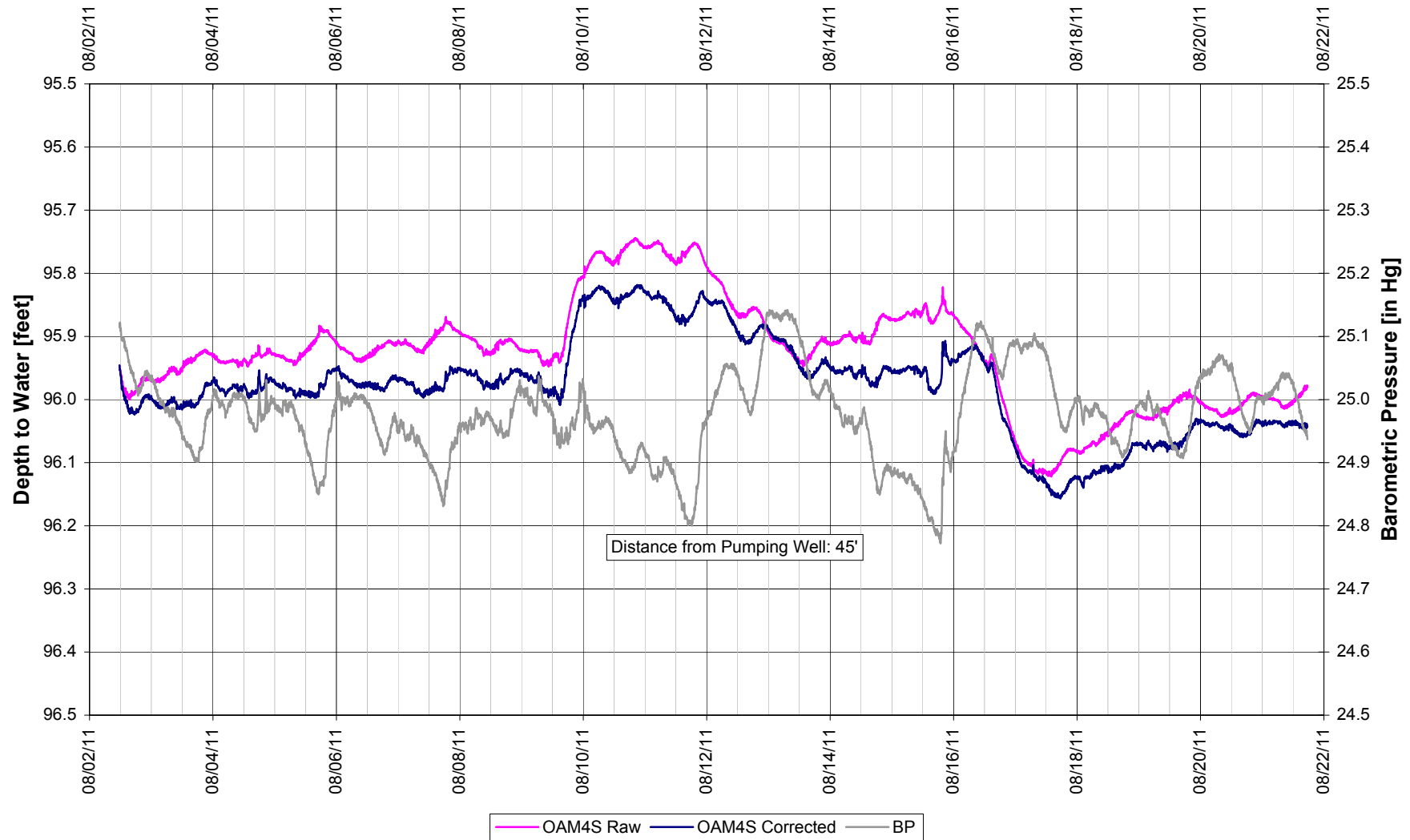
PZM4D PUMP TEST

WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

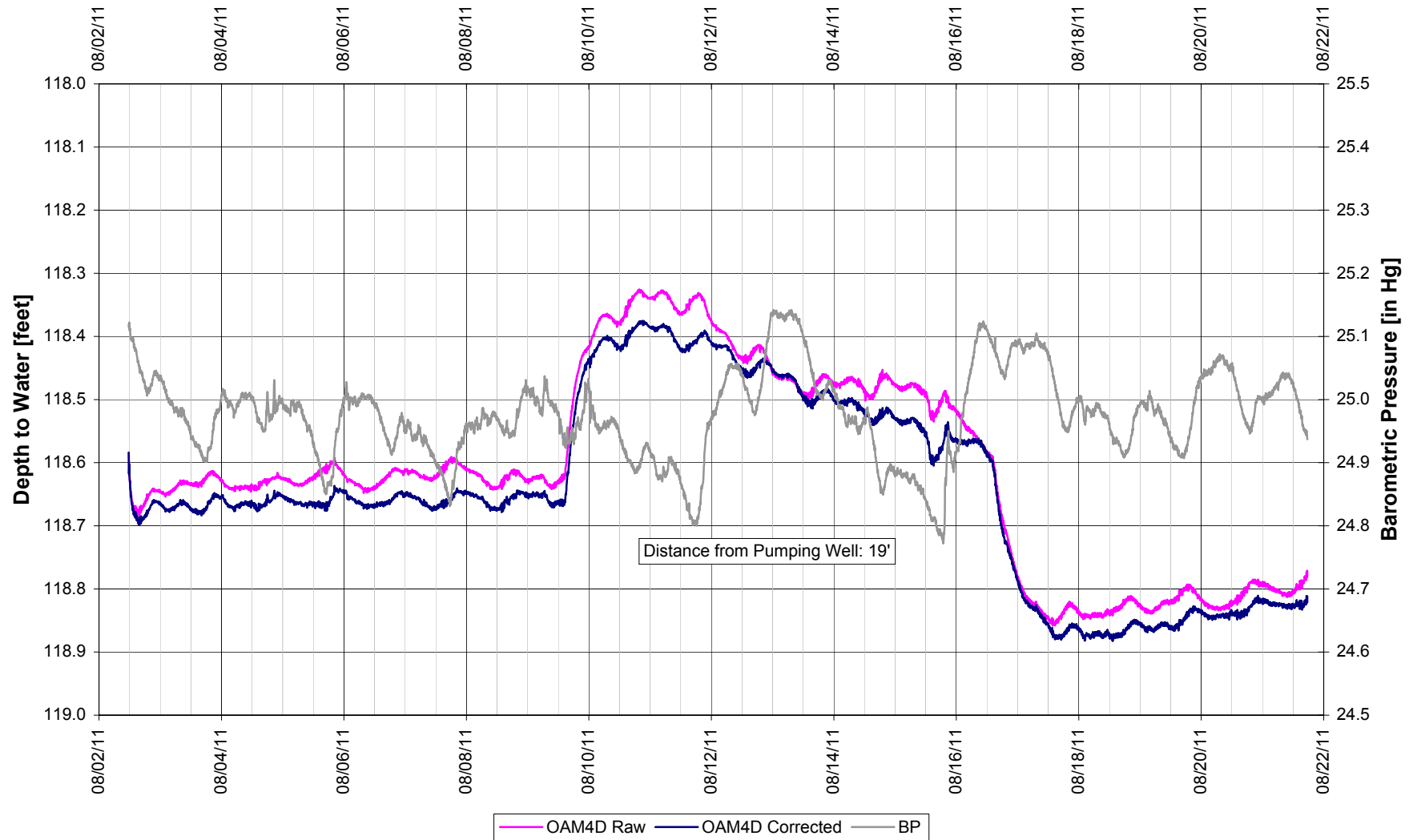
Barometric Corrections to Water Level, OM4 PZM4D Pump Test, AUC Reno Creek Project



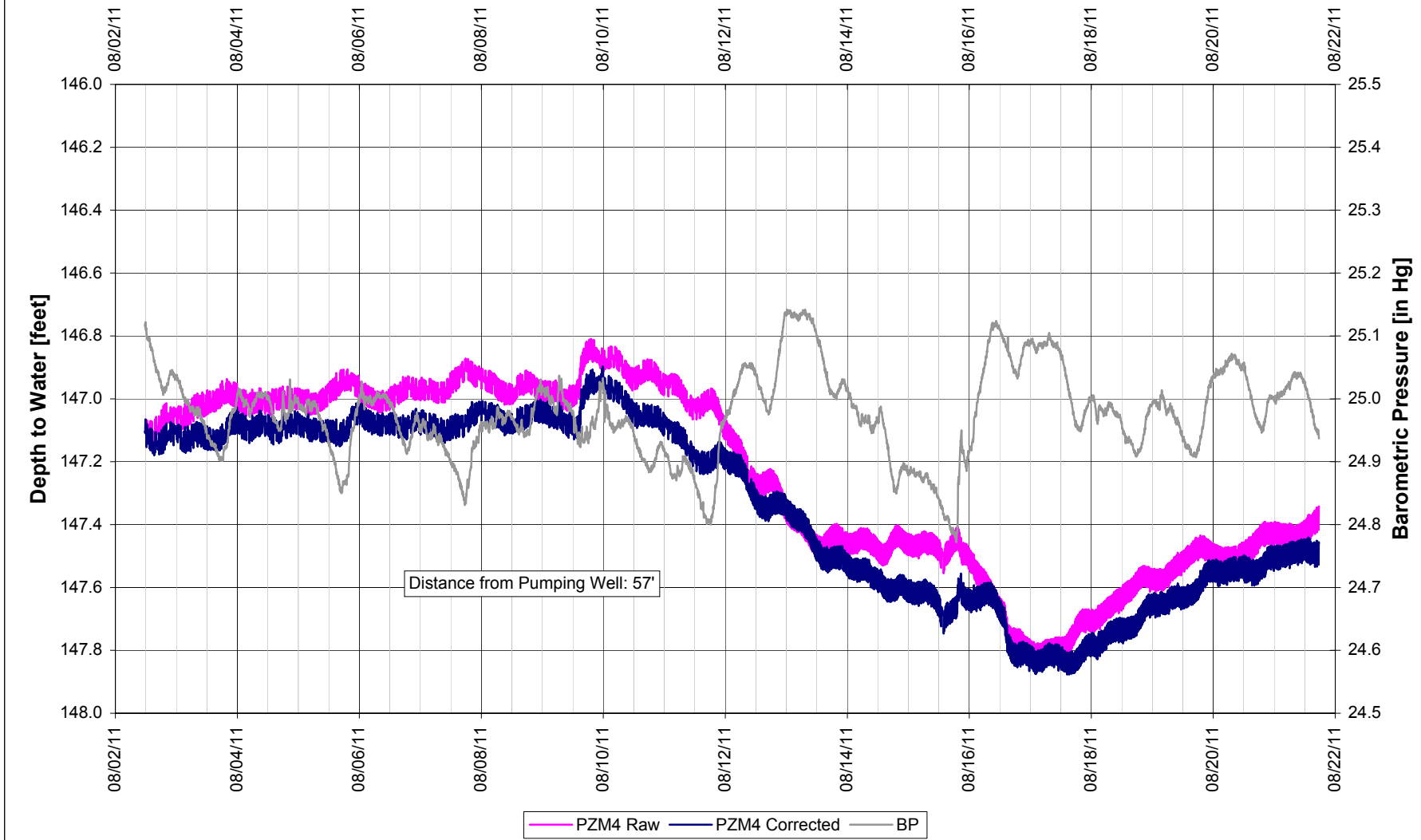
**Barometric Corrections to Water Level, OAM4S
PZM4D Pump Test, AUC Reno Creek Project**



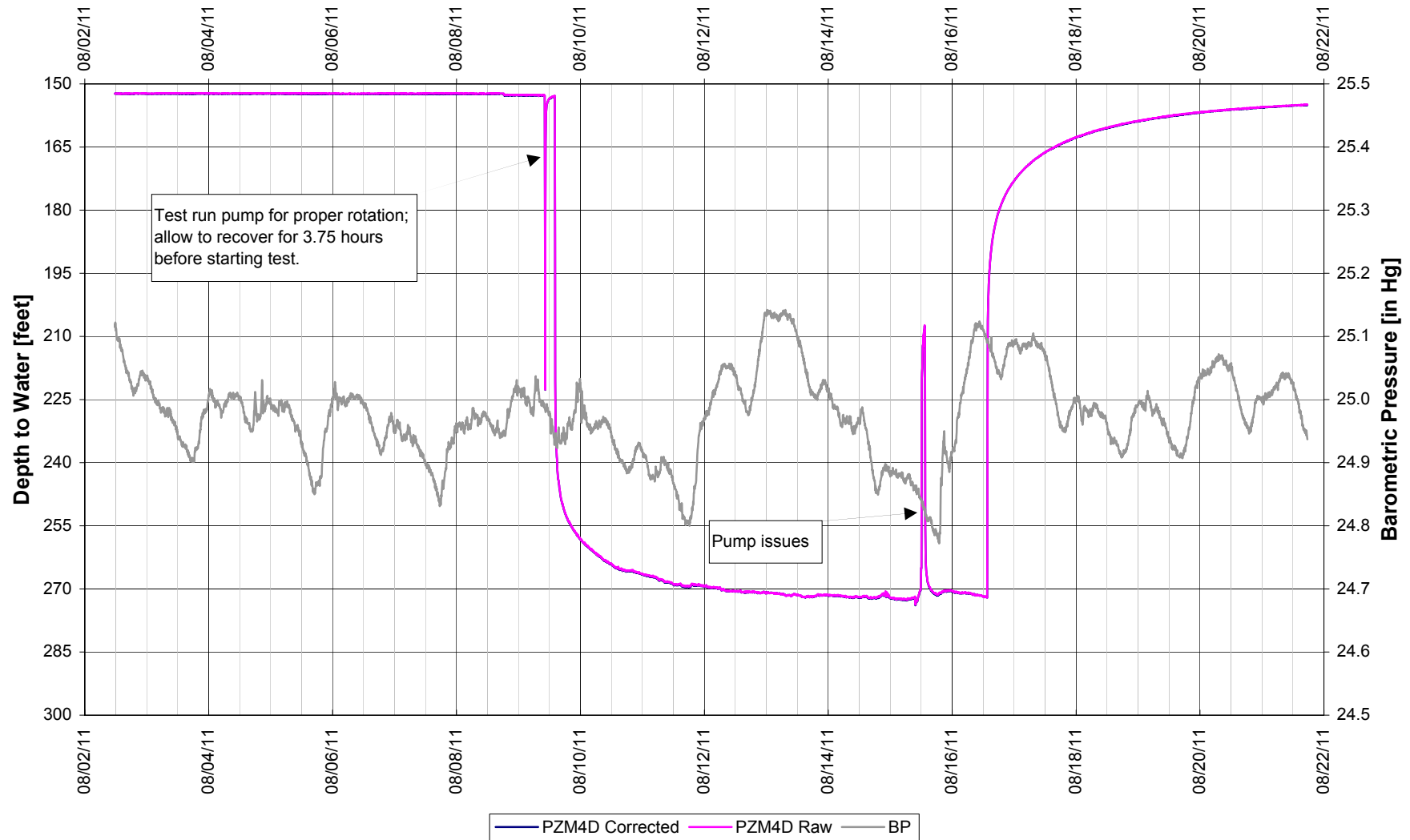
**Barometric Corrections to Water Level, OAM4D
PZM4D Pump Test, AUC Reno Creek Project**



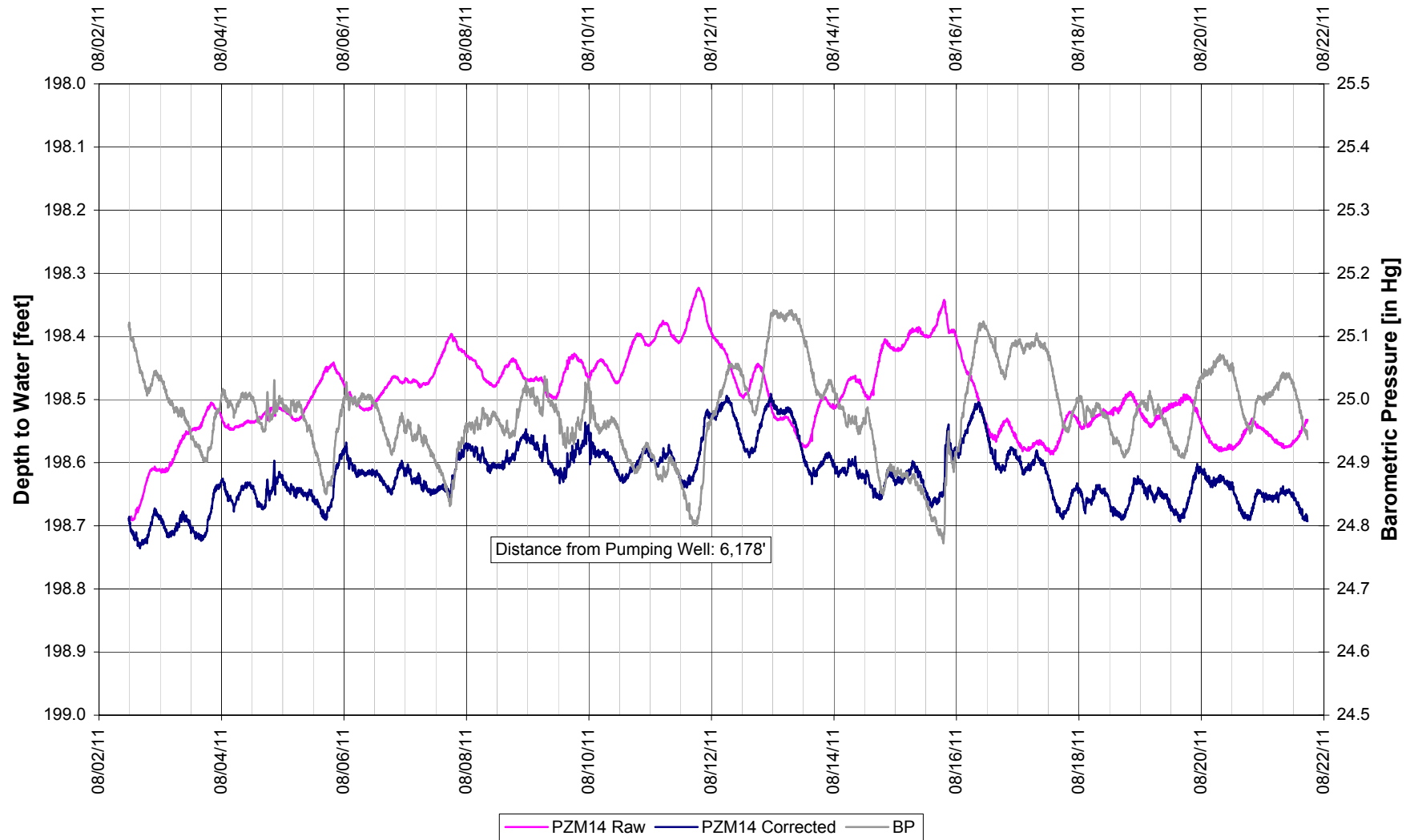
Barometric Corrections to Water Level, PZM4
PZM4D Pump Test, AUC Reno Creek Project



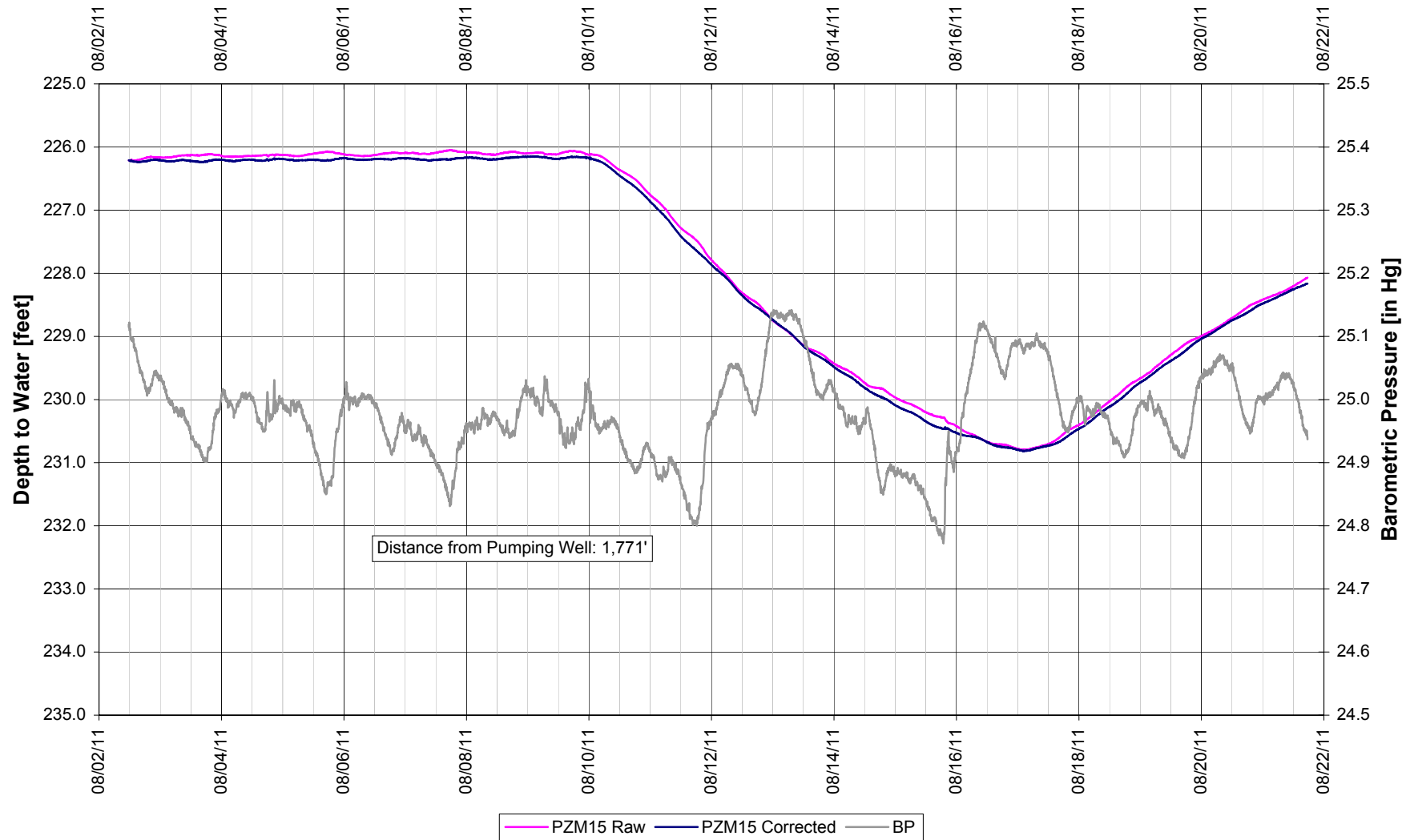
Barometric Corrections to Water Level, PZM4D (Pumping Well) PZM4D Pump Test, AUC Reno Creek Project



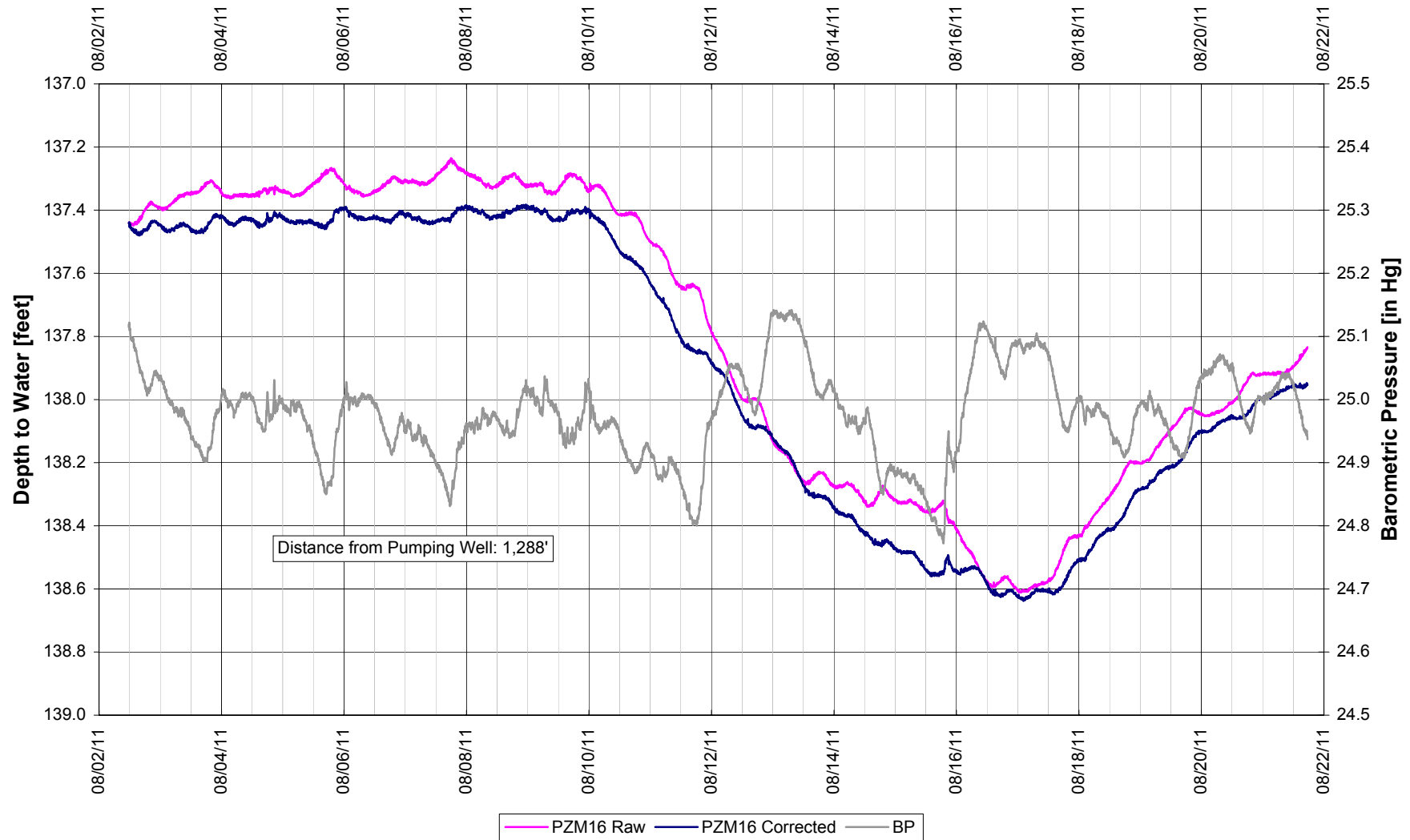
**Barometric Corrections to Water Level, PZM14
PZM4D Pump Test, AUC Reno Creek Project**



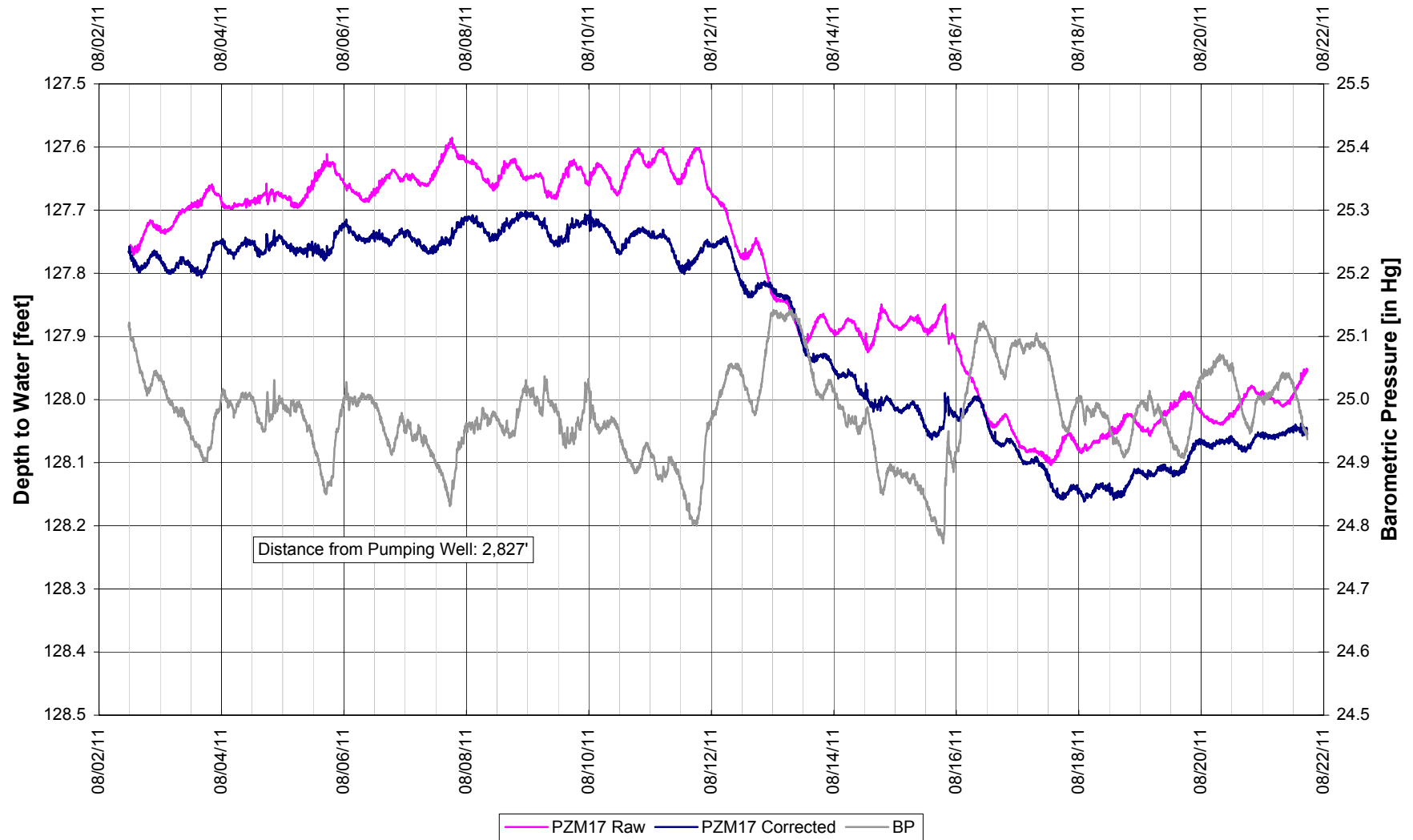
**Barometric Corrections to Water Level, PZM15
PZM4D Pump Test, AUC Reno Creek Project**



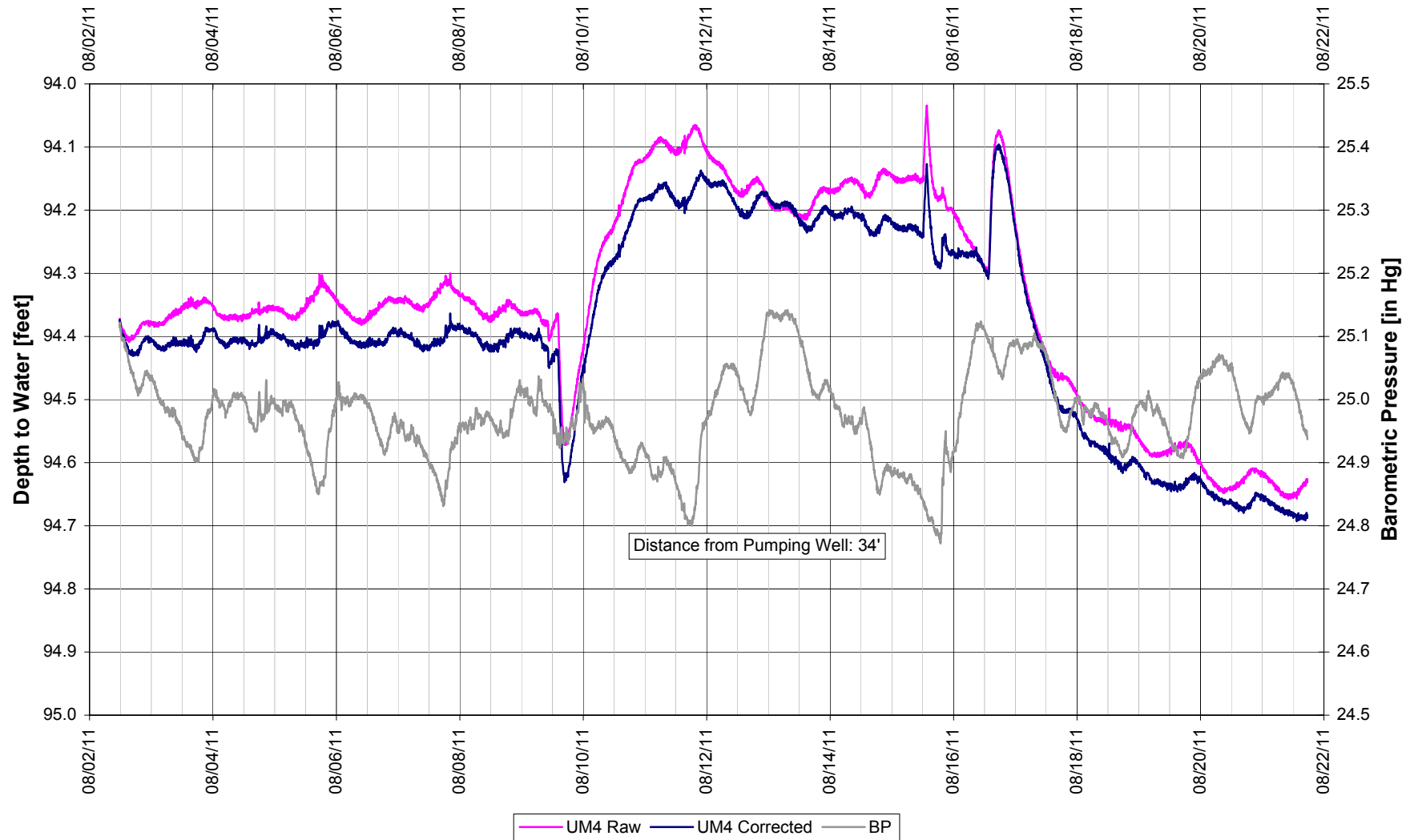
Barometric Corrections to Water Level, PZM16 PZM4D Pump Test, AUC Reno Creek Project



**Barometric Corrections to Water Level, PZM17
PZM4D Pump Test, AUC Reno Creek Project**



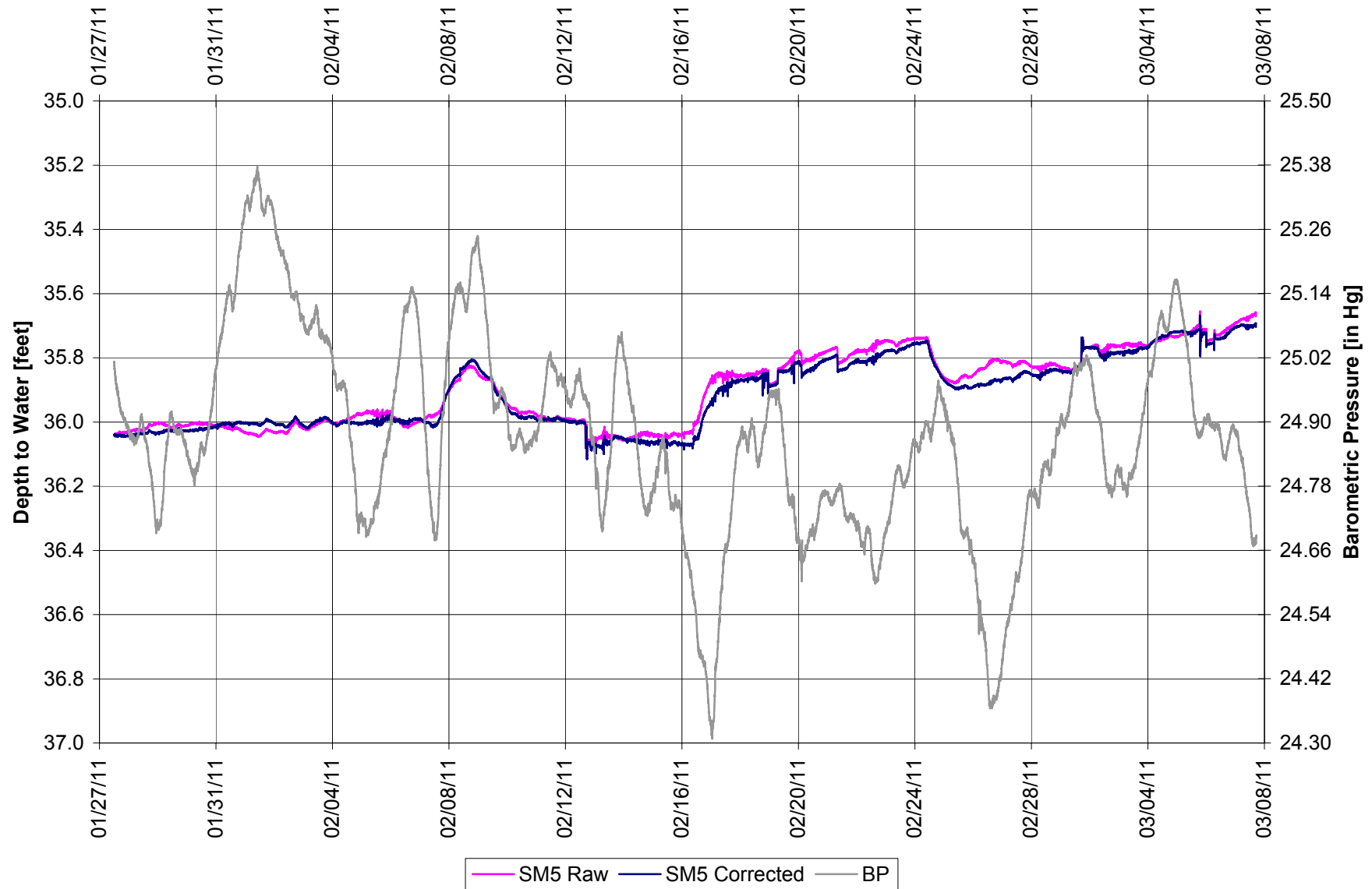
Barometric Corrections to Water Level, UM4 PZM4D Pump Test, AUC Reno Creek Project



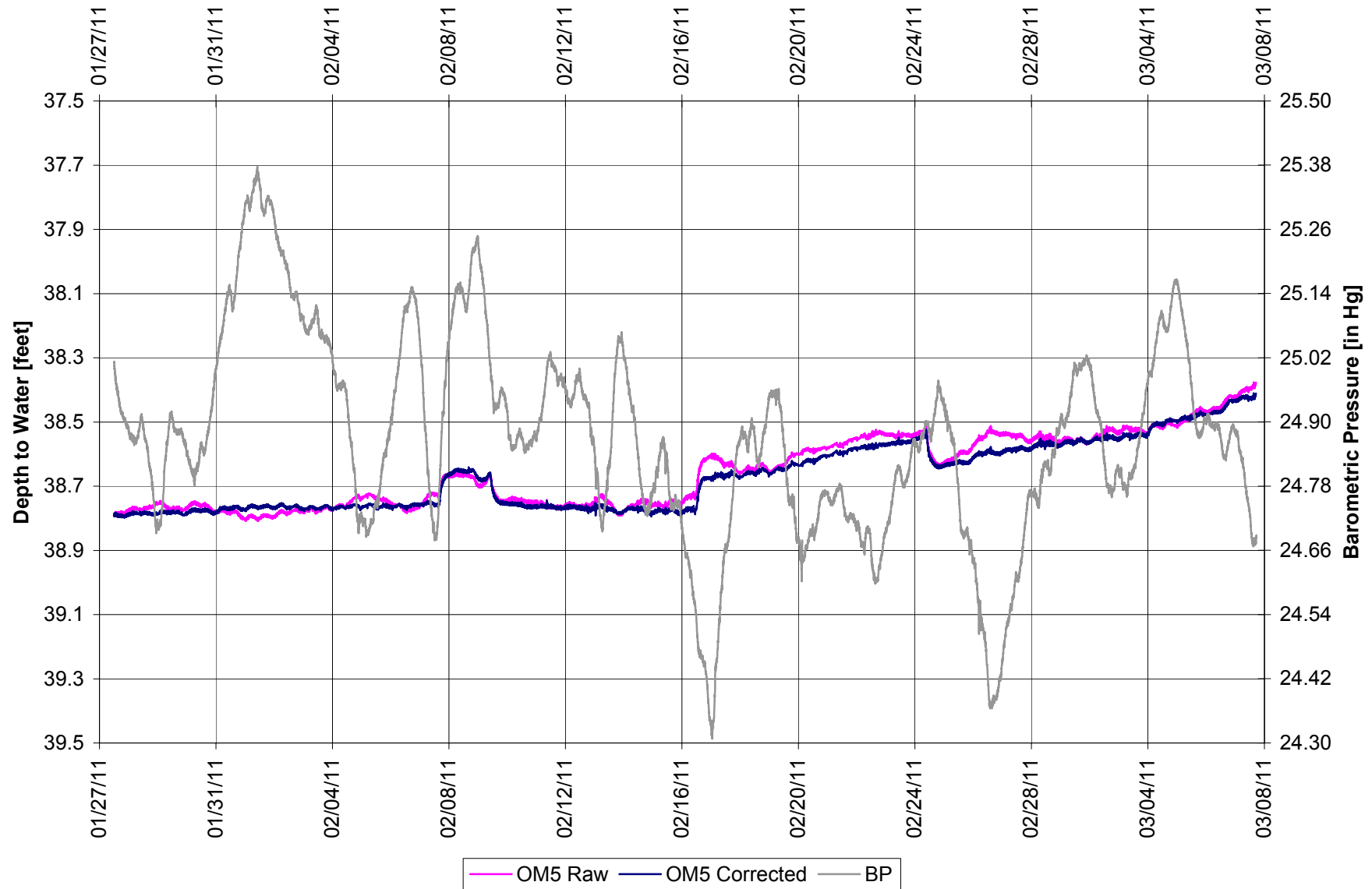
PZM5 PUMP TEST

WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

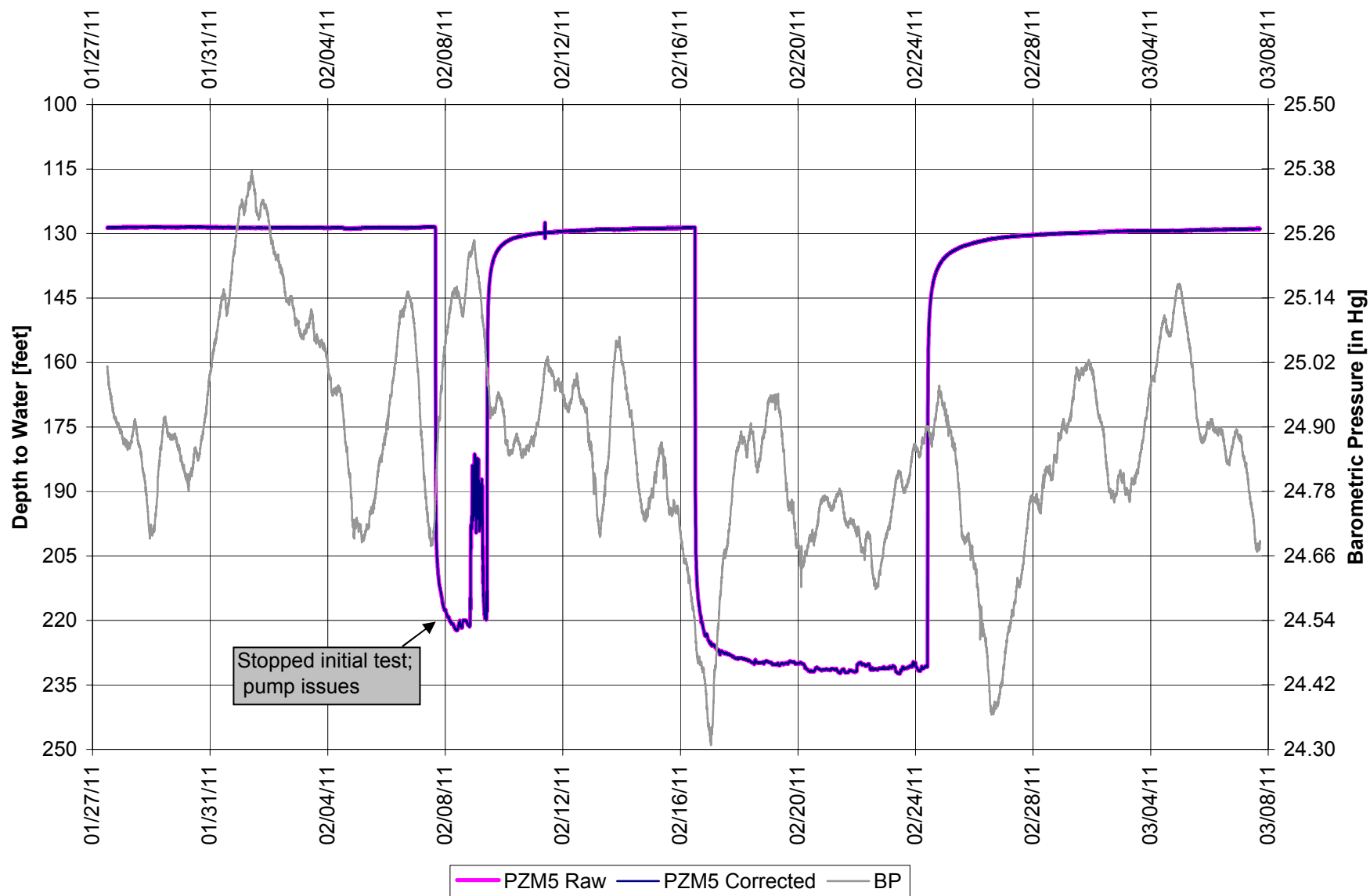
**Barometric Corrections to Water Level, SM5
PZM5 Pump Test, Reno Creek Project**



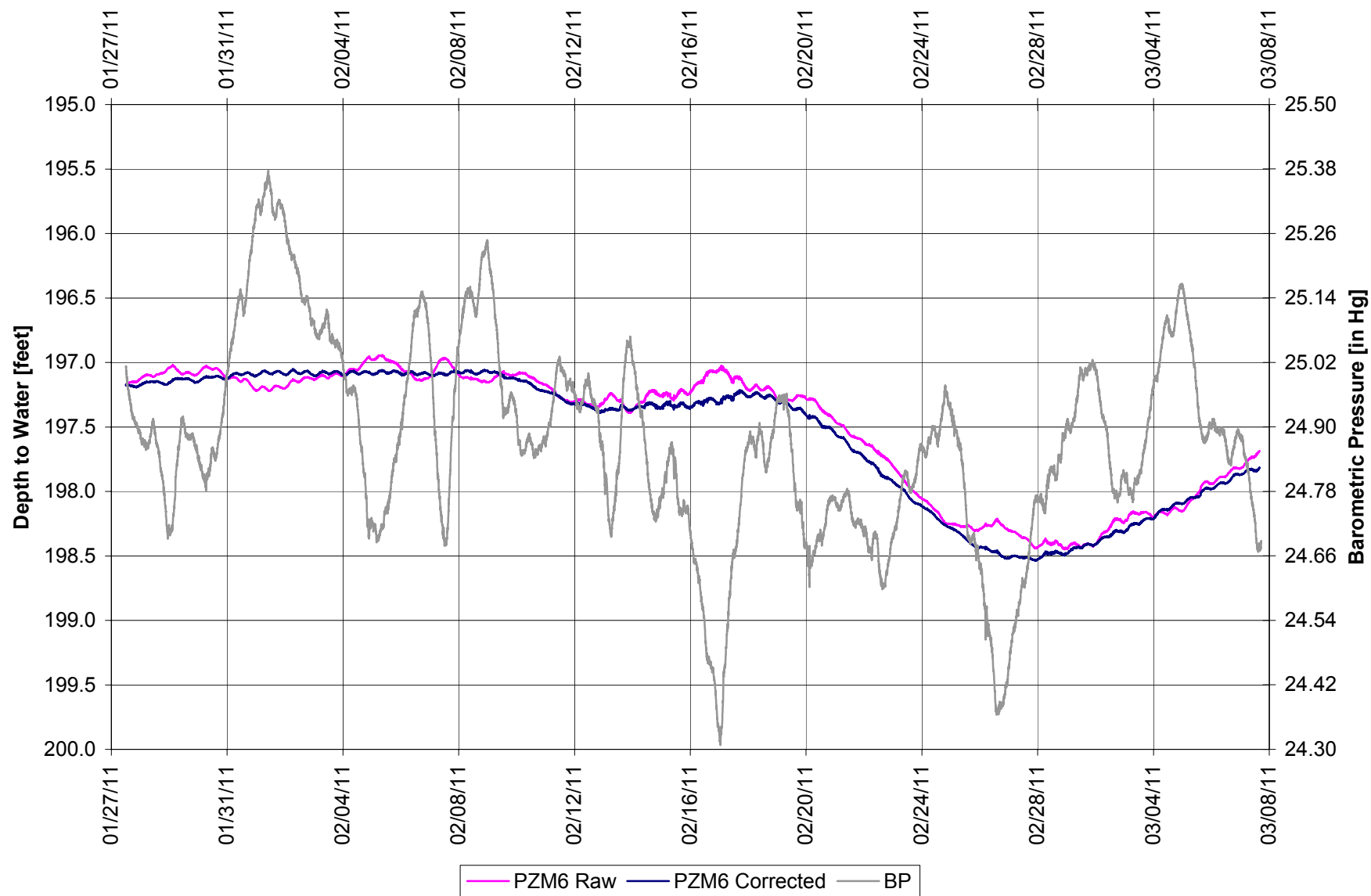
**Barometric Corrections to Water Level, OM5
PZM5 Pump Test, Reno Creek Project**



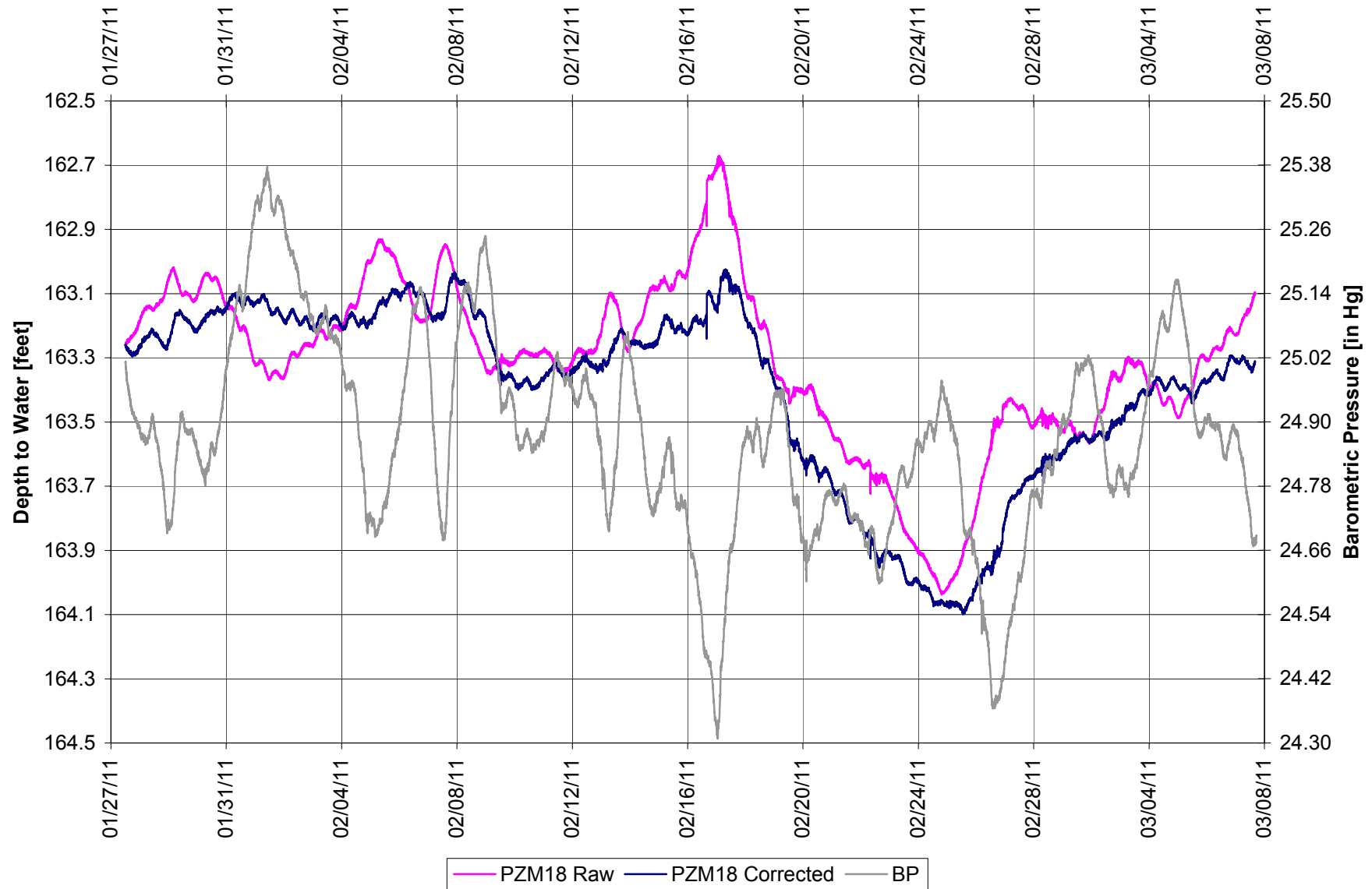
Barometric Corrections to Water Level, PZM5 PZM5 Pump Test, Reno Creek Project



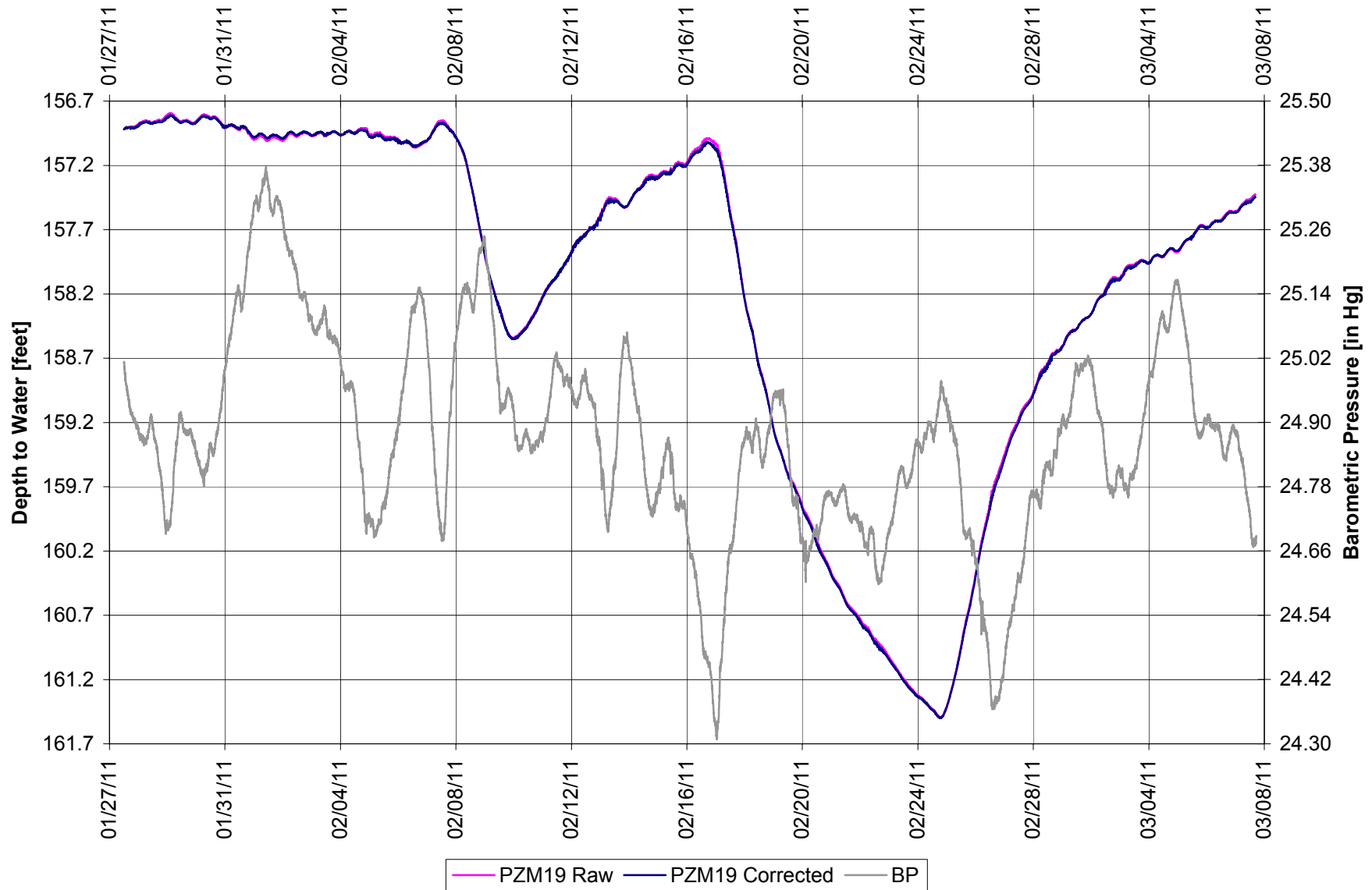
**Barometric Corrections to Water Level, PZM6
PZM5 Pump Test, Reno Creek Project**



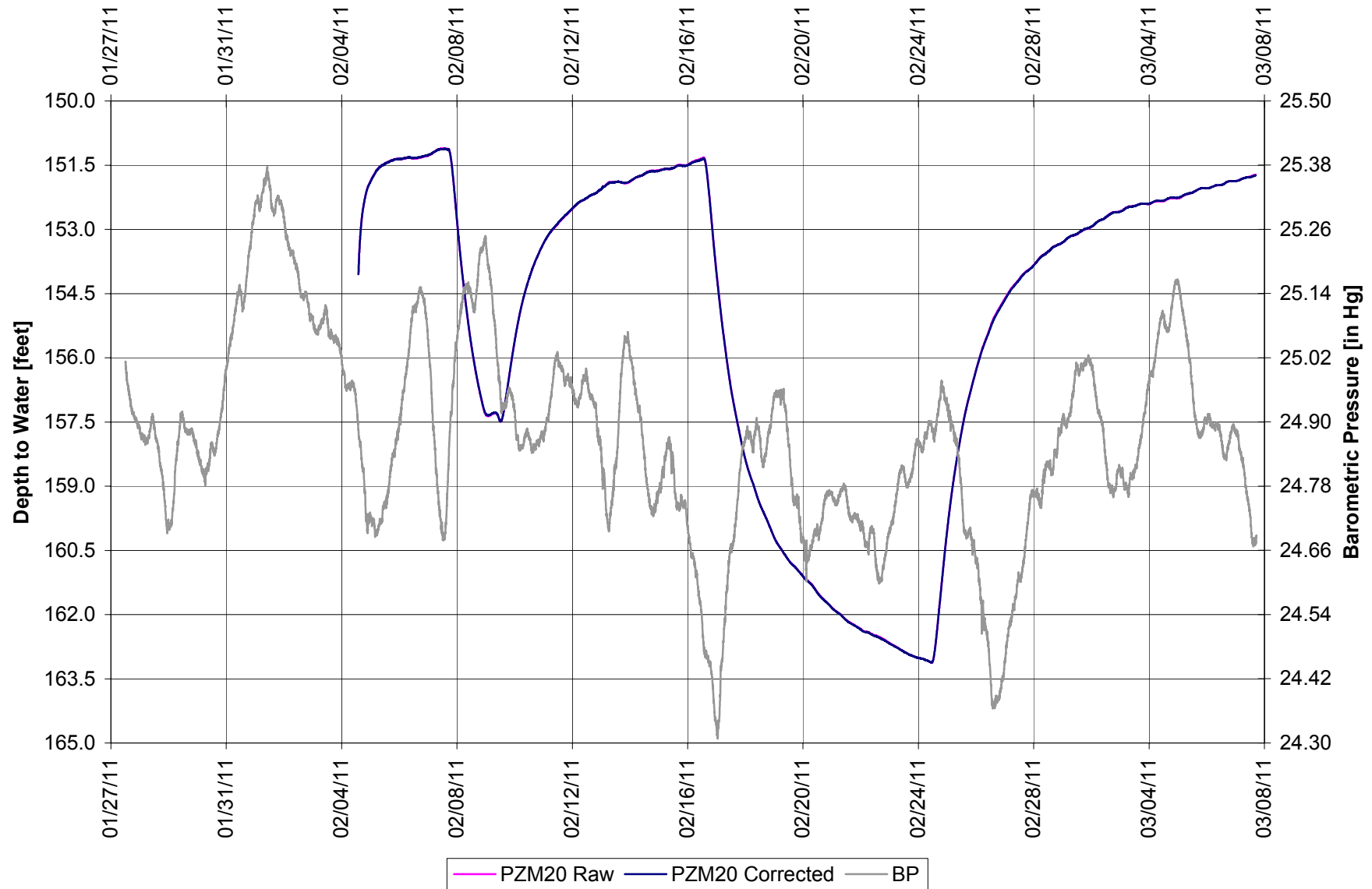
**Barometric Corrections to Water Level, PZM18
PZM5 Pump Test, Reno Creek Project**



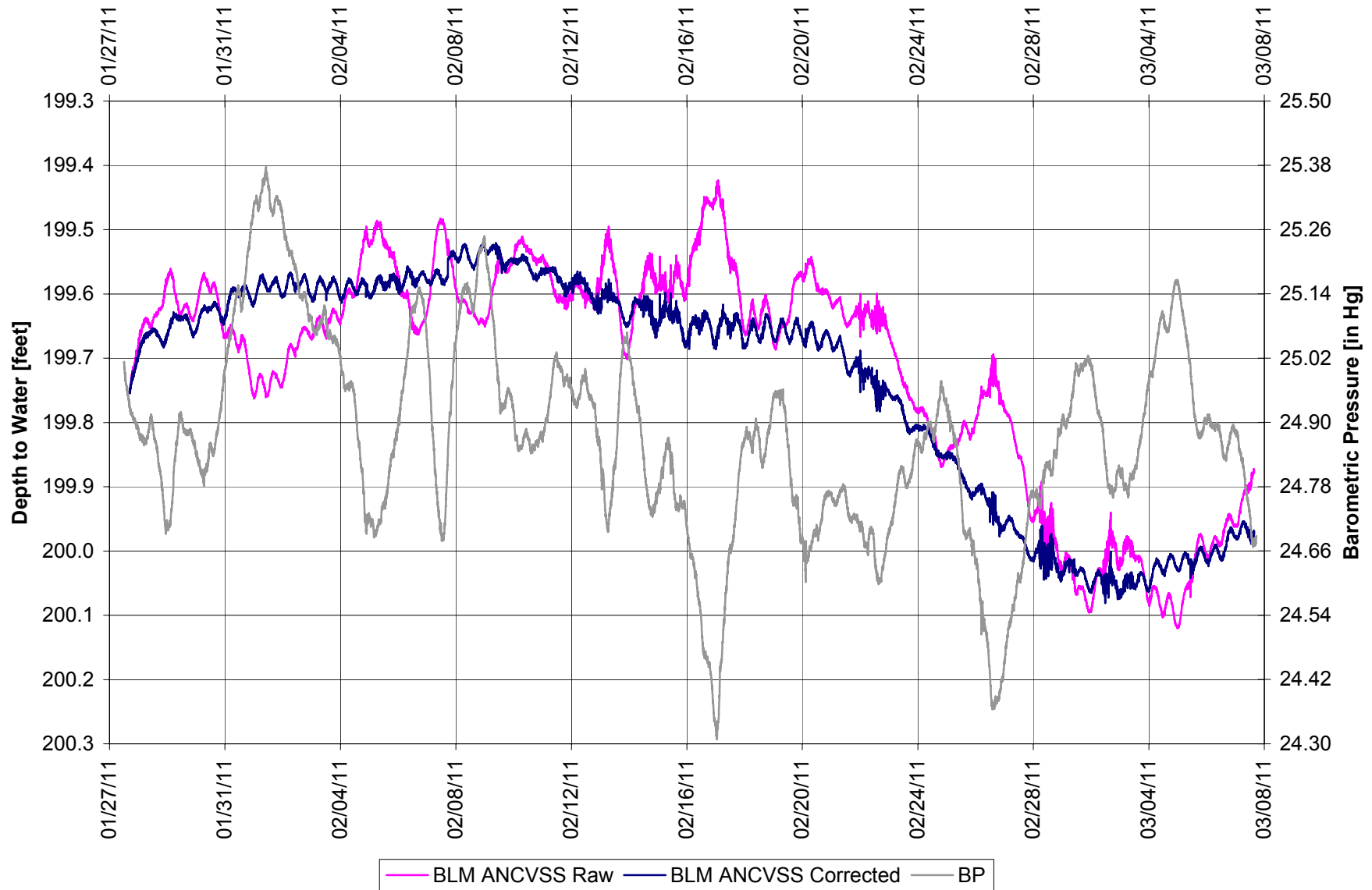
**Barometric Corrections to Water Level, PZM19
PZM5 Pump Test, Reno Creek Project**



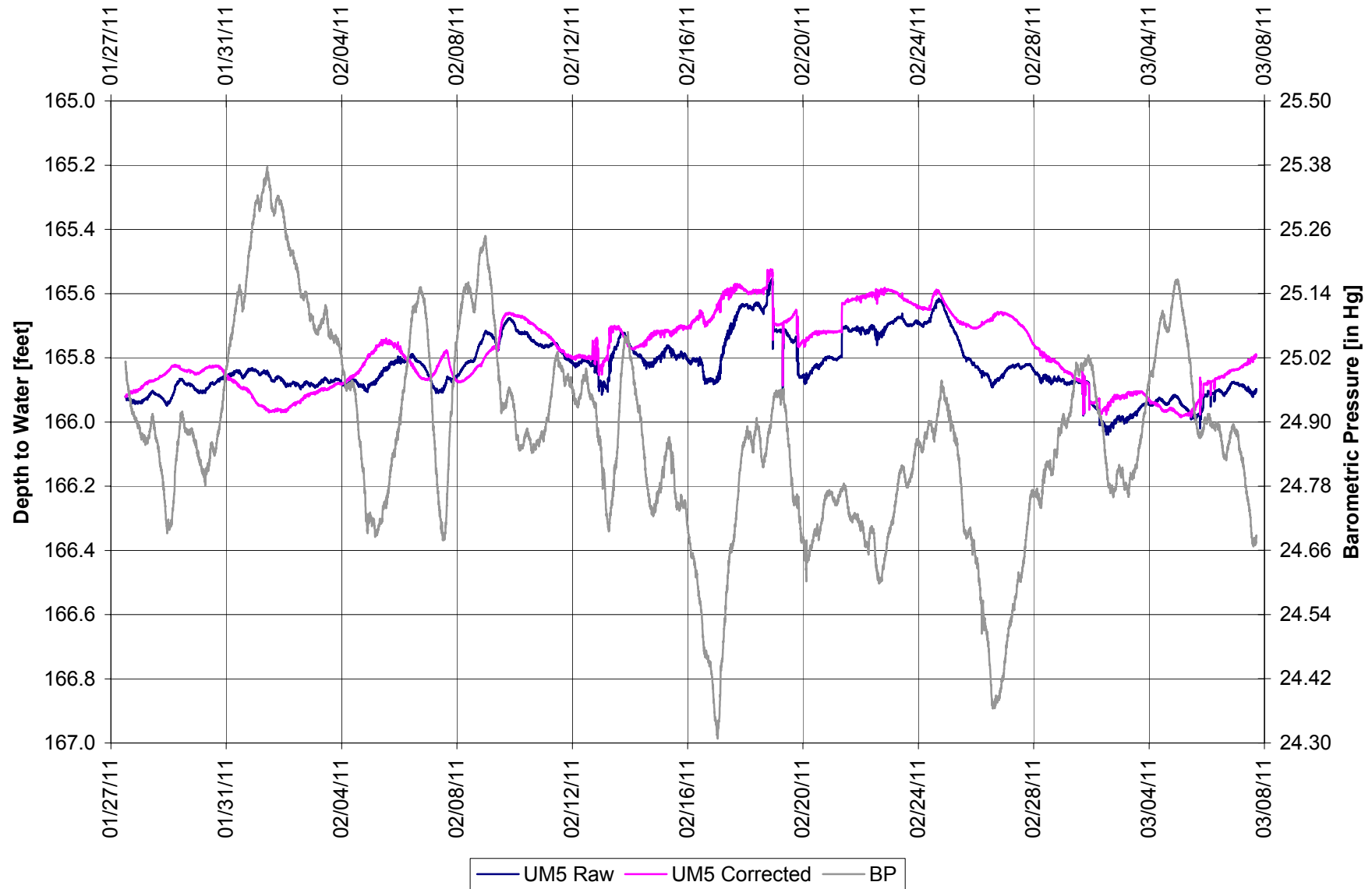
**Barometric Corrections to Water Level, PZM20
PZM5 Pump Test, Reno Creek Project**



**Barometric Corrections to Water Level, BLM ANCVSS
PZM5 Pump Test, Reno Creek Project**



**Barometric Corrections to Water Level, UM5
PZM5 Pump Test, Reno Creek Project**



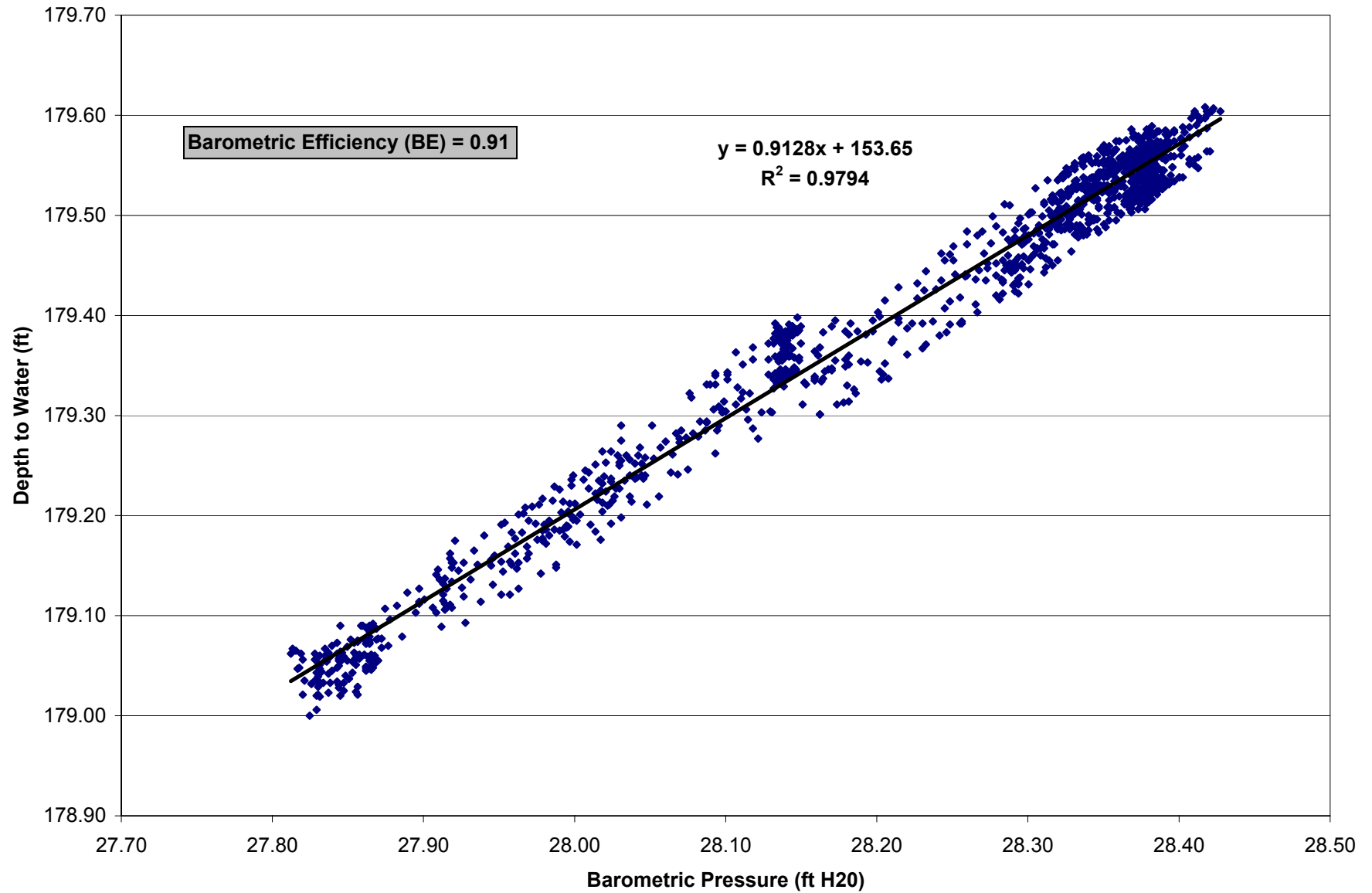
APPENDIX B

**WATER LEVEL ELEVATIONS VS.
BAROMETRIC PRESSURE AND MONITOR WELL
BAROMETRIC EFFICIENCY EVALUATIONS**

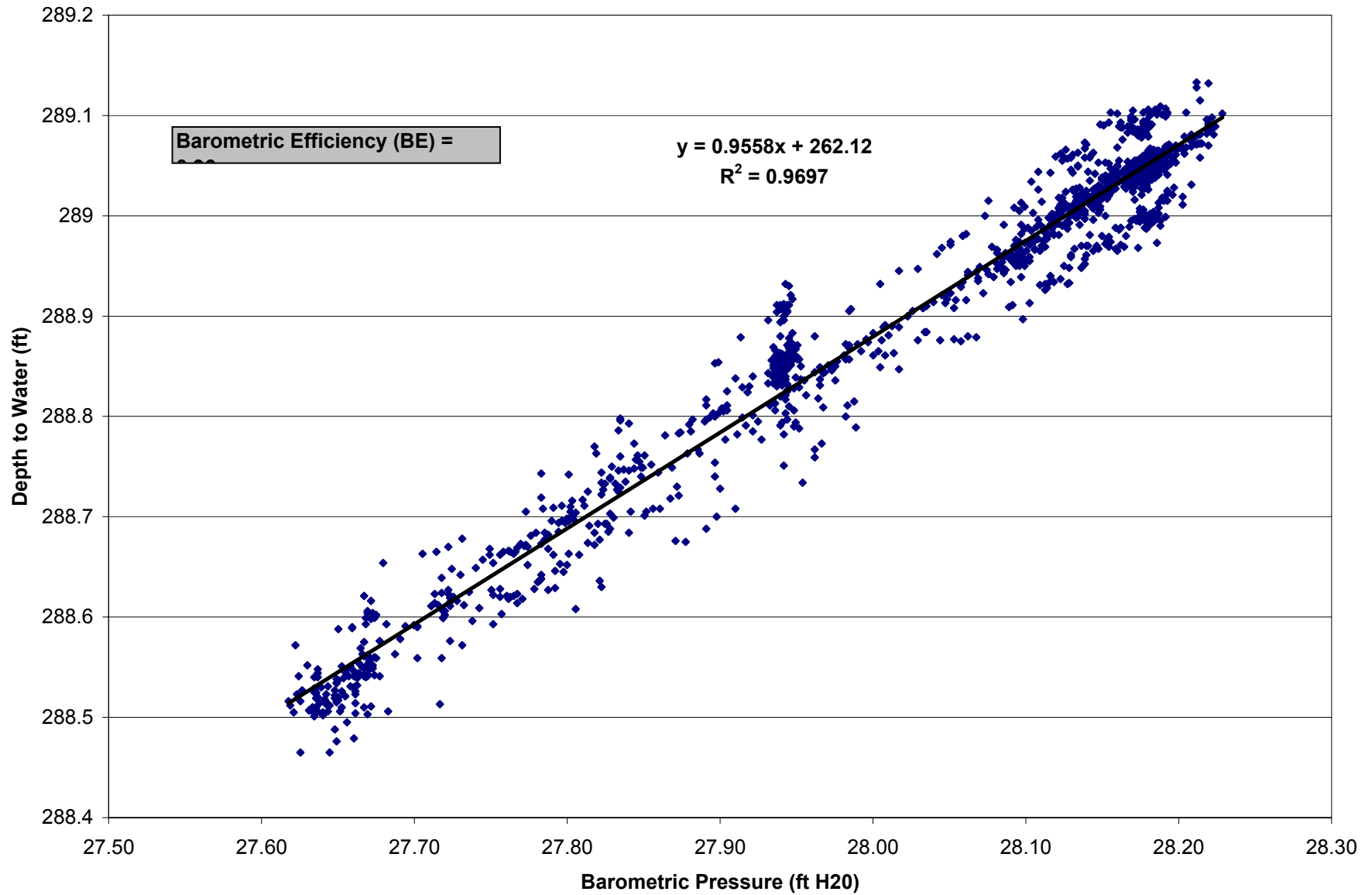
PZM1 PUMP TEST

**WATER LEVEL ELEVATIONS VS.
BAROMETRIC PRESSURE AND MONITOR WELL
BAROMETRIC EFFICIENCY EVALUATIONS**

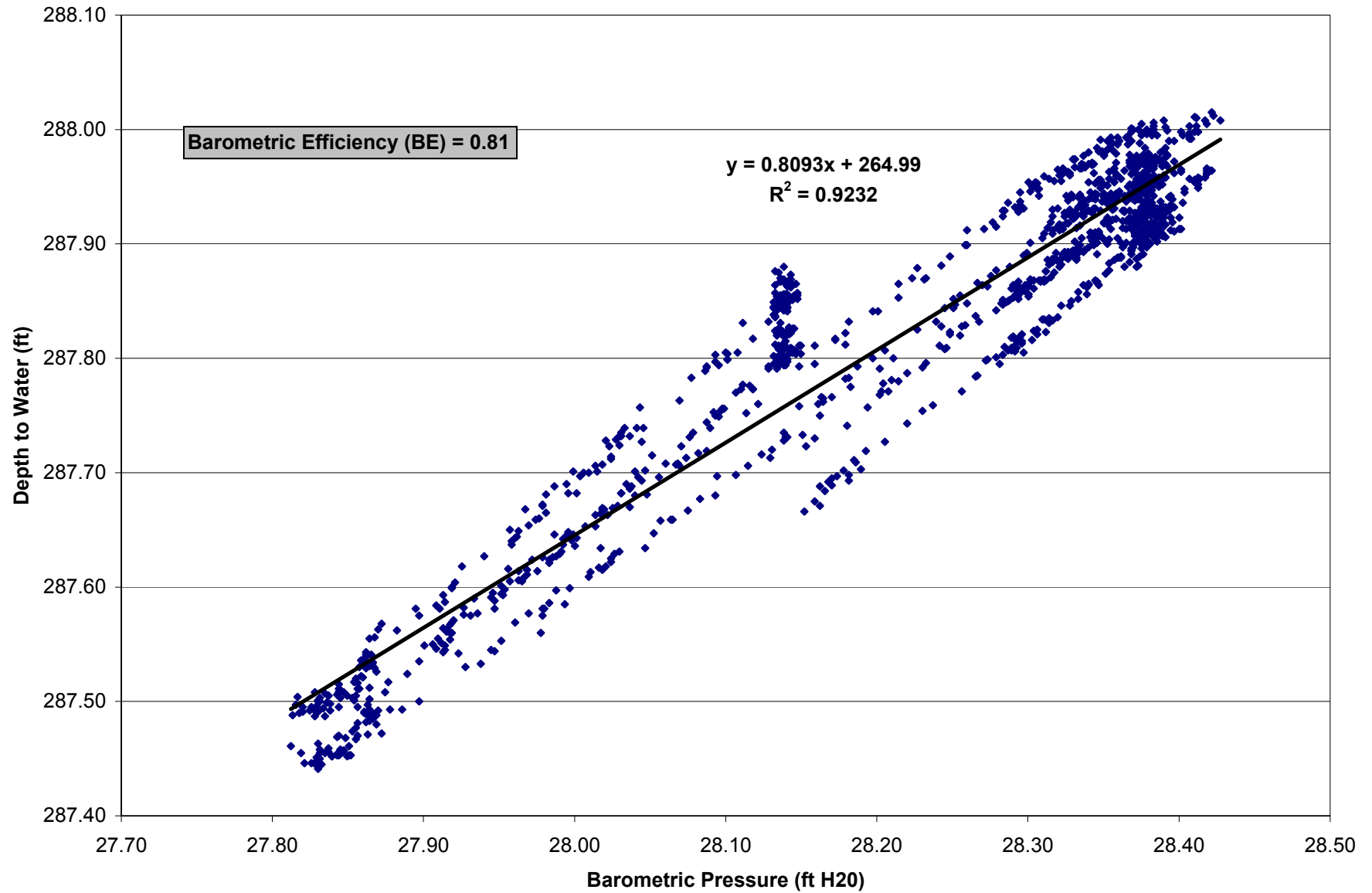
OM1 BE Evaluation



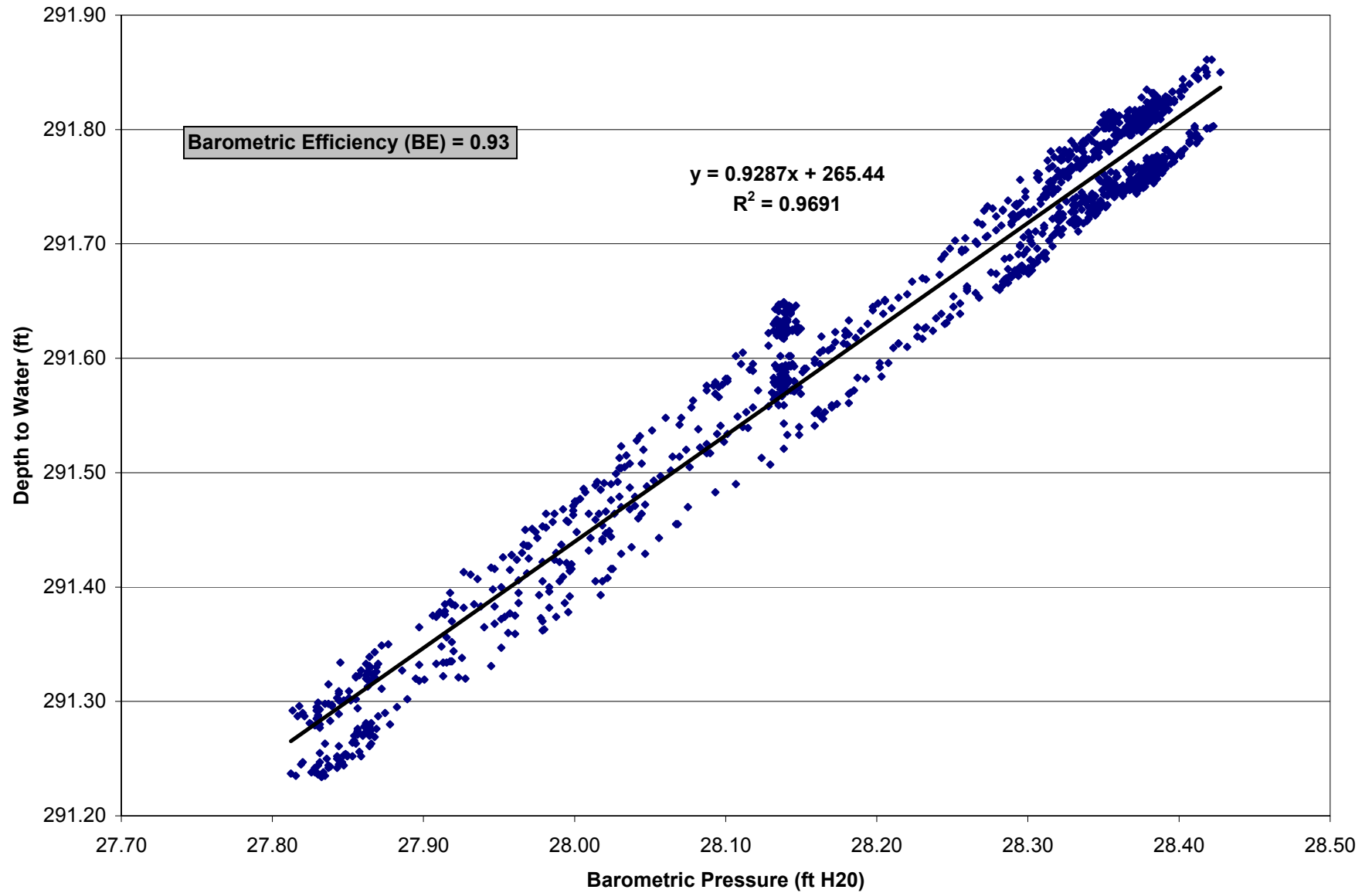
PZM1 BE Evaluation



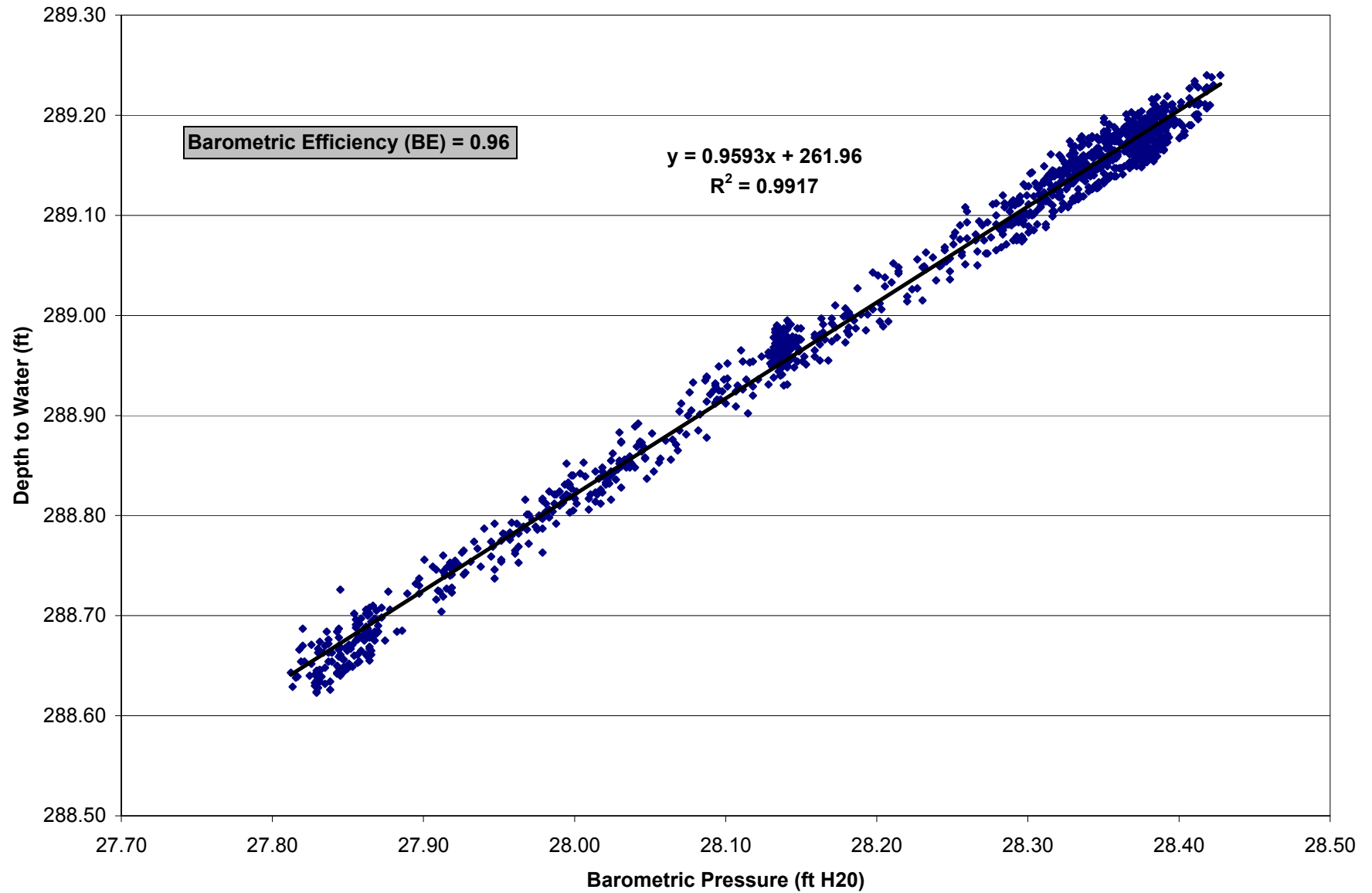
PZM8 BE Evaluation



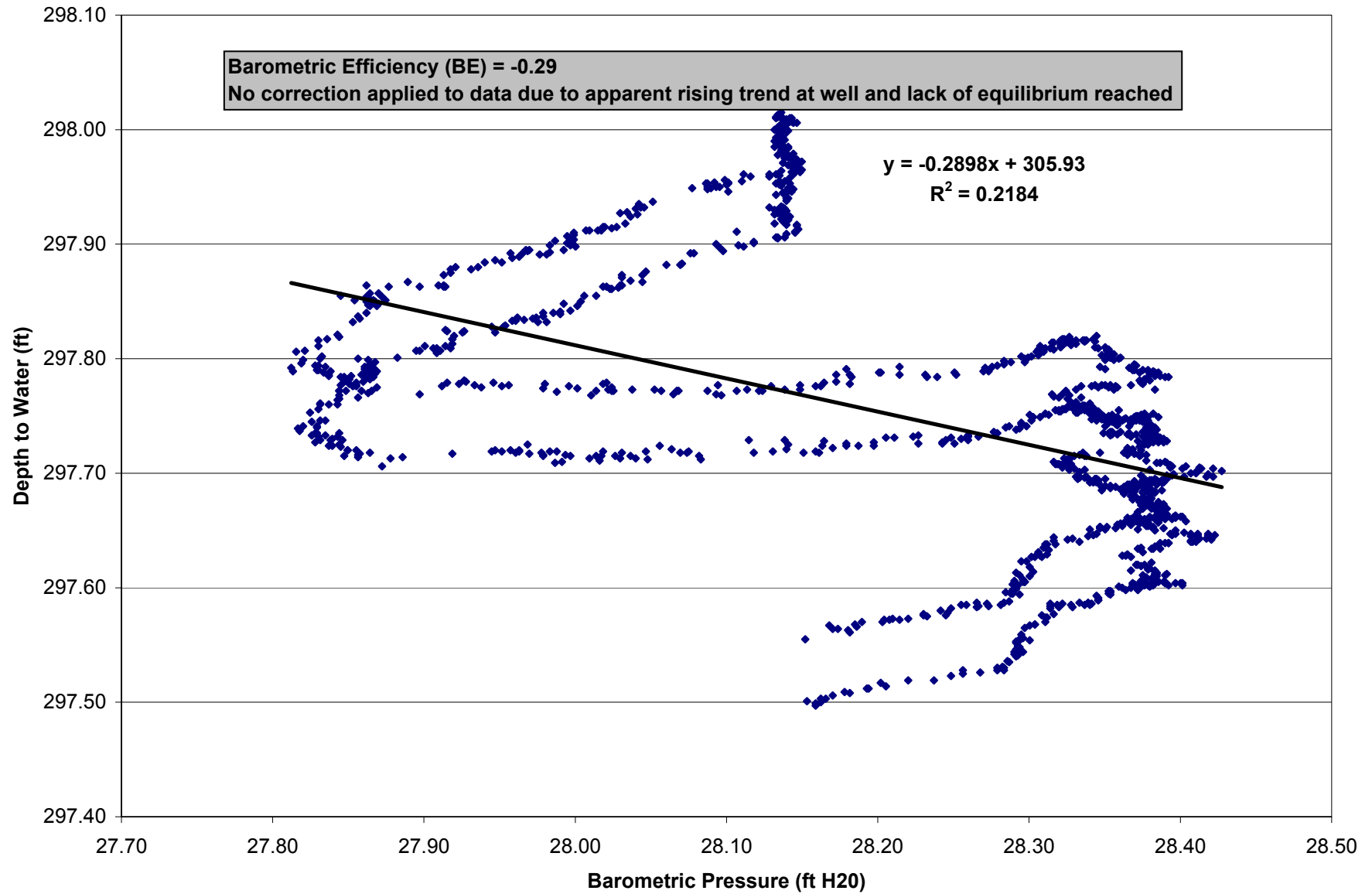
PZM9 BE Evaluation



PZM10 BE Evaluation



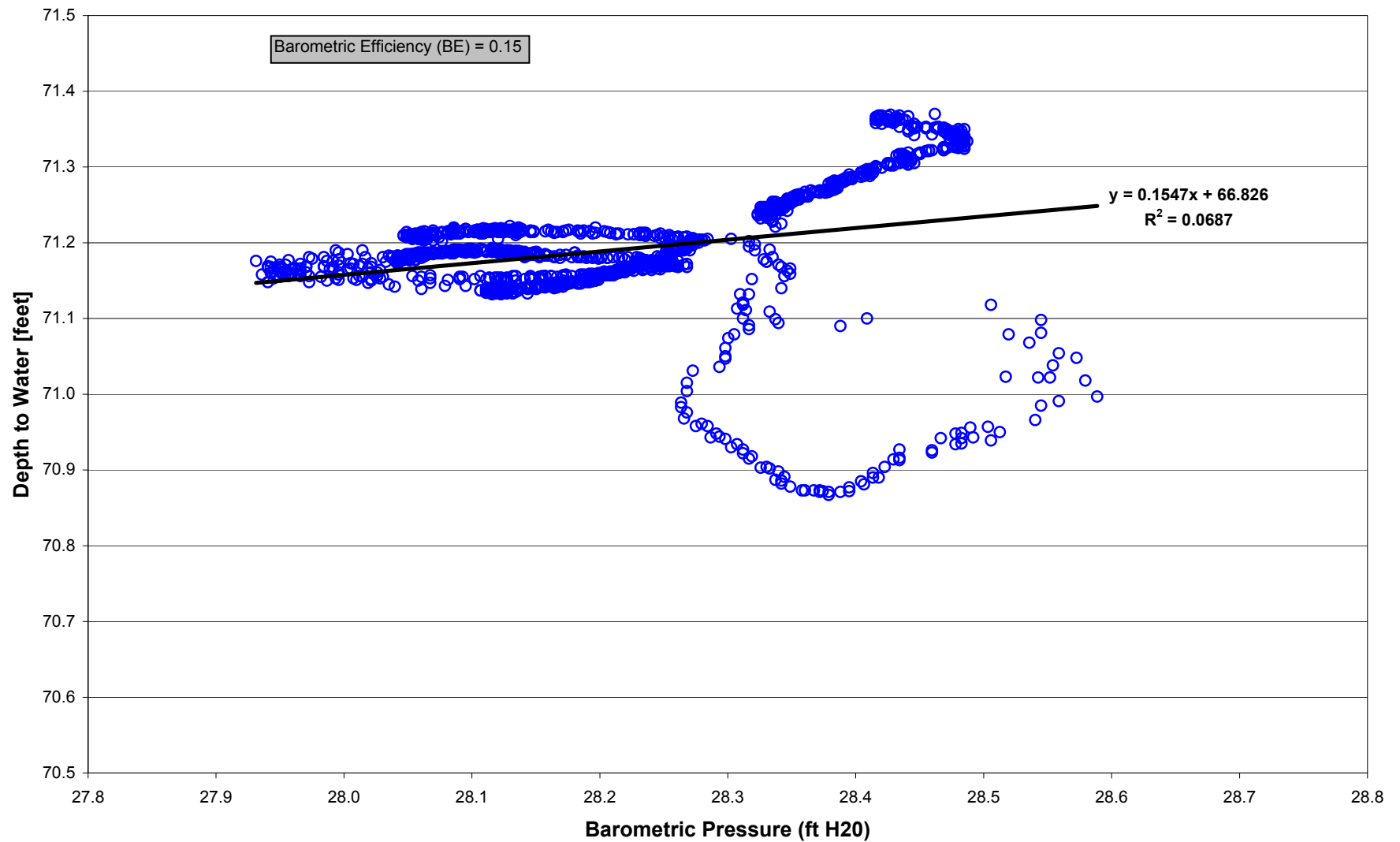
UM1 BE Evaluation



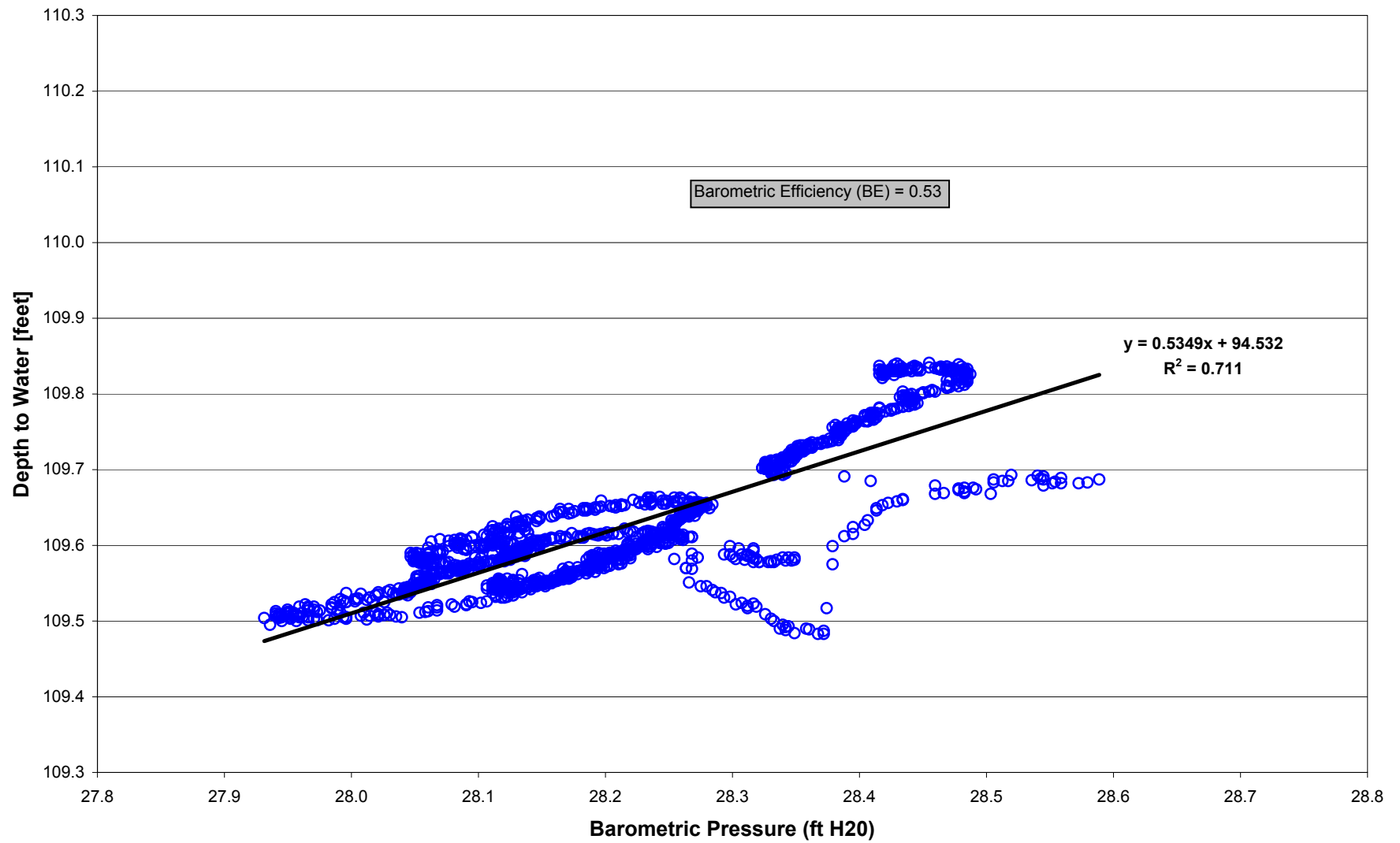
PZM3 PUMP TEST

**WATER LEVEL ELEVATIONS VS.
BAROMETRIC PRESSURE AND MONITOR WELL
BAROMETRIC EFFICIENCY EVALUATIONS**

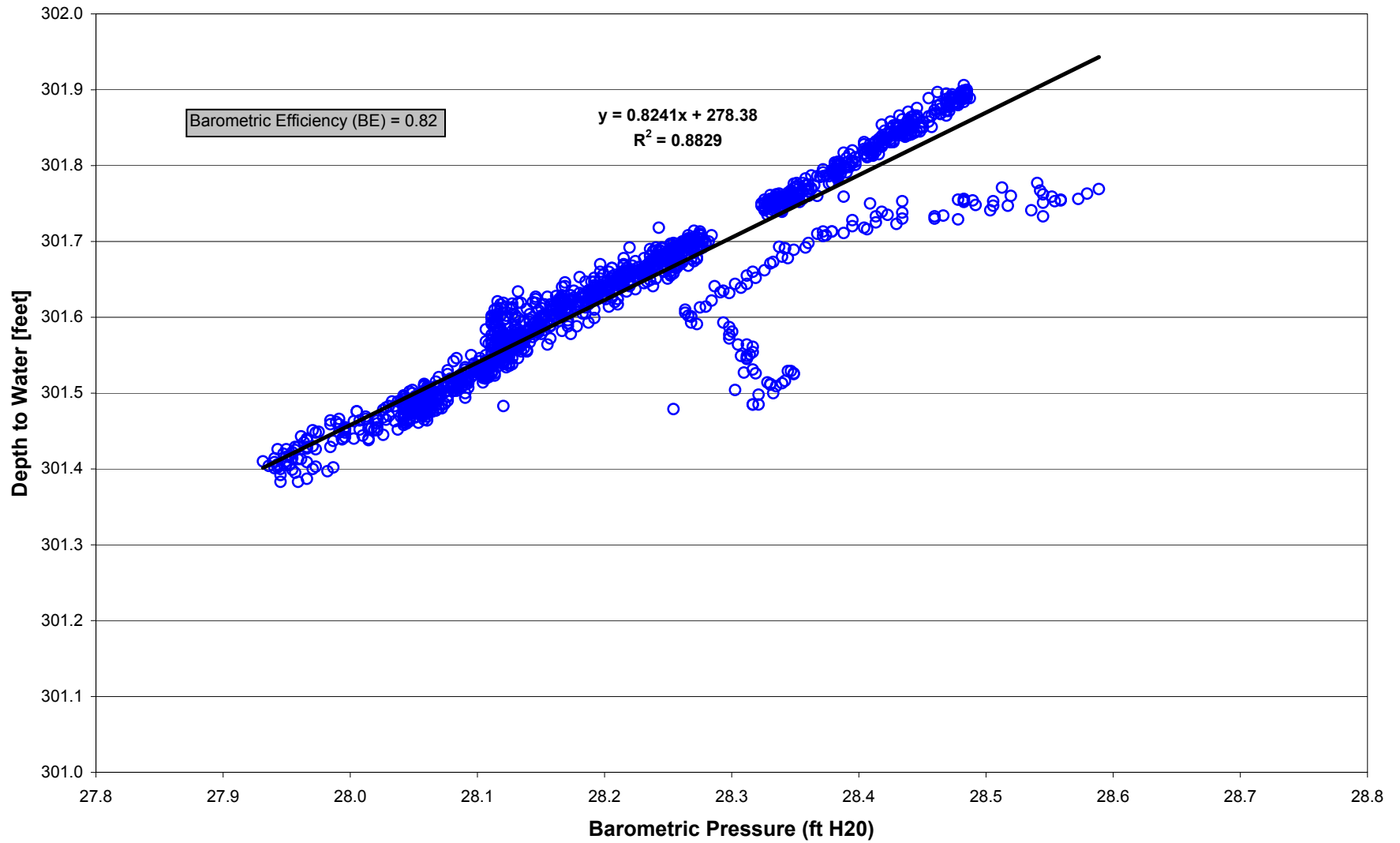
SM3 BE Evaluation



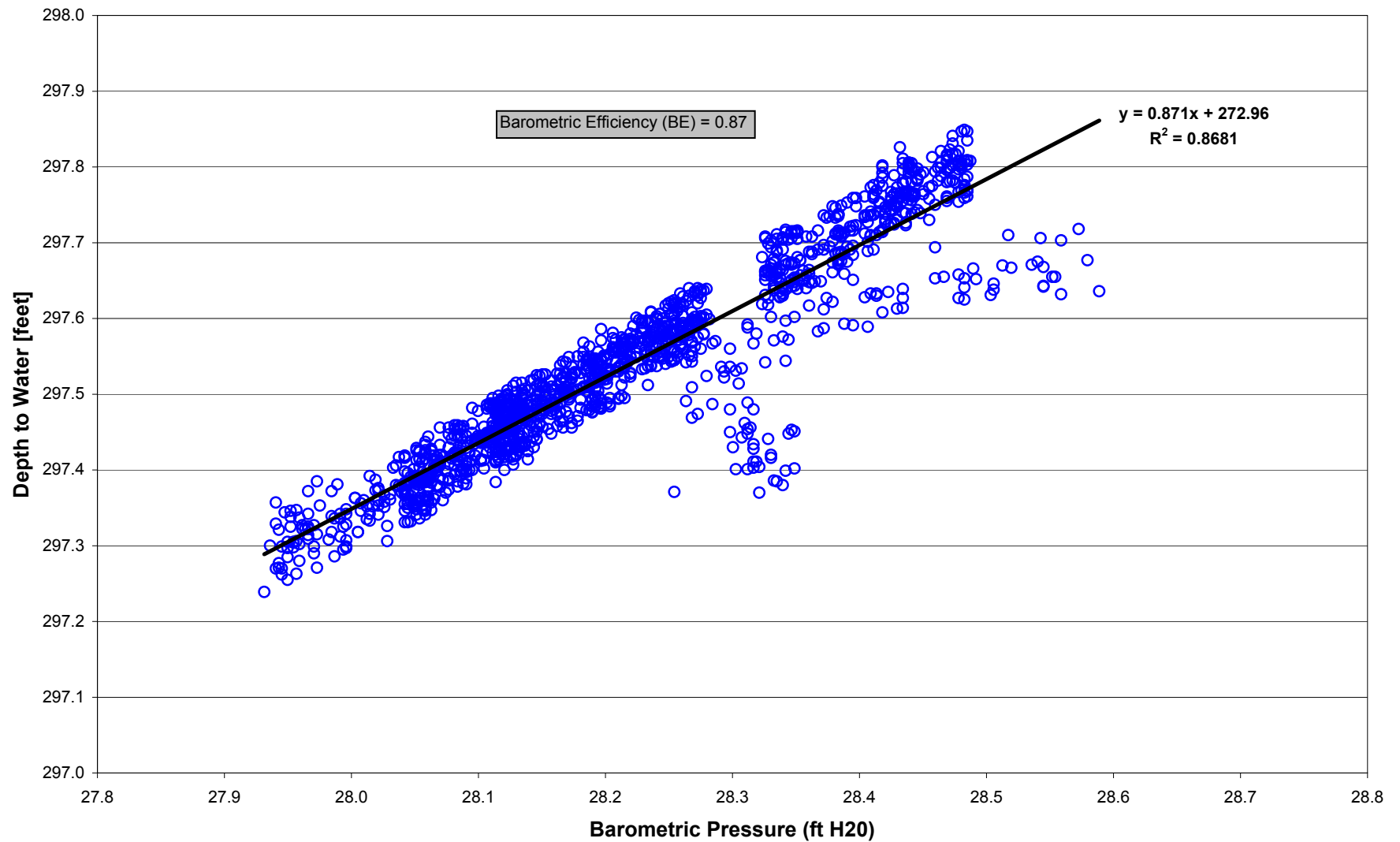
OM3 BE Evaluation



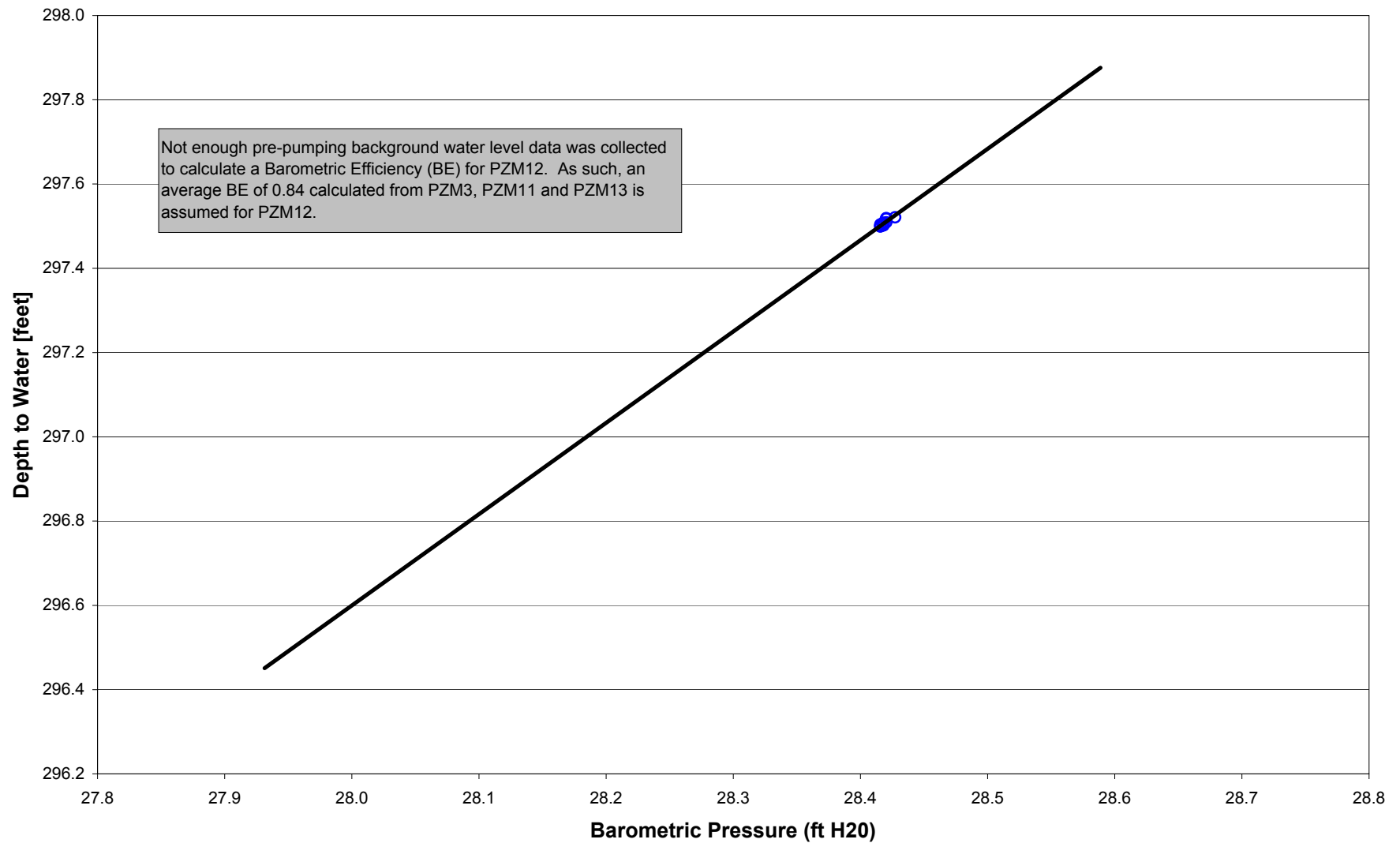
PZM3 BE Evaluation



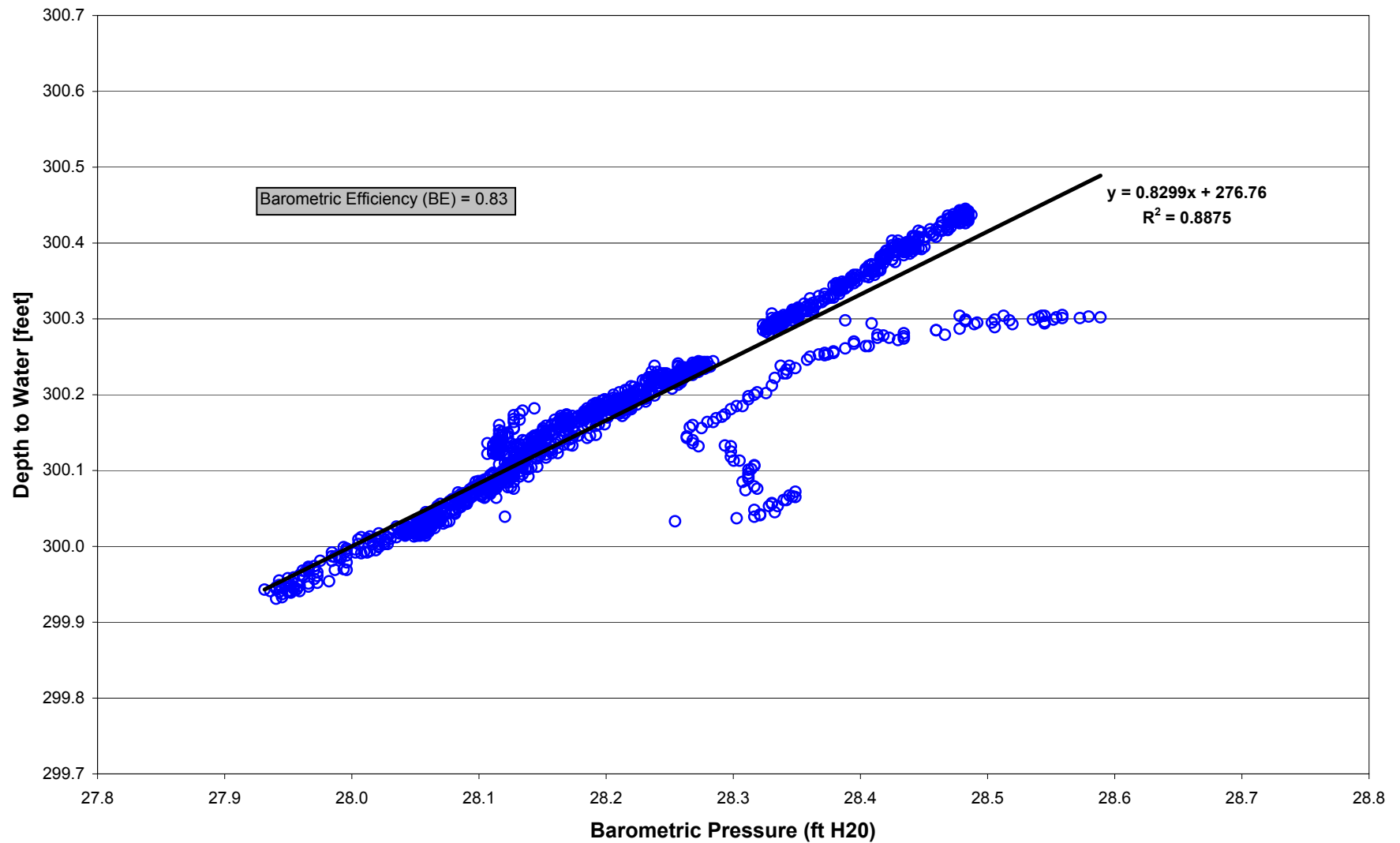
PZM11 BE Evaluation



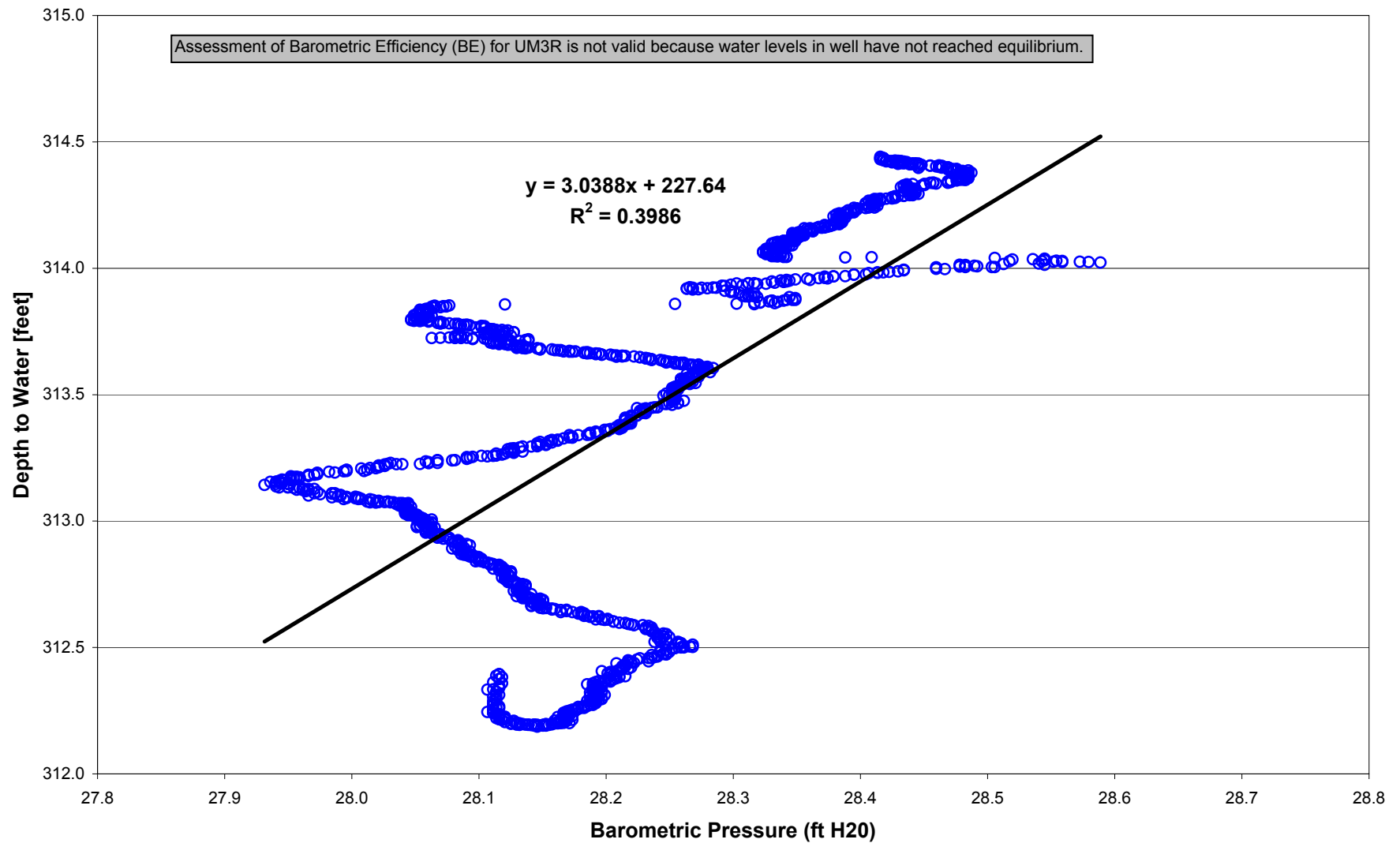
PZM12 BE Evaluation



PZM13 BE Evaluation



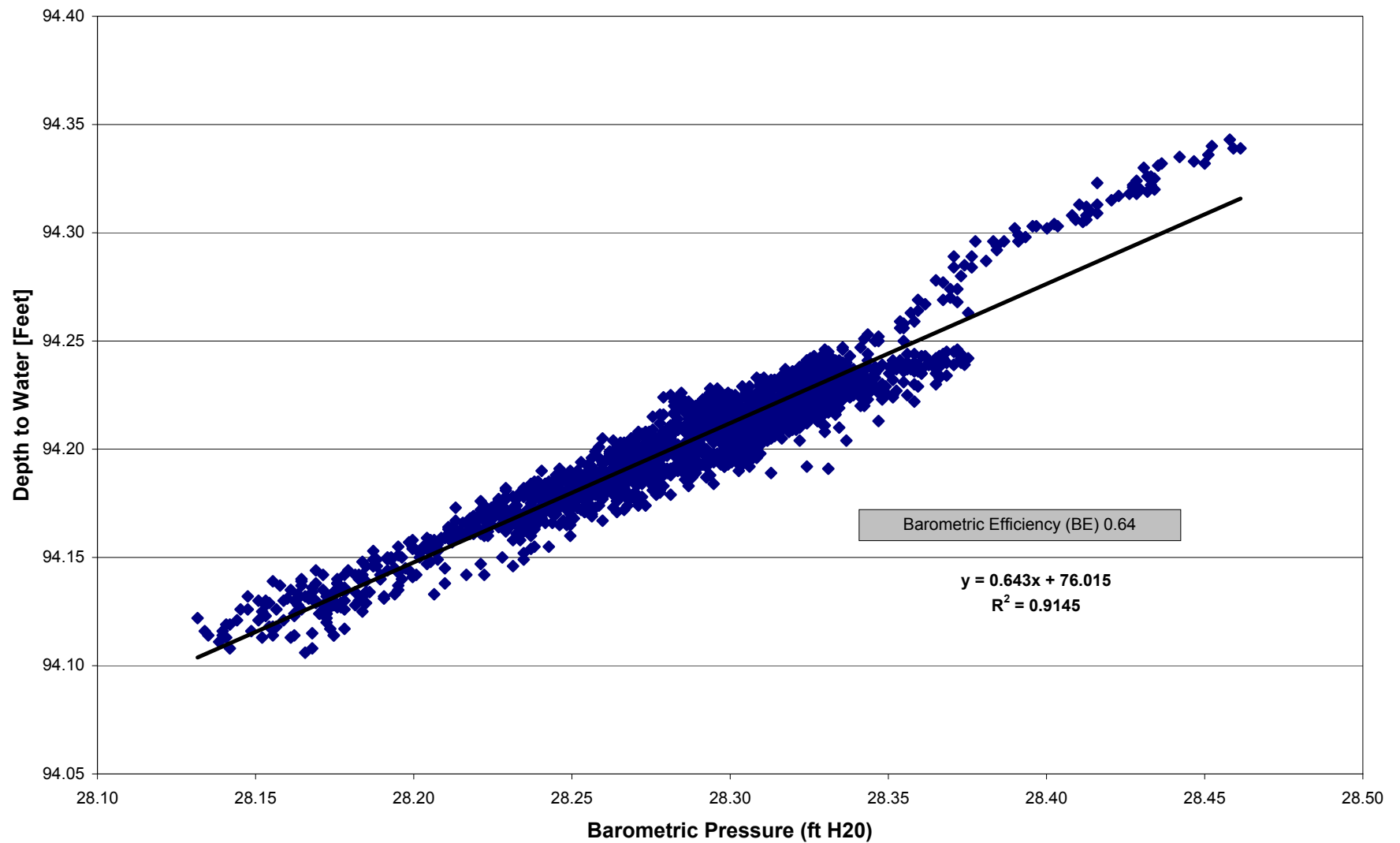
UM3R BE Evaluation



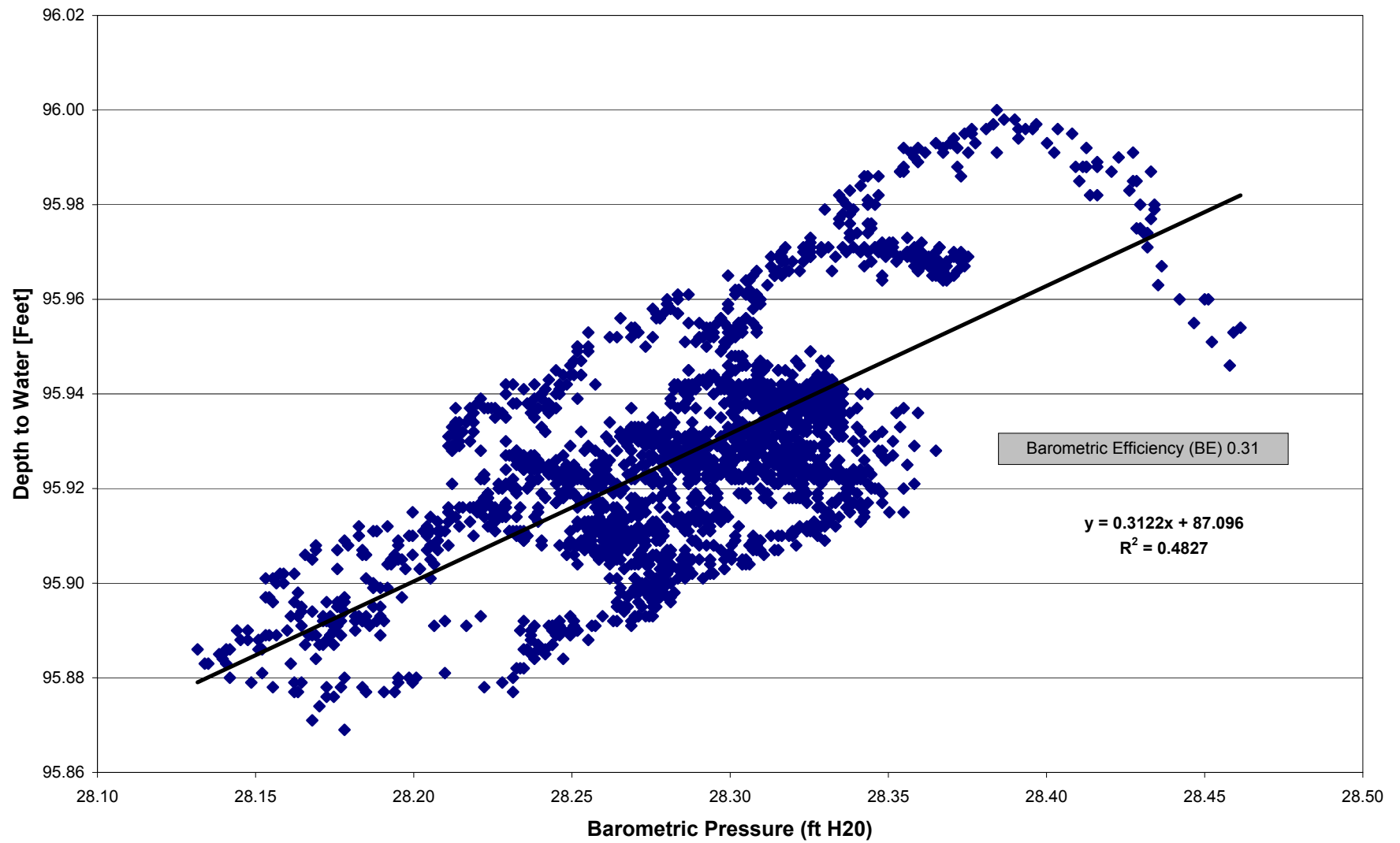
PZM4D PUMP TEST

**WATER LEVEL ELEVATIONS VS.
BAROMETRIC PRESSURE AND MONITOR WELL
BAROMETRIC EFFICIENCY EVALUATIONS**

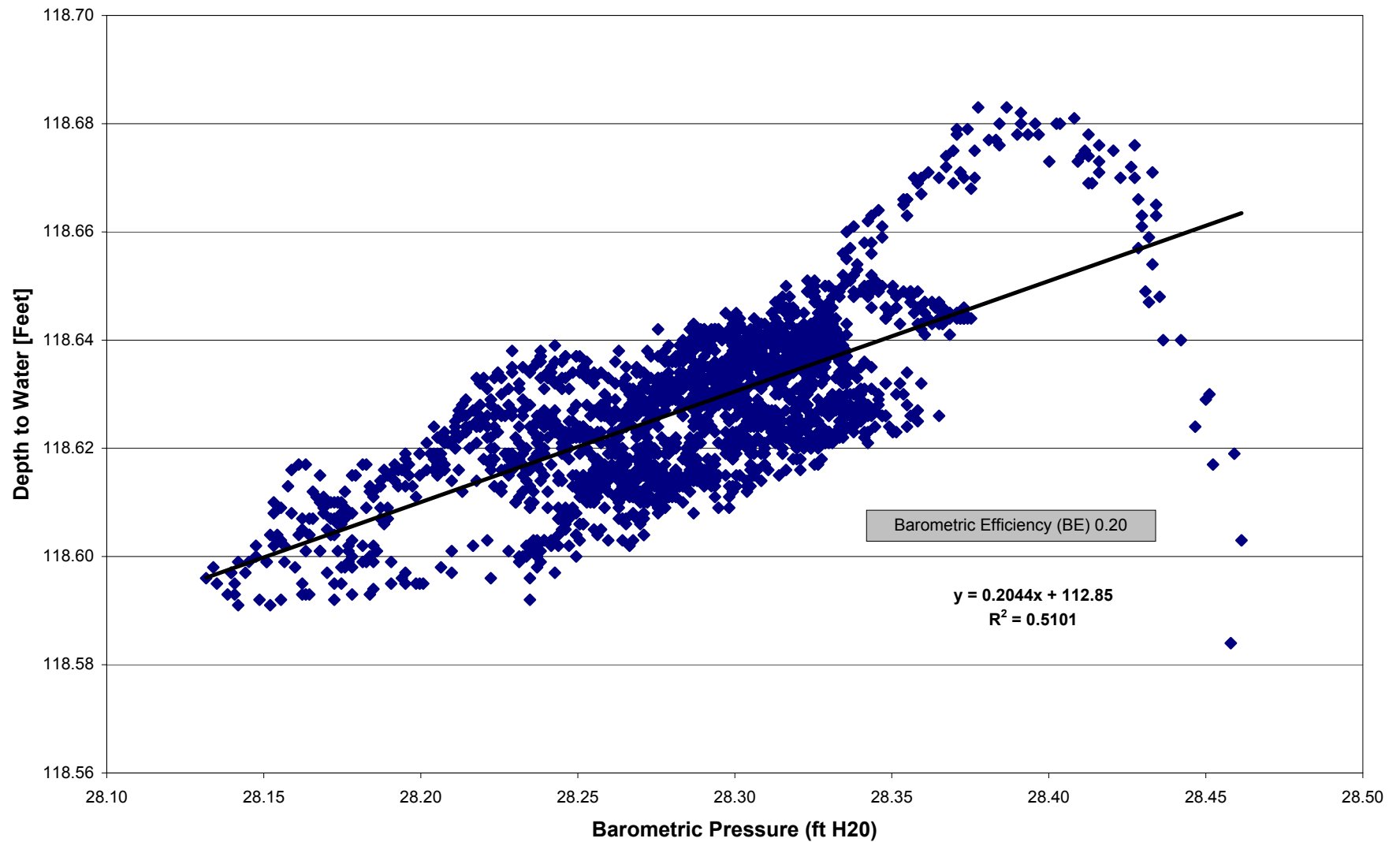
OM4 BE Evaluation



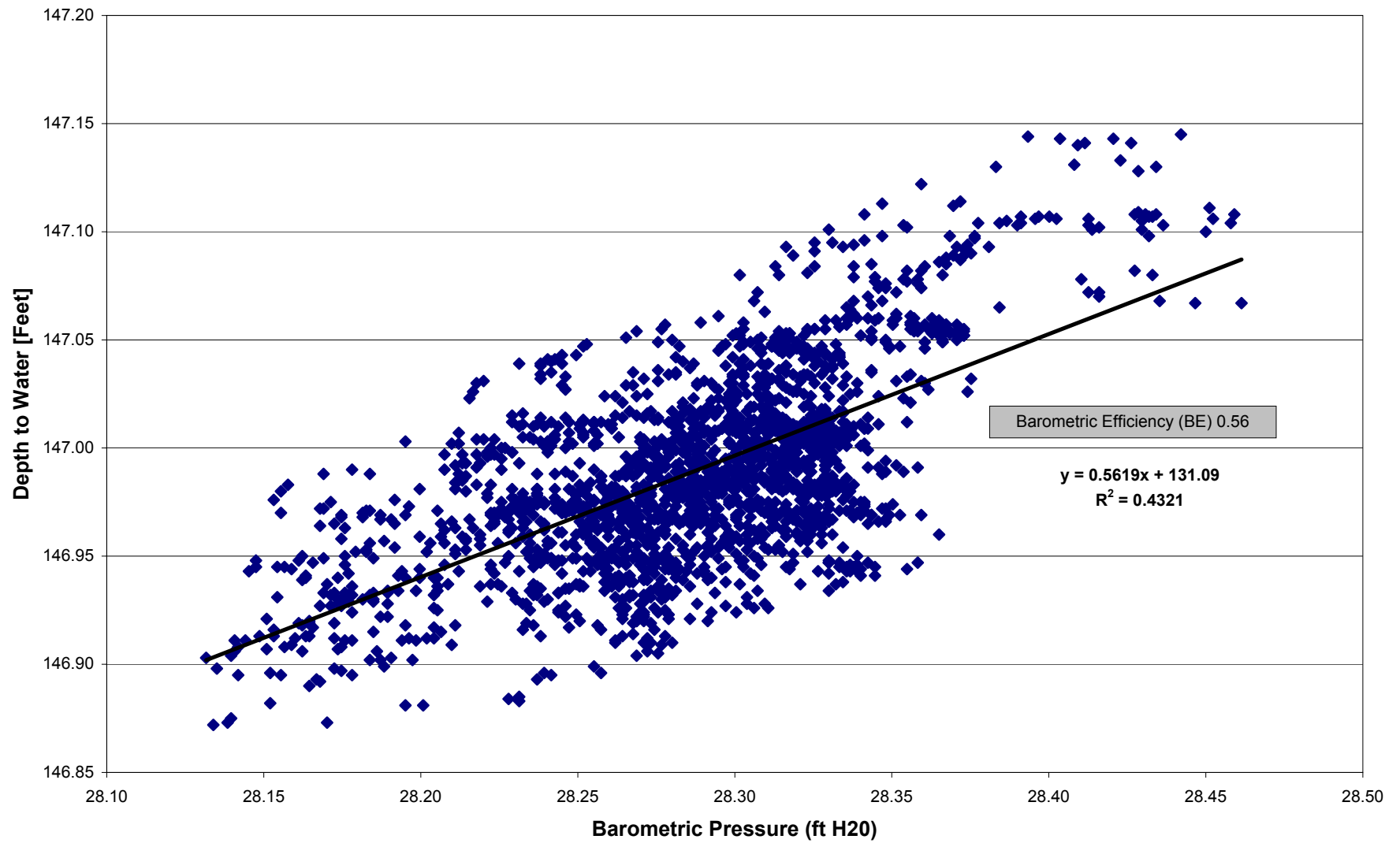
OAM4S BE Evaluation



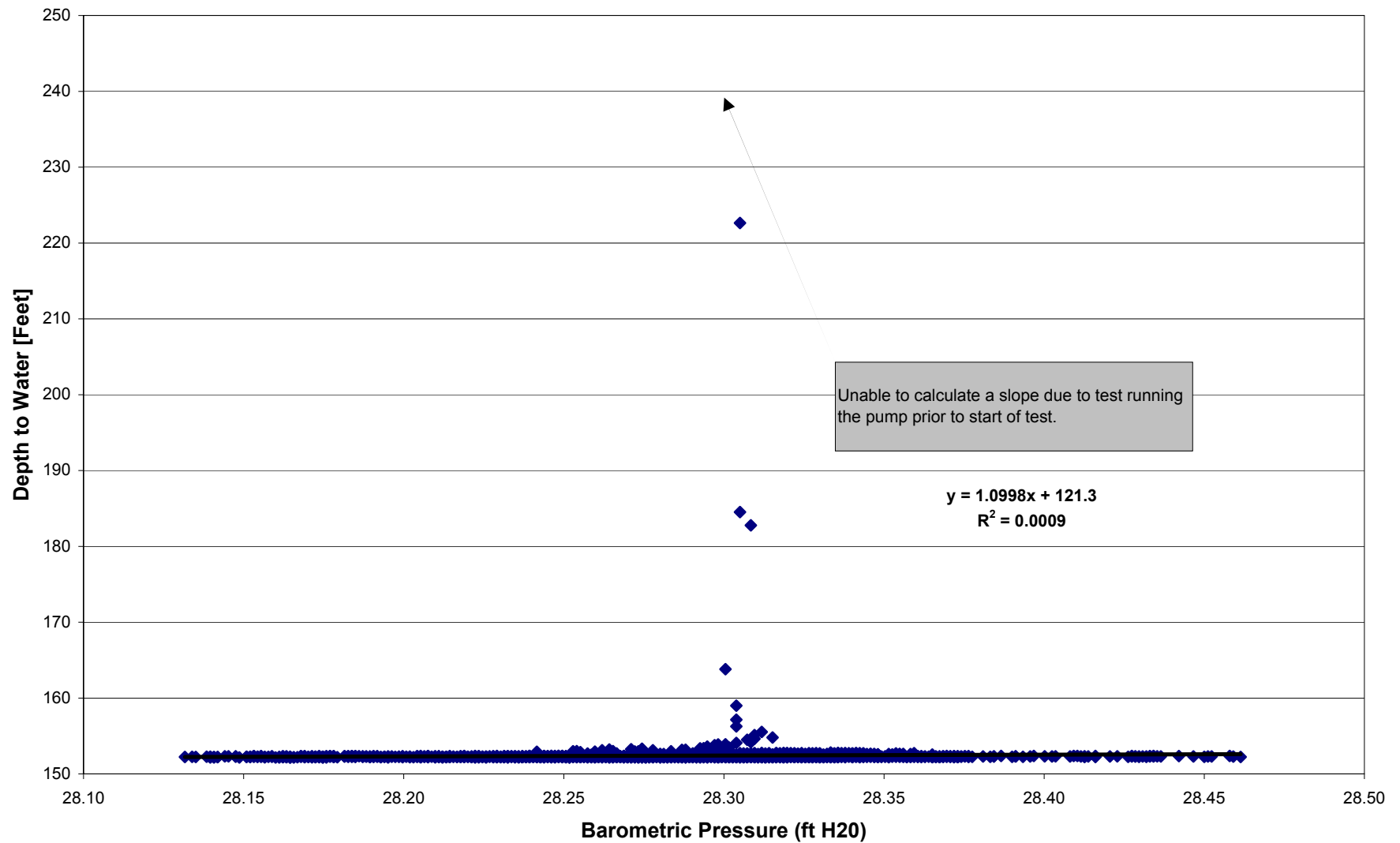
OAM4D BE Evaluation



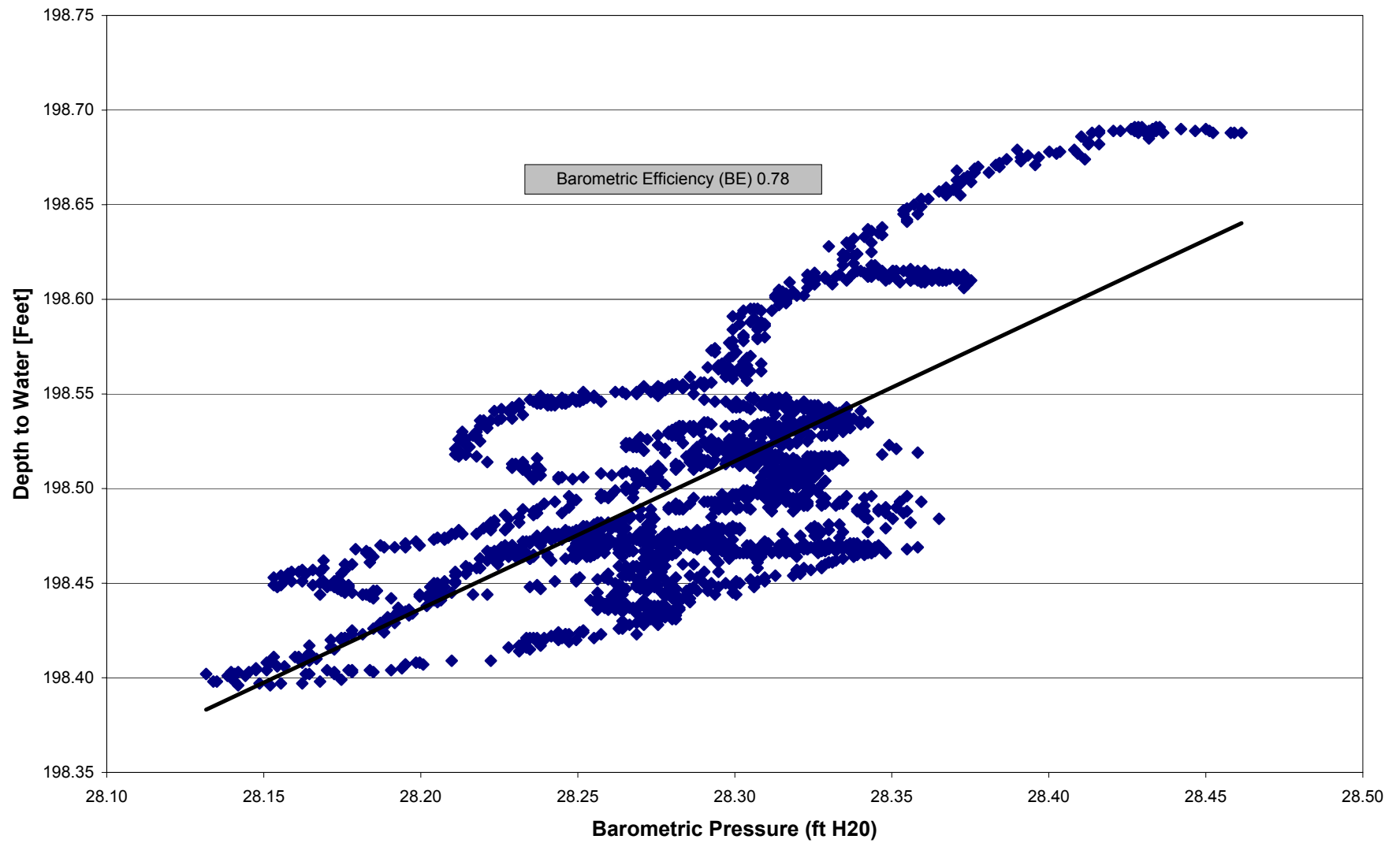
PZM4 BE Evaluation



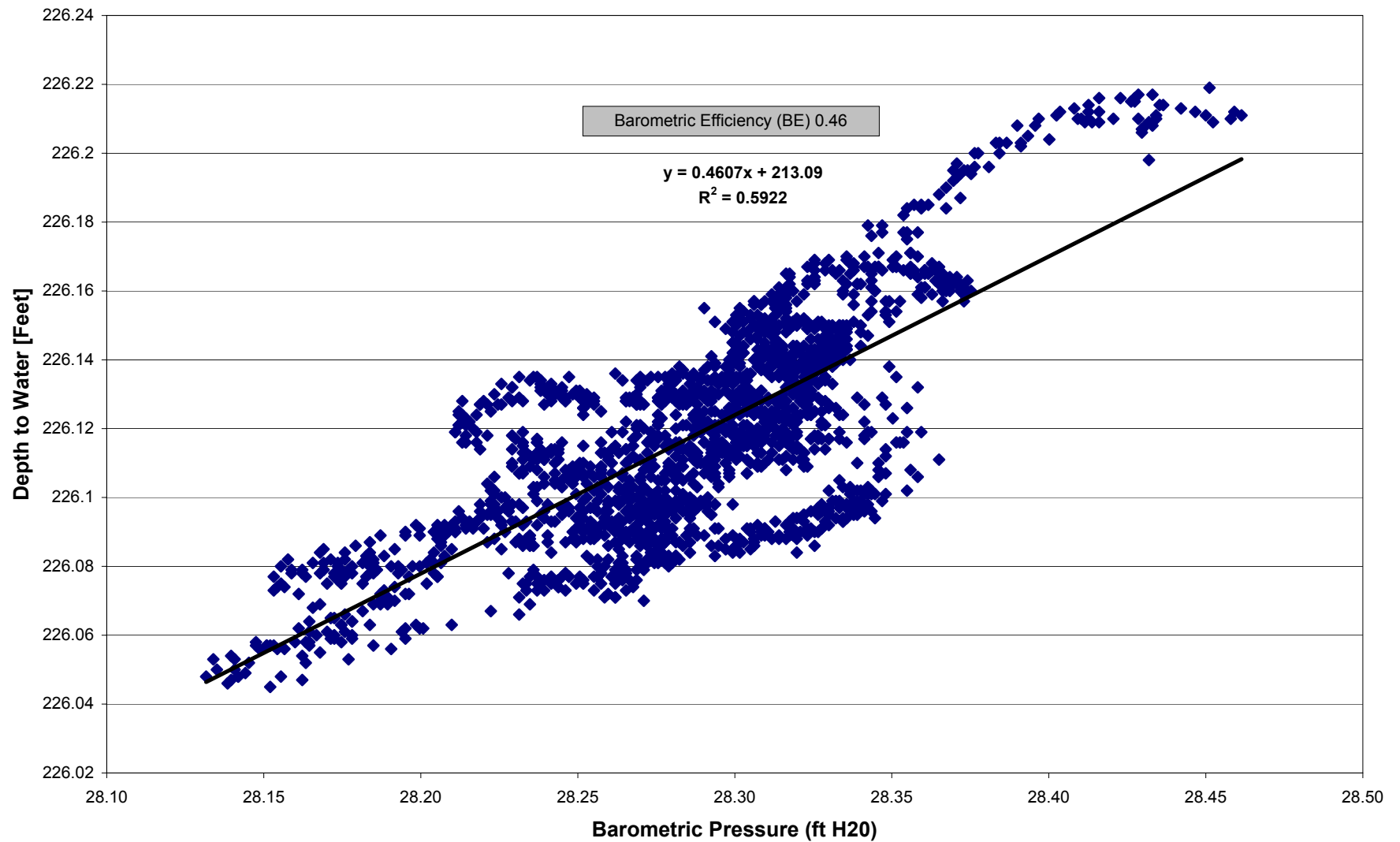
PZM4D BE Evaluation



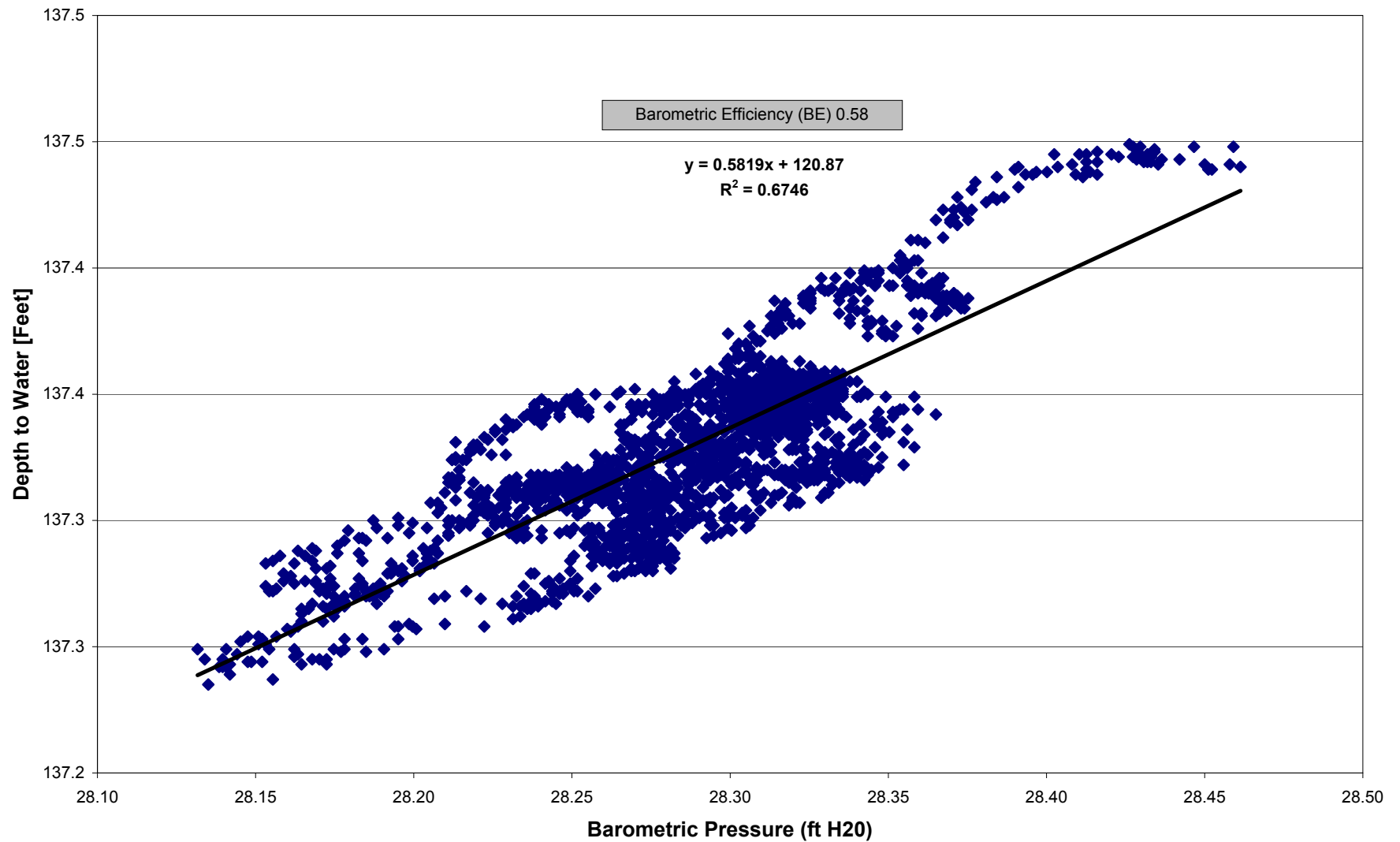
PZM14 BE Evaluation



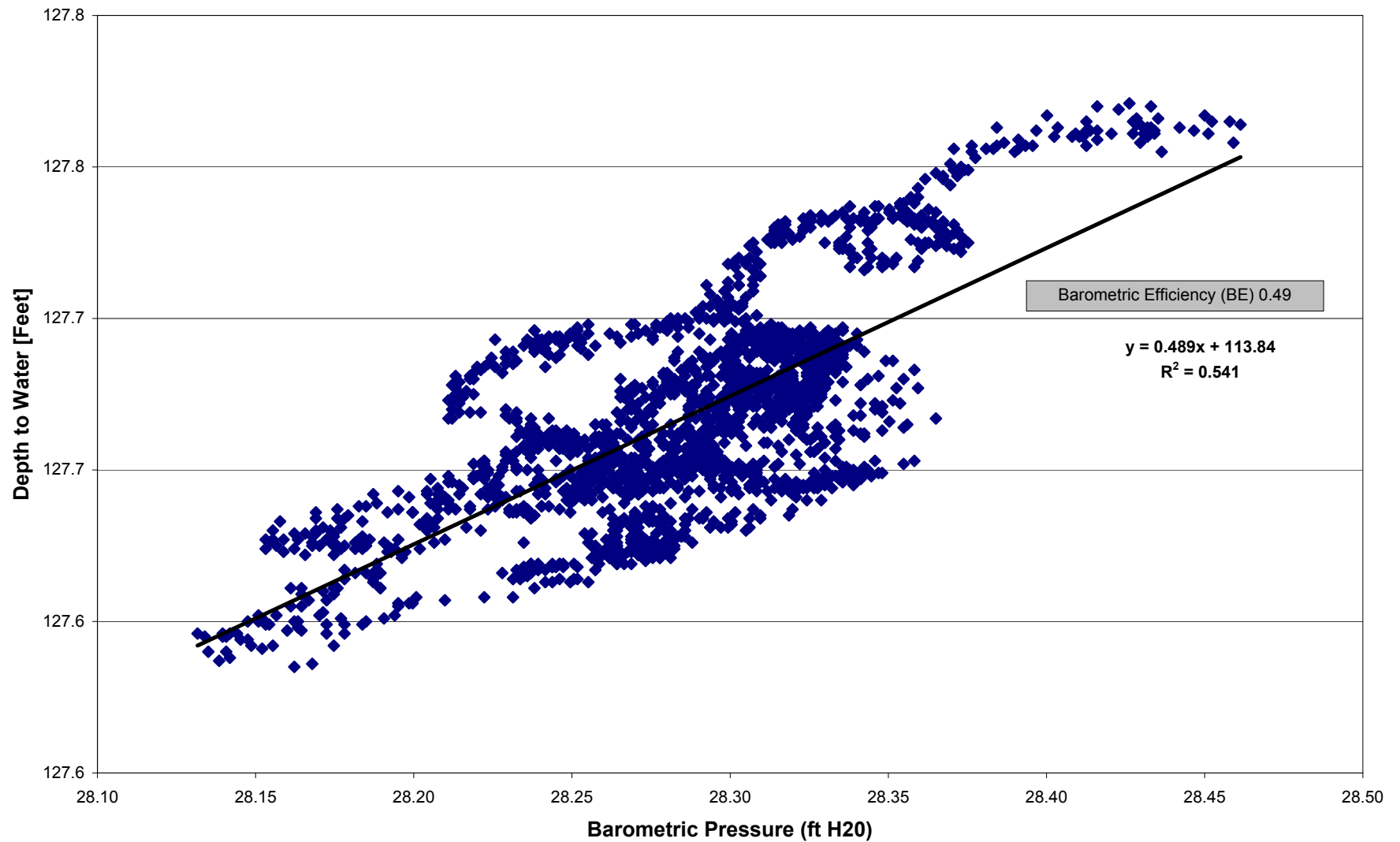
PZM15 BE Evaluation



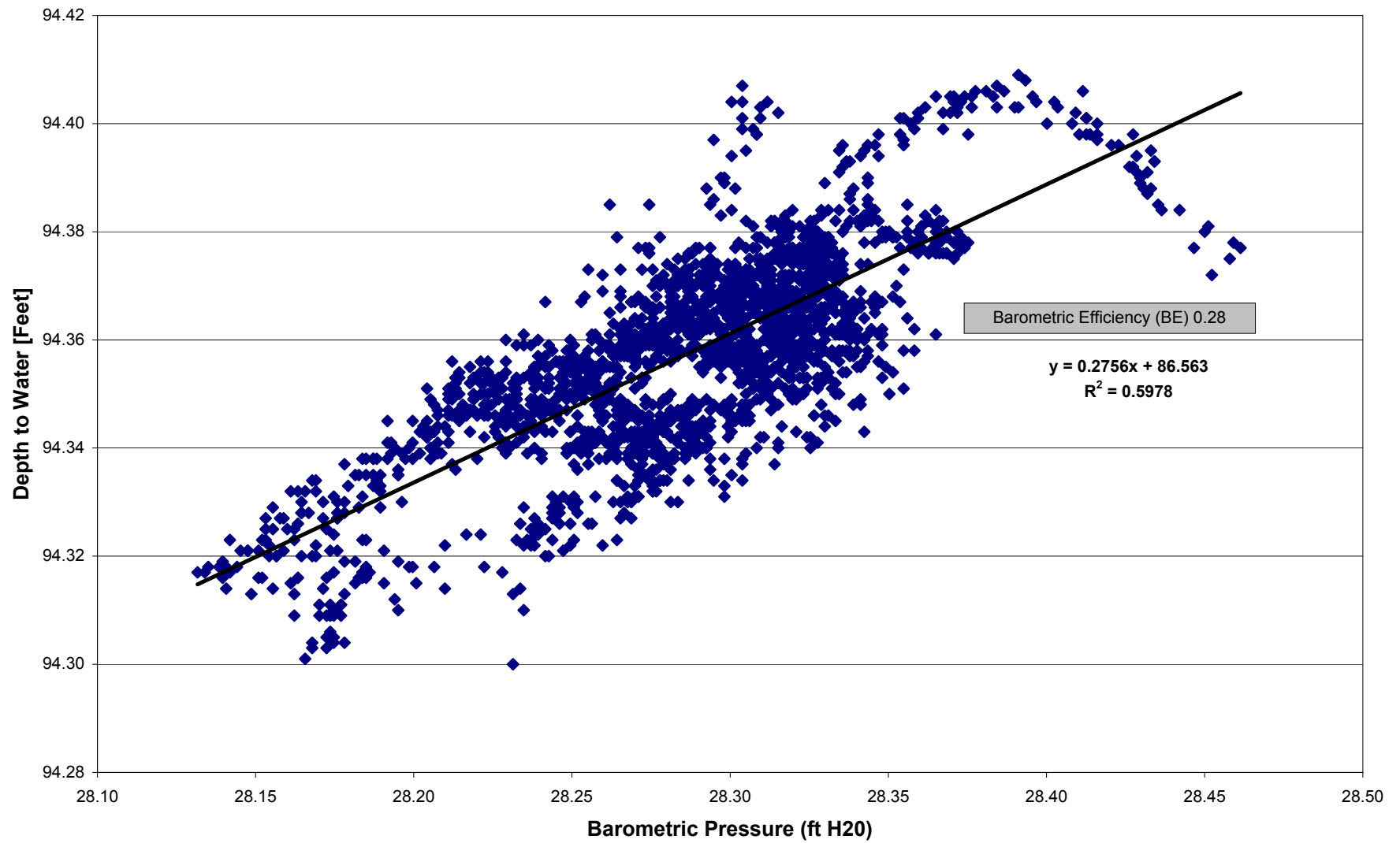
PZM16 BE Evaluation



PZM17 BE Evaluation



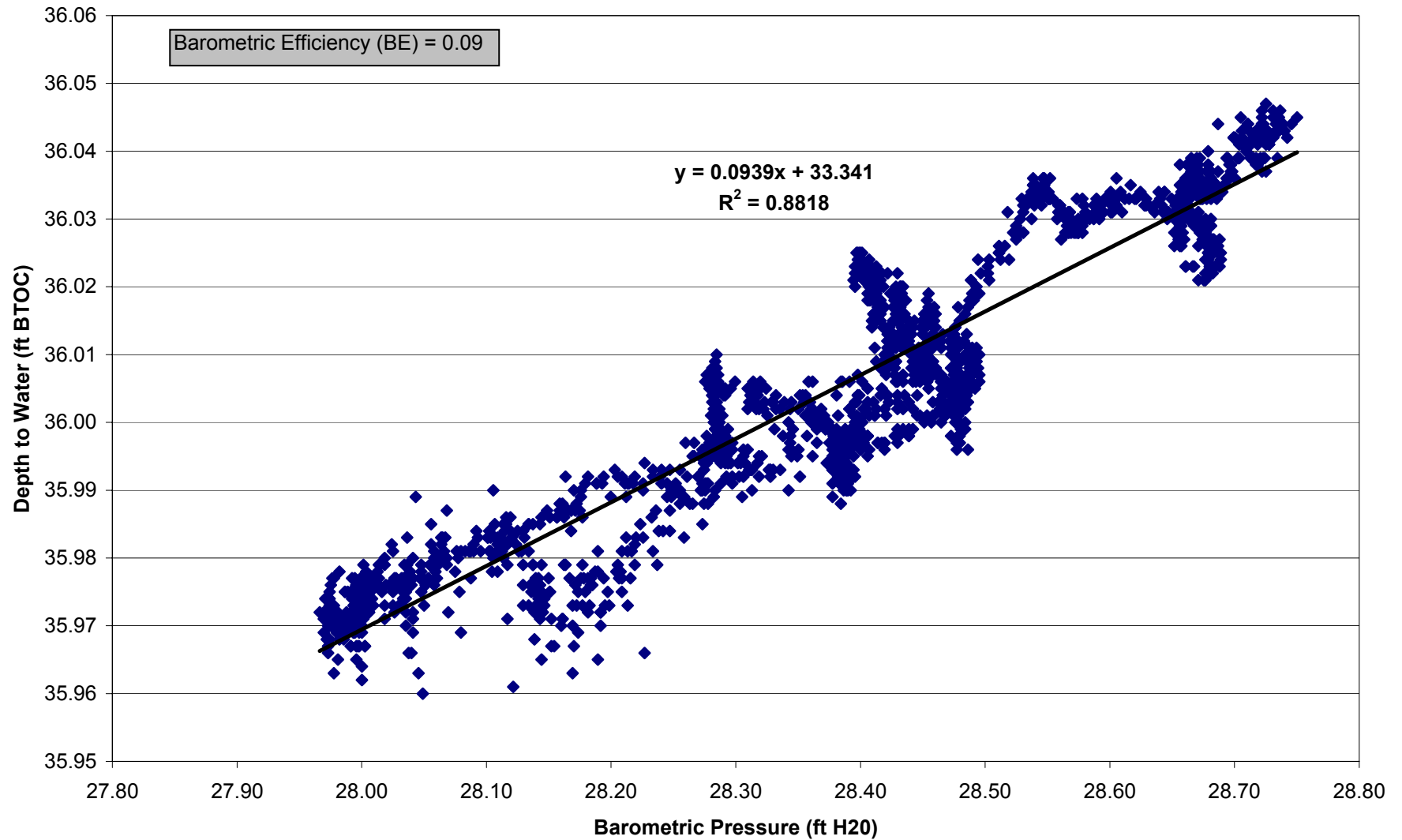
UM4 BE Evaluation



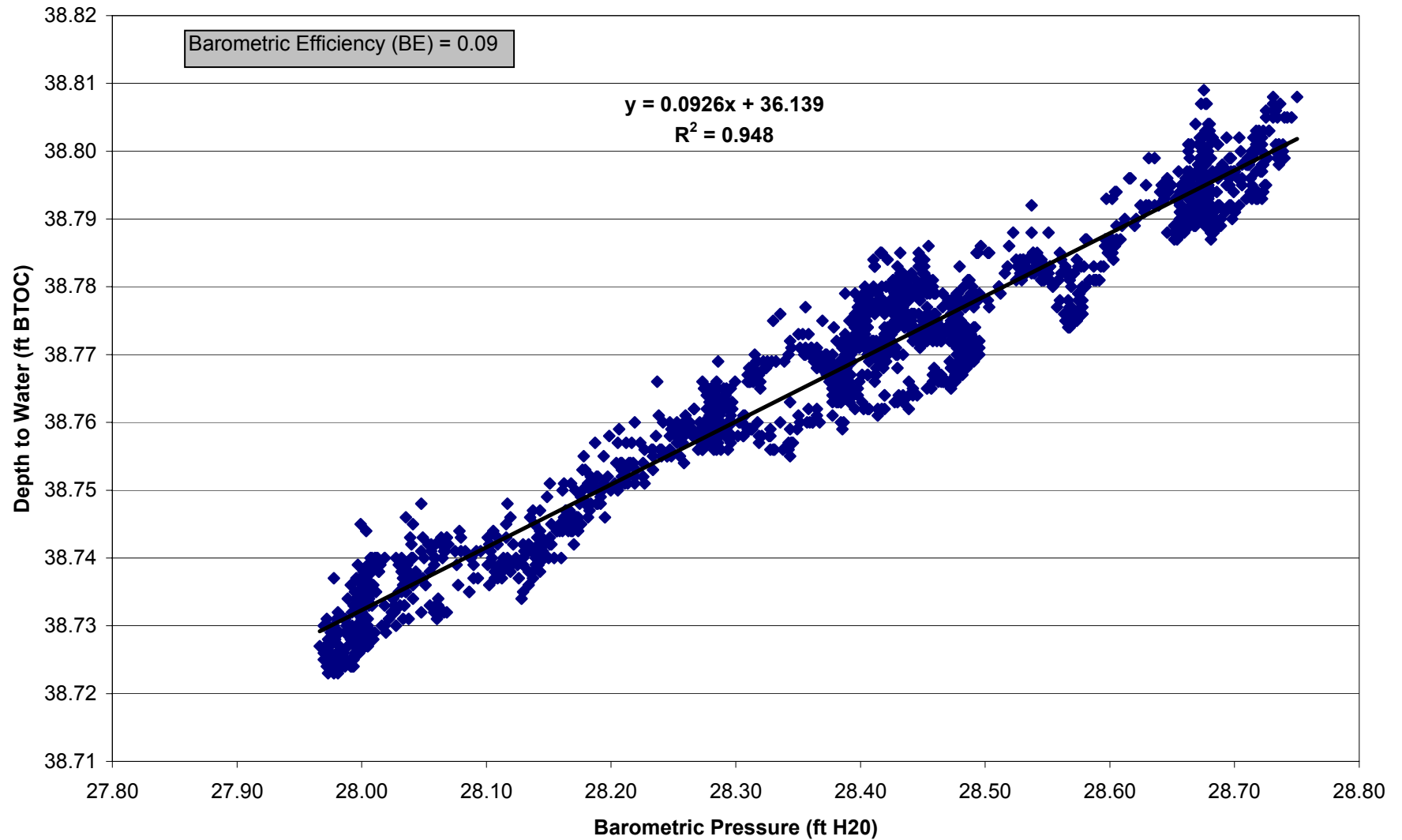
PZM5 PUMP TEST

**WATER LEVEL ELEVATIONS VS.
BAROMETRIC PRESSURE AND MONITOR WELL
BAROMETRIC EFFICIENCY EVALUATIONS**

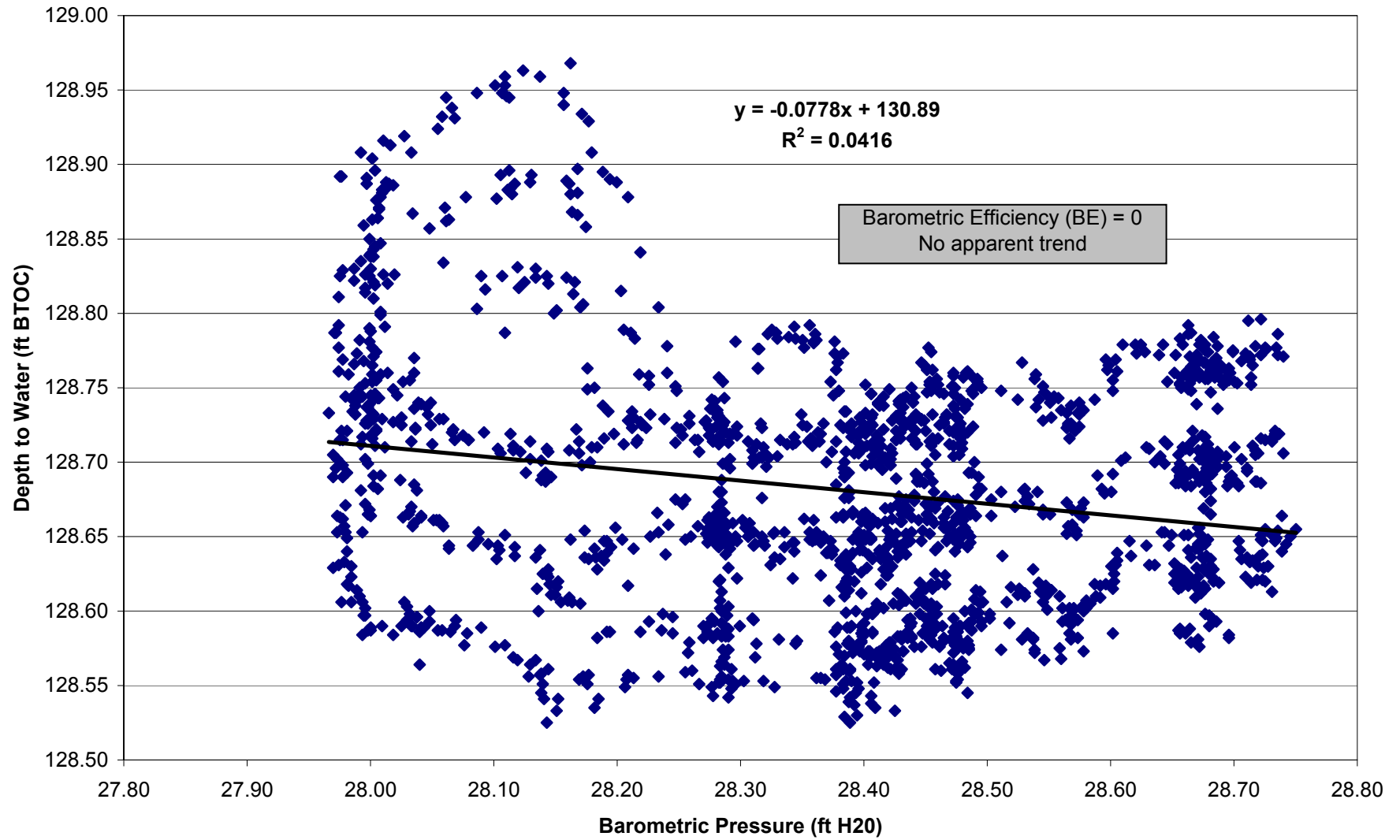
SM5 BE Evaluation



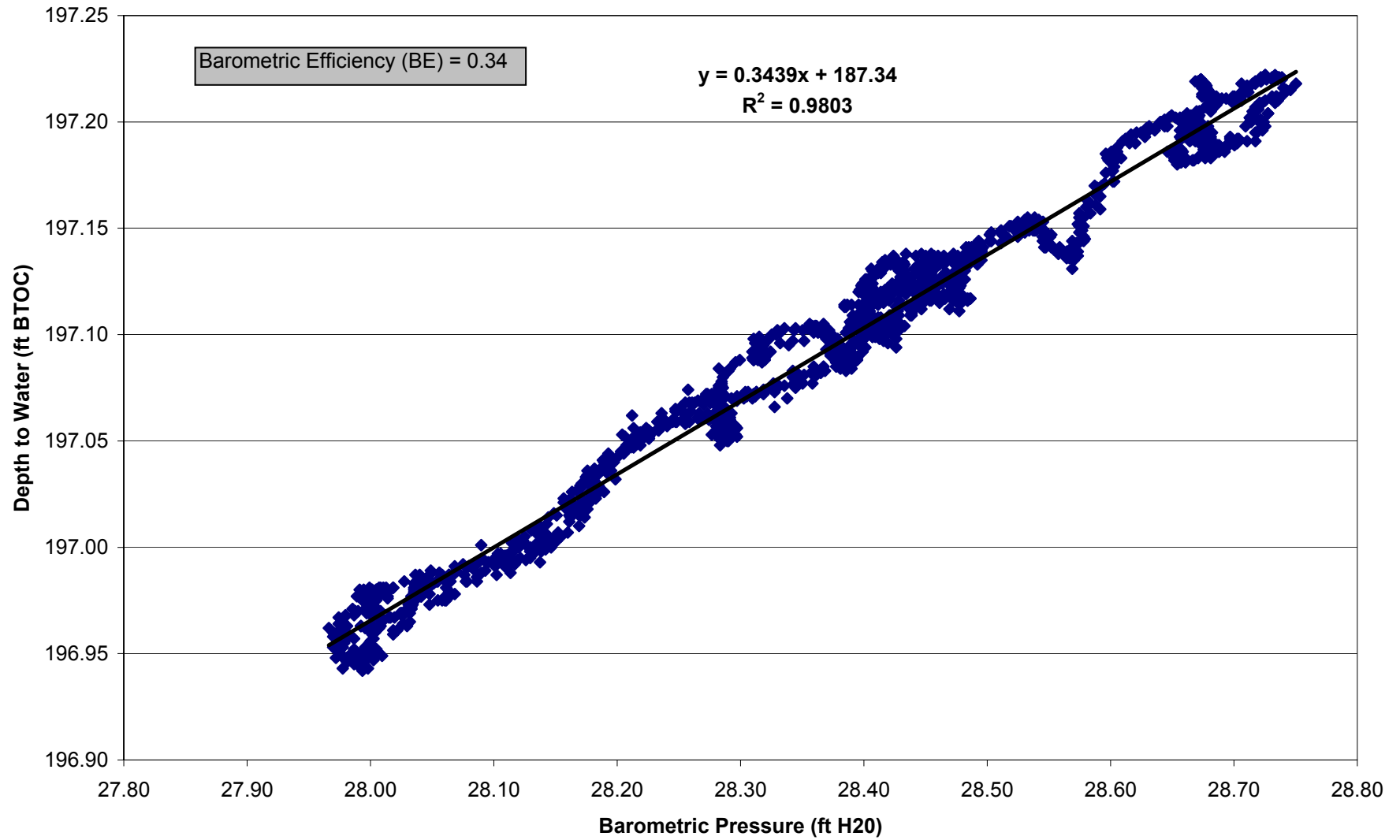
OM5 BE Evaluation



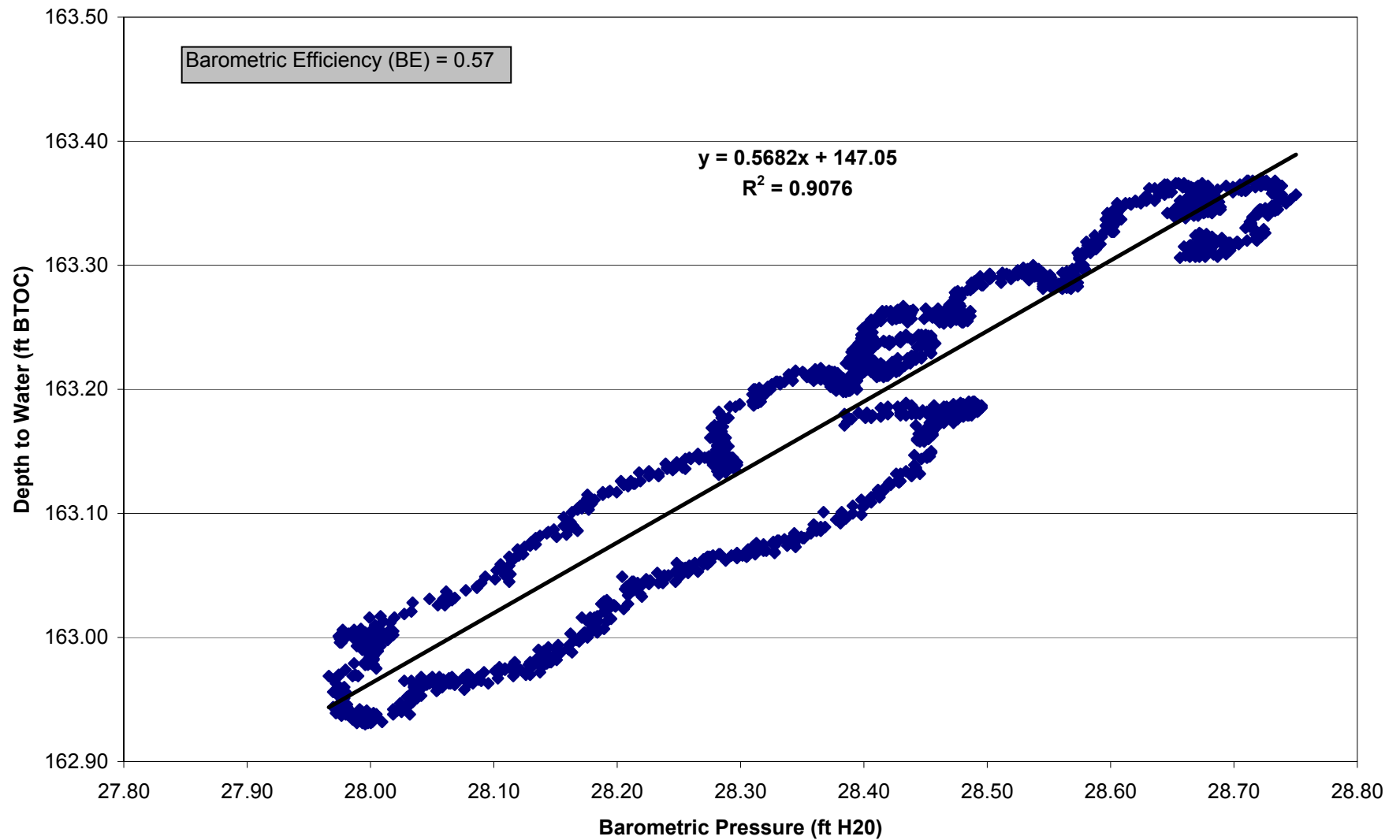
PZM5 BE Evaluation



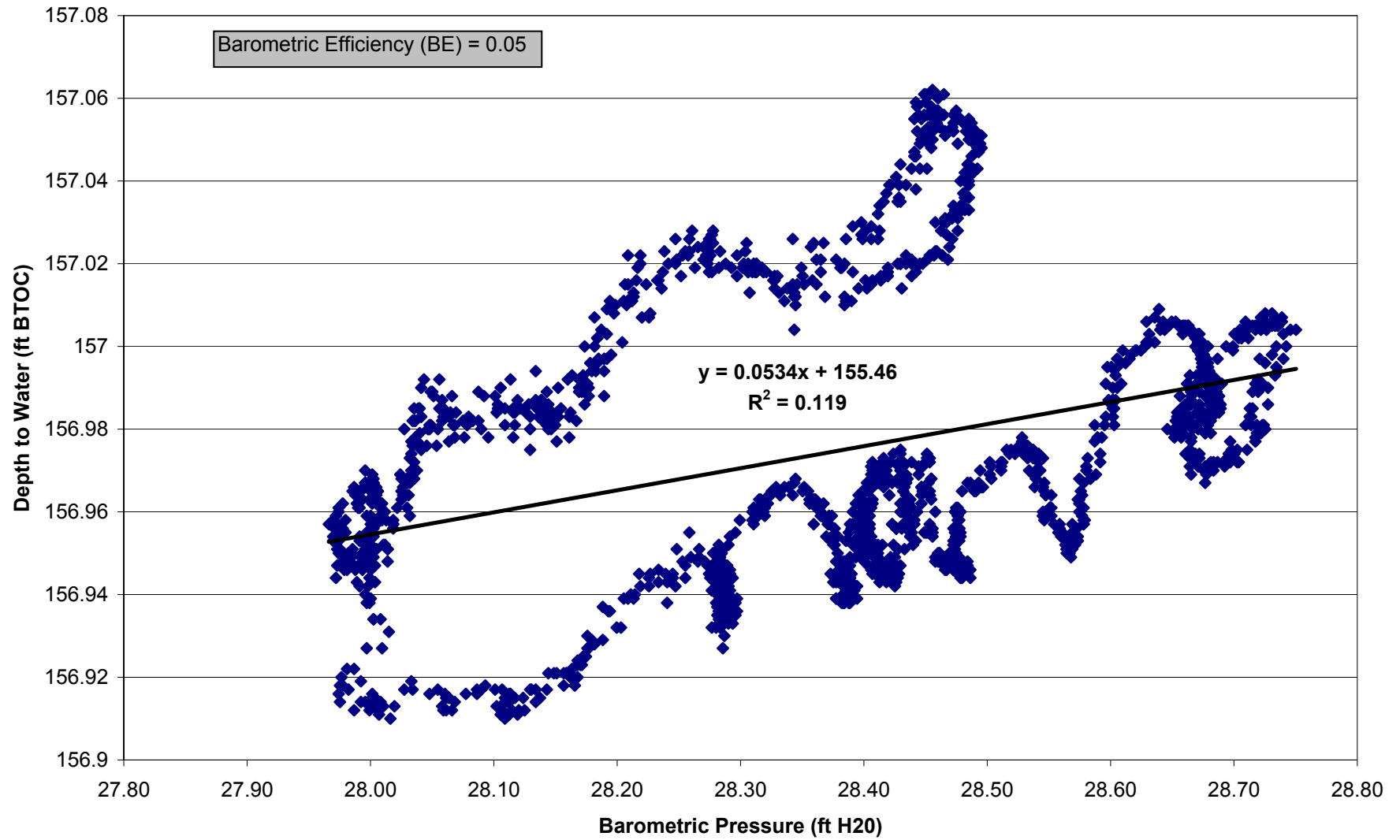
PZM6 BE Evaluation



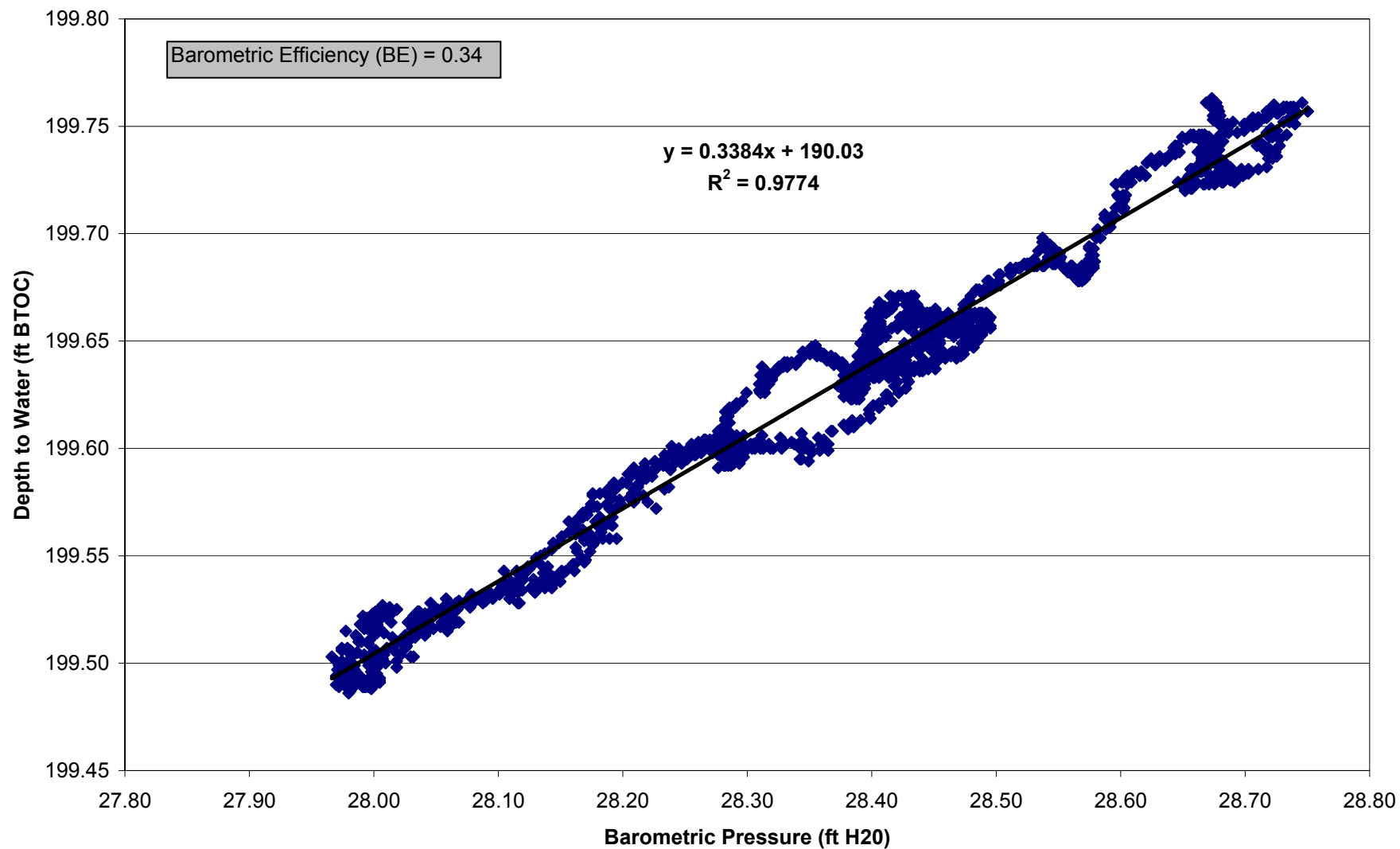
PZM18 BE Evaluation



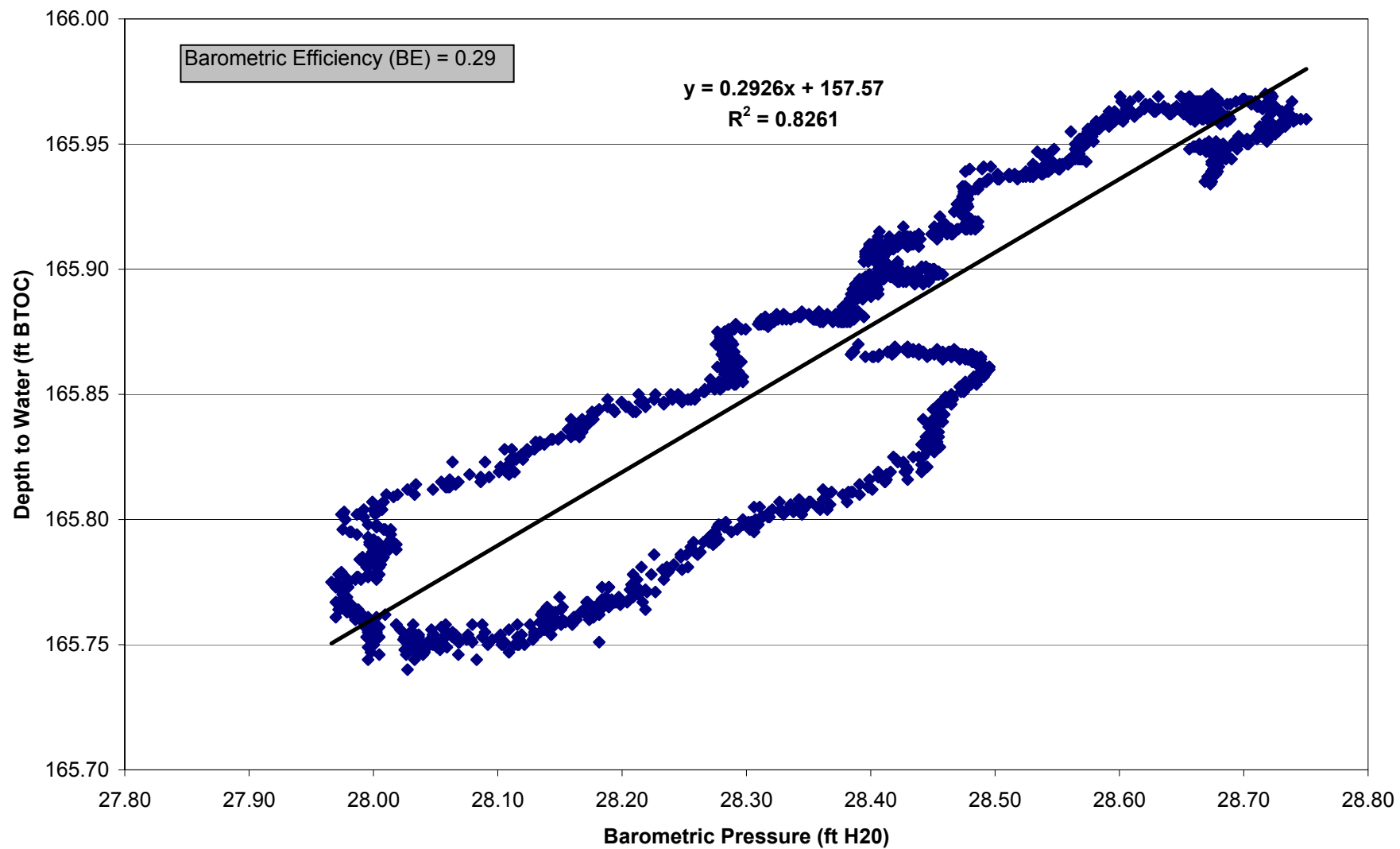
PZM19 BE Evaluation



ANCVSS BE Evaluation



UM5 BE Evaluation



APPENDIX C

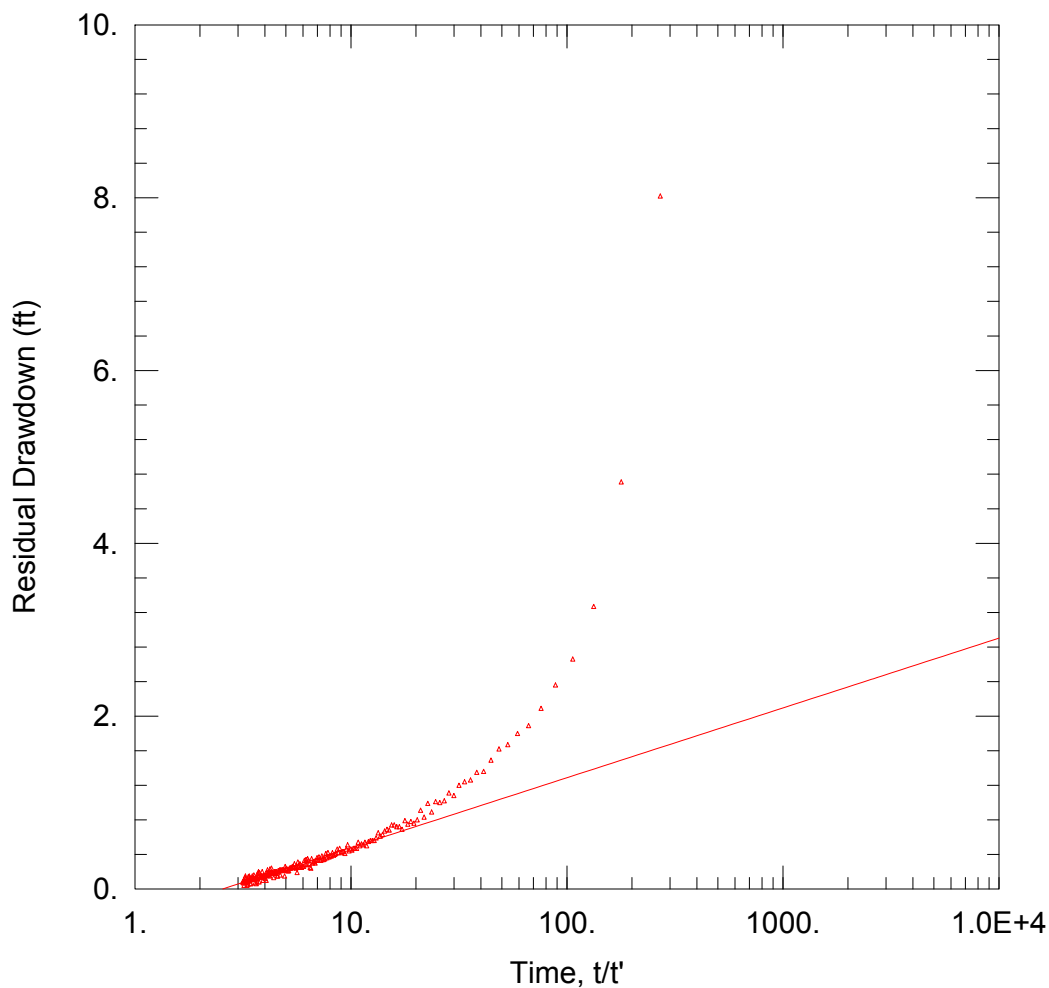
RAW WATER LEVEL DATA

(Included with report as seperate file)

APPENDIX D

TYPE CURVE MATCHES

PZM1 PUMP TEST TYPE CURVE MATCHES



PZM1 PUMP TEST

Data Set: N:\...\201111_PZM1 Recovery.aqt

Date: 02/02/12

Time: 16:24:42

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM1

Test Date: Dec 6-8, 2010

AQUIFER DATA

Saturated Thickness: 97. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| PZM-1 | 536230.1 | 1156669.6 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| ▲ PZM-1 | 536230.1 | 1156669.6 |

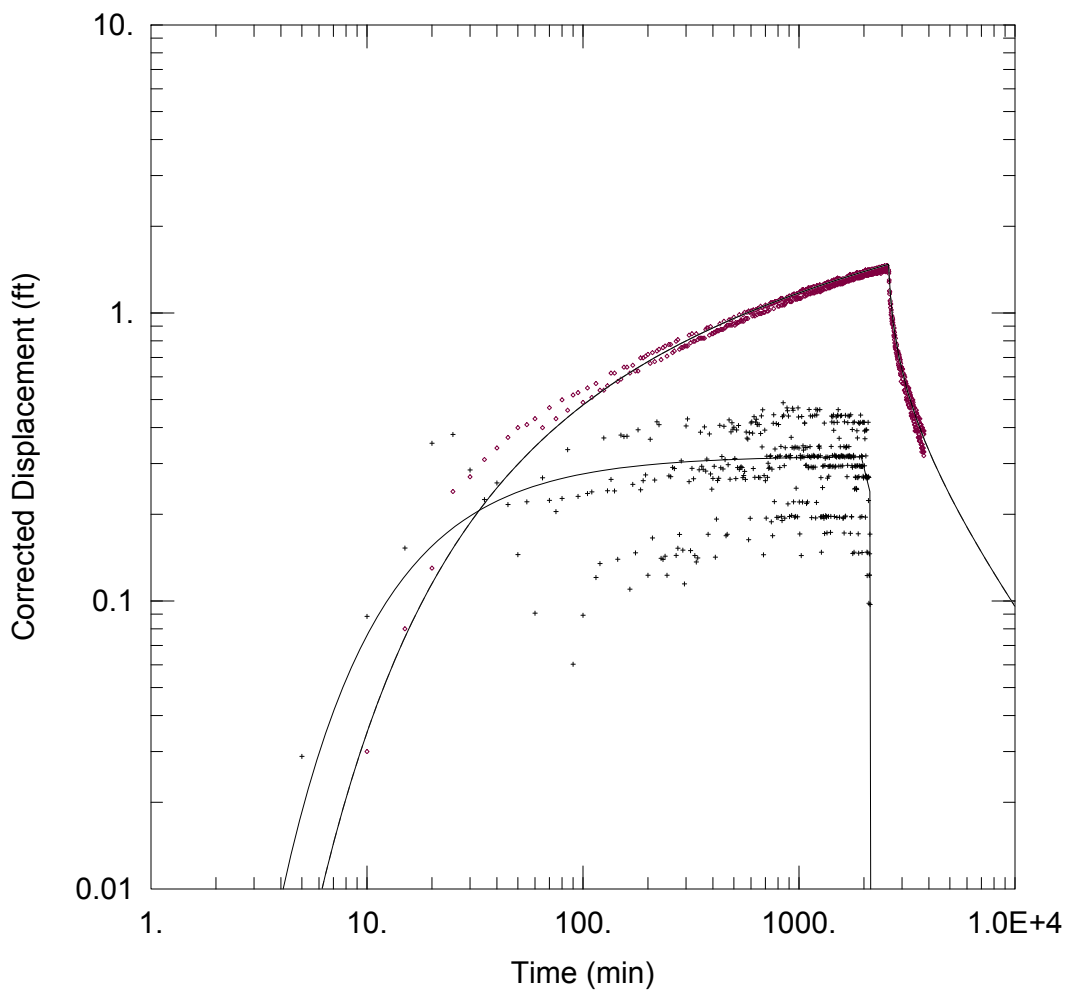
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 388.8 \text{ ft}^2/\text{day}$

$S/S' = 2.552$



PZM1 PUMP TEST

Data Set: N:\...\201111_PZM9 Theis Unconfined.aqt

Date: 02/02/12

Time: 16:27:41

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-1

Test Date: Dec 6-8, 2010

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| PZM1 | 536230.1 | 1156669.6 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| • PZM9 | 536271.8 | 1156709.4 |

SOLUTION

Aquifer Model: Unconfined

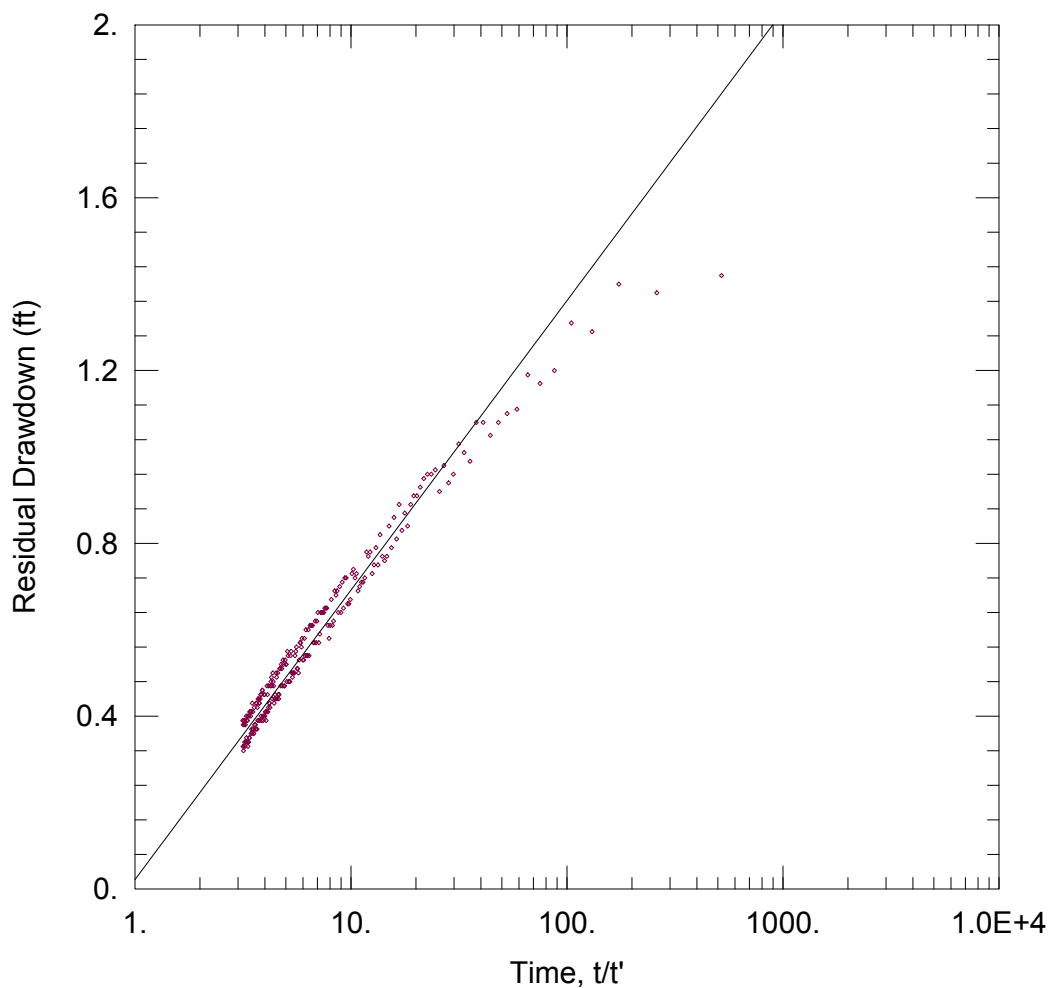
Solution Method: Theis

T = 427.4 ft²/day

S = 0.00515

Kz/Kr = 1.

b = 97. ft



PZM1 PUMP TEST

Data Set: N:\...\201111_PZM9 Recovery.aqt

Date: 02/02/12

Time: 16:28:33

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-1

Test Date: Dec 6-8, 2010

AQUIFER DATA

Saturated Thickness: 97. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| PZM-1 | 536230.1 | 1156669.6 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| • PZM-9 | 536271.8 | 1156709.4 |

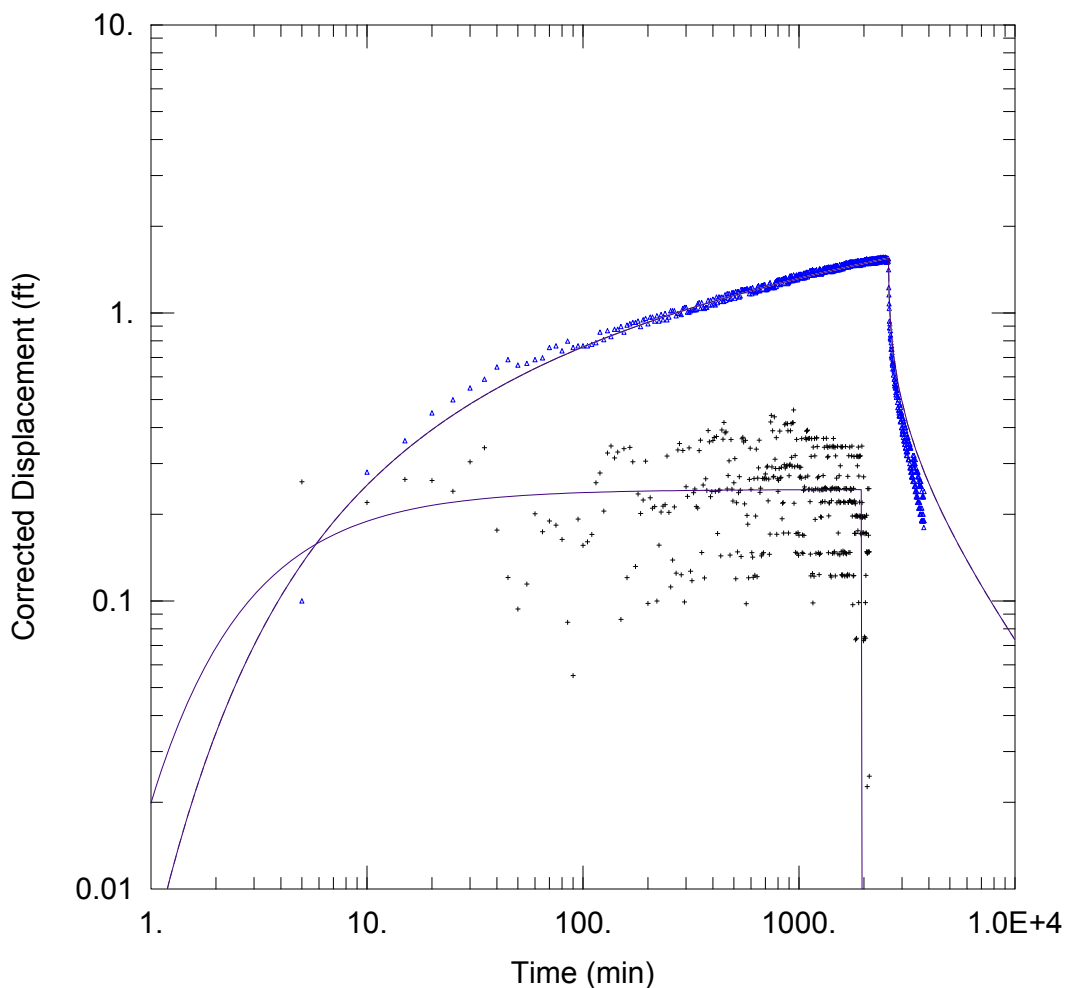
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 468.6 \text{ ft}^2/\text{day}$

$S/S' = 0.9296$



PZM1 PUMP TEST

Data Set: N:\...\201111_PZM8 Theis Unconfined.aqt

Date: 02/02/12

Time: 16:29:03

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-1

Test Date: Dec 6-8, 2010

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| PZM1 | 536230.1 | 1156669.6 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| ▲ PZM8 | 536245.3 | 1156590.1 |

SOLUTION

Aquifer Model: Unconfined

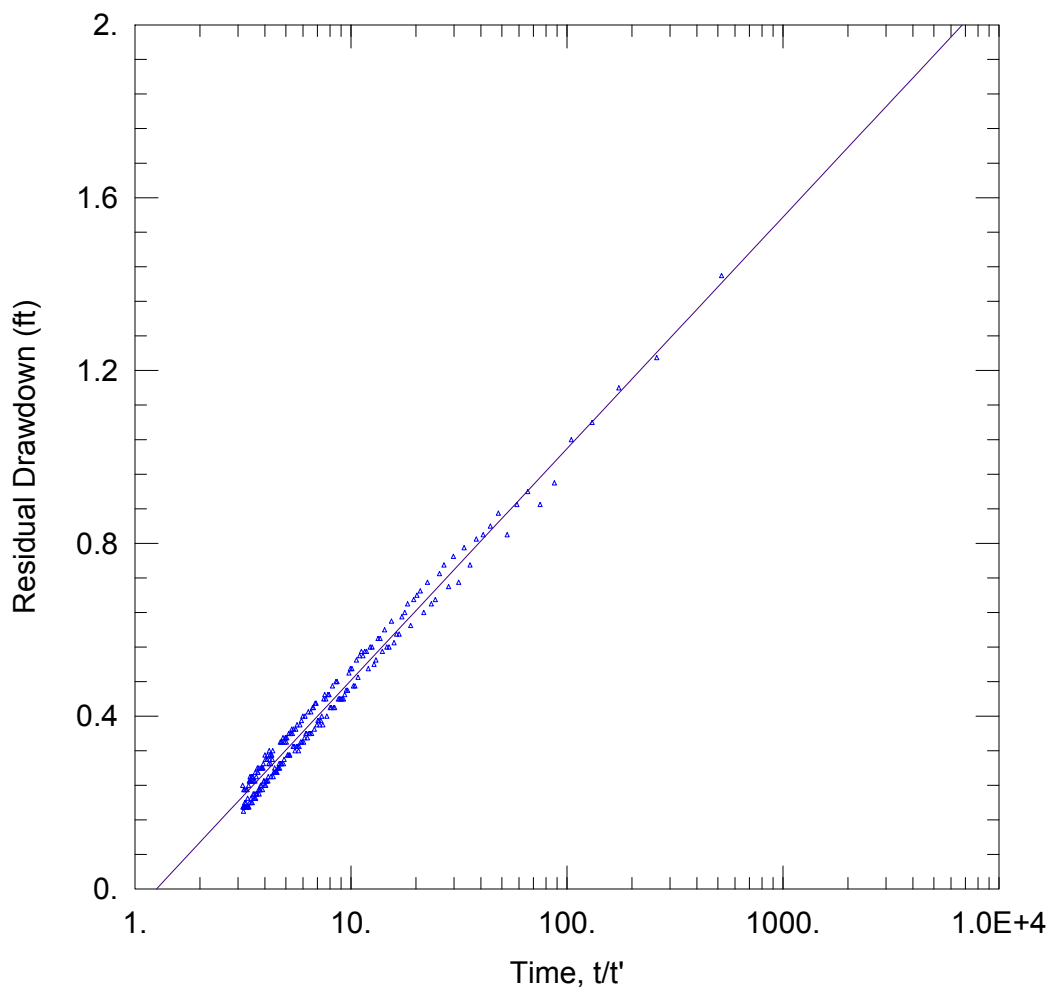
Solution Method: Theis

T = 559.3 ft²/day

S = 0.0006009

Kz/Kr = 1.

b = 125. ft



PZM1 PUMP TEST

Data Set: N:\...\201111_PZM8 Recovery.aqt

Date: 02/02/12

Time: 16:29:40

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-1

Test Date: Dec 6-8, 2010

AQUIFER DATA

Saturated Thickness: 97. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| PZM1 | 536230.1 | 1156669.6 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|---------------|----------|-----------|
| ▲ <u>PZM8</u> | 536245.3 | 1156590.1 |

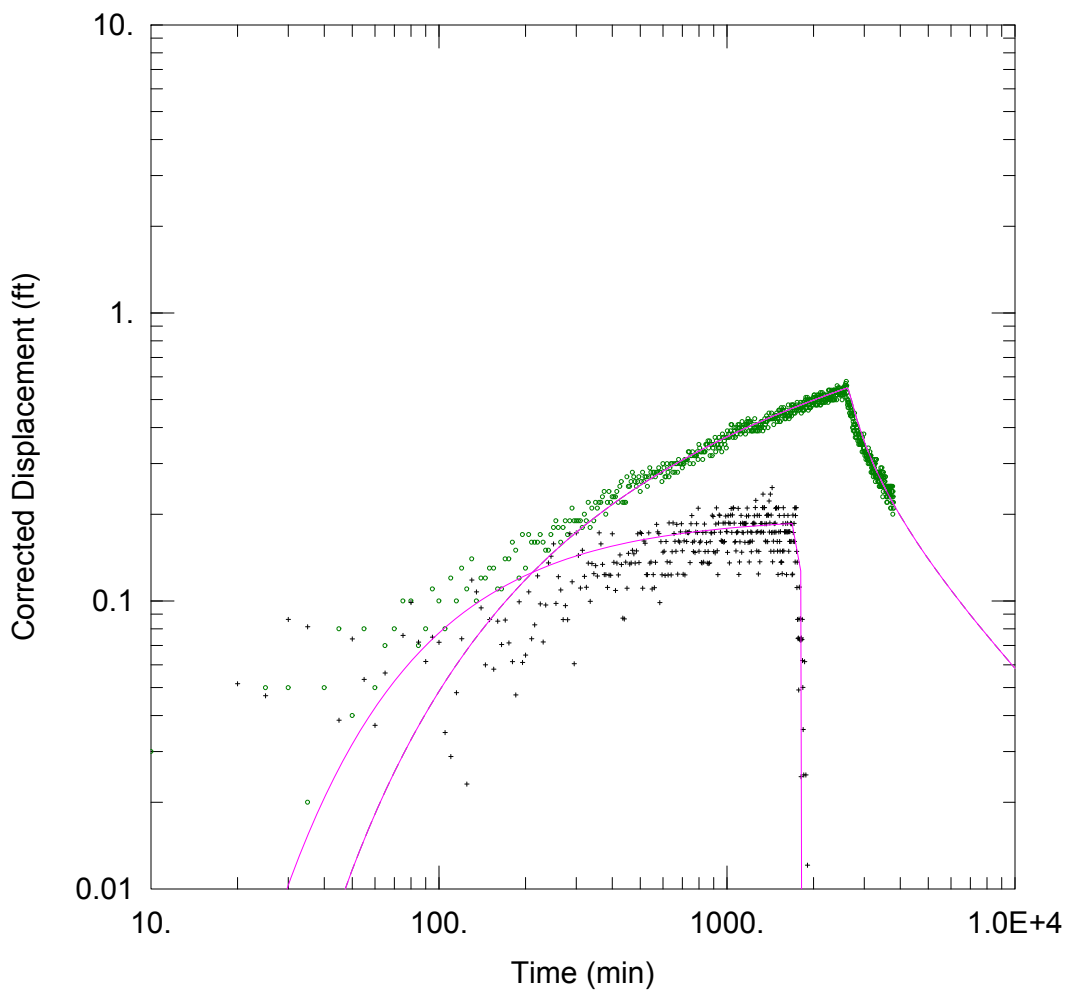
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 585.6 ft²/day

S/S' = 1.259



PZM1 PUMP TEST

Data Set: N:\...\201111_PZM10 Theis Unconfined.aqt

Date: 02/02/12

Time: 16:30:22

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-1

Test Date: Dec 6-8, 2010

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| PZM1 | 536230.1 | 1156669.6 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|----------|-----------|
| • PZM10 | 535998.9 | 1156627.2 |

SOLUTION

Aquifer Model: Unconfined

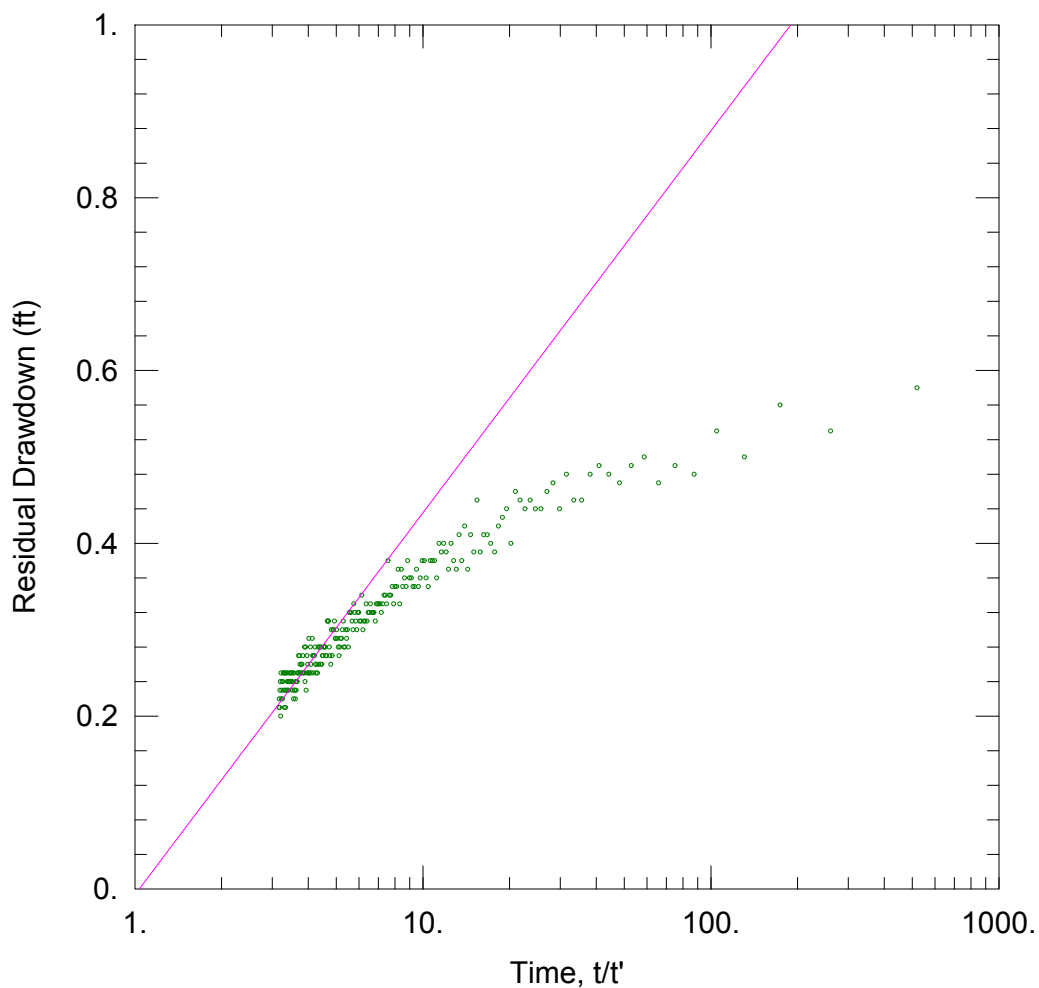
Solution Method: Theis

T = 693.7 ft²/day

S = 0.003249

Kz/Kr = 1.

b = 97. ft



WELL TEST ANALYSIS

Data Set: N:\...\201111_PZM10 Recovery.aqt

Date: 02/02/12

Time: 16:30:58

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-1

Test Date: Dec 6-8, 2010

AQUIFER DATA

Saturated Thickness: 97. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|----------|-----------|
| PZM1 | 536230.1 | 1156669.6 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|----------|-----------|
| • PZM10 | 535998.9 | 1156627.2 |

SOLUTION

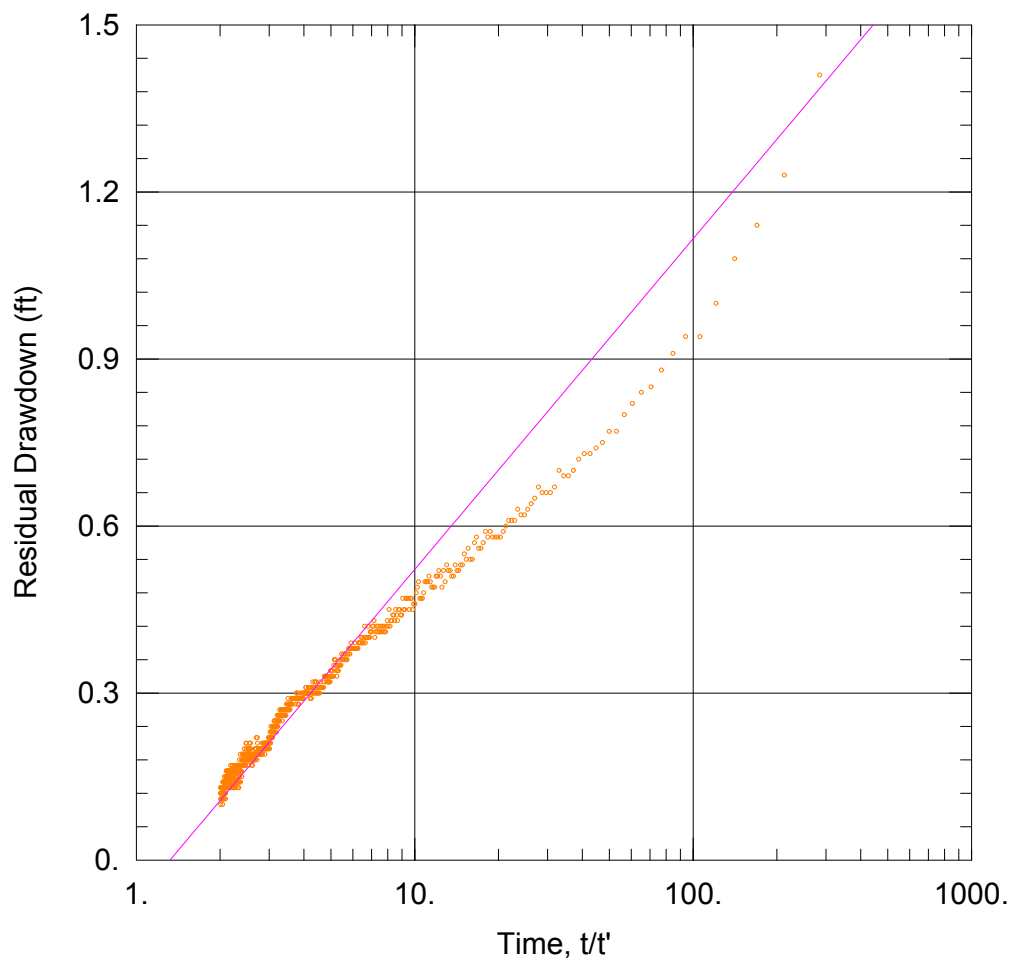
Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 710.2 ft²/day

S/S' = 1.037

PZM3 PUMP TEST TYPE CURVE MATCHES



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM3_s_rec.aqt
 Date: 02/02/12

Time: 16:34:01

PROJECT INFORMATION

Company: Petrotek Engineering
 Client: AUC, LLC
 Project: Reno Creek Project
 Location: Wyoming
 Test Well: PZM3 Multi-well Test
 Test Date: 10/18/2011

AQUIFER DATA

Saturated Thickness: 109. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| ◦ PZM3 | 532818.44 | 1151661.64 |

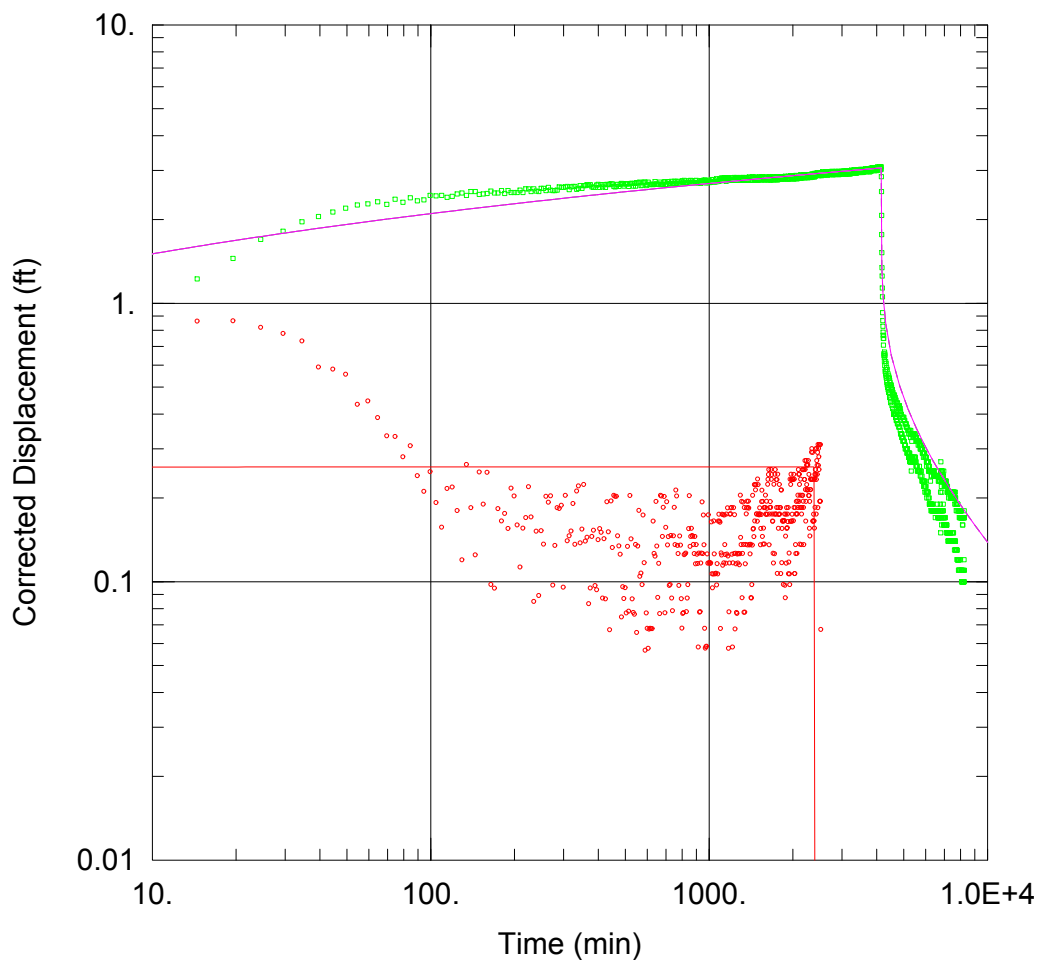
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 588.1 ft²/day

S/S' = 1.321



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM11_s_Theis.aqt

Date: 02/02/12

Time: 16:35:17

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM3 Multi-well Test

Test Date: 10/18/2011

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM11 | 532870.26 | 1151666.82 |

SOLUTION

Aquifer Model: Unconfined

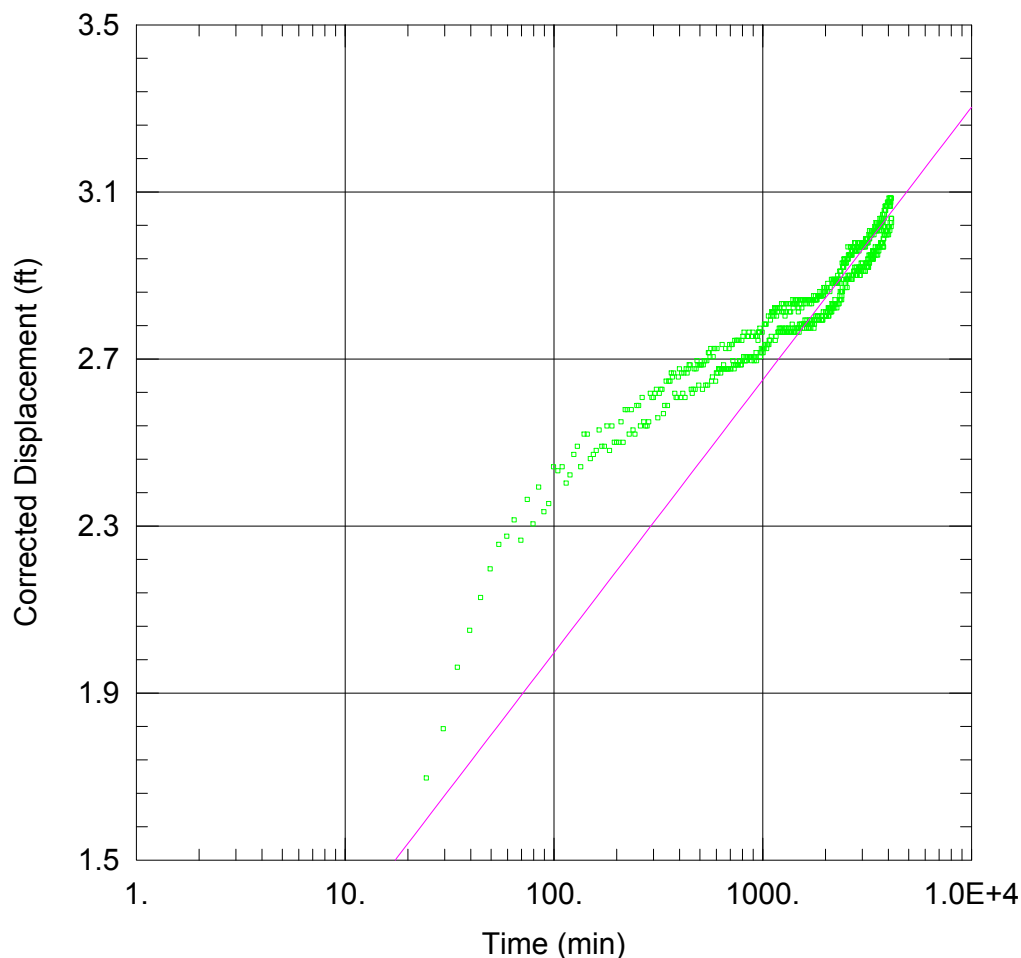
Solution Method: Theis

T = 586.7 ft²/day

S = 1.0E-5

Kz/Kr = 1.

b = 109. ft



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM11_s_CJ.aqt
Date: 02/02/12

Time: 16:36:16

PROJECT INFORMATION

Company: Petrotek Engineering
Client: AUC, LLC
Project: Reno Creek Project
Location: Wyoming
Test Well: PZM3 Multi-well Test
Test Date: 10/18/2011

AQUIFER DATA

Saturated Thickness: 109. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|-----------|------------|
| █ <u>PZM11</u> | 532870.26 | 1151666.82 |

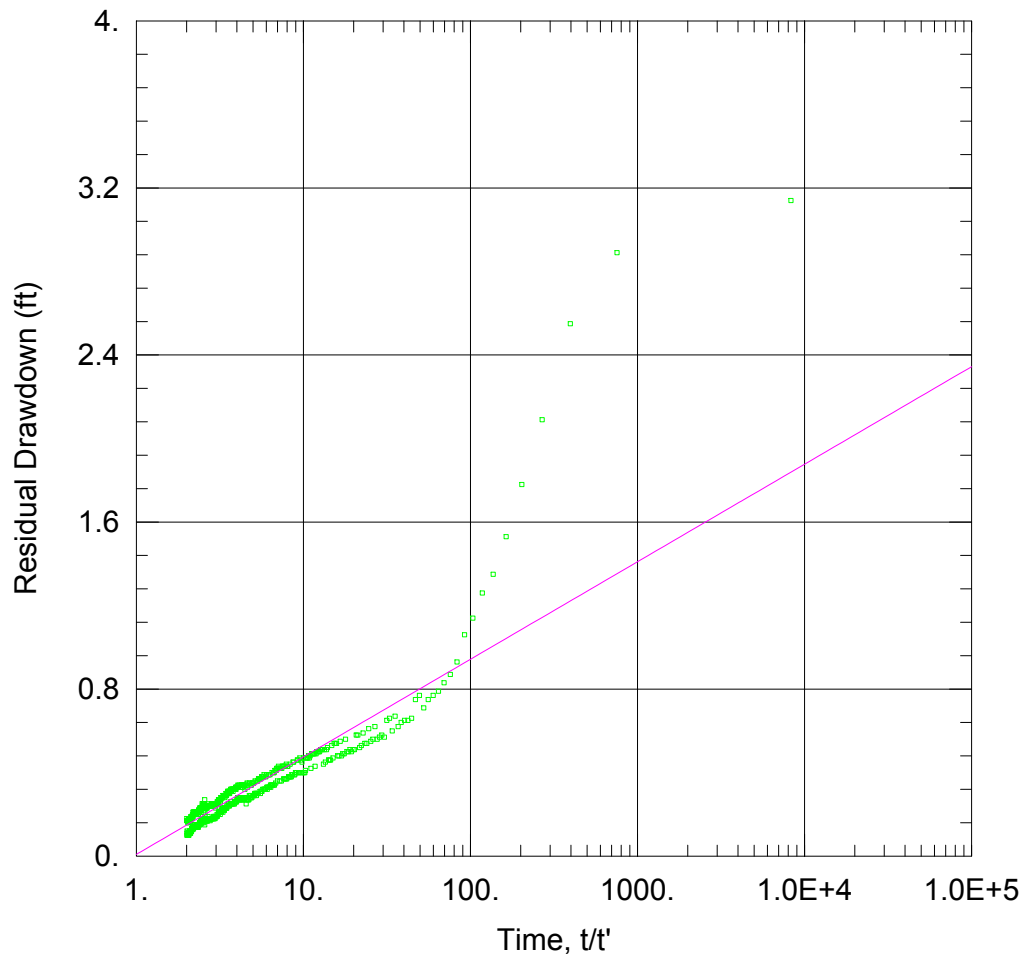
SOLUTION

Aquifer Model: Unconfined

Solution Method: Cooper-Jacob

T = 534.6 ft²/day

S = 2.7E-5



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM11_rec_Theis.aqt

Date: 02/02/12

Time: 16:36:49

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM3 Multi-well Test

Test Date: 10/18/2011

AQUIFER DATA

Saturated Thickness: 109. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|-----------|------------|
| █ <u>PZM11</u> | 532870.26 | 1151666.82 |

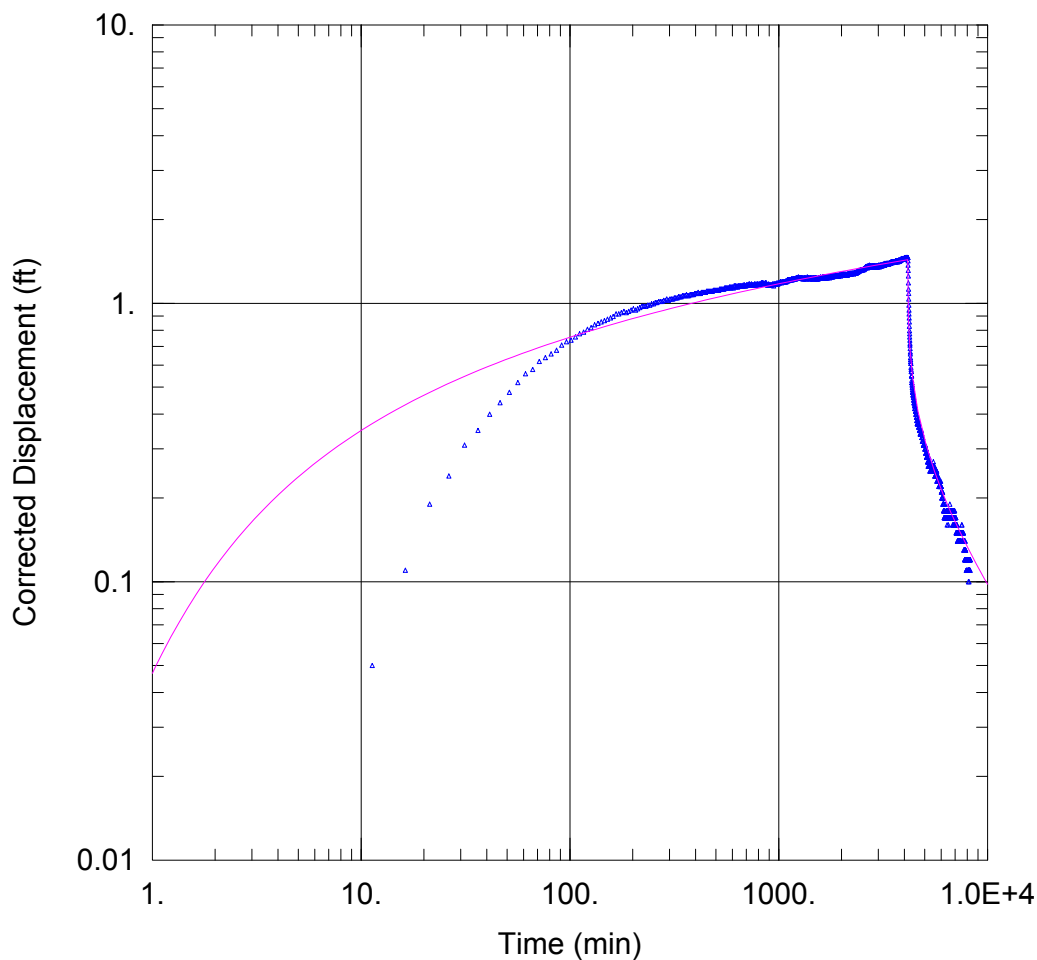
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 747.6 ft²/day

S/S' = 0.9607



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM12_s_Theis.aqt

Date: 02/02/12

Time: 16:37:18

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM3 Multi-well Test

Test Date: 10/18/2011

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM12 | 532758.68 | 1151578.86 |

SOLUTION

Aquifer Model: Unconfined

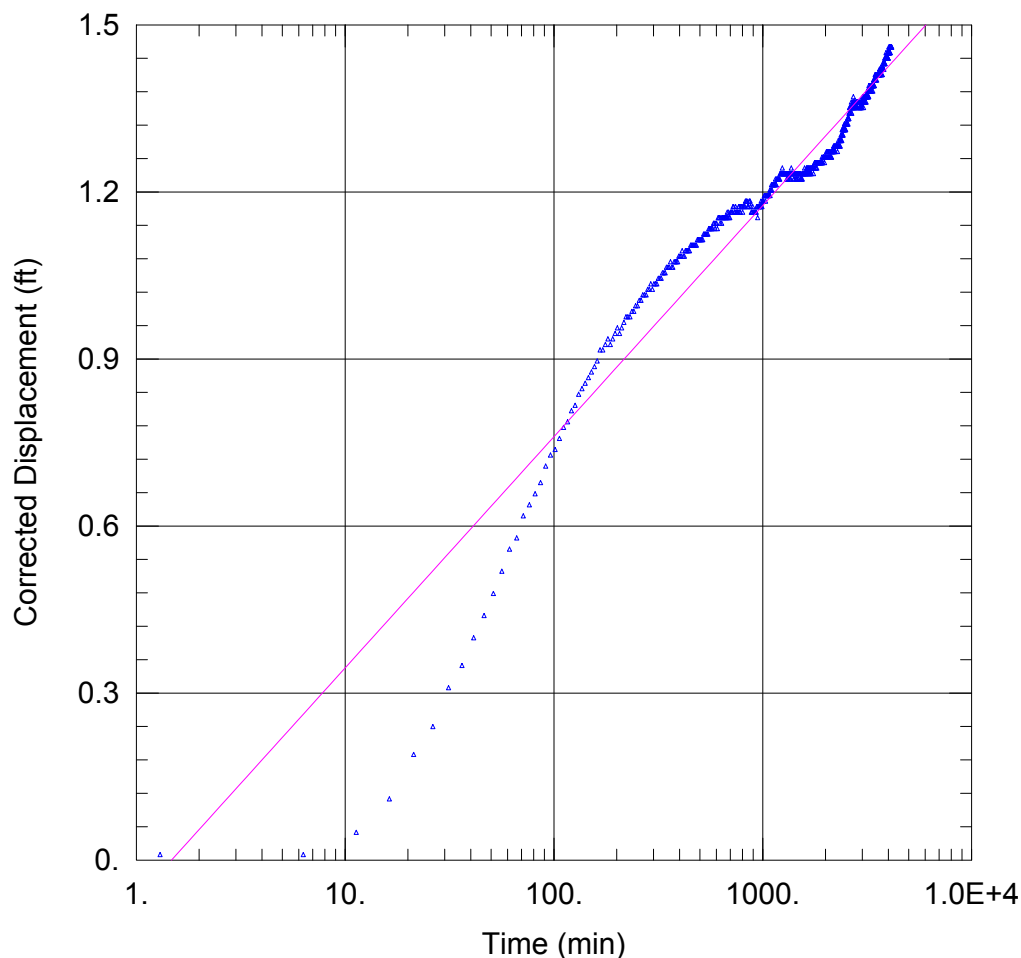
Solution Method: Theis

T = 829.8 ft²/day

S = 0.0002009

Kz/Kr = 1.

b = 109. ft



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM12_s_CJ.aqt
Date: 02/02/12

Time: 16:37:52

PROJECT INFORMATION

Company: Petrotek Engineering
Client: AUC, LLC
Project: Reno Creek Project
Location: Wyoming
Test Well: PZM3 Multi-well Test
Test Date: 10/18/2011

AQUIFER DATA

Saturated Thickness: 109. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|-----------|------------|
| ▲ <u>PZM12</u> | 532758.68 | 1151578.86 |

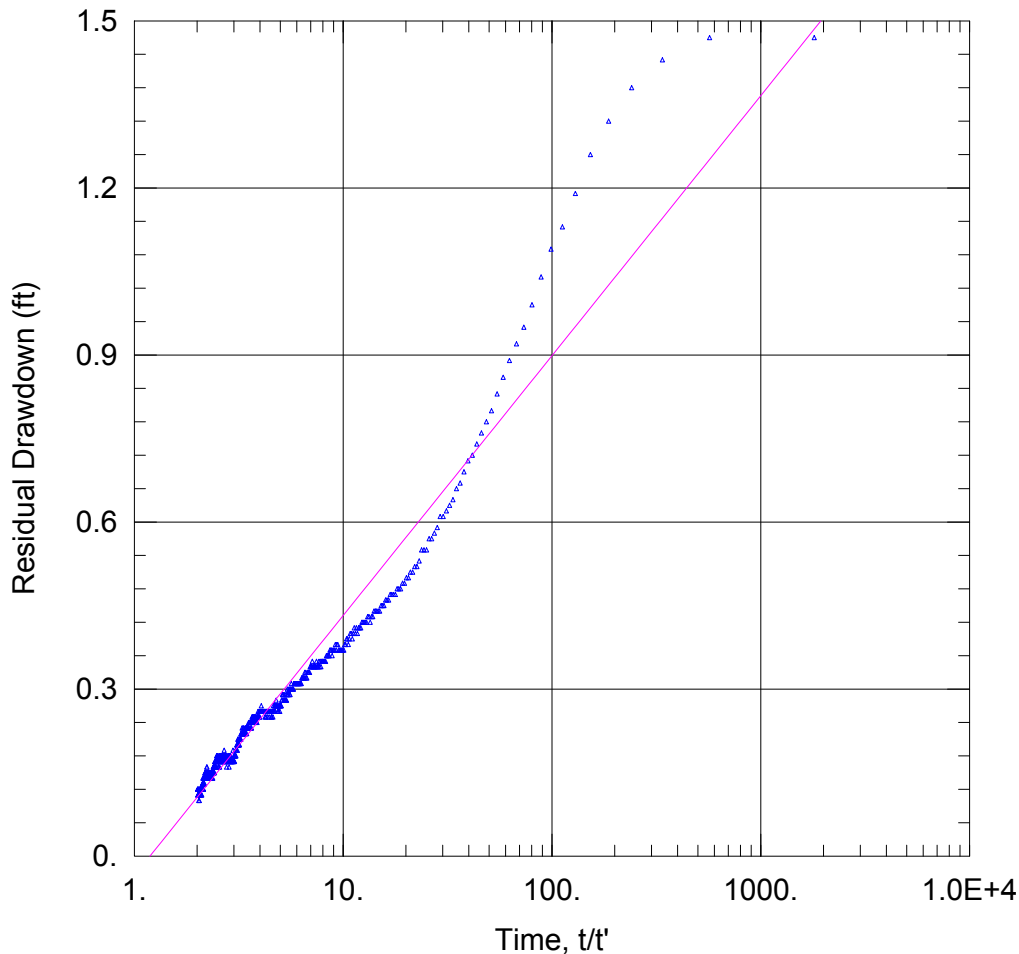
SOLUTION

Aquifer Model: Unconfined

Solution Method: Cooper-Jacob

T = 841.1 ft²/day

S = 0.0001856



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM12_rec_Theis.aqt

Date: 02/02/12

Time: 17:23:08

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM3 Multi-well Test

Test Date: 10/18/2011

AQUIFER DATA

Saturated Thickness: 109. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|-----------|------------|
| ▲ PZM12 | 532758.68 | 1151578.86 |

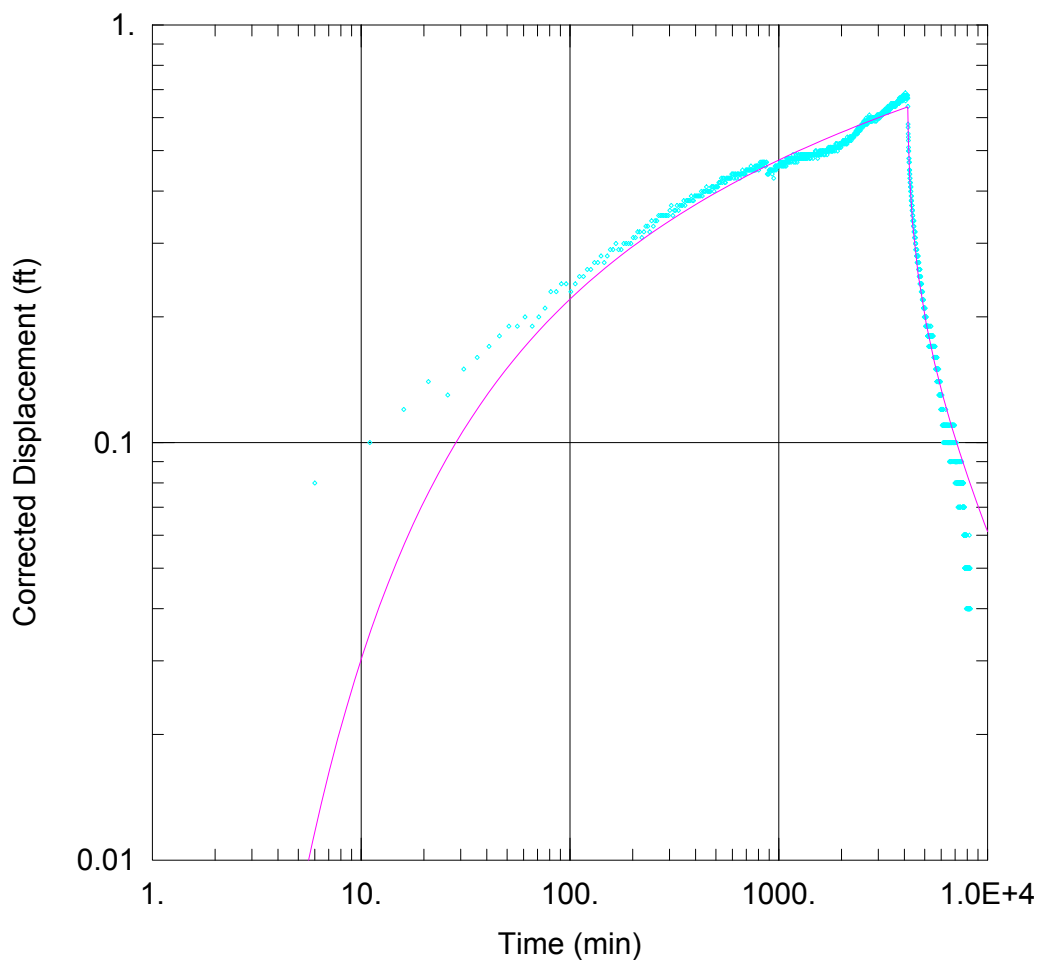
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 748.1 \text{ ft}^2/\text{day}$

$S/S' = 1.189$



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM13_s_Theis.aqt

Date: 02/02/12

Time: 17:23:36

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM3 Multi-well Test

Test Date: 10/18/2011

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|-----------|
| PZM13 | 532676.09 | 1151800.9 |

SOLUTION

Aquifer Model: Unconfined

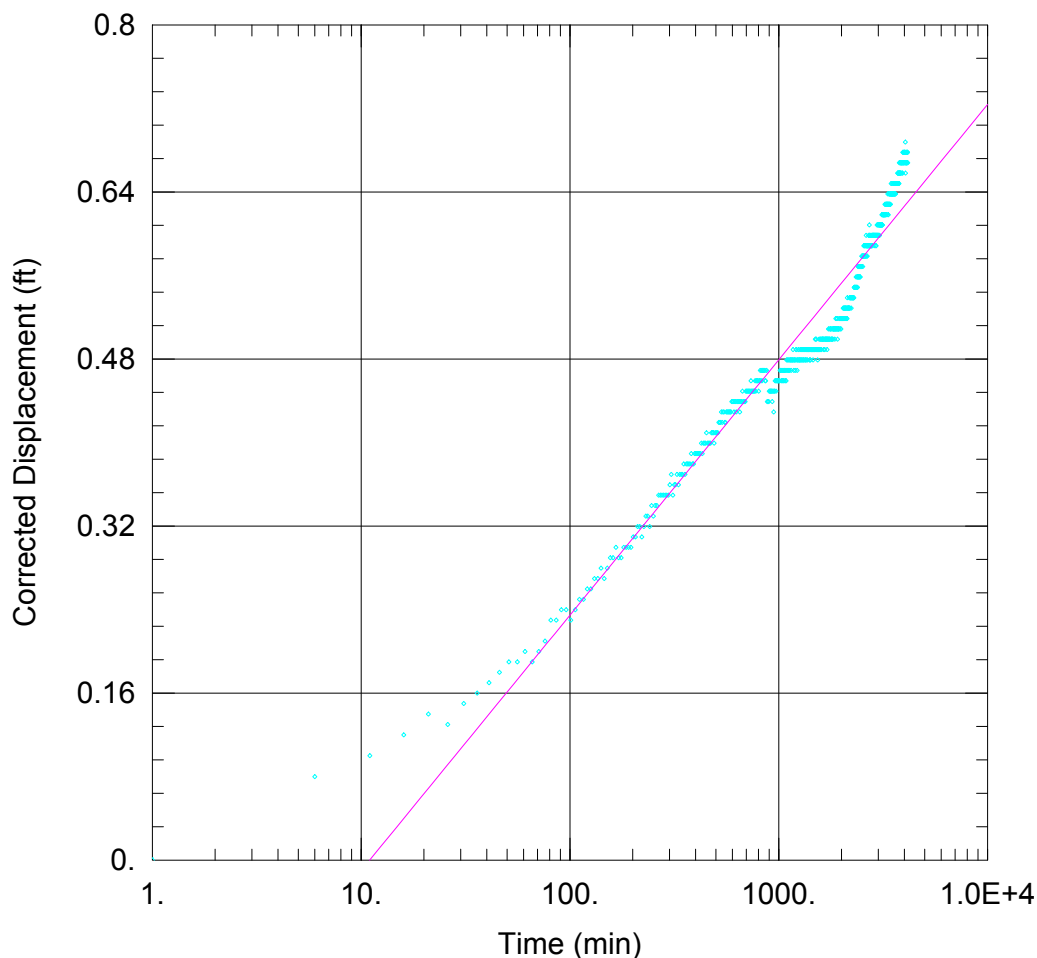
Solution Method: Theis

T = 1326.9 ft²/day

S = 0.0008279

Kz/Kr = 1.

b = 109. ft



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM13_s_CJ.aqt
Date: 02/02/12

Time: 17:24:11

PROJECT INFORMATION

Company: Petrotek Engineering
Client: AUC, LLC
Project: Reno Creek Project
Location: Wyoming
Test Well: PZM3 Multi-well Test
Test Date: 10/18/2011

AQUIFER DATA

Saturated Thickness: 109. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|-----------|-----------|
| • PZM13 | 532676.09 | 1151800.9 |

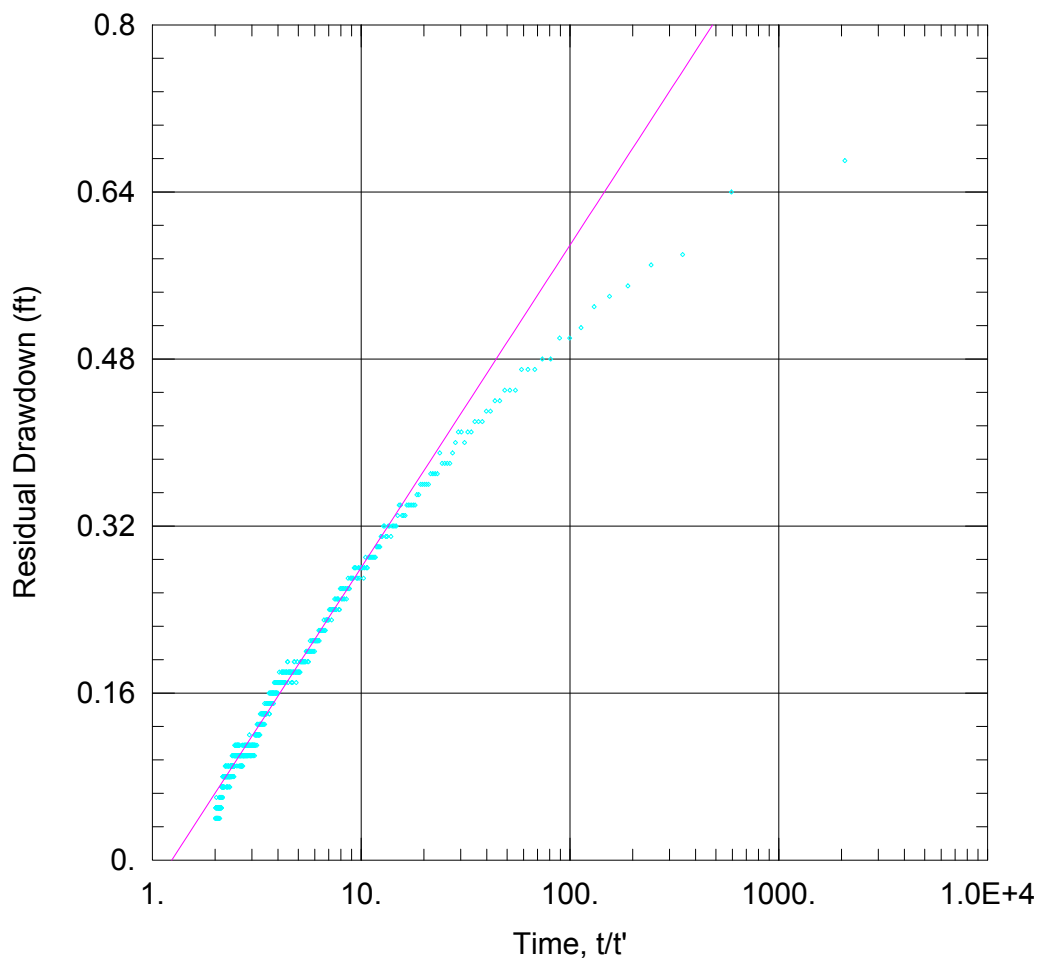
SOLUTION

Aquifer Model: Unconfined

Solution Method: Cooper-Jacob

T = 1427.7 ft²/day

S = 0.0006171



PZM3 MULTI-WELL TEST

Data Set: N:\...\PZM13_s_rec.aqt

Date: 02/02/12

Time: 17:25:23

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM3 Multi-well Test

Test Date: 10/18/2011

AQUIFER DATA

Saturated Thickness: 109. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM3 | 532818.44 | 1151661.64 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|-----------|-----------|
| • PZM13 | 532676.09 | 1151800.9 |

SOLUTION

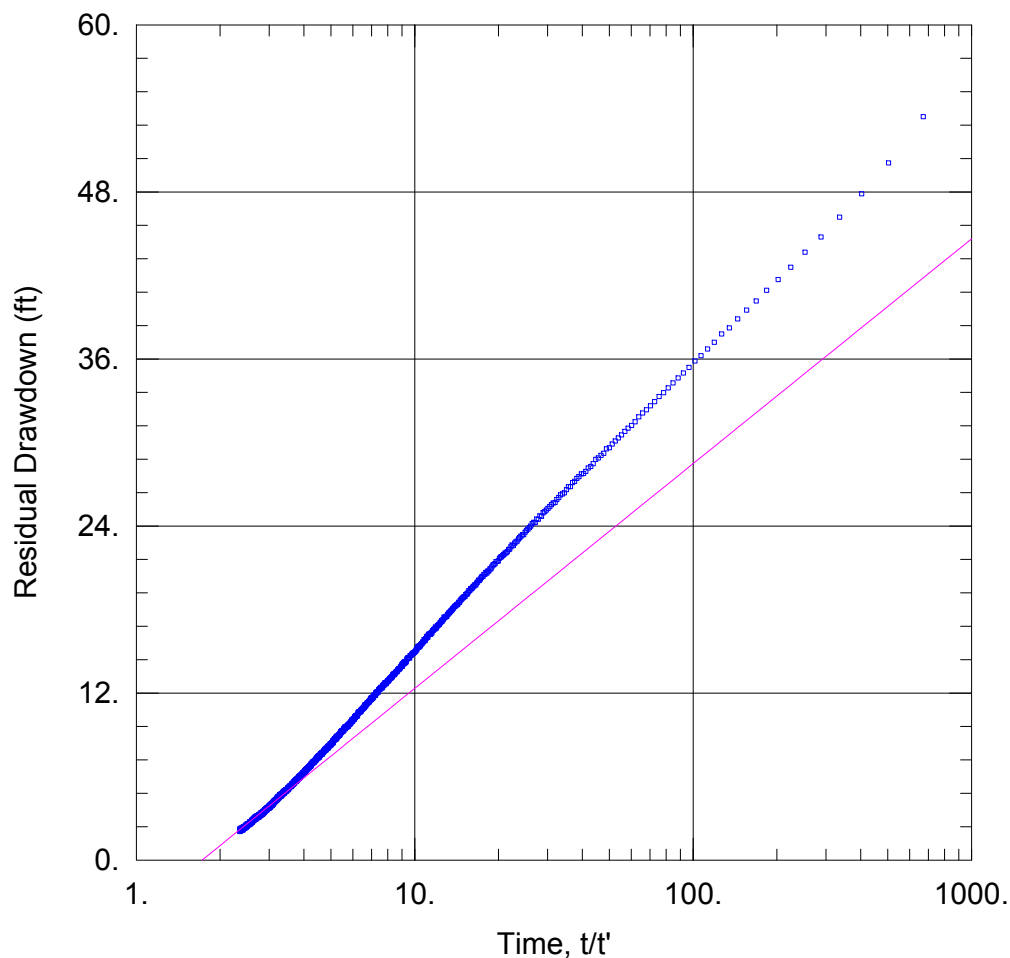
Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 1130.8 ft²/day

S/S' = 1.239

PZM4D PUMP TEST TYPE CURVE MATCHES



PZM4 MULTI-WELL TEST

Data Set: N:\...\PZM4_s_all_Theis.aqt

Date: 02/02/12

Time: 17:36:31

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM4 Multi-well Test

Test Date: 08/09/2011

AQUIFER DATA

Saturated Thickness: 98.75 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM4D | 525953.26 | 1155490.65 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| ▣ PZM4D | 525953.26 | 1155490.65 |

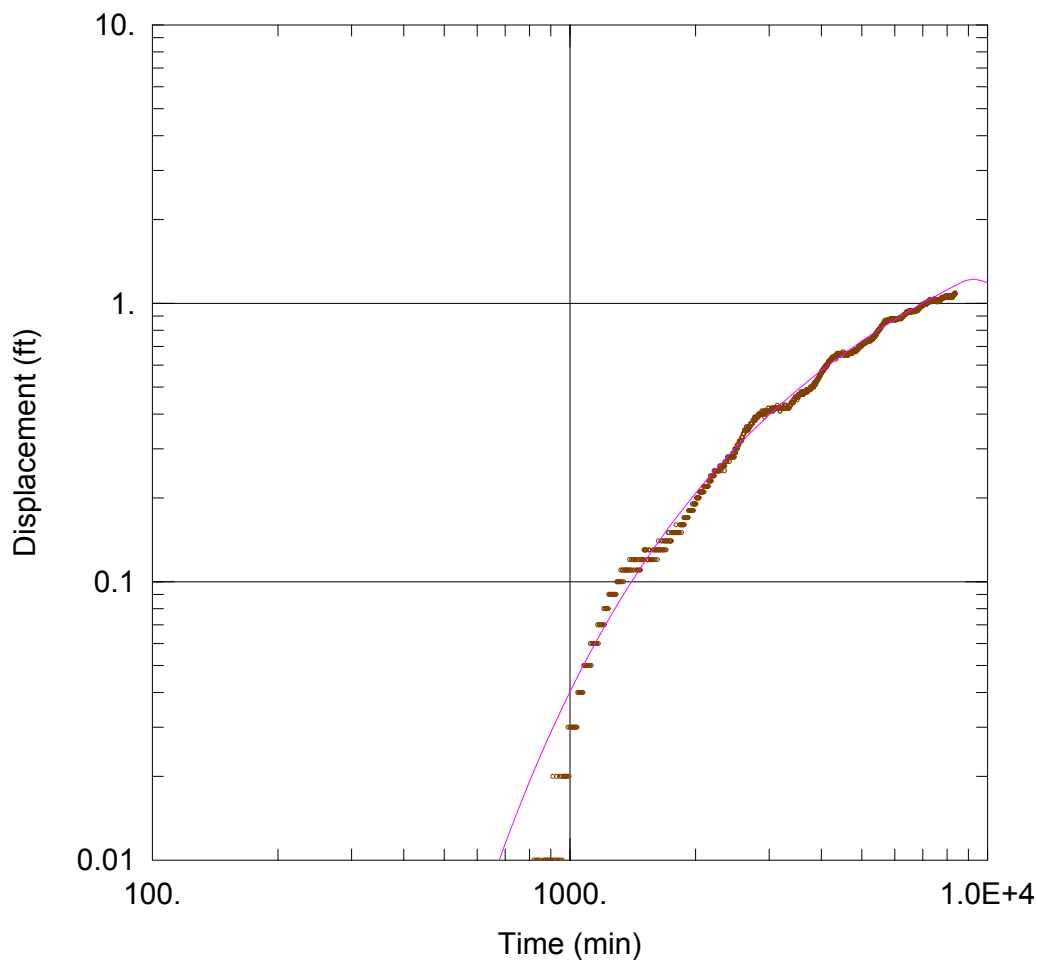
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 30.8 ft²/day

S/S' = 1.723



PZM4 MULTI-WELL TEST

Data Set: N:\...\PZM16_s8375_Theis.aqt

Date: 02/02/12

Time: 17:37:12

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM4 Multi-well Test

Test Date: 08/09/2011

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM4D | 525953.26 | 1155490.65 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| ◦ PZM16 | 525890.05 | 1154203.76 |

SOLUTION

Aquifer Model: Confined

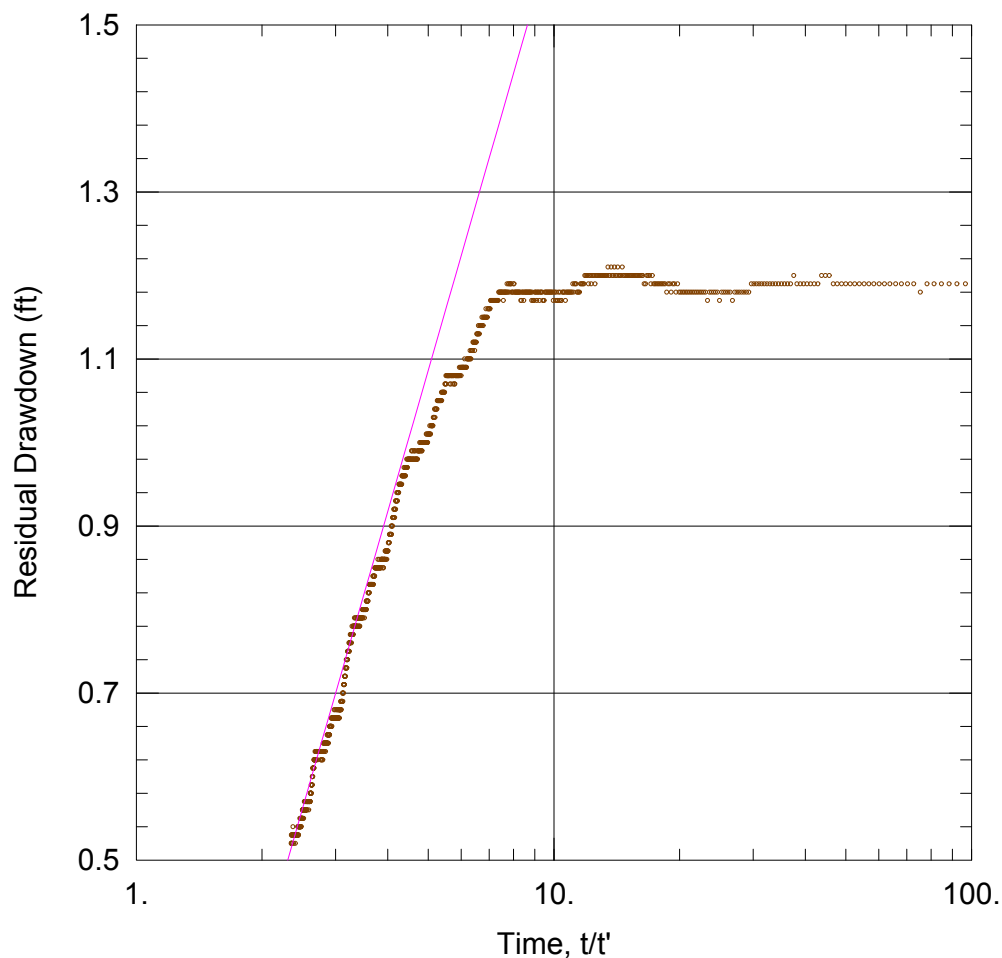
Solution Method: Theis

T = 229.2 ft²/day

S = 0.0008677

Kz/Kr = 1.

b = 98.75 ft



PZM4 MULTI-WELL TEST

Data Set: N:\...\PZM16_Rec_all_Theis.aqt

Date: 02/02/12

Time: 17:37:45

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM4 Multi-well Test

Test Date: 08/09/2011

AQUIFER DATA

Saturated Thickness: 98.75 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM4D | 525953.26 | 1155490.65 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|-----------|------------|
| ◦ PZM16 | 525890.05 | 1154203.76 |

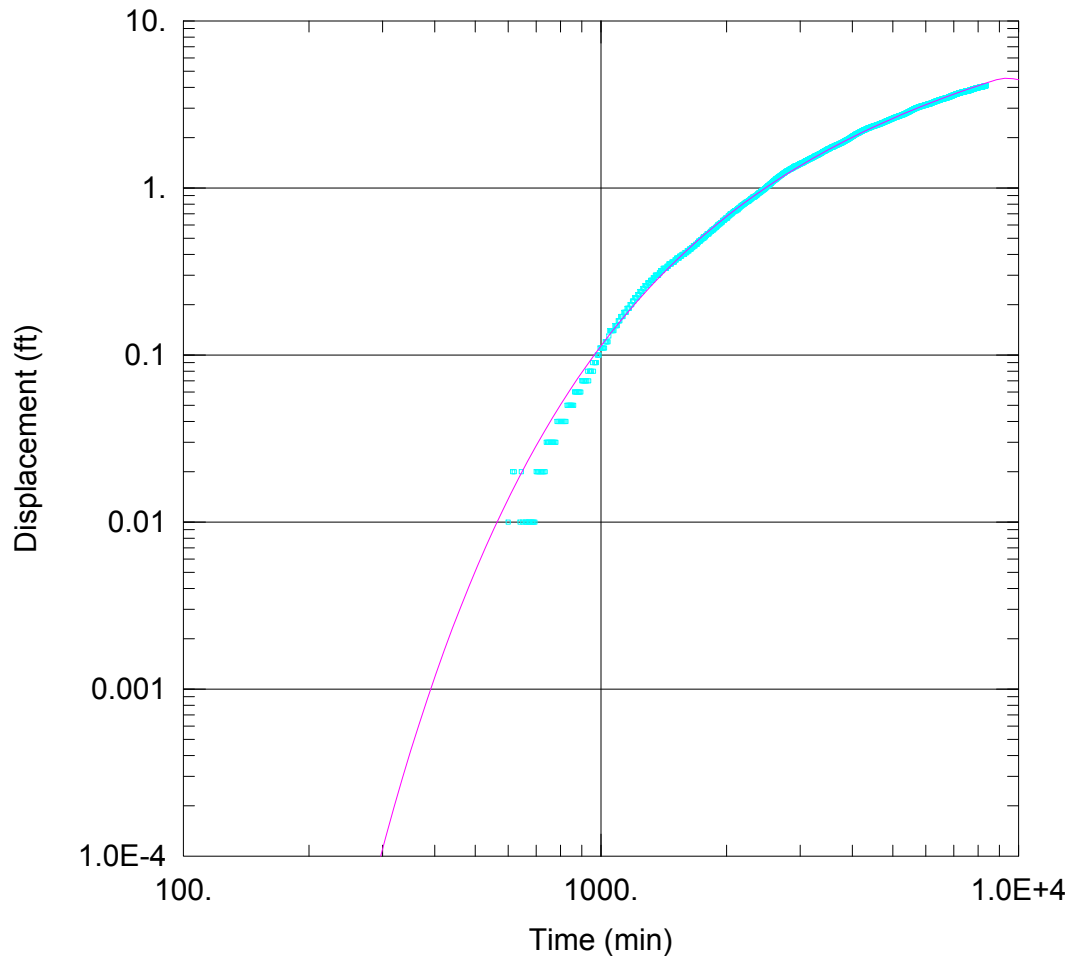
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 285.6 ft²/day

S/S' = 1.19



PZM4 MULTI-WELL TEST

Data Set: N:\...\PZM15_s8375_Theis.aqt

Date: 02/02/12

Time: 17:38:20

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM4 Multi-well Test

Test Date: 08/09/2011

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM4D | 525953.26 | 1155490.65 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|-----------|
| PZM15 | 527720.66 | 1155604.3 |

SOLUTION

Aquifer Model: Confined

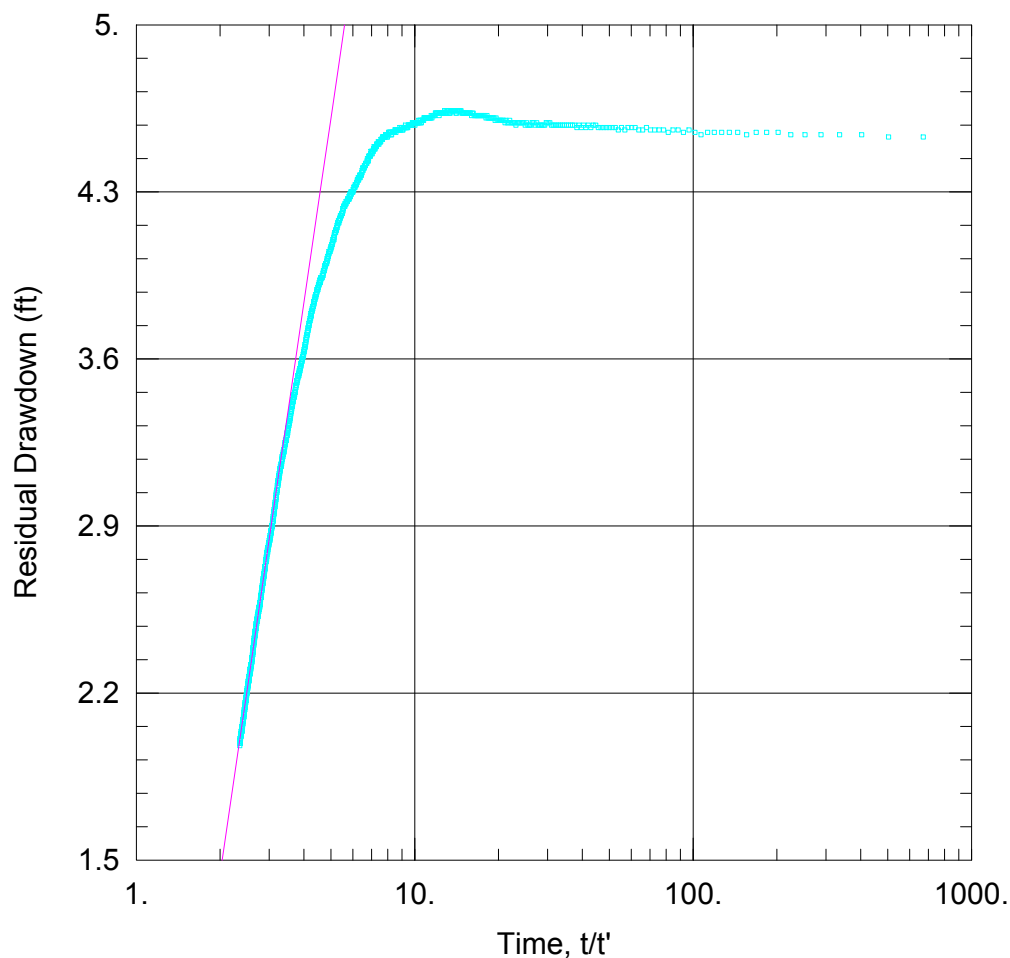
Solution Method: Theis

T = 57.16 ft²/day

S = 0.000128

Kz/Kr = 1.

b = 98.75 ft



PZM4 MULTI-WELL TEST

Data Set: N:\...\PZM15_Rec_all_Theis.aqt

Date: 02/02/12

Time: 17:39:08

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: PZM4 Multi-well Test

Test Date: 08/09/2011

AQUIFER DATA

Saturated Thickness: 98.75 ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM4D | 525953.26 | 1155490.65 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|----------------|-----------|-----------|
| ◻ PZM15 | 527720.66 | 1155604.3 |

SOLUTION

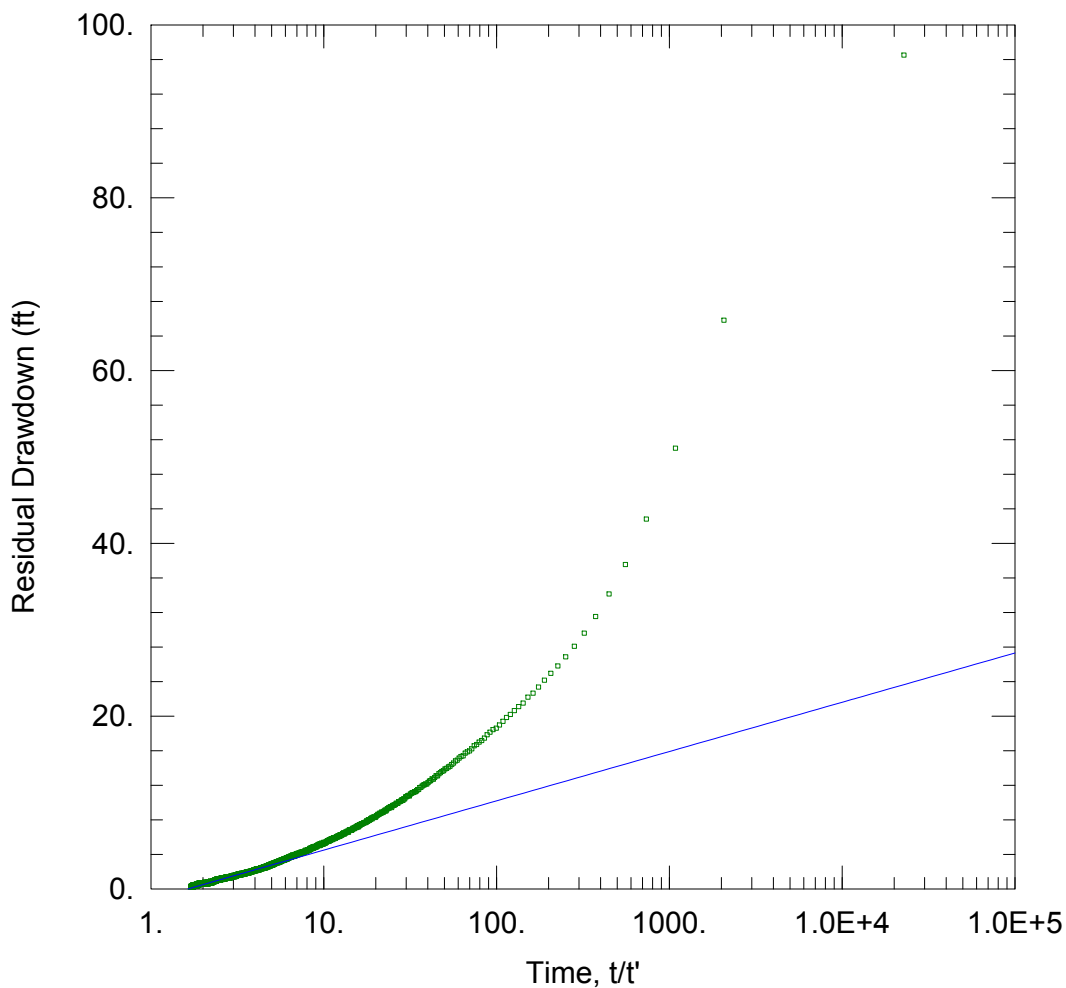
Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = \underline{62.52 \text{ ft}^2/\text{day}}$

$S/S' = \underline{1.318}$

PZM5 PUMP TEST TYPE CURVE MATCHES



PZM5 PUMP TEST

Data Set: N:\...\PZM-5_Recovery.aqt

Date: 02/02/12

Time: 17:42:13

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM5

Test Date: February 16 - 24, 2011

AQUIFER DATA

Saturated Thickness: 132. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM-5 | 518128.87 | 1149228.79 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| □ PZM-5 | 518128.87 | 1149228.79 |

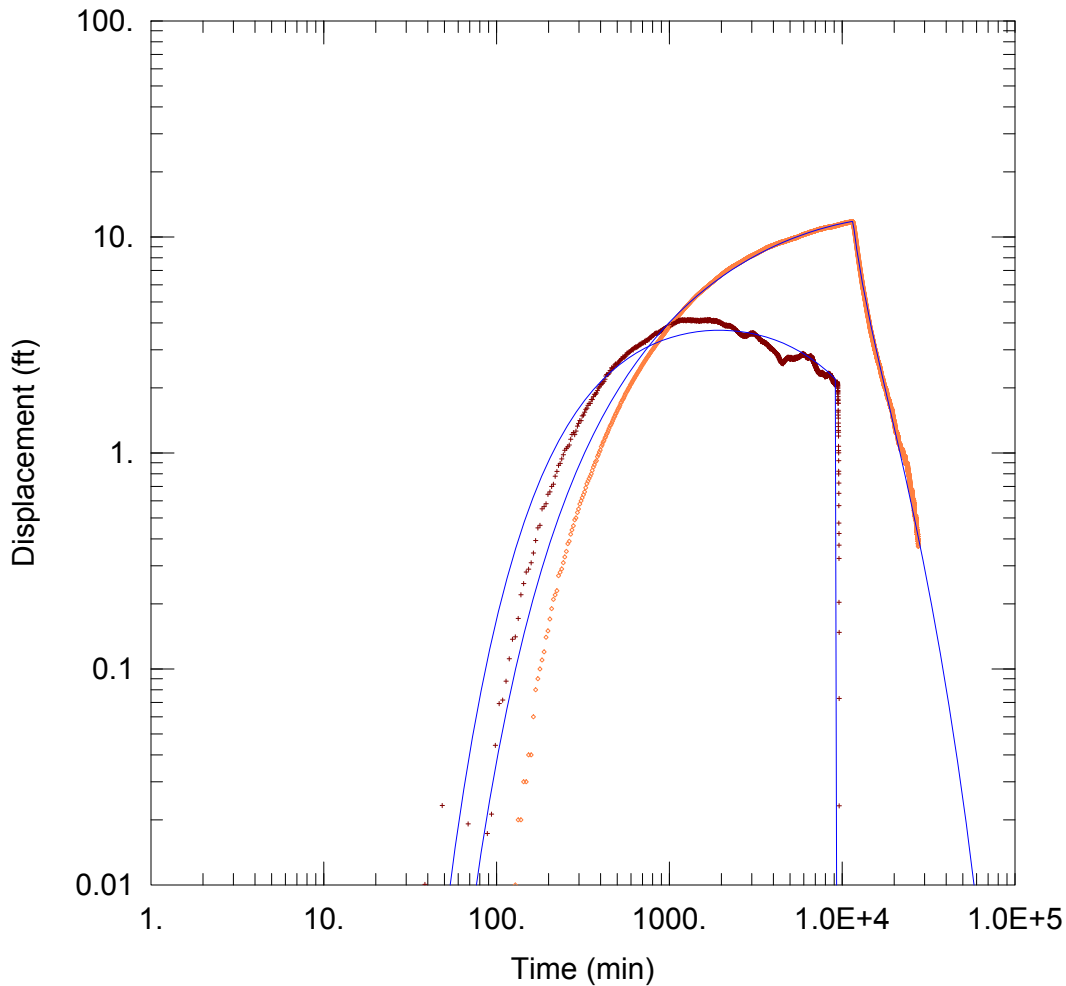
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 61.83 \text{ ft}^2/\text{day}$

$S/S' = 1.637$



PZM5 PUMP TEST (7 GPM)

Data Set: N:\...\PZM-20_Drawdown Leaky.aqt

Date: 02/02/12

Time: 17:42:37

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-5

Test Date: February 16 - 24, 2011

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM-5 | 518128.87 | 1149228.79 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------------|-----------|------------|
| • <u>PZM-20</u> | 517756.21 | 1149561.08 |

SOLUTION

Aquifer Model: Leaky

Solution Method: Hantush-Jacob

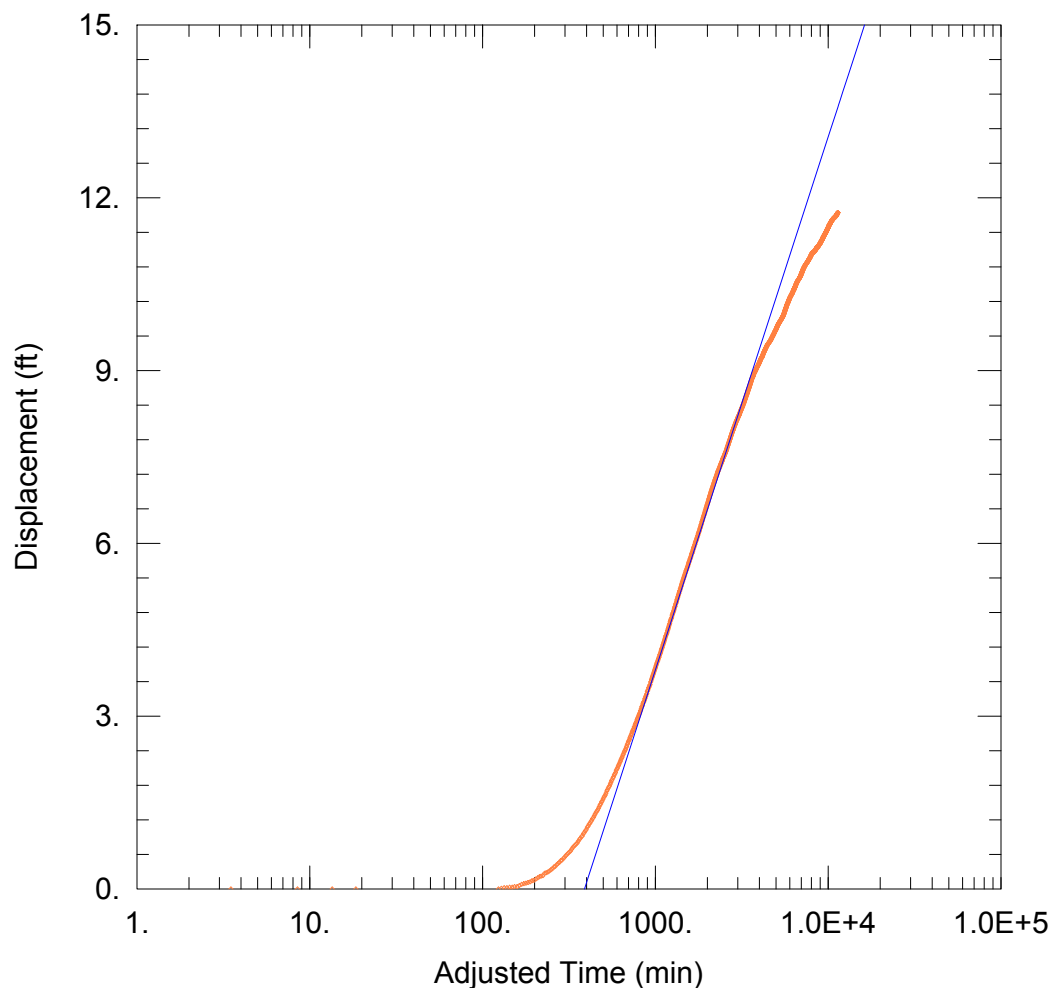
T = 20.23 ft²/day

S = 7.871E-5

1/B = 0.0007172 ft⁻¹

Kz/Kr = 1.

b = 47. ft



PZM5 PUMP TEST (7 GPM)

Data Set: N:\...\PZM-20_Drawdown_CJ.aqt

Date: 02/02/12

Time: 17:42:57

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-5

Test Date: February 16 - 24, 2011

AQUIFER DATA

Saturated Thickness: 130. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM-5 | 518128.87 | 1149228.79 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------------|-----------|------------|
| • <u>PZM-20</u> | 517756.21 | 1149561.08 |

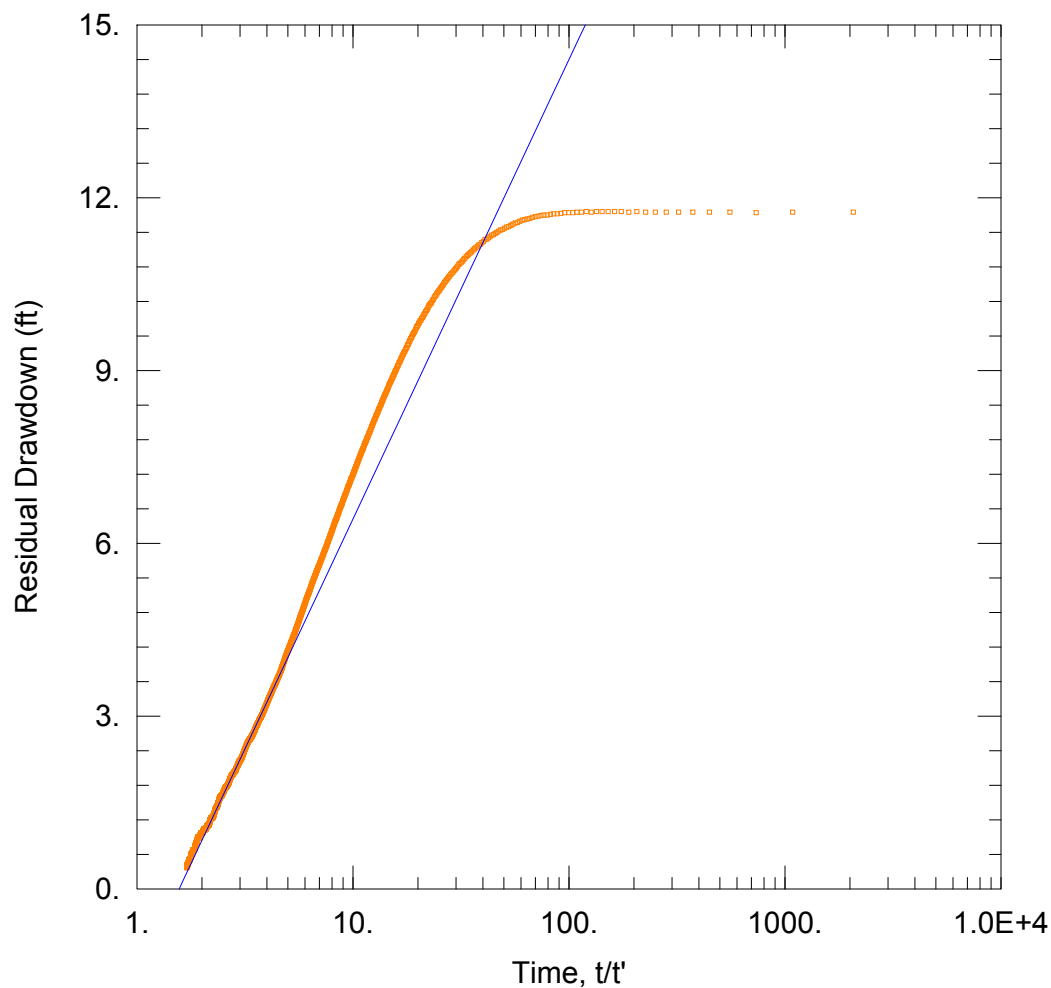
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 26.67 ft²/day

S = 6.497E-5



PZM PUMP TEST (7 GPM)

Data Set: N:\...\PZM-20_Recovery.aqt

Date: 02/02/12

Time: 17:43:18

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-5

Test Date: February 16 - 24, 2011

AQUIFER DATA

Saturated Thickness: 47. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM-5 | 518128.87 | 1149228.79 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------------|-----------|------------|
| • <u>PZM-20</u> | 517756.21 | 1149561.08 |

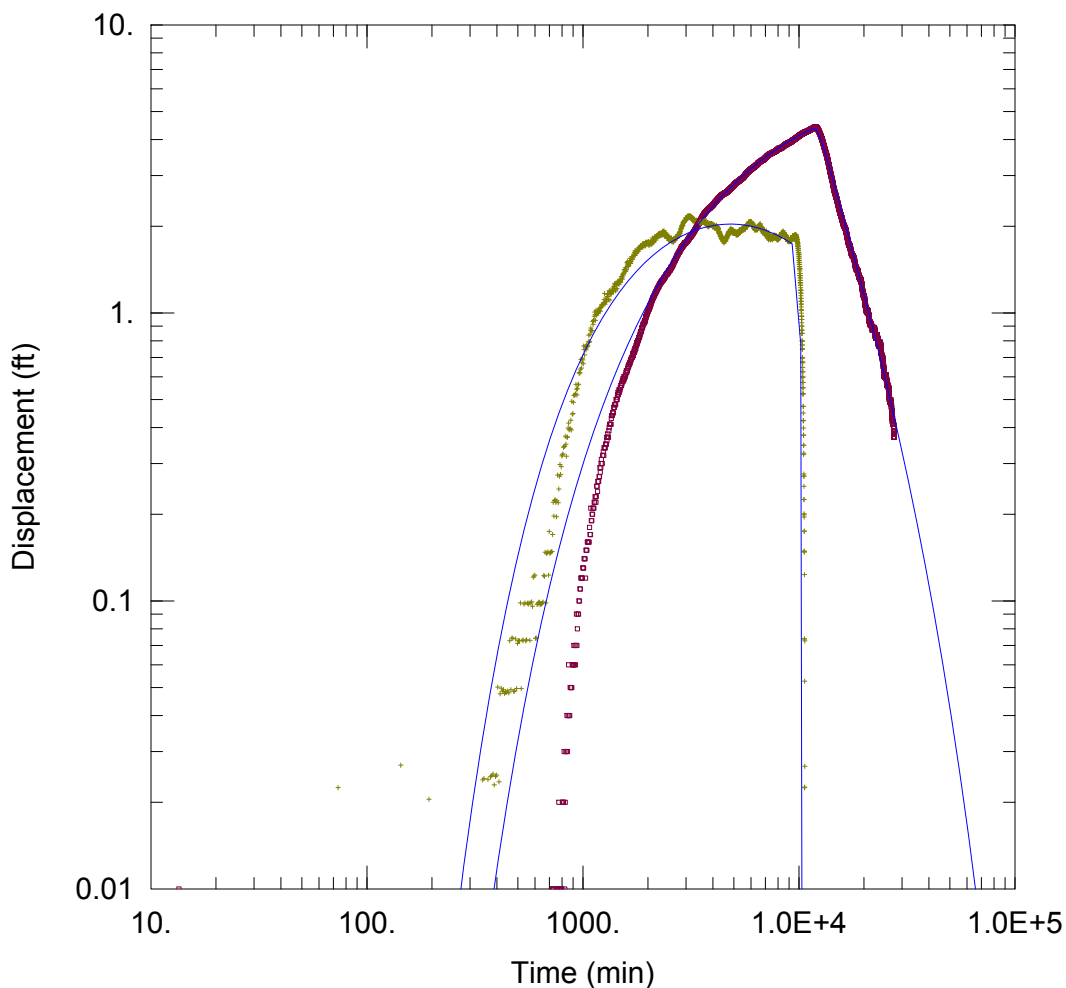
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 30.95 ft²/day

S/S' = 1.57



PZM5 PUMP TEST (7 GPM)

Data Set: N:\...\PZM-19_Drawdown Leaky.aqt

Date: 02/02/12

Time: 17:43:43

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-5

Test Date: February 16 - 24, 2011

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM-5 | 518128.87 | 1149228.79 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM-19 | 518231.32 | 1150272.01 |

SOLUTION

Aquifer Model: Leaky

Solution Method: Hantush-Jacob

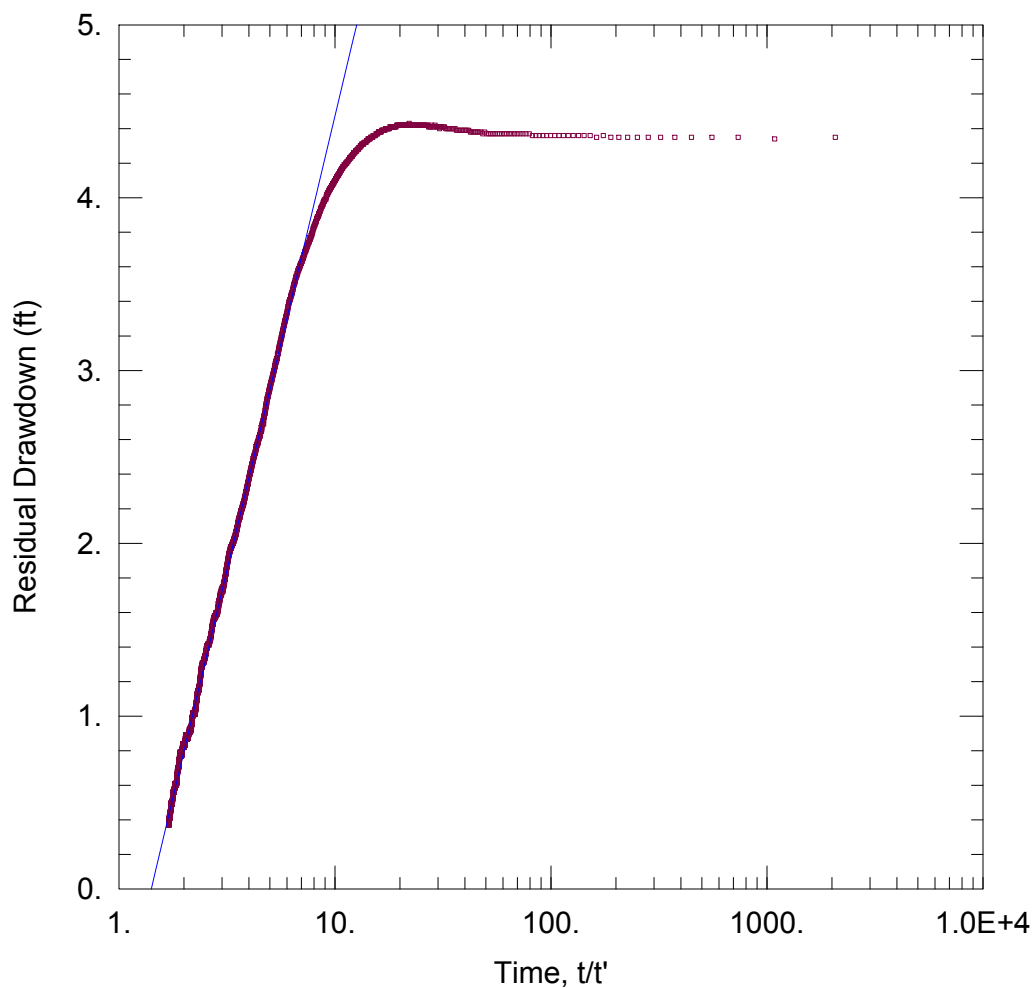
T = 26.02 ft²/day

S = 0.0001109

1/B = 0.0006687 ft⁻¹

Kz/Kr = 1.

b = 56. ft



PZM5 PUMP TEST (7 GPM)

Data Set: N:\...\PZM-19_Recovery.aqt

Date: 02/02/12

Time: 17:44:03

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Location: Reno Creek ISR Project

Test Well: PZM-5

Test Date: February 16 - 24, 2011

AQUIFER DATA

Saturated Thickness: 56. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|-----------|------------|
| PZM-5 | 518128.87 | 1149228.79 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------------|-----------|------------|
| • <u>PZM-19</u> | 518231.32 | 1150272.01 |

SOLUTION

Aquifer Model: Confined

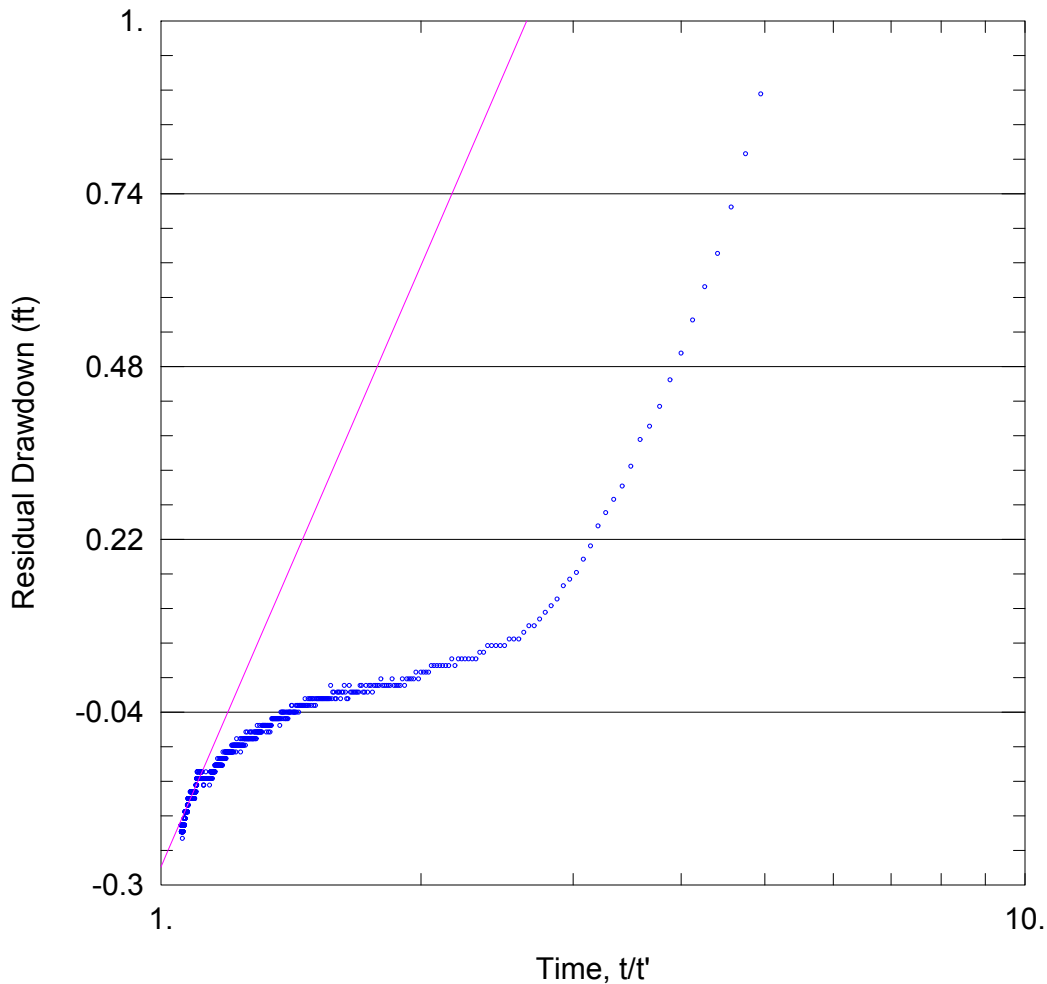
Solution Method: Theis (Recovery)

$T = 46.96 \text{ ft}^2/\text{day}$

$S/S' = 1.413$

SINGLE-WELL TESTS

TYPE CURVE MATCHES



OM1 SINGLE-WELL TEST

Data Set: N:\...\OM1_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:46:30

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: OM1 Single-well Test

Test Date: 10/5/2011

AQUIFER DATA

Saturated Thickness: 38. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| OM1 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| • OM1 | 0 | 0 |

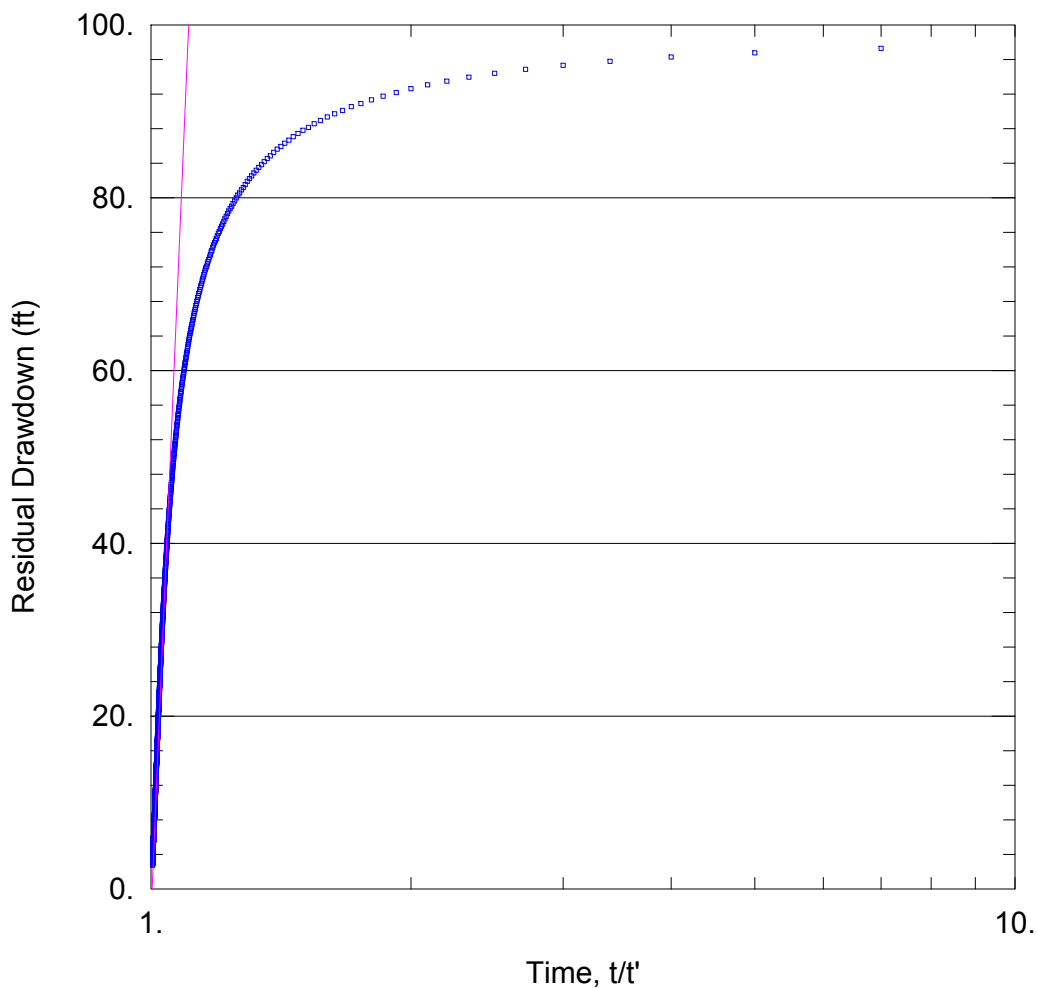
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 39.08 ft²/day

S/S' = 1.233



UM1 SINGLE-WELL TEST

Data Set: N:\...\UM1_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:47:32

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: UM1 Single-well Test

Test Date: 10/24/2011

AQUIFER DATA

Saturated Thickness: 17. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| UM1 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| UM1 | 0 | 0 |

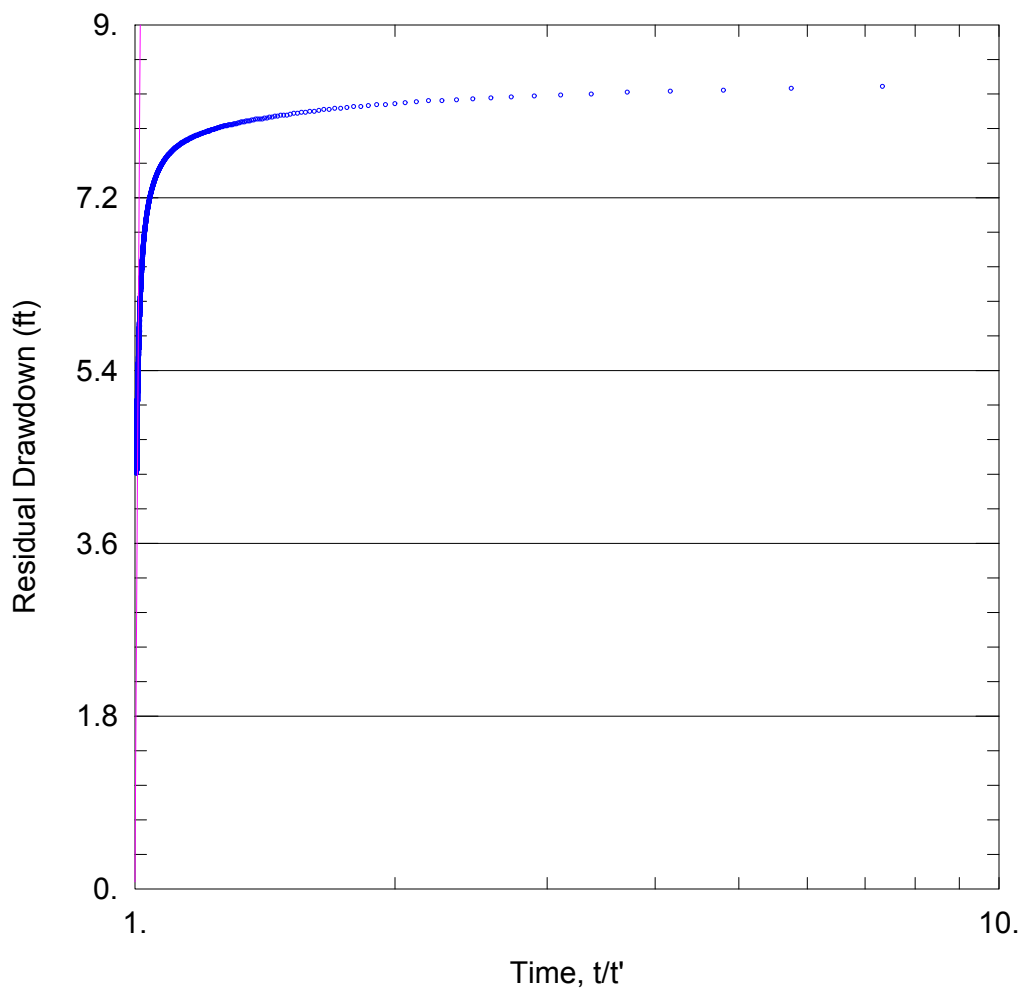
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 0.09162 \text{ ft}^2/\text{day}$

$S/S' = 1.003$



SM3 SINGLE-WELL TEST

Data Set: N:\...\SM3_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:47:19

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: SM3 Single-well Test

Test Date: 09/27/2011

AQUIFER DATA

Saturated Thickness: 30. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| SM3 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| • SM3 | 0 | 0 |

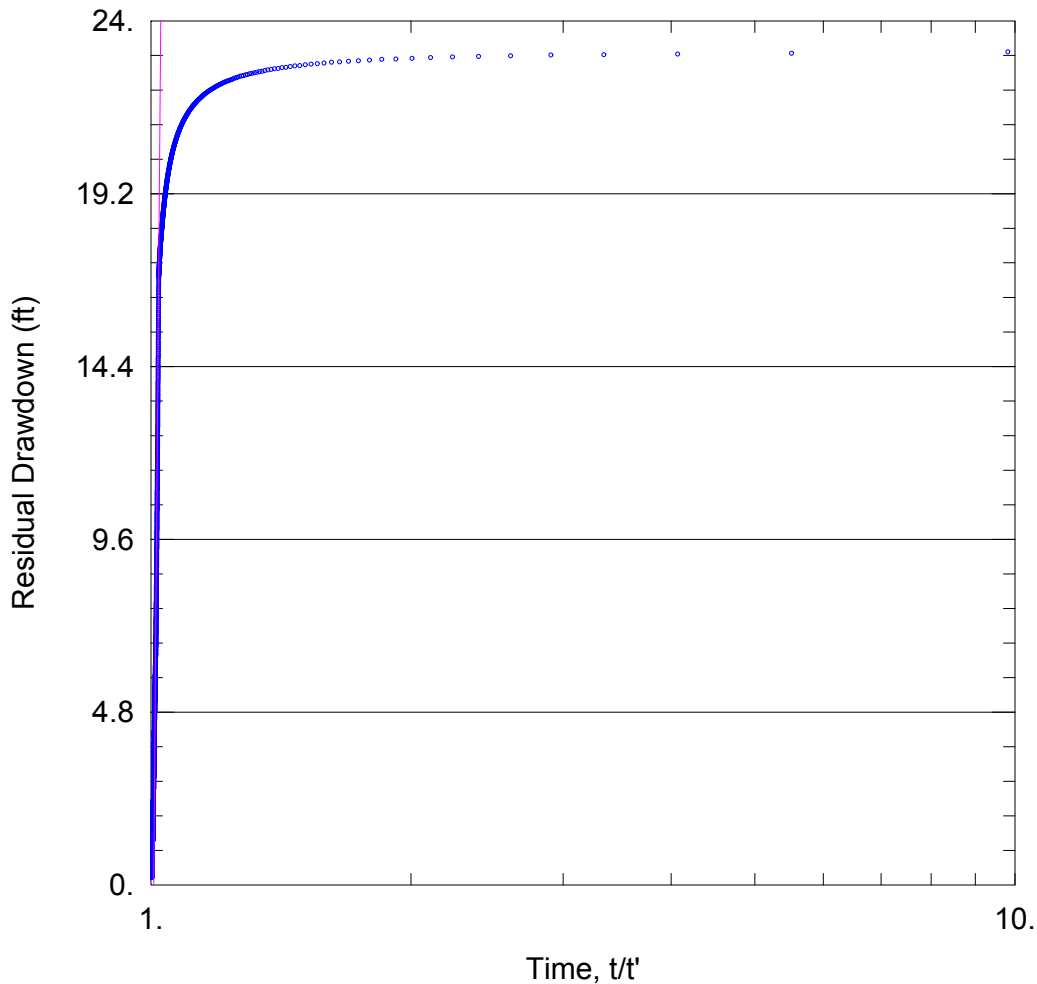
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.01404 ft²/day

S/S' = 0.9999



OM3 SINGLE-WELL TEST

Data Set: N:\...\OM3_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:46:36

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: OM3 Single-well Test

Test Date: 09/27/2011

AQUIFER DATA

Saturated Thickness: 10. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| OM3 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| • OM3 | 0 | 0 |

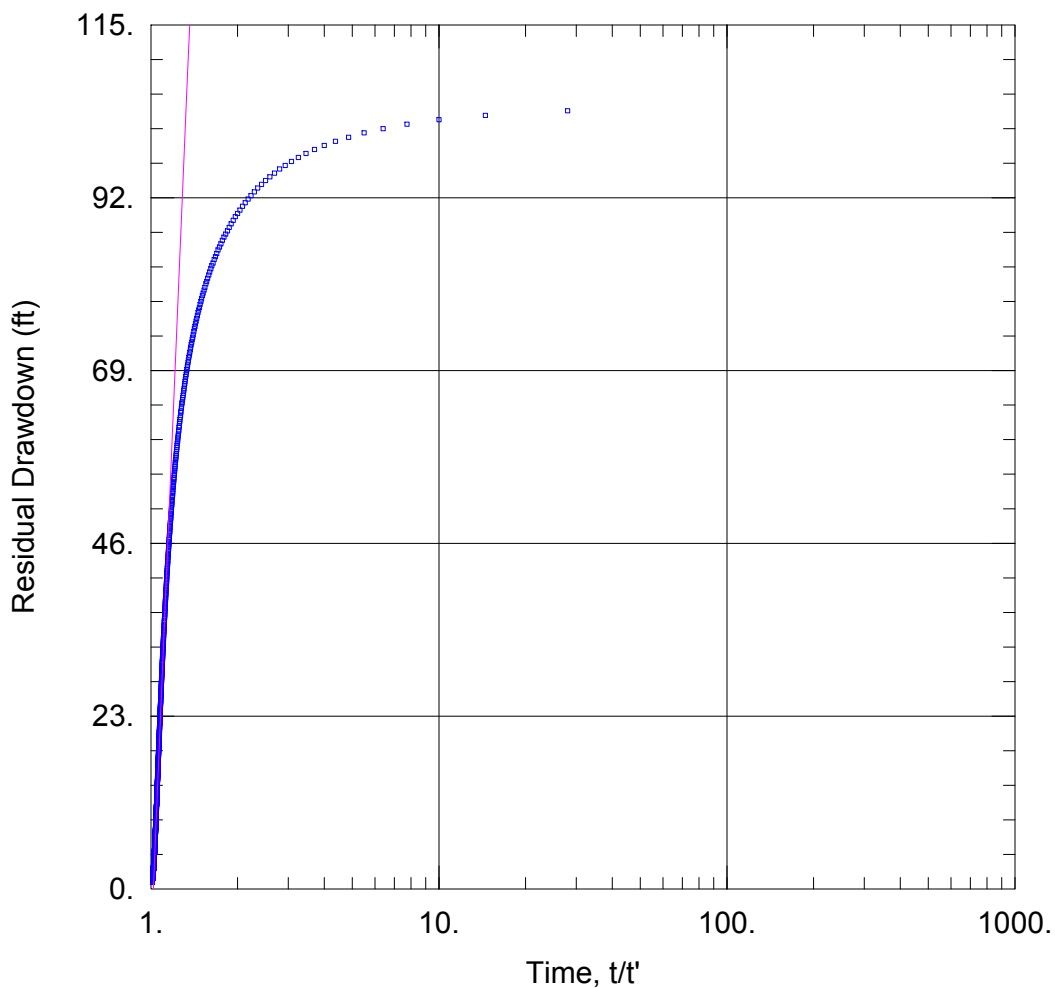
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.04866 ft²/day

S/S' = 1.007



UM3R SINGLE-WELL TEST

Data Set: N:\...\UM3R_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:47:46

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: UM1 Single-well Test

Test Date: 10/24/2011

AQUIFER DATA

Saturated Thickness: 14. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| UM3R | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| UM3R | 0 | 0 |

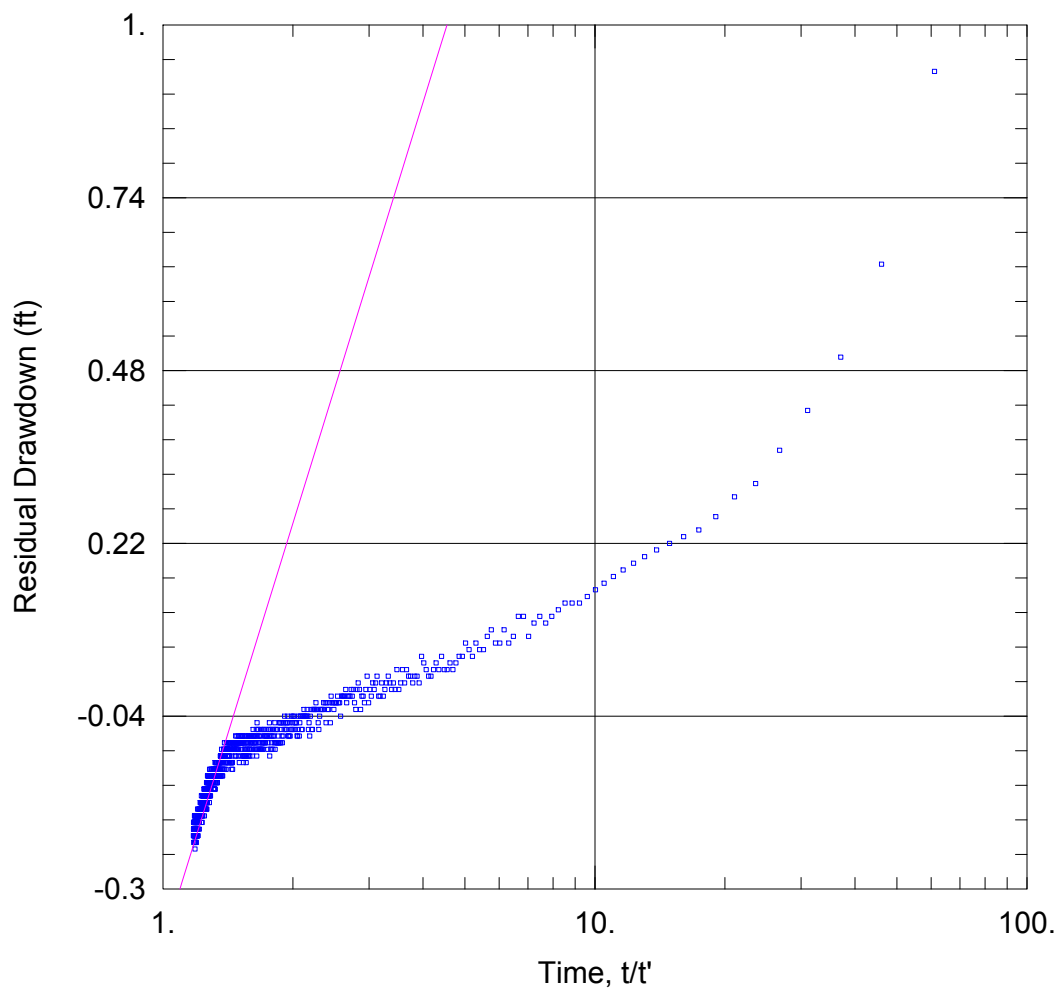
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.07352 ft²/day

S/S' = 1.019



OM4 SINGLE-WELL TEST

Data Set: N:\...\OM4_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:46:42

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: OM4 Single-well Test

Test Date: 09/29/2011

AQUIFER DATA

Saturated Thickness: 82. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| OM4 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| OM4 | 0 | 0 |

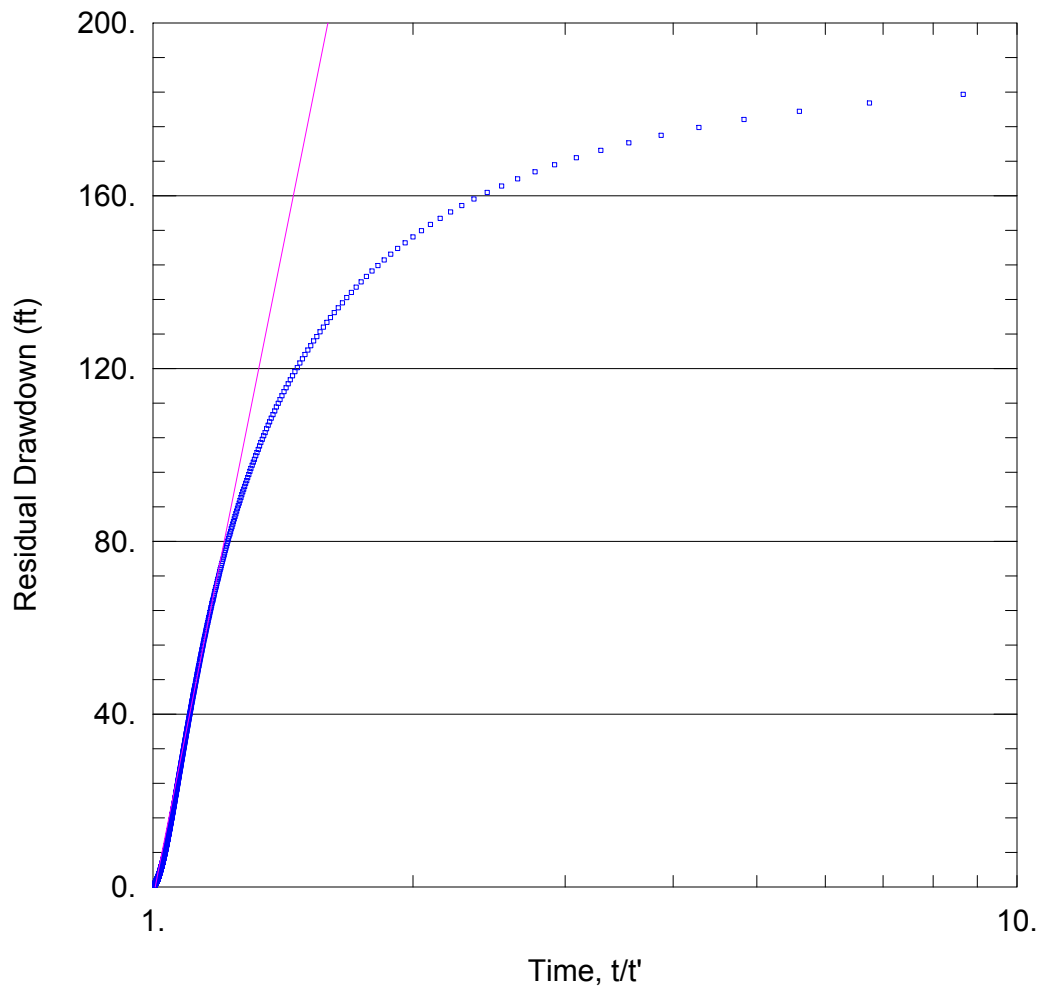
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 62.91 ft²/day

S/S' = 1.521



UM4 SINGLE-WELL TEST

Data Set: N:\...\UM4_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:47:54

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: UM4 Single-well Test

Test Date: 10/14/2011

AQUIFER DATA

Saturated Thickness: 17. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| UM4 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| UM4 | 0 | 0 |

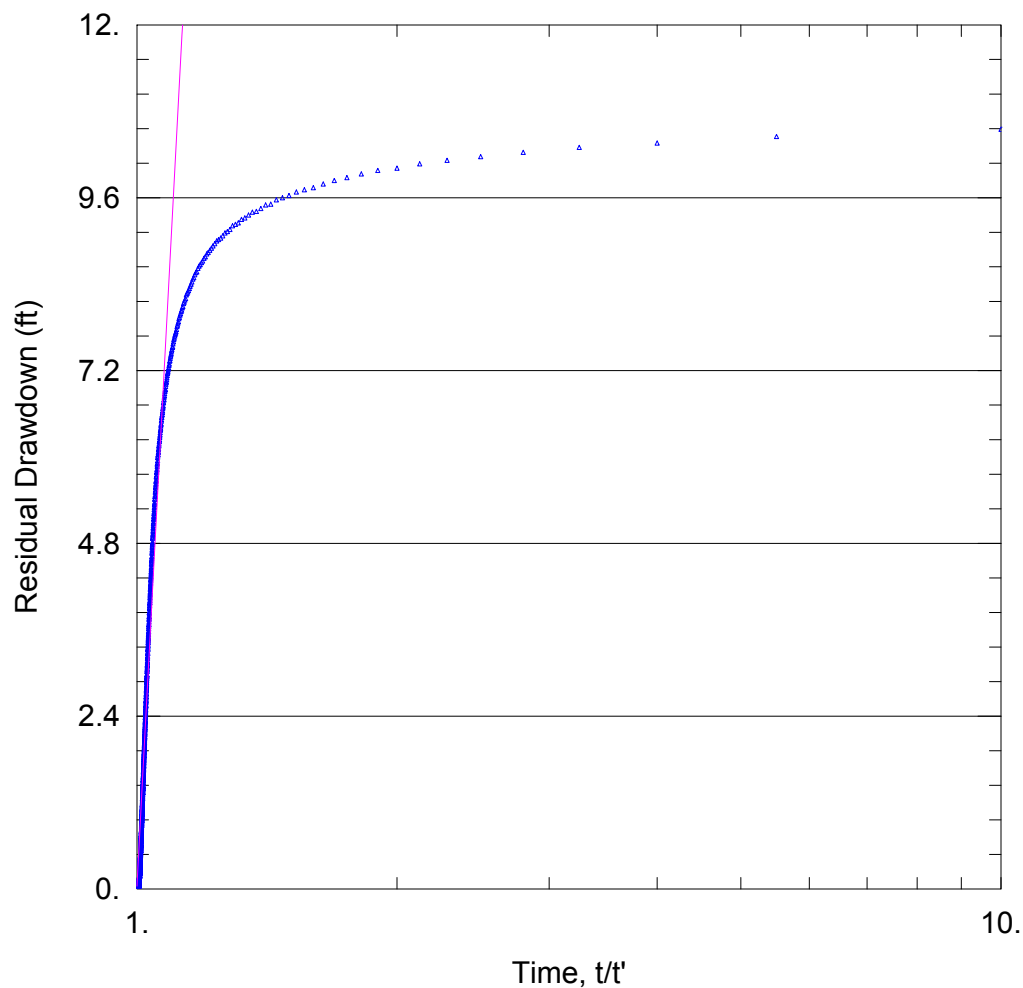
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.2152 ft²/day

S/S' = 1.006



SM5 SINGLE-WELL TEST

Data Set: N:\...\SM5_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:47:24

PROJECT INFORMATION

Company: Petrotek Engineering

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: SM5 Single-well Test

Test Date: 10/04/2011

AQUIFER DATA

Saturated Thickness: 15. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| SM5 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| ▲ SM5 | 0 | 0 |

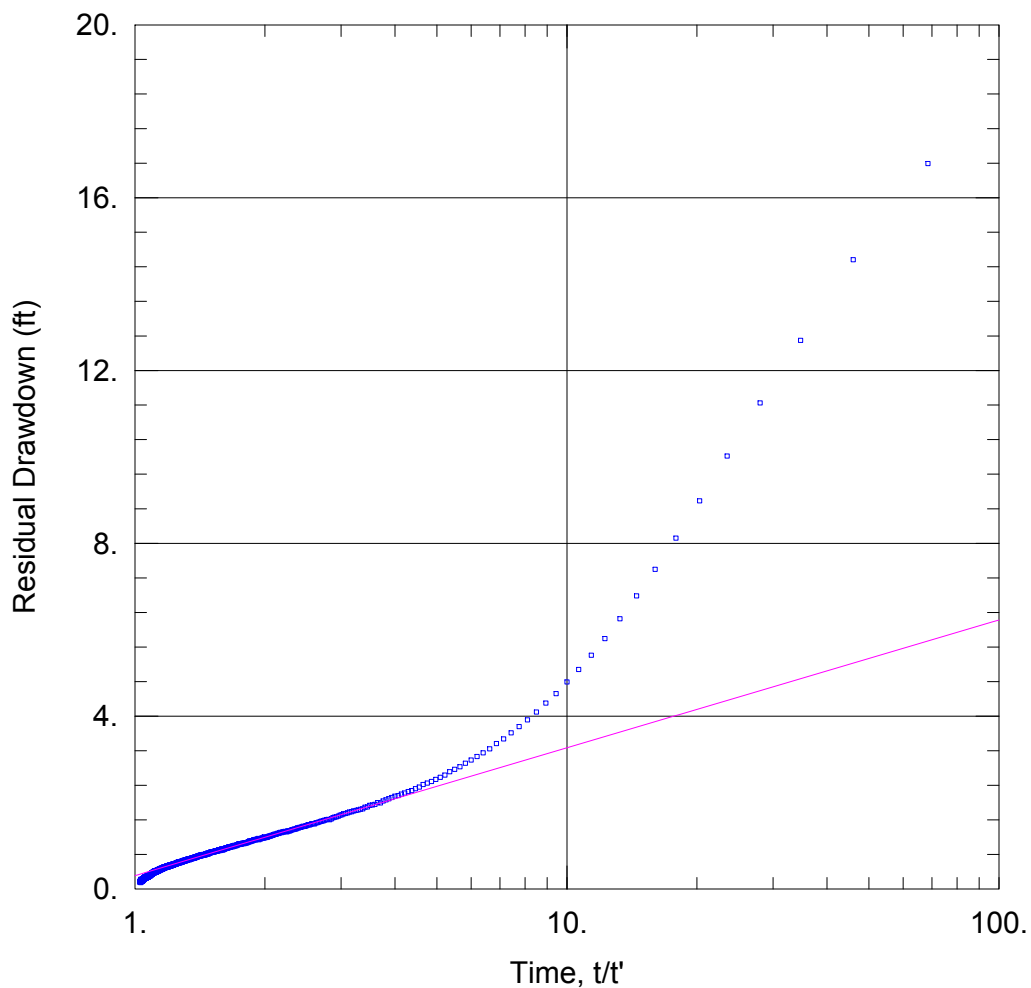
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.2597 ft²/day

S/S' = 0.9996



OM5 SINGLE-WELL TEST

Data Set: N:\...\OM5_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:46:50

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: OM5 Single-well Test

Test Date: 09/30/2011

AQUIFER DATA

Saturated Thickness: 12. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| OM5 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| OM5 | 0 | 0 |

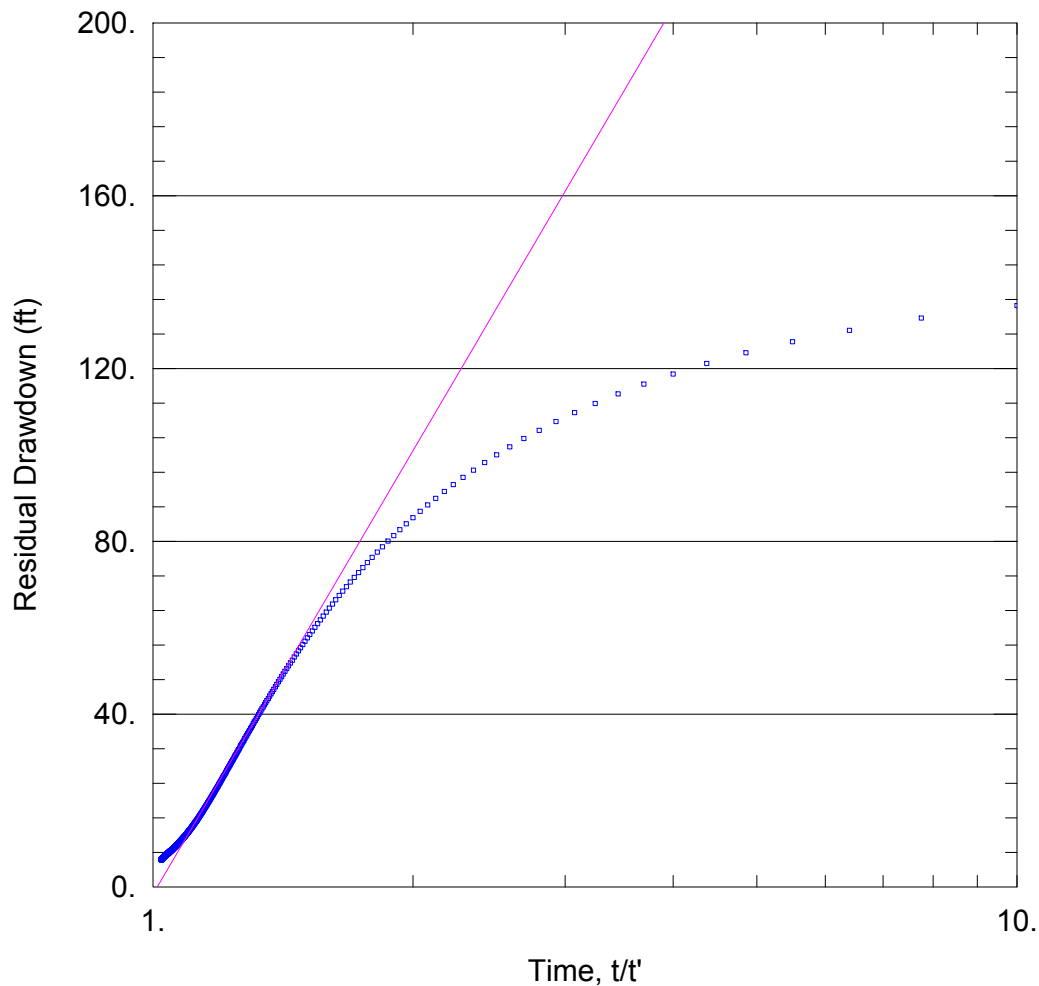
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

$T = 39.1 \text{ ft}^2/\text{day}$

$S/S' = 0.7878$



UM5 SINGLE-WELL TEST

Data Set: N:\...\UM5_SWT_Theis_Rec.aqt

Date: 02/02/12

Time: 17:48:04

PROJECT INFORMATION

Company: Petrotek Engineering Corp.

Client: AUC, LLC

Project: Reno Creek Project

Location: Wyoming

Test Well: UM5 Single-well Test

Test Date: 10/18/2011

AQUIFER DATA

Saturated Thickness: 18. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| UM5 | 0 | 0 |

Observation Wells

| Well Name | X (ft) | Y (ft) |
|-----------|--------|--------|
| UM5 | 0 | 0 |

SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 0.4447 ft²/day

S/S' = 1.012

APPENDIX E

WELL CONSTRUCTION DETAILS

PZM1 PUMP TEST WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID OM1
 SEO # 193231
 Casing Date 9/28/2010
 Screened Aquifer Zone Overlying
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>270</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>398</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>40</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>2.1</u> | Casing Depth (ft) | <u>190.5</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>191</u> |
| Number of Centralizers | <u>6</u> | Sacks/pails of pellets used | <u>2</u> |
| Top of bentonite chips (ft) | <u>180</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>182</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>190.5</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>187.5</u> |
| Total Ream Depth (ft) | <u>211</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>211</u> |
| Bottom of Screen (ft) | <u>210.5</u> | Cement Depth (ft) | <u>180</u> |

Comments: _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM1
 SEO # 193262
 Casing Date 10/12/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Pump Well for Pump Test</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>486</u> |
| Grout Weight (lbs/gal) | <u>14.4</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>717</u> | Casing Nominal ID (in) | <u>5</u> |
| Number of cement sacks (94 lbs) | <u>72</u> | Casing Nominal OD (in) | <u>5.563</u> |
| Number of bentonite sacks (50 lbs) | <u>3.8</u> | Casing Depth (ft) | <u>354</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>430</u> |
| Number of Centralizers | <u>11</u> | Sacks/pails of pellets used | <u>3</u> |
| Top of bentonite chips (ft) | <u>282</u> | Screen O.D. (in) | <u>6.078</u> |
| Top of Secondary Filter Pack (ft) | <u>288</u> | Screen type | <u>W.O.P PVC</u> |
| Top of Screen (ft) | <u>354</u> | Screen diameter (in) | <u>5</u> |
| Screen Length (ft) | <u>30</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9.875</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>290</u> |
| Total Ream Depth (ft) | <u>384</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>6.078</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>384</u> |
| Bottom of Screen (ft) | <u>384</u> | Cement Depth (ft) | <u>282</u> |

Comments: _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM10
 SEO # 193243
 Casing Date 10/4/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>418.5</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>617</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>62</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>3.3</u> | Casing Depth (ft) | <u>300</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>300</u> |
| Number of Centralizers | <u>9</u> | Sacks/pails of pellets used | <u>2.5</u> |
| Top of bentonite chips (ft) | <u>289</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>295</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>300</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>297.8</u> |
| Total Ream Depth (ft) | <u>320</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>320</u> |
| Bottom of Screen (ft) | <u>320</u> | Cement Depth (ft) | <u>289</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM8
 SEO # 193241
 Casing Date 9/27/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>378</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>558</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>56</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>3.0</u> | Casing Depth (ft) | <u>305</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>320</u> |
| Number of Centralizers | <u>10</u> | Sacks/pails of pellets used | <u>2</u> |
| Top of bentonite chips (ft) | <u>284</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Fiter Pack (ft) | <u>288</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>305</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>35</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>289</u> |
| Total Ream Depth (ft) | <u>340</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>340</u> |
| Bottom of Screen (ft) | <u>340</u> | Cement Depth (ft) | <u>284</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM9
 SEO # 193242
 Casing Date 9/30/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Pump Test Observation</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>492.75</u> |
| Grout Weight (lbs/gal) | <u>14.6</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>727</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>73</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>3.9</u> | Casing Depth (ft) | <u>310</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>310</u> |
| Number of Centralizers | <u>9</u> | Sacks/pails of pellets used | <u>2.5</u> |
| Top of bentonite chips (ft) | <u>302</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Fiter Pack (ft) | <u>304</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>310</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>305</u> |
| Total Ream Depth (ft) | <u>330</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>330</u> |
| Bottom of Screen (ft) | <u>330</u> | Cement Depth (ft) | <u>302</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID UM1
 SEO # 193254
 Casing Date 10/7/2010
 Screened Aquifer Zone Underlying
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>594</u> |
| Grout Weight (lbs/gal) | <u>14.4</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>876</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>88</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>4.7</u> | Casing Depth (ft) | <u>430</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>430</u> |
| Number of Centralizers | <u>12</u> | Sacks/pails of pellets used | <u>1.5</u> |
| Top of bentonite chips (ft) | <u>413</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>420</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>430</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>425</u> |
| Total Ream Depth (ft) | <u>450</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>450</u> |
| Bottom of Screen (ft) | <u>450</u> | Cement Depth (ft) | <u>413</u> |

Comments _____

PZM3 PUMP TEST WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID SM3
 SEO # NA
 Casing Date 7/7/2011
 Screened Aquifer Zone Shallow
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor
 Drill Rig Number (Case) 6
 Driller (Case) Ryan
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>81</u> |
| Grout Weight (lbs/gal) | <u>14.3</u> | Casing Material | <u>SCH 40 PVC belled glue joint</u> |
| Total Volume of Grout Used (gals) | <u>119</u> | Casing Nominal ID (in) | <u>4</u> |
| Number of cement sacks (94 lbs) | <u>12</u> | Casing Nominal OD (in) | <u>4.5</u> |
| Number of bentonite sacks (50 lbs) | <u>0.6</u> | Casing Depth (ft) | <u>50</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>J-M Manufacturing</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>80</u> |
| Number of Centralizers | <u>3</u> | Sacks/pails of pellets used | <u>1</u> |
| Top of bentonite chips (ft) | <u>38</u> | Screen O.D. (in) | <u>4.5</u> |
| Top of Secondary Filter Pack (ft) | <u>44</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>50</u> | Screen diameter (in) | <u>4</u> |
| Screen Length (ft) | <u>30</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>8.75</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>46.5</u> |
| Total Ream Depth (ft) | <u>80</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>na</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>80</u> |
| Bottom of Screen (ft) | <u>80</u> | Cement Depth (ft) | <u>38</u> |

Comments _____

The Reno Creek Project - Monitor Well Completion Report

| | |
|-------------------------|----------------------|
| Drilling Company (Case) | K.E. Taylor Drilling |
| Drill Rig Number (Case) | 2 |
| Driller (Case) | Todd |
| Datum | Ground Level |

2.7D Appendix E-11

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM11
 SEO # 193244
 Casing Date 7/28/2011
 Screened Aquifer Zone Production Zone
 Form Completed by: km

Drilling Company (Case) DC drilling
 Drill Rig Number (Case) 5
 Driller (Case) Carmine
 Datum Ground Level

| | | |
|--|--|--|
| <p>Annular Seal Material <u>Cement w/ bentonite</u></p> <p>Grout Emplacement Technique <u>Pump through Casing</u></p> <p>Grout Weight (lbs/gal) <u>14.3</u></p> <p>Total Volume of Grout Used (gals) <u>868</u></p> <p>Number of cement sacks (94 lbs) <u>80</u></p> <p>Number of bentonite sacks (50 lbs) <u>4.5</u></p> <p>Number of CaCl sacks (50 lbs) <u>0</u></p> <p>Type of Centralizers <u>Stainless Steel</u></p> <p>Number of Centralizers <u>10</u></p> <p>Top of bentonite chips (ft) <u>na</u></p> <p>Top of Secondary Filter Pack (ft) <u>na</u></p> <p>Top of Screen (ft) <u>365</u></p> <p>Screen Length (ft) <u>20</u></p> <p>Ream Bit Diameter (in) <u>8.75</u></p> <p>Total Ream Depth (ft) <u>385</u></p> <p>Silt Trap Diameter (in) <u>na</u></p> <p>Bottom of Screen (ft) <u>385</u></p> <p>Comments _____ _____ _____</p> | | <p>Well Use <u>Baseline Monitor</u></p> <p>Gallons of Water in Grout Mix <u>588</u></p> <p>Casing Material <u>SDR 17 PVC spline and groove</u></p> <p>Casing Nominal ID (in) <u>4.5</u></p> <p>Casing Nominal OD (in) <u>4.95</u></p> <p>Casing Depth (ft) <u>365</u></p> <p>Casing Manufacturer <u>CertainTeed</u></p> <p>1st Centralizer on Casing depth (ft) <u>360</u></p> <p>Sacks/pails of pellets used <u>na</u></p> <p>Screen O.D. (in) <u>3.5</u></p> <p>Screen type <u>Factory Slotted PVC</u></p> <p>Screen diameter (in) <u>3</u></p> <p>Screen slot size (in) <u>0.03</u></p> <p>Top of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Silt Trap w/ end cap Length (ft) <u>0</u></p> <p>Bottom of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Cement Depth (ft) <u>365</u></p> <p>Under-ream blade (in) <u>10</u></p> <p>Top of Riser Pipe (ft) <u>355</u></p> <p>Riser pipe length (ft) <u>10</u></p> <p>Date screen installed <u>8/1/2011</u></p> <p>Pilot TD (FT) <u>430</u></p> <p>Well developed <u>8/1/2011</u></p> <p>Time of development (hrs) <u>3</u></p> <p>Method <u>H2O/airlift</u></p> <p>Displacement gallons <u>276</u></p> <p>Est. Flow (gpm) <u>3</u></p> <p>Cement in casing (ft) <u>yes</u></p> <p>Wellhead hold pressure <u>yes</u></p> |
|--|--|--|

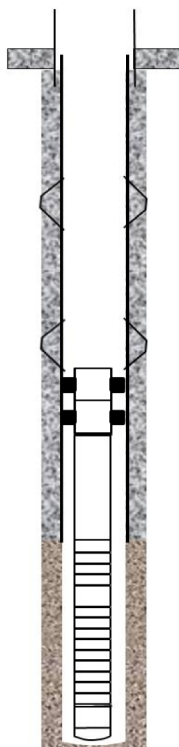
AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM12
 SEO # 193245
 Casing Date 7/27/2011
 Screened Aquifer Zone Production Zone
 Form Completed by: km

Drilling Company (Case) DC drilling
 Drill Rig Number (Case) 5
 Driller (Case) Carmine
 Datum Ground Level

Annular Seal Material Cement w/ bentonite
 Grout Emplacement Technique Pump through Casing
 Grout Weight (lbs/gal) 14.3
 Total Volume of Grout Used (gals) 868
 Number of cement sacks (94 lbs) 80
 Number of bentonite sacks (50 lbs) 4.5
 Number of CaCl sacks (50 lbs) 0
 Type of Centralizers Stainless Steel
 Number of Centralizers 11
 Top of bentonite chips (ft) na
 Top of Secondary Filter Pack (ft) na
 Top of Screen (ft) 370
 Screen Length (ft) 20
 Ream Bit Diameter (in) 8.75
 Total Ream Depth (ft) 370
 Silt Trap Diameter (in) na
 Bottom of Screen (ft) 390



Well Use Baseline Monitor
 Gallons of Water in Grout Mix 588
 Casing Material SDR 17 PVC spline and groove
 Casing Nominal ID (in) 4.5
 Casing Nominal OD (in) 4.95
 Casing Depth (ft) 370
 Casing Manufacturer CertainTeed
 1st Centralizer on Casing depth (ft) 367
 Sacks/pails of pellets used na
 Screen O.D. (in) 3.5
 Screen type Factory Slotted PVC
 Screen diameter (in) 3
 Screen slot size (in) 0.03
 Top of # 8 - 12 Pri. Filter pack (ft) na
 Silt Trap w/ end cap Length (ft) 0
 Bottom of # 8 - 12 Pri. Filter pack (ft) na
 Cement Depth (ft) 370
 Under-ream blade (in) 10
 Top of Riser Pipe (ft) 360
 Riser pipe length (ft) 10
 Date screen installed 7/29/2011
 Pilot TD (FT) 430
 Well developed 7/29/2011
 Time of development (hrs) 3.5
 Method H2O/air
 Displacement gallons 280
 Est. Flow (gpm) 3
 Cement in casing (ft) yes
 Wellhead hold pressure yes

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM13
 SEO # 193246
 Casing Date 8/2/2011
 Screened Aquifer Zone Production Zone
 Form Completed by: km

Drilling Company (Case) DC drilling
 Drill Rig Number (Case) 5
 Driller (Case) Carmine
 Datum Ground Level

| | | |
|---|--|---|
| <p>Annular Seal Material <u>Cement w/ bentonite</u></p> <p>Grout Emplacement Technique <u>Pump through Casing</u></p> <p>Grout Weight (lbs/gal) <u>14.3</u></p> <p>Total Volume of Grout Used (gals) <u>875</u></p> <p>Number of cement sacks (94 lbs) <u>80</u></p> <p>Number of bentonite sacks (50 lbs) <u>4.6</u></p> <p>Number of CaCl sacks (50 lbs) <u>0</u></p> <p>Type of Centralizers <u>Stainless Steel</u></p> <p>Number of Centralizers <u>10</u></p> <p>Top of bentonite chips (ft) <u>na</u></p> <p>Top of Secondary Filter Pack (ft) <u>na</u></p> <p>Top of Screen (ft) <u>357</u></p> <p>Screen Length (ft) <u>20</u></p> <p>Ream Bit Diameter (in) <u>8.75</u></p> <p>Total Ream Depth (ft) <u>377</u></p> <p>Silt Trap Diameter (in) <u>na</u></p> <p>Bottom of Screen (ft) <u>377</u></p> <p>Comments: _____ _____ _____</p> | | <p>Well Use <u>Baseline Monitor</u></p> <p>Gallons of Water in Grout Mix <u>593</u></p> <p>Casing Material <u>SDR 17 PVC spline and groove</u></p> <p>Casing Nominal ID (in) <u>4.5</u></p> <p>Casing Nominal OD (in) <u>4.95</u></p> <p>Casing Depth (ft) <u>357</u></p> <p>Casing Manufacturer <u>CertainTeed</u></p> <p>1st Centralizer on Casing depth (ft) <u>352</u></p> <p>Sacks/pails of pellets used <u>na</u></p> <p>Screen O.D. (in) <u>3.5</u></p> <p>Screen type <u>Factory Slotted PVC</u></p> <p>Screen diameter (in) <u>3</u></p> <p>Screen slot size (in) <u>0.03</u></p> <p>Top of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Silt Trap w/ end cap Length (ft) <u>0</u></p> <p>Bottom of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Cement Depth (ft) <u>357</u></p> <p>Under-ream blade (in) <u>10</u></p> <p>Top of Riser Pipe (ft) <u>347</u></p> <p>Riser pipe length (ft) <u>10</u></p> <p>Date screen installed <u>8/8/2011</u></p> <p>Pilot TD (FT) <u>430</u></p> <p>Well developed <u>8/8/2011</u></p> <p>Time of development (hrs) <u>3</u></p> <p>Method <u>H2O/air</u></p> <p>Displacement gallons <u>271</u></p> <p>Est. Flow (gpm) <u>10</u></p> <p>Cement in casing (ft) <u>yes</u></p> <p>Wellhead hold pressure <u>yes</u></p> |
|---|--|---|

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM3
 SEO # 193263
 Casing Date 8/3/2011
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) D.C. Drilling
 Drill Rig Number (Case) 4
 Driller (Case) Carmin
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Pump Well for Pump Test</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>513</u> |
| Grout Weight (lbs/gal) | <u>14.3</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>784</u> | Casing Nominal ID (in) | <u>5</u> |
| Number of cement sacks (94 lbs) | <u>76</u> | Casing Nominal OD (in) | <u>5.563</u> |
| Number of bentonite sacks (50 lbs) | <u>4.0</u> | Casing Depth (ft) | <u>372</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>370</u> |
| Number of Centralizers | <u>11</u> | Sacks/pails of pellets used | <u>2.9</u> |
| Top of bentonite chips (ft) | <u>278</u> | Screen O.D. (in) | <u>5.75</u> |
| Top of Secondary Filter Pack (ft) | <u>285</u> | Screen type | <u>W.O.P PVC</u> |
| Top of Screen (ft) | <u>372</u> | Screen diameter (in) | <u>5</u> |
| Screen Length (ft) | <u>40</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9.875</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>286</u> |
| Total Ream Depth (ft) | <u>415</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>412</u> |
| Bottom of Screen (ft) | <u>412</u> | Cement Depth (ft) | <u>278</u> |

Comments _____

AUC LLC

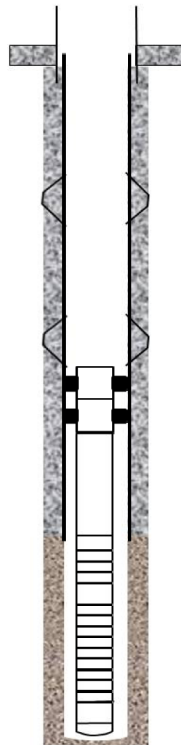
The Reno Creek Project - Monitor Well Completion Report

Well ID UM3R
 SEO # 193389
 Casing Date 10/6/2011
 Screened Aquifer Zone Underlying
 Form Completed by: KM

Drilling Company (Case) DC drilling
 Drill Rig Number (Case) 5
 Driller (Case) Carmine
 Datum Ground Level

Annular Seal Material Cement w/ bentonite
 Grout Emplacement Technique Pump through Casing
 Grout Weight (lbs/gal) 14.3
 Total Volume of Grout Used (gals) 1128
 Number of cement sacks (94 lbs) 80
 Number of bentonite sacks (50 lbs) 5.9
 Number of CaCl sacks (50 lbs) 0
 Type of Centralizers Stainless Steel
 Number of Centralizers 13
 Top of bentonite chips (ft) na
 Top of Secondary Filter Pack (ft) na
 Top of Screen (ft) 459
 Screen Length (ft) 20
 Ream Bit Diameter (in) 8.75
 Total Ream Depth (ft) 480
 Silt Trap Diameter (in) na
 Bottom of Screen (ft) 479

Comments _____



Well Use Baseline Monitor
 Gallons of Water in Grout Mix 764
 Casing Material SDR 17 PVC spline and groove
 Casing Nominal ID (in) 4.5
 Casing Nominal OD (in) 4.95
 Casing Depth (ft) 459
 Casing Manufacturer CertainTeed
 1st Centralizer on Casing depth (ft) 453
 Sacks/pails of pellets used na
 Screen O.D. (in) 3.5
 Screen type Factory Slotted PVC
 Screen diameter (in) 3
 Screen slot size (in) 0.03
 Top of # 8 - 12 Pri. Filter pack (ft) na
 Silt Trap w/ end cap Length (ft) 0
 Bottom of # 8 - 12 Pri. Filter pack (ft) na
 Cement Depth (ft) 459
 Under-ream blade (in) 10
 Top of Riser Pipe (ft) 450
 Riser pipe length (ft) 10
 Date screen installed 10/10/2011
 Pilot TD (FT) 462
 Well developed 10/11/2011
 Time of development (hrs) 1
 Method H2O/air
 Displacement gallons 336
 Est. Flow (gpm) 1
 Cement in casing (ft) yes
 Wellhead hold pressure no

PZM4D PUMP TEST WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID OM4
 SEO # 193234
 Casing Date 12/2/2010
 Screened Aquifer Zone Overlying
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | |
|--|---|---|
| Annular Seal Material <u>Cement w/ bentonite</u> | | Well Use <u>Observation/Monitor</u> |
| Grout Emplacement Technique <u>Tremie Pipe</u> | | Gallons of Water in Grout Mix <u>270</u> |
| Grout Weight (lbs/gal) <u>14.5</u> | | Casing Material <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) <u>398</u> | | Casing Nominal ID (in) <u>4.5</u> |
| Number of cement sacks (94 lbs) <u>40</u> | | Casing Nominal OD (in) <u>4.95</u> |
| Number of bentonite sacks (50 lbs) <u>2.1</u> | | Casing Depth (ft) <u>157</u> |
| Number of CaCl sacks (50 lbs) <u>0</u> | | Casing Manufacturer <u>CertainTeed</u> |
| Type of Centralizers <u>Stainless Steel</u> | | 1st Centralizer on Casing depth (ft) <u>157</u> |
| Number of Centralizers <u>5</u> | | Sacks/pails of pellets used <u>2.5</u> |
| Top of bentonite chips (ft) <u>147</u> | | Screen O.D. (in) <u>4.95</u> |
| Top of Secondary Fiter Pack (ft) <u>151</u> | | Screen type <u>Factory Slotted PVC</u> |
| Top of Screen (ft) <u>157</u> | | Screen diameter (in) <u>4.5</u> |
| Screen Length (ft) <u>20</u> | | Screen slot size (in) <u>0.03</u> |
| Ream Bit Diameter (in) <u>9</u> | | Top of # 8 - 12 Pri. Filter pack (ft) <u>154</u> |
| Total Ream Depth (ft) <u>180</u> | | Silt Trap w/ end cap Length (ft) <u>0</u> |
| Silt Trap Diameter (in) <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) <u>177</u> | |
| Bottom of Screen (ft) <u>177</u> | Cement Depth (ft) <u>147</u> | |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID OAM4D
 SEO # NA
 Casing Date 4/13/2011
 Screened Aquifer Zone Overlying Aquitard
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) # 4
 Driller (Case) Bobby
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>324</u> |
| Grout Weight (lbs/gal) | <u>13.1</u> | Casing Material | <u>SCH 40 PVC belled glue joint</u> |
| Total Volume of Grout Used (gals) | <u>443</u> | Casing Nominal ID (in) | <u>4</u> |
| Number of cement sacks (94 lbs) | <u>36</u> | Casing Nominal OD (in) | <u>4.5</u> |
| Number of bentonite sacks (50 lbs) | <u>1.7</u> | Casing Depth (ft) | <u>201</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>J-M Manufacturing</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>201</u> |
| Number of Centralizers | <u>6</u> | Sacks/pails of pellets used | <u>5.5</u> |
| Top of bentonite chips (ft) | <u>185</u> | Screen O.D. (in) | <u>4.5</u> |
| Top of Secondary Fiter Pack (ft) | <u>198</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>201</u> | Screen diameter (in) | <u>4</u> |
| Screen Length (ft) | <u>5</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>8.75</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>199.5</u> |
| Total Ream Depth (ft) | <u>208</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.5</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>206</u> |
| Bottom of Screen (ft) | <u>206</u> | Cement Depth (ft) | <u>185</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID OAM4S
 SEO # NA
 Casing Date 4/14/2011
 Screened Aquifer Zone Overlying Aquitard
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) #4
 Driller (Case) Bobby
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>311</u> |
| Grout Weight (lbs/gal) | <u>13.1</u> | Casing Material | <u>SCH 40 PVC belled glue joint</u> |
| Total Volume of Grout Used (gals) | <u>424</u> | Casing Nominal ID (in) | <u>4</u> |
| Number of cement sacks (94 lbs) | <u>35</u> | Casing Nominal OD (in) | <u>4.5</u> |
| Number of bentonite sacks (50 lbs) | <u>1.7</u> | Casing Depth (ft) | <u>191</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>J-M Manufacturing</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>191</u> |
| Number of Centralizers | <u>6</u> | Sacks/pails of pellets used | <u>4.5</u> |
| Top of bentonite chips (ft) | <u>178</u> | Screen O.D. (in) | <u>4.5</u> |
| Top of Secondary Fiter Pack (ft) | <u>na</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>191</u> | Screen diameter (in) | <u>4</u> |
| Screen Length (ft) | <u>3</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>8.75</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>189</u> |
| Total Ream Depth (ft) | <u>196</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>na</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>194</u> |
| Bottom of Screen (ft) | <u>194</u> | Cement Depth (ft) | <u>177.5</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM4
 SEO # 193261
 Casing Date 7/1/2011
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) 4
 Driller (Case) Bobby
 Datum Ground Level

| | | |
|---|--|---|
| <p>Annular Seal Material <u>Cement w/ bentonite</u></p> <p>Grout Emplacement Technique <u>Tremie Pipe</u></p> <p>Grout Weight (lbs/gal) <u>14.3</u></p> <p>Total Volume of Grout Used (gals) <u>617</u></p> <p>Number of cement sacks (94 lbs) <u>62</u></p> <p>Number of bentonite sacks (50 lbs) <u>3.3</u></p> <p>Number of CaCl sacks (50 lbs) <u>0</u></p> <p>Type of Centralizers <u>Stainless Steel</u></p> <p>Number of Centralizers <u>6</u></p> <p>Top of bentonite chips (ft) <u>211</u></p> <p>Top of Secondary Filter Pack (ft) <u>216</u></p> <p>Top of Screen (ft) <u>235</u></p> <p>Screen Length (ft) <u>20</u></p> <p>Ream Bit Diameter (in) <u>9.875</u></p> <p>Total Ream Depth (ft) <u>266</u></p> <p>Silt Trap Diameter (in) <u>na</u></p> <p>Bottom of Screen (ft) <u>255</u></p> <p>Comments:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> | | <p>Well Use <u>Pump Test Observation</u></p> <p>Gallons of Water in Grout Mix <u>419</u></p> <p>Casing Material <u>SDR 17 PVC spline and groove</u></p> <p>Casing Nominal ID (in) <u>5</u></p> <p>Casing Nominal OD (in) <u>5.563</u></p> <p>Casing Depth (ft) <u>235</u></p> <p>Casing Manufacturer <u>CertainTeed</u></p> <p>Centralizer on Casing depth (ft) <u>200</u></p> <p>Sacks/pails of pellets used <u>3</u></p> <p>Screen O.D. (in) <u>3.5</u></p> <p>Screen type <u>Factory Slotted PVC</u></p> <p>Screen diameter (in) <u>3</u></p> <p>Screen slot size (in) <u>0.03</u></p> <p>Top of # 8 - 12 Pri. Filter pack (ft) <u>218</u></p> <p>Silt Trap w/ end cap Length (ft) <u>0</u></p> <p>Bottom of # 8 - 12 Pri. Filter pack (ft) <u>235</u></p> <p>Cement Depth (ft) <u>211</u></p> <p>Under-ream blade (in) <u>10.5</u></p> <p>Top of Riser Pipe (ft) <u>225</u></p> <p>Riser pipe length (ft) <u>10</u></p> <p>Date screen installed <u>7/5/2011</u></p> <p>Well developed <u>7/5/2011</u></p> <p>Time of development (hrs) <u>3</u></p> <p>Method <u>airlift</u></p> <p>Est. Flow (gpm) <u>5</u></p> |
|---|--|---|

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM14
 SEO # 193247
 Casing Date 2/15/2011
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | |
|--|--|---|
| Annular Seal Material <u>Cement w/ bentonite</u> | | Well Use <u>Observation/Monitor</u> |
| Grout Emplacement Technique <u>Tremie Pipe</u> | | Gallons of Water in Grout Mix <u>486</u> |
| Grout Weight (lbs/gal) <u>14.5</u> | | Casing Material <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) <u>717</u> | | Casing Nominal ID (in) <u>4.5</u> |
| Number of cement sacks (94 lbs) <u>72</u> | | Casing Nominal OD (in) <u>4.95</u> |
| Number of bentonite sacks (50 lbs) <u>3.8</u> | | Casing Depth (ft) <u>327</u> |
| Number of CaCl sacks (50 lbs) <u>0</u> | | Casing Manufacturer <u>CertainTeed</u> |
| Type of Centralizers <u>Stainless Steel</u> | | 1st Centralizer on Casing depth (ft) <u>327</u> |
| Number of Centralizers <u>9</u> | | Sacks/pails of pellets used <u>2.5</u> |
| Top of bentonite chips (ft) <u>314</u> | | Screen O.D. (in) <u>4.95</u> |
| Top of Secondary Fiter Pack (ft) <u>319</u> | | Screen type <u>Factory Slotted PVC</u> |
| Top of Screen (ft) <u>327</u> | | Screen diameter (in) <u>4.5</u> |
| Screen Length (ft) <u>20</u> | | Screen slot size (in) <u>0.03</u> |
| Ream Bit Diameter (in) <u>9</u> | | Top of # 8 - 12 Pri. Filter pack (ft) <u>321</u> |
| Total Ream Depth (ft) <u>347</u> | | Silt Trap w/ end cap Length (ft) <u>0</u> |
| Silt Trap Diameter (in) <u>4.95</u> | | Bottom of # 8 - 12 Pri. Filter pack (ft) <u>347</u> |
| Bottom of Screen (ft) <u>347</u> | | Cement Depth (ft) <u>314</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM15
 SEO # 193248
 Casing Date 10/20/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>635</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>936</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>94</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>5.0</u> | Casing Depth (ft) | <u>420</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>420</u> |
| Number of Centralizers | <u>12</u> | Sacks/pails of pellets used | <u>2</u> |
| Top of bentonite chips (ft) | <u>399</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Fiter Pack (ft) | <u>403</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>420</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>404</u> |
| Total Ream Depth (ft) | <u>443</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>443</u> |
| Bottom of Screen (ft) | <u>440</u> | Cement Depth (ft) | <u>399</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM16
 SEO # 193249
 Casing Date 12/13/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | |
|--|---|---|
| Annular Seal Material <u>Cement w/ bentonite</u> | | Well Use <u>Observation/Monitor</u> |
| Grout Emplacement Technique <u>Tremie Pipe</u> | | Gallons of Water in Grout Mix <u>459</u> |
| Grout Weight (lbs/gal) <u>14.5</u> | | Casing Material <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) <u>677</u> | | Casing Nominal ID (in) <u>4.5</u> |
| Number of cement sacks (94 lbs) <u>68</u> | | Casing Nominal OD (in) <u>4.95</u> |
| Number of bentonite sacks (50 lbs) <u>3.6</u> | | Casing Depth (ft) <u>295</u> |
| Number of CaCl sacks (50 lbs) <u>0</u> | | Casing Manufacturer <u>CertainTeed</u> |
| Type of Centralizers <u>Stainless Steel</u> | | 1st Centralizer on Casing depth (ft) <u>295</u> |
| Number of Centralizers <u>9</u> | | Sacks/pails of pellets used <u>2.5</u> |
| Top of bentonite chips (ft) <u>273</u> | | Screen O.D. (in) <u>4.95</u> |
| Top of Secondary Fiter Pack (ft) <u>277</u> | | Screen type <u>Factory Slotted PVC</u> |
| Top of Screen (ft) <u>295</u> | | Screen diameter (in) <u>4.5</u> |
| Screen Length (ft) <u>20</u> | | Screen slot size (in) <u>0.03</u> |
| Ream Bit Diameter (in) <u>9</u> | | Top of # 8 - 12 Pri. Filter pack (ft) <u>280</u> |
| Total Ream Depth (ft) <u>318</u> | | Silt Trap w/ end cap Length (ft) <u>0</u> |
| Silt Trap Diameter (in) <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) <u>315</u> | |
| Bottom of Screen (ft) <u>315</u> | Cement Depth (ft) <u>273</u> | |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM17
 SEO # 193250
 Casing Date 12/15/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>459</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>677</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>68</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>3.6</u> | Casing Depth (ft) | <u>296</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>296</u> |
| Number of Centralizers | <u>9</u> | Sacks/pails of pellets used | <u>2.5</u> |
| Top of bentonite chips (ft) | <u>282</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>289</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>296</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>292</u> |
| Total Ream Depth (ft) | <u>319</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>316</u> |
| Bottom of Screen (ft) | <u>316</u> | Cement Depth (ft) | <u>282</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM4D
 SEO # 193390
 Casing Date 6/23/2011
 Screened Aquifer Zone Lower Production Zone
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) 4
 Driller (Case) Todd
 Datum Ground Level

| | | |
|---|--|--|
| <p>Annular Seal Material <u>Cement w/ bentonite</u></p> <p>Grout Emplacement Technique <u>Pump through Casing</u></p> <p>Grout Weight (lbs/gal) <u>14.3</u></p> <p>Total Volume of Grout Used (gals) <u>781</u></p> <p>Number of cement sacks (94 lbs) <u>72</u></p> <p>Number of bentonite sacks (50 lbs) <u>4.1</u></p> <p>Number of CaCl sacks (50 lbs) <u>0</u></p> <p>Type of Centralizers <u>Stainless Steel</u></p> <p>Number of Centralizers <u>9</u></p> <p>Top of bentonite chips (ft) <u>na</u></p> <p>Top of Secondary Filter Pack (ft) <u>na</u></p> <p>Top of Screen (ft) <u>311</u></p> <p>Screen Length (ft) <u>60</u></p> <p>Ream Bit Diameter (in) <u>9</u></p> <p>Total Ream Depth (ft) <u>325</u></p> <p>Silt Trap Diameter (in) <u>4.95</u></p> <p>Bottom of Screen (ft) <u>371</u></p> <p>Comments: _____</p> <p>_____</p> <p>_____</p> | | <p>Well Use <u>Pump Well for Pump Test</u></p> <p>Gallons of Water in Grout Mix <u>529.2</u></p> <p>Casing Material <u>SDR 17 PVC spline and groove</u></p> <p>Casing Nominal ID (in) <u>4.5</u></p> <p>Casing Nominal OD (in) <u>4.95</u></p> <p>Casing Depth (ft) <u>311</u></p> <p>Casing Manufacturer <u>CertainTeed</u></p> <p>1st Centralizer on Casing depth (ft) <u>295</u></p> <p>Sacks/pails of pellets used <u>na</u></p> <p>Screen O.D. (in) <u>3.5</u></p> <p>Screen type <u>W.O.P PVC</u></p> <p>Screen diameter (in) <u>3</u></p> <p>Screen slot size (in) <u>0.03</u></p> <p>Top of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Silt Trap w/ end cap Length (ft) <u>0</u></p> <p>Bottom of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Cement Depth (ft) <u>311</u></p> <p>Under-ream blade (in) <u>10.5</u></p> <p>Top of Riser Pipe (ft) <u>300</u></p> <p>Riser pipe length (ft) <u>10</u></p> <p>Date screen installed <u>6/27/2011</u></p> <p>Pilot TD (FT) <u>389</u></p> <p>Well developed <u>6/27/2011</u></p> <p>Time of development (hrs) <u>3</u></p> <p>Method <u>airlift</u></p> <p>Displacement gallons <u>240</u></p> <p>Est. Flow (gpm) <u>20</u></p> <p>Cement in casing (ft) <u>yes</u></p> <p>Wellhead hold pressure <u>yes</u></p> |
|---|--|--|

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID UM4
 SEO # 193257
 Casing Date 11/18/2010
 Screened Aquifer Zone Underlying
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>675</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>996</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>100</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>5.3</u> | Casing Depth (ft) | <u>410</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>410</u> |
| Number of Centralizers | <u>12</u> | Sacks/pails of pellets used | <u>2.5</u> |
| Top of bentonite chips (ft) | <u>399</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>404</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>410</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>406</u> |
| Total Ream Depth (ft) | <u>434</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>430</u> |
| Bottom of Screen (ft) | <u>430</u> | Cement Depth (ft) | <u>399</u> |

Comments _____

PZM5 PUMP TEST WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID SM5
 SEO # NA
 Casing Date 8/18/2010
 Screened Aquifer Zone Shallow
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | |
|--|--|---|
| Annular Seal Material <u>Cement w/ bentonite</u> | | Well Use <u>Observation/Monitor</u> |
| Grout Emplacement Technique <u>Tremie Pipe</u> | | Gallons of Water in Grout Mix <u>47.25</u> |
| Grout Weight (lbs/gal) <u>14.2</u> | | Casing Material <u>SCH 40 PVC belled glue joint</u> |
| Total Volume of Grout Used (gals) <u>79</u> | | Casing Nominal ID (in) <u>4</u> |
| Number of cement sacks (94 lbs) <u>7</u> | | Casing Nominal OD (in) <u>4.5</u> |
| Number of bentonite sacks (50 lbs) <u>0.4</u> | | Casing Depth (ft) <u>30</u> |
| Number of CaCl sacks (50 lbs) <u>0</u> | | Casing Manufacturer <u>J-M Manufacturing</u> |
| Type of Centralizers <u>Stainless Steel</u> | | 1st Centralizer on Casing depth (ft) <u>40</u> |
| Number of Centralizers <u>2</u> | | Sacks/pails of pellets used <u>3</u> |
| Top of bentonite chips (ft) <u>19</u> | | Screen O.D. (in) <u>4.5</u> |
| Top of Secondary Filter Pack (ft) <u>24</u> | | Screen type <u>Factory Slotted PVC</u> |
| Top of Screen (ft) <u>30</u> | | Screen diameter (in) <u>4</u> |
| Screen Length (ft) <u>20</u> | | Screen slot size (in) <u>0.03</u> |
| Ream Bit Diameter (in) <u>8.75</u> | | Top of # 8 - 12 Pri. Filter pack (ft) <u>26</u> |
| Total Ream Depth (ft) <u>50</u> | | Silt Trap w/ end cap Length (ft) <u>0</u> |
| Silt Trap Diameter (in) <u>4.5</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) <u>50</u> | |
| Bottom of Screen (ft) <u>50</u> | Cement Depth (ft) <u>19</u> | |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID OM5
 SEO # 193235
 Casing Date 8/18/2010
 Screened Aquifer Zone Overlying
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle Drilling #1
 Driller (Case) T. Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>108</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>160</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>16</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>0.88</u> | Casing Depth (ft) | <u>69</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>70</u> |
| Number of Centralizers | <u>3</u> | Sacks/pails of pellets used | <u>2.5</u> |
| Top of bentonite chips (ft) | <u>59</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>64</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>69</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>15</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>67</u> |
| Total Ream Depth (ft) | <u>84</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>84</u> |
| Bottom of Screen (ft) | <u>84</u> | Cement Depth (ft) | <u>59</u> |

Comments Grout showed at surface after 3.4 batches, approximately 136 gals in well.

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM18
 SEO # 193251
 Casing Date 9/10/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #12
 Driller (Case) Cesar Domingez
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>378</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>558</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>56</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>3.0</u> | Casing Depth (ft) | <u>250</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>250</u> |
| Number of Centralizers | <u>8</u> | Sacks/pails of pellets used | <u>2.5</u> |
| Top of bentonite chips (ft) | <u>239</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Fiter Pack (ft) | <u>243</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>250</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>246</u> |
| Total Ream Depth (ft) | <u>270</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>270</u> |
| Bottom of Screen (ft) | <u>270</u> | Cement Depth (ft) | <u>239</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM19
 SEO # 193252
 Casing Date 12/8/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | |
|--|--|---|
| Annular Seal Material <u>Cement w/ bentonite</u> | | Well Use <u>Observation/Monitor</u> |
| Grout Emplacement Technique <u>Tremie Pipe</u> | | Gallons of Water in Grout Mix <u>459</u> |
| Grout Weight (lbs/gal) <u>14.4</u> | | Casing Material <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) <u>677</u> | | Casing Nominal ID (in) <u>4.5</u> |
| Number of cement sacks (94 lbs) <u>68</u> | | Casing Nominal OD (in) <u>4.95</u> |
| Number of bentonite sacks (50 lbs) <u>3.6</u> | | Casing Depth (ft) <u>312</u> |
| Number of CaCl sacks (50 lbs) <u>0</u> | | Casing Manufacturer <u>CertainTeed</u> |
| Type of Centralizers <u>Stainless Steel</u> | | 1st Centralizer on Casing depth (ft) <u>312</u> |
| Number of Centralizers <u>9</u> | | Sacks/pails of pellets used <u>2.5</u> |
| Top of bentonite chips (ft) <u>302</u> | | Screen O.D. (in) <u>4.95</u> |
| Top of Secondary Filter Pack (ft) <u>306</u> | | Screen type <u>Factory Slotted PVC</u> |
| Top of Screen (ft) <u>312</u> | | Screen diameter (in) <u>4.5</u> |
| Screen Length (ft) <u>20</u> | | Screen slot size (in) <u>0.03</u> |
| Ream Bit Diameter (in) <u>9</u> | | Top of # 8 - 12 Pri. Filter pack (ft) <u>308</u> |
| Total Ream Depth (ft) <u>335</u> | | Silt Trap w/ end cap Length (ft) <u>0</u> |
| Silt Trap Diameter (in) <u>4.95</u> | | Bottom of # 8 - 12 Pri. Filter pack (ft) <u>332</u> |
| Bottom of Screen (ft) <u>332</u> | | Cement Depth (ft) <u>302</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM20
 SEO # 193253
 Casing Date 1/27/2011
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------------------------------|----------------------------|-----------------------------|--------------------|------------------------|-------------|-----------------------------------|------------|---------------------------------|-----------|------------------------------------|------------|-------------------------------|----------|----------------------|------------------------|------------------------|----------|-----------------------------|-----------|----------------------------------|-----------|--------------------|------------|--------------------|-----------|------------------------|--------------|-----------------------|------------|-------------------------|-----------|-----------------------|------------|--|--|----------|------------------------------|-------------------------------|------------|-----------------|-------------------------------------|------------------------|----------|------------------------|--------------|-------------------|------------|---------------------|--------------------|----------------------------------|------------|-----------------------------|----------|------------------|------------|-------------|----------------------------|----------------------|----------|-----------------------|-------------|---------------------------------------|------------|----------------------------------|----------|--|------------|-------------------|------------|
| <table border="0"> <tr><td>Annular Seal Material</td><td><u>Cement w/ bentonite</u></td></tr> <tr><td>Grout Emplacement Technique</td><td><u>Tremie Pipe</u></td></tr> <tr><td>Grout Weight (lbs/gal)</td><td><u>14.5</u></td></tr> <tr><td>Total Volume of Grout Used (gals)</td><td><u>832</u></td></tr> <tr><td>Number of cement sacks (94 lbs)</td><td><u>88</u></td></tr> <tr><td>Number of bentonite sacks (50 lbs)</td><td><u>4.7</u></td></tr> <tr><td>Number of CaCl sacks (50 lbs)</td><td><u>0</u></td></tr> <tr><td>Type of Centralizers</td><td><u>Stainless Steel</u></td></tr> <tr><td>Number of Centralizers</td><td><u>9</u></td></tr> <tr><td>Top of bentonite chips (ft)</td><td><u>na</u></td></tr> <tr><td>Top of Secondary Fiter Pack (ft)</td><td><u>na</u></td></tr> <tr><td>Top of Screen (ft)</td><td><u>312</u></td></tr> <tr><td>Screen Length (ft)</td><td><u>20</u></td></tr> <tr><td>Ream Bit Diameter (in)</td><td><u>9.875</u></td></tr> <tr><td>Total Ream Depth (ft)</td><td><u>312</u></td></tr> <tr><td>Silt Trap Diameter (in)</td><td><u>na</u></td></tr> <tr><td>Bottom of Screen (ft)</td><td><u>332</u></td></tr> </table> | Annular Seal Material | <u>Cement w/ bentonite</u> | Grout Emplacement Technique | <u>Tremie Pipe</u> | Grout Weight (lbs/gal) | <u>14.5</u> | Total Volume of Grout Used (gals) | <u>832</u> | Number of cement sacks (94 lbs) | <u>88</u> | Number of bentonite sacks (50 lbs) | <u>4.7</u> | Number of CaCl sacks (50 lbs) | <u>0</u> | Type of Centralizers | <u>Stainless Steel</u> | Number of Centralizers | <u>9</u> | Top of bentonite chips (ft) | <u>na</u> | Top of Secondary Fiter Pack (ft) | <u>na</u> | Top of Screen (ft) | <u>312</u> | Screen Length (ft) | <u>20</u> | Ream Bit Diameter (in) | <u>9.875</u> | Total Ream Depth (ft) | <u>312</u> | Silt Trap Diameter (in) | <u>na</u> | Bottom of Screen (ft) | <u>332</u> | | <table border="0"> <tr><td>Well Use</td><td><u>Pump Test Observation</u></td></tr> <tr><td>Gallons of Water in Grout Mix</td><td><u>594</u></td></tr> <tr><td>Casing Material</td><td><u>SDR 17 PVC spline and groove</u></td></tr> <tr><td>Casing Nominal ID (in)</td><td><u>5</u></td></tr> <tr><td>Casing Nominal OD (in)</td><td><u>5.563</u></td></tr> <tr><td>Casing Depth (ft)</td><td><u>312</u></td></tr> <tr><td>Casing Manufacturer</td><td><u>CertainTeed</u></td></tr> <tr><td>Centralizer on Casing depth (ft)</td><td><u>292</u></td></tr> <tr><td>Sacks/pails of pellets used</td><td><u>0</u></td></tr> <tr><td>Screen O.D. (in)</td><td><u>4.5</u></td></tr> <tr><td>Screen type</td><td><u>Factory Slotted PVC</u></td></tr> <tr><td>Screen diameter (in)</td><td><u>4</u></td></tr> <tr><td>Screen slot size (in)</td><td><u>0.03</u></td></tr> <tr><td>Top of # 8 - 12 Pri. Filter pack (ft)</td><td><u>312</u></td></tr> <tr><td>Silt Trap w/ end cap Length (ft)</td><td><u>0</u></td></tr> <tr><td>Bottom of # 8 - 12 Pri. Filter pack (ft)</td><td><u>332</u></td></tr> <tr><td>Cement Depth (ft)</td><td><u>312</u></td></tr> </table> | Well Use | <u>Pump Test Observation</u> | Gallons of Water in Grout Mix | <u>594</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> | Casing Nominal ID (in) | <u>5</u> | Casing Nominal OD (in) | <u>5.563</u> | Casing Depth (ft) | <u>312</u> | Casing Manufacturer | <u>CertainTeed</u> | Centralizer on Casing depth (ft) | <u>292</u> | Sacks/pails of pellets used | <u>0</u> | Screen O.D. (in) | <u>4.5</u> | Screen type | <u>Factory Slotted PVC</u> | Screen diameter (in) | <u>4</u> | Screen slot size (in) | <u>0.03</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>312</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>332</u> | Cement Depth (ft) | <u>312</u> |
| Annular Seal Material | <u>Cement w/ bentonite</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Grout Weight (lbs/gal) | <u>14.5</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Volume of Grout Used (gals) | <u>832</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of cement sacks (94 lbs) | <u>88</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of bentonite sacks (50 lbs) | <u>4.7</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of CaCl sacks (50 lbs) | <u>0</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type of Centralizers | <u>Stainless Steel</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Number of Centralizers | <u>9</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Top of bentonite chips (ft) | <u>na</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Top of Secondary Fiter Pack (ft) | <u>na</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Top of Screen (ft) | <u>312</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Screen Length (ft) | <u>20</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ream Bit Diameter (in) | <u>9.875</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Ream Depth (ft) | <u>312</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silt Trap Diameter (in) | <u>na</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bottom of Screen (ft) | <u>332</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Well Use | <u>Pump Test Observation</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gallons of Water in Grout Mix | <u>594</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casing Material | <u>SDR 17 PVC spline and groove</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casing Nominal ID (in) | <u>5</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casing Nominal OD (in) | <u>5.563</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casing Depth (ft) | <u>312</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Casing Manufacturer | <u>CertainTeed</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Centralizer on Casing depth (ft) | <u>292</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sacks/pails of pellets used | <u>0</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Screen O.D. (in) | <u>4.5</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Screen type | <u>Factory Slotted PVC</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Screen diameter (in) | <u>4</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Screen slot size (in) | <u>0.03</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Top of # 8 - 12 Pri. Filter pack (ft) | <u>312</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Silt Trap w/ end cap Length (ft) | <u>0</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>332</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cement Depth (ft) | <u>312</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Comments Filter pack in screens. Inner screen 2" dia. Outer screen 4" dia. Drilled out below casing w/ 4.75" bit. Under-
ream w/ 9" blades. The top of the 10 ft 2 in riser pipe which has the K-packers and attaches to the screen
is 304' (TOC). Screen assembly: 2 ea 10 ft 2" x 4" surepak screens, 0.030 slot filled with #8-12 sand.

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM5
 SEO # 193264
 Casing Date 8/17/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) T. Taylor
 Datum Ground Level

| | | |
|--|--|---|
| Annular Seal Material <u>Cement w/ bentonite</u> | | Well Use <u>Pump Well for Pump Test</u> |
| Grout Emplacement Technique <u>Tremie Pipe</u> | | Gallons of Water in Grout Mix <u>351</u> |
| Grout Weight (lbs/gal) <u>14.6</u> | | Casing Material <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) <u>519</u> | | Casing Nominal ID (in) <u>5</u> |
| Number of cement sacks (94 lbs) <u>49</u> | | Casing Nominal OD (in) <u>5.563</u> |
| Number of bentonite sacks (50 lbs) <u>2.68</u> | | Casing Depth (ft) <u>260</u> |
| Number of CaCl sacks (50 lbs) <u>0</u> | | Casing Manufacturer <u>CertainTeed</u> |
| Type of Centralizers <u>Stainless Steel</u> | | 1st Centralizer on Casing depth (ft) <u>320</u> |
| Number of Centralizers <u>9</u> | | Sacks/pails of pellets used <u>3</u> |
| Top of bentonite chips (ft) <u>177</u> | | Bottom of # 20 - 40 Sec. Filter (ft) <u>187</u> |
| Top of Secondary Fiter Pack (ft) <u>182</u> | | Screen type <u>W.O.P PVC</u> |
| Top of Screen (ft) <u>260</u> | | Screen diameter (in) <u>5</u> |
| Screen Length (ft) <u>70</u> | | Screen slot size (in) <u>0.03</u> |
| Ream Bit Diameter (in) <u>9.875</u> | | Top of # 8 - 12 Pri. Filter pack (ft) <u>187</u> |
| Total Ream Depth (ft) <u>331</u> | | Silt Trap w/ end cap Length (ft) <u>1</u> |
| Silt Trap Diameter (in) <u>5</u> | | Bottom of # 8 - 12 Pri. Filter pack (ft) <u>331</u> |
| Bottom of Screen (ft) <u>330</u> | | Cement Depth (ft) <u>177</u> |
| Comments _____ | | |

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM6
 SEO # 193239
 Casing Date 9/2/2010
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #12
 Driller (Case) Cesar Domingez
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>634.5</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>936</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>94</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>5.0</u> | Casing Depth (ft) | <u>335</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>335</u> |
| Number of Centralizers | <u>9</u> | Sacks/pails of pellets used | <u>3</u> |
| Top of bentonite chips (ft) | <u>324</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>329</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>335</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9.875</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>332</u> |
| Total Ream Depth (ft) | <u>359</u> | Silt Trap w/ end cap Length (ft) | <u>4</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>359</u> |
| Bottom of Screen (ft) | <u>355</u> | Cement Depth (ft) | <u>324</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID UM5
 SEO # 193258
 Casing Date 8/28/2010
 Screened Aquifer Zone Underlying
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>742.5</u> |
| Grout Weight (lbs/gal) | <u>14.4</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>1100</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>110</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>5.83</u> | Casing Depth (ft) | <u>424</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>425</u> |
| Number of Centralizers | <u>12</u> | Sacks/pails of pellets used | <u>2.5</u> |
| Top of bentonite chips (ft) | <u>414</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>418</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>424</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>422</u> |
| Total Ream Depth (ft) | <u>445</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>445</u> |
| Bottom of Screen (ft) | <u>444</u> | Cement Depth (ft) | <u>414</u> |

Comments _____

BASELINE WELLS

WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID OM2
 SEO # 193232
 Casing Date 7/1/2011
 Screened Aquifer Zone Overlying
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) 6
 Driller (Case) Ryan
 Datum Ground Level

| | | |
|--|--|--|
| <p>Annular Seal Material <u>Cement w/ bentonite</u></p> <p>Grout Emplacement Technique <u>Pump through Casing</u></p> <p>Grout Weight (lbs/gal) <u>14.4</u></p> <p>Total Volume of Grout Used (gals) <u>477</u></p> <p>Number of cement sacks (94 lbs) <u>44</u></p> <p>Number of bentonite sacks (50 lbs) <u>2.5</u></p> <p>Number of CaCl sacks (50 lbs) <u>0</u></p> <p>Type of Centralizers <u>Stainless Steel</u></p> <p>Number of Centralizers <u>7</u></p> <p>Top of bentonite chips (ft) <u>na</u></p> <p>Top of Secondary Filter Pack (ft) <u>na</u></p> <p>Top of Screen (ft) <u>201</u></p> <p>Screen Length (ft) <u>20</u></p> <p>Ream Bit Diameter (in) <u>8.75</u></p> <p>Total Ream Depth (ft) <u>211</u></p> <p>Silt Trap Diameter (in) <u>na</u></p> <p>Bottom of Screen (ft) <u>221</u></p> <p>Comments _____</p> <p>_____</p> | | <p>Well Use <u>Baseline Monitor</u></p> <p>Gallons of Water in Grout Mix <u>323.4</u></p> <p>Casing Material <u>SDR 17 PVC spline and groove</u></p> <p>Casing Nominal ID (in) <u>4.5</u></p> <p>Casing Nominal OD (in) <u>4.95</u></p> <p>Casing Depth (ft) <u>201</u></p> <p>Casing Manufacturer <u>CertainTeed</u></p> <p>1st Centralizer on Casing depth (ft) <u>201</u></p> <p>Sacks/pails of pellets used <u>na</u></p> <p>Screen O.D. (in) <u>3.5</u></p> <p>Screen type <u>Factory Slotted PVC</u></p> <p>Screen diameter (in) <u>3</u></p> <p>Screen slot size (in) <u>0.03</u></p> <p>Top of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Silt Trap w/ end cap Length (ft) <u>0</u></p> <p>Bottom of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Cement Depth (ft) <u>201</u></p> <p>Under-ream blade (in) <u>10.5</u></p> <p>Top of Riser Pipe (ft) <u>190</u></p> <p>Riser pipe length (ft) <u>10</u></p> <p>Date screen installed <u>7/12/2011</u></p> <p>Pilot TD (FT) <u>225</u></p> <p>Well developed <u>7/12/2011</u></p> <p>Time of development (hrs) <u>3</u></p> <p>Method <u>airlift</u></p> <p>Displacement gallons <u>151</u></p> <p>Est. Flow (gpm) <u>1</u></p> <p>Cement in casing (ft) <u>yes</u></p> <p>Wellhead hold pressure <u>yes</u></p> |
|--|--|--|

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM2
 SEO # 193238
 Casing Date 6/29/2011
 Screened Aquifer Zone Lower Production Zone
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) 6
 Driller (Case) Ryan
 Datum Ground Level

| | | |
|--|--|--|
| <p>Annular Seal Material <u>Cement w/ bentonite</u></p> <p>Grout Emplacement Technique <u>Pump through Casing</u></p> <p>Grout Weight (lbs/gal) <u>14.4</u></p> <p>Total Volume of Grout Used (gals) <u>868</u></p> <p>Number of cement sacks (94 lbs) <u>80</u></p> <p>Number of bentonite sacks (50 lbs) <u>4.5</u></p> <p>Number of CaCl sacks (50 lbs) <u>0</u></p> <p>Type of Centralizers <u>Stainless Steel</u></p> <p>Number of Centralizers <u>11</u></p> <p>Top of bentonite chips (ft) <u>na</u></p> <p>Top of Secondary Filter Pack (ft) <u>na</u></p> <p>Top of Screen (ft) <u>350</u></p> <p>Screen Length (ft) <u>20</u></p> <p>Ream Bit Diameter (in) <u>8.75</u></p> <p>Total Ream Depth (ft) <u>360</u></p> <p>Silt Trap Diameter (in) <u>na</u></p> <p>Bottom of Screen (ft) <u>370</u></p> <p>Comments _____</p> <p>_____</p> <p>_____</p> | | <p>Well Use <u>Baseline Monitor</u></p> <p>Gallons of Water in Grout Mix <u>588</u></p> <p>Casing Material <u>SDR 17 PVC spline and groove</u></p> <p>Casing Nominal ID (in) <u>4.5</u></p> <p>Casing Nominal OD (in) <u>4.95</u></p> <p>Casing Depth (ft) <u>350</u></p> <p>Casing Manufacturer <u>CertainTeed</u></p> <p>1st Centralizer on Casing depth (ft) <u>350</u></p> <p>Sacks/pails of pellets used <u>na</u></p> <p>Screen O.D. (in) <u>3.5</u></p> <p>Screen type <u>Factory Slotted PVC</u></p> <p>Screen diameter (in) <u>3</u></p> <p>Screen slot size (in) <u>0.03</u></p> <p>Top of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Silt Trap w/ end cap Length (ft) <u>0</u></p> <p>Bottom of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Cement Depth (ft) <u>350</u></p> <p>Under-ream blade (in) <u>10.5</u></p> <p>Top of Riser Pipe (ft) <u>338</u></p> <p>Riser pipe length (ft) <u>12</u></p> <p>Date screen installed <u>7/12/2011</u></p> <p>Pilot TD (FT) <u>390</u></p> <p>Well developed <u>7/12/2011</u></p> <p>Time of development (hrs) <u>5</u></p> <p>Method <u>airlift</u></p> <p>Displacement gallons <u>268</u></p> <p>Est. Flow (gpm) <u>3</u></p> <p>Cement in casing (ft) <u>yes</u></p> <p>Wellhead hold pressure <u>yes</u></p> |
|--|--|--|

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID UM2
 SEO # 193255
 Casing Date 7/6/2011
 Screened Aquifer Zone Underlying
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) 6
 Driller (Case) Ryan
 Datum Ground Level

| | | |
|---|--|--|
| <p>Annular Seal Material <u>Cement w/ bentonite</u></p> <p>Grout Emplacement Technique <u>Pump through Casing</u></p> <p>Grout Weight (lbs/gal) <u>14.3</u></p> <p>Total Volume of Grout Used (gals) <u>1041</u></p> <p>Number of cement sacks (94 lbs) <u>96</u></p> <p>Number of bentonite sacks (50 lbs) <u>5.4</u></p> <p>Number of CaCl sacks (50 lbs) <u>0</u></p> <p>Type of Centralizers <u>Stainless Steel</u></p> <p>Number of Centralizers <u>13</u></p> <p>Top of bentonite chips (ft) <u>na</u></p> <p>Top of Secondary Filter Pack (ft) <u>na</u></p> <p>Top of Screen (ft) <u>423</u></p> <p>Screen Length (ft) <u>20</u></p> <p>Ream Bit Diameter (in) <u>8.75</u></p> <p>Total Ream Depth (ft) <u>433</u></p> <p>Silt Trap Diameter (in) <u>na</u></p> <p>Bottom of Screen (ft) <u>443</u></p> <p>Comments _____</p> <p>_____</p> <p>_____</p> | | <p>Well Use <u>Baseline Monitor</u></p> <p>Gallons of Water in Grout Mix <u>705.6</u></p> <p>Casing Material <u>SDR 17 PVC spline and groove</u></p> <p>Casing Nominal ID (in) <u>4.5</u></p> <p>Casing Nominal OD (in) <u>4.95</u></p> <p>Casing Depth (ft) <u>423</u></p> <p>Casing Manufacturer <u>CertainTeed</u></p> <p>1st Centralizer on Casing depth (ft) <u>423</u></p> <p>Sacks/pails of pellets used <u>na</u></p> <p>Screen O.D. (in) <u>3.5</u></p> <p>Screen type <u>Factory Slotted PVC</u></p> <p>Screen diameter (in) <u>3</u></p> <p>Screen slot size (in) <u>0.03</u></p> <p>Top of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Silt Trap w/ end cap Length (ft) <u>0</u></p> <p>Bottom of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Cement Depth (ft) <u>423</u></p> <p>Under-ream blade (in) <u>10.5</u></p> <p>Top of Riser Pipe (ft) <u>411</u></p> <p>Riser pipe length (ft) <u>12</u></p> <p>Date screen installed <u>7/12/2011</u></p> <p>Pilot TD (FT) <u>450</u></p> <p>Well developed <u>7/12/2011</u></p> <p>Time of development (hrs) <u>4</u></p> <p>Method <u>airlift</u></p> <p>Displacement gallons <u>326</u></p> <p>Est. Flow (gpm) <u>1</u></p> <p>Cement in casing (ft) <u>yes</u></p> <p>Wellhead hold pressure <u>yes</u></p> |
|---|--|--|

The Reno Creek Project - Monitor Well Completion Report

| | |
|-------------------------|----------------|
| Drilling Company (Case) | Eagle Drilling |
| Drill Rig Number (Case) | Eagle #1 |
| Driller (Case) | Todd Taylor |
| Datum | Ground Level |

| Well Construction Data | | Well Use / Observation | |
|------------------------------------|---------------------|--|------------------------------|
| Annular Seal Material | Cement w/ bentonite | Well Use | Observation/Monitor |
| Grout Emplacement Technique | Tremie Pipe | Gallons of Water in Grout Mix | 81 |
| Grout Weight (lbs/gal) | 14.3 | Casing Material | SCH 40 PVC belled glue joint |
| Total Volume of Grout Used (gals) | 119 | Casing Nominal ID (in) | 4 |
| Number of cement sacks (94 lbs) | 12 | Casing Nominal OD (in) | 4.5 |
| Number of bentonite sacks (50 lbs) | 0.6 | Casing Depth (ft) | 60 |
| Number of CaCl sacks (50 lbs) | 0 | Casing Manufacturer | J-M Manufacturing |
| Type of Centralizers | Stainless Steel | 1st Centralizer on Casing depth (ft) | 60 |
| Number of Centralizers | 3 | Sacks/pails of pellets used | 2.5 |
| Top of bentonite chips (ft) | 49 | Screen O.D. (in) | 4.5 |
| Top of Secondary Filter Pack (ft) | 54 | Screen type | Factory Slotted PVC |
| Top of Screen (ft) | 60 | Screen diameter (in) | 4 |
| Screen Length (ft) | 20 | Screen slot size (in) | 0.03 |
| Ream Bit Diameter (in) | 8.75 | Top of # 8 - 12 Pri. Filter pack (ft) | 57 |
| Total Ream Depth (ft) | 80 | Silt Trap w/ end cap Length (ft) | 0 |
| Silt Trap Diameter (in) | 4.5 | Bottom of # 8 - 12 Pri. Filter pack (ft) | 80 |
| Bottom of Screen (ft) | 80 | Cement Depth (ft) | 49 |

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID OM6
 SEO # 193236
 Casing Date 9/21/2010
 Screened Aquifer Zone Overlying
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>357.75</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>528</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>53</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>2.8</u> | Casing Depth (ft) | <u>227</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>227</u> |
| Number of Centralizers | <u>7</u> | Sacks/pails of pellets used | <u>2.5</u> |
| Top of bentonite chips (ft) | <u>214</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>219</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>227</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>10</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>220</u> |
| Total Ream Depth (ft) | <u>238</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>238</u> |
| Bottom of Screen (ft) | <u>237</u> | Cement Depth (ft) | <u>214</u> |

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID UM6
 SEO # 193259
 Casing Date 9/1/2010
 Screened Aquifer Zone Underlying
 Form Completed by: LH

Drilling Company (Case) Eagle Drilling
 Drill Rig Number (Case) Eagle #1
 Driller (Case) Todd Taylor
 Datum Ground Level

| | | | |
|------------------------------------|----------------------------|--|-------------------------------------|
| Annular Seal Material | <u>Cement w/ bentonite</u> | Well Use | <u>Observation/Monitor</u> |
| Grout Emplacement Technique | <u>Tremie Pipe</u> | Gallons of Water in Grout Mix | <u>675</u> |
| Grout Weight (lbs/gal) | <u>14.5</u> | Casing Material | <u>SDR 17 PVC spline and groove</u> |
| Total Volume of Grout Used (gals) | <u>1000</u> | Casing Nominal ID (in) | <u>4.5</u> |
| Number of cement sacks (94 lbs) | <u>100</u> | Casing Nominal OD (in) | <u>4.95</u> |
| Number of bentonite sacks (50 lbs) | <u>5.3</u> | Casing Depth (ft) | <u>415</u> |
| Number of CaCl sacks (50 lbs) | <u>0</u> | Casing Manufacturer | <u>CertainTeed</u> |
| Type of Centralizers | <u>Stainless Steel</u> | 1st Centralizer on Casing depth (ft) | <u>415</u> |
| Number of Centralizers | <u>12</u> | Sacks/pails of pellets used | <u>2</u> |
| Top of bentonite chips (ft) | <u>400</u> | Screen O.D. (in) | <u>4.95</u> |
| Top of Secondary Filter Pack (ft) | <u>NA</u> | Screen type | <u>Factory Slotted PVC</u> |
| Top of Screen (ft) | <u>415</u> | Screen diameter (in) | <u>4.5</u> |
| Screen Length (ft) | <u>20</u> | Screen slot size (in) | <u>0.03</u> |
| Ream Bit Diameter (in) | <u>9</u> | Top of # 8 - 12 Pri. Filter pack (ft) | <u>405</u> |
| Total Ream Depth (ft) | <u>435</u> | Silt Trap w/ end cap Length (ft) | <u>0</u> |
| Silt Trap Diameter (in) | <u>4.95</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) | <u>435</u> |
| Bottom of Screen (ft) | <u>435</u> | Cement Depth (ft) | <u>400</u> |

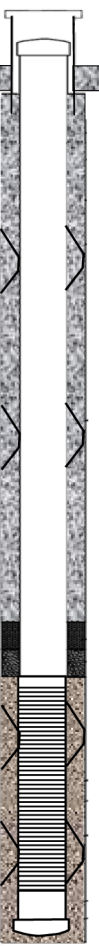
Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID SM7
 SEO # NA
 Casing Date 8/29/2011
 Screened Aquifer Zone Shallow
 Form Completed by: LH

Drilling Company (Case) D.C. Drilling
 Drill Rig Number (Case) 5
 Driller (Case) Carmine
 Datum Ground Level

| | | |
|--|--|---|
| Annular Seal Material <u>Cement w/ bentonite</u> |  | Well Use <u>Baseline Monitor</u> |
| Grout Emplacement Technique <u>Tremie Pipe</u> | | Gallons of Water in Grout Mix <u>81</u> |
| Grout Weight (lbs/gal) <u>14.2</u> | | Casing Material <u>SCH 40 PVC belled glue joint</u> |
| Total Volume of Grout Used (gals) <u>119</u> | | Casing Nominal ID (in) <u>4</u> |
| Number of cement sacks (94 lbs) <u>12</u> | | Casing Nominal OD (in) <u>4.5</u> |
| Number of bentonite sacks (50 lbs) <u>0.6</u> | | Casing Depth (ft) <u>55</u> |
| Number of CaCl sacks (50 lbs) <u>0</u> | | Casing Manufacturer <u>J-M Manufacturing</u> |
| Type of Centralizers <u>Stainless Steel</u> | | 1st Centralizer on Casing depth (ft) <u>55</u> |
| Number of Centralizers <u>3</u> | | Sacks/pails of pellets used <u>2</u> |
| Top of bentonite chips (ft) <u>45</u> | | Screen O.D. (in) <u>4.5</u> |
| Top of Secondary Fiter Pack (ft) <u>50</u> | | Screen type <u>Factory Slotted PVC</u> |
| Top of Screen (ft) <u>55</u> | | Screen diameter (in) <u>4</u> |
| Screen Length (ft) <u>20</u> | | Screen slot size (in) <u>0.03</u> |
| Ream Bit Diameter (in) <u>8.75</u> | | Top of # 8 - 12 Pri. Filter pack (ft) <u>51.5</u> |
| Total Ream Depth (ft) <u>78</u> | | Silt Trap w/ end cap Length (ft) <u>0</u> |
| Silt Trap Diameter (in) <u>na</u> | Bottom of # 8 - 12 Pri. Filter pack (ft) <u>75</u> | |
| Bottom of Screen (ft) <u>75</u> | Cement Depth (ft) <u>45</u> | |

Comments _____

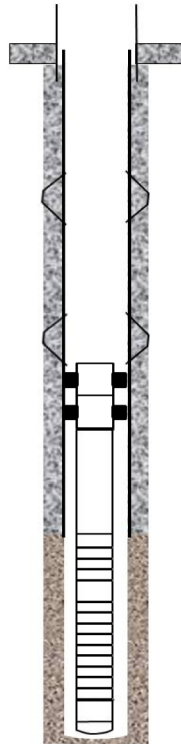
AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID OM7
 SEO # 193237
 Casing Date 7/8/2011
 Screened Aquifer Zone Overlying
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) 6
 Driller (Case) Ryan
 Datum Ground Level

Annular Seal Material Cement w/ bentonite
 Grout Emplacement Technique Pump through Casing
 Grout Weight (lbs/gal) 14.5
 Total Volume of Grout Used (gals) 347
 Number of cement sacks (94 lbs) 32
 Number of bentonite sacks (50 lbs) 1.8
 Number of CaCl sacks (50 lbs) 0
 Type of Centralizers Stainless Steel
 Number of Centralizers 5
 Top of bentonite chips (ft) na
 Top of Secondary Filter Pack (ft) na
 Top of Screen (ft) 130
 Screen Length (ft) 20
 Ream Bit Diameter (in) 8.75
 Total Ream Depth (ft) 140
 Silt Trap Diameter (in) na
 Bottom of Screen (ft) 150



Well Use Baseline Monitor
 Gallons of Water in Grout Mix 235.2
 Casing Material SDR 17 PVC spline and groove
 Casing Nominal ID (in) 4.5
 Casing Nominal OD (in) 4.95
 Casing Depth (ft) 130
 Casing Manufacturer CertainTeed
 1st Centralizer on Casing depth (ft) 130
 Sacks/pails of pellets used na
 Screen O.D. (in) 3.5
 Screen type Factory Slotted PVC
 Screen diameter (in) 3
 Screen slot size (in) 0.03
 Top of # 8 - 12 Pri. Filter pack (ft) na
 Silt Trap w/ end cap Length (ft) 0
 Bottom of # 8 - 12 Pri. Filter pack (ft) na
 Cement Depth (ft) 130
 Under-ream blade (in) 10
 Top of Riser Pipe (ft) 120
 Riser pipe length (ft) 10
 Date screen installed 7/12/2011
 Pilot TD (FT) 420
 Well developed 7/12/2011
 Time of development (hrs) 2
 Method airlift
 Displacement gallons 95
 Est. Flow (gpm) 1
 Cement in casing (ft) yes
 Wellhead hold pressure yes

Comments _____

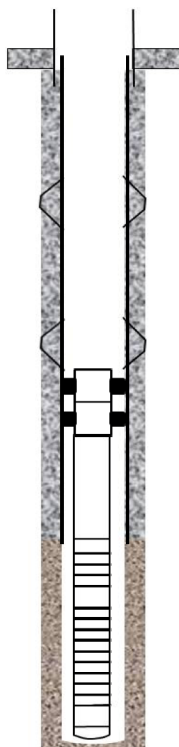
AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID PZM7
 SEO # 193240
 Casing Date 7/6/2011
 Screened Aquifer Zone Production Zone
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) 2
 Driller (Case) Todd
 Datum Ground Level

Annular Seal Material Cement w/ bentonite
 Grout Emplacement Technique Pump through Casing
 Grout Weight (lbs/gal) 14.3
 Total Volume of Grout Used (gals) 738
 Number of cement sacks (94 lbs) 68
 Number of bentonite sacks (50 lbs) 3.8
 Number of CaCl sacks (50 lbs) 0
 Type of Centralizers Stainless Steel
 Number of Centralizers 9
 Top of bentonite chips (ft) na
 Top of Secondary Filter Pack (ft) na
 Top of Screen (ft) 298
 Screen Length (ft) 20
 Ream Bit Diameter (in) 8.75
 Total Ream Depth (ft) 309
 Silt Trap Diameter (in) na
 Bottom of Screen (ft) 318



Well Use Baseline Monitor
 Gallons of Water in Grout Mix 499.8
 Casing Material SDR 17 PVC spline and groove
 Casing Nominal ID (in) 4.5
 Casing Nominal OD (in) 4.95
 Casing Depth (ft) 298
 Casing Manufacturer CertainTeed
 1st Centralizer on Casing depth (ft) 298
 Sacks/pails of pellets used na
 Screen O.D. (in) 3.5
 Screen type Factory Slotted PVC
 Screen diameter (in) 3
 Screen slot size (in) 0.03
 Top of # 8 - 12 Pri. Filter pack (ft) na
 Silt Trap w/ end cap Length (ft) 0
 Bottom of # 8 - 12 Pri. Filter pack (ft) na
 Cement Depth (ft) 298
 Under-ream blade (in) 10
 Top of Riser Pipe (ft) 287
 Riser pipe length (ft) 11
 Date screen installed 7/11/2011
 Pilot TD (FT) 360
 Well developed 7/11/2011
 Time of development (hrs) 5
 Method airlift
 Displacement gallons 227
 Est. Flow (gpm) 5
 Cement in casing (ft) yes
 Wellhead hold pressure yes

Comments _____

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID UM7
 SEO # 193260
 Casing Date 7/7/2011
 Screened Aquifer Zone Underlying
 Form Completed by: LH

Drilling Company (Case) K.E. Taylor Drilling
 Drill Rig Number (Case) 2
 Driller (Case) Todd
 Datum Ground Level

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| <p>Annular Seal Material <u>Cement w/ bentonite</u></p> <p>Grout Emplacement Technique <u>Pump through Casing</u></p> <p>Grout Weight (lbs/gal) <u>14.3</u></p> <p>Total Volume of Grout Used (gals) <u>955</u></p> <p>Number of cement sacks (94 lbs) <u>88</u></p> <p>Number of bentonite sacks (50 lbs) <u>5.0</u></p> <p>Number of CaCl sacks (50 lbs) <u>0</u></p> <p>Type of Centralizers <u>Stainless Steel</u></p> <p>Number of Centralizers <u>12</u></p> <p>Top of bentonite chips (ft) <u>na</u></p> <p>Top of Secondary Filter Pack (ft) <u>na</u></p> <p>Top of Screen (ft) <u>385</u></p> <p>Screen Length (ft) <u>20</u></p> <p>Ream Bit Diameter (in) <u>8.75</u></p> <p>Total Ream Depth (ft) <u>405</u></p> <p>Silt Trap Diameter (in) <u>na</u></p> <p>Bottom of Screen (ft) <u>405</u></p> <p>Comments _____</p> <p>_____</p> <p>_____</p> | | <p>Well Use <u>Baseline Monitor</u></p> <p>Gallons of Water in Grout Mix <u>646.8</u></p> <p>Casing Material <u>SDR 17 PVC spline and groove</u></p> <p>Casing Nominal ID (in) <u>4.5</u></p> <p>Casing Nominal OD (in) <u>4.95</u></p> <p>Casing Depth (ft) <u>385</u></p> <p>Casing Manufacturer <u>CertainTeed</u></p> <p>1st Centralizer on Casing depth (ft) <u>385</u></p> <p>Sacks/pails of pellets used <u>na</u></p> <p>Screen O.D. (in) <u>3.5</u></p> <p>Screen type <u>Factory Slotted PVC</u></p> <p>Screen diameter (in) <u>3</u></p> <p>Screen slot size (in) <u>0.03</u></p> <p>Top of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Silt Trap w/ end cap Length (ft) <u>0</u></p> <p>Bottom of # 8 - 12 Pri. Filter pack (ft) <u>na</u></p> <p>Cement Depth (ft) <u>385</u></p> <p>Under-ream blade (in) <u>10</u></p> <p>Top of Riser Pipe (ft) <u>375</u></p> <p>Riser pipe length (ft) <u>10</u></p> <p>Date screen installed <u>7/11/2011</u></p> <p>Pilot TD (FT) <u>420</u></p> <p>Well developed <u>7/11/2011</u></p> <p>Time of development (hrs) <u>3</u></p> <p>Method <u>airlift</u></p> <p>Displacement gallons <u>227</u></p> <p>Est. Flow (gpm) <u>1</u></p> <p>Cement in casing (ft) <u>yes</u></p> <p>Wellhead hold pressure <u>yes</u></p> |
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