ADDENDUM 2.7-C
GROUNDWATER MODEL REPORT

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

AUC LLC

THE RENO CREEK PROJECT

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February 2012

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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 ¾ 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 ¼ 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 H_2O; where 1 inch of mercury equals 1.1329 feet of water). Plotting depth to water versus BP, both in units of ft H_2O, 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.

Corrected DTW = DTW - (BP2-BP1) 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 ft^2/day to 1,428 ft^2/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 ft^2/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 ft^2/day to 262 ft^2/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 ft^2/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 ft^2/day to 0.44 ft^2/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 ft^2/d. Theis recovery analysis of T for the pumping well PZM1 was calculated to be 389 ft^2/d, and T ranged between 469 to 710 ft^2/d for the three observation wells from recovery data (Table 8-2). Calculated storativity values for the three observation wells ranged between 6.0 x 10-4 to 5.0 x 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 ft^2/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 ft^2/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, 2011and 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 ft^2/d. Theis recovery analysis of T for the pumping well PZM3 was calculated to be 588 ft^2/d, and T ranged between 748 to 1,131 ft^2/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 65 feet higher than the head in the overlying aquifer; the head in the overlying aquifer is approximately 165 feet higher than the head in the PZA; and the head in the PZA is approximately 3 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 ft^2/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 ft^2/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 ft^2/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. The well was completed, but as the results of the step test conducted at PZM3 show, 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 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 ft^2/day and a calculated storativity of 8.7 x 10-4. At well PZM15, T from drawdown was 57 ft^2/day, and a calculated S value of 1.3 x 10-4. Transmissivity evaluated from recovery data was in good agreement with the drawdown data, 286 ft^2/day at PZM16 and 63 ft^2/day at PZM15. Transmissivity from recovery data in the pumping well was 31 ft^2/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 ft^2/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 ft^2/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 ft^2/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 ft^2day, the straight-line analysis transmissivity is 26.7 ft^2/day, and the recovery data analysis indicates a transmissivity value of 31.0 ft^2/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 ft^2/day and 47.0 ft^2/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.

<u>SM Unit Single-well Pump Test</u>

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 ft^2/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.

<u>Overlying Aquifer Single-well Pump Test</u>

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 ft^2/day was determined and hydraulic conductivity is approximately 3.3 ft/day.

<u>Underlying Unit Single-well Pump Test</u>

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 ft^2day 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 Detals
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 (ft2/d)	K (ft/d)	S	T (ft2/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 (ft2/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	61	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	9/1/2011 12:13	SM Unit	69.74	5,260.94	5,191.20	5,210.94	5,195.94	5,180.94	--	--
PZM3	OM3	9/1/2011 12:17	Overlying	136.58	5,262.27	5,125.69	5,112.27	5,102.27	5,092.27	-65.51	-0.70
PZM3	PZM3	9/1/2011 12:10	PZA	301.75	5,261.99	4,960.24	4,889.99	4,869.99	4,849.99	-165.45	-0.71
PZM3	UM3	9/1/2011 12:12	Underlying	304.50	5,262.25	4,957.75	4,802.25	4,792.25	4,782.25	-2.50	-0.03

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 Feliix 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.

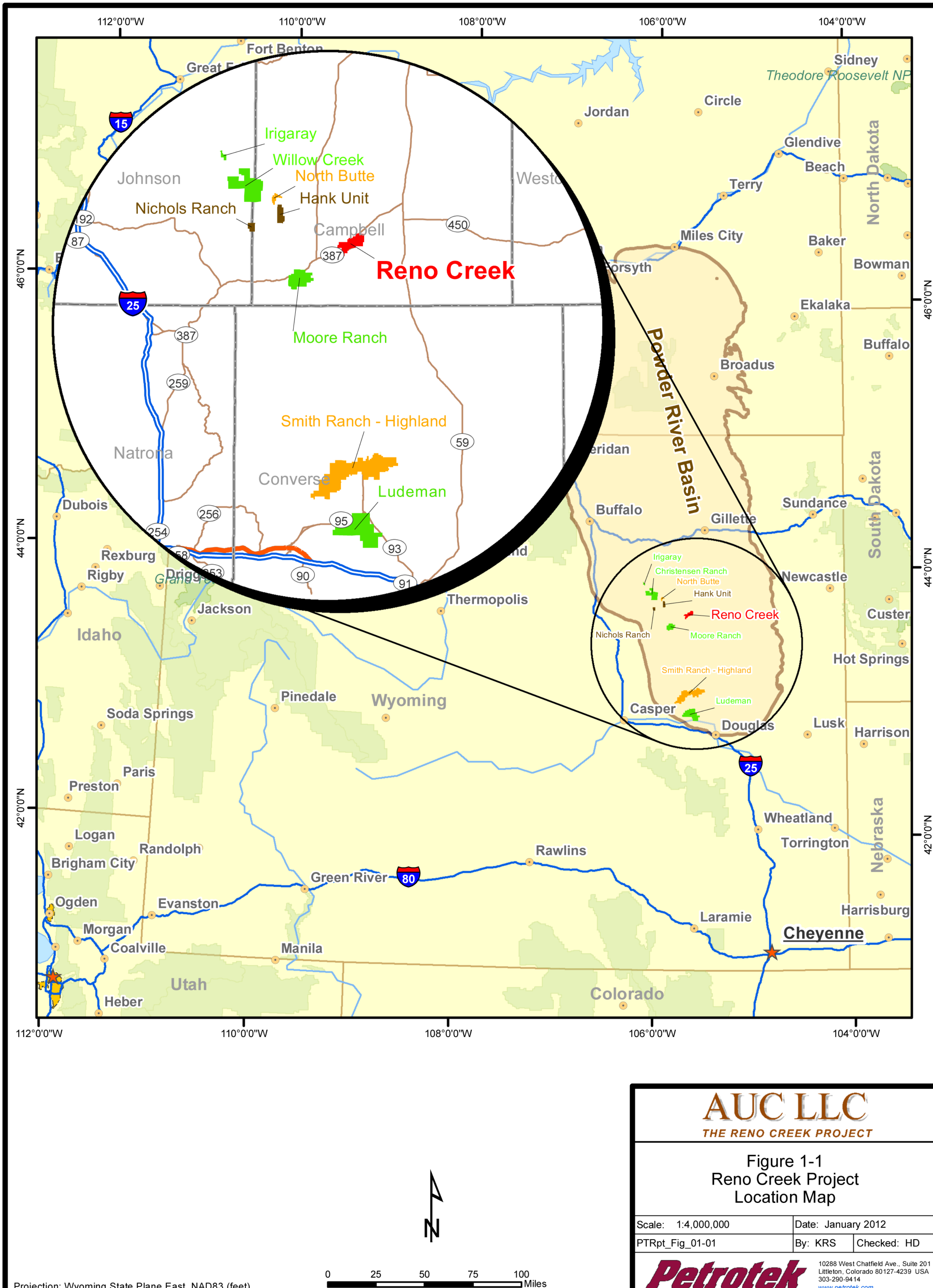
Single-well Testing

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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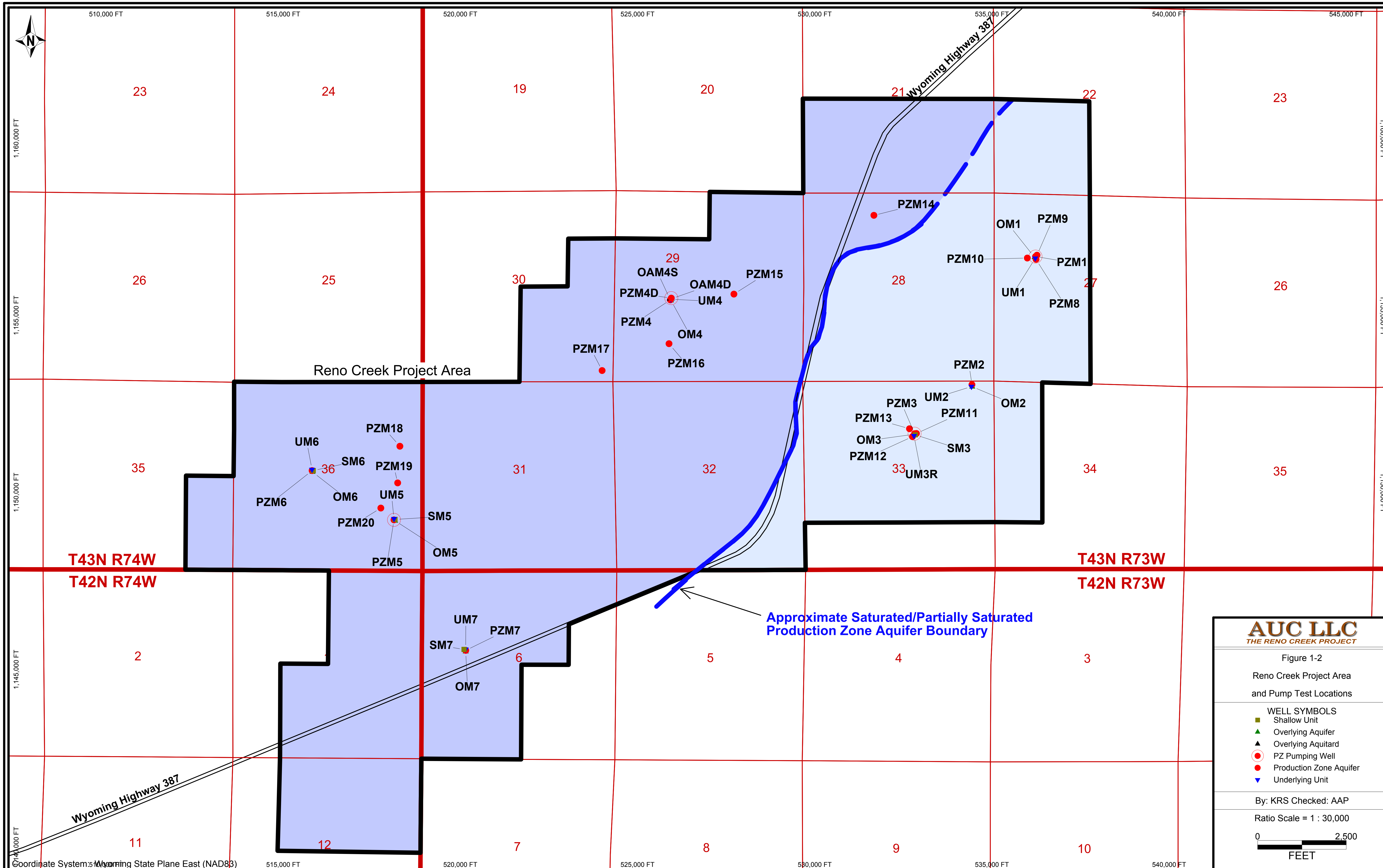
THE RENO CREEK PROJECT

Figure 1-1
Reno Creek Project
Location Map

Scale: 1:4,000,000	Date: January 2012
PTRpt_Fig_01-01	By: KRS / Checked: HD

Petrotek
10288 West Chatfield Ave., Suite 201
Littleton, Colorado 80127-4239 USA
303-290-9414
www.petrotek.com



Reno Creek Project Area
Wyoming Highway 387
T43N R74W
T42N R74W
T43N R73W
T42N R73W
Approximate Saturated/Partially Saturated Production Zone Aquifer Boundary
PZM14
OM1
PZM9
PZM10
PZM1
UM1
PZM8
OAM4S
OAM4D
PZM15
PZM4D
UM4
PZM4
OM4
PZM17
PZM16
PZM2
PZM3
UM2
OM2
PZM13
PZM11
OM3
SM3
PZM12
UM3R
PZM18
UM6
SM6
PZM19
PZM6
OM6
UM5
SM5
PZM20
OM5
PZM5
UM7
PZM7
SM7
OM7
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 1-2
Reno Creek Project Area
and Pump Test Locations
WELL SYMBOLS
Shallow Unit
Overlying Aquifer
Overlying Aquitard
PZ Pumping Well
Production Zone Aquifer
Underlying Unit
By: KRS Checked: AAP
Ratio Scale = 1 : 30,000
0
2,500
FEET

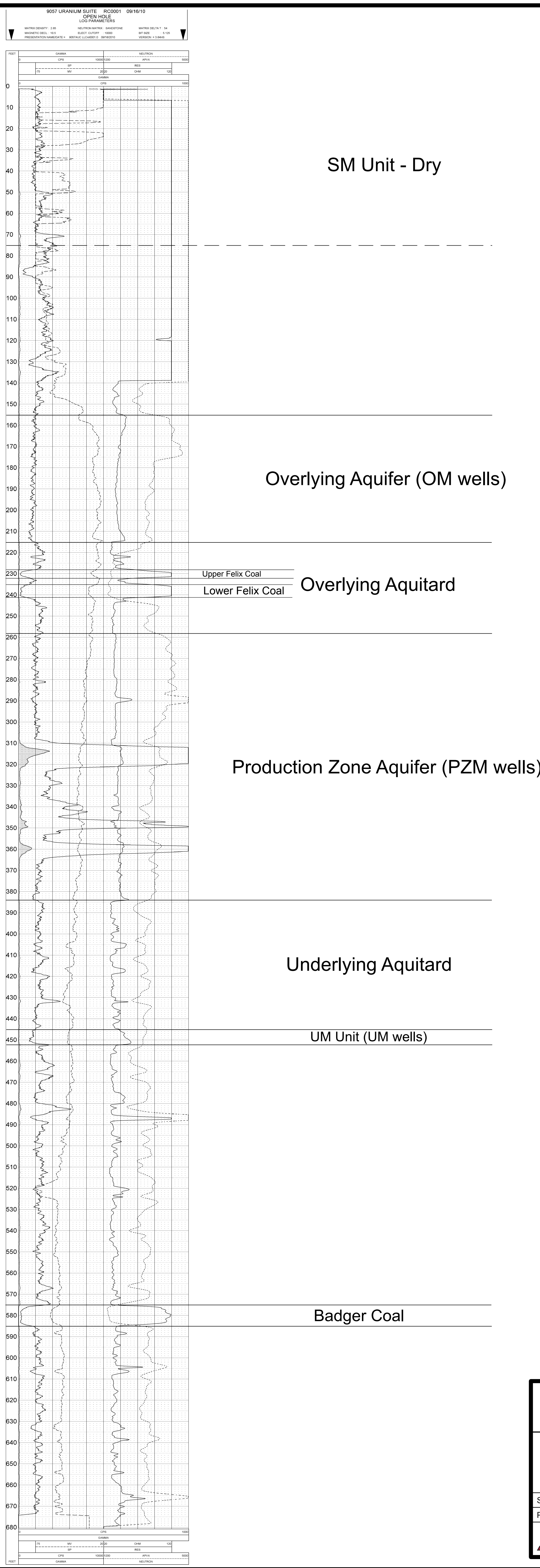


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Figure 2-1
Typical Geophysical Log
RC0001 (East, PZM1 Cluster)

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

Petrotek
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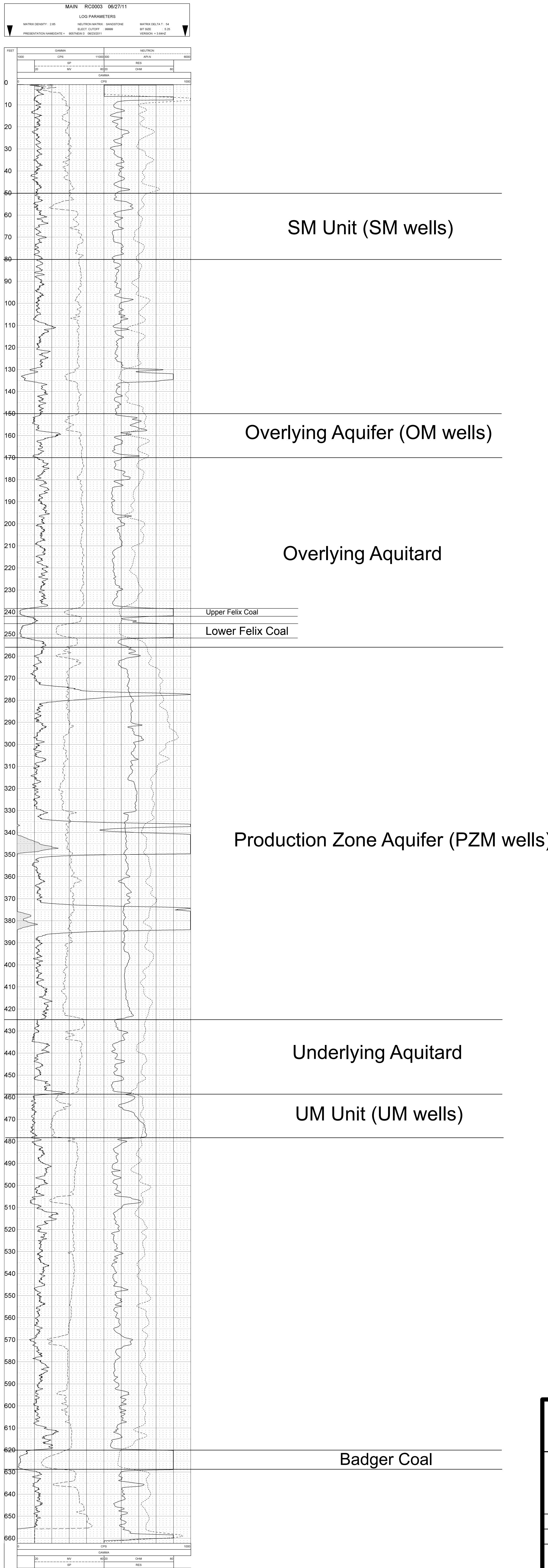

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Figure 2-2
Typical Geophysical Log
RC0003 (Southeast, PZM3 Cluster)

Scale: See Log Scale	Date: January 2012	
PTRpt_Fig_02-02.ai	By: KRS	Checked: AAP

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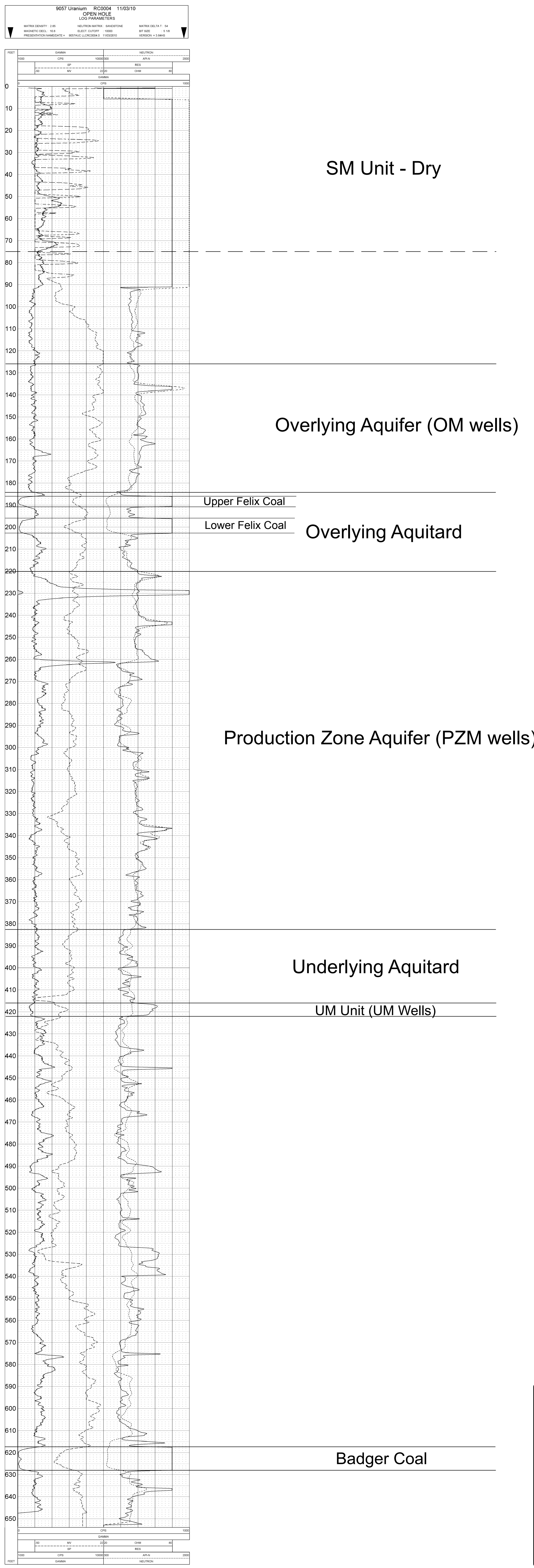

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Figure 2-3
Typical Geophysical Log
RC0004 (Central, PZM4D Cluster)

Scale: See Log Scale	Date: January 2012	
PTRpt_Fig_02-03.ai	By: KRS	Checked: AAP

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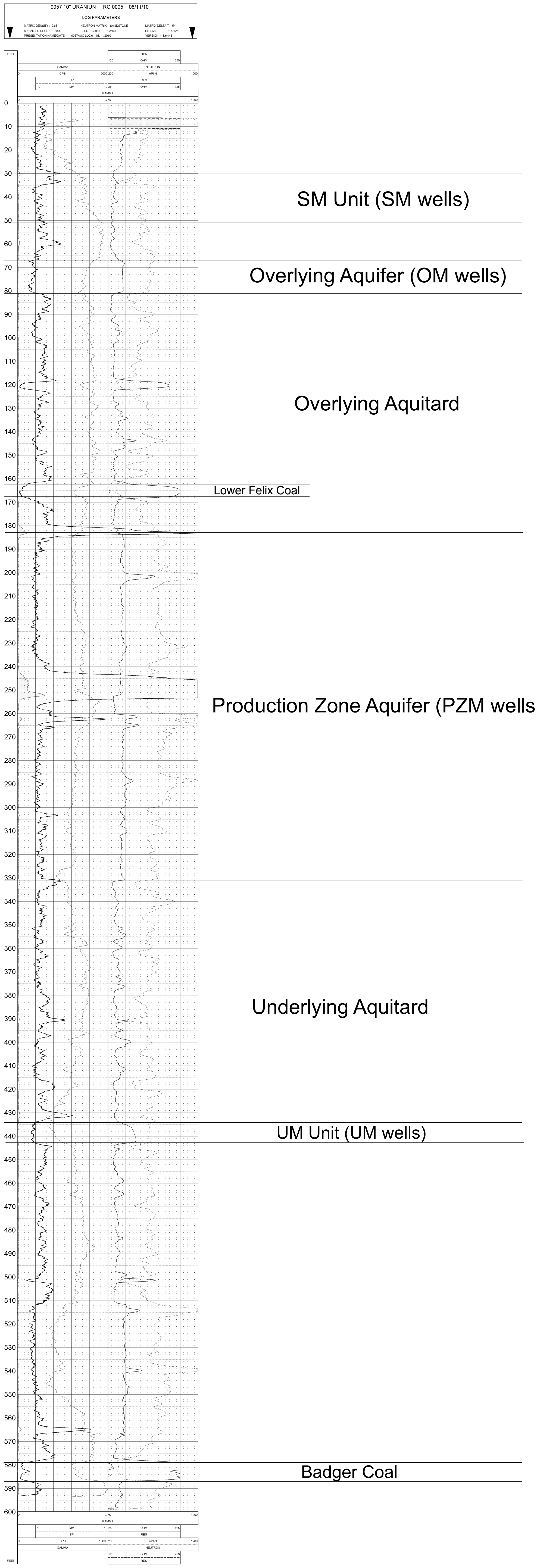

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Figure 2-4

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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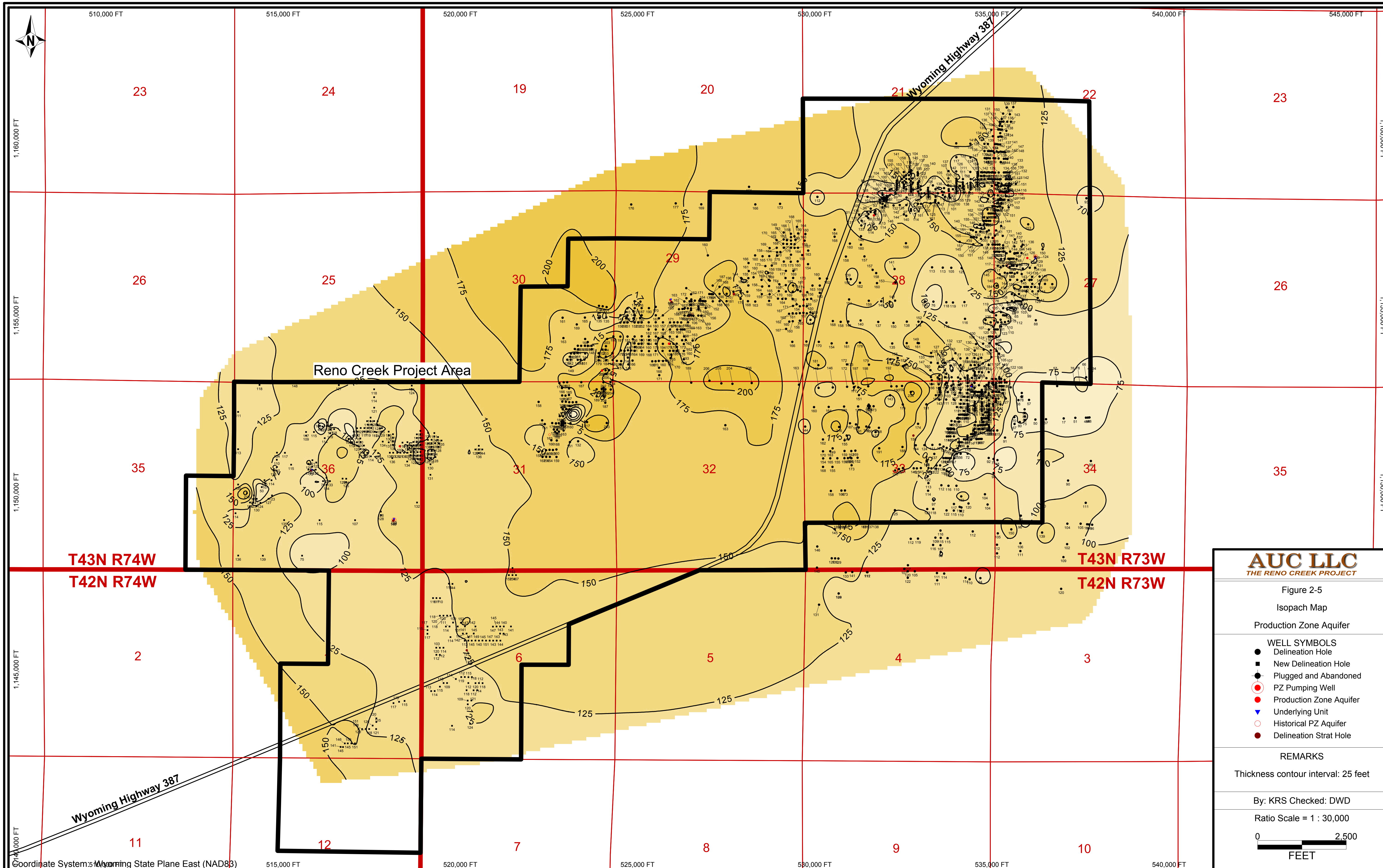
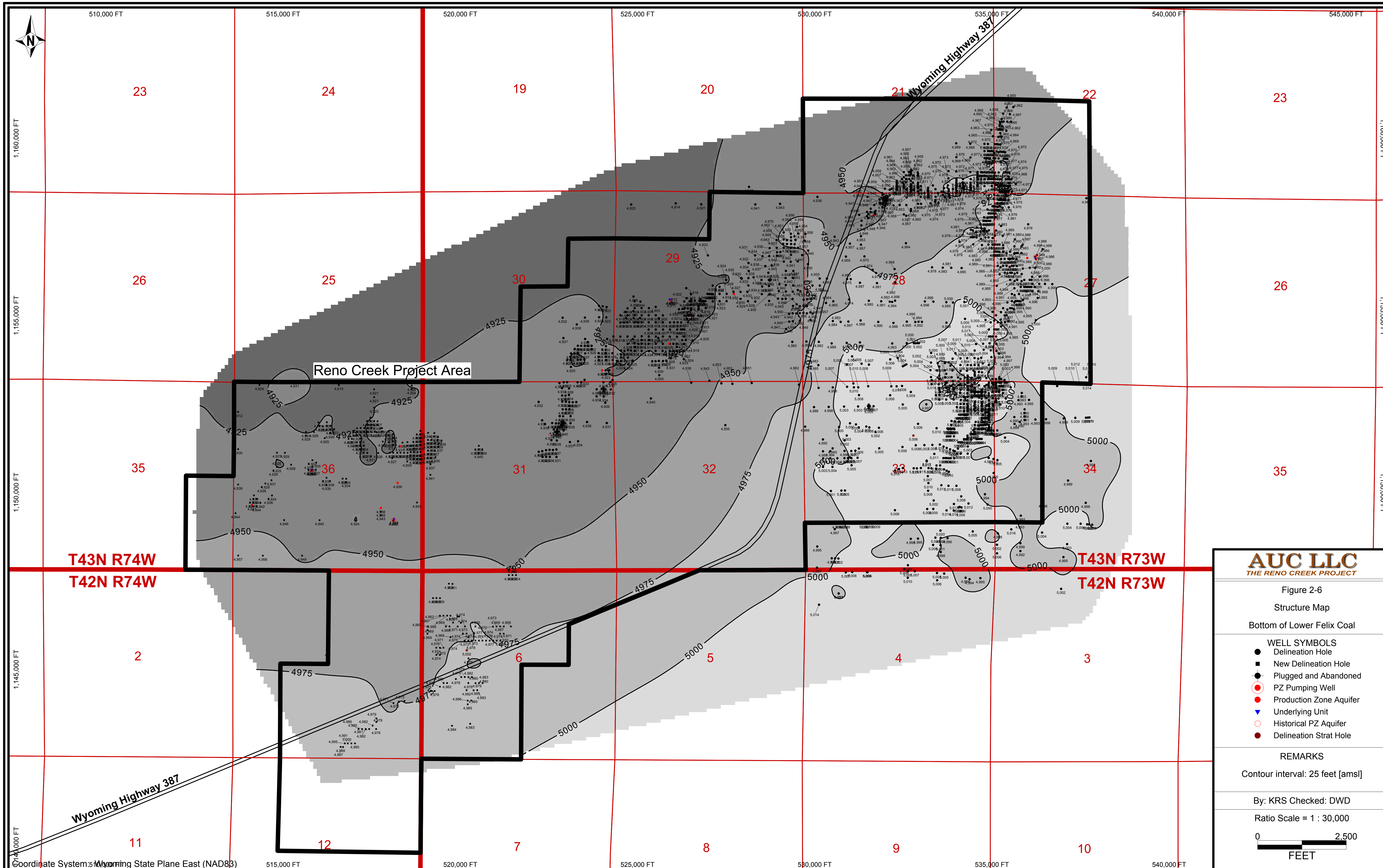


Reno Creek Project Area
Wyoming Highway 387
T43N R74W
T42N R74W
T43N R73W
T42N R73W
510,000 FT
515,000 FT
520,000 FT
525,000 FT
530,000 FT
535,000 FT
540,000 FT
545,000 FT
1,160,000 FT
1,155,000 FT
1,150,000 FT
1,145,000 FT
1,140,000 FT
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 2-5
Isopach Map
Production Zone Aquifer
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
Thickness contour interval: 25 feet
By: KRS Checked: DWD
Ratio Scale = 1 : 30,000
0
2,500
FEET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THE RENO CREEK PROJECT
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
0
2,500
FEET
Reno Creek Project Area
Wyoming Highway 387
T43N R74W
T42N R74W
T43N R73W
T42N R73W
Coordinate System: Wyoming State Plane East (NAD83)
510,000 FT
515,000 FT
520,000 FT
525,000 FT
530,000 FT
535,000 FT
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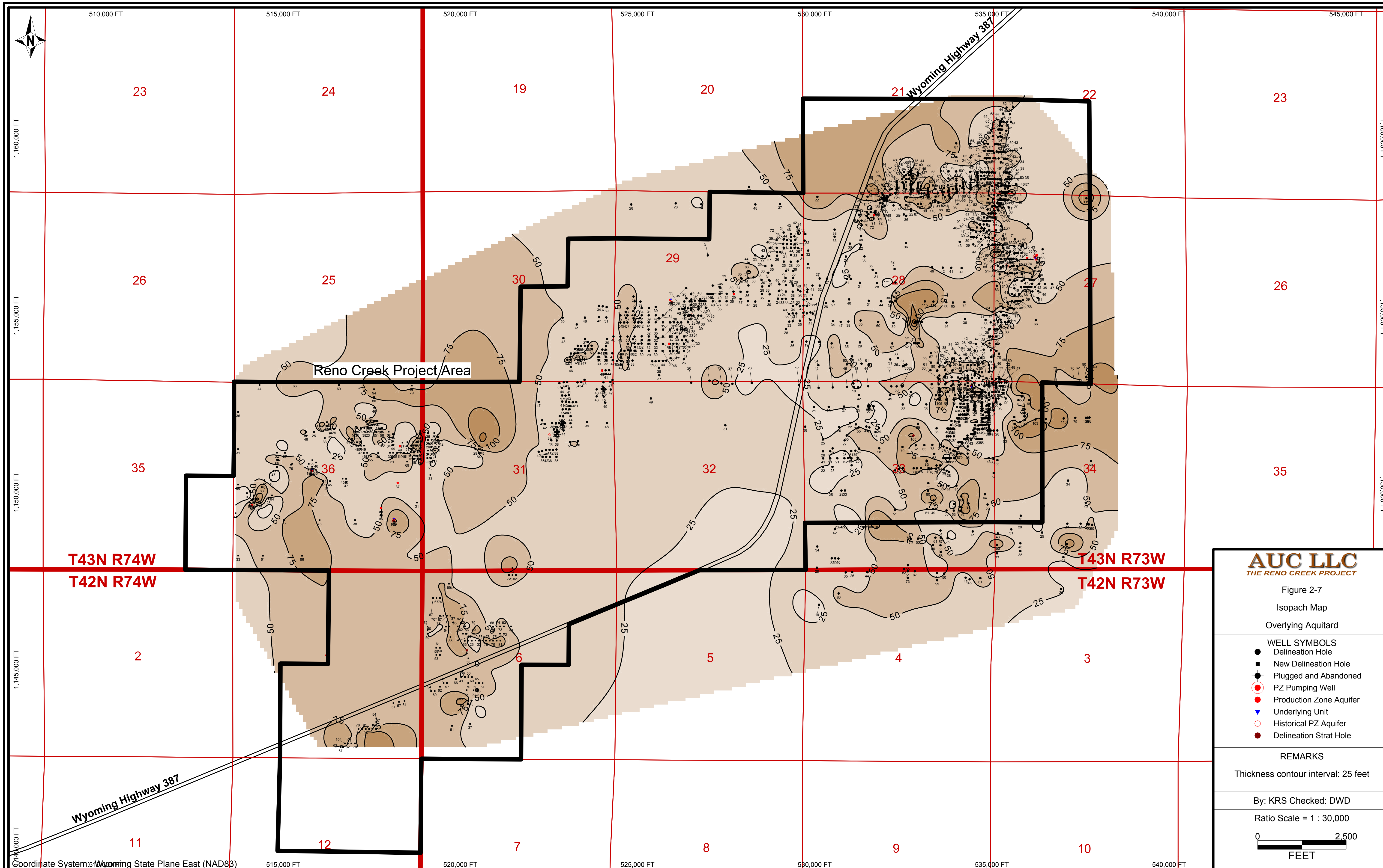
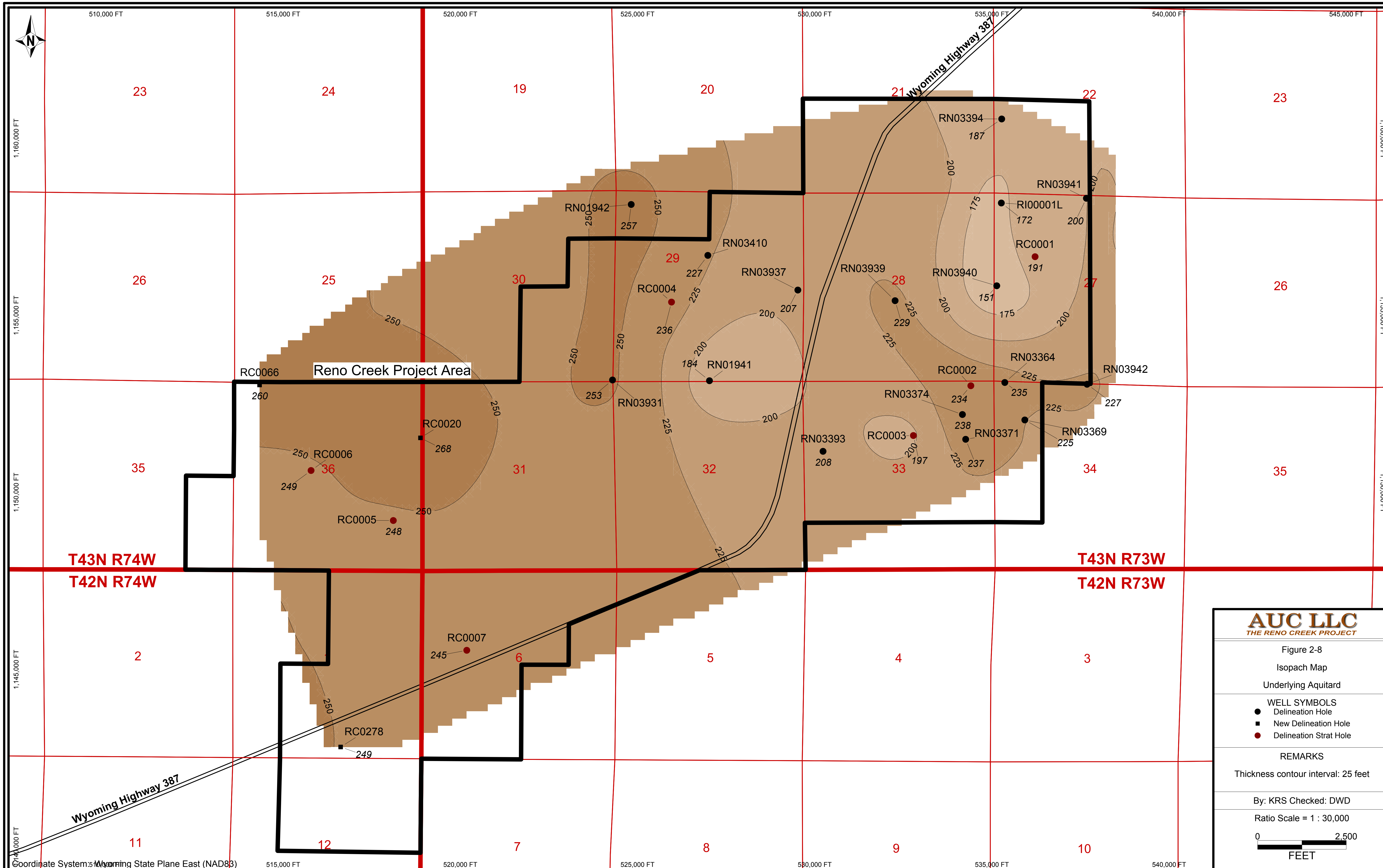
4950
4975
5000



Reno Creek Project Area
Wyoming Highway 387
T43N R74W
T42N R74W
T43N R73W
T42N R73W
AUC LLC
THE RENO CREEK PROJECT
Figure 2-7
Isopach Map
Overlying Aquitard
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
Thickness contour interval: 25 feet
By: KRS Checked: DWD
Ratio Scale = 1 : 30,000
0
2,500
FEET
Coordinate System: Wyoming State Plane East (NAD83)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THE RENO CREEK PROJECT
Figure 2-8
Isopach Map
Underlying Aquitard
WELL SYMBOLS
Delineation Hole
New Delineation Hole
Delineation Strat Hole
REMARKS
Thickness contour interval: 25 feet
By: KRS Checked: DWD
Ratio Scale = 1 : 30,000
0
2,500
FEET
Reno Creek Project Area
Wyoming Highway 387
T43N R74W
T42N R74W
T43N R73W
T42N R73W
Coordinate System: Wyoming State Plane East (NAD83)
510,000 FT
515,000 FT
520,000 FT
525,000 FT
530,000 FT
535,000 FT
540,000 FT
545,000 FT
1,160,000 FT
1,155,000 FT
1,150,000 FT
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RN03394
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RN01942
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RN03940
RC0004
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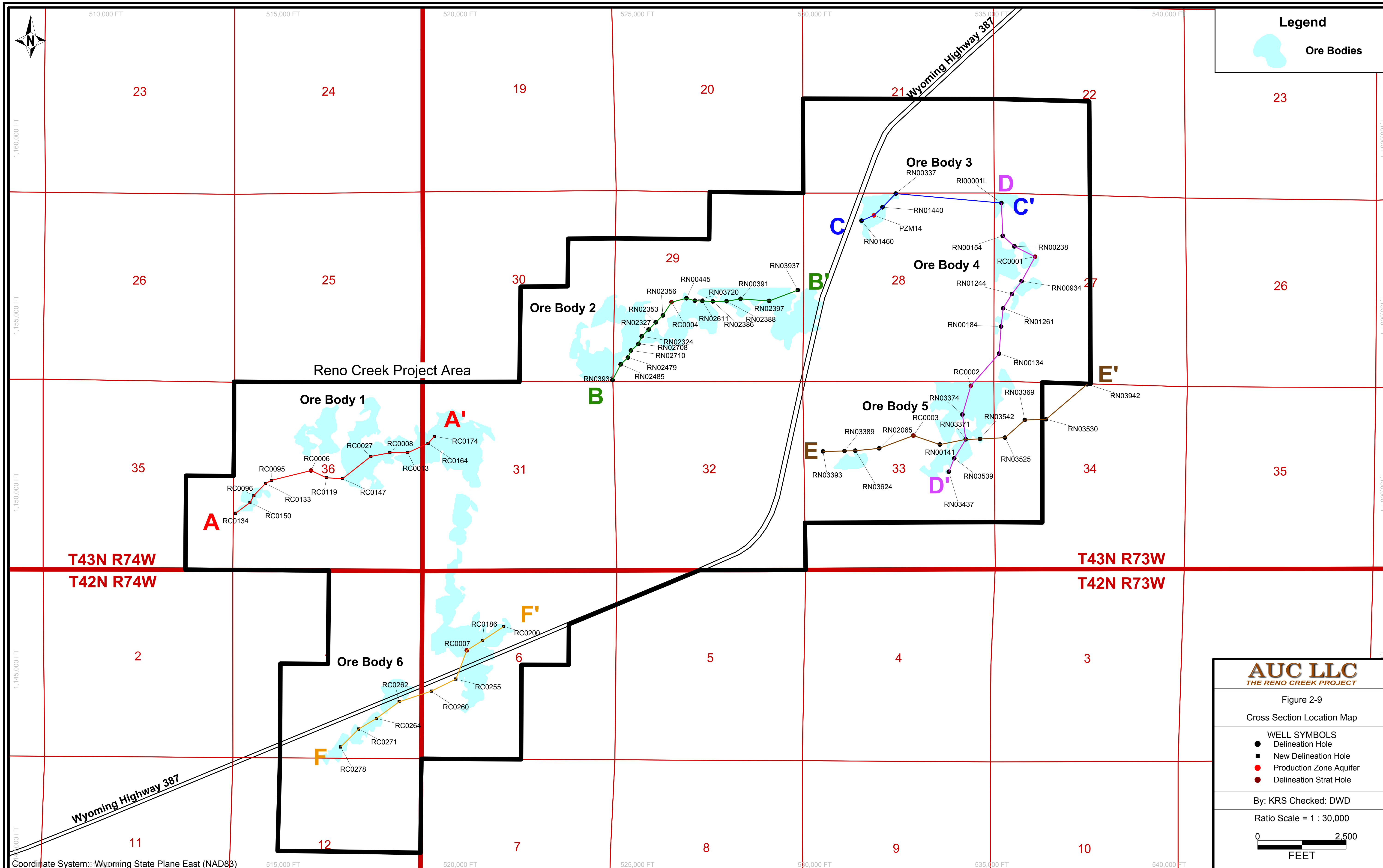
RC0007
RC0278


Legend
Ore Bodies
Reno Creek Project Area
Ore Body 1
Ore Body 2
Ore Body 3
Ore Body 4
Ore Body 5
Ore Body 6
Wyoming Highway 387
T43N R74W
T42N R74W
T43N R73W
T42N R73W
A
A'
B
B'
C
C'
D
D'
E
E'
F
F'
RC0134
RC0150
RC0096
RC0133
RC0095
RC0006
RC0119
RC0147
RC0027
RC0008
RC0013
RC0174
RC0164
RN00445
RN02356
RN02353
RN02327
RN03720
RN00391
RN03937
RN02397
RN02611
RN02388
RN02386
RC0004
RN02324
RN02708
RN02710
RN02479
RN02485
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RI00001L
RN01440
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RC0002
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RN03374
RC0003
RN03371
RN03542
RN03530
RN03389
RN02065
RN00141
RN03525
RN03393
RN03624
RN03539
RN03437
RC0186
RC0200
RC0007
RC0255
RC0262
RC0260
RC0264
RC0271
RC0278
Coordinate System: Wyoming State Plane East (NAD83)
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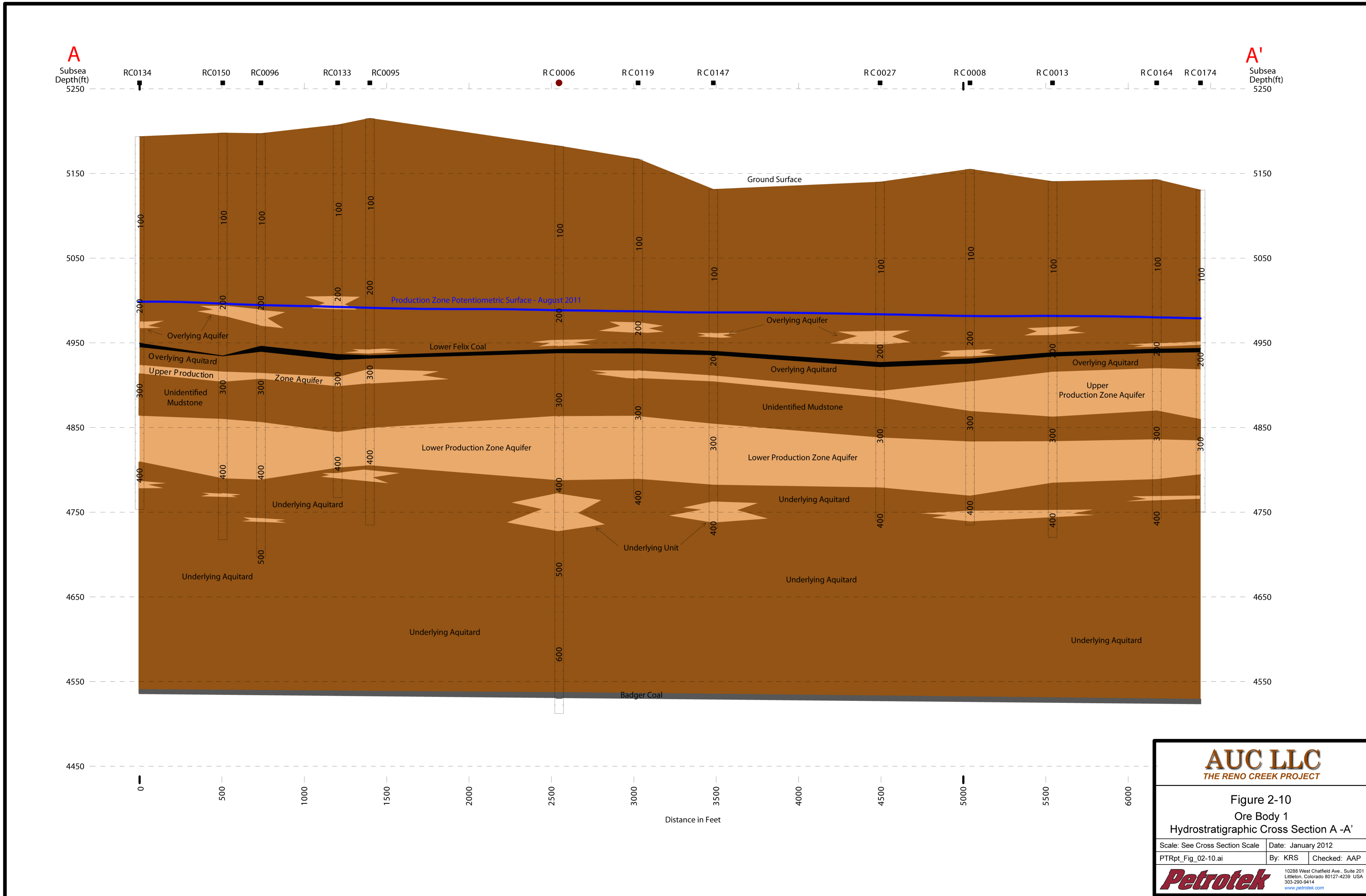
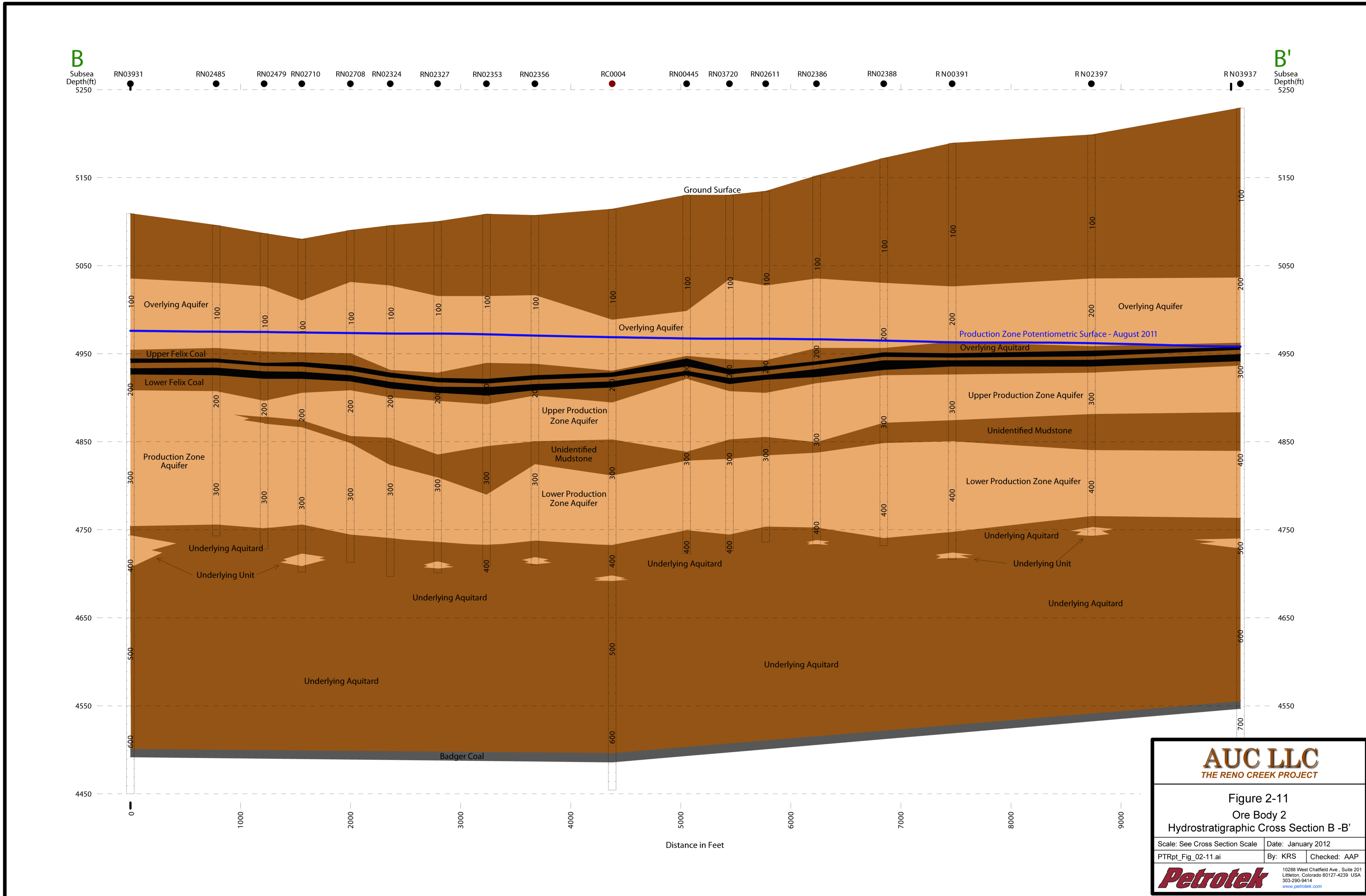
THE RENO CREEK PROJECT
Figure 2-9
Cross Section Location Map
WELL SYMBOLS
Delineation Hole
New Delineation Hole
Production Zone Aquifer
Delineation Strat Hole
By: KRS Checked: DWD
Ratio Scale = 1 : 30,000
0
2,500
FEET


A
A'
Subsea Depth(ft)
Subsea Depth(ft)
RC0134
RC0150
RC0096
RC0133
RC0095
RC0006
RC0119
RC0147
RC0027
RC0008
RC0013
RC0164
RC0174
5250
5150
5050
4950
4850
4750
4650
4550
4450
Ground Surface
Production Zone Potentiometric Surface - August 2011
Overlying Aquifer
Lower Felix Coal
Overlying Aquitard
Upper Production Zone Aquifer
Unidentified Mudstone
Upper Production Zone Aquifer
Lower Production Zone Aquifer
Underlying Aquitard
Underlying Unit
Badger Coal
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
Distance in Feet
AUC LLC
THE RENO CREEK PROJECT
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
Petrotek
10288 West Chatfield Ave., Suite 201
Littleton, Colorado 80127-4239 USA
303-290-9414
www.petrotek.com



B
B'
Subsea Depth(ft)
RN03931
RN02485
RN02479
RN02710
RN02708
RN02324
RN02327
RN02353
RN02356
RC0004
RN00445
RN03720
RN02611
RN02386
RN02388
R N00391
R N02397
R N03937
5250
5150
5050
4950
4850
4750
4650
4550
4450
Ground Surface
Overlying Aquifer
Production Zone Potentiometric Surface - August 2011
Overlying Aquitard
Upper Felix Coal
Lower Felix Coal
Upper Production Zone Aquifer
Unidentified Mudstone
Production Zone Aquifer
Lower Production Zone Aquifer
Underlying Aquitard
Underlying Unit
Badger Coal
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Distance in Feet
AUC LLC
THE RENO CREEK PROJECT
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
Petrotek
10288 West Chatfield Ave., Suite 201
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303-290-9414
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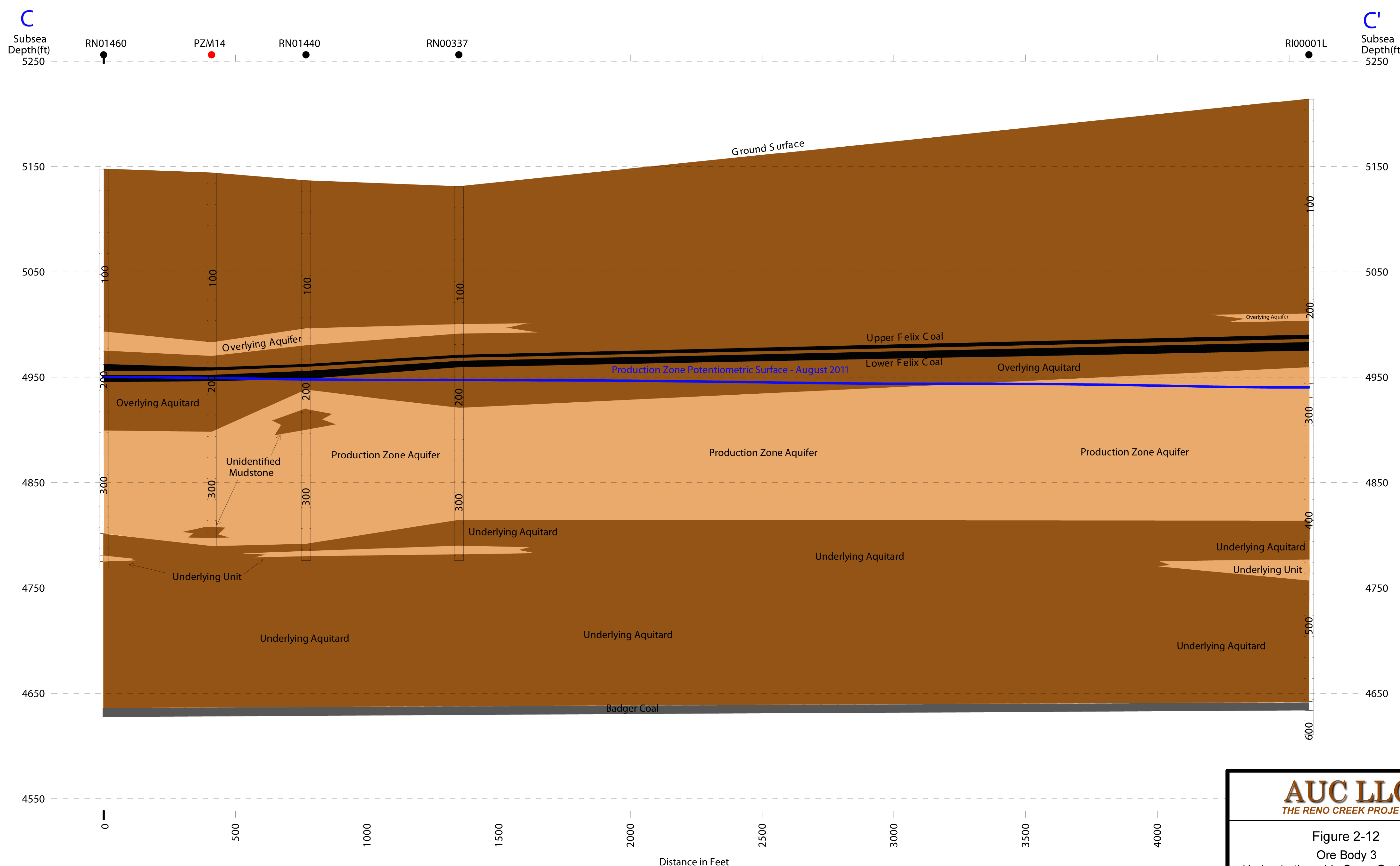

AUC LLC
THE RENO CREEK PROJECT

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

Petrotek
10288 West Chatfield Ave., Suite 201
Littleton, Colorado 80127-4239 USA
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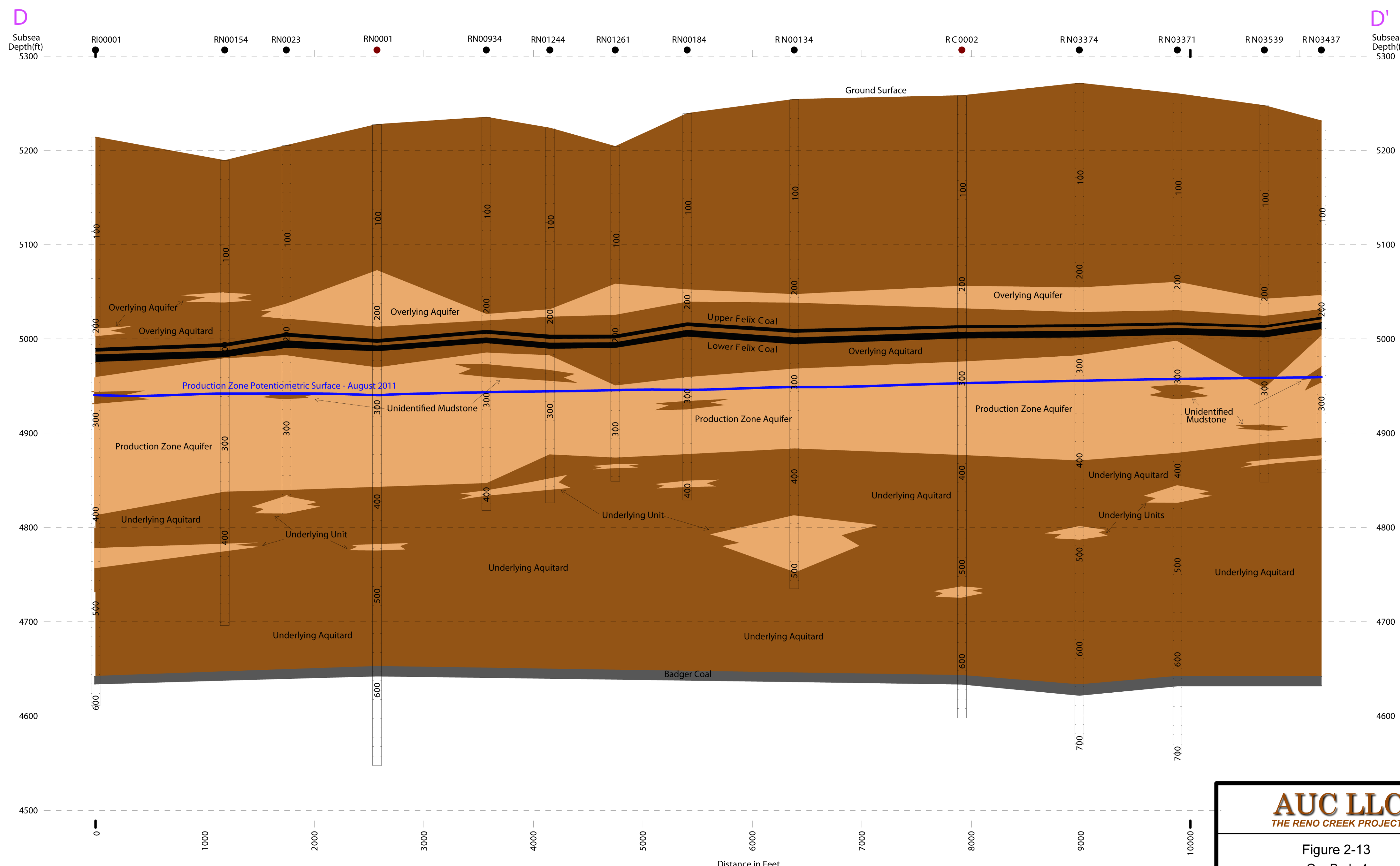

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Figure 2-13
Ore Body 4
Hydrostratigraphic Cross Section D - D'

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

Petrotek
10288 West Chatfield Ave., Suite 201
Littleton, Colorado 80127-4239 USA
303-290-9414
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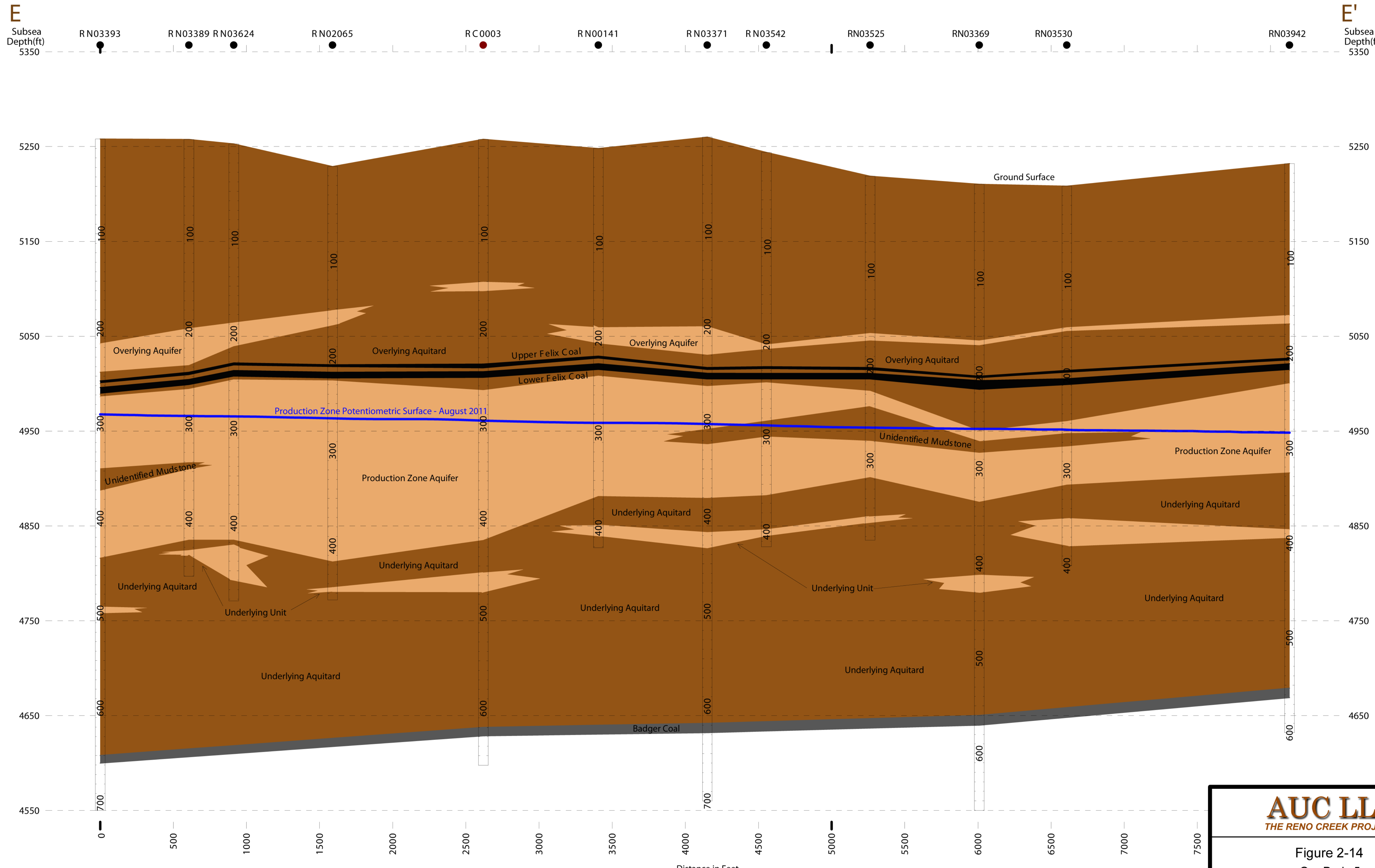

AUC LLC
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Figure 2-14
Ore Body 5
Hydrostratigraphic Cross Section E - E'

Scale: See Cross Section Scale	Date: January 2012
PTRpt_Fig_02-14.ai	By: KRS Checked: AAP

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10288 West Chatfield Ave., Suite 201
Littleton, Colorado 80127-4239 USA
303-290-9414
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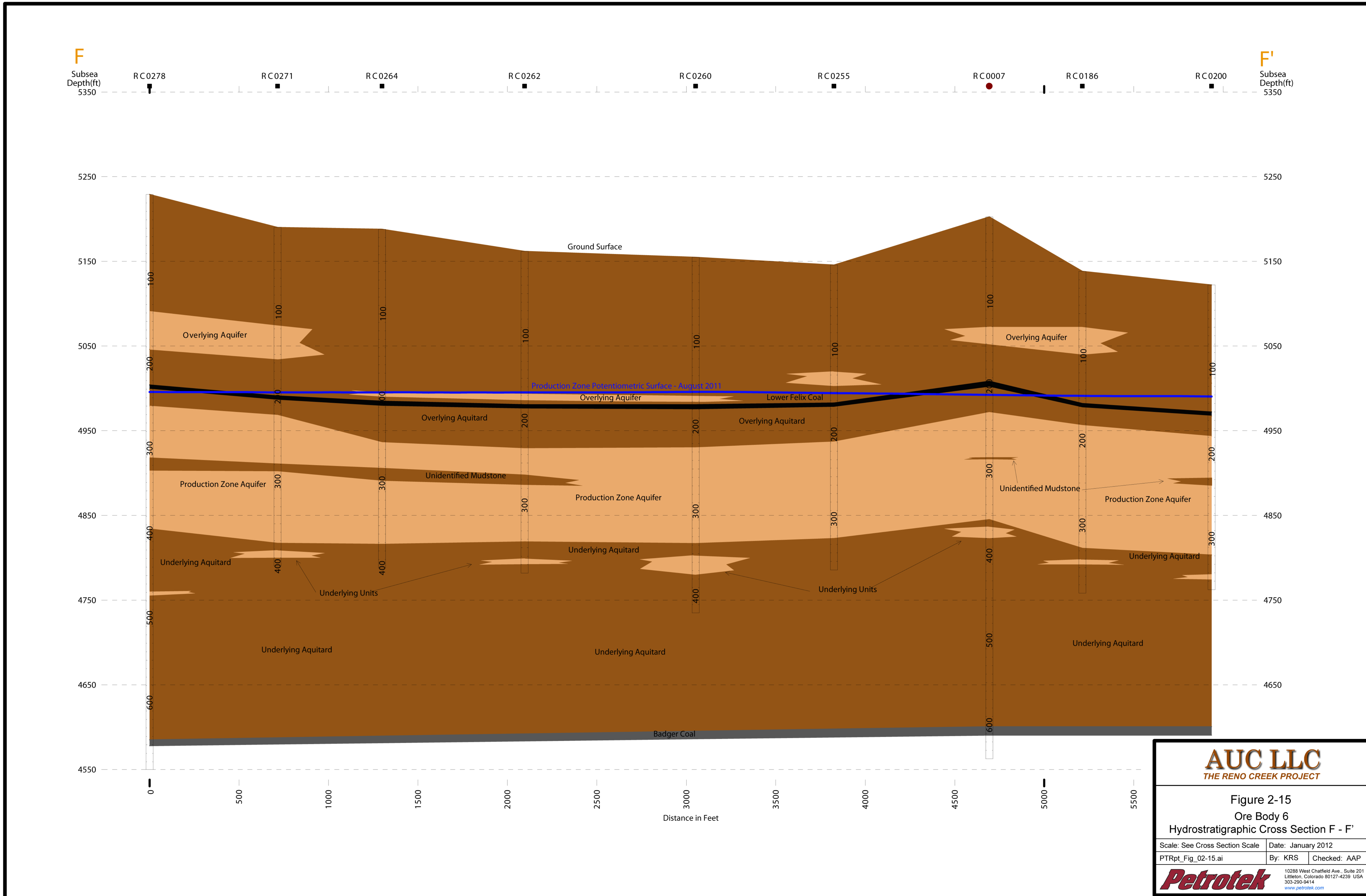
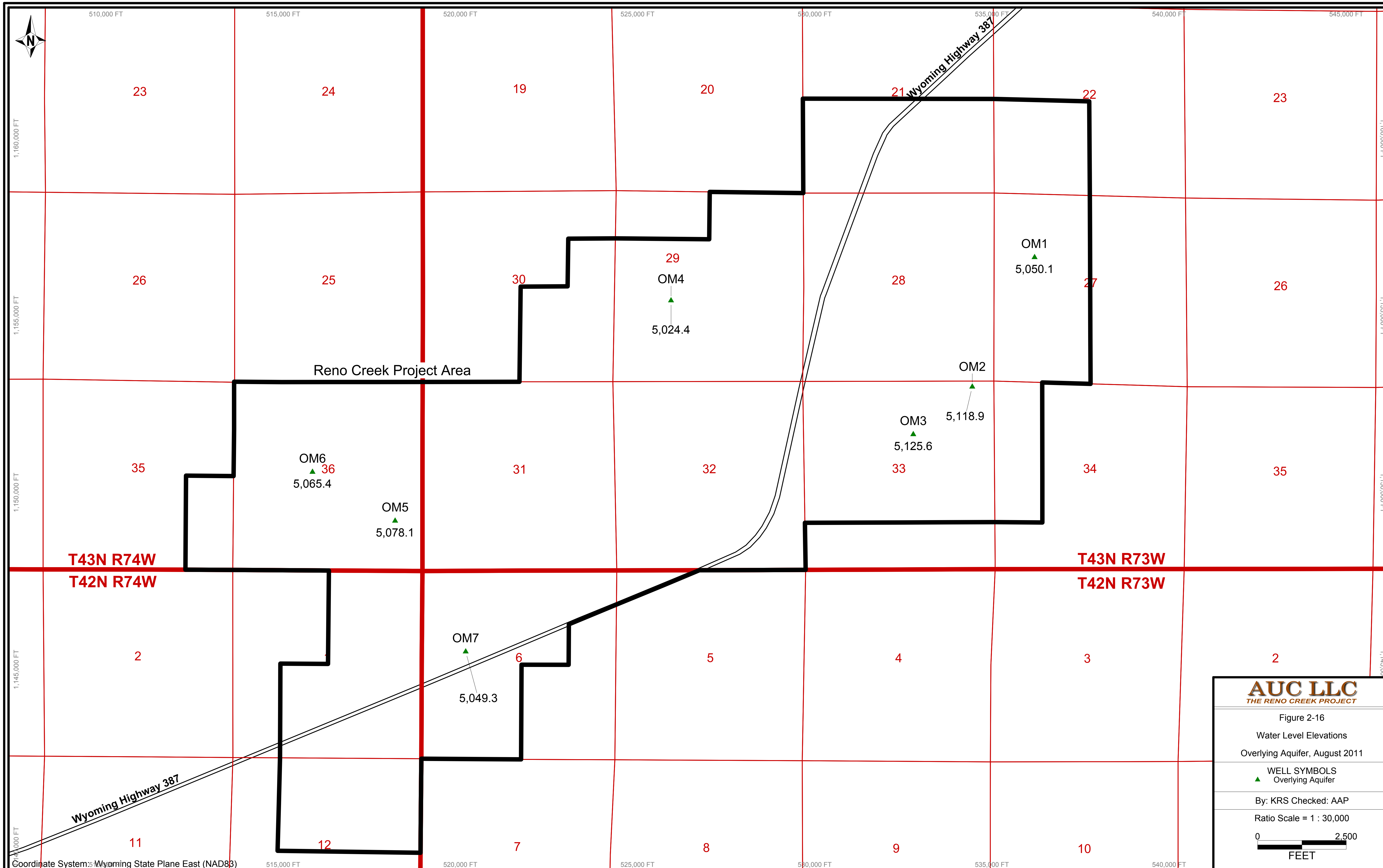
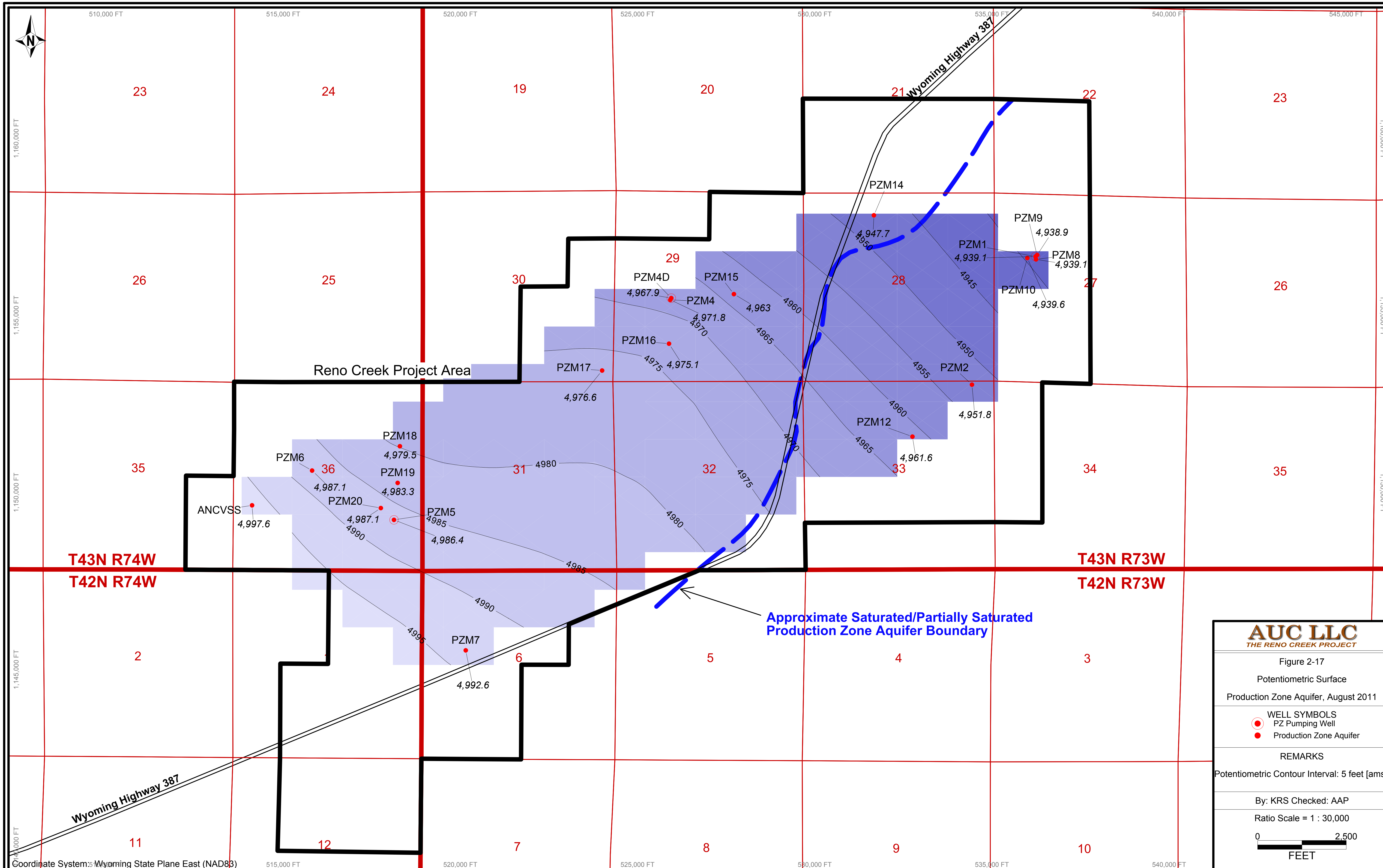

F
F'
Subsea Depth(ft)
RC0278
RC0271
RC0264
RC0262
RC0260
RC0255
RC0007
RC0186
RC0200
5350
5250
5150
5050
4950
4850
4750
4650
4550
Ground Surface
Overlying Aquifer
Production Zone Potentiometric Surface - August 2011
Lower Felix Coal
Overlying Aquitard
Unidentified Mudstone
Production Zone Aquifer
Underlying Aquitard
Underlying Units
Badger Coal
Distance in Feet
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
AUC LLC
THE RENO CREEK PROJECT
Figure 2-15
Ore Body 6
Hydrostratigraphic Cross Section F - F'
Scale: See Cross Section Scale
Date: January 2012
PTRpt_Fig_02-15.ai
By: KRS
Checked: AAP
Petrotek


Wyoming Highway 387
Reno Creek Project Area
T43N R74W
T42N R74W
T43N R73W
T42N R73W
OM1
5,050.1
OM2
5,118.9
OM3
5,125.6
OM4
5,024.4
OM5
5,078.1
OM6
5,065.4
OM7
5,049.3
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 2-16
Water Level Elevations
Overlying Aquifer, August 2011
WELL SYMBOLS
Overlying Aquifer
By: KRS Checked: AAP
Ratio Scale = 1 : 30,000
0
2,500
FEET


AUC LLC
THE RENO CREEK PROJECT
Figure 2-17
Potentiometric Surface
Production Zone Aquifer, August 2011
WELL SYMBOLS
PZ Pumping Well
Production Zone Aquifer
REMARKS
Potentiometric Contour Interval: 5 feet [amsl]
By: KRS Checked: AAP
Ratio Scale = 1 : 30,000
0
2,500
FEET
Reno Creek Project Area
Approximate Saturated/Partially Saturated
Production Zone Aquifer Boundary
Wyoming Highway 387
T43N R74W
T42N R74W
T43N R73W
T42N R73W
PZM14
4,947.7
PZM9
4,938.9
PZM1
4,939.1
PZM8
4,939.1
PZM10
4,939.6
PZM4D
4,967.9
PZM4
4,971.8
PZM15
4,963
PZM16
4,975.1
PZM17
4,976.6
PZM2
4,951.8
PZM12
4,961.6
PZM18
4,979.5
PZM6
4,987.1
PZM19
4,983.3
PZM20
4,987.1
PZM5
4,986.4
ANCVSS
4,997.6
PZM7
4,992.6
Coordinate System: Wyoming State Plane East (NAD83)

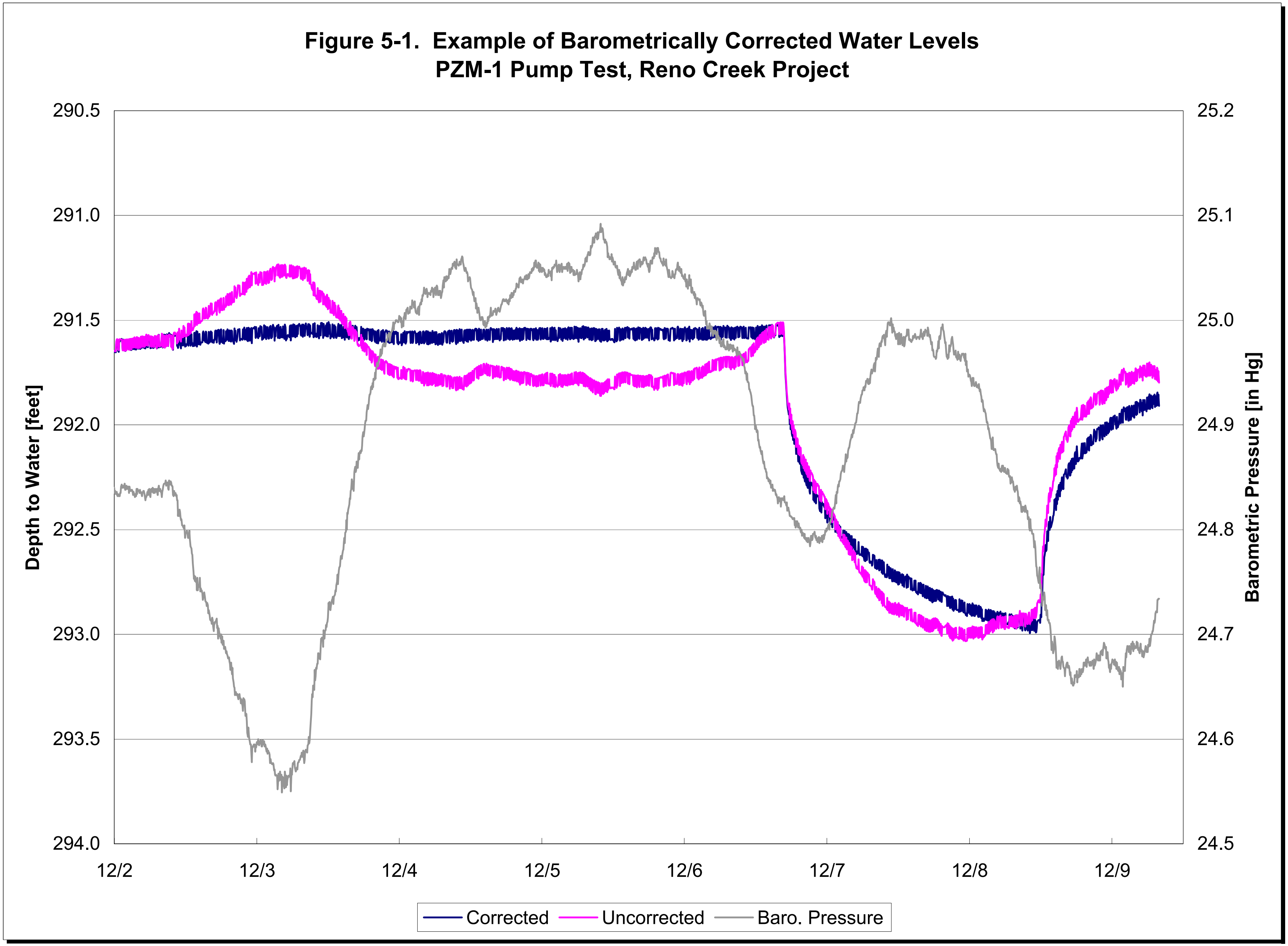
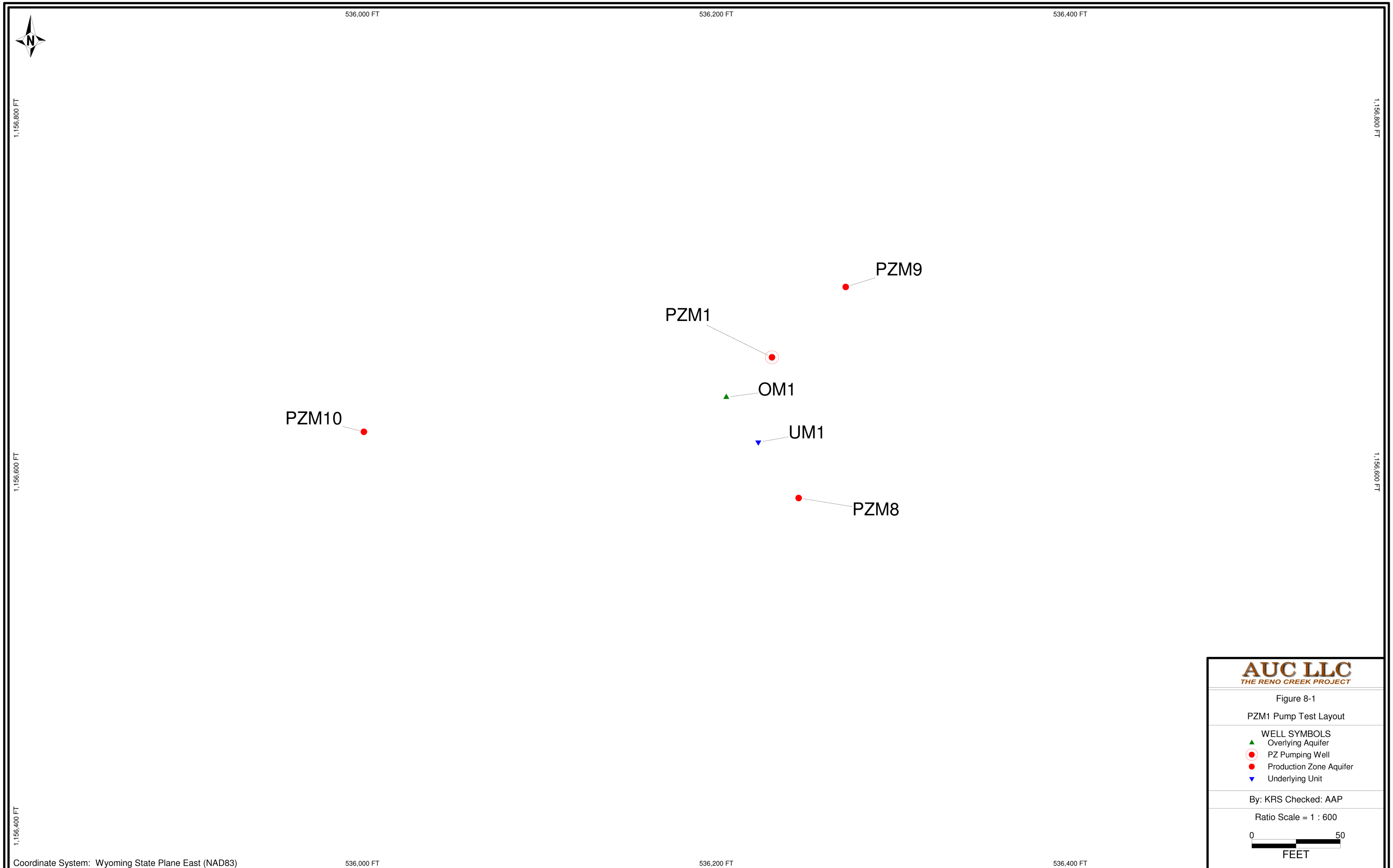


Figure 5-1. Example of Barometrically Corrected Water Levels
PZM-1 Pump Test, Reno Creek Project
Depth to Water [feet]
290.5
291.0
291.5
292.0
292.5
293.0
293.5
294.0
Barometric Pressure [in Hg]
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
Corrected
Uncorrected
Baro. Pressure

Petrotek


536,000 FT
536,200 FT
536,400 FT
1,156,800 FT
1,156,600 FT
1,156,400 FT
N
PZM9
PZM1
OM1
PZM10
UM1
PZM8
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 8-1
PZM1 Pump Test Layout
WELL SYMBOLS
Overlying Aquifer
PZ Pumping Well
Production Zone Aquifer
Underlying Unit
By: KRS Checked: AAP
Ratio Scale = 1 : 600
0
50
FEET

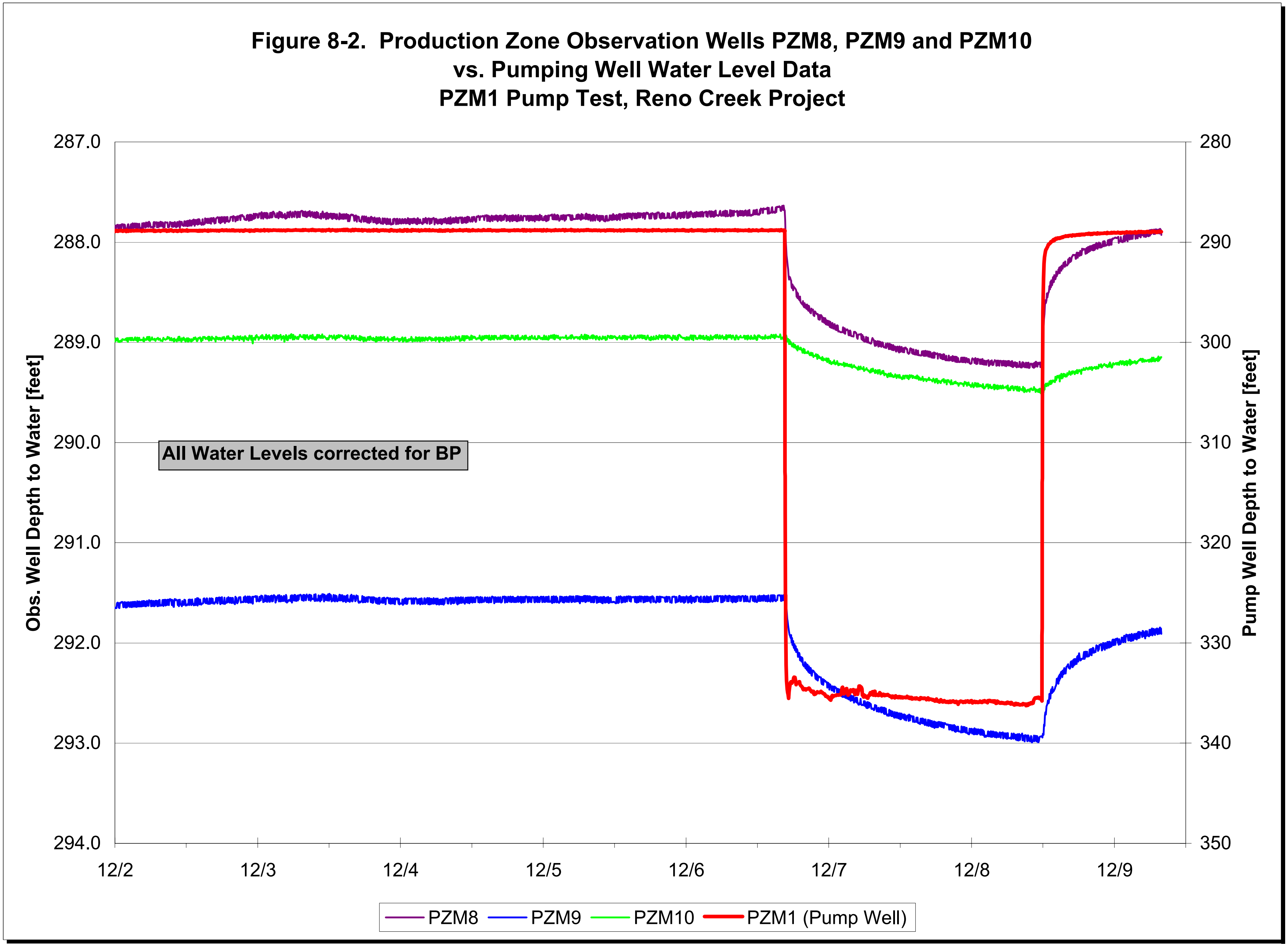


Figure 8-2. Production Zone Observation Wells PZM8, PZM9 and PZM10
vs. Pumping Well Water Level Data
PZM1 Pump Test, Reno Creek Project
Obs. Well Depth to Water [feet]
Pump Well Depth to Water [feet]
287.0
288.0
289.0
290.0
291.0
292.0
293.0
294.0
280
290
300
310
320
330
340
350
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
All Water Levels corrected for BP
PZM8
PZM9
PZM10
PZM1 (Pump Well)

Petrotek

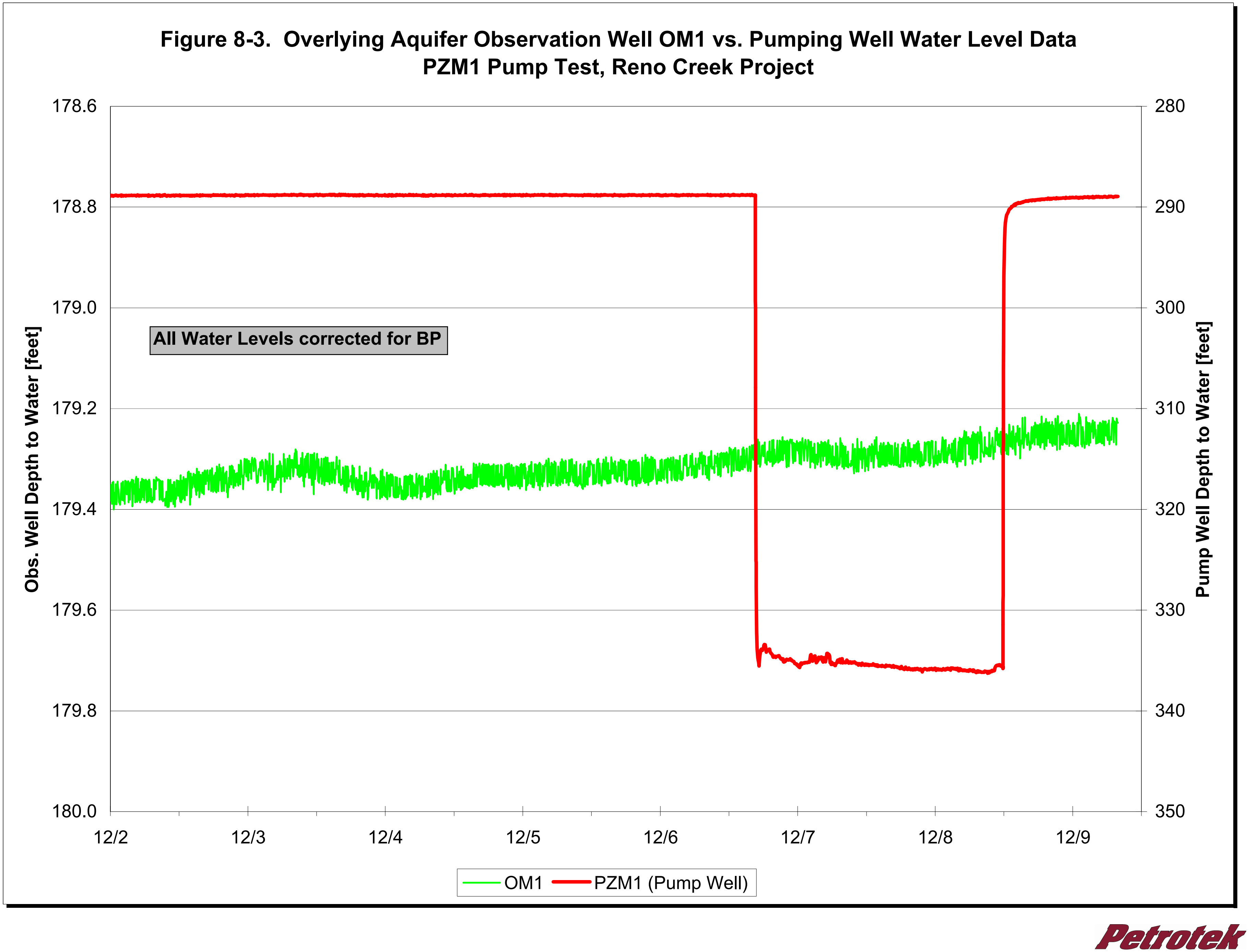


Figure 8-3. Overlying Aquifer Observation Well OM1 vs. Pumping Well Water Level Data
PZM1 Pump Test, Reno Creek Project
All Water Levels corrected for BP
Obs. Well Depth to Water [feet]
Pump Well Depth to Water [feet]
178.6
178.8
179.0
179.2
179.4
179.6
179.8
180.0
280
290
300
310
320
330
340
350
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
OM1
PZM1 (Pump Well)
Petrotek

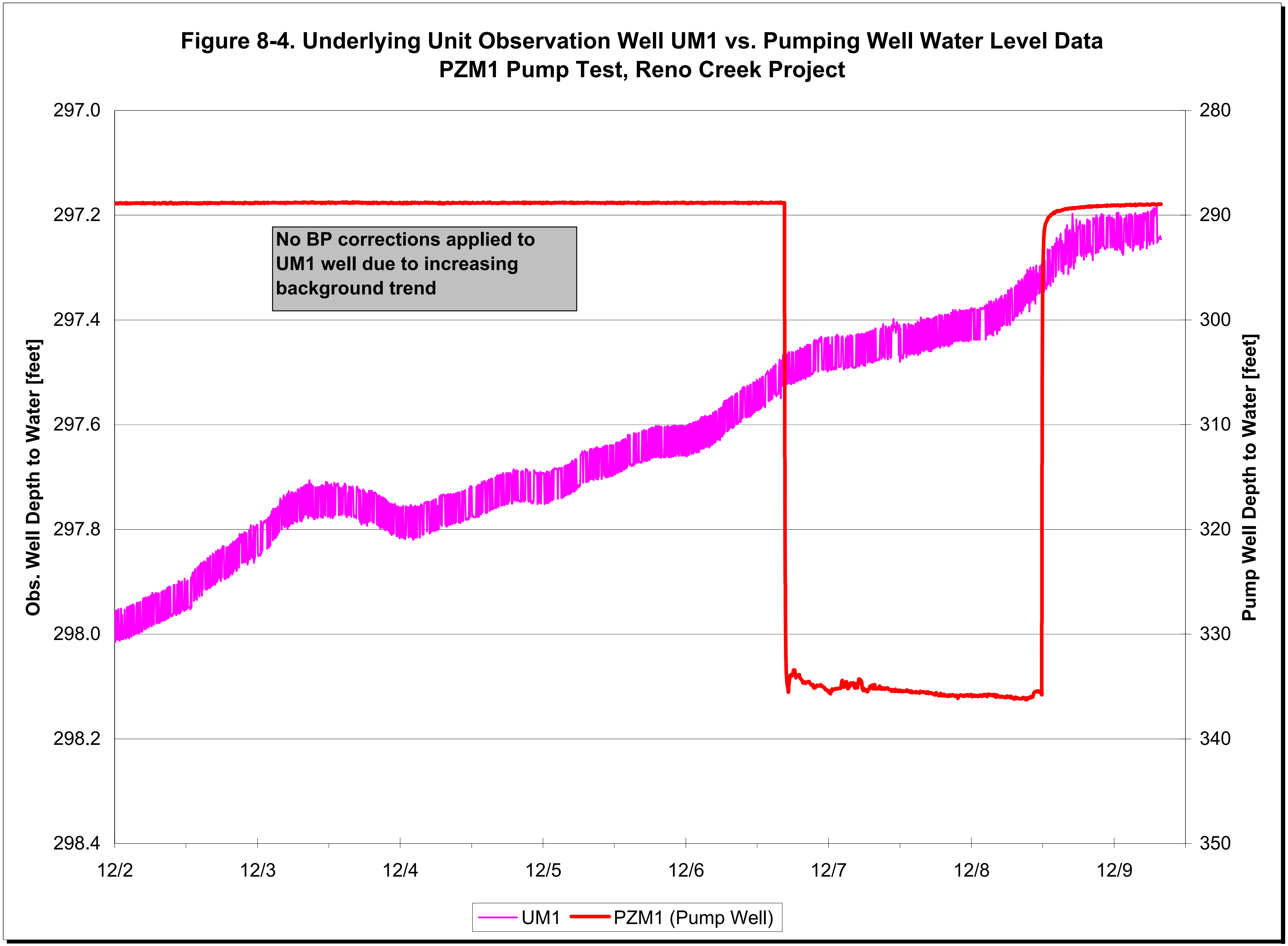
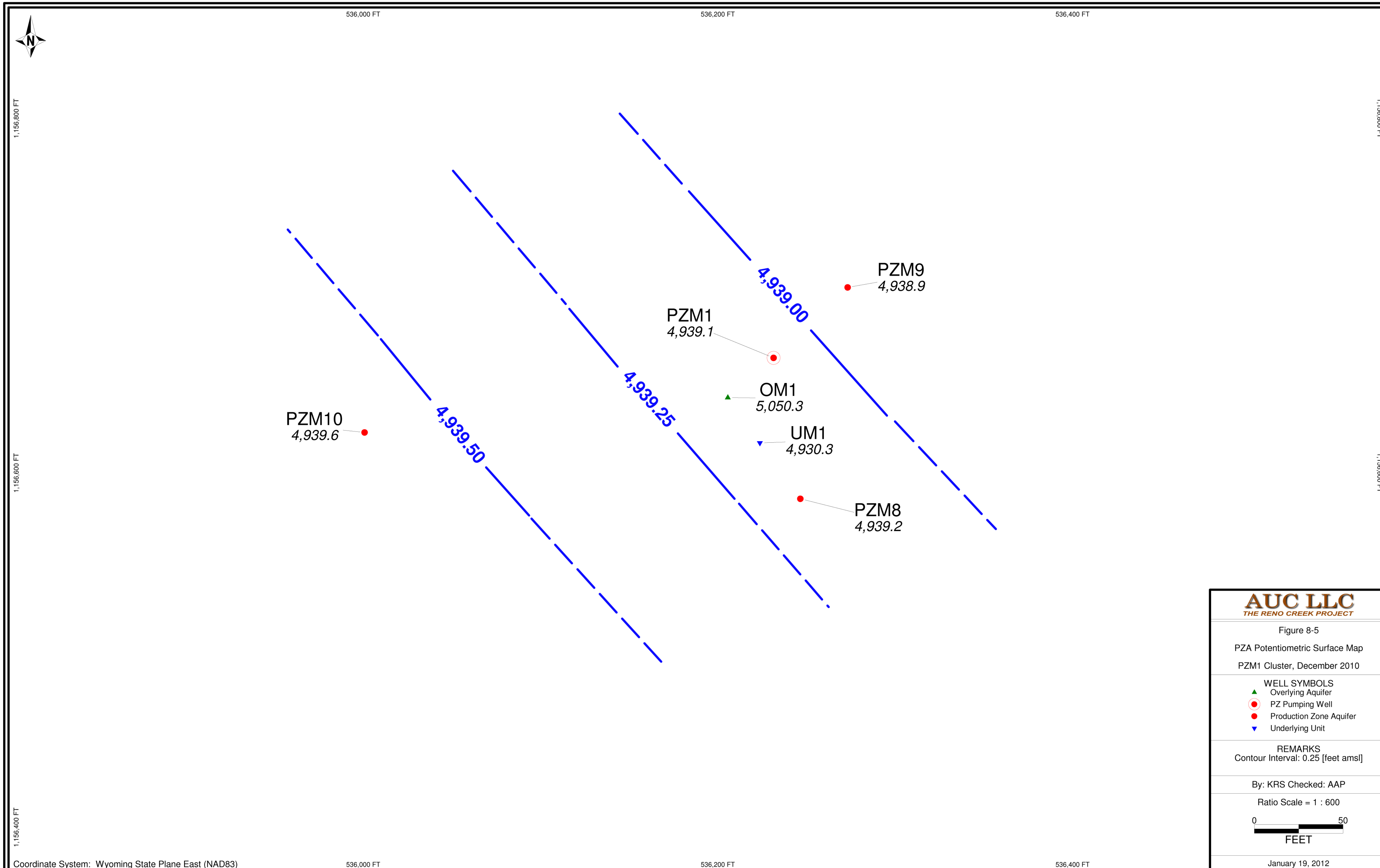


Figure 8-4. Underlying Unit Observation Well UM1 vs. Pumping Well Water Level Data
PZM1 Pump Test, Reno Creek Project
No BP corrections applied to UM1 well due to increasing background trend
Obs. Well Depth to Water [feet]
Pump Well Depth to Water [feet]
297.0
297.2
297.4
297.6
297.8
298.0
298.2
298.4
280
290
300
310
320
330
340
350
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
UM1
PZM1 (Pump Well)

Petrotek


536,000 FT
536,200 FT
536,400 FT
1,156,800 FT
1,156,600 FT
1,156,400 FT
4,939.00
4,939.25
4,939.50
PZM9
4,938.9
PZM1
4,939.1
OM1
5,050.3
UM1
4,930.3
PZM10
4,939.6
PZM8
4,939.2
AUC LLC
THE RENO CREEK PROJECT
Figure 8-5
PZA Potentiometric Surface Map
PZM1 Cluster, December 2010
WELL SYMBOLS
Overlying Aquifer
PZ Pumping Well
Production Zone Aquifer
Underlying Unit
REMARKS
Contour Interval: 0.25 [feet amsl]
By: KRS Checked: AAP
Ratio Scale = 1 : 600
0
50
FEET
January 19, 2012
Coordinate System: Wyoming State Plane East (NAD83)

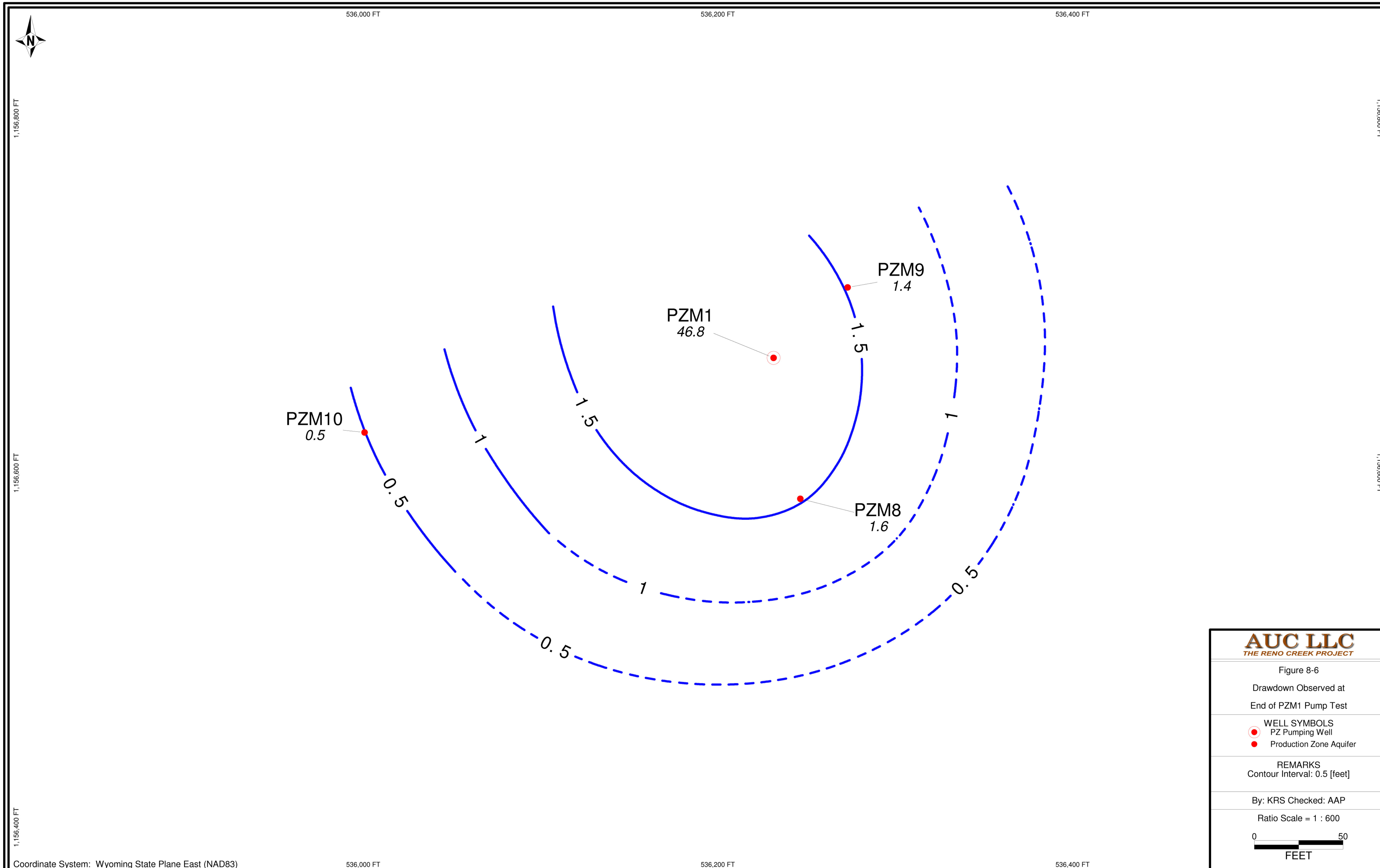
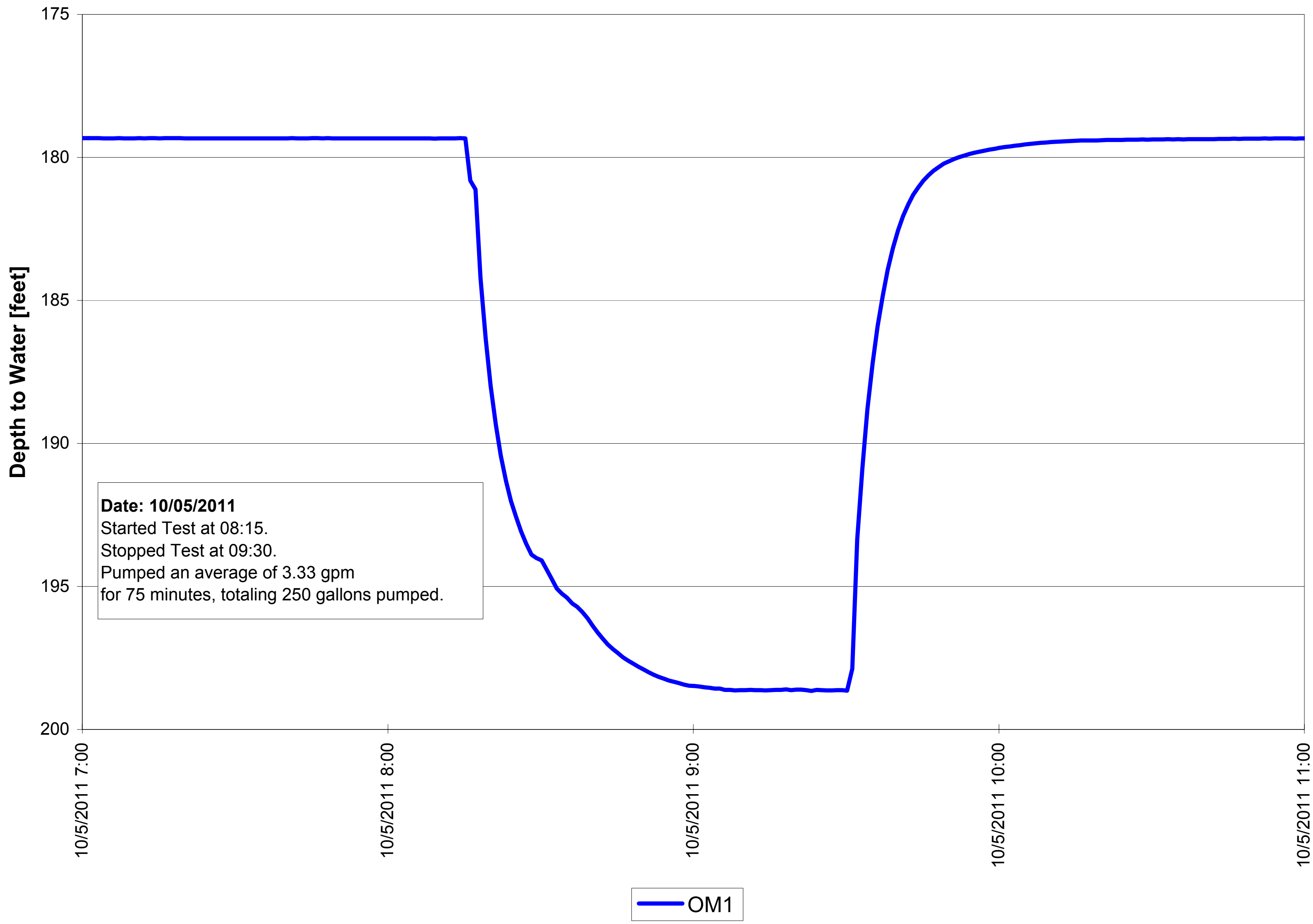
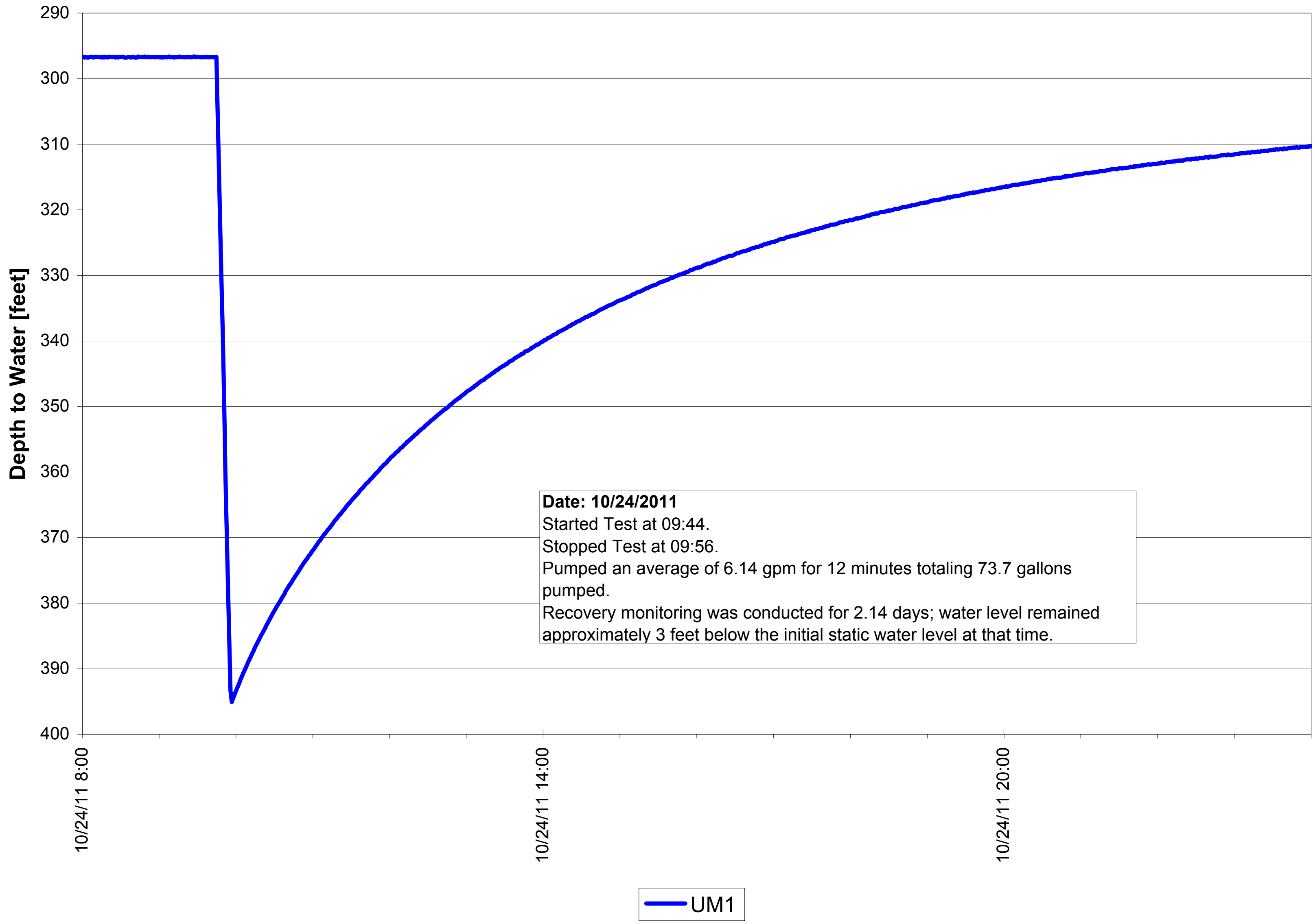

536,000 FT
536,200 FT
536,400 FT
1,156,800 FT
1,156,600 FT
1,156,400 FT
N
PZM1
46.8
PZM9
1.4
PZM8
1.6
PZM10
0.5
1.5
1
0.5
AUC LLC
THE RENO CREEK PROJECT
Figure 8-6
Drawdown Observed at
End of PZM1 Pump Test
WELL SYMBOLS
PZ Pumping Well
Production Zone Aquifer
REMARKS
Contour Interval: 0.5 [feet]
By: KRS Checked: AAP
Ratio Scale = 1 : 600
0
50
FEET
Coordinate System: Wyoming State Plane East (NAD83)

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

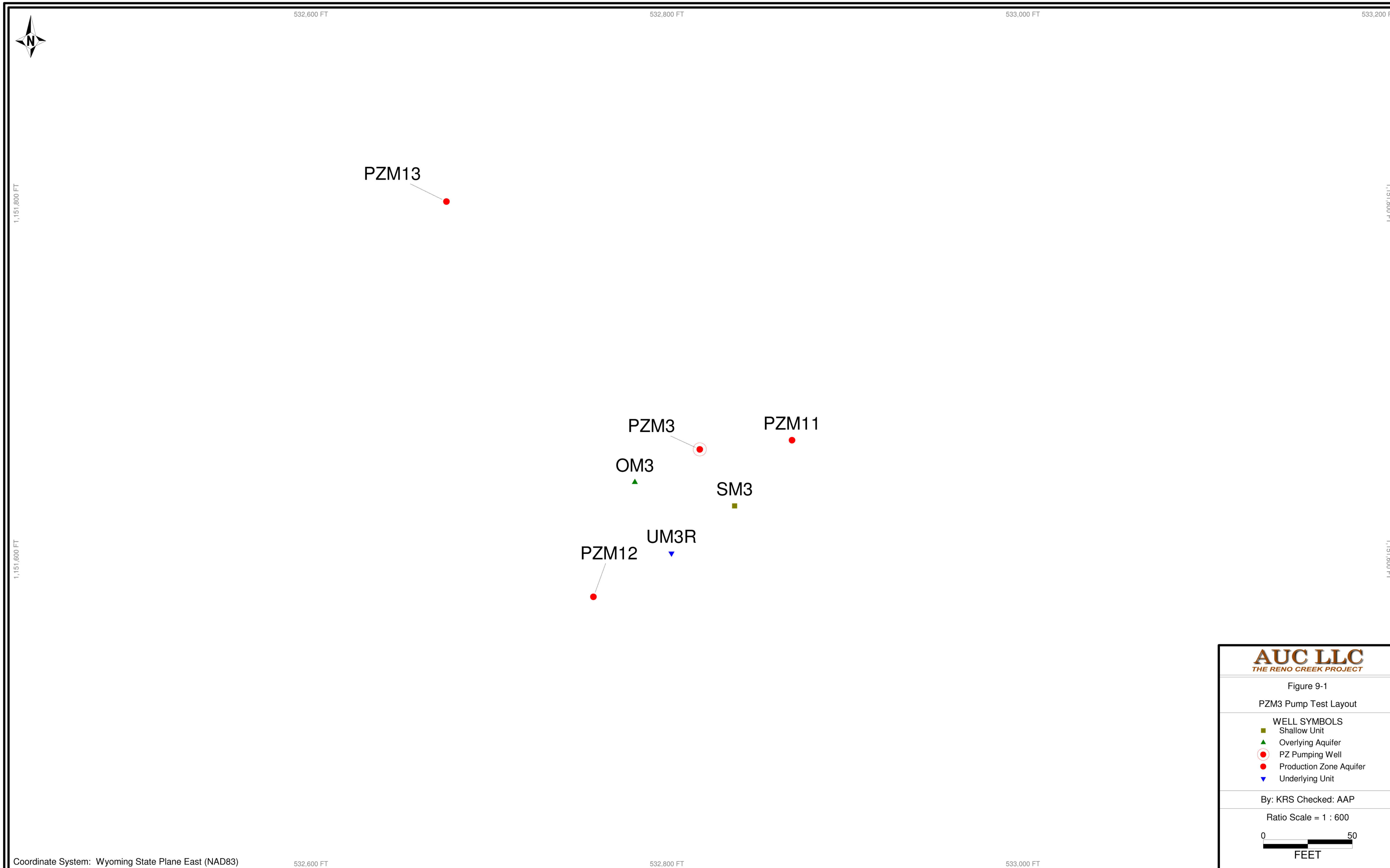


Petrotek

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



Petrotek


532,600 FT
532,800 FT
533,000 FT
533,200 FT
1,151,800 FT
1,151,600 FT
N
PZM13
PZM3
PZM11
OM3
SM3
UM3R
PZM12
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 9-1
PZM3 Pump Test Layout
WELL SYMBOLS
Shallow Unit
Overlying Aquifer
PZ Pumping Well
Production Zone Aquifer
Underlying Unit
By: KRS Checked: AAP
Ratio Scale = 1 : 600
0
50
FEET

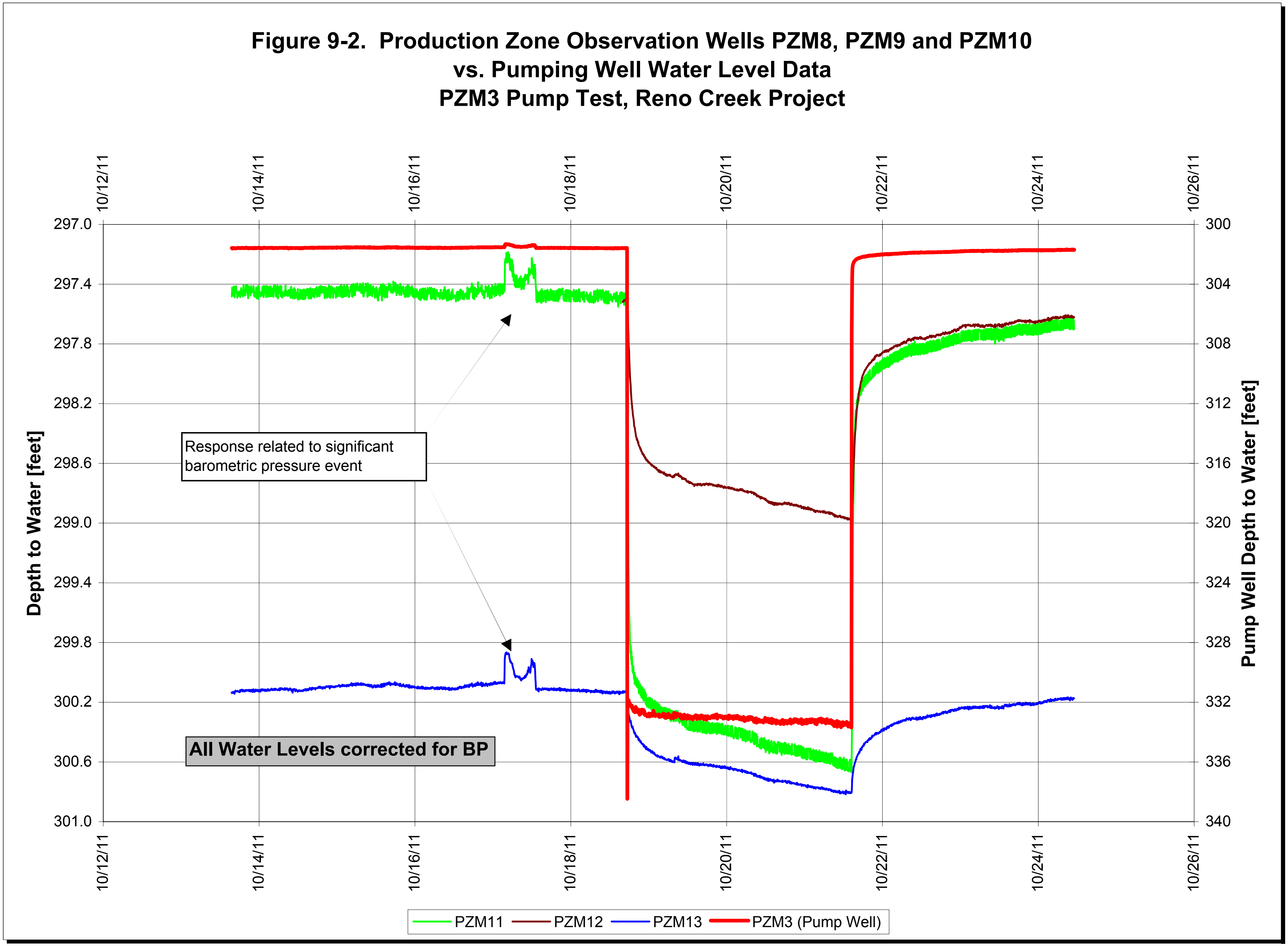


Figure 9-2. Production Zone Observation Wells PZM8, PZM9 and PZM10
vs. Pumping Well Water Level Data
PZM3 Pump Test, Reno Creek Project
Depth to Water [feet]
Pump Well Depth to Water [feet]
Response related to significant barometric pressure event
All Water Levels corrected for BP
PZM11
PZM12
PZM13
PZM3 (Pump Well)

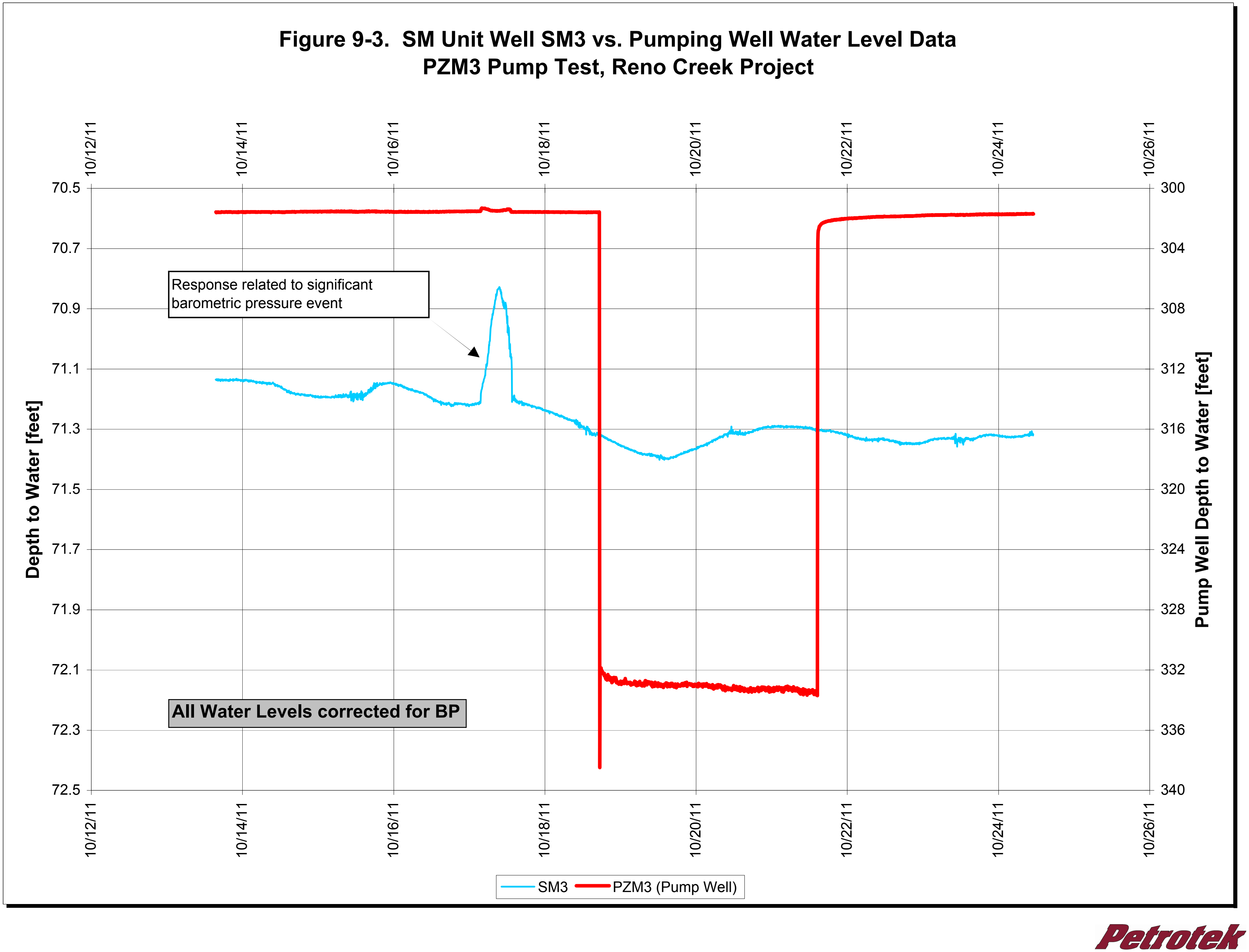


Figure 9-3. SM Unit Well SM3 vs. Pumping Well Water Level Data
PZM3 Pump Test, Reno Creek Project
Response related to significant barometric pressure event
All Water Levels corrected for BP
Depth to Water [feet]
Pump Well Depth to Water [feet]
70.5
70.7
70.9
71.1
71.3
71.5
71.7
71.9
72.1
72.3
72.5
300
304
308
312
316
320
324
328
332
336
340
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
SM3
PZM3 (Pump Well)
Petrotek

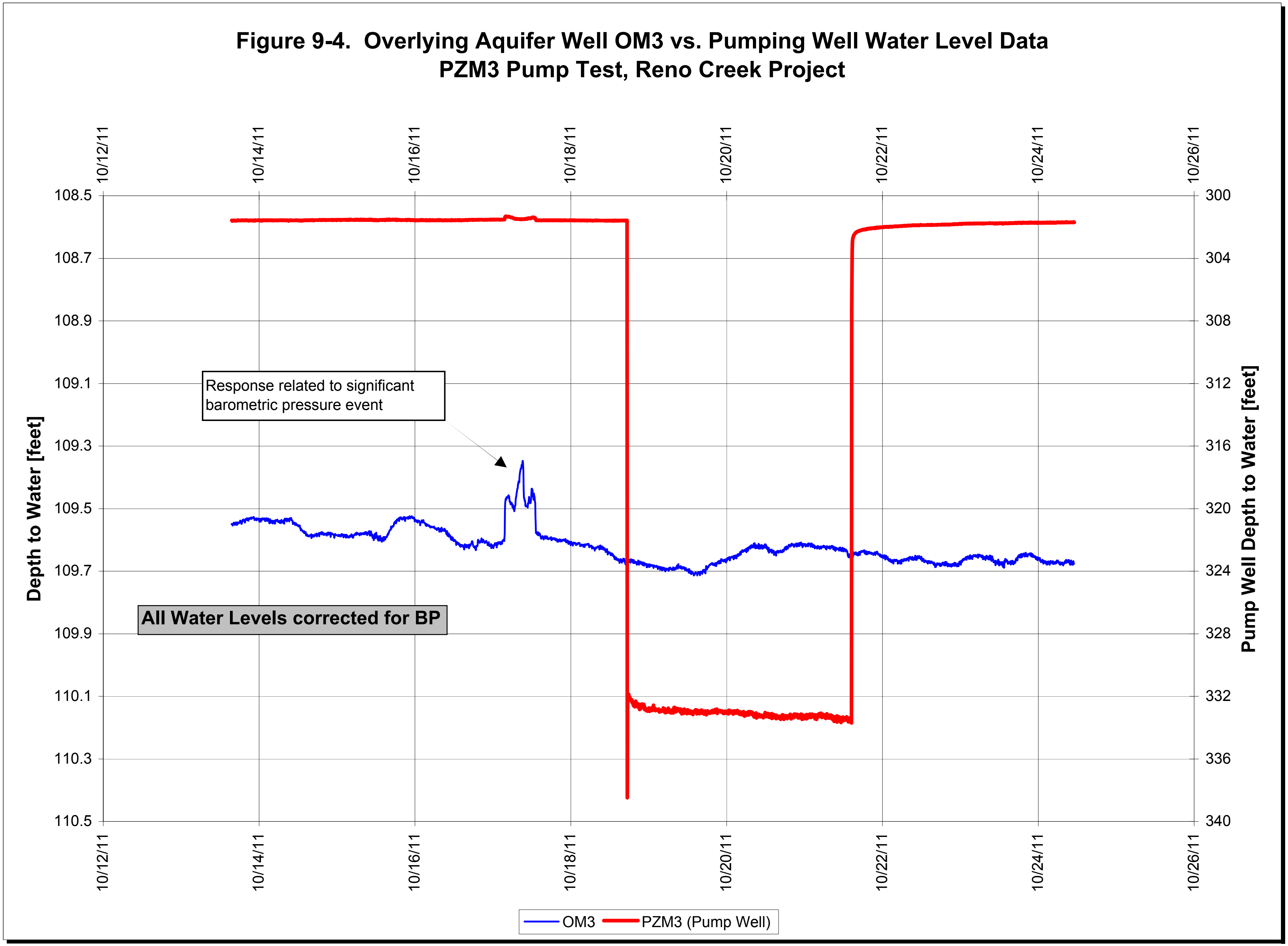


Figure 9-4. Overlying Aquifer Well OM3 vs. Pumping Well Water Level Data
PZM3 Pump Test, Reno Creek Project
Response related to significant barometric pressure event
All Water Levels corrected for BP
Depth to Water [feet]
Pump Well Depth to Water [feet]
108.5
108.7
108.9
109.1
109.3
109.5
109.7
109.9
110.1
110.3
110.5
300
304
308
312
316
320
324
328
332
336
340
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
OM3
PZM3 (Pump Well)

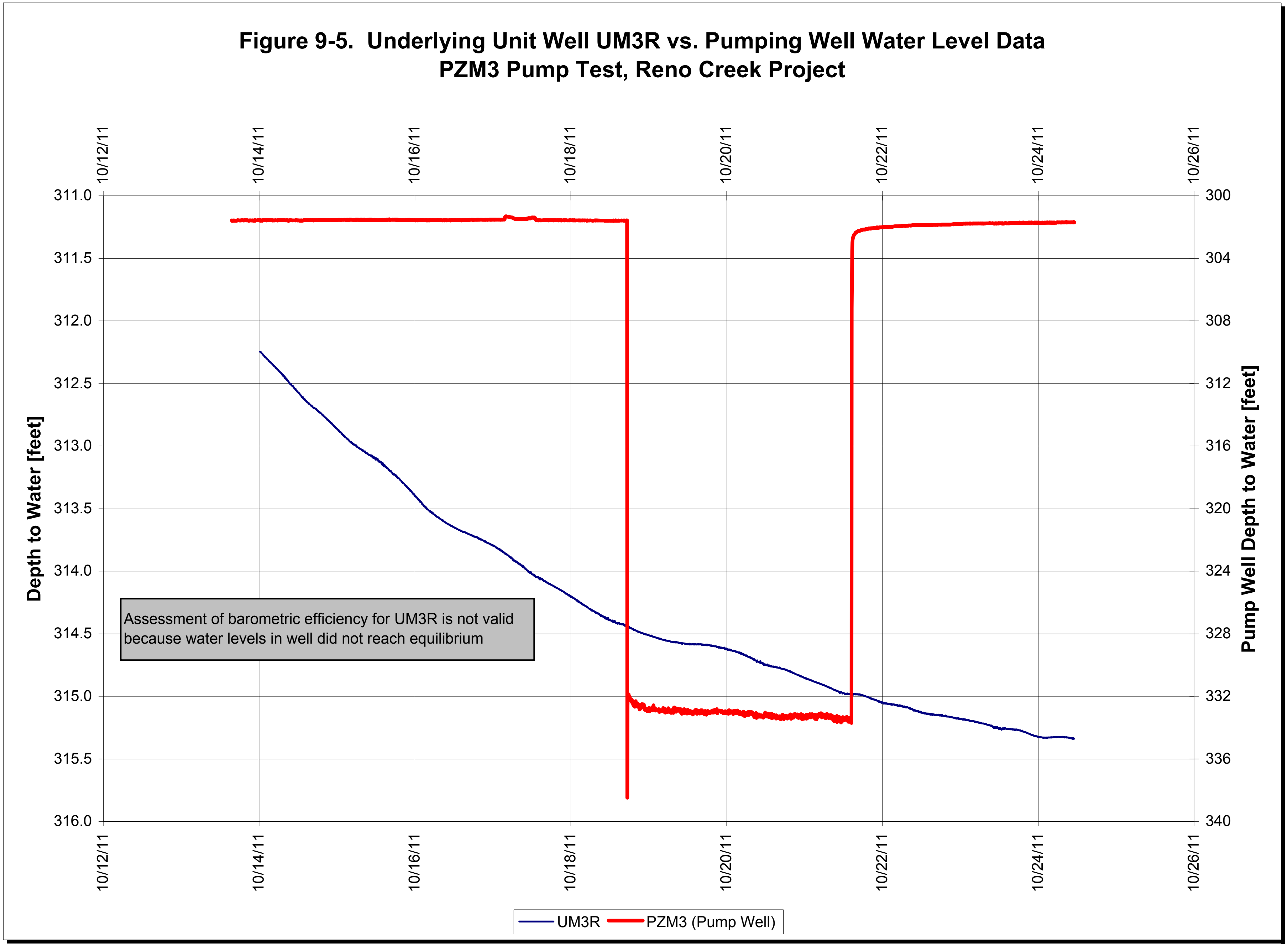
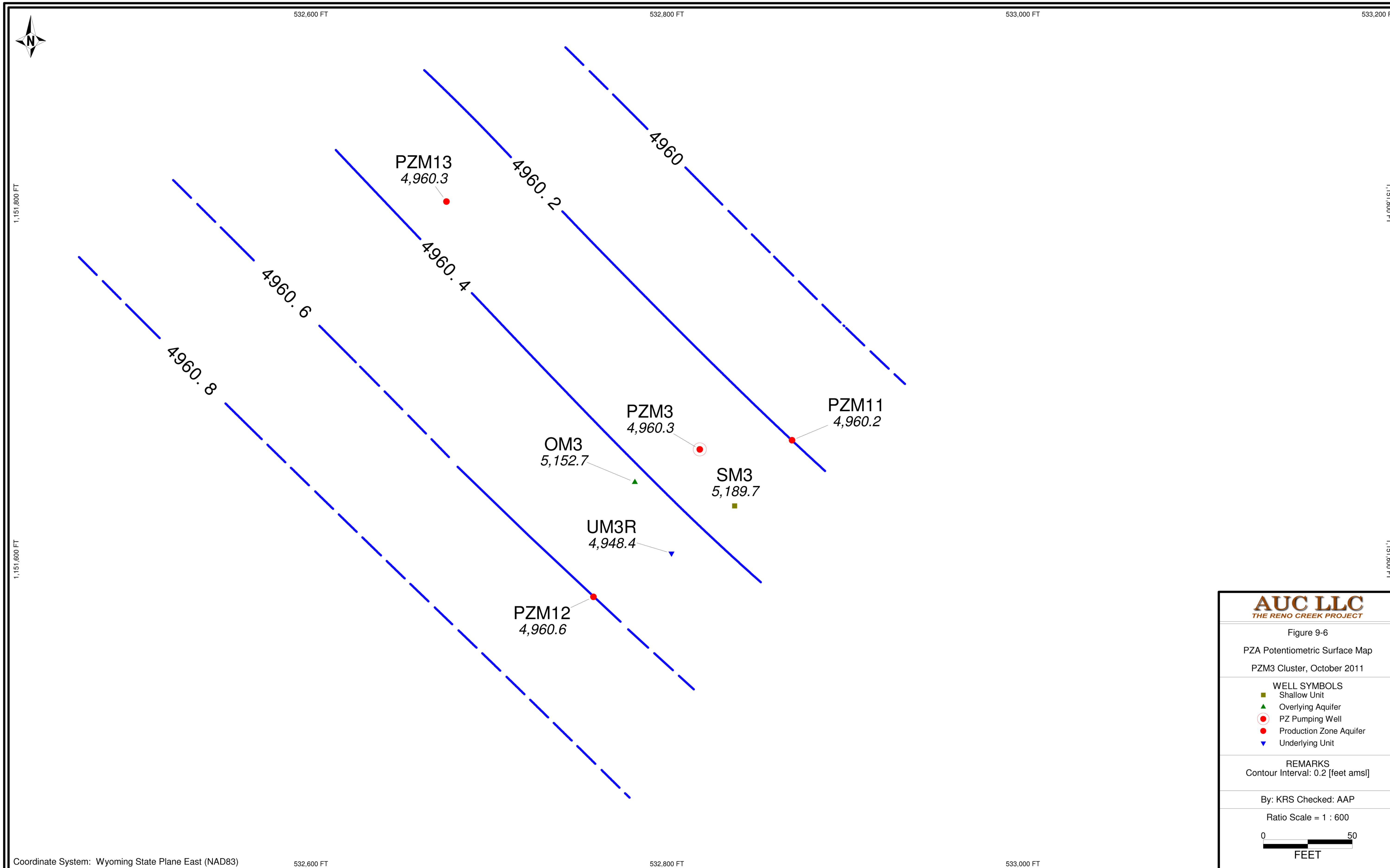
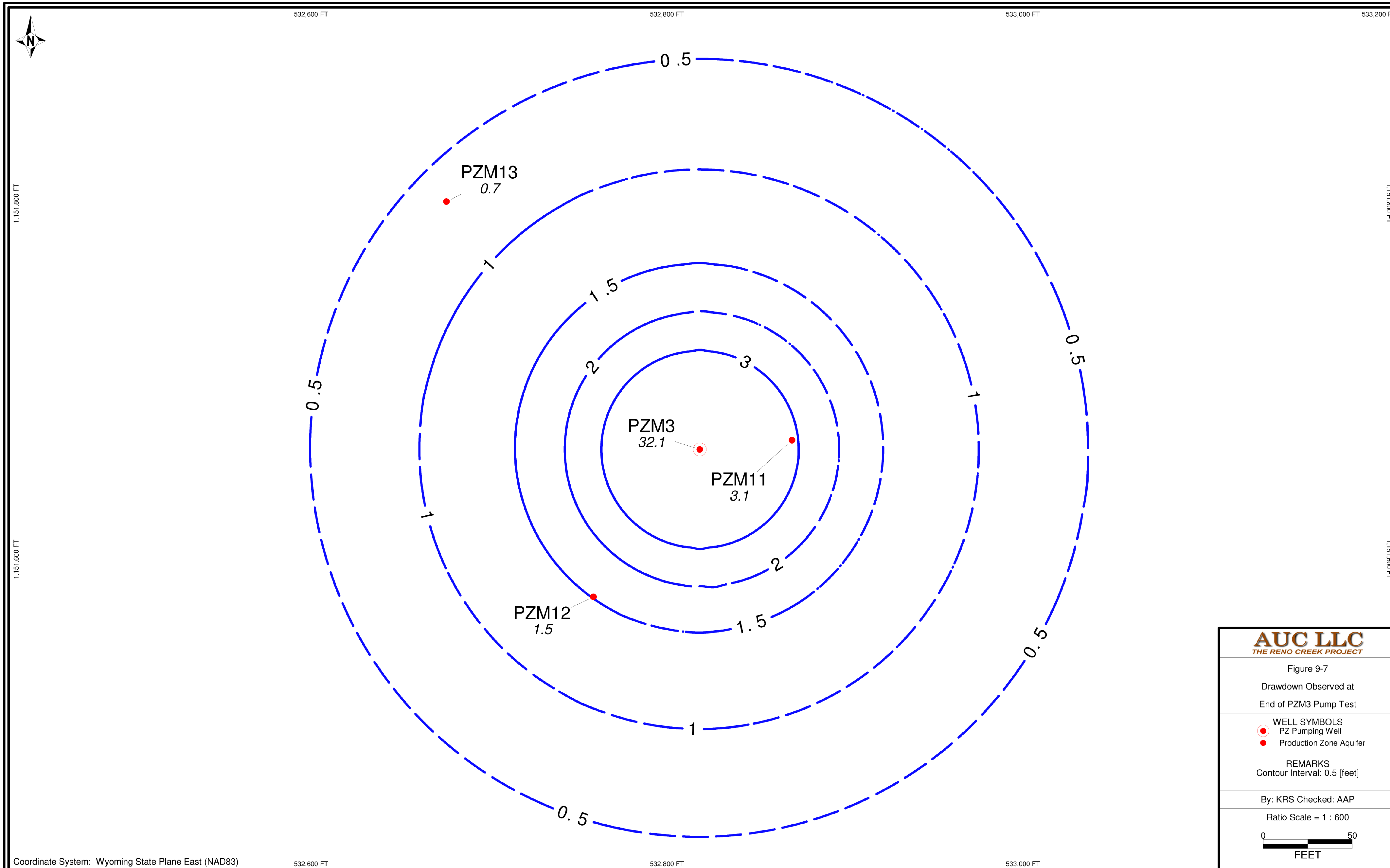


Figure 9-5. Underlying Unit Well UM3R vs. Pumping Well Water Level Data
PZM3 Pump Test, Reno Creek Project
Depth to Water [feet]
Pump Well Depth to Water [feet]
311.0
311.5
312.0
312.5
313.0
313.5
314.0
314.5
315.0
315.5
316.0
300
304
308
312
316
320
324
328
332
336
340
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
Assessment of barometric efficiency for UM3R is not valid because water levels in well did not reach equilibrium
UM3R
PZM3 (Pump Well)

Petrotek


532,600 FT
532,800 FT
533,000 FT
533,200 FT
1,151,800 FT
1,151,600 FT
N
4960
4960. 2
4960. 4
4960. 6
4960. 8
PZM13
4,960.3
PZM3
4,960.3
PZM11
4,960.2
OM3
5,152.7
SM3
5,189.7
UM3R
4,948.4
PZM12
4,960.6
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 9-6
PZA Potentiometric Surface Map
PZM3 Cluster, October 2011
WELL SYMBOLS
Shallow Unit
Overlying Aquifer
PZ Pumping Well
Production Zone Aquifer
Underlying Unit
REMARKS
Contour Interval: 0.2 [feet amsl]
By: KRS Checked: AAP
Ratio Scale = 1 : 600
0
50
FEET


532,600 FT
532,800 FT
533,000 FT
533,200 FT
1,151,800 FT
1,151,600 FT
N
0.5
1
1.5
2
3
PZM13
0.7
PZM3
32.1
PZM11
3.1
PZM12
1.5
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 9-7
Drawdown Observed at
End of PZM3 Pump Test
WELL SYMBOLS
PZ Pumping Well
Production Zone Aquifer
REMARKS
Contour Interval: 0.5 [feet]
By: KRS Checked: AAP
Ratio Scale = 1 : 600
0
50
FEET

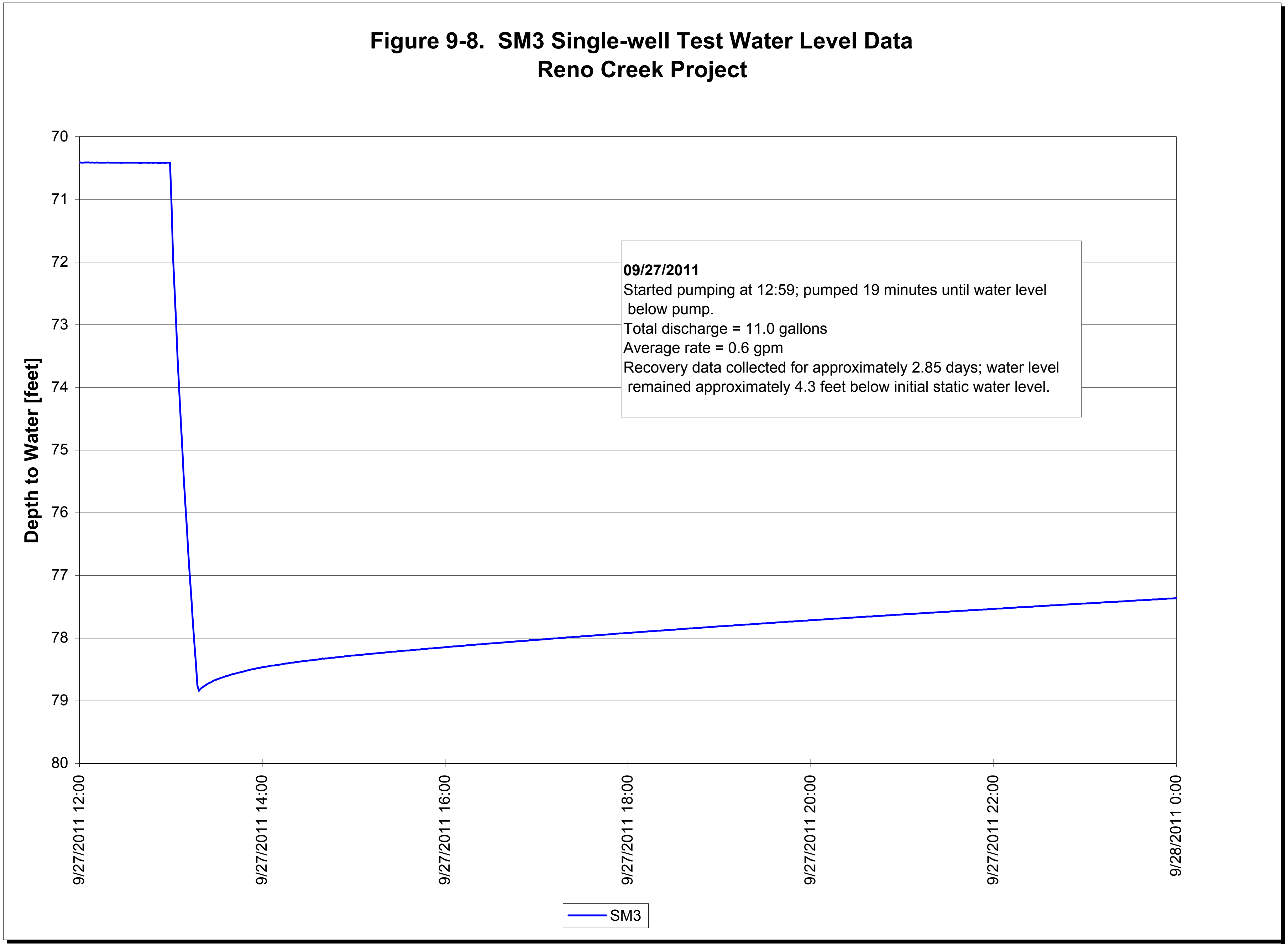


Figure 9-8. SM3 Single-well Test Water Level Data
Reno Creek Project
Depth to Water [feet]
70
71
72
73
74
75
76
77
78
79
80
09/27/2011
Started pumping at 12:59; pumped 19 minutes until water level below pump.
Total discharge = 11.0 gallons
Average rate = 0.6 gpm
Recovery data collected for approximately 2.85 days; water level remained approximately 4.3 feet below initial static water level.
9/27/2011 12:00
9/27/2011 14:00
9/27/2011 16:00
9/27/2011 18:00
9/27/2011 20:00
9/27/2011 22:00
9/28/2011 0:00
SM3

Petrotek

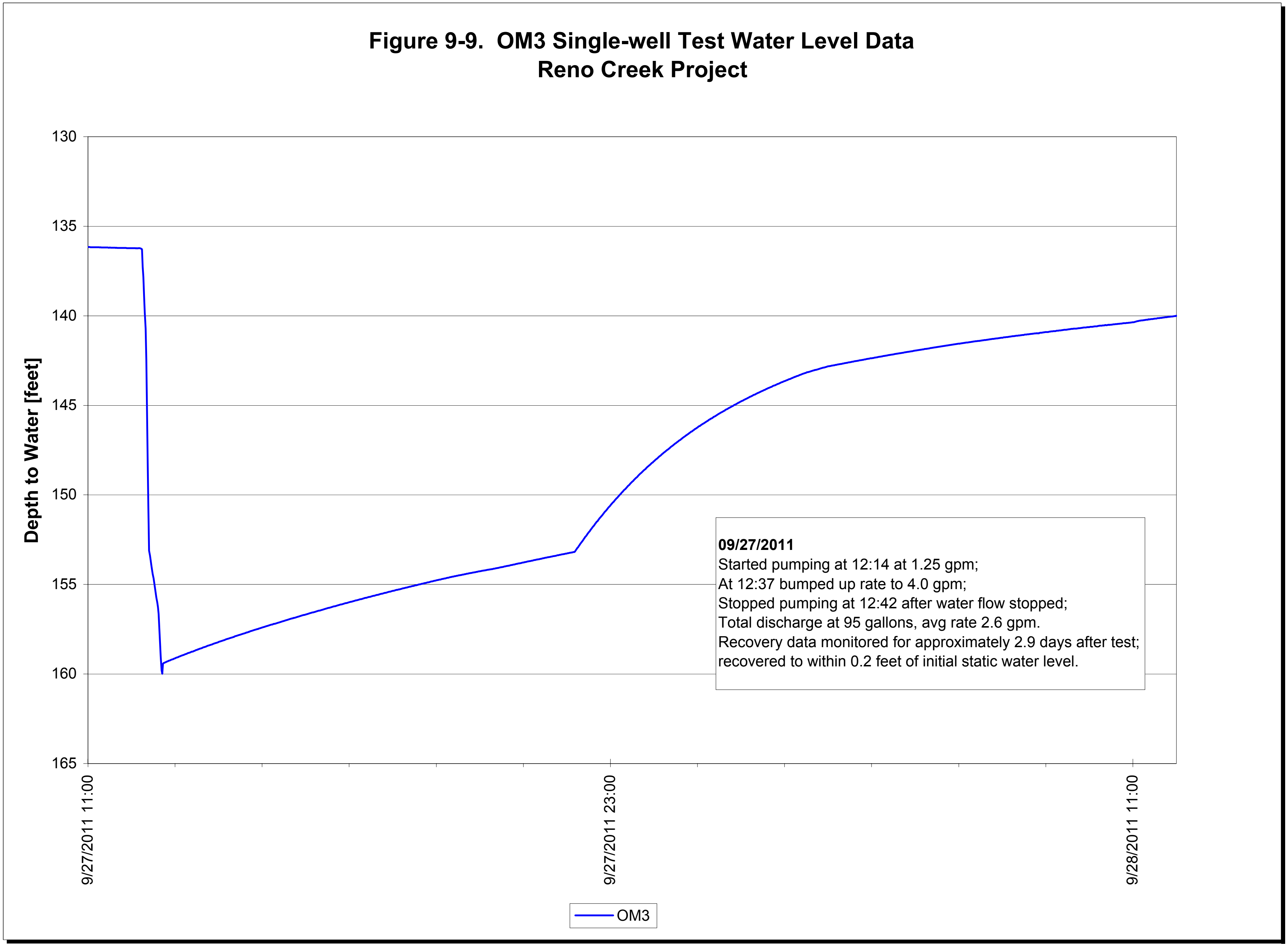


Figure 9-9. OM3 Single-well Test Water Level Data
Reno Creek Project
Depth to Water [feet]
130
135
140
145
150
155
160
165
9/27/2011 11:00
9/27/2011 23:00
9/28/2011 11:00
09/27/2011
Started pumping at 12:14 at 1.25 gpm;
At 12:37 bumped up rate to 4.0 gpm;
Stopped pumping at 12:42 after water flow stopped;
Total discharge at 95 gallons, avg rate 2.6 gpm.
Recovery data monitored for approximately 2.9 days after test;
recovered to within 0.2 feet of initial static water level.
OM3

Petrotek

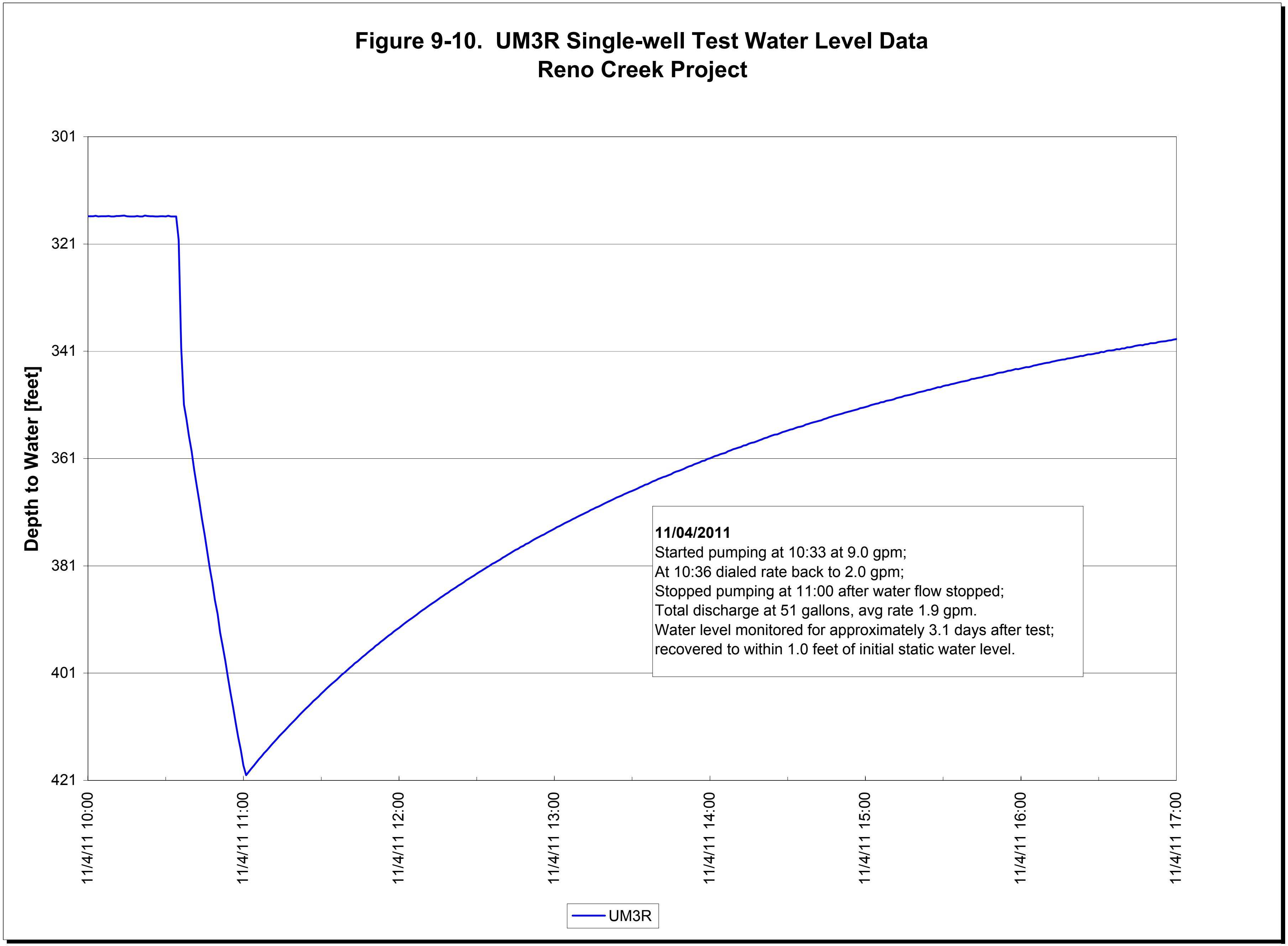
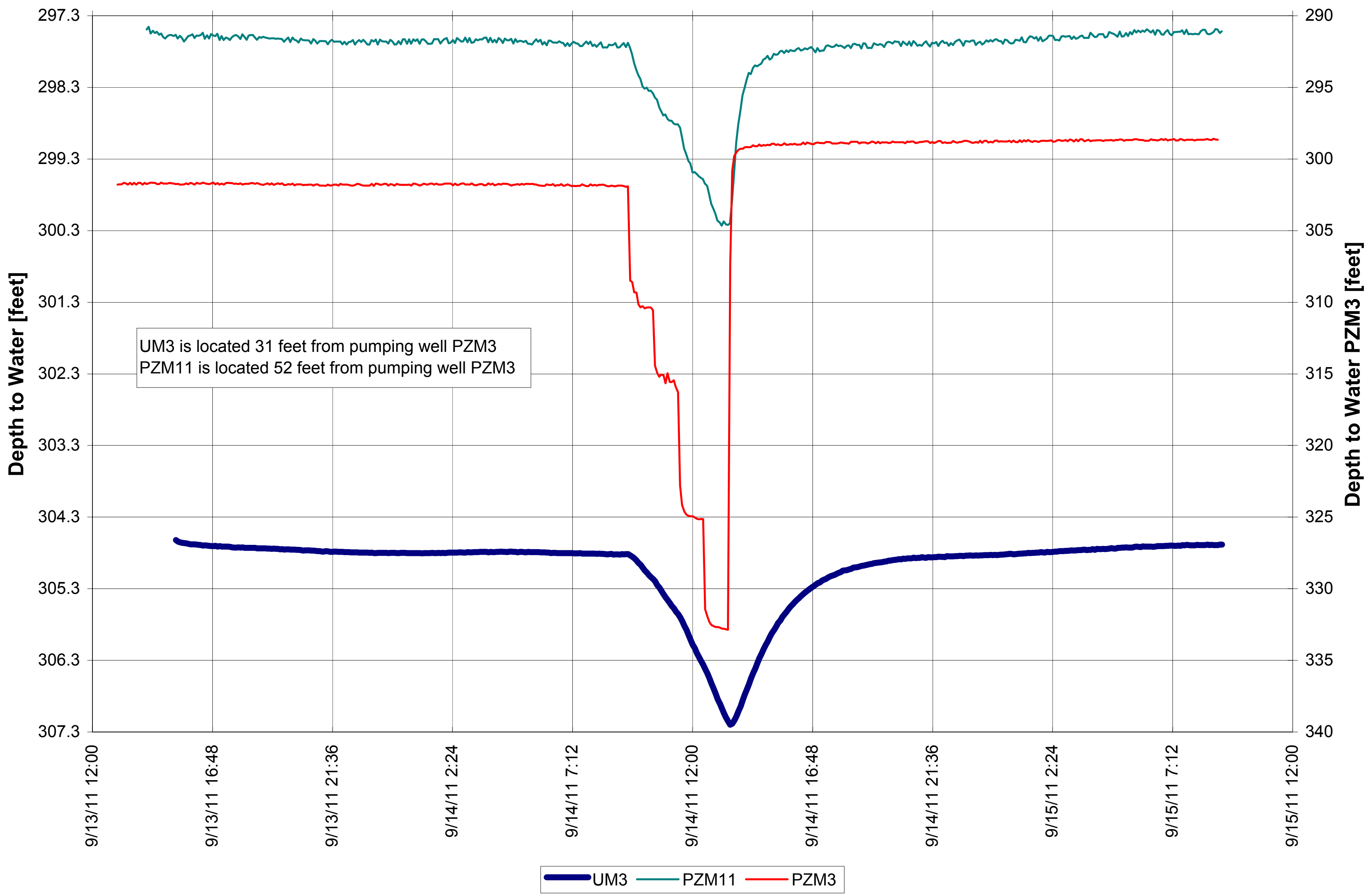


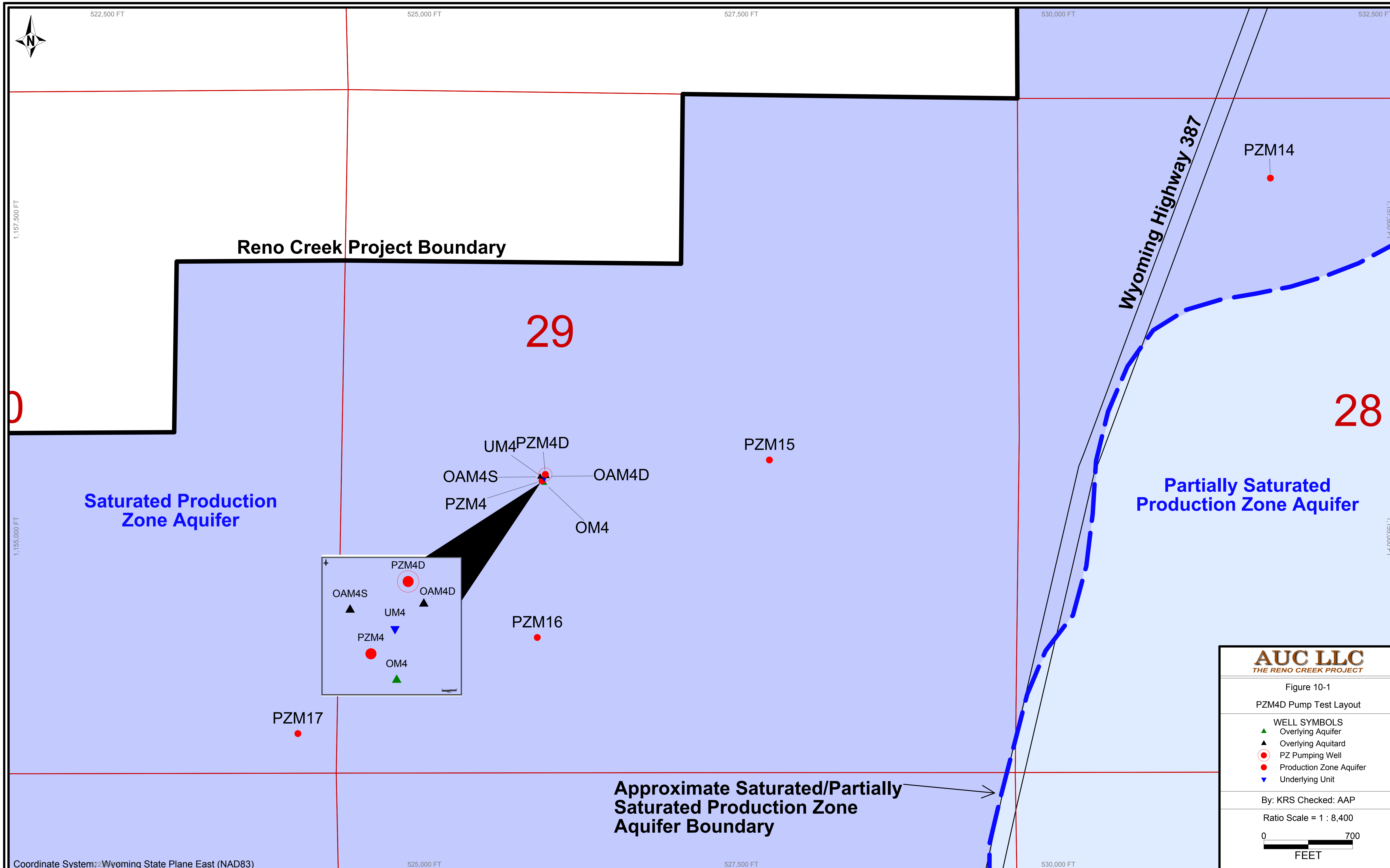
Figure 9-10. UM3R Single-well Test Water Level Data
Reno Creek Project
Depth to Water [feet]
301
321
341
361
381
401
421
11/4/11 10:00
11/4/11 11:00
11/4/11 12:00
11/4/11 13:00
11/4/11 14:00
11/4/11 15:00
11/4/11 16:00
11/4/11 17:00
11/04/2011
Started pumping at 10:33 at 9.0 gpm;
At 10:36 dialed rate back to 2.0 gpm;
Stopped pumping at 11:00 after water flow stopped;
Total discharge at 51 gallons, avg rate 1.9 gpm.
Water level monitored for approximately 3.1 days after test;
recovered to within 1.0 feet of initial static water level.
UM3R

Petrotek

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



Petrotek


522,500 FT
525,000 FT
527,500 FT
530,000 FT
532,500 FT
1,157,500 FT
1,155,000 FT
N
Reno Creek Project Boundary
29
28
Wyoming Highway 387
PZM14
PZM15
UM4
PZM4D
OAM4S
OAM4D
PZM4
OM4
PZM16
PZM17
Saturated Production Zone Aquifer
Partially Saturated Production Zone Aquifer
Approximate Saturated/Partially Saturated Production Zone Aquifer Boundary
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 10-1
PZM4D Pump Test Layout
WELL SYMBOLS
Overlying Aquifer
Overlying Aquitard
PZ Pumping Well
Production Zone Aquifer
Underlying Unit
By: KRS Checked: AAP
Ratio Scale = 1 : 8,400
0
700
FEET

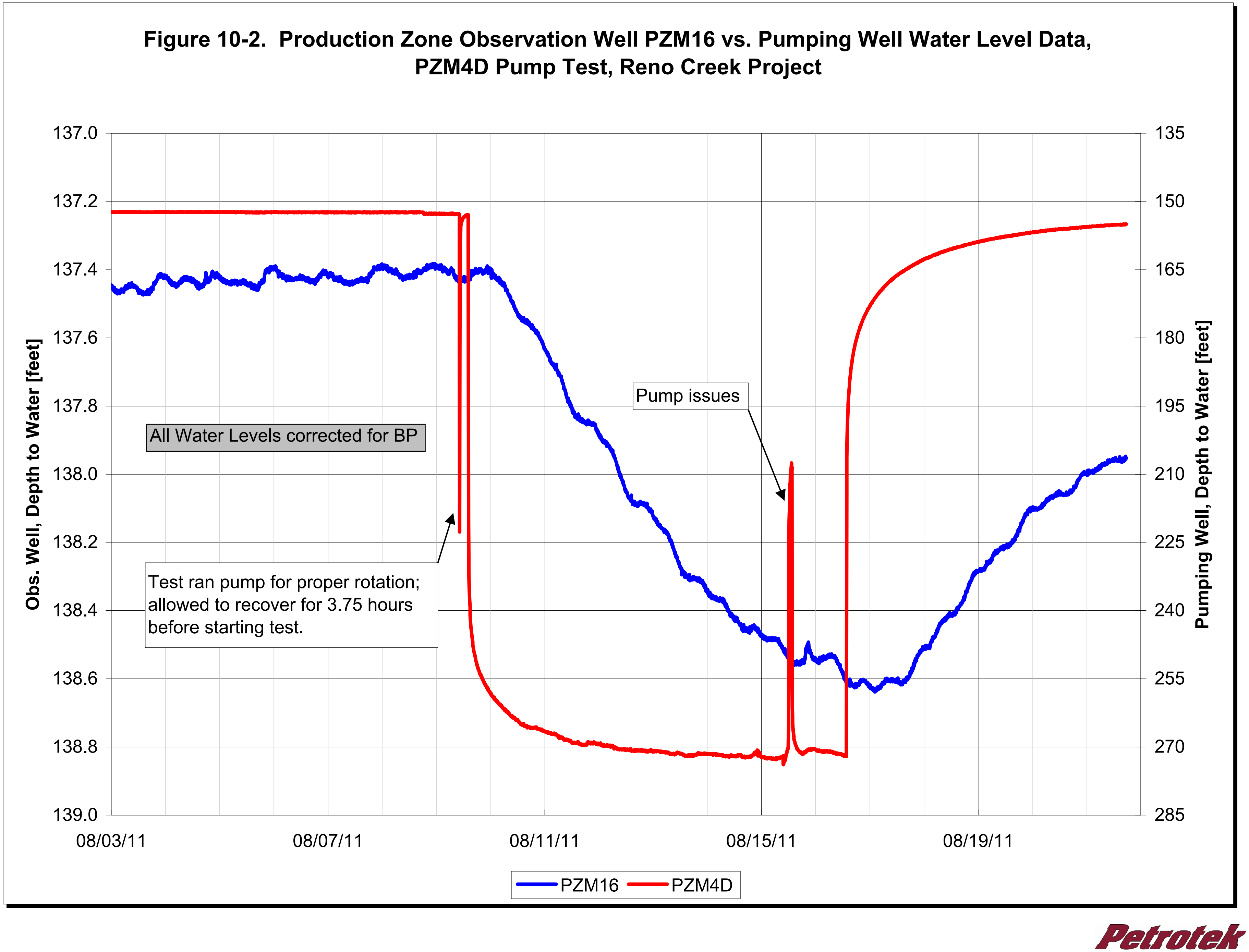


Figure 10-2. Production Zone Observation Well PZM16 vs. Pumping Well Water Level Data,
PZM4D Pump Test, Reno Creek Project
137.0
137.2
137.4
137.6
137.8
138.0
138.2
138.4
138.6
138.8
139.0
Obs. Well, Depth to Water [feet]
135
150
165
180
195
210
225
240
255
270
285
Pumping Well, Depth to Water [feet]
08/03/11
08/07/11
08/11/11
08/15/11
08/19/11
All Water Levels corrected for BP
Pump issues
Test ran pump for proper rotation; allowed to recover for 3.75 hours before starting test.
PZM16
PZM4D
Petrotek

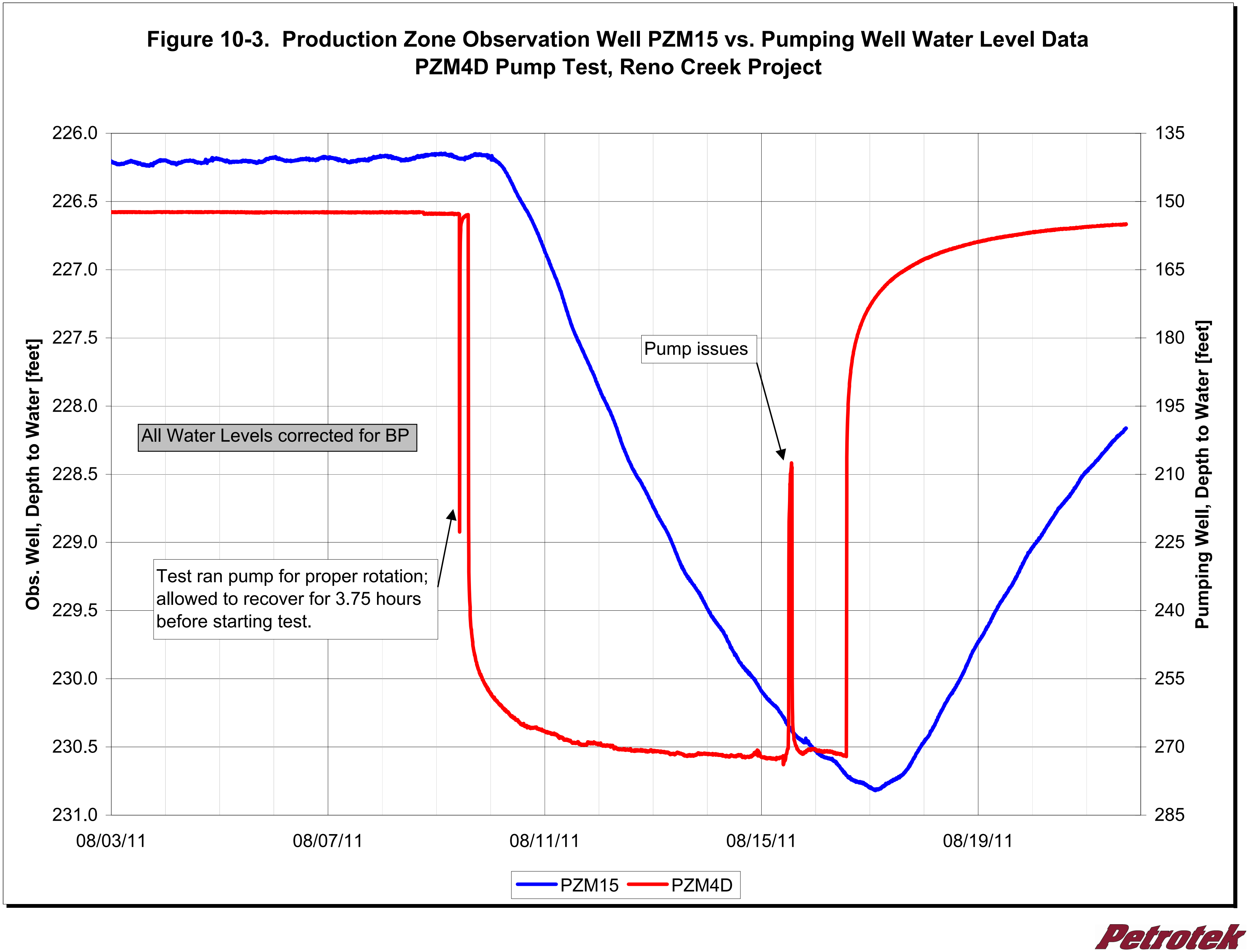


Figure 10-3. Production Zone Observation Well PZM15 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
Pumping Well, Depth to Water [feet]
226.0
226.5
227.0
227.5
228.0
228.5
229.0
229.5
230.0
230.5
231.0
135
150
165
180
195
210
225
240
255
270
285
08/03/11
08/07/11
08/11/11
08/15/11
08/19/11
All Water Levels corrected for BP
Test ran pump for proper rotation; allowed to recover for 3.75 hours before starting test.
Pump issues
PZM15
PZM4D
Petrotek

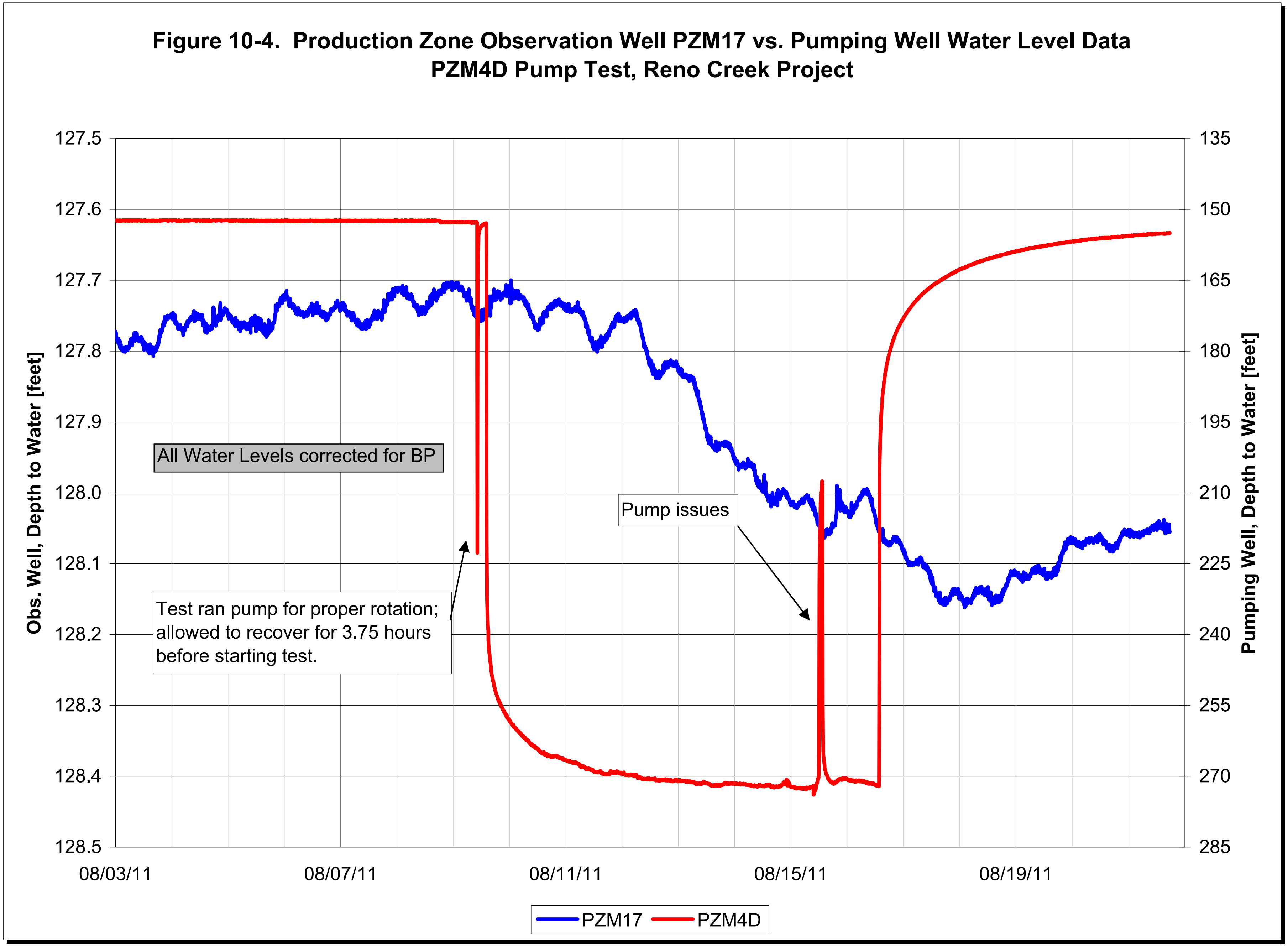


Figure 10-4. Production Zone Observation Well PZM17 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
127.5
127.6
127.7
127.8
127.9
128.0
128.1
128.2
128.3
128.4
128.5
Pumping Well, Depth to Water [feet]
135
150
165
180
195
210
225
240
255
270
285
08/03/11
08/07/11
08/11/11
08/15/11
08/19/11
All Water Levels corrected for BP
Test ran pump for proper rotation; allowed to recover for 3.75 hours before starting test.
Pump issues
PZM17
PZM4D

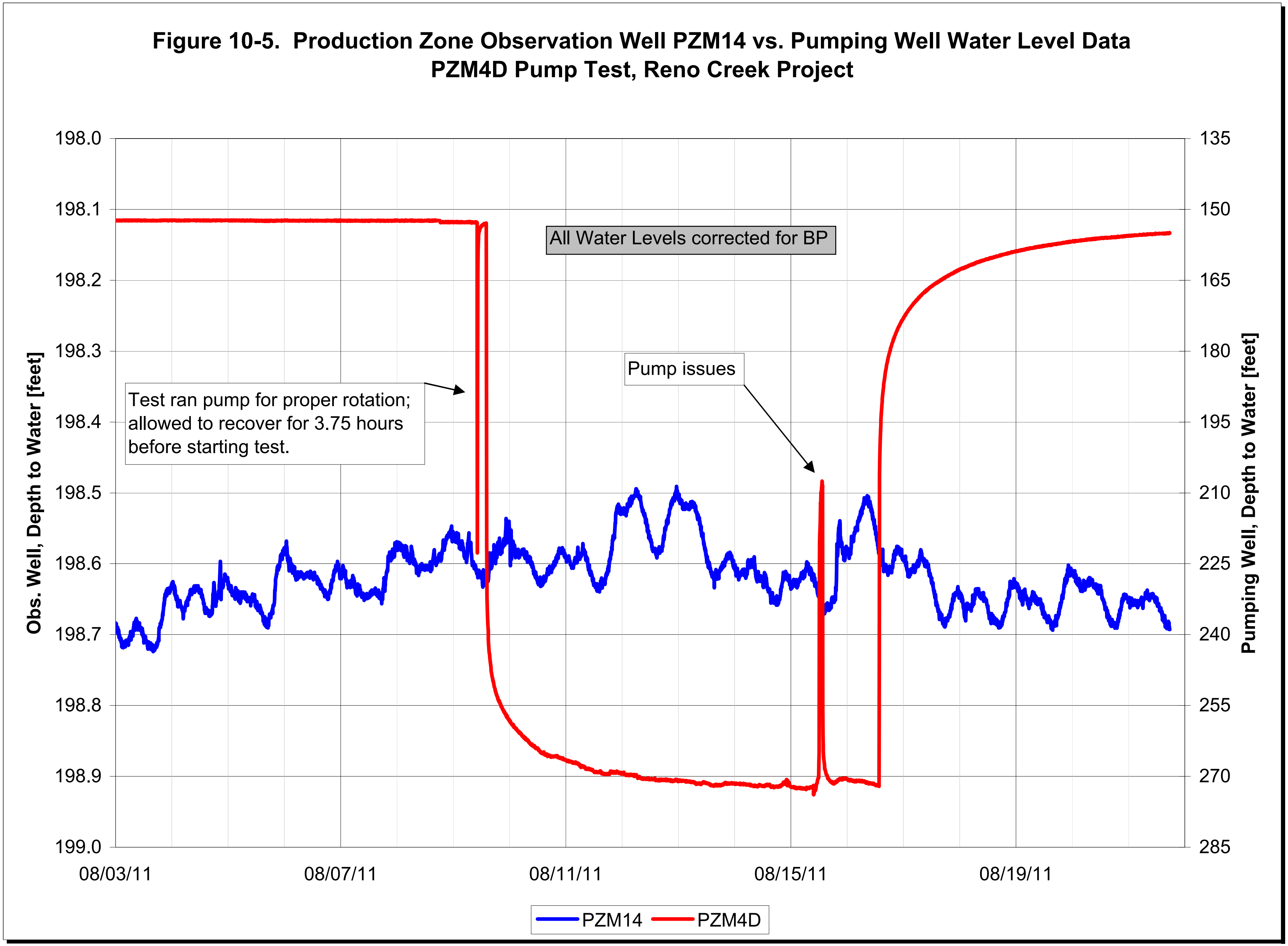


Figure 10-5. Production Zone Observation Well PZM14 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project
All Water Levels corrected for BP
Pump issues
Test ran pump for proper rotation; allowed to recover for 3.75 hours before starting test.
Obs. Well, Depth to Water [feet]
Pumping Well, Depth to Water [feet]
198.0
198.1
198.2
198.3
198.4
198.5
198.6
198.7
198.8
198.9
199.0
135
150
165
180
195
210
225
240
255
270
285
08/03/11
08/07/11
08/11/11
08/15/11
08/19/11
PZM14
PZM4D

Petrotek

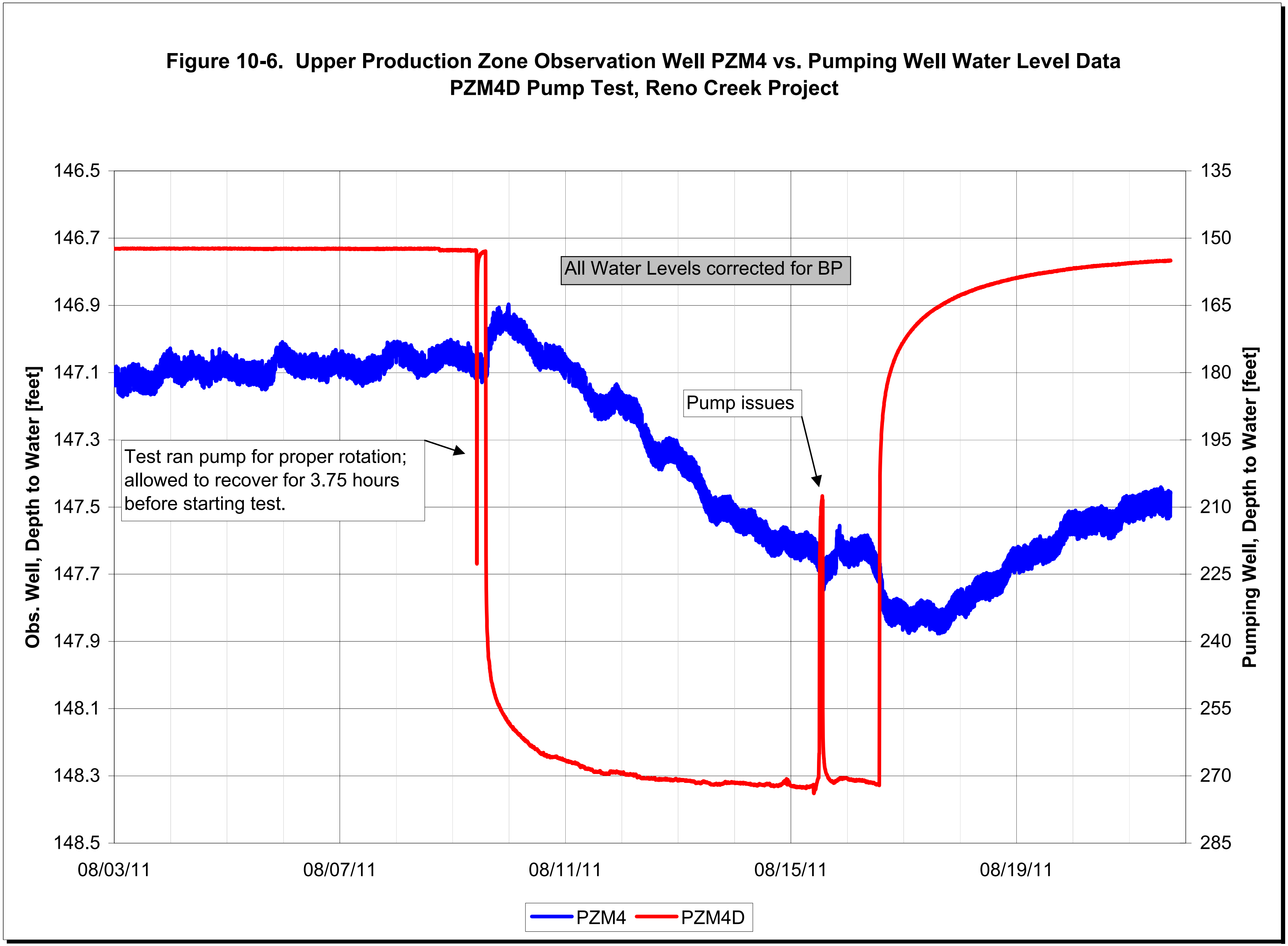
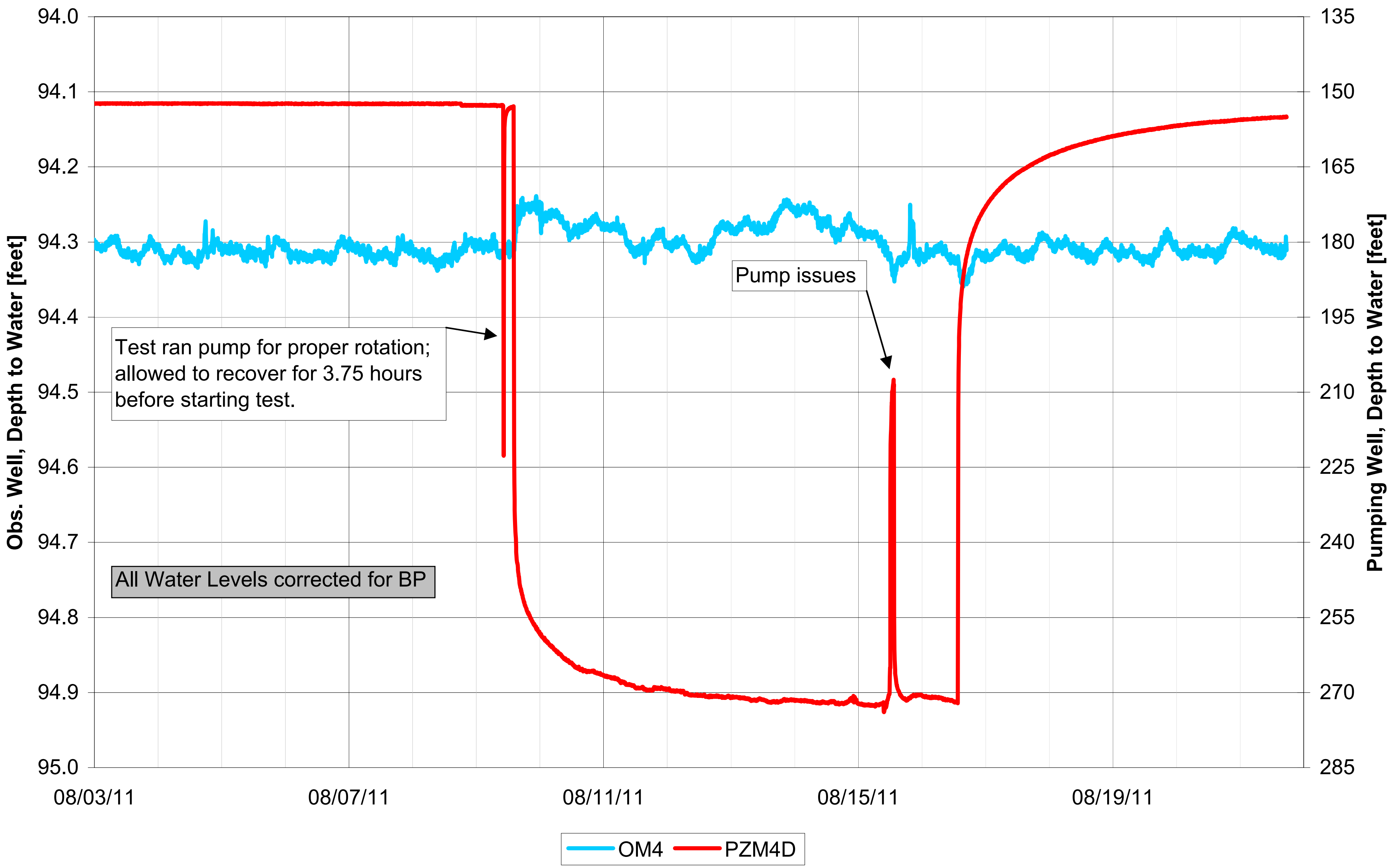


Figure 10-6. Upper Production Zone Observation Well PZM4 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
146.5
146.7
146.9
147.1
147.3
147.5
147.7
147.9
148.1
148.3
148.5
Pumping Well, Depth to Water [feet]
135
150
165
180
195
210
225
240
255
270
285
08/03/11
08/07/11
08/11/11
08/15/11
08/19/11
All Water Levels corrected for BP
Pump issues
Test ran pump for proper rotation; allowed to recover for 3.75 hours before starting test.
PZM4
PZM4D
Petrotek

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



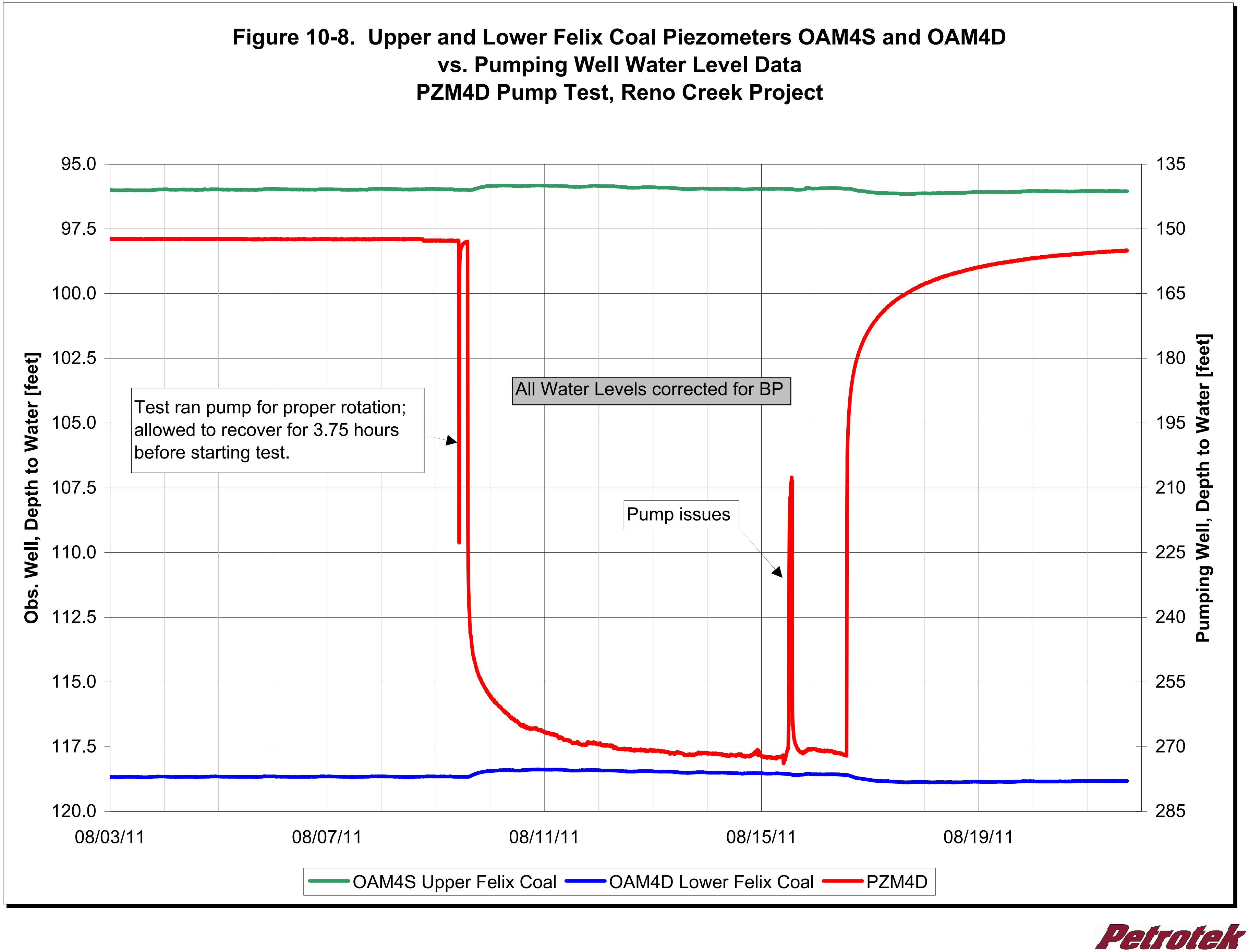


Figure 10-8. Upper and Lower Felix Coal Piezometers OAM4S and OAM4D
vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
Pumping Well, Depth to Water [feet]
95.0
97.5
100.0
102.5
105.0
107.5
110.0
112.5
115.0
117.5
120.0
135
150
165
180
195
210
225
240
255
270
285
08/03/11
08/07/11
08/11/11
08/15/11
08/19/11
Test ran pump for proper rotation; allowed to recover for 3.75 hours before starting test.
All Water Levels corrected for BP
Pump issues
OAM4S Upper Felix Coal
OAM4D Lower Felix Coal
PZM4D
Petrotek

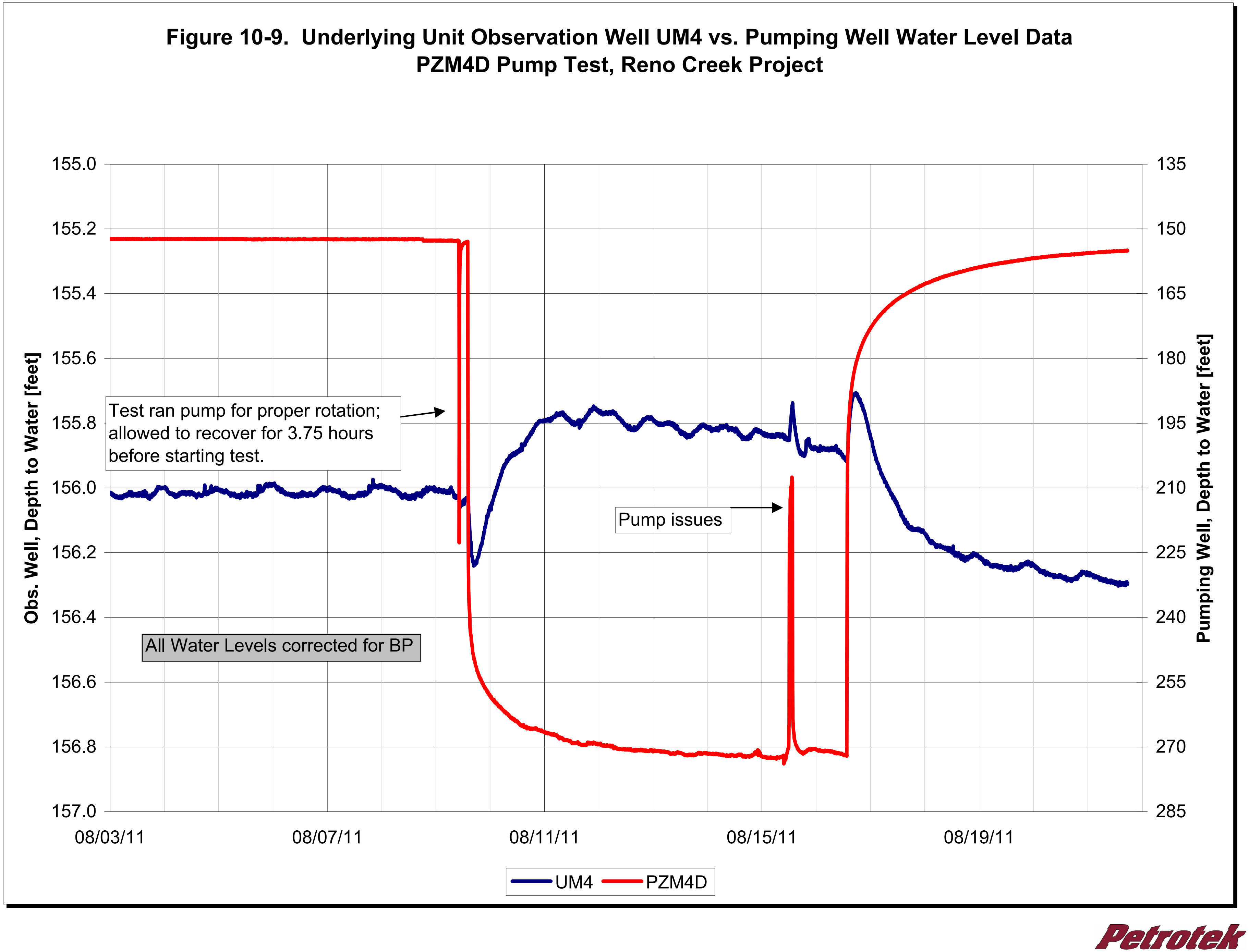
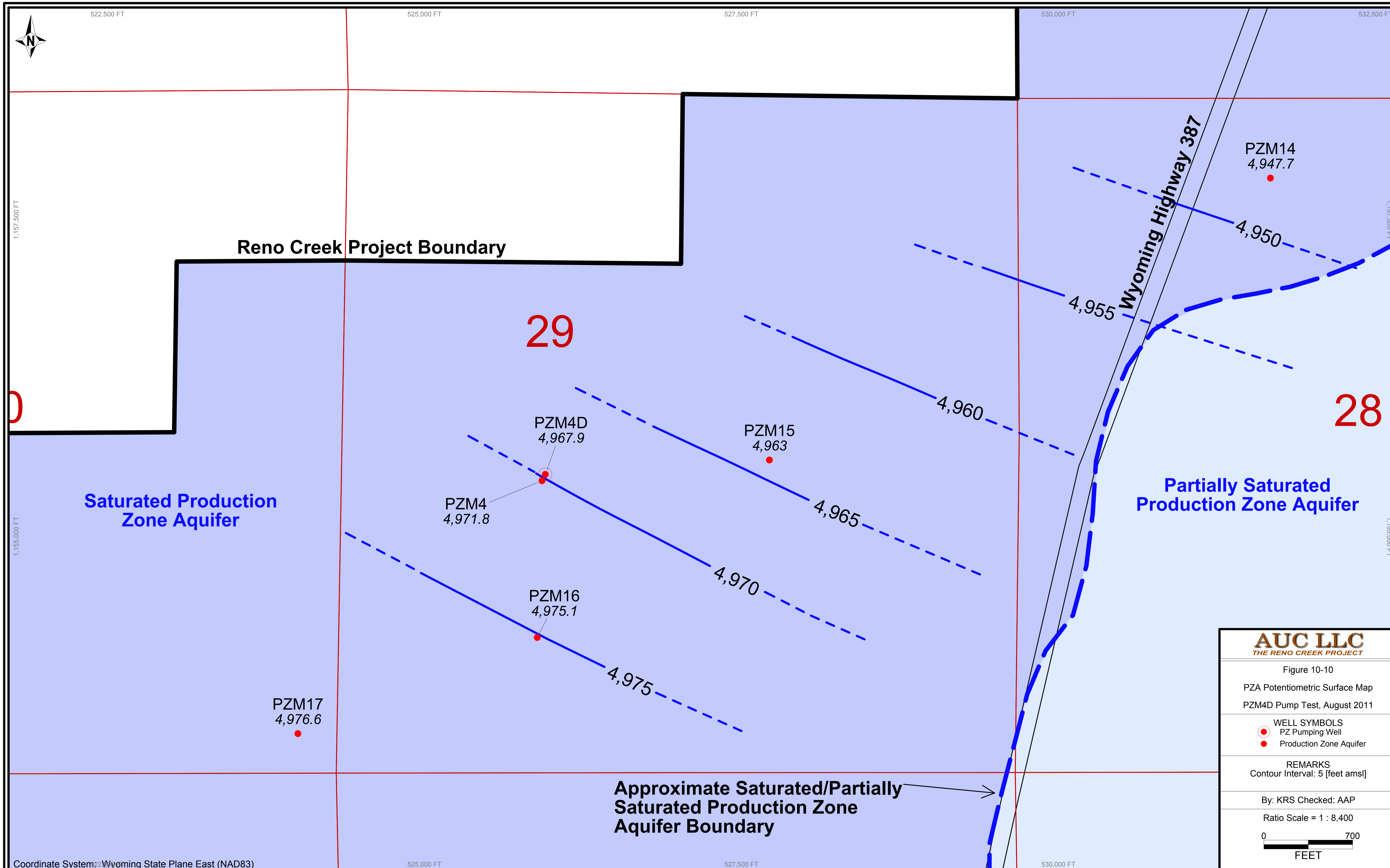


Figure 10-9. Underlying Unit Observation Well UM4 vs. Pumping Well Water Level Data
PZM4D Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
155.0
155.2
155.4
155.6
155.8
156.0
156.2
156.4
156.6
156.8
157.0
Pumping Well, Depth to Water [feet]
135
150
165
180
195
210
225
240
255
270
285
08/03/11
08/07/11
08/11/11
08/15/11
08/19/11
Test ran pump for proper rotation; allowed to recover for 3.75 hours before starting test.
Pump issues
All Water Levels corrected for BP
UM4
PZM4D
Petrotek


522,500 FT
525,000 FT
527,500 FT
530,000 FT
532,500 FT
1,157,500 FT
1,155,000 FT
N
Reno Creek Project Boundary
29
28
Wyoming Highway 387
PZM14
4,947.7
4,950
4,955
4,960
4,965
4,970
4,975
PZM4D
4,967.9
PZM15
4,963
PZM4
4,971.8
PZM16
4,975.1
PZM17
4,976.6
Saturated Production Zone Aquifer
Partially Saturated Production Zone Aquifer
Approximate Saturated/Partially Saturated Production Zone Aquifer Boundary
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 10-10
PZA Potentiometric Surface Map
PZM4D Pump Test, August 2011
WELL SYMBOLS
PZ Pumping Well
Production Zone Aquifer
REMARKS
Contour Interval: 5 [feet amsl]
By: KRS Checked: AAP
Ratio Scale = 1 : 8,400
0
700
FEET

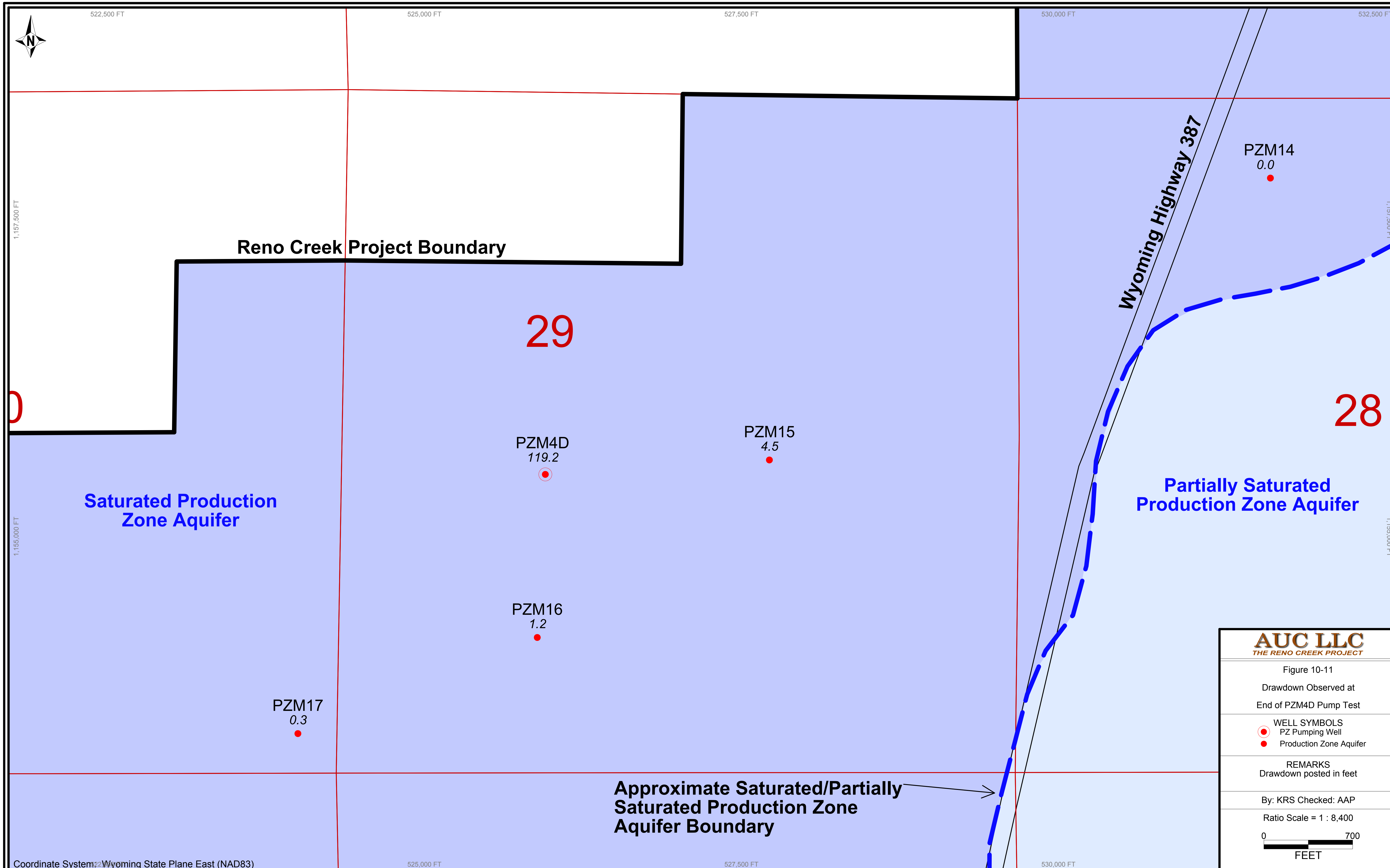
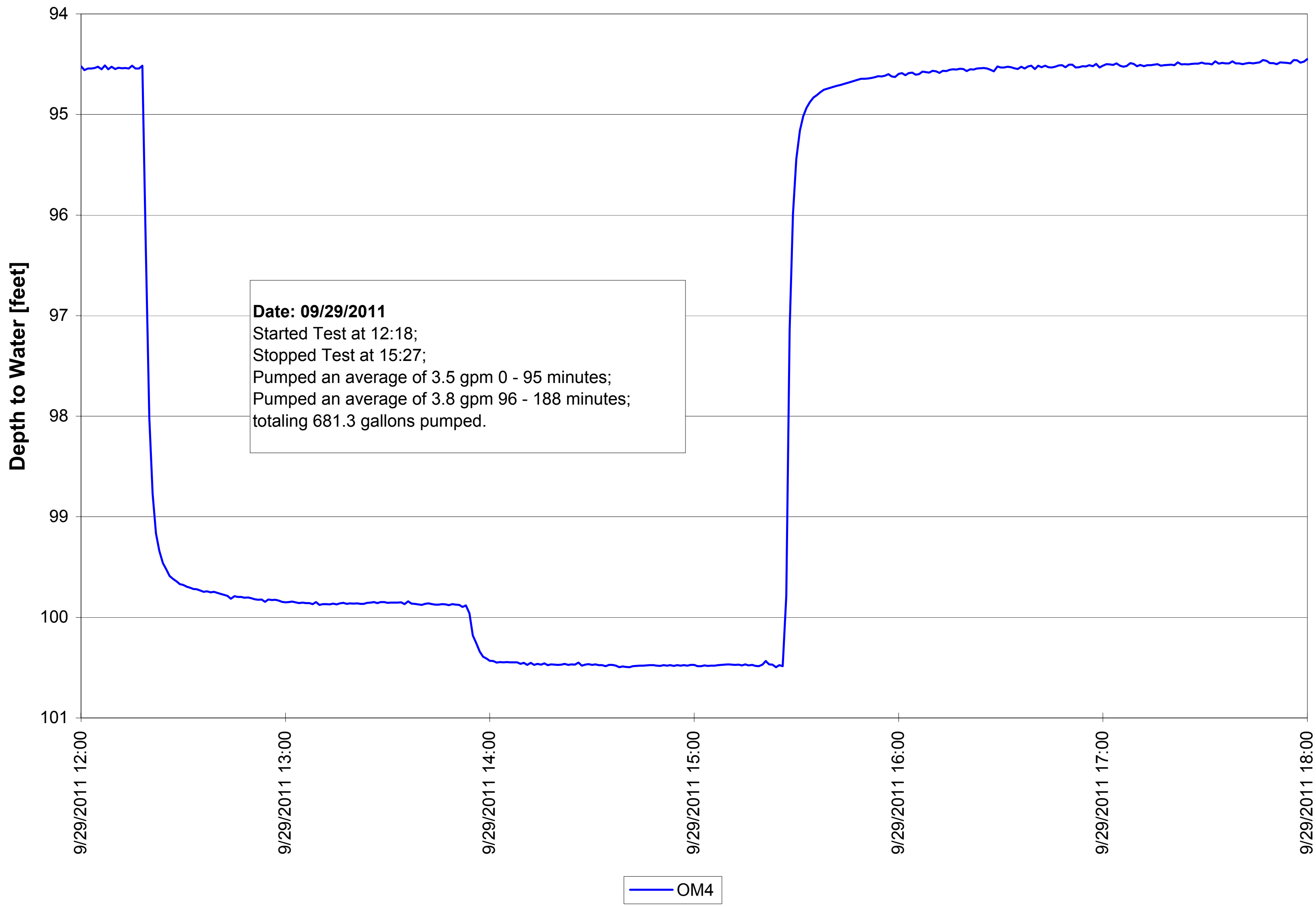

522,500 FT
525,000 FT
527,500 FT
530,000 FT
532,500 FT
1,157,500 FT
1,155,000 FT
Reno Creek Project Boundary
Wyoming Highway 387
29
28
PZM14
0.0
PZM4D
119.2
PZM15
4.5
PZM16
1.2
PZM17
0.3
Saturated Production Zone Aquifer
Partially Saturated Production Zone Aquifer
Approximate Saturated/Partially Saturated Production Zone Aquifer Boundary
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 10-11
Drawdown Observed at
End of PZM4D Pump Test
WELL SYMBOLS
PZ Pumping Well
Production Zone Aquifer
REMARKS
Drawdown posted in feet
By: KRS Checked: AAP
Ratio Scale = 1 : 8,400
0
700
FEET

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



Petrotek

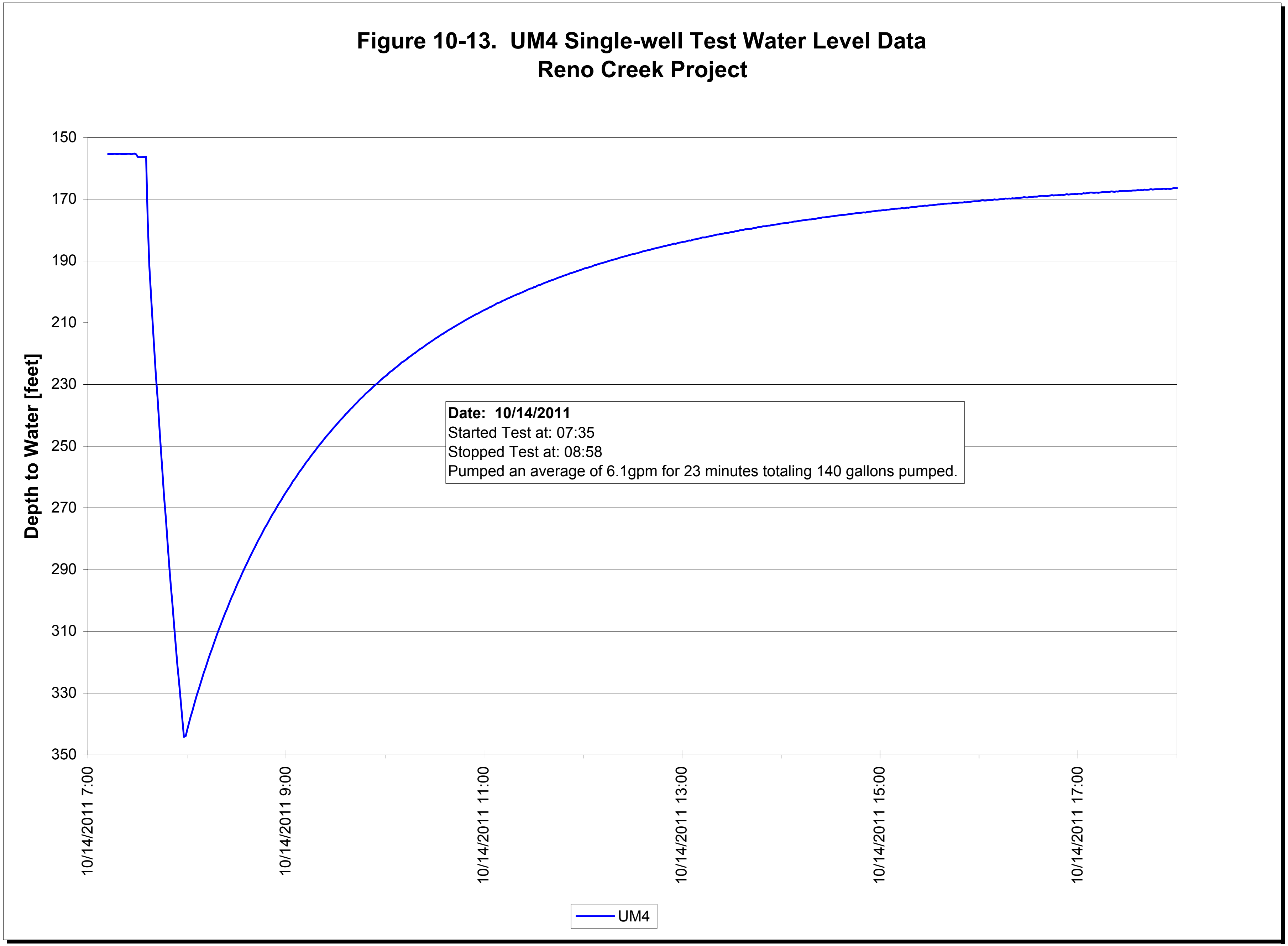
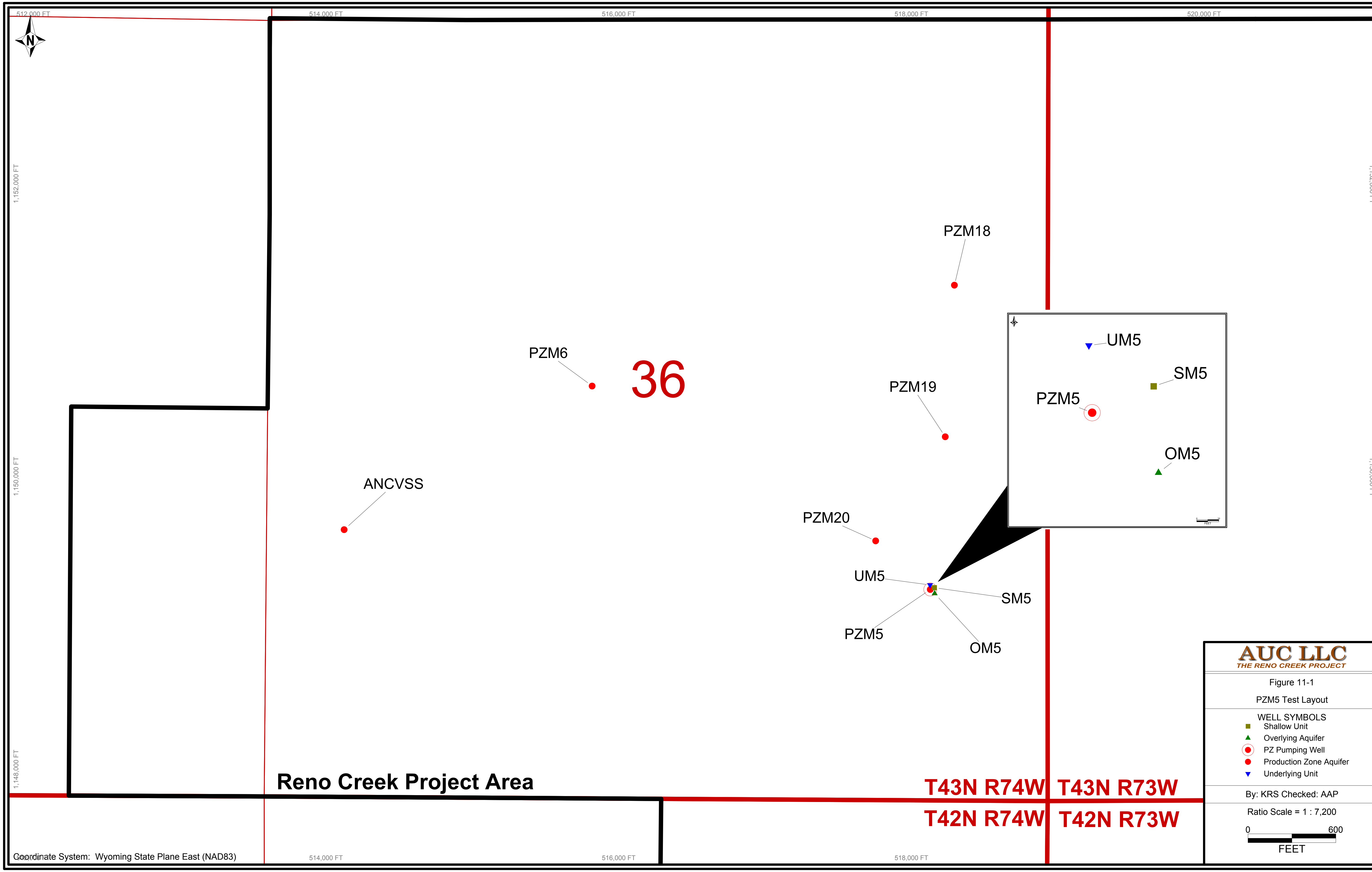


Figure 10-13. UM4 Single-well Test Water Level Data
Reno Creek Project
Depth to Water [feet]
150
170
190
210
230
250
270
290
310
330
350
10/14/2011 7:00
10/14/2011 9:00
10/14/2011 11:00
10/14/2011 13:00
10/14/2011 15:00
10/14/2011 17:00
Date: 10/14/2011
Started Test at: 07:35
Stopped Test at: 08:58
Pumped an average of 6.1gpm for 23 minutes totaling 140 gallons pumped.
UM4

Petrotek


512,000 FT
514,000 FT
516,000 FT
518,000 FT
520,000 FT
1,152,000 FT
1,150,000 FT
1,148,000 FT
N
PZM18
PZM6
36
PZM19
ANCVSS
PZM20
UM5
SM5
PZM5
OM5
Reno Creek Project Area
T43N R74W
T43N R73W
T42N R74W
T42N R73W
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 11-1
PZM5 Test Layout
WELL SYMBOLS
Shallow Unit
Overlying Aquifer
PZ Pumping Well
Production Zone Aquifer
Underlying Unit
By: KRS Checked: AAP
Ratio Scale = 1 : 7,200
0
600
FEET

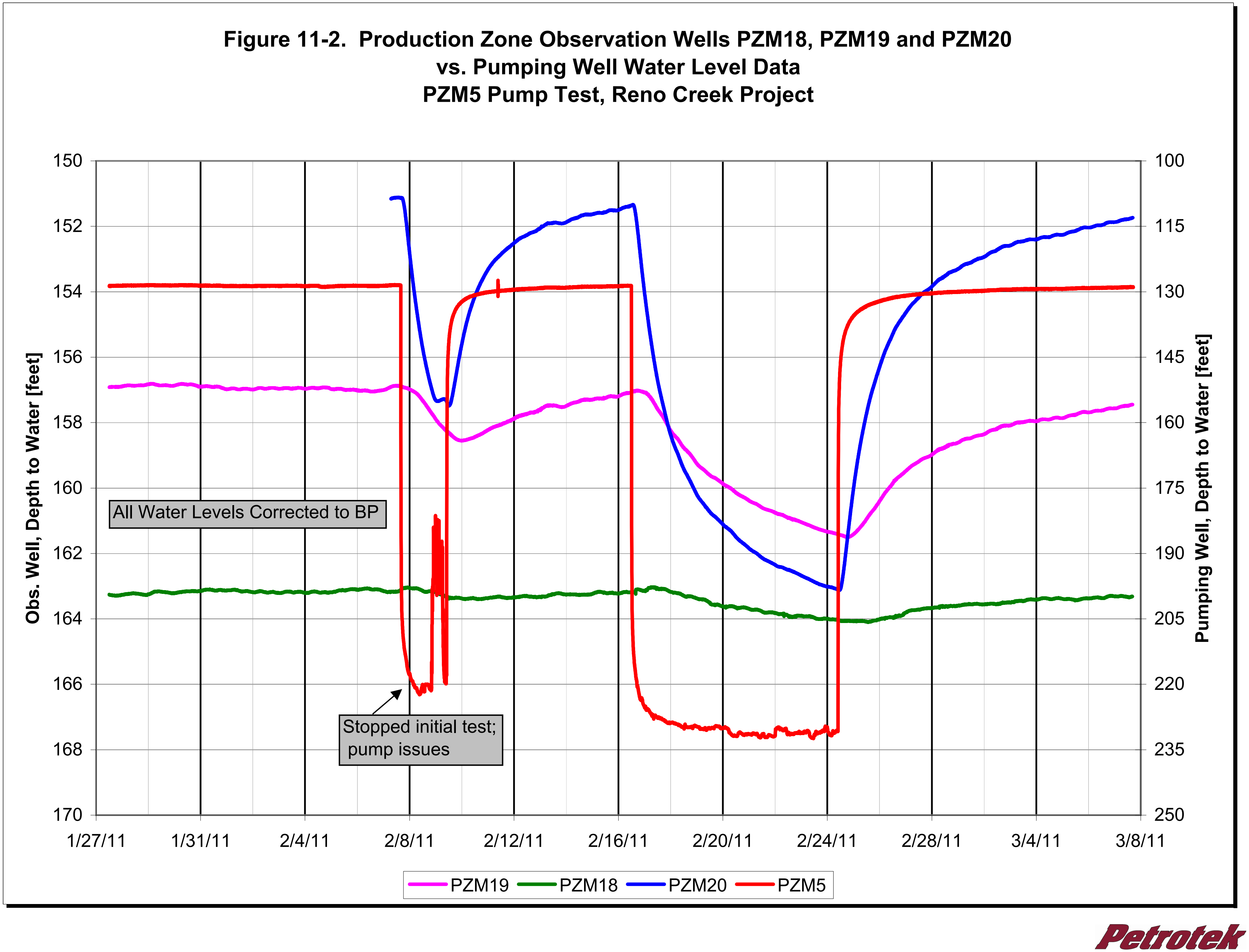


Figure 11-2. Production Zone Observation Wells PZM18, PZM19 and PZM20
vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
Pumping Well, Depth to Water [feet]
150
152
154
156
158
160
162
164
166
168
170
100
115
130
145
160
175
190
205
220
235
250
1/27/11
1/31/11
2/4/11
2/8/11
2/12/11
2/16/11
2/20/11
2/24/11
2/28/11
3/4/11
3/8/11
All Water Levels Corrected to BP
Stopped initial test; pump issues
PZM19
PZM18
PZM20
PZM5
Petrotek

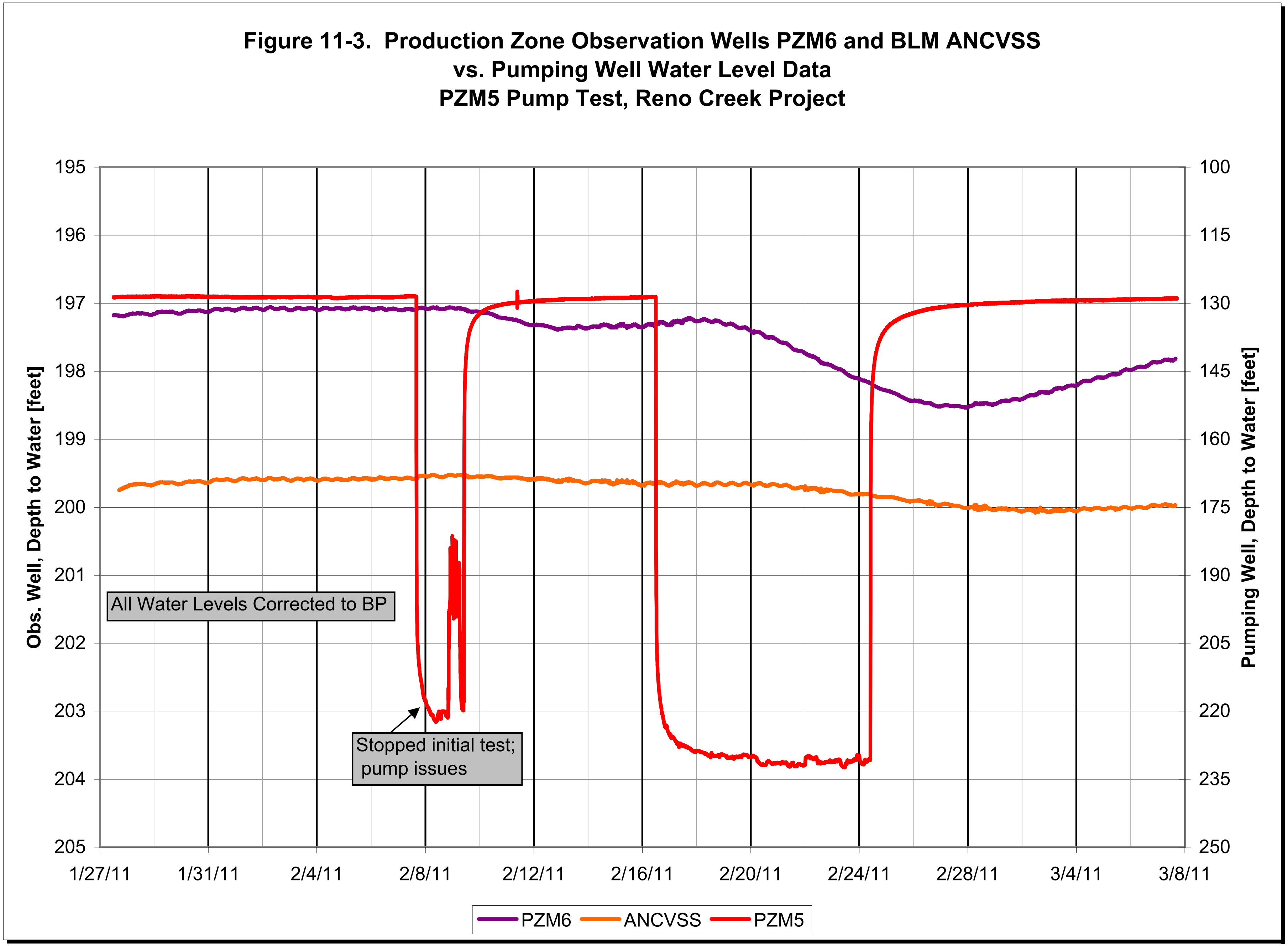


Figure 11-3. Production Zone Observation Wells PZM6 and BLM ANCVSS
vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
Pumping Well, Depth to Water [feet]
195
196
197
198
199
200
201
202
203
204
205
100
115
130
145
160
175
190
205
220
235
250
1/27/11
1/31/11
2/4/11
2/8/11
2/12/11
2/16/11
2/20/11
2/24/11
2/28/11
3/4/11
3/8/11
All Water Levels Corrected to BP
Stopped initial test; pump issues
PZM6
ANCVSS
PZM5

Petrotek

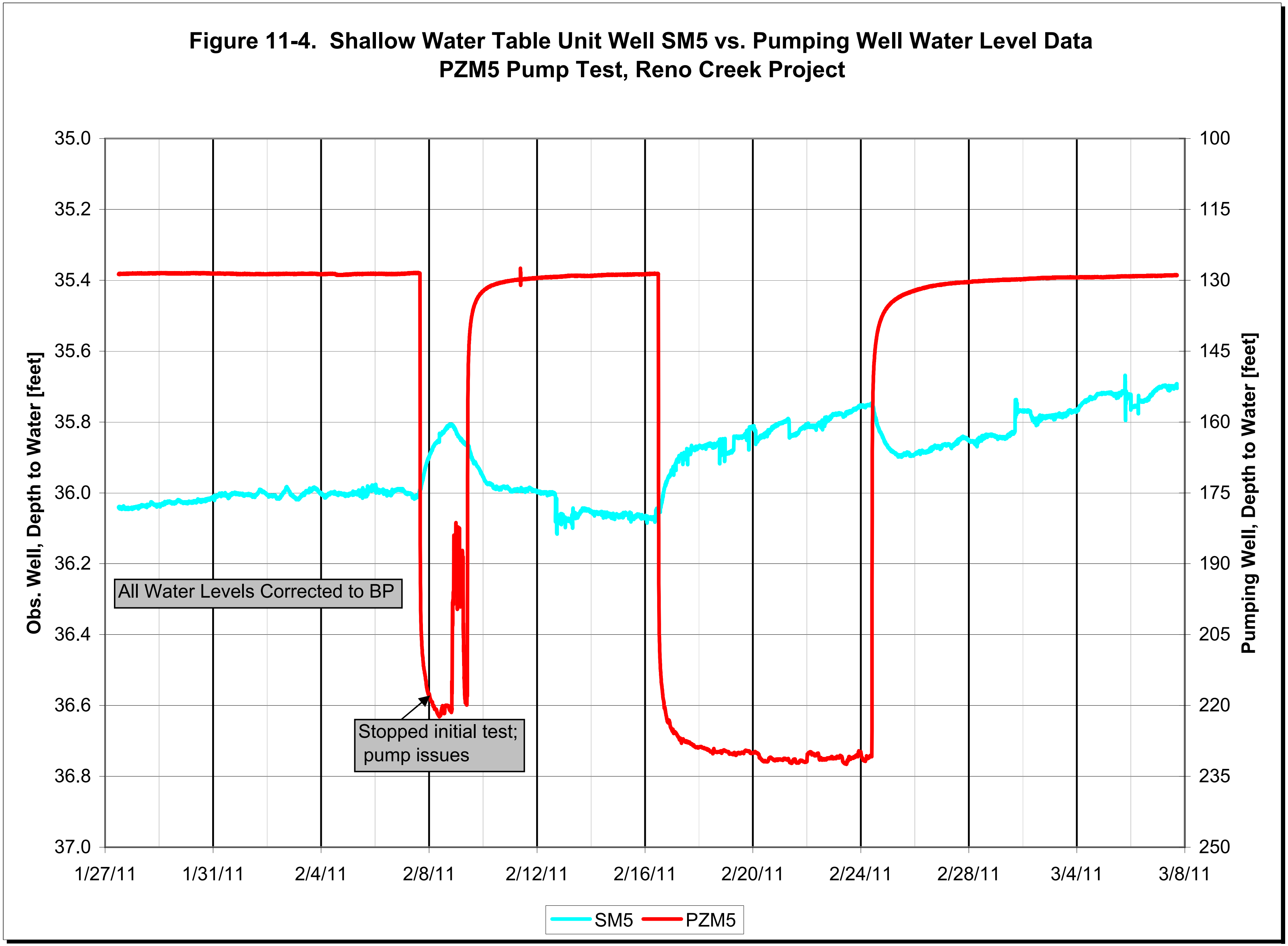


Figure 11-4. Shallow Water Table Unit Well SM5 vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
Pumping Well, Depth to Water [feet]
35.0
35.2
35.4
35.6
35.8
36.0
36.2
36.4
36.6
36.8
37.0
100
115
130
145
160
175
190
205
220
235
250
1/27/11
1/31/11
2/4/11
2/8/11
2/12/11
2/16/11
2/20/11
2/24/11
2/28/11
3/4/11
3/8/11
All Water Levels Corrected to BP
Stopped initial test; pump issues
SM5
PZM5

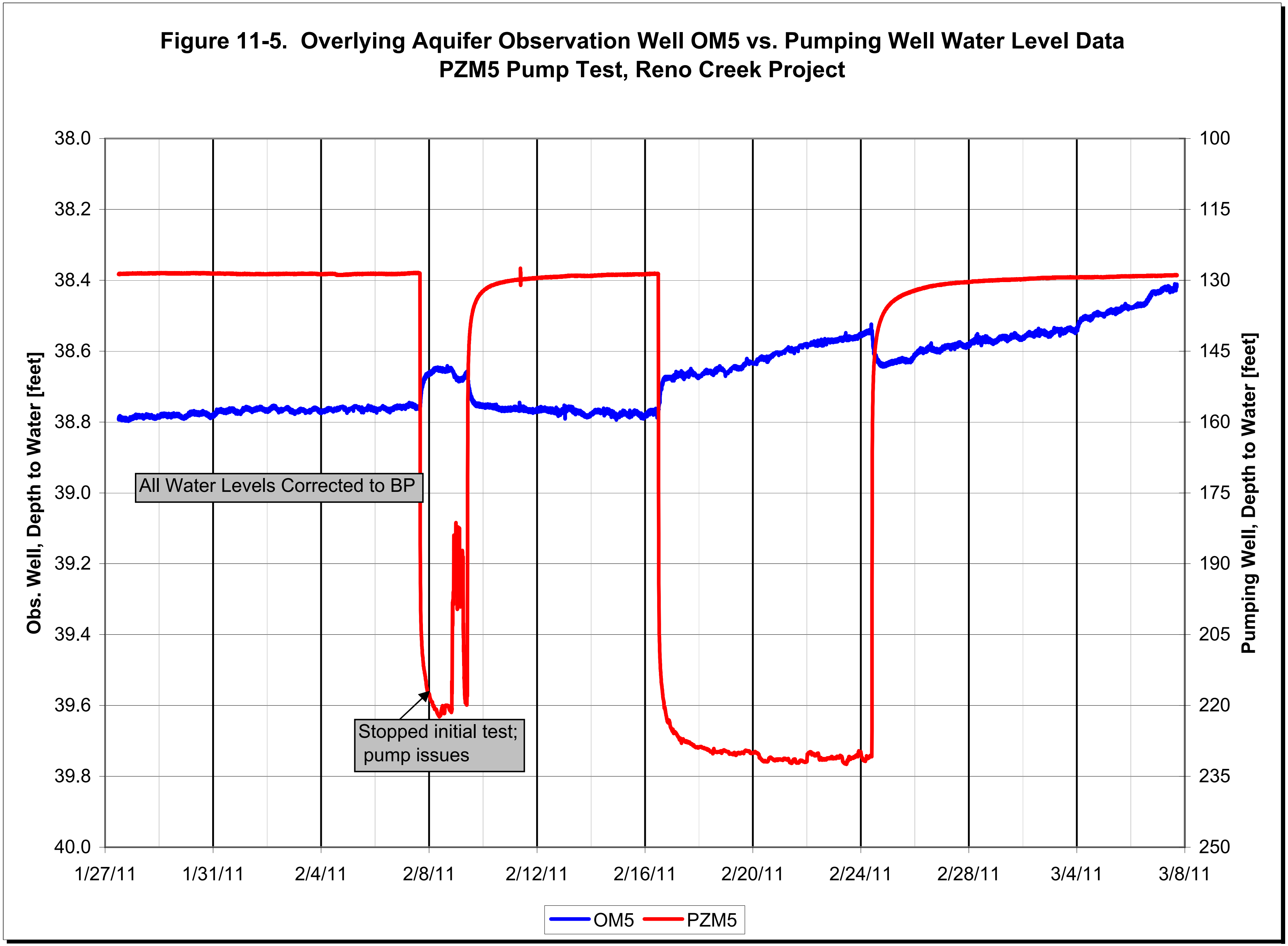


Figure 11-5. Overlying Aquifer Observation Well OM5 vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
Pumping Well, Depth to Water [feet]
38.0
38.2
38.4
38.6
38.8
39.0
39.2
39.4
39.6
39.8
40.0
100
115
130
145
160
175
190
205
220
235
250
1/27/11
1/31/11
2/4/11
2/8/11
2/12/11
2/16/11
2/20/11
2/24/11
2/28/11
3/4/11
3/8/11
All Water Levels Corrected to BP
Stopped initial test; pump issues
OM5
PZM5

Petrotek

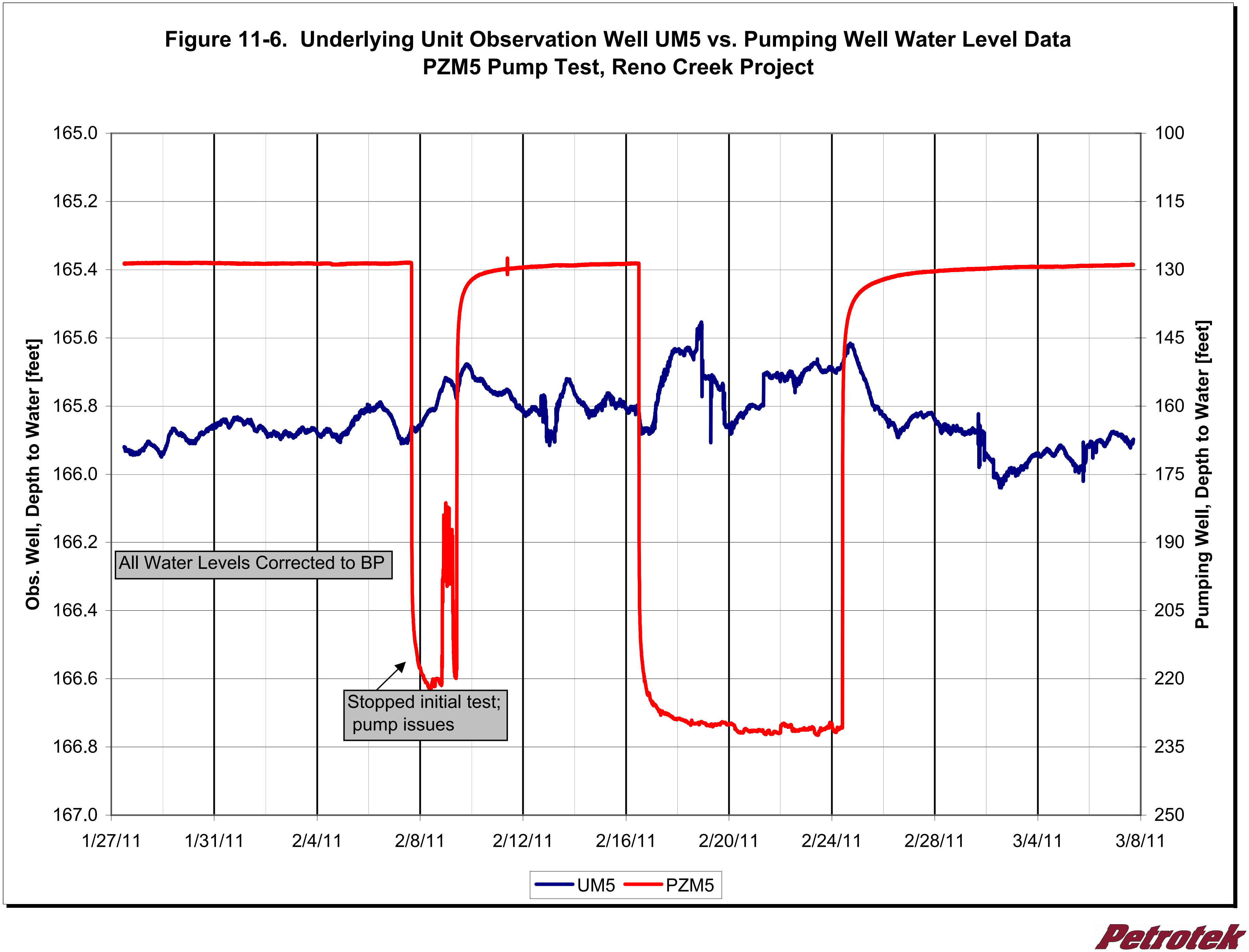
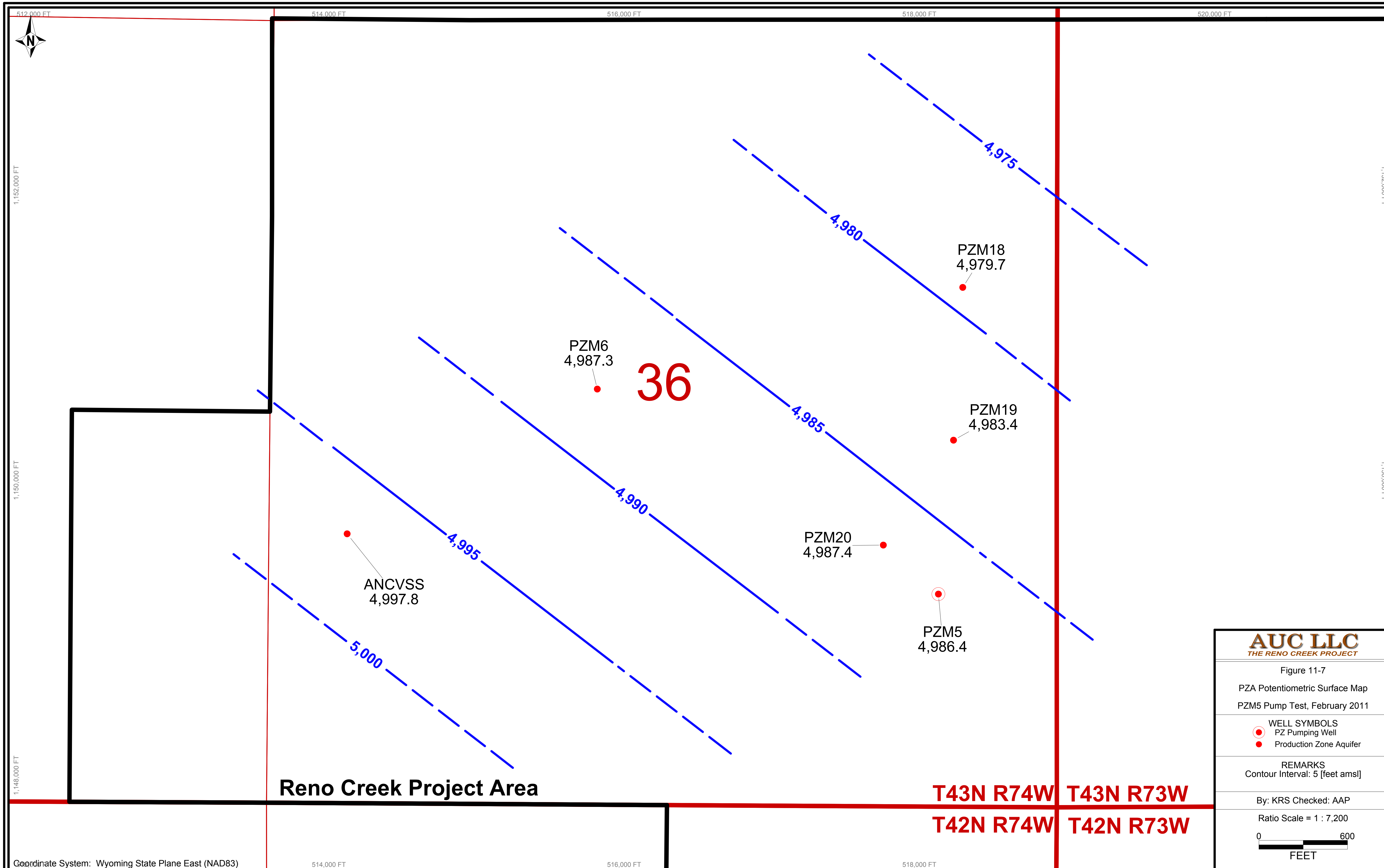
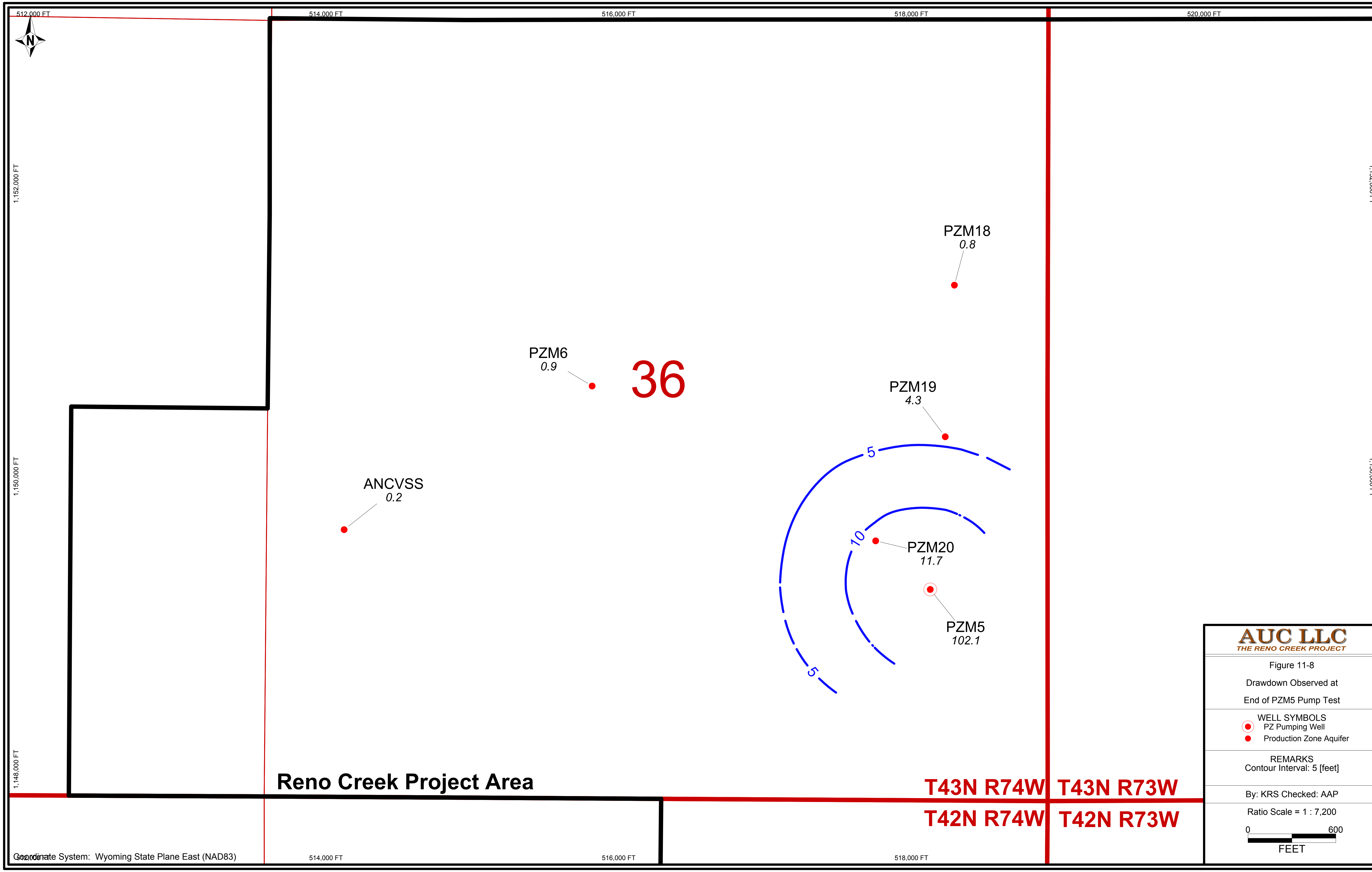


Figure 11-6. Underlying Unit Observation Well UM5 vs. Pumping Well Water Level Data
PZM5 Pump Test, Reno Creek Project
Obs. Well, Depth to Water [feet]
Pumping Well, Depth to Water [feet]
165.0
165.2
165.4
165.6
165.8
166.0
166.2
166.4
166.6
166.8
167.0
100
115
130
145
160
175
190
205
220
235
250
1/27/11
1/31/11
2/4/11
2/8/11
2/12/11
2/16/11
2/20/11
2/24/11
2/28/11
3/4/11
3/8/11
All Water Levels Corrected to BP
Stopped initial test; pump issues
UM5
PZM5
Petrotek

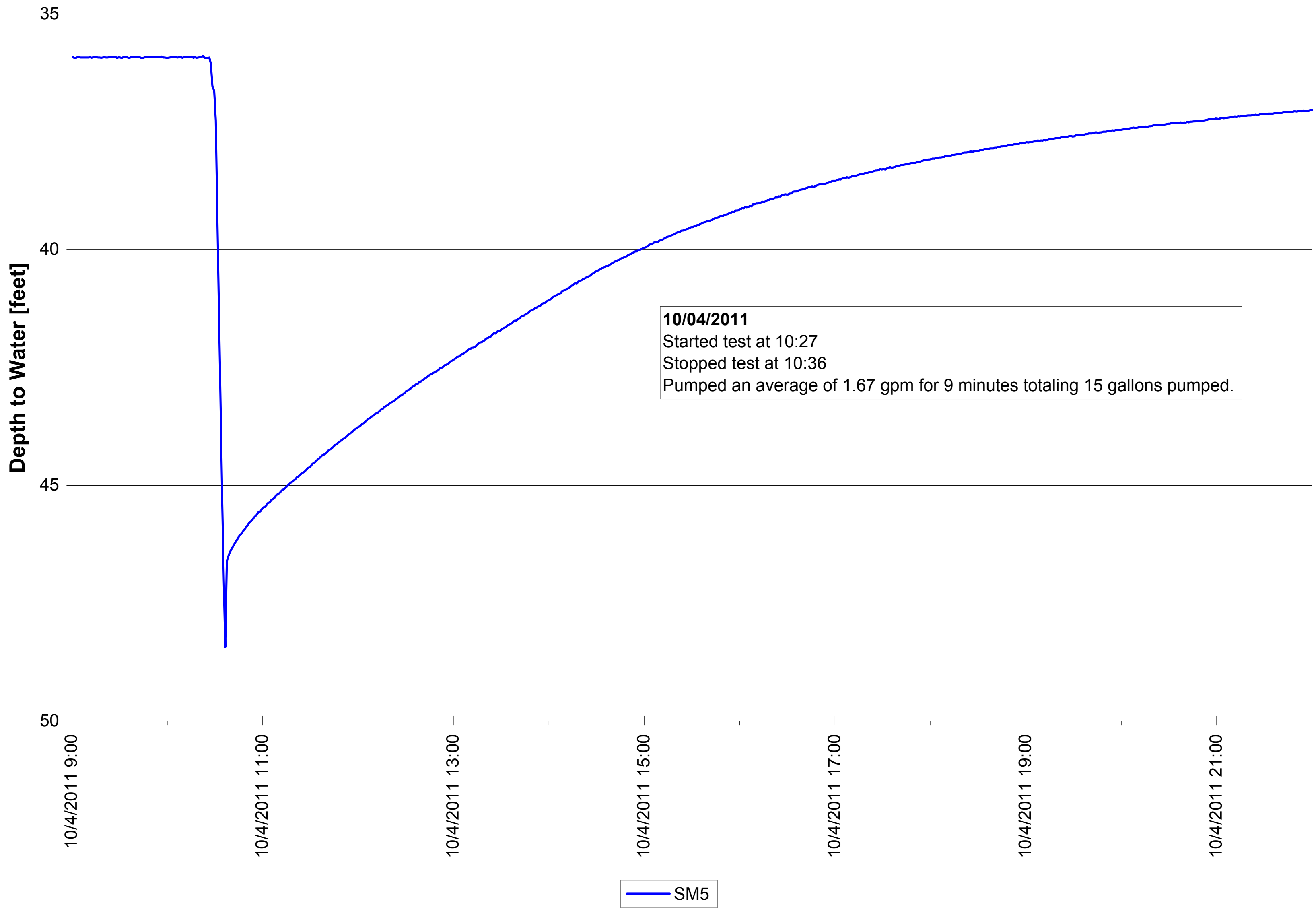


N
512,000 FT
514,000 FT
516,000 FT
518,000 FT
520,000 FT
1,152,000 FT
1,150,000 FT
1,148,000 FT
4,975
4,980
4,985
4,990
4,995
5,000
PZM18
4,979.7
PZM6
4,987.3
36
PZM19
4,983.4
PZM20
4,987.4
ANCVSS
4,997.8
PZM5
4,986.4
Reno Creek Project Area
T43N R74W
T43N R73W
T42N R74W
T42N R73W
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 11-7
PZA Potentiometric Surface Map
PZM5 Pump Test, February 2011
WELL SYMBOLS
PZ Pumping Well
Production Zone Aquifer
REMARKS
Contour Interval: 5 [feet amsl]
By: KRS Checked: AAP
Ratio Scale = 1 : 7,200
0
600
FEET



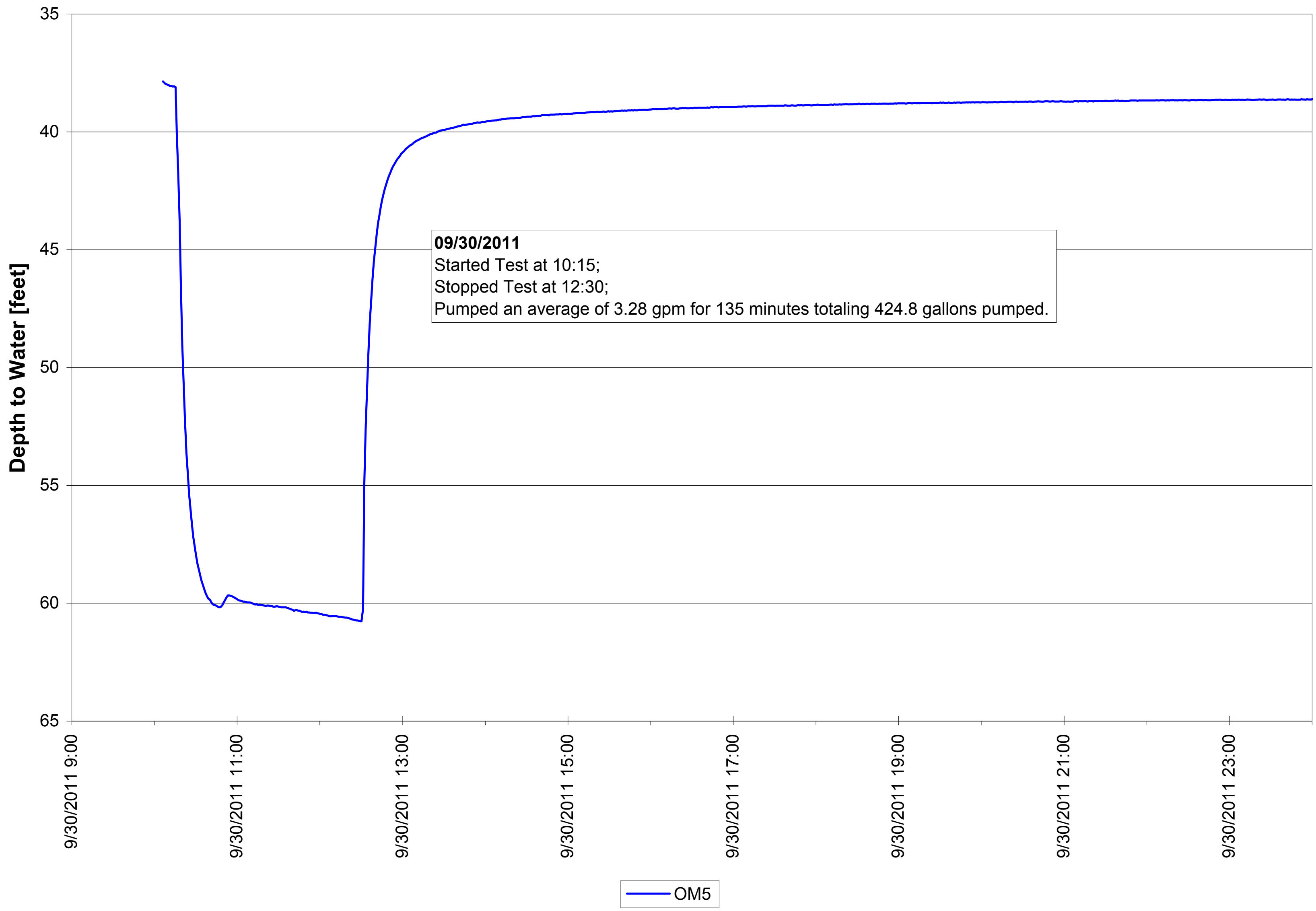
512,000 FT
514,000 FT
516,000 FT
518,000 FT
520,000 FT
1,152,000 FT
1,150,000 FT
1,148,000 FT
PZM18
0.8
PZM6
0.9
36
PZM19
4.3
ANCVSS
0.2
5
10
PZM20
11.7
PZM5
102.1
Reno Creek Project Area
T43N R74W
T43N R73W
T42N R74W
T42N R73W
Coordinate System: Wyoming State Plane East (NAD83)
AUC LLC
THE RENO CREEK PROJECT
Figure 11-8
Drawdown Observed at
End of PZM5 Pump Test
WELL SYMBOLS
PZ Pumping Well
Production Zone Aquifer
REMARKS
Contour Interval: 5 [feet]
By: KRS Checked: AAP
Ratio Scale = 1 : 7,200
0
600
FEET

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



Petrotek

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



Petrotek

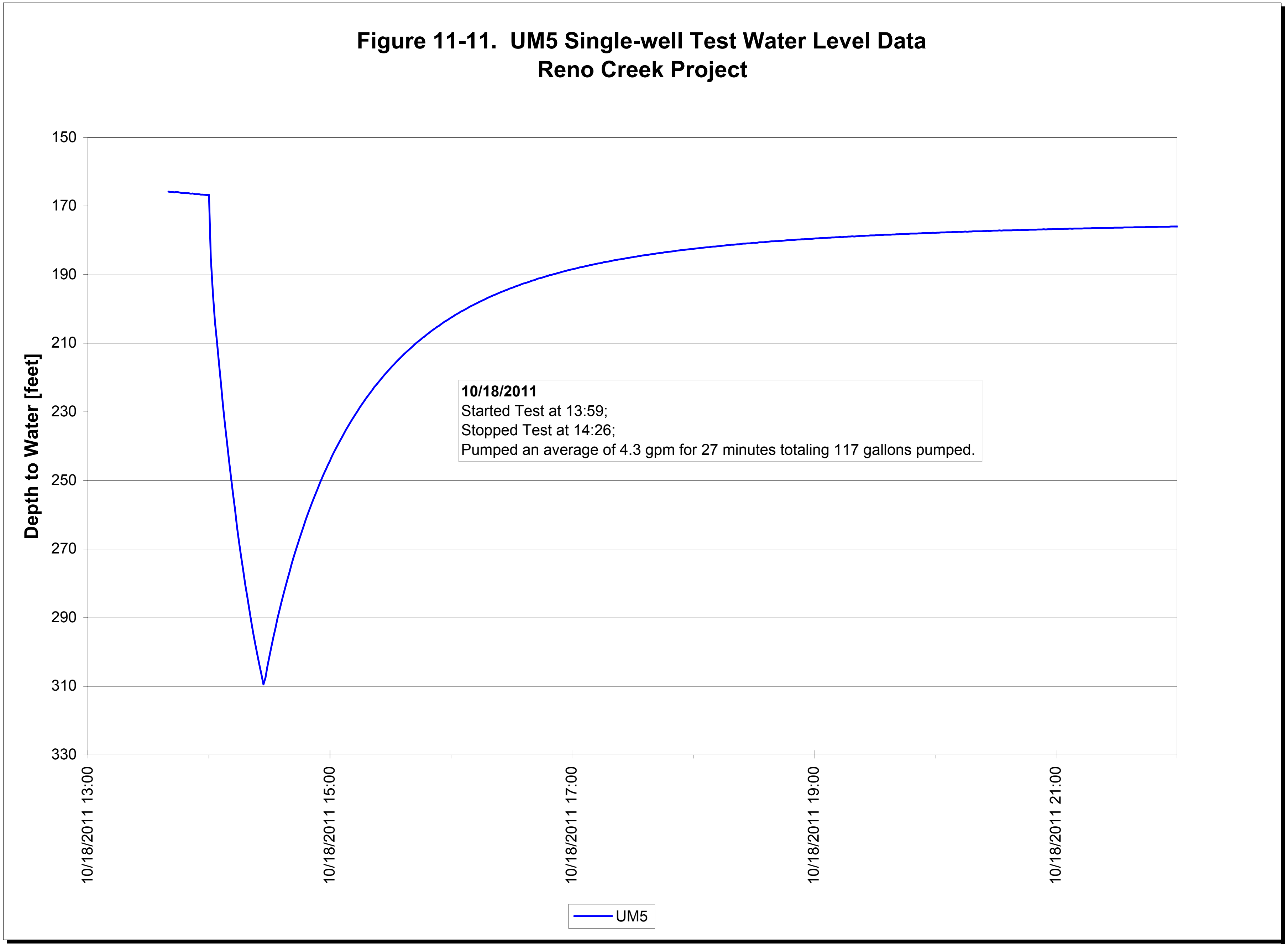


Figure 11-11. UM5 Single-well Test Water Level Data
Reno Creek Project
Depth to Water [feet]
150
170
190
210
230
250
270
290
310
330
10/18/2011 13:00
10/18/2011 15:00
10/18/2011 17:00
10/18/2011 19:00
10/18/2011 21:00
10/18/2011
Started Test at 13:59;
Stopped Test at 14:26;
Pumped an average of 4.3 gpm for 27 minutes totaling 117 gallons pumped.
UM5

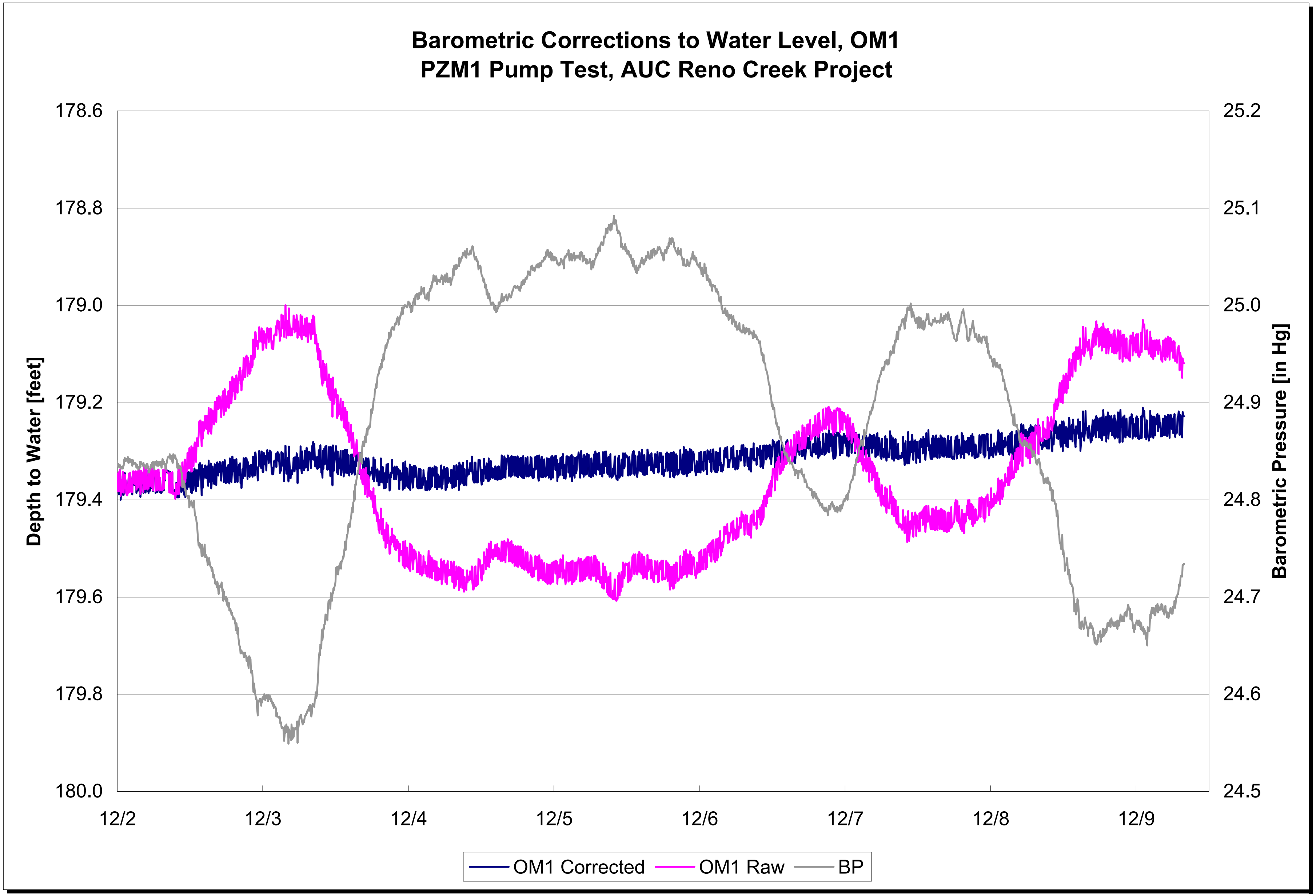
Petrotek

APPENDIX A

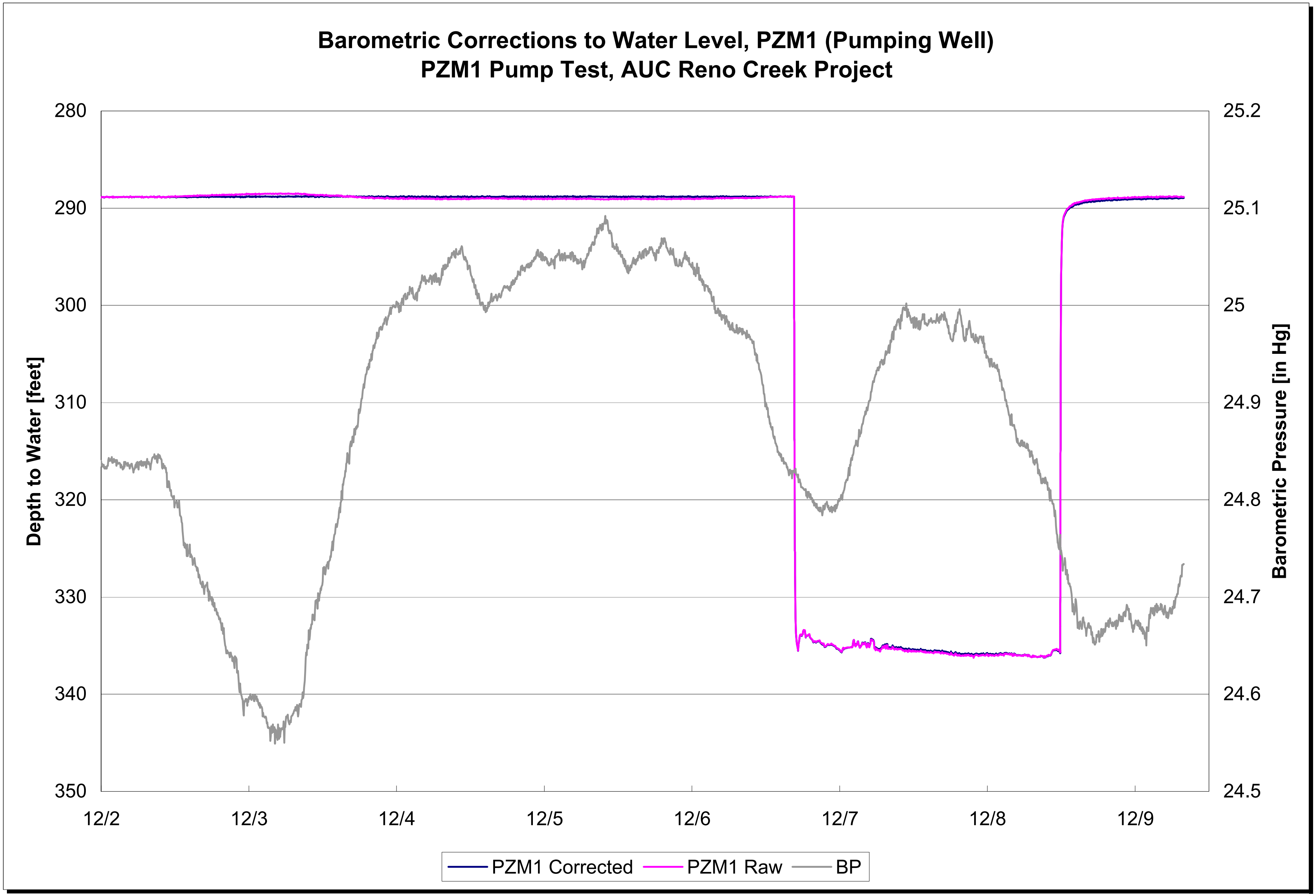
WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

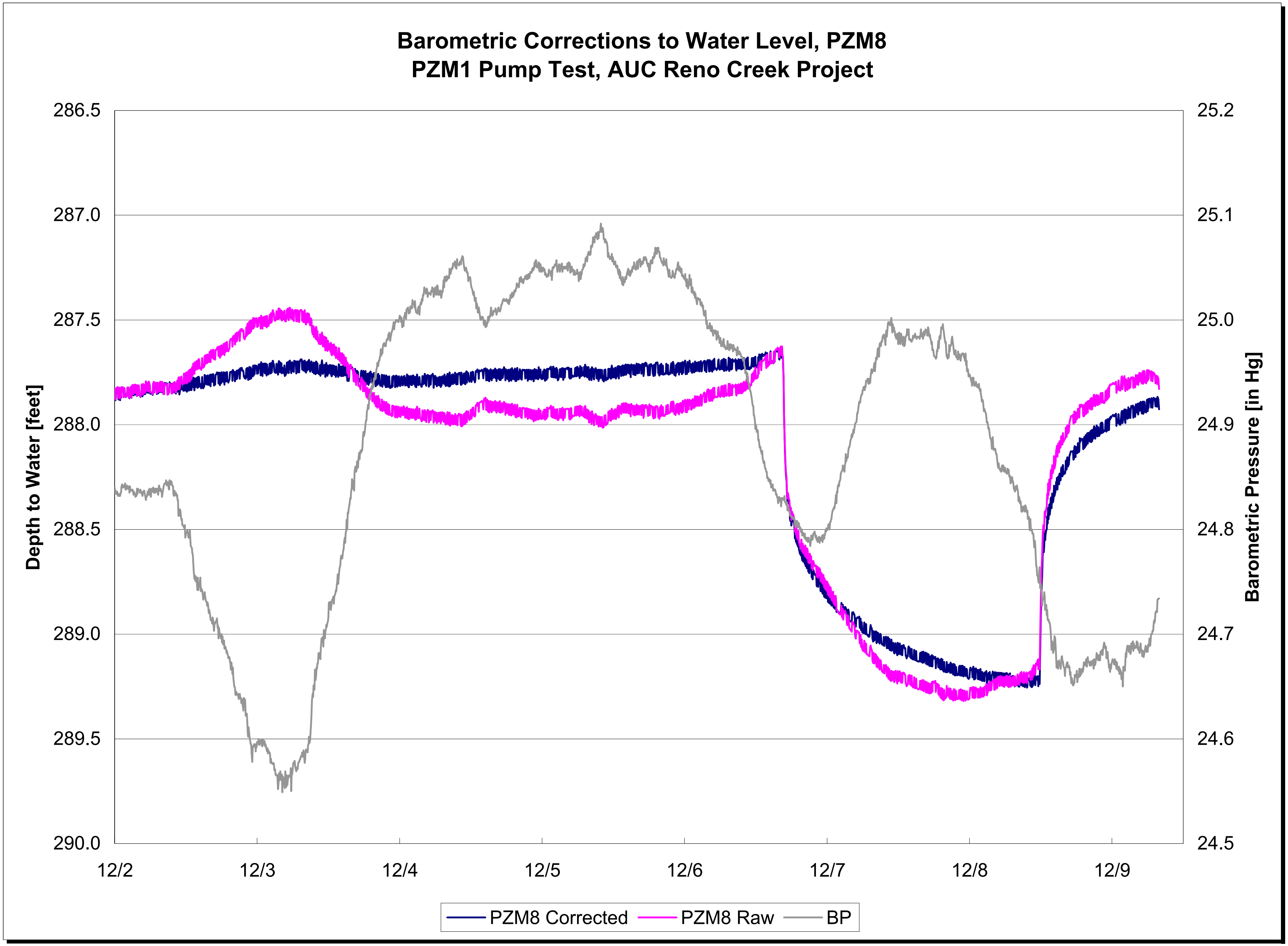
PZM1 PUMP TEST

WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

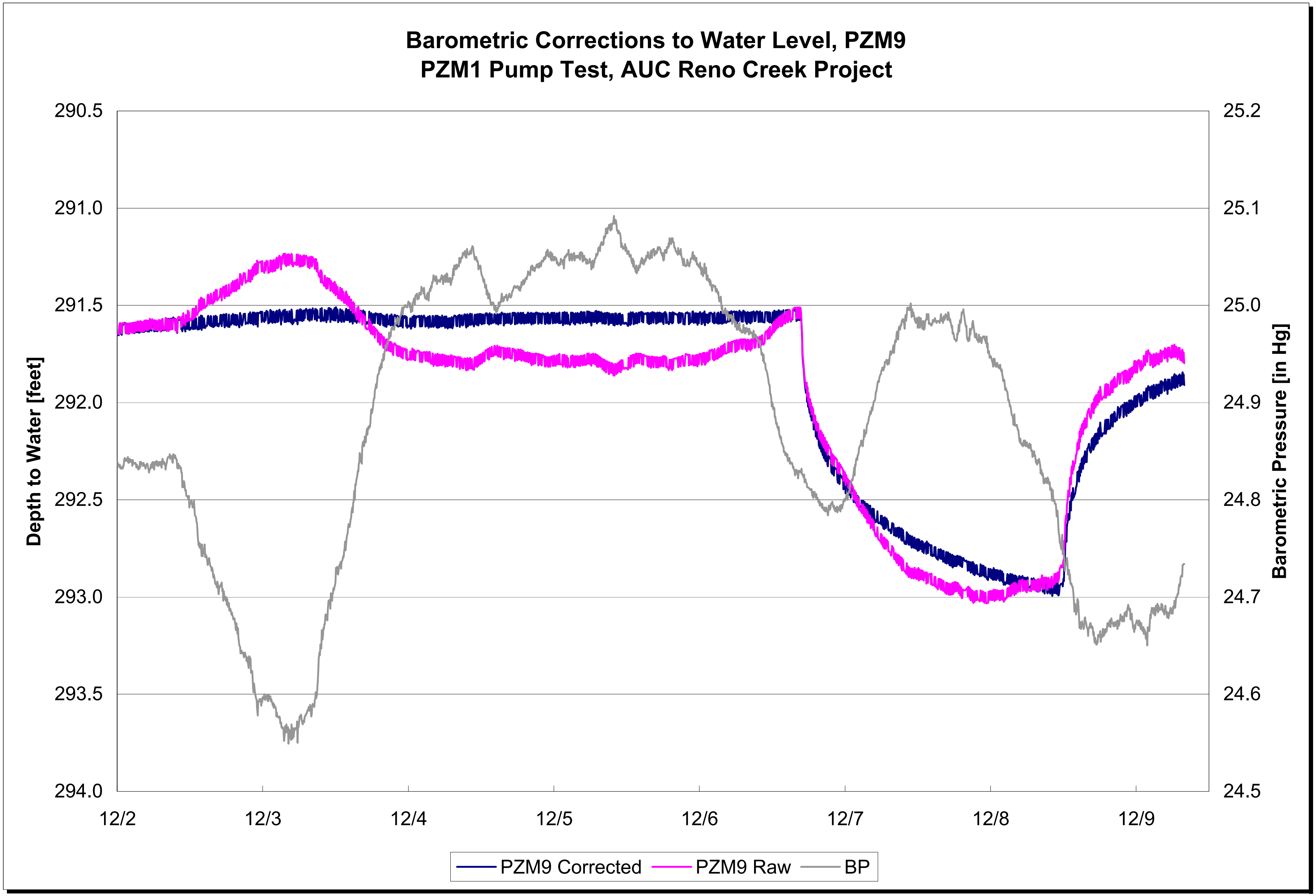


Barometric Corrections to Water Level, OM1
PZM1 Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
178.6
178.8
179.0
179.2
179.4
179.6
179.8
180.0
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
OM1 Corrected
OM1 Raw
BP

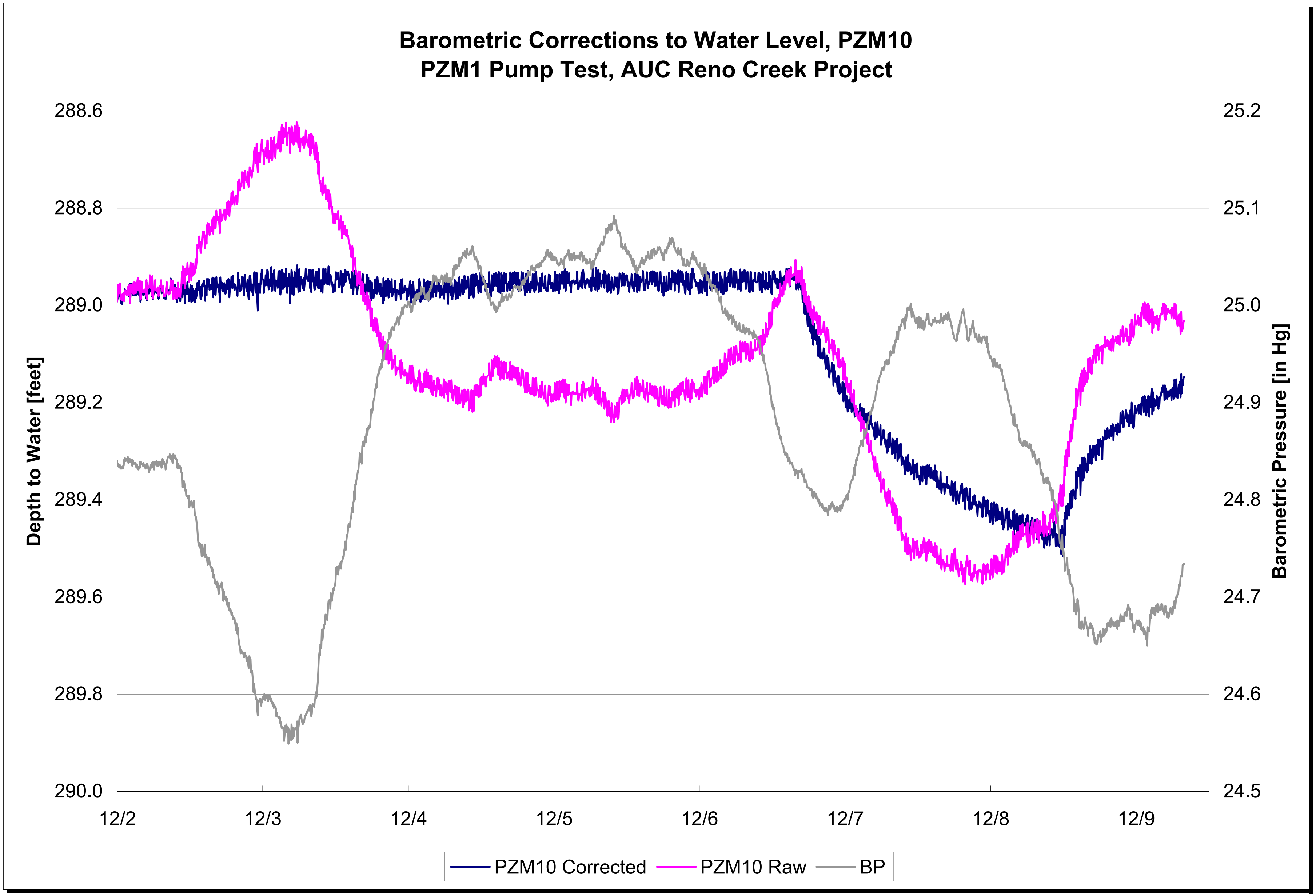

Barometric Corrections to Water Level, PZM1 (Pumping Well)
PZM1 Pump Test, AUC Reno Creek Project
Depth to Water [feet]
280
290
300
310
320
330
340
350
Barometric Pressure [in Hg]
25.2
25.1
25
24.9
24.8
24.7
24.6
24.5
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
PZM1 Corrected
PZM1 Raw
BP



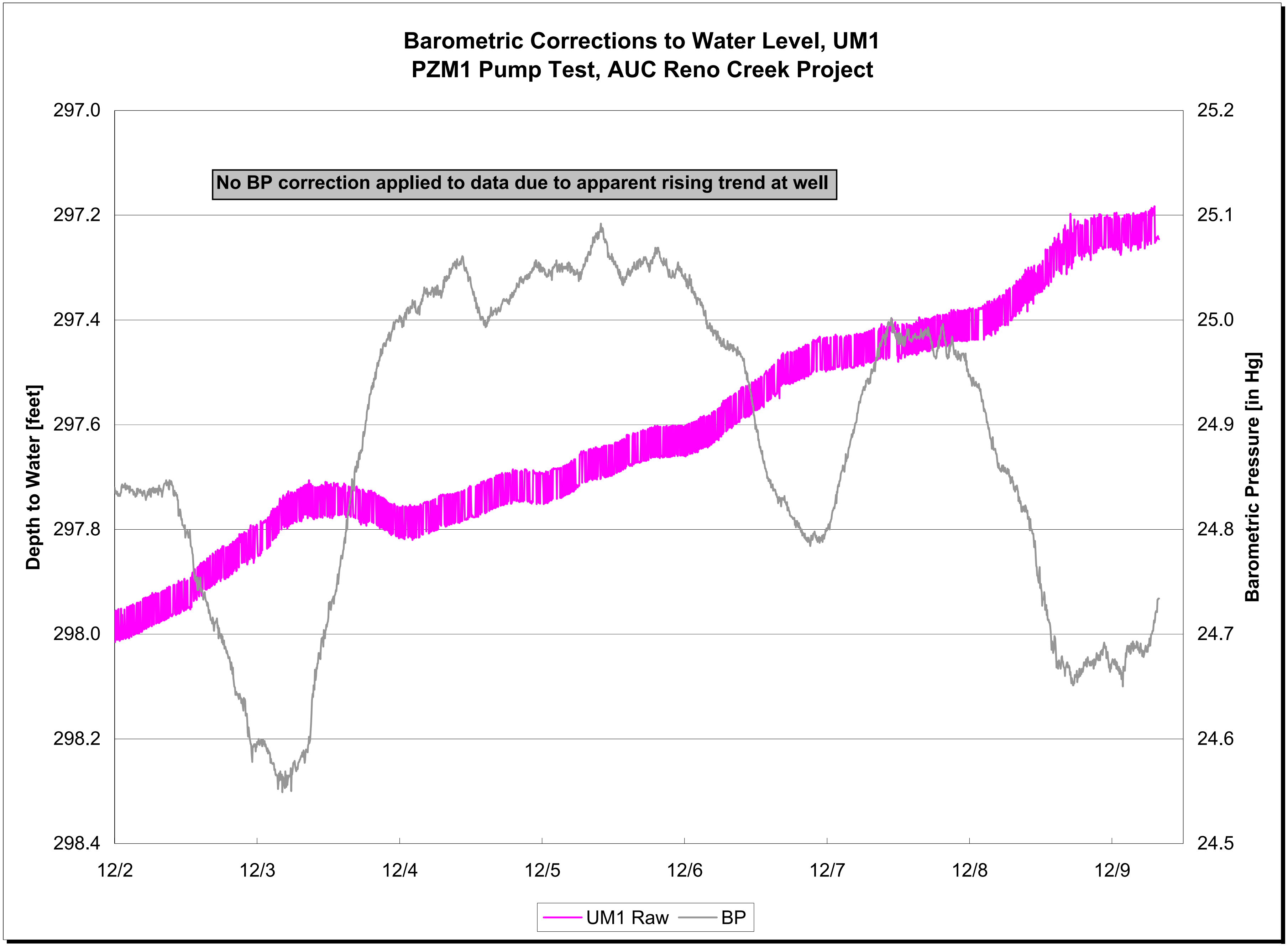
Barometric Corrections to Water Level, PZM8
PZM1 Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
286.5
287.0
287.5
288.0
288.5
289.0
289.5
290.0
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
PZM8 Corrected
PZM8 Raw
BP



Barometric Corrections to Water Level, PZM9
PZM1 Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
290.5
291.0
291.5
292.0
292.5
293.0
293.5
294.0
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
PZM9 Corrected
PZM9 Raw
BP



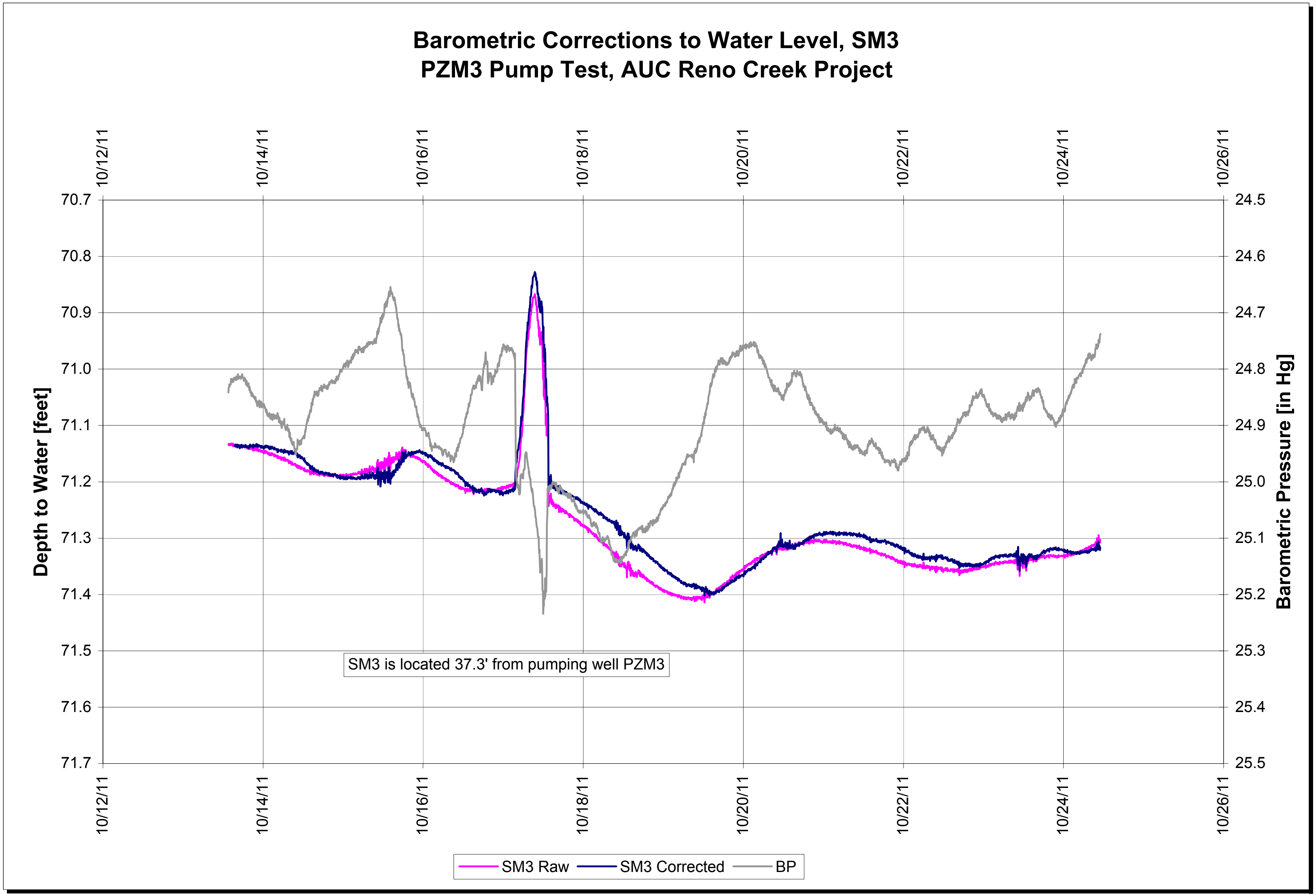
Barometric Corrections to Water Level, PZM10
PZM1 Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
288.6
288.8
289.0
289.2
289.4
289.6
289.8
290.0
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
PZM10 Corrected
PZM10 Raw
BP



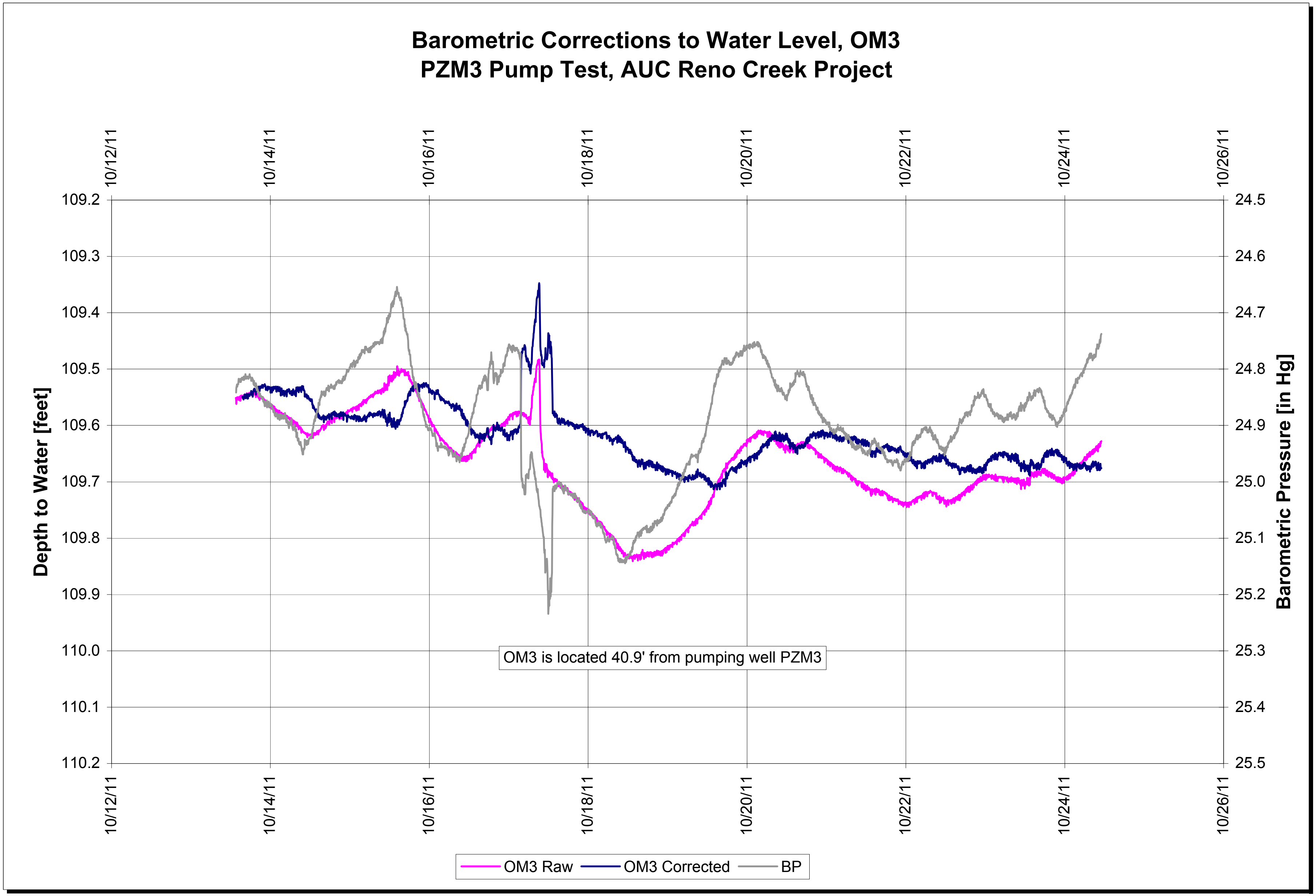
Barometric Corrections to Water Level, UM1
PZM1 Pump Test, AUC Reno Creek Project
No BP correction applied to data due to apparent rising trend at well
Depth to Water [feet]
Barometric Pressure [in Hg]
297.0
297.2
297.4
297.6
297.8
298.0
298.2
298.4
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
12/2
12/3
12/4
12/5
12/6
12/7
12/8
12/9
UM1 Raw
BP

PZM3 PUMP TEST

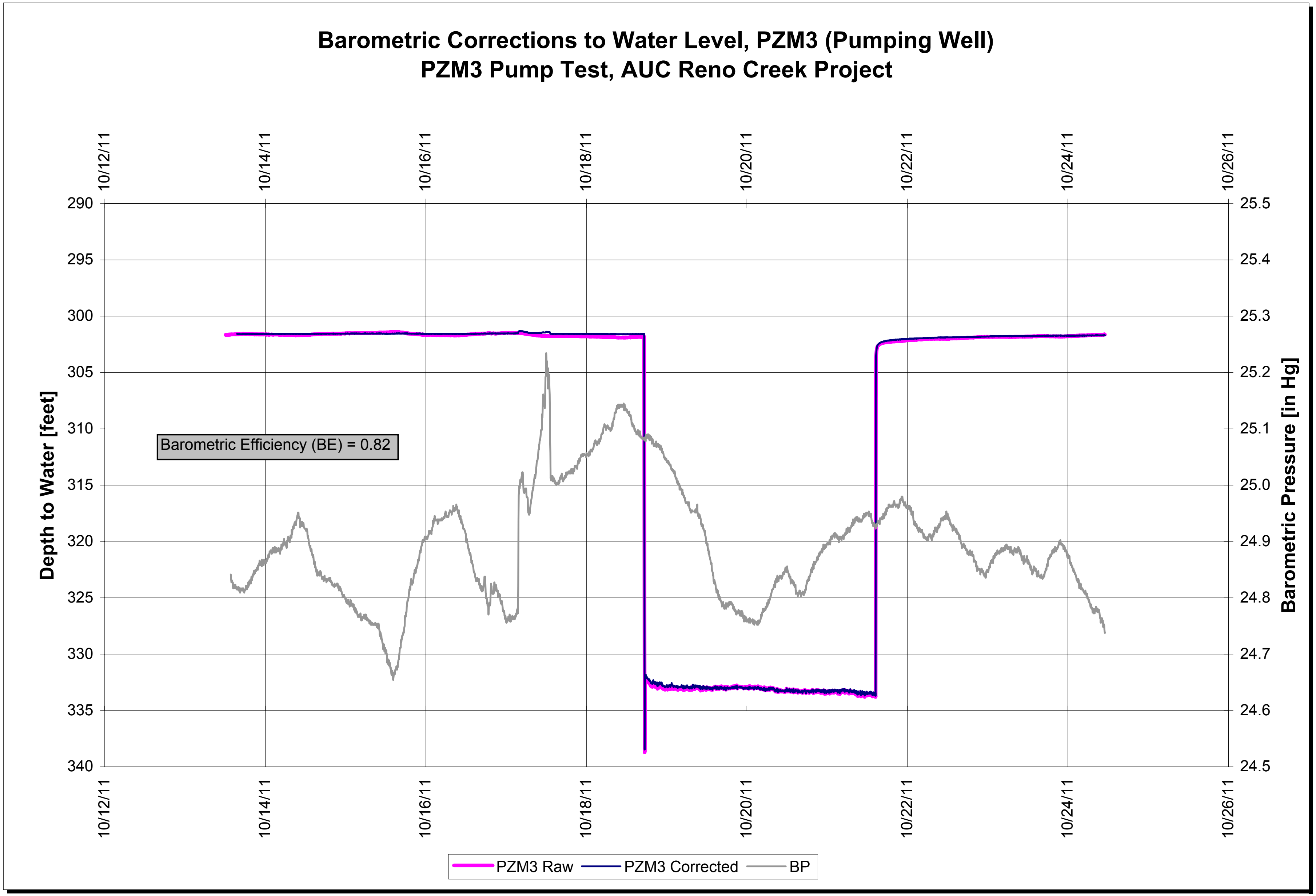
WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

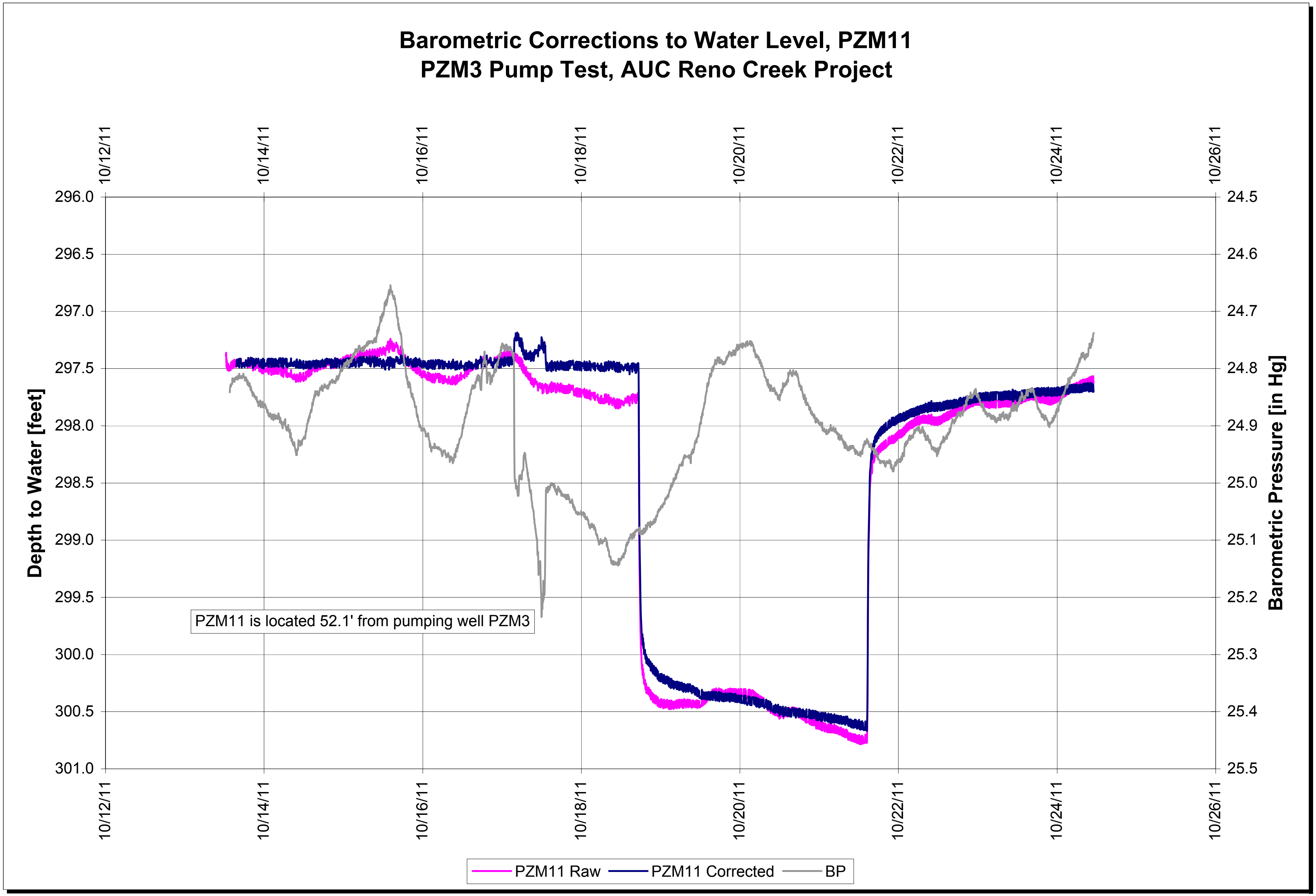


Barometric Corrections to Water Level, SM3
PZM3 Pump Test, AUC Reno Creek Project
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
70.7
70.8
70.9
71.0
71.1
71.2
71.3
71.4
71.5
71.6
71.7
Depth to Water [feet]
24.5
24.6
24.7
24.8
24.9
25.0
25.1
25.2
25.3
25.4
25.5
Barometric Pressure [in Hg]
SM3 is located 37.3' from pumping well PZM3
SM3 Raw
SM3 Corrected
BP

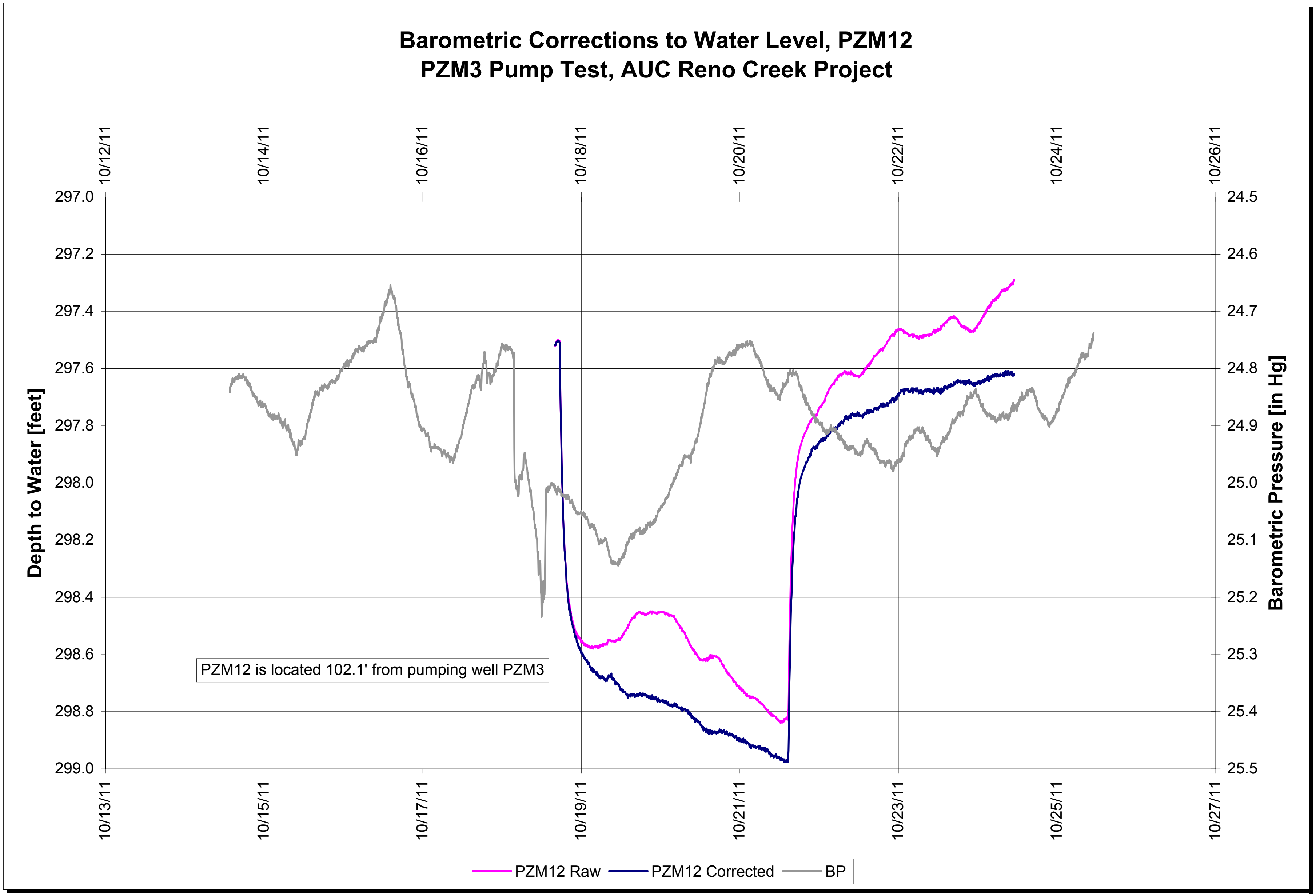


Barometric Corrections to Water Level, OM3
PZM3 Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
109.2
109.3
109.4
109.5
109.6
109.7
109.8
109.9
110.0
110.1
110.2
24.5
24.6
24.7
24.8
24.9
25.0
25.1
25.2
25.3
25.4
25.5
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
OM3 is located 40.9' from pumping well PZM3
OM3 Raw
OM3 Corrected
BP

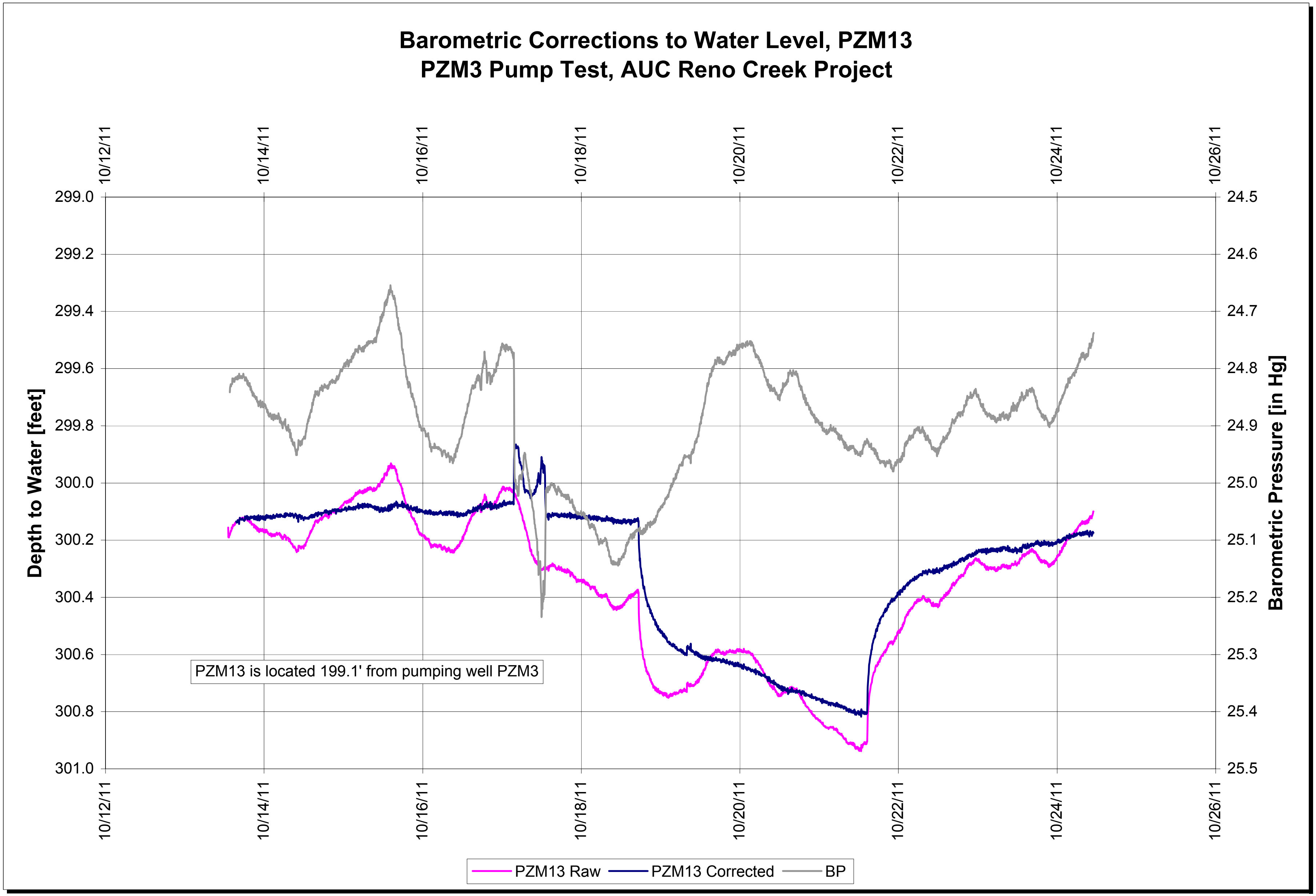

Barometric Corrections to Water Level, PZM3 (Pumping Well)
PZM3 Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
Barometric Efficiency (BE) = 0.82
290
295
300
305
310
315
320
325
330
335
340
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
PZM3 Raw
PZM3 Corrected
BP



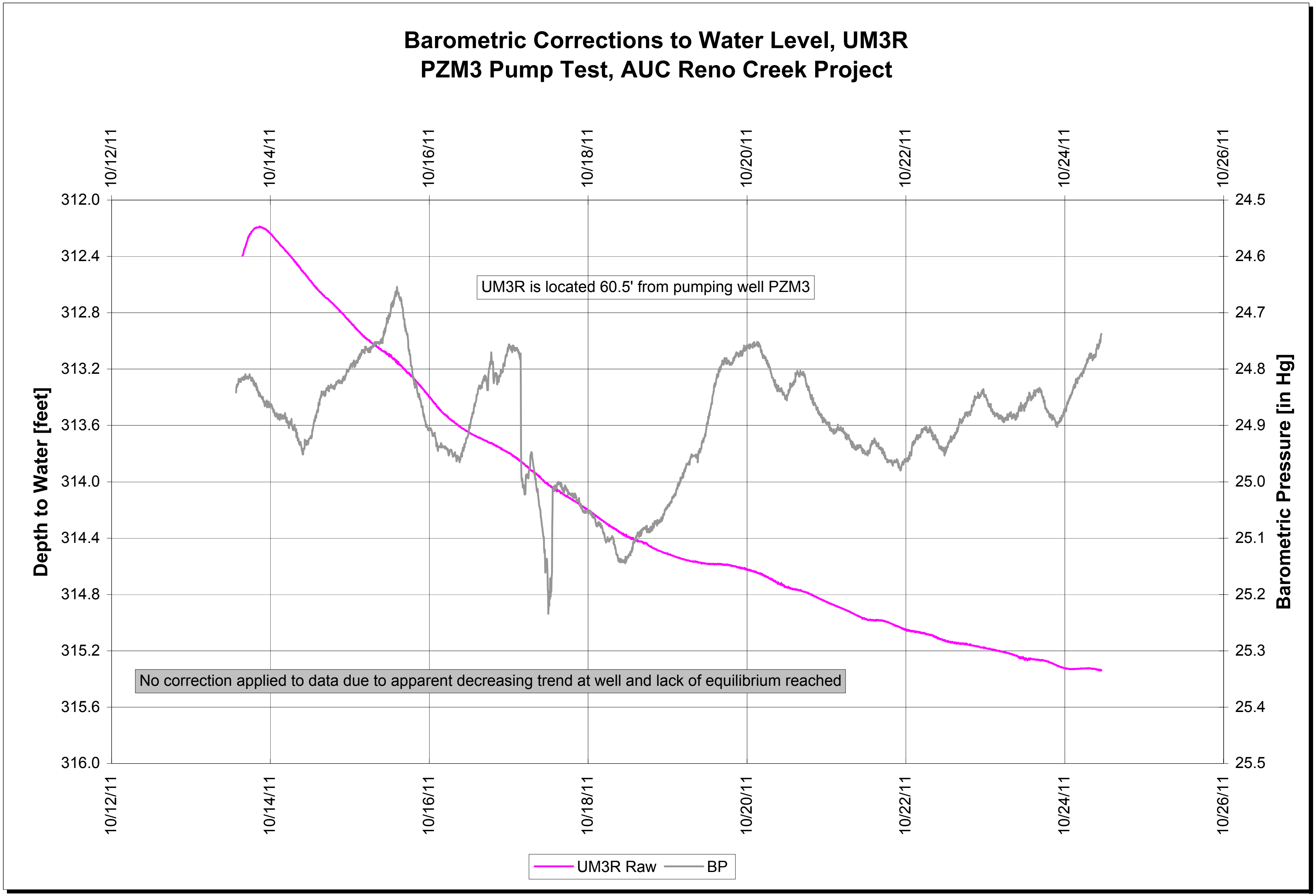
Barometric Corrections to Water Level, PZM11
PZM3 Pump Test, AUC Reno Creek Project
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
296.0
296.5
297.0
297.5
298.0
298.5
299.0
299.5
300.0
300.5
301.0
24.5
24.6
24.7
24.8
24.9
25.0
25.1
25.2
25.3
25.4
25.5
Depth to Water [feet]
Barometric Pressure [in Hg]
PZM11 is located 52.1' from pumping well PZM3
PZM11 Raw
PZM11 Corrected
BP



Barometric Corrections to Water Level, PZM12
PZM3 Pump Test, AUC Reno Creek Project
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
297.0
297.2
297.4
297.6
297.8
298.0
298.2
298.4
298.6
298.8
299.0
Depth to Water [feet]
24.5
24.6
24.7
24.8
24.9
25.0
25.1
25.2
25.3
25.4
25.5
Barometric Pressure [in Hg]
PZM12 is located 102.1' from pumping well PZM3
10/13/11
10/15/11
10/17/11
10/19/11
10/21/11
10/23/11
10/25/11
10/27/11
PZM12 Raw
PZM12 Corrected
BP



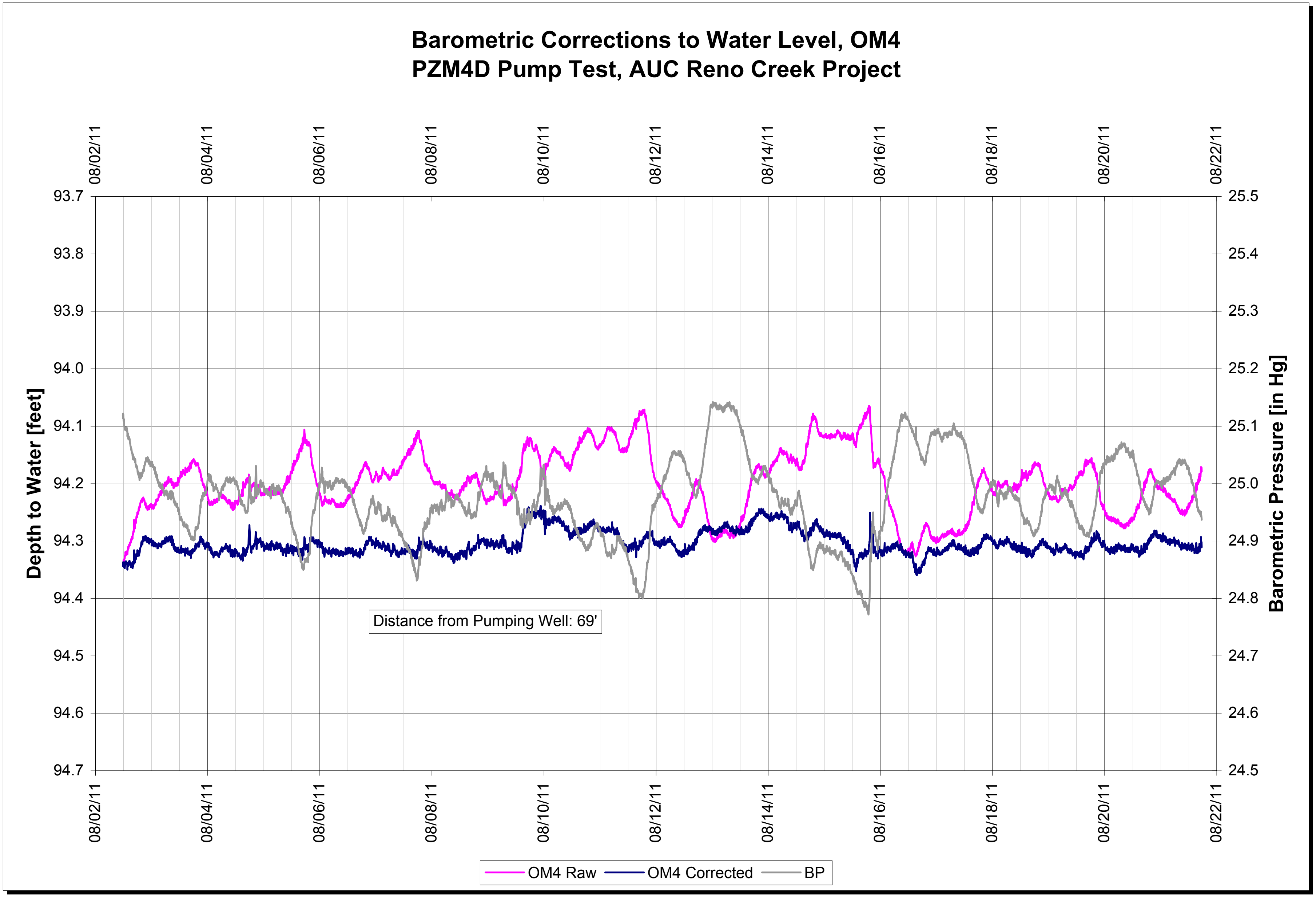
Barometric Corrections to Water Level, PZM13
PZM3 Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
299.0
299.2
299.4
299.6
299.8
300.0
300.2
300.4
300.6
300.8
301.0
24.5
24.6
24.7
24.8
24.9
25.0
25.1
25.2
25.3
25.4
25.5
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
PZM13 is located 199.1' from pumping well PZM3
PZM13 Raw
PZM13 Corrected
BP



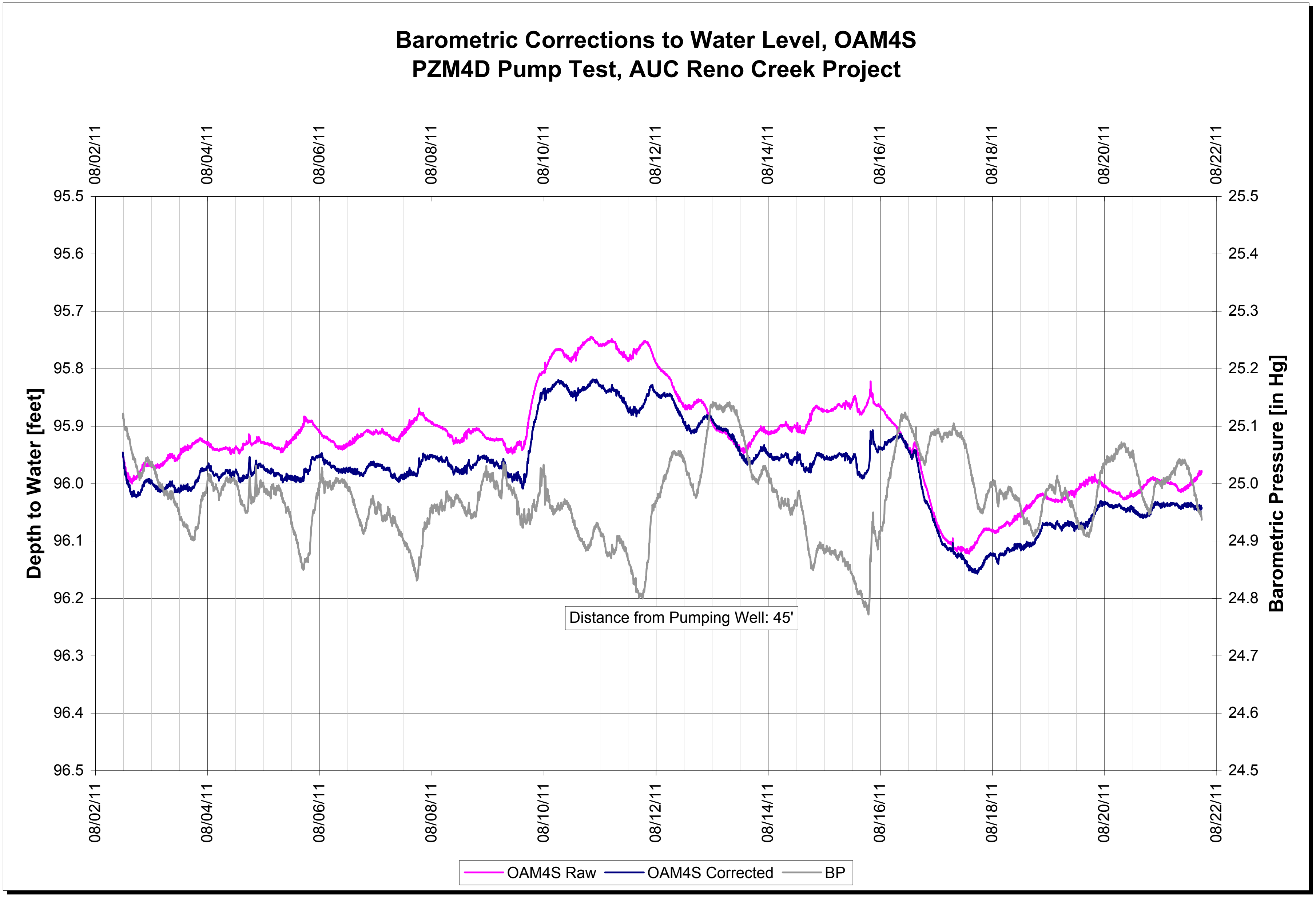
Barometric Corrections to Water Level, UM3R
PZM3 Pump Test, AUC Reno Creek Project
UM3R is located 60.5' from pumping well PZM3
No correction applied to data due to apparent decreasing trend at well and lack of equilibrium reached
Depth to Water [feet]
Barometric Pressure [in Hg]
312.0
312.4
312.8
313.2
313.6
314.0
314.4
314.8
315.2
315.6
316.0
24.5
24.6
24.7
24.8
24.9
25.0
25.1
25.2
25.3
25.4
25.5
10/12/11
10/14/11
10/16/11
10/18/11
10/20/11
10/22/11
10/24/11
10/26/11
UM3R Raw
BP

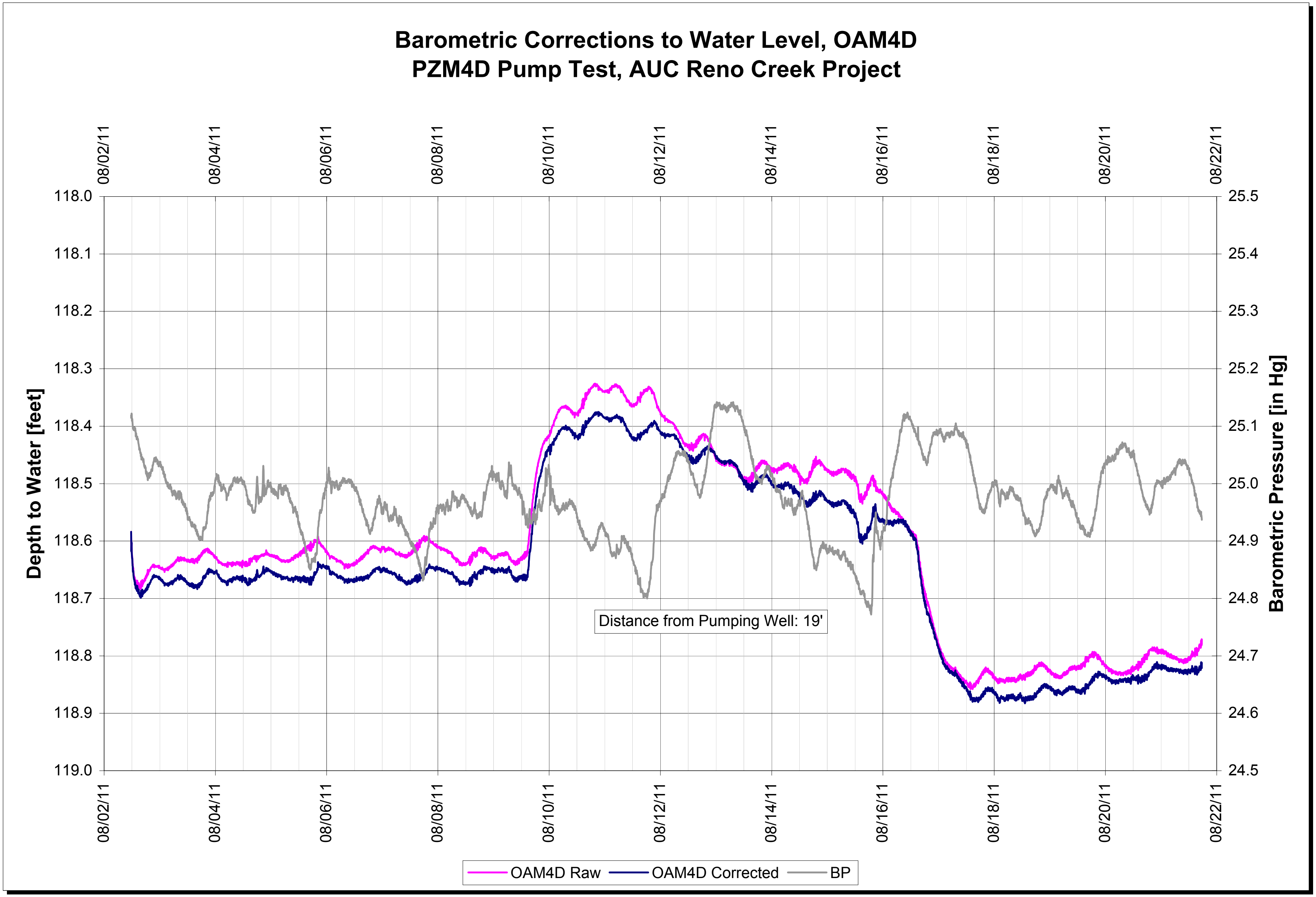
PZM4D PUMP TEST

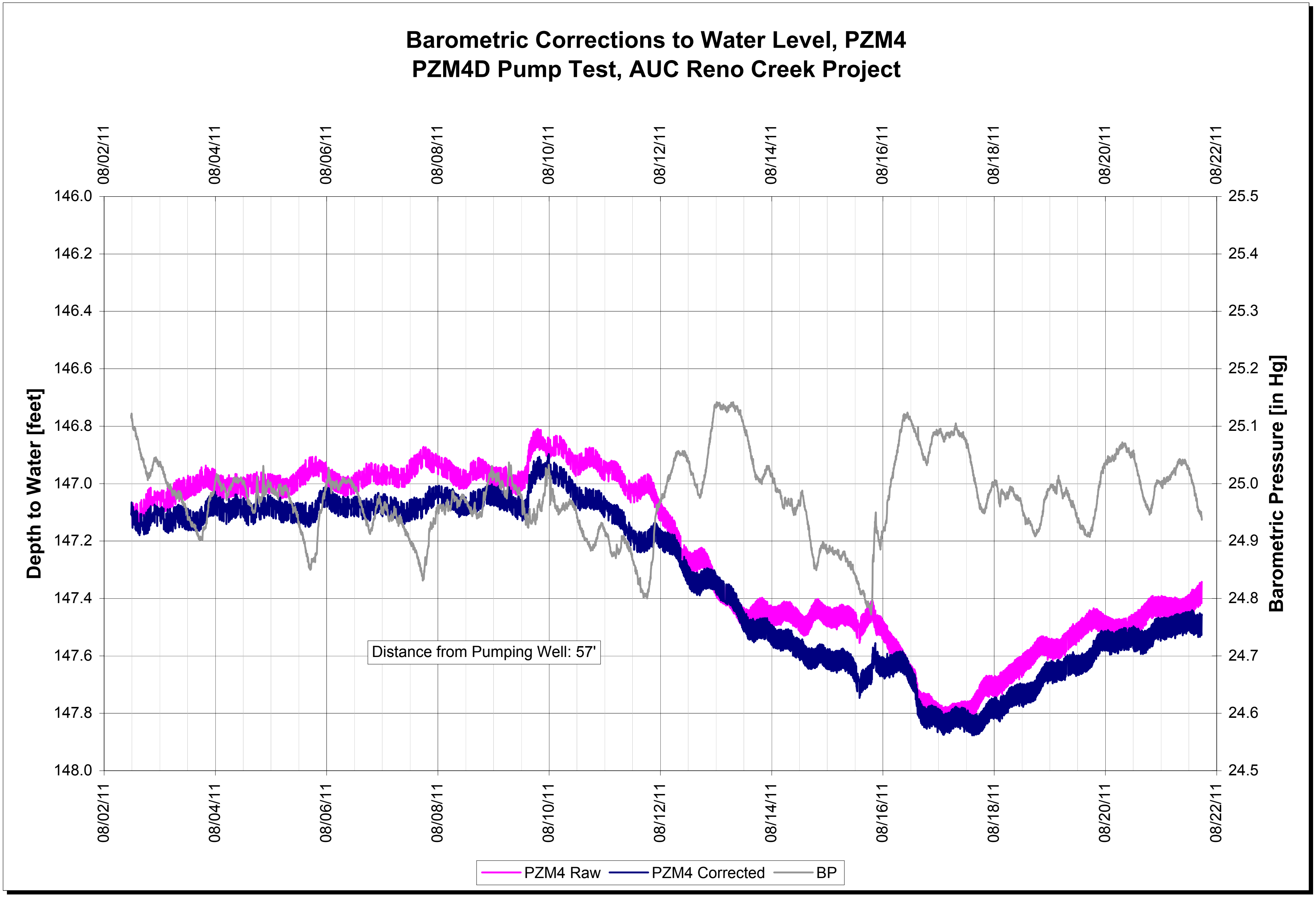
WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE



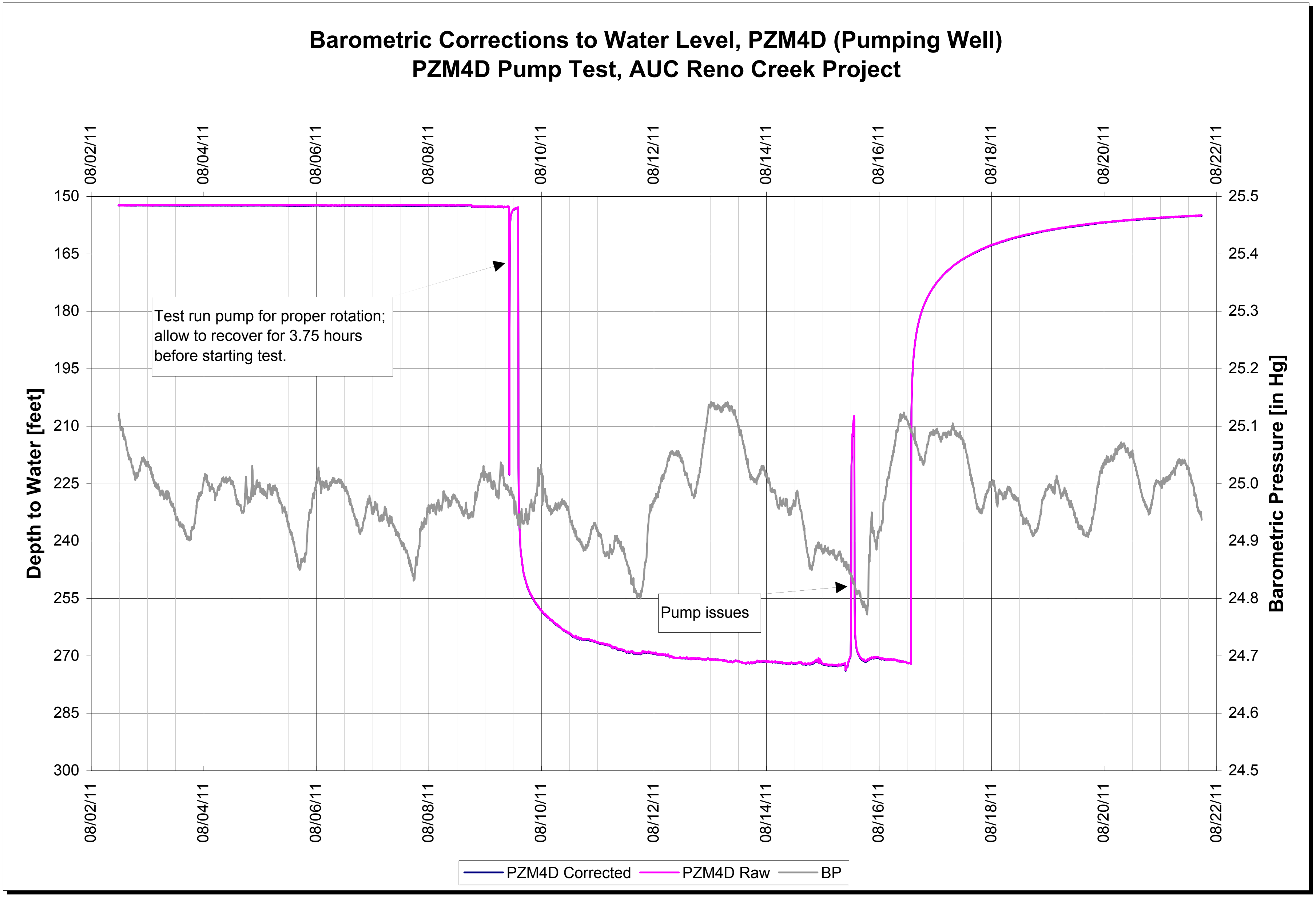
Barometric Corrections to Water Level, OM4
PZM4D Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
93.7
93.8
93.9
94.0
94.1
94.2
94.3
94.4
94.5
94.6
94.7
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Distance from Pumping Well: 69'
OM4 Raw
OM4 Corrected
BP

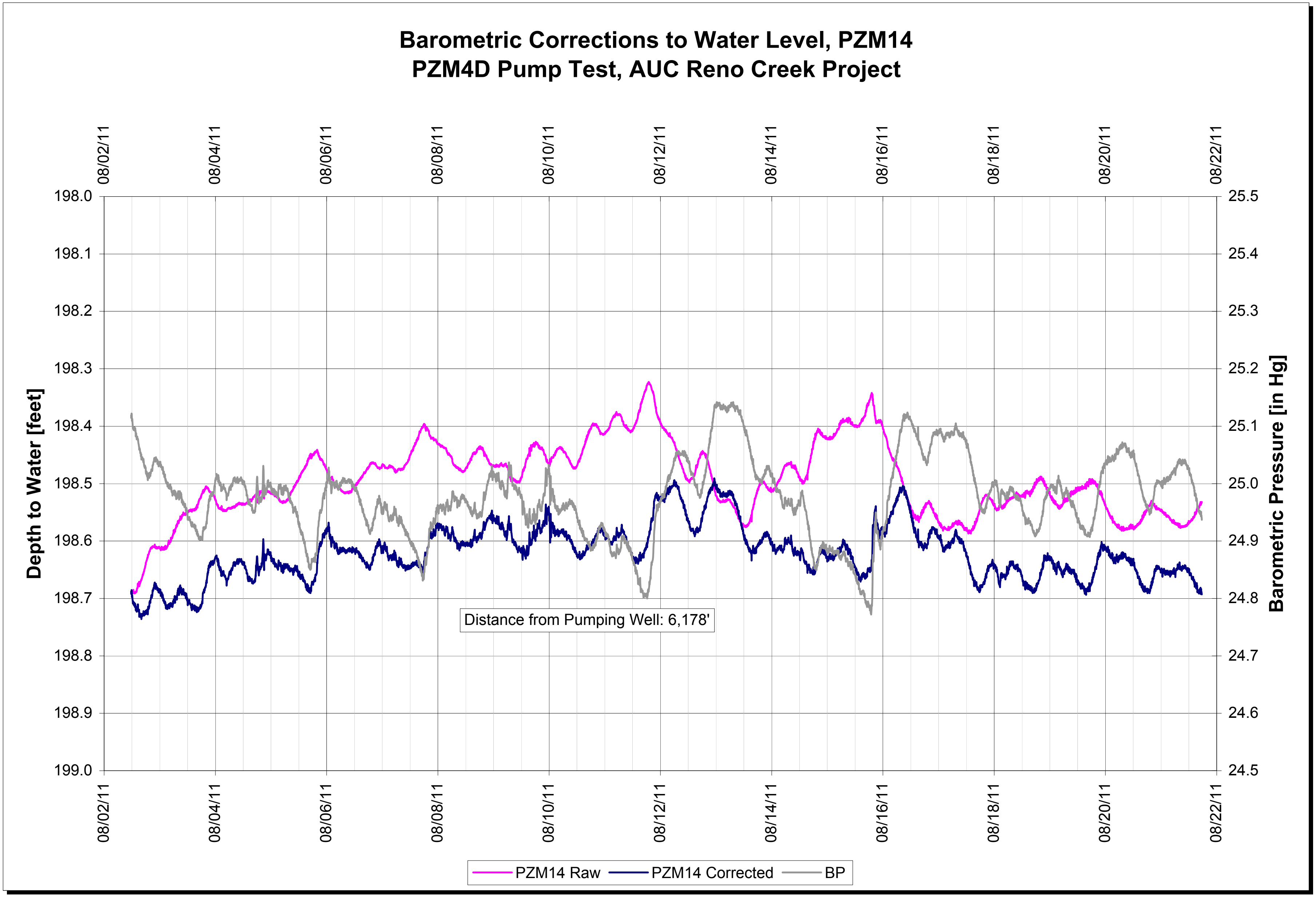

Barometric Corrections to Water Level, OAM4S
PZM4D Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
95.5
95.6
95.7
95.8
95.9
96.0
96.1
96.2
96.3
96.4
96.5
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Distance from Pumping Well: 45'
OAM4S Raw
OAM4S Corrected
BP


Barometric Corrections to Water Level, OAM4D
PZM4D Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
118.0
118.1
118.2
118.3
118.4
118.5
118.6
118.7
118.8
118.9
119.0
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Distance from Pumping Well: 19'
OAM4D Raw
OAM4D Corrected
BP

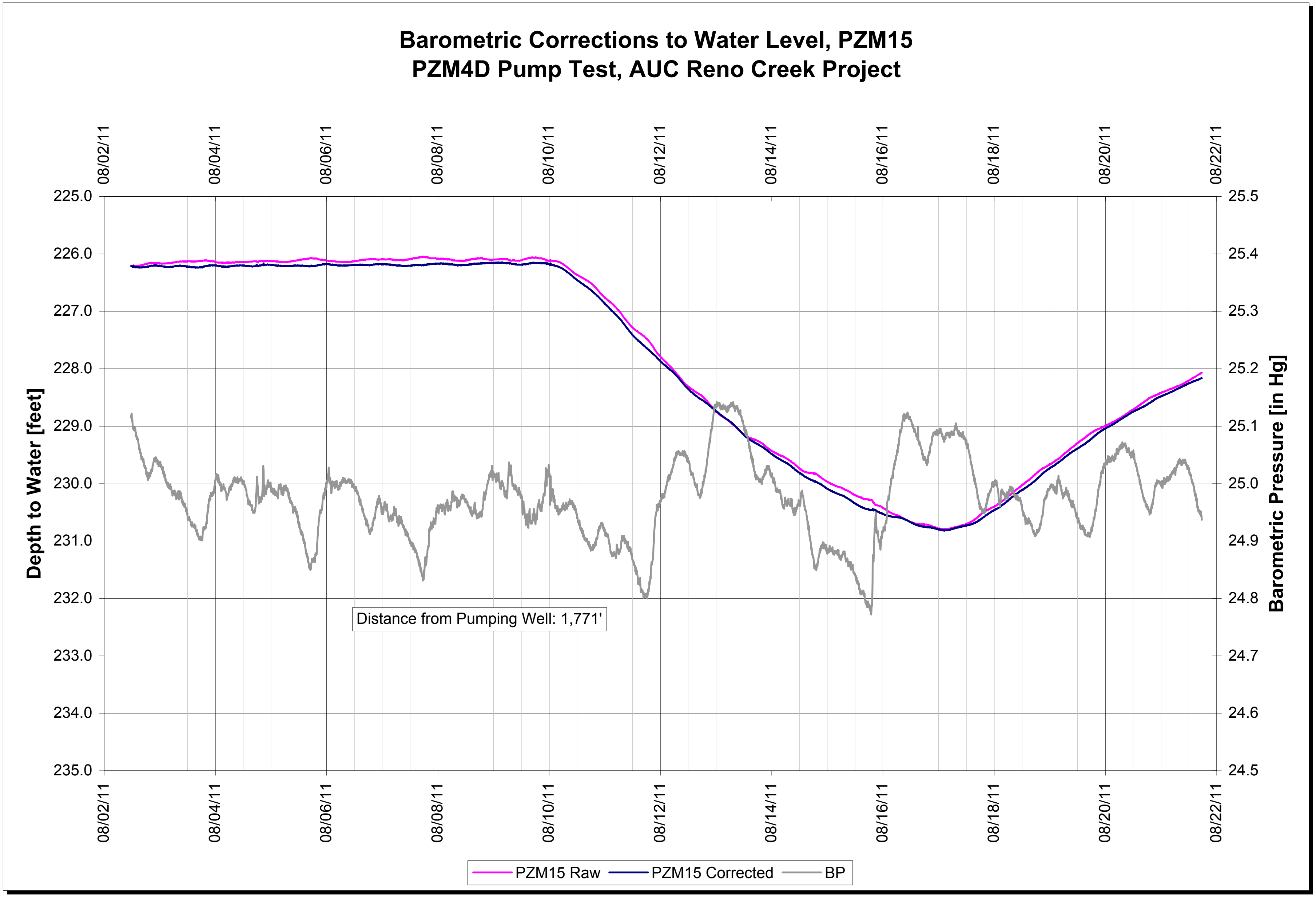


Barometric Corrections to Water Level, PZM4
PZM4D Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
146.0
146.2
146.4
146.6
146.8
147.0
147.2
147.4
147.6
147.8
148.0
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Distance from Pumping Well: 57'
PZM4 Raw
PZM4 Corrected
BP

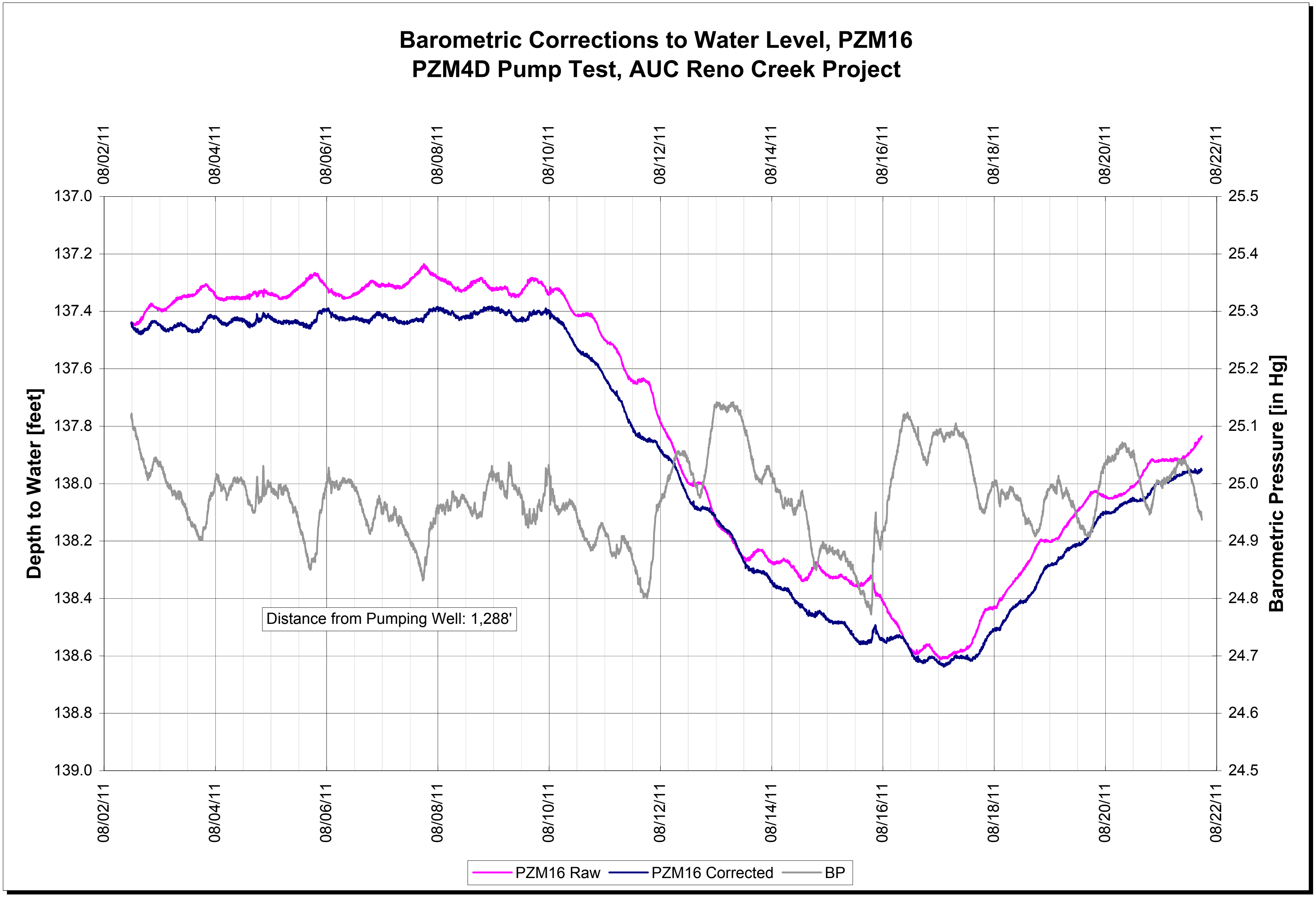

Barometric Corrections to Water Level, PZM4D (Pumping Well)
PZM4D Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
150
165
180
195
210
225
240
255
270
285
300
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Test run pump for proper rotation; allow to recover for 3.75 hours before starting test.
Pump issues
PZM4D Corrected
PZM4D Raw
BP

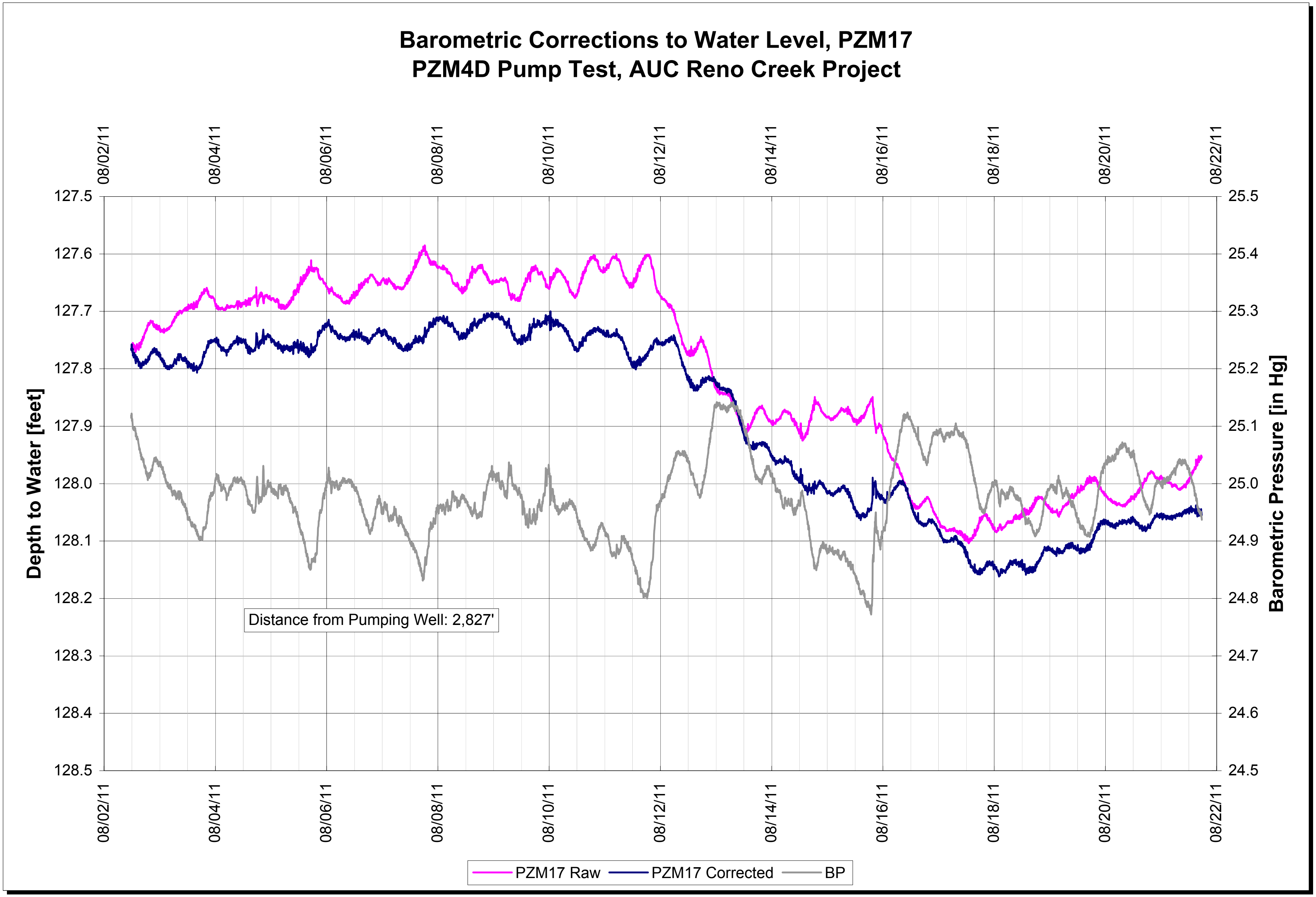


Barometric Corrections to Water Level, PZM14
PZM4D Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
198.0
198.1
198.2
198.3
198.4
198.5
198.6
198.7
198.8
198.9
199.0
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Distance from Pumping Well: 6,178'
PZM14 Raw
PZM14 Corrected
BP

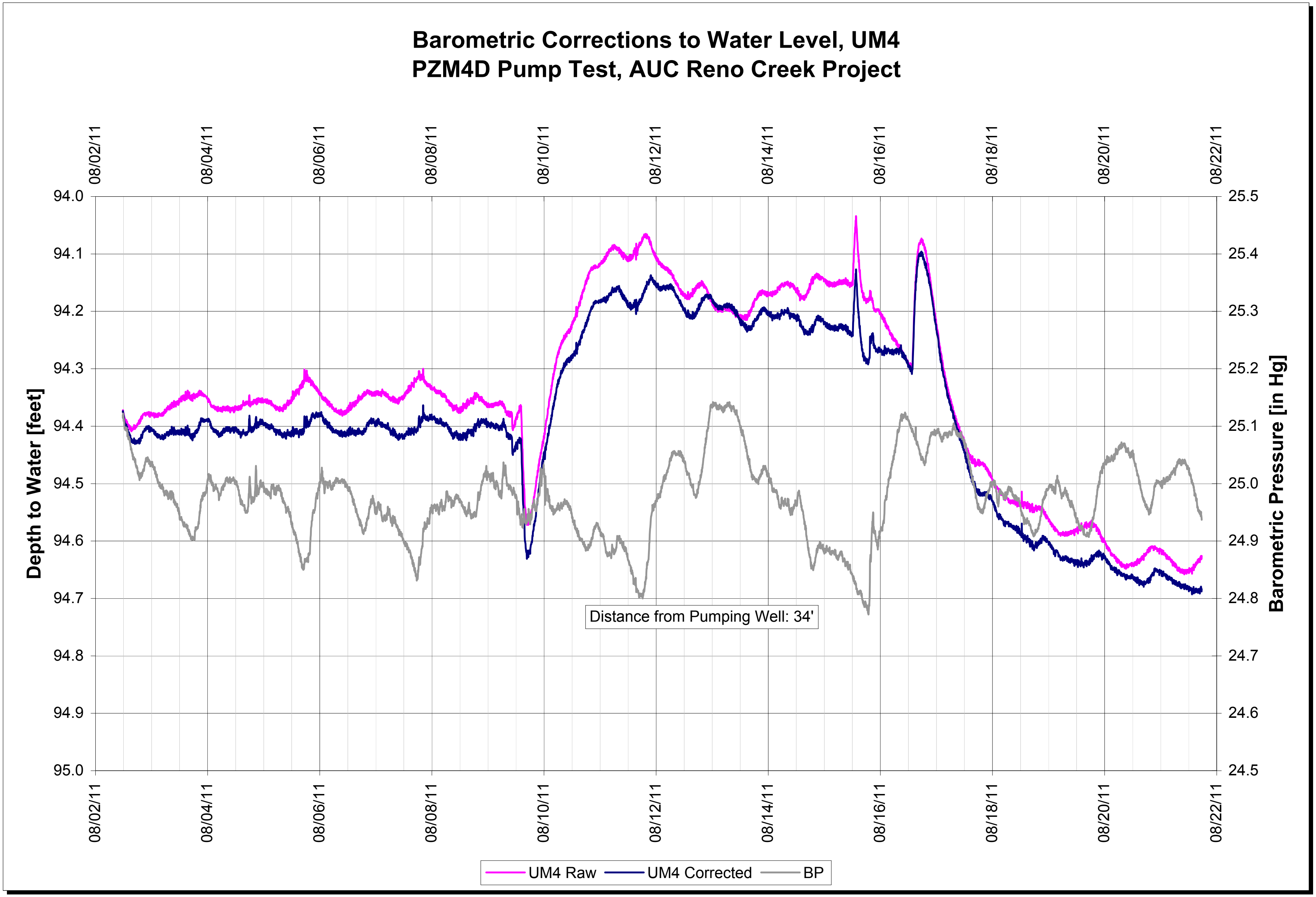


Barometric Corrections to Water Level, PZM15
PZM4D Pump Test, AUC Reno Creek Project
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Depth to Water [feet]
225.0
226.0
227.0
228.0
229.0
230.0
231.0
232.0
233.0
234.0
235.0
Barometric Pressure [in Hg]
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
Distance from Pumping Well: 1,771'
PZM15 Raw
PZM15 Corrected
BP


Barometric Corrections to Water Level, PZM16
PZM4D Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
Distance from Pumping Well: 1,288'
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
137.0
137.2
137.4
137.6
137.8
138.0
138.2
138.4
138.6
138.8
139.0
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
PZM16 Raw
PZM16 Corrected
BP

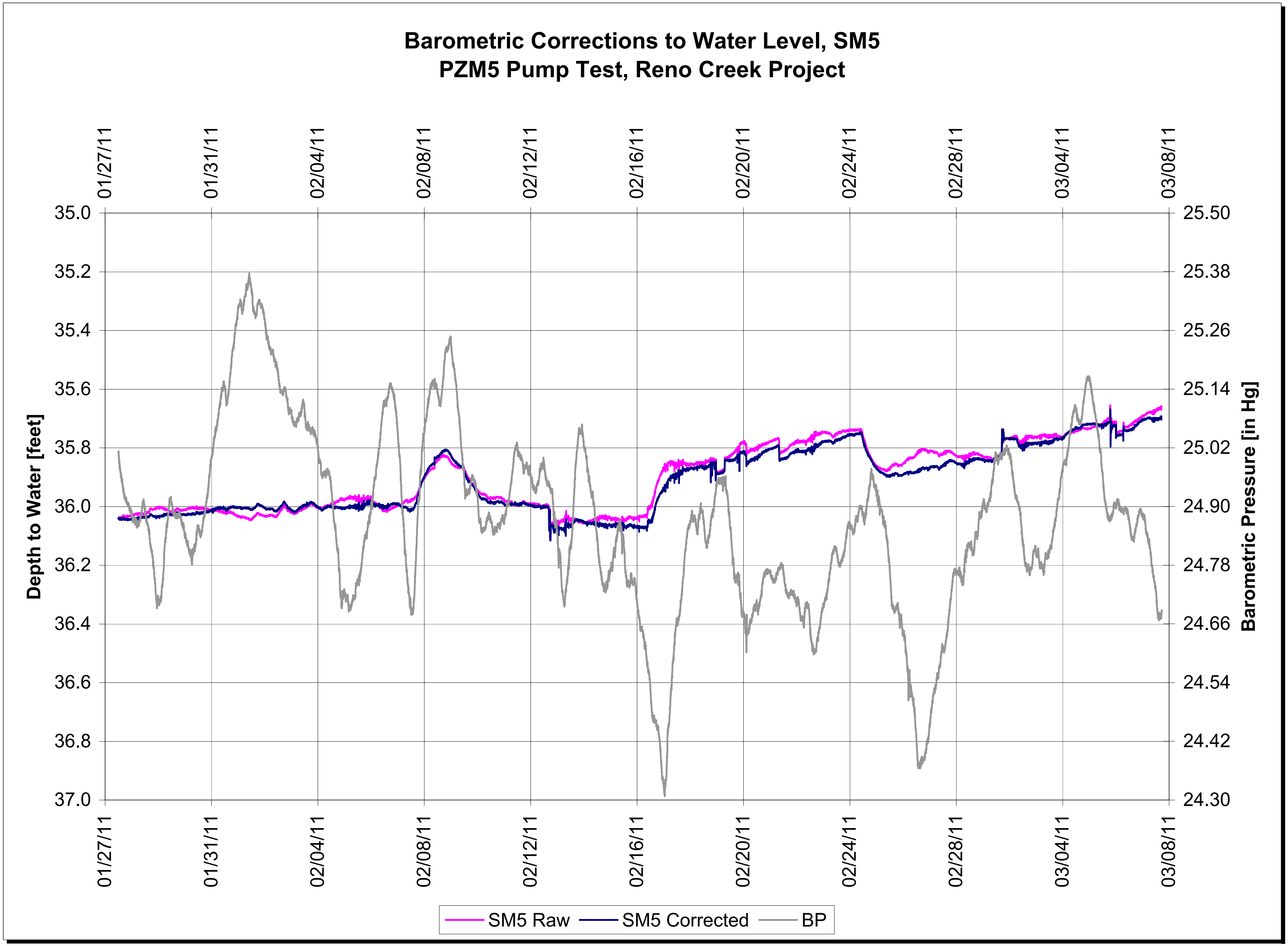


Barometric Corrections to Water Level, PZM17
PZM4D Pump Test, AUC Reno Creek Project
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Depth to Water [feet]
127.5
127.6
127.7
127.8
127.9
128.0
128.1
128.2
128.3
128.4
128.5
Barometric Pressure [in Hg]
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
Distance from Pumping Well: 2,827'
PZM17 Raw
PZM17 Corrected
BP

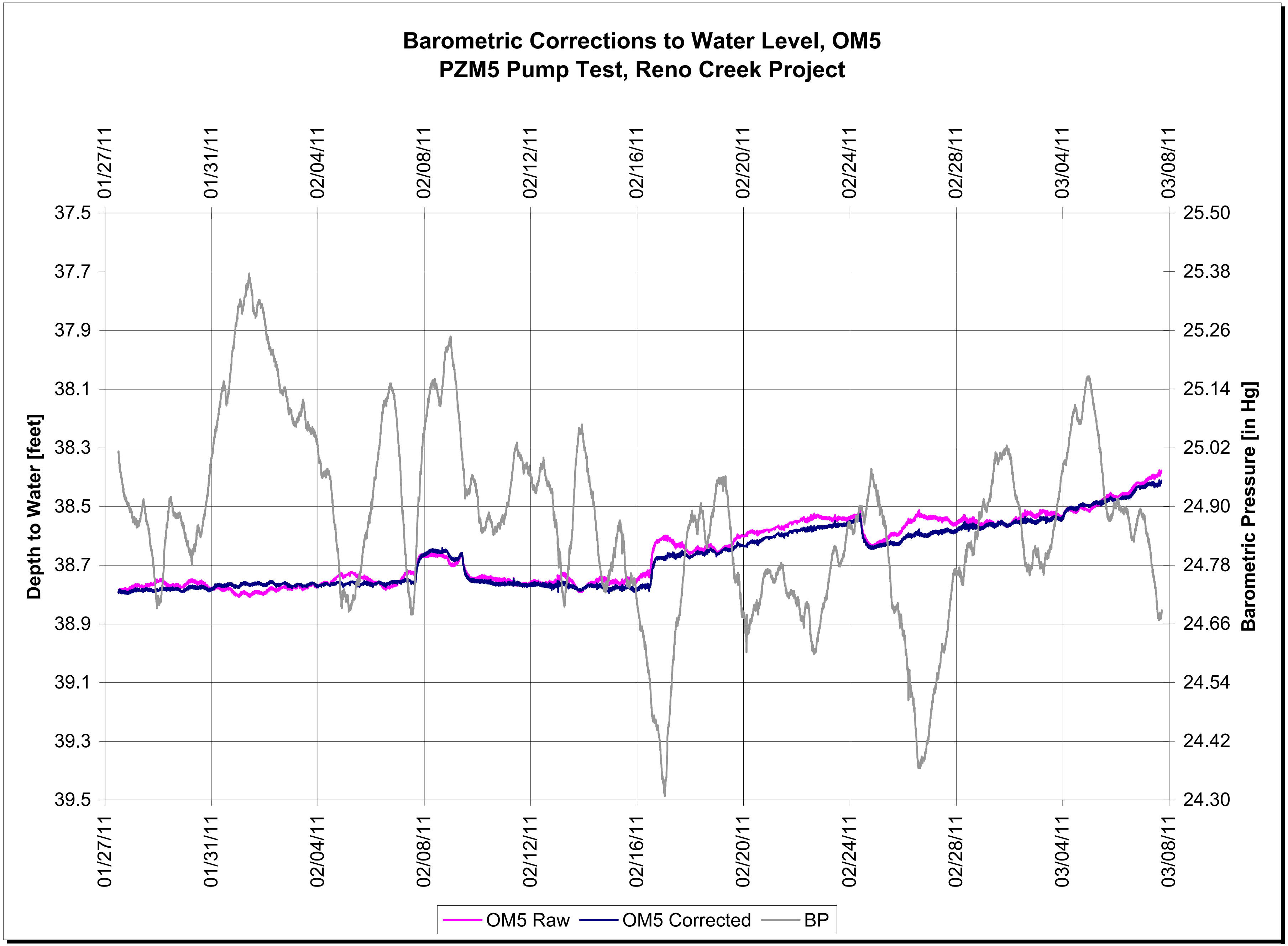

Barometric Corrections to Water Level, UM4
PZM4D Pump Test, AUC Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
94.0
94.1
94.2
94.3
94.4
94.5
94.6
94.7
94.8
94.9
95.0
25.5
25.4
25.3
25.2
25.1
25.0
24.9
24.8
24.7
24.6
24.5
08/02/11
08/04/11
08/06/11
08/08/11
08/10/11
08/12/11
08/14/11
08/16/11
08/18/11
08/20/11
08/22/11
Distance from Pumping Well: 34'
UM4 Raw
UM4 Corrected
BP

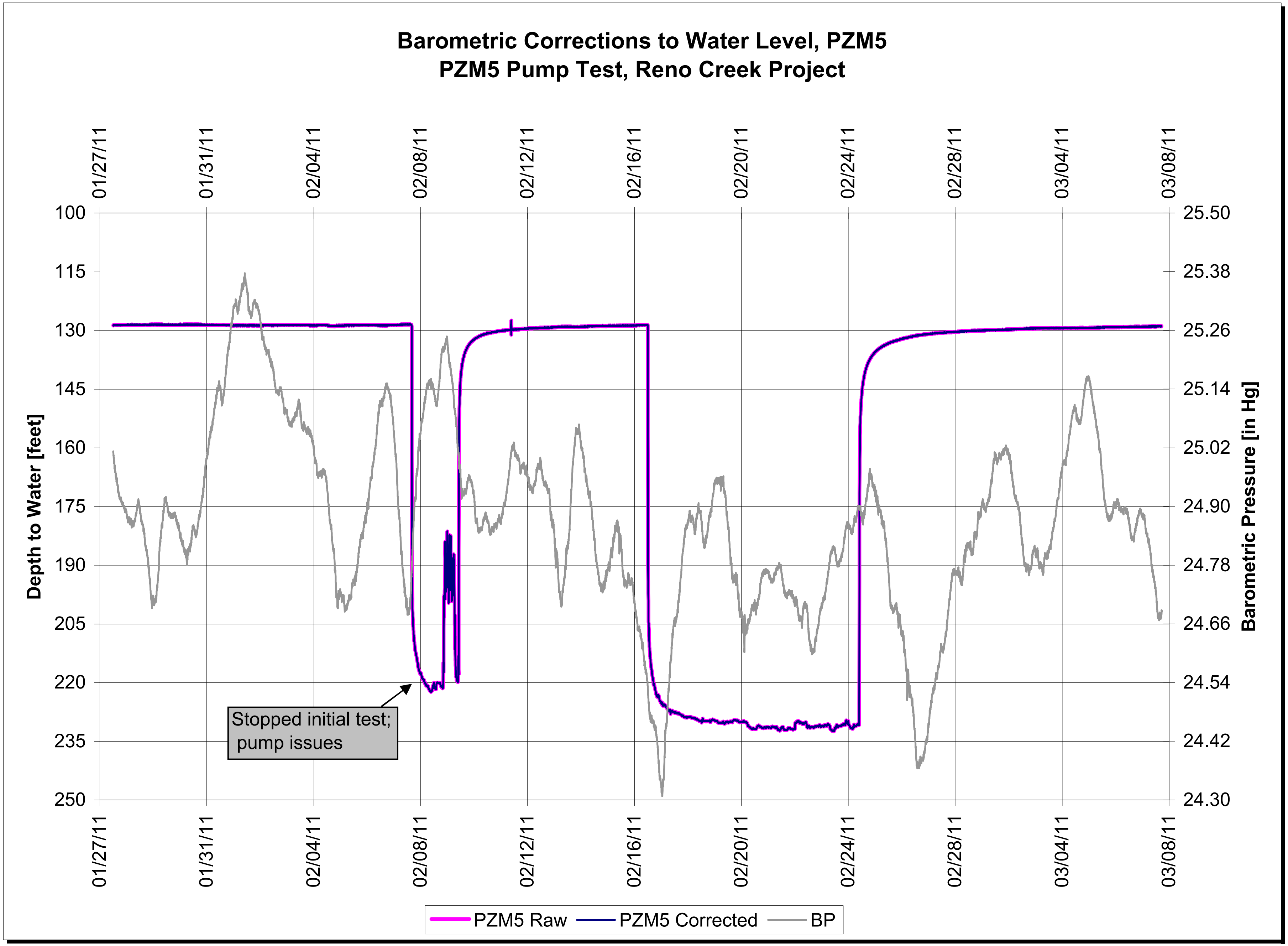
PZM5 PUMP TEST

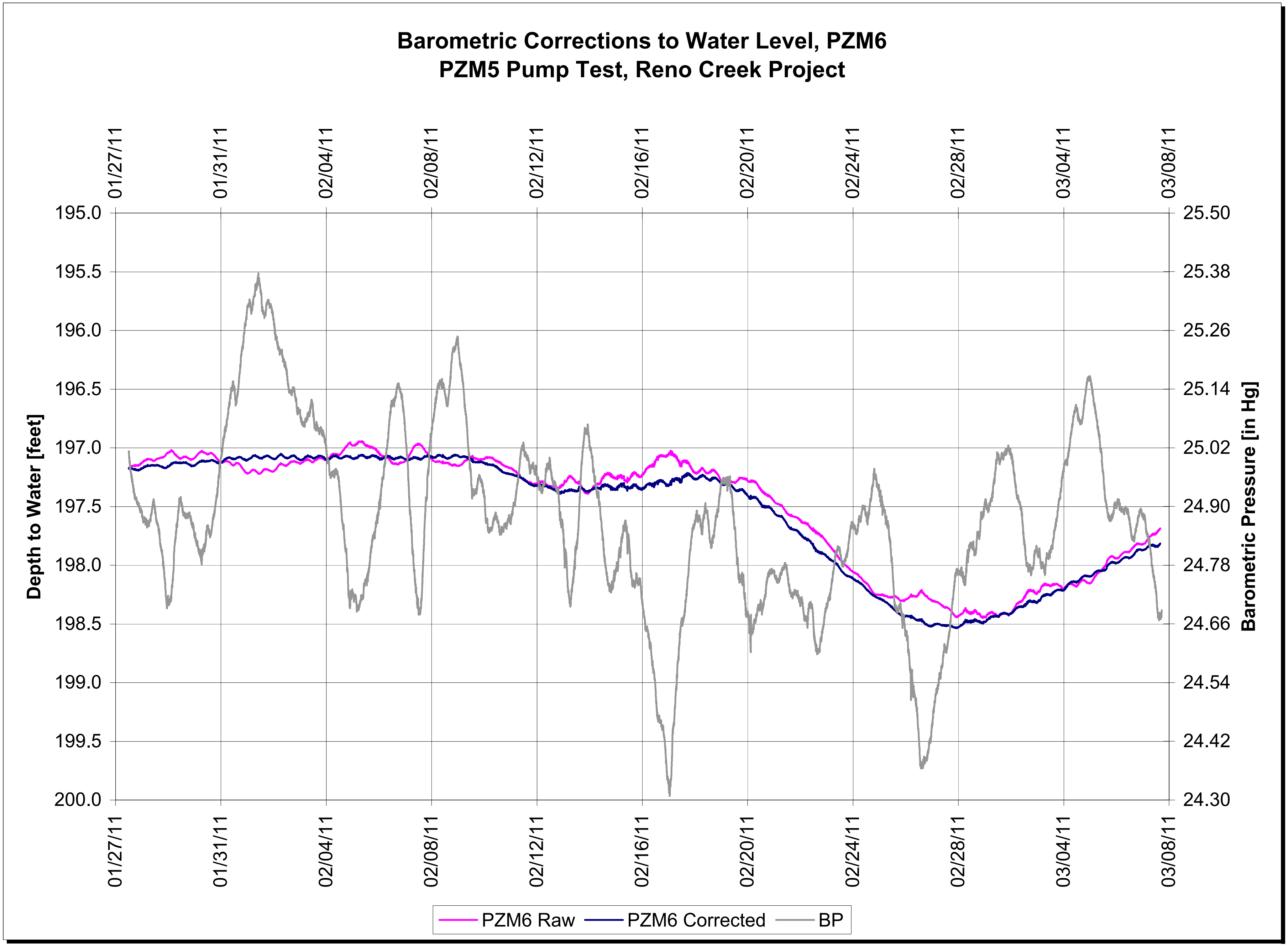
WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE

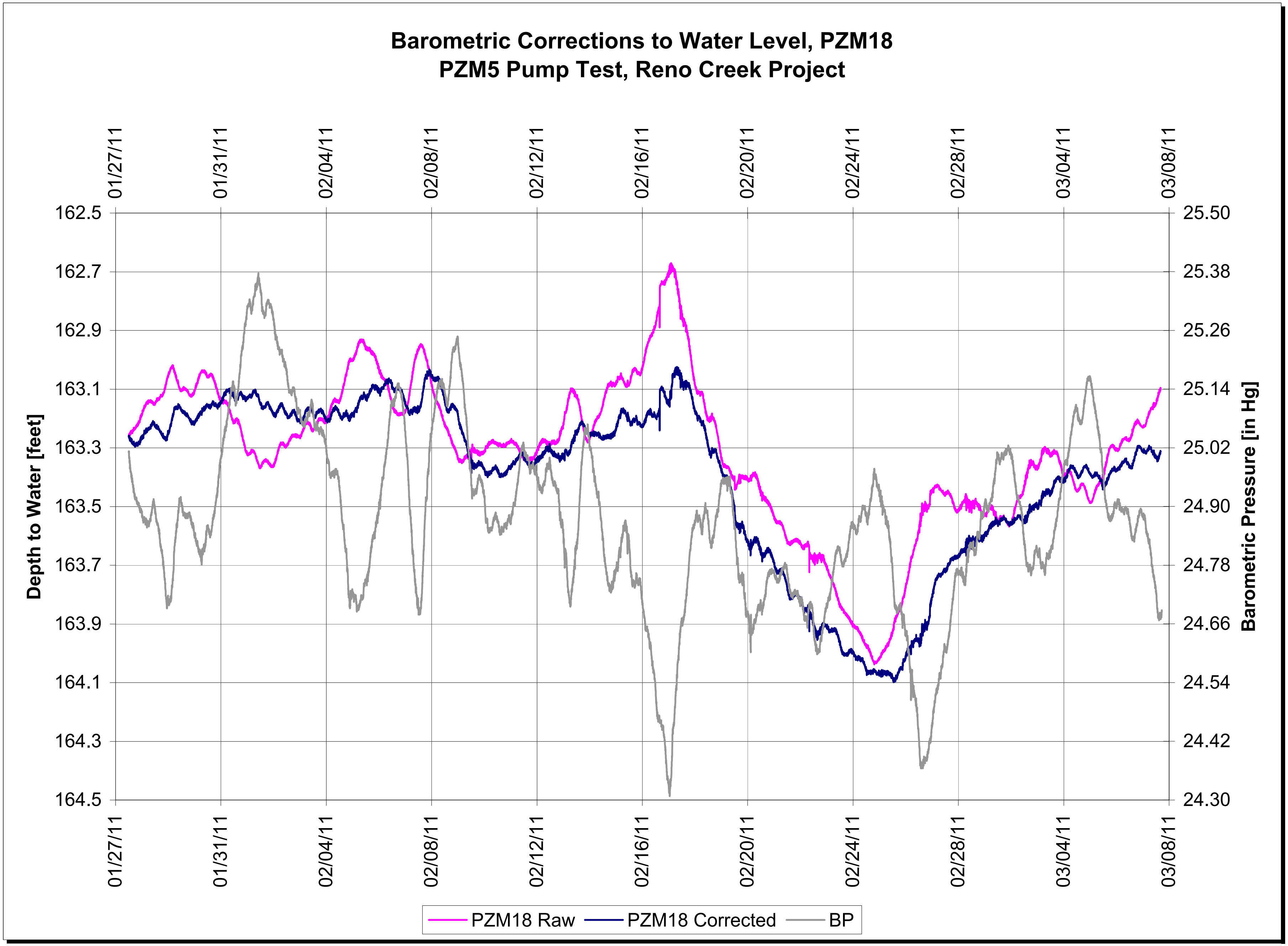


Barometric Corrections to Water Level, SM5
PZM5 Pump Test, Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
35.0
35.2
35.4
35.6
35.8
36.0
36.2
36.4
36.6
36.8
37.0
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
SM5 Raw
SM5 Corrected
BP

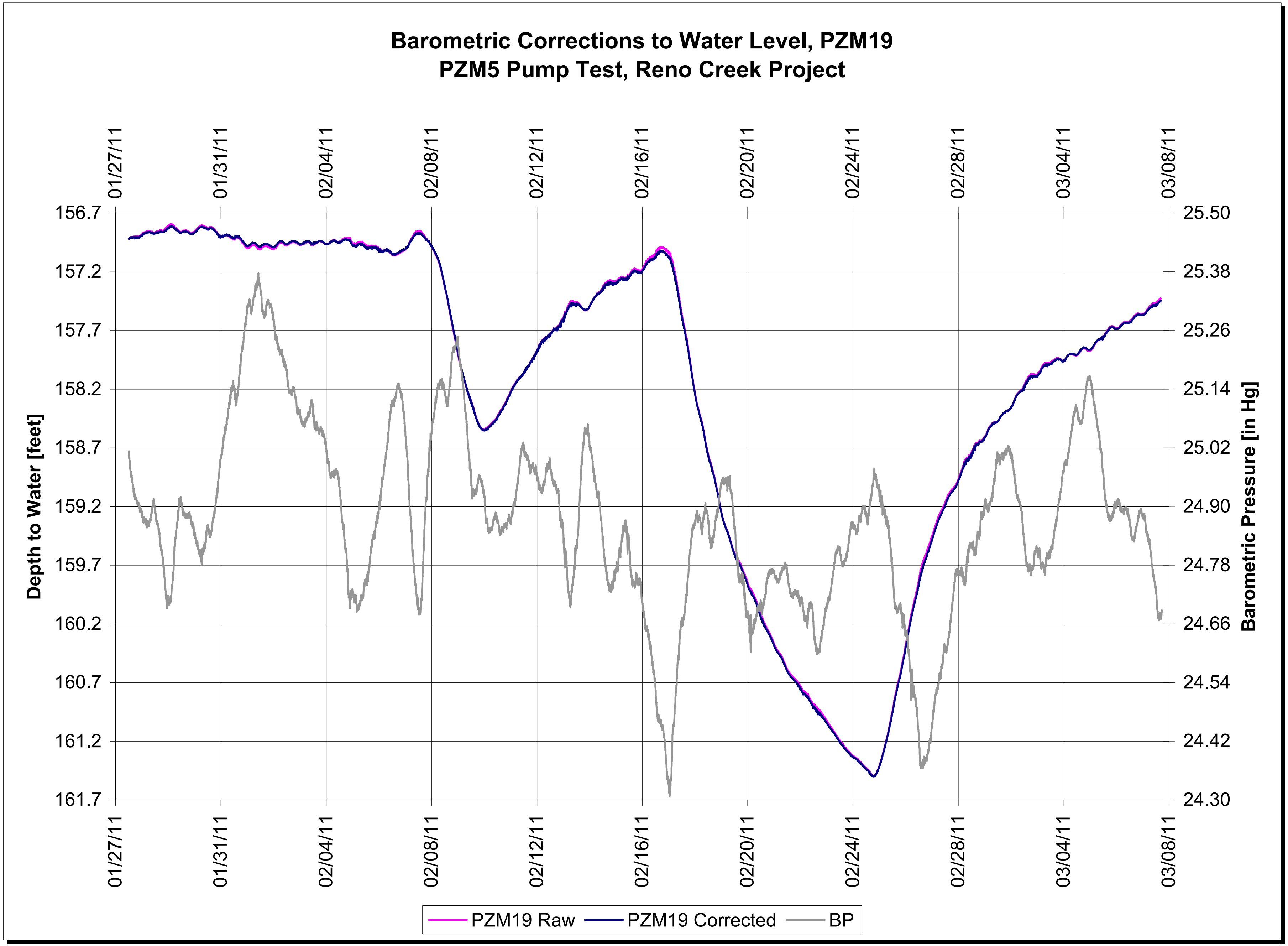

Barometric Corrections to Water Level, OM5
PZM5 Pump Test, Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
37.5
37.7
37.9
38.1
38.3
38.5
38.7
38.9
39.1
39.3
39.5
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
OM5 Raw
OM5 Corrected
BP

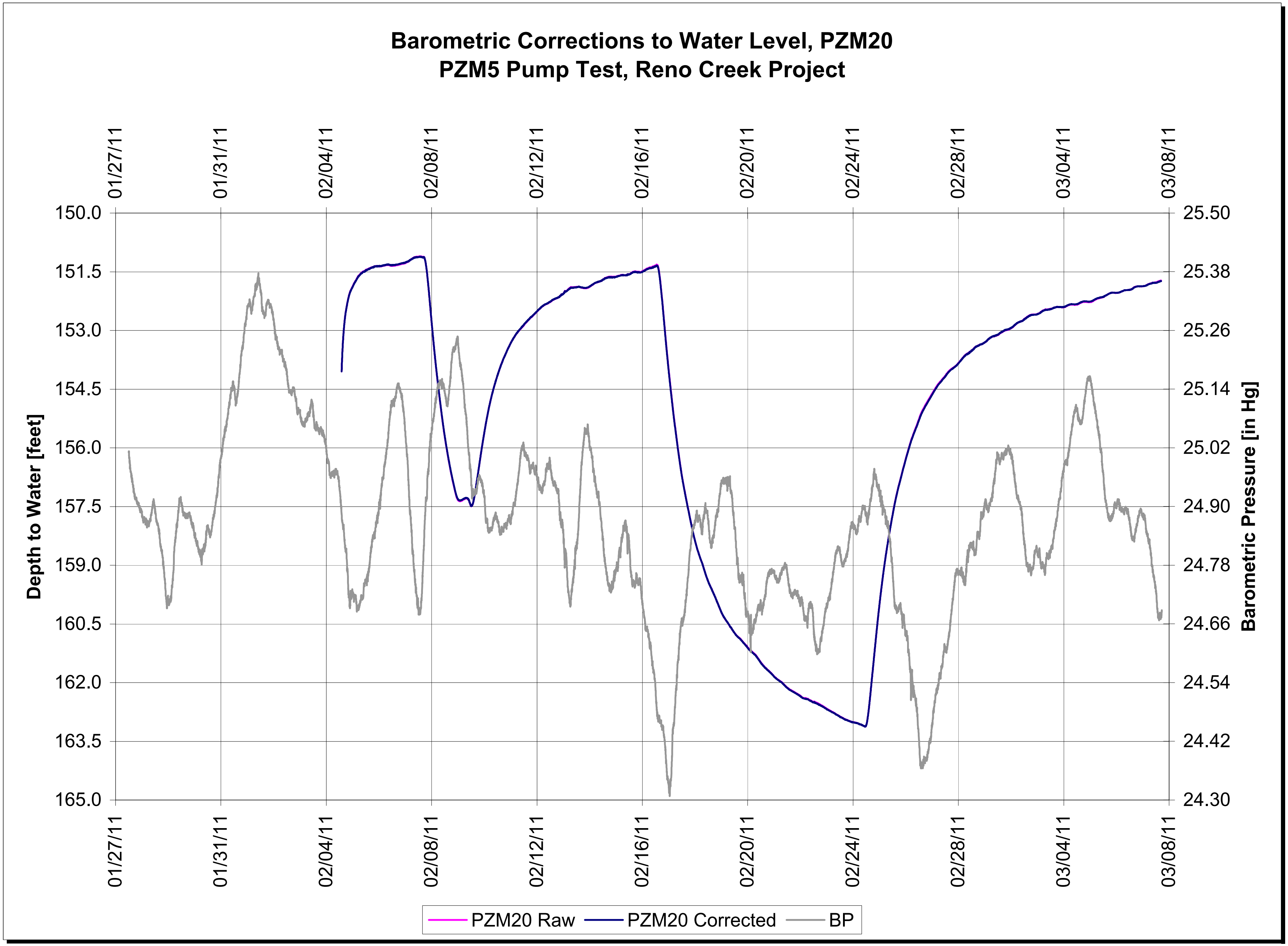

Barometric Corrections to Water Level, PZM5
PZM5 Pump Test, Reno Creek Project
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
100
115
130
145
160
175
190
205
220
235
250
Depth to Water [feet]
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
Barometric Pressure [in Hg]
Stopped initial test; pump issues
PZM5 Raw
PZM5 Corrected
BP


Barometric Corrections to Water Level, PZM6
PZM5 Pump Test, Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
195.0
195.5
196.0
196.5
197.0
197.5
198.0
198.5
199.0
199.5
200.0
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
PZM6 Raw
PZM6 Corrected
BP

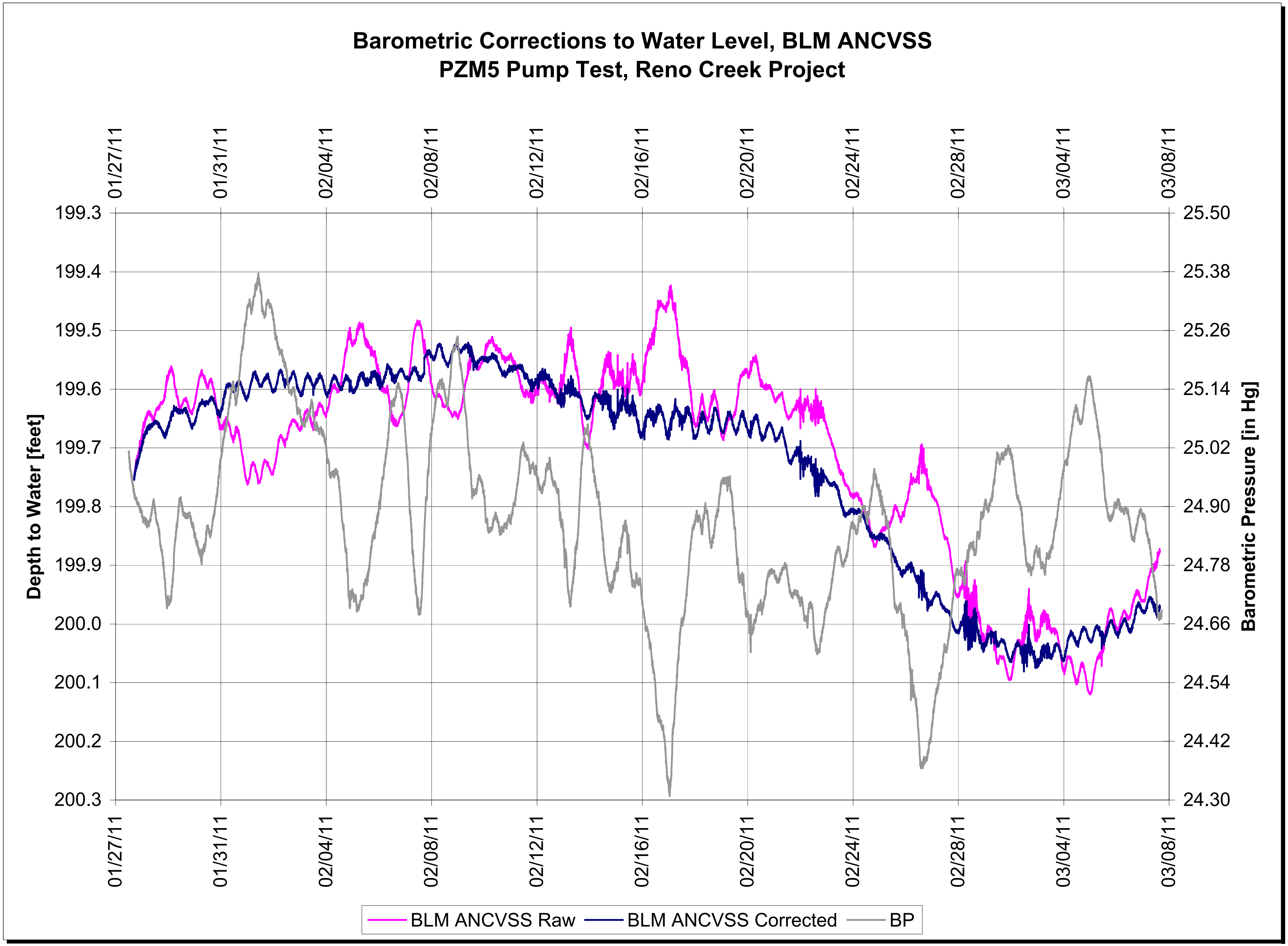


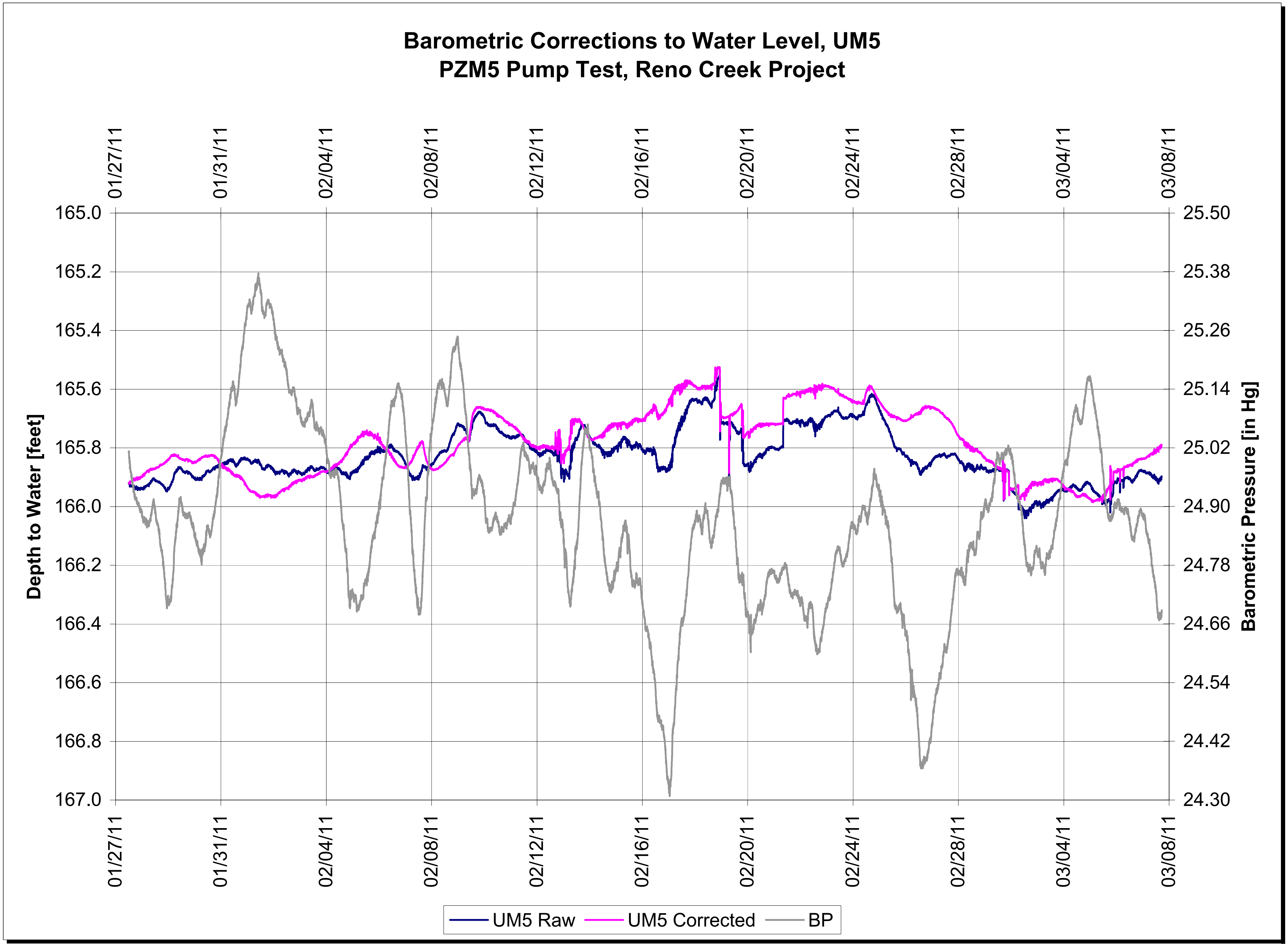
Barometric Corrections to Water Level, PZM18
PZM5 Pump Test, Reno Creek Project
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
Depth to Water [feet]
162.5
162.7
162.9
163.1
163.3
163.5
163.7
163.9
164.1
164.3
164.5
Barometric Pressure [in Hg]
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
PZM18 Raw
PZM18 Corrected
BP


Barometric Corrections to Water Level, PZM19
PZM5 Pump Test, Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
156.7
157.2
157.7
158.2
158.7
159.2
159.7
160.2
160.7
161.2
161.7
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
PZM19 Raw
PZM19 Corrected
BP



Barometric Corrections to Water Level, PZM20
PZM5 Pump Test, Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
150.0
151.5
153.0
154.5
156.0
157.5
159.0
160.5
162.0
163.5
165.0
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
PZM20 Raw
PZM20 Corrected
BP


Barometric Corrections to Water Level, BLM ANCVSS
PZM5 Pump Test, Reno Creek Project
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
199.3
199.4
199.5
199.6
199.7
199.8
199.9
200.0
200.1
200.2
200.3
Depth to Water [feet]
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
Barometric Pressure [in Hg]
BLM ANCVSS Raw
BLM ANCVSS Corrected
BP



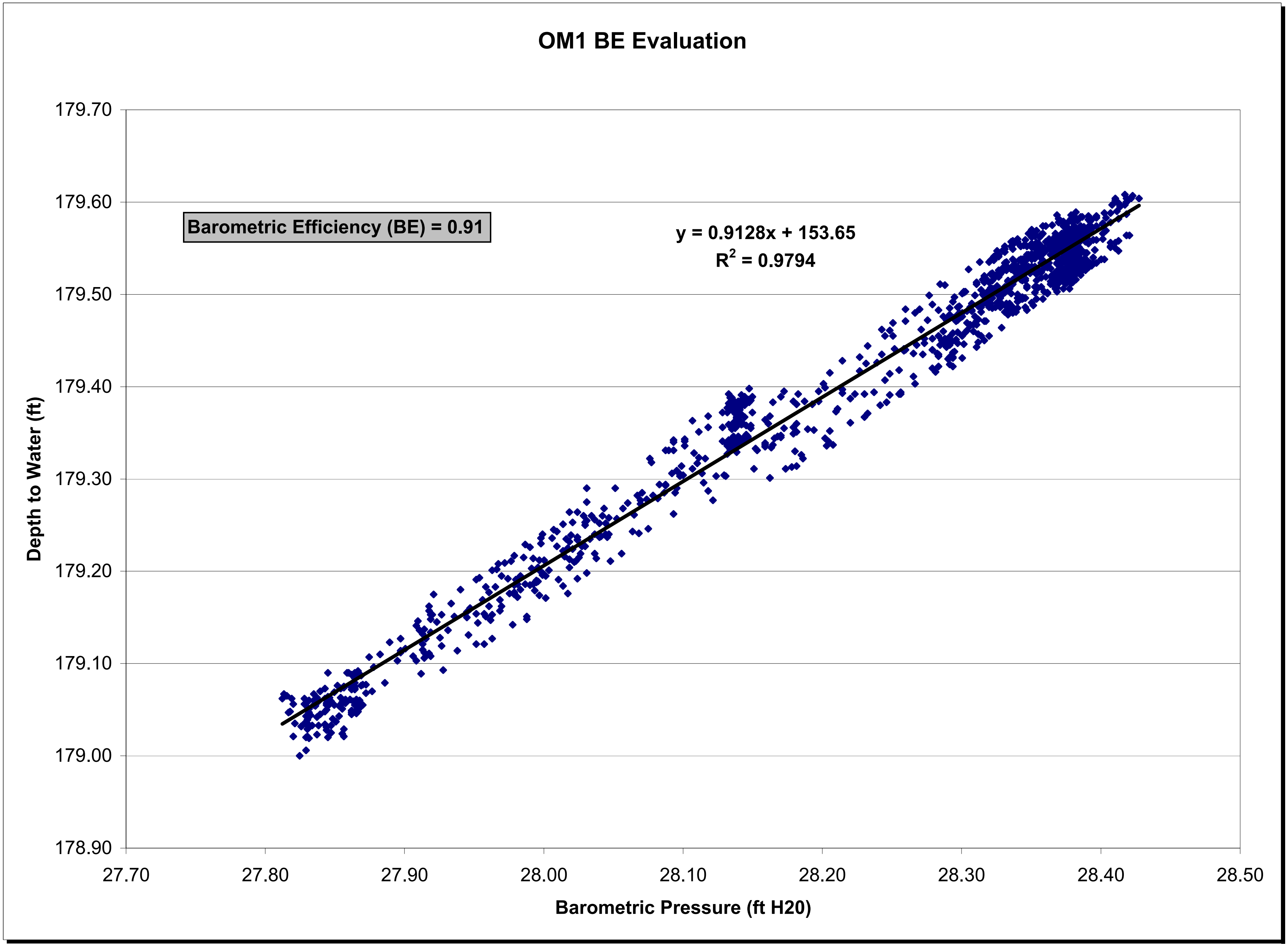
Barometric Corrections to Water Level, UM5
PZM5 Pump Test, Reno Creek Project
Depth to Water [feet]
Barometric Pressure [in Hg]
01/27/11
01/31/11
02/04/11
02/08/11
02/12/11
02/16/11
02/20/11
02/24/11
02/28/11
03/04/11
03/08/11
165.0
165.2
165.4
165.6
165.8
166.0
166.2
166.4
166.6
166.8
167.0
25.50
25.38
25.26
25.14
25.02
24.90
24.78
24.66
24.54
24.42
24.30
UM5 Raw
UM5 Corrected
BP

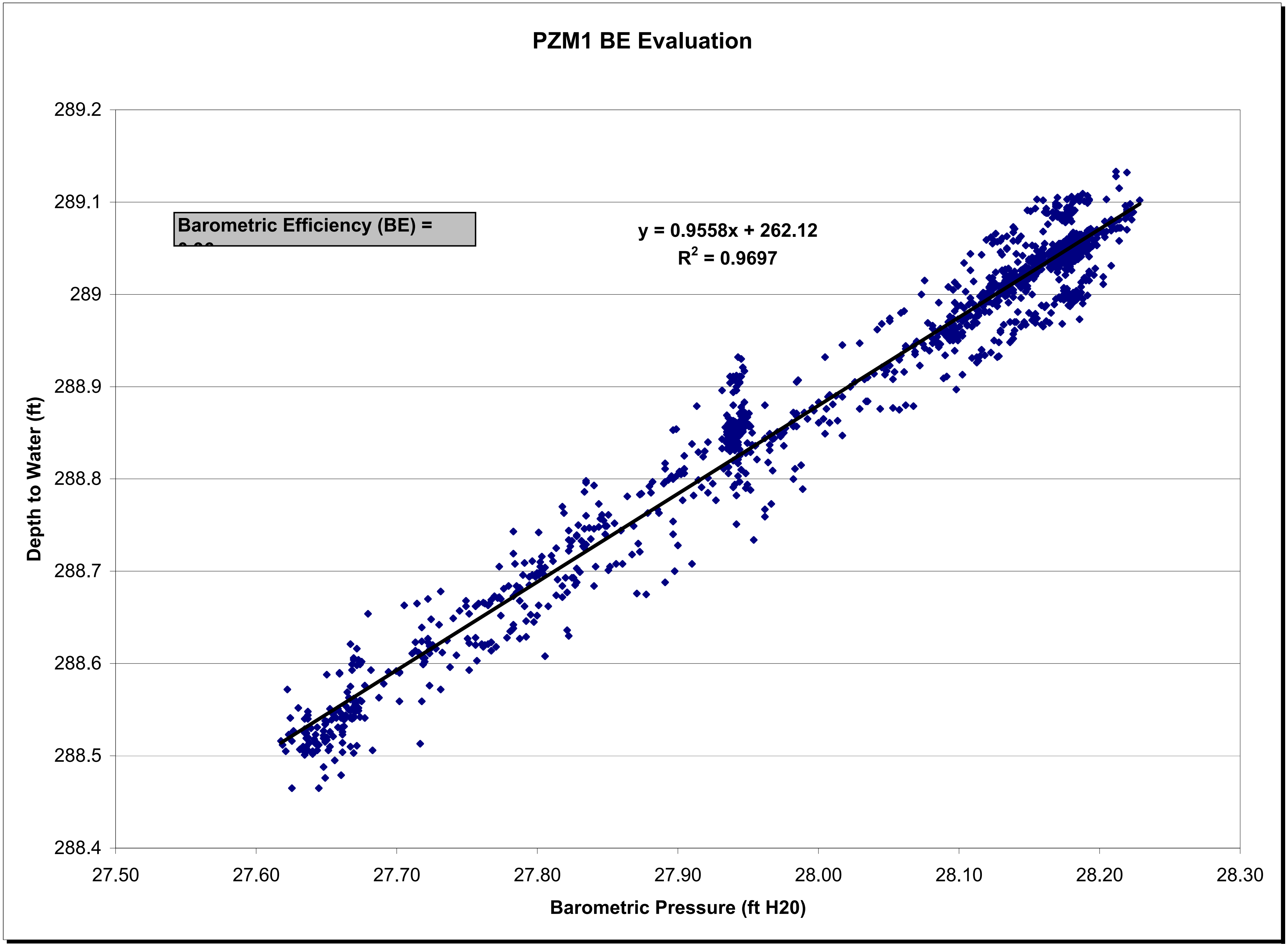
APPENDIX B

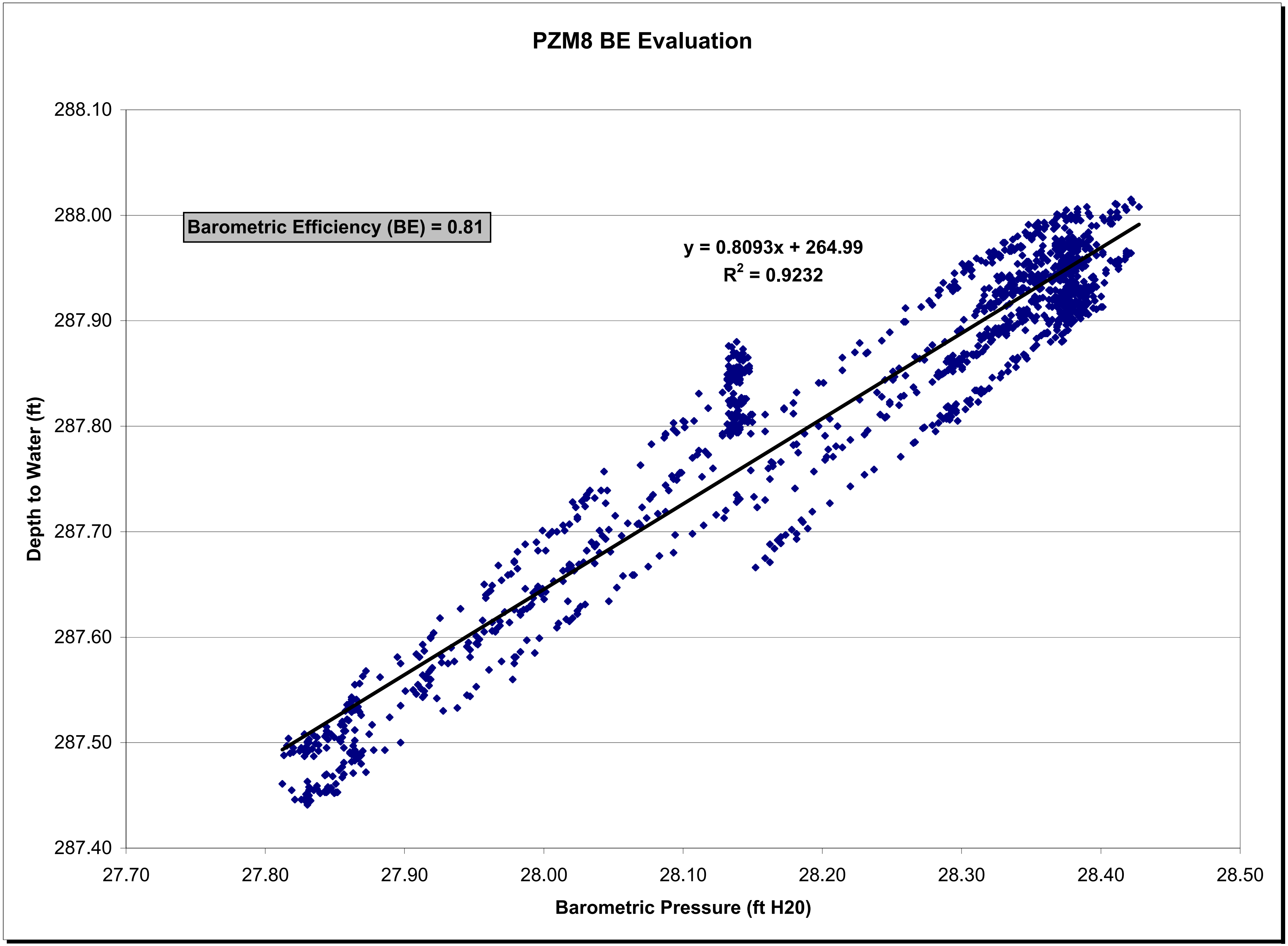
WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE AND MONITOR WELL BAROMETRIC EFFICIENCY EVALUATIONS

PZM1 PUMP TEST

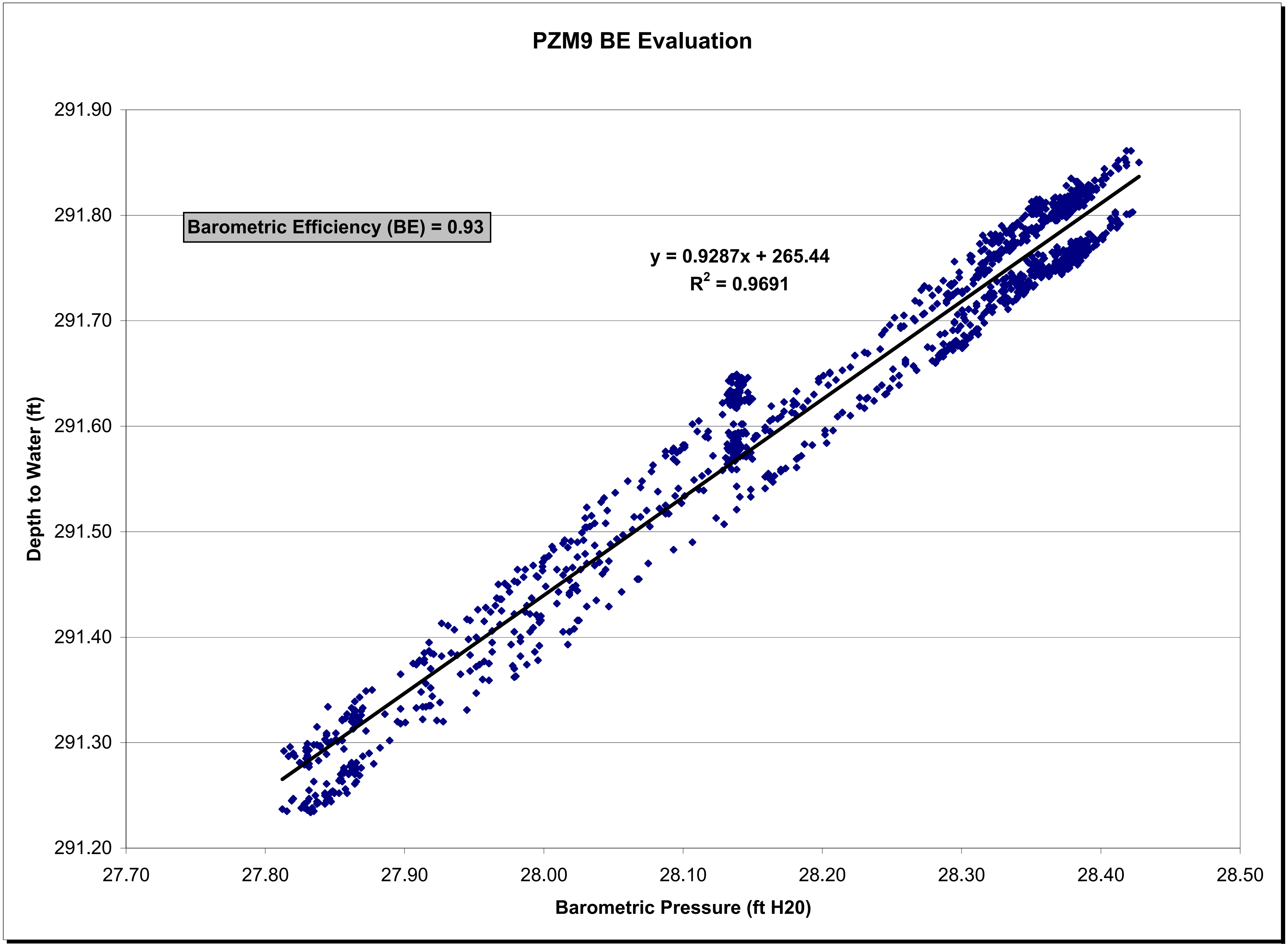
WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE AND MONITOR WELL BAROMETRIC EFFICIENCY EVALUATIONS


OM1 BE Evaluation
Barometric Efficiency (BE) = 0.91
y = 0.9128x + 153.65
R2 = 0.9794
179.70
179.60
179.50
179.40
179.30
179.20
179.10
179.00
178.90
Depth to Water (ft)
27.70
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
Barometric Pressure (ft H20)

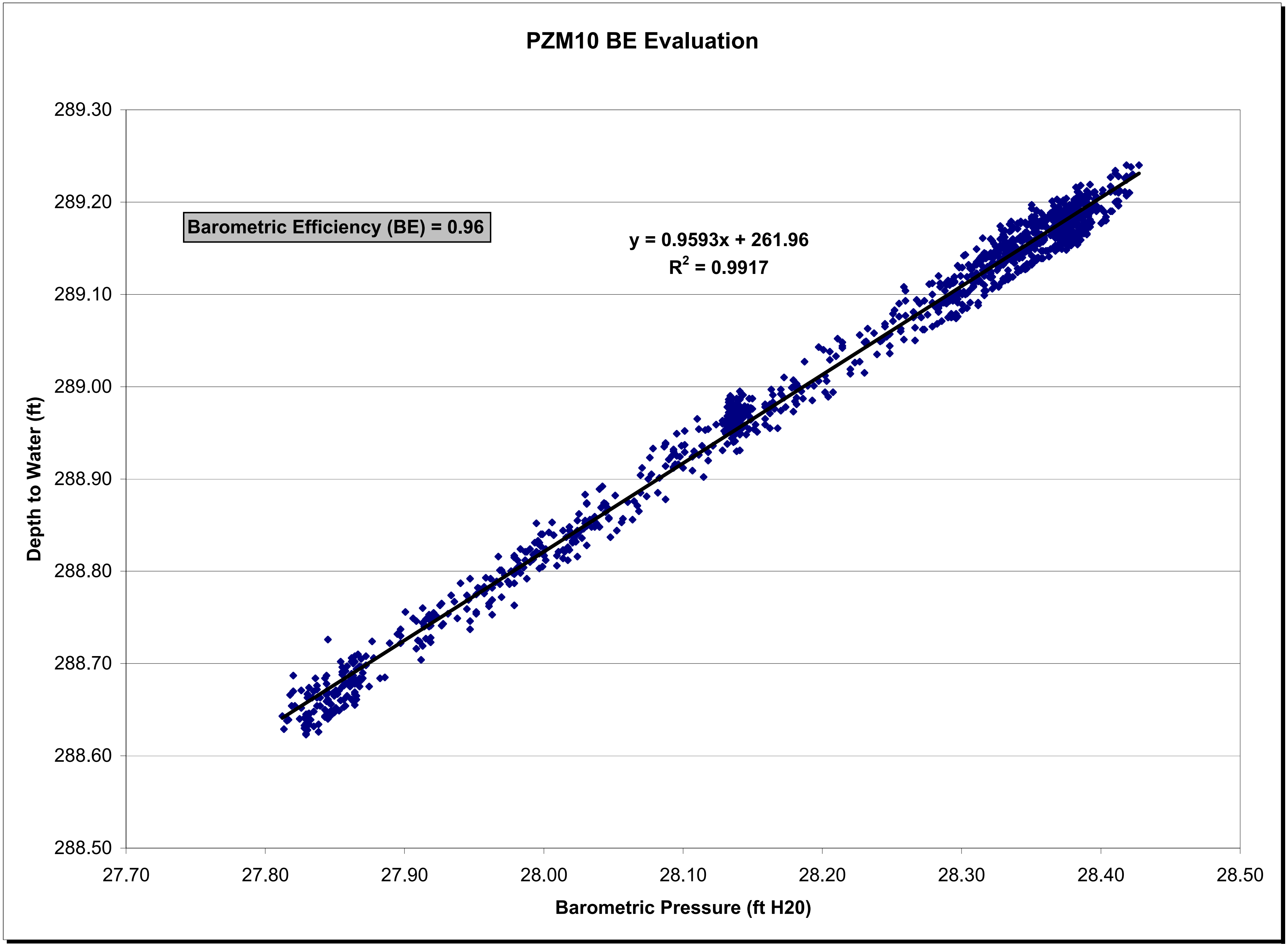

PZM1 BE Evaluation
Barometric Efficiency (BE) =
y = 0.9558x + 262.12
R2 = 0.9697
Depth to Water (ft)
289.2
289.1
289
288.9
288.8
288.7
288.6
288.5
288.4
27.50
27.60
27.70
27.80
27.90
28.00
28.10
28.20
28.30
Barometric Pressure (ft H20)

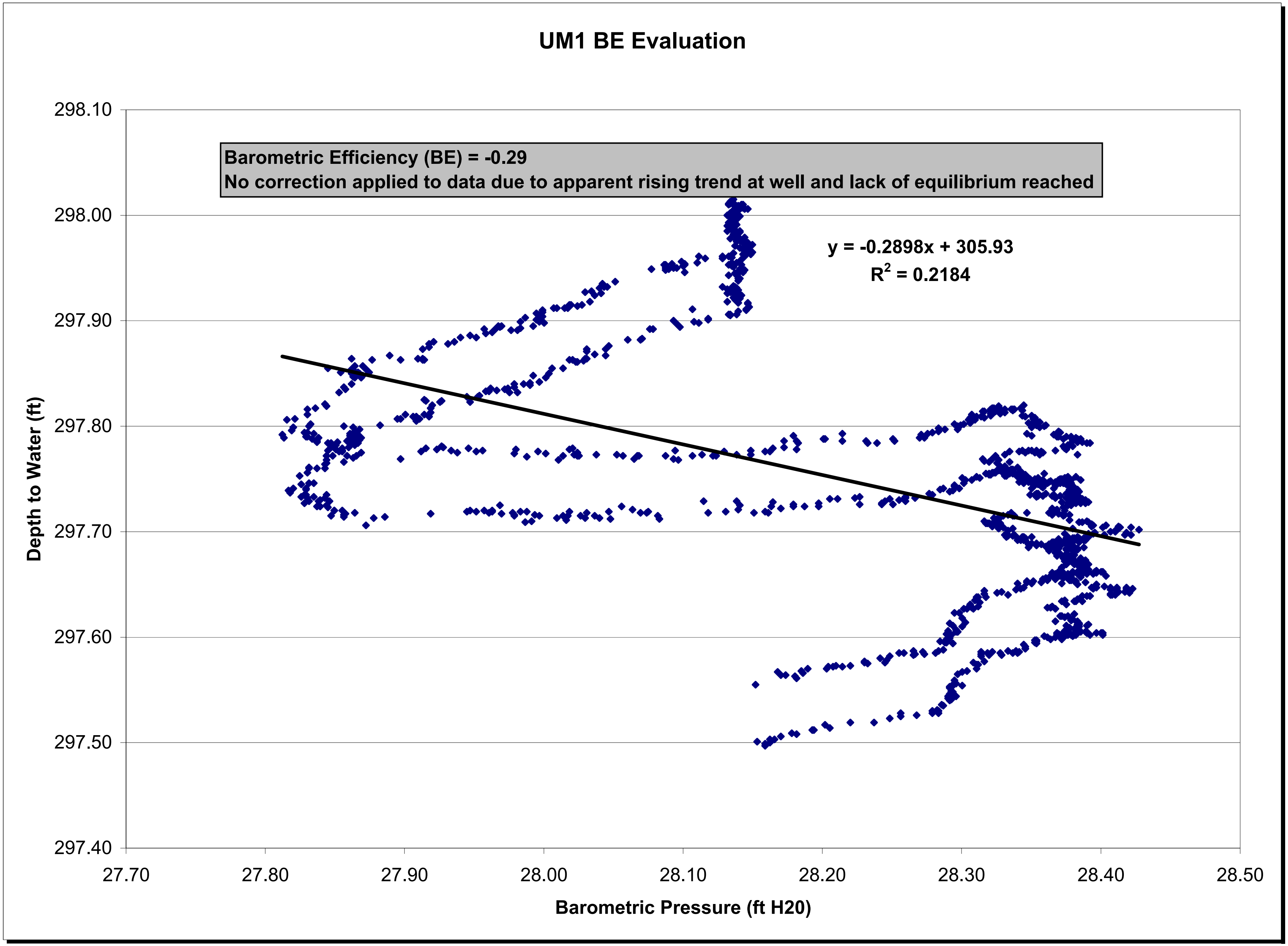


PZM8 BE Evaluation
Barometric Efficiency (BE) = 0.81
y = 0.8093x + 264.99
R2 = 0.9232
288.10
288.00
287.90
287.80
287.70
287.60
287.50
287.40
Depth to Water (ft)
27.70
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
Barometric Pressure (ft H20)



PZM9 BE Evaluation
Barometric Efficiency (BE) = 0.93
y = 0.9287x + 265.44
R^2 = 0.9691
291.90
291.80
291.70
291.60
291.50
291.40
291.30
291.20
Depth to Water (ft)
27.70
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
Barometric Pressure (ft H20)

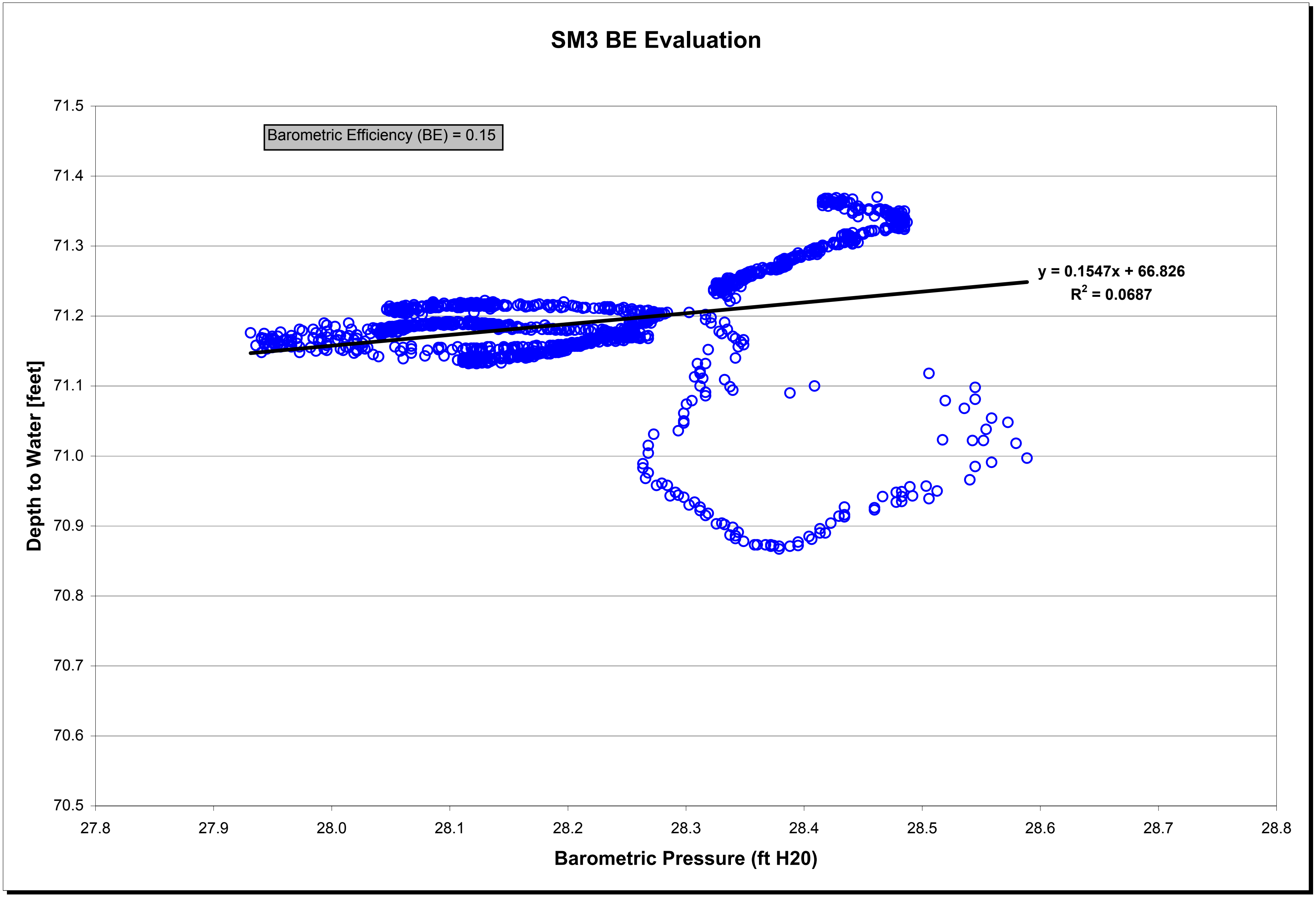

PZM10 BE Evaluation
Barometric Efficiency (BE) = 0.96
y = 0.9593x + 261.96
R2 = 0.9917
Depth to Water (ft)
289.30
289.20
289.10
289.00
288.90
288.80
288.70
288.60
288.50
27.70
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
Barometric Pressure (ft H20)



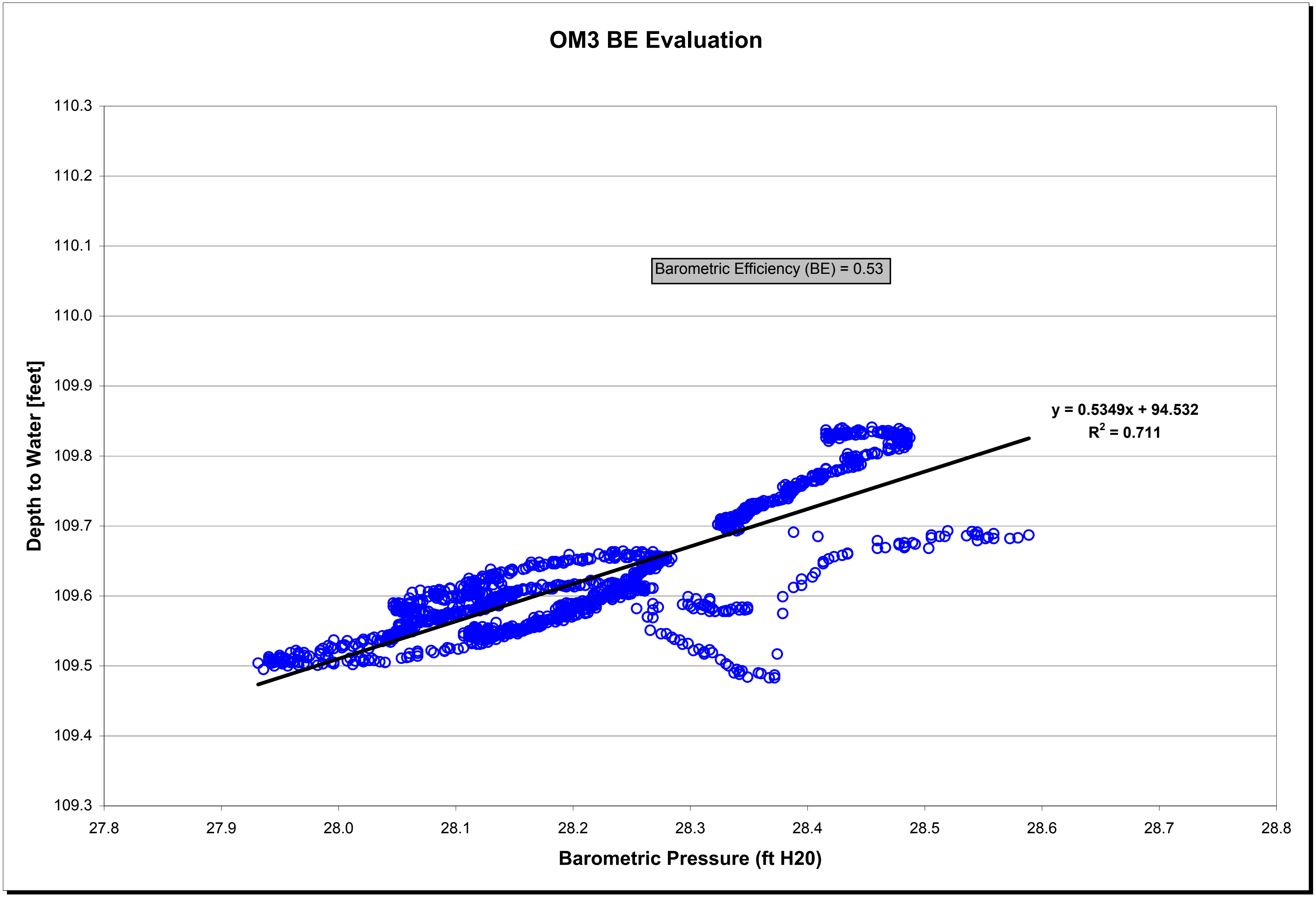
UM1 BE Evaluation
Barometric Efficiency (BE) = -0.29
No correction applied to data due to apparent rising trend at well and lack of equilibrium reached
y = -0.2898x + 305.93
R2 = 0.2184
298.10
298.00
297.90
297.80
297.70
297.60
297.50
297.40
Depth to Water (ft)
27.70
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
Barometric Pressure (ft H20)

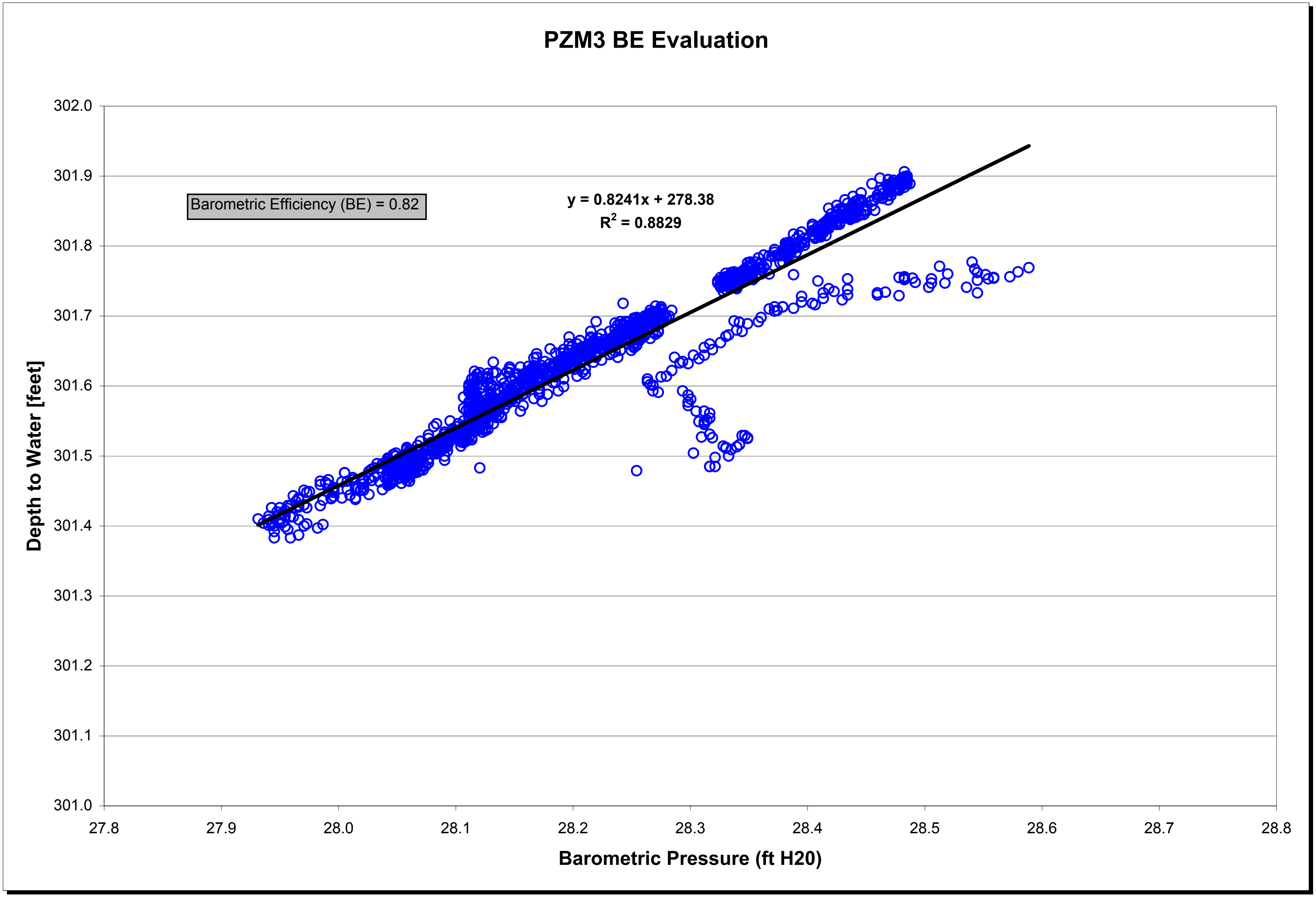
PZM3 PUMP TEST

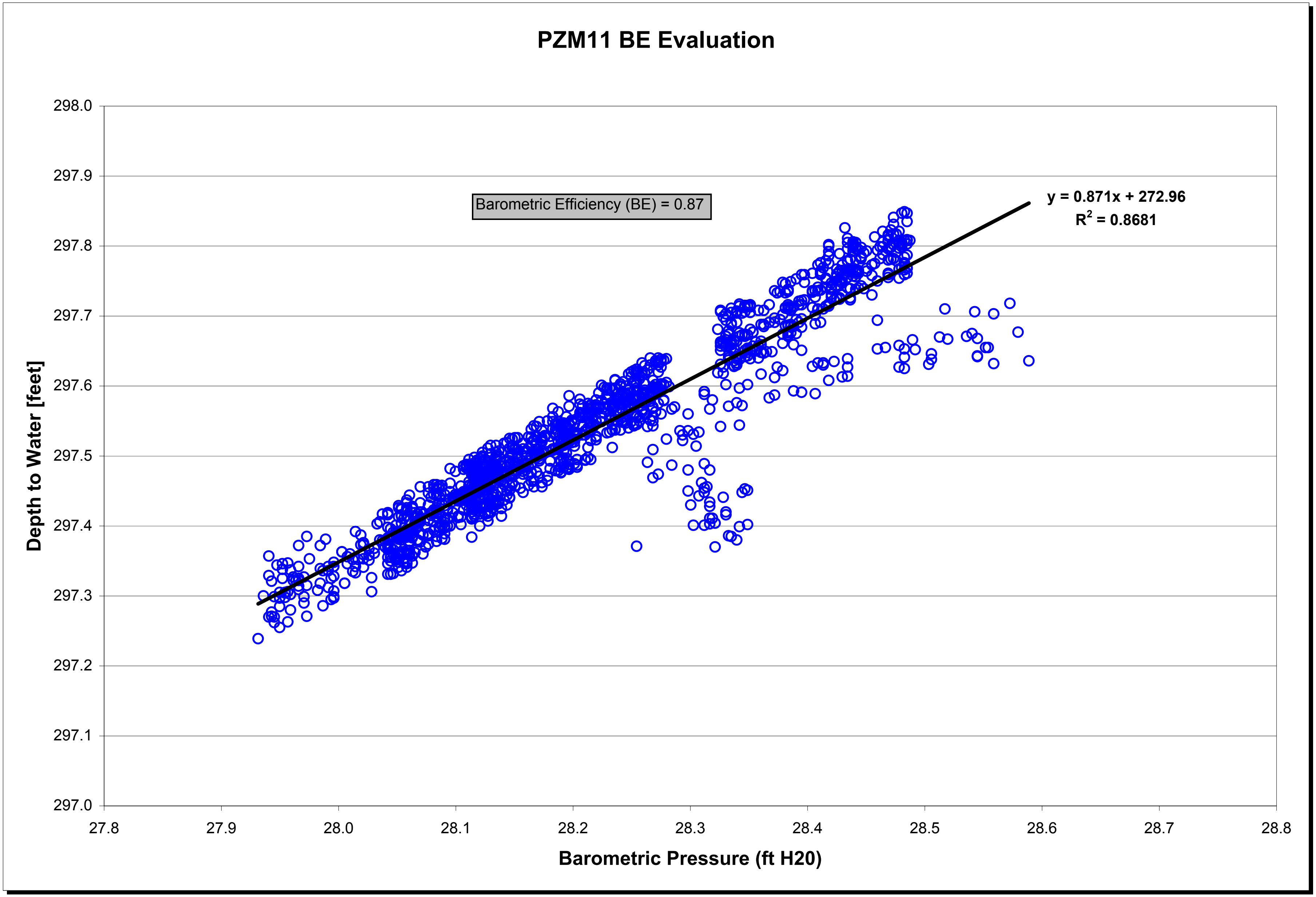
WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE AND MONITOR WELL BAROMETRIC EFFICIENCY EVALUATIONS

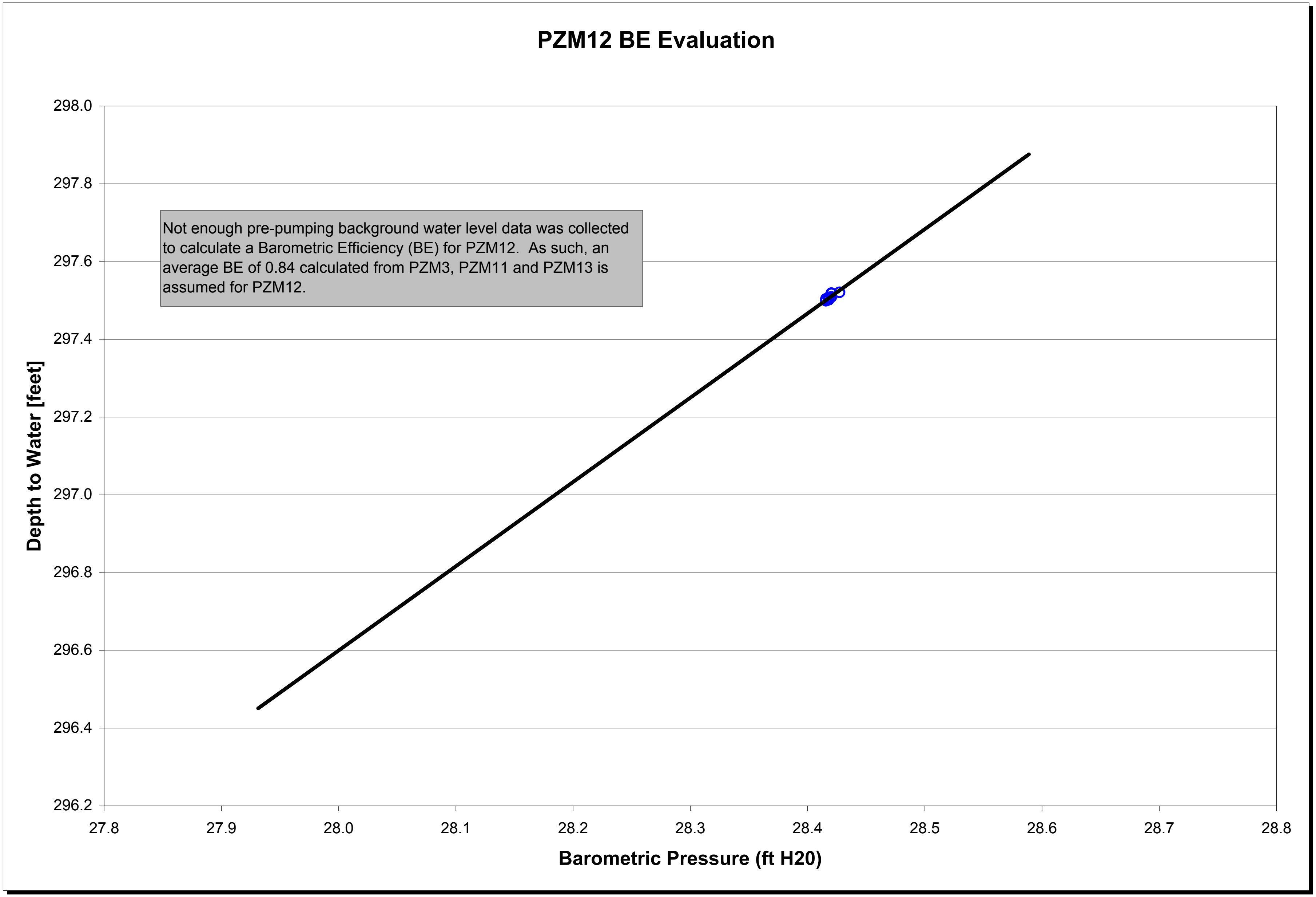


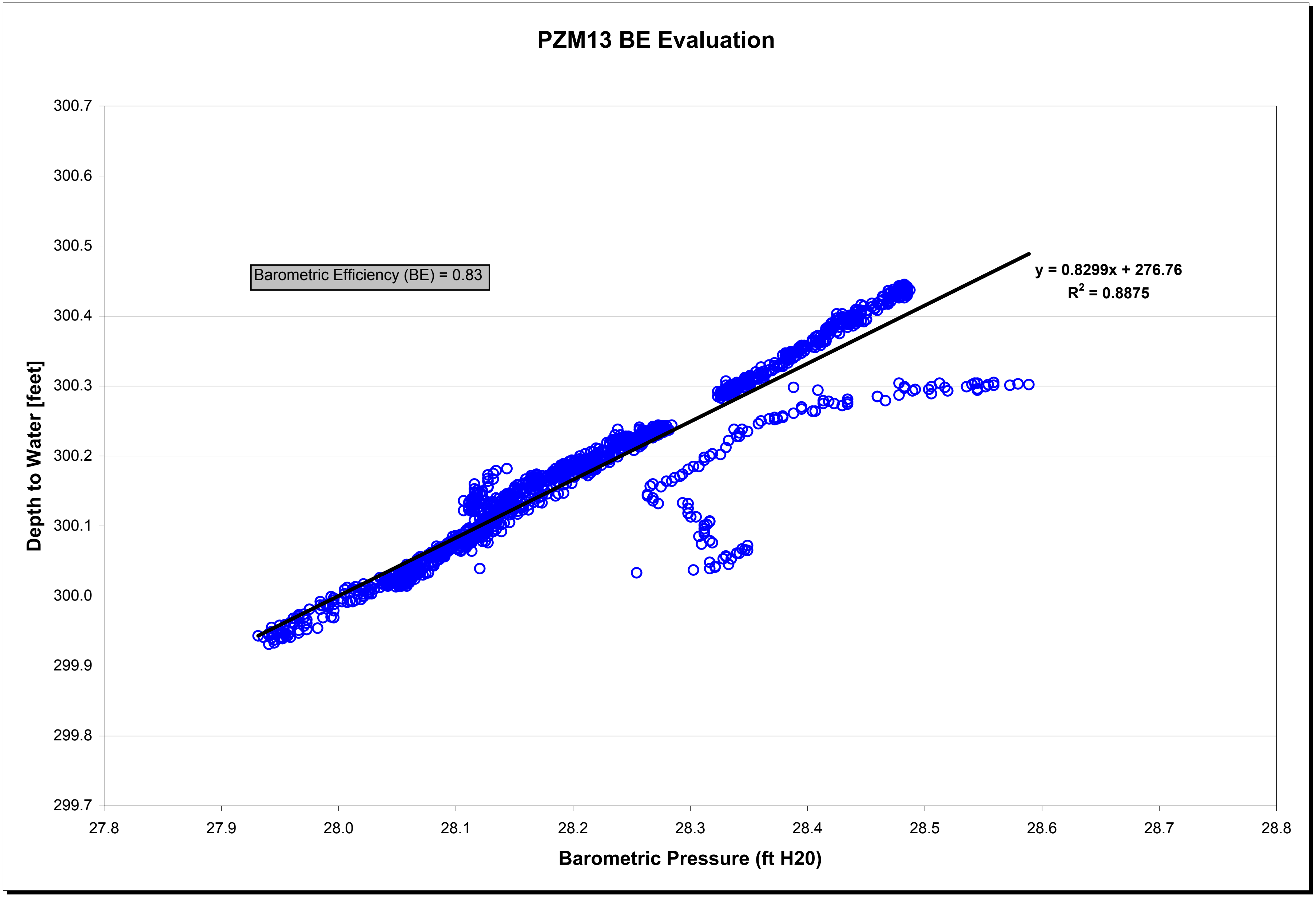
SM3 BE Evaluation
Barometric Efficiency (BE) = 0.15
y = 0.1547x + 66.826
R2 = 0.0687
71.5
71.4
71.3
71.2
71.1
71.0
70.9
70.8
70.7
70.6
70.5
Depth to Water [feet]
27.8
27.9
28.0
28.1
28.2
28.3
28.4
28.5
28.6
28.7
28.8
Barometric Pressure (ft H20)


OM3 BE Evaluation
Barometric Efficiency (BE) = 0.53
y = 0.5349x + 94.532
R^2 = 0.711
Depth to Water [feet]
110.3
110.2
110.1
110.0
109.9
109.8
109.7
109.6
109.5
109.4
109.3
27.8
27.9
28.0
28.1
28.2
28.3
28.4
28.5
28.6
28.7
28.8
Barometric Pressure (ft H20)

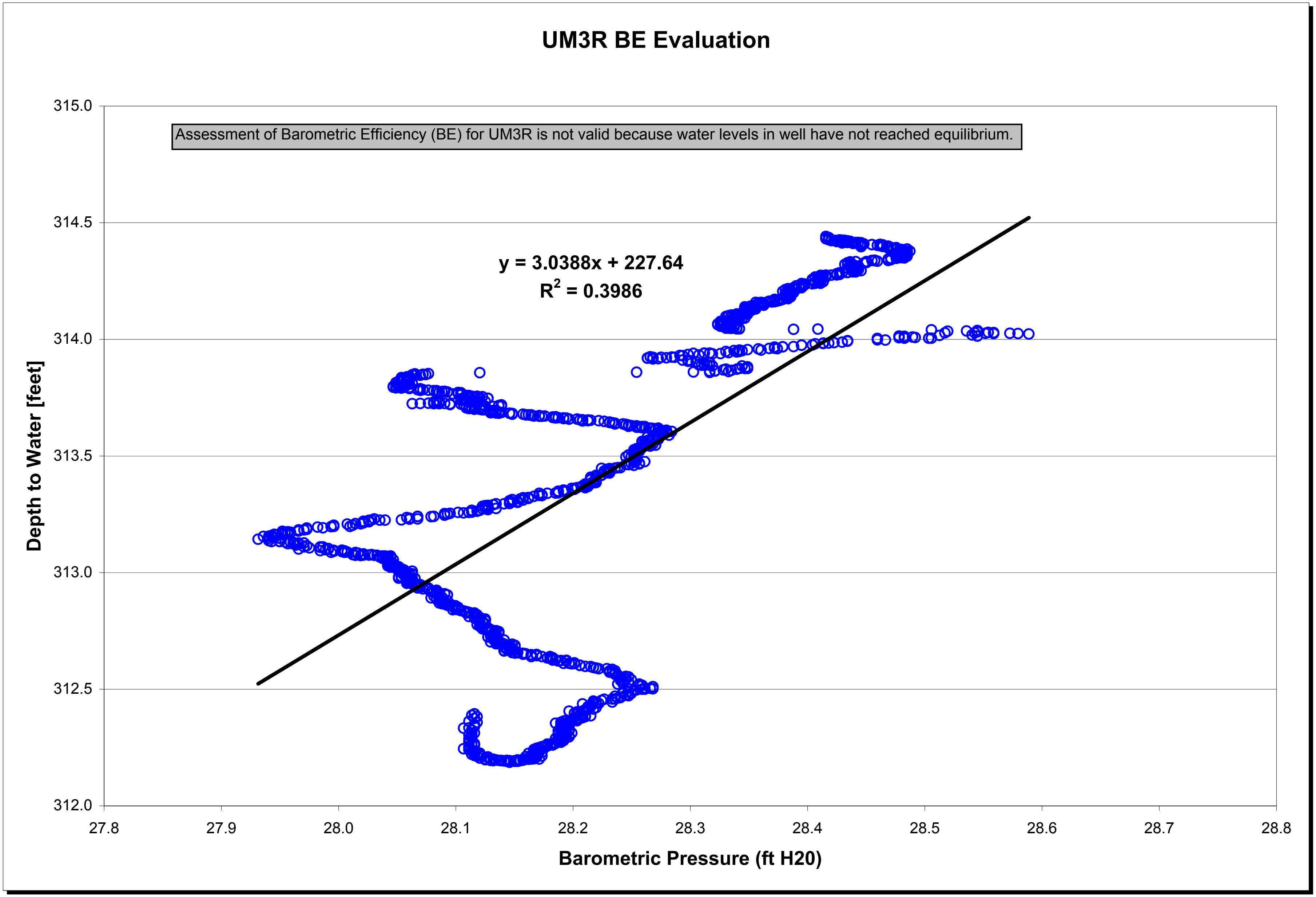

PZM3 BE Evaluation
Barometric Efficiency (BE) = 0.82
y = 0.8241x + 278.38
R2 = 0.8829
Depth to Water [feet]
302.0
301.9
301.8
301.7
301.6
301.5
301.4
301.3
301.2
301.1
301.0
27.8
27.9
28.0
28.1
28.2
28.3
28.4
28.5
28.6
28.7
28.8
Barometric Pressure (ft H20)


PZM11 BE Evaluation
Barometric Efficiency (BE) = 0.87
y = 0.871x + 272.96
R2 = 0.8681
Depth to Water [feet]
Barometric Pressure (ft H20)
298.0
297.9
297.8
297.7
297.6
297.5
297.4
297.3
297.2
297.1
297.0
27.8
27.9
28.0
28.1
28.2
28.3
28.4
28.5
28.6
28.7
28.8


PZM12 BE Evaluation
Not enough pre-pumping background water level data was collected to calculate a Barometric Efficiency (BE) for PZM12. As such, an average BE of 0.84 calculated from PZM3, PZM11 and PZM13 is assumed for PZM12.
Depth to Water [feet]
298.0
297.8
297.6
297.4
297.2
297.0
296.8
296.6
296.4
296.2
27.8
27.9
28.0
28.1
28.2
28.3
28.4
28.5
28.6
28.7
28.8
Barometric Pressure (ft H20)

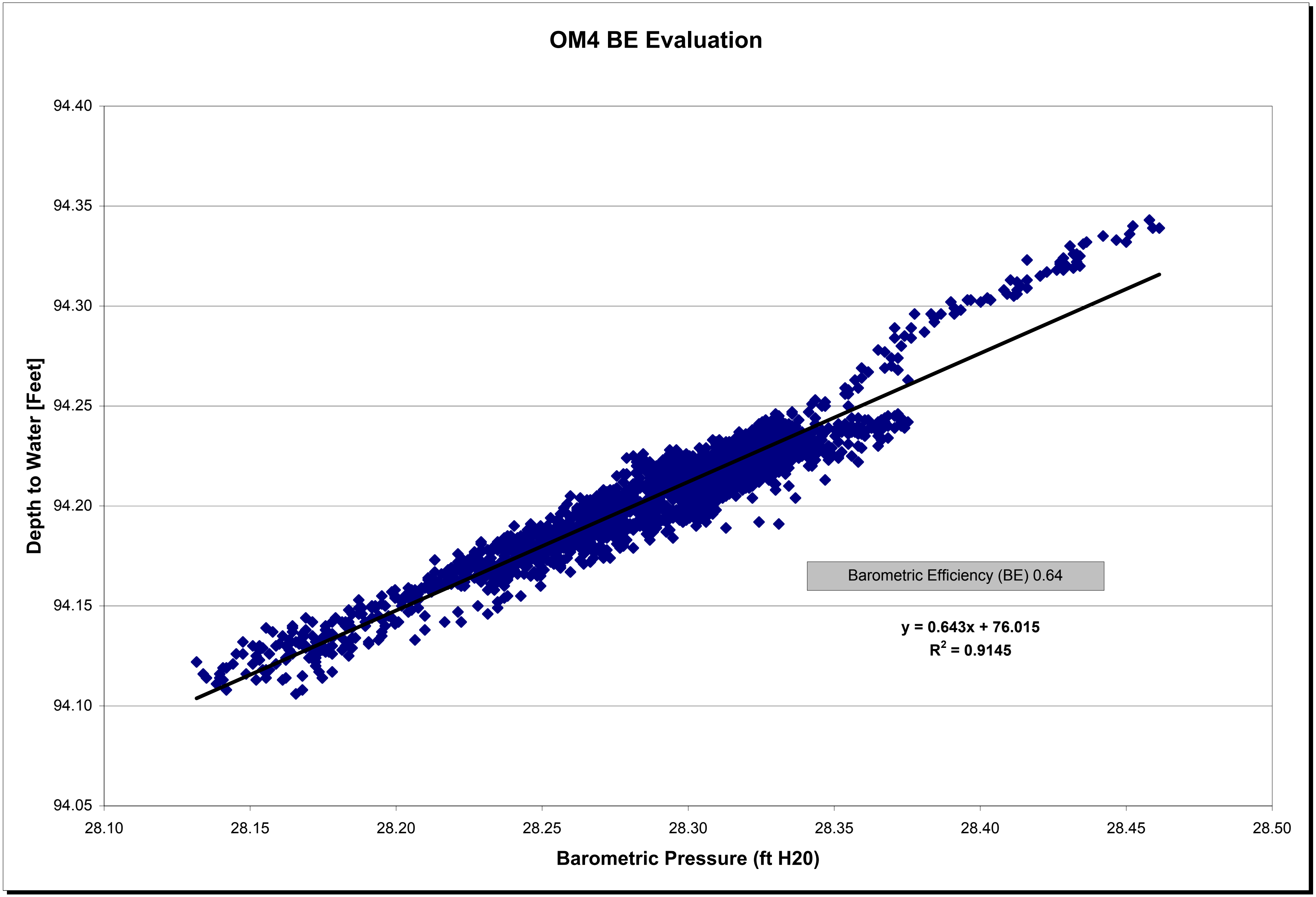


PZM13 BE Evaluation
Barometric Efficiency (BE) = 0.83
y = 0.8299x + 276.76
R2 = 0.8875
Depth to Water [feet]
300.7
300.6
300.5
300.4
300.3
300.2
300.1
300.0
299.9
299.8
299.7
27.8
27.9
28.0
28.1
28.2
28.3
28.4
28.5
28.6
28.7
28.8
Barometric Pressure (ft H20)

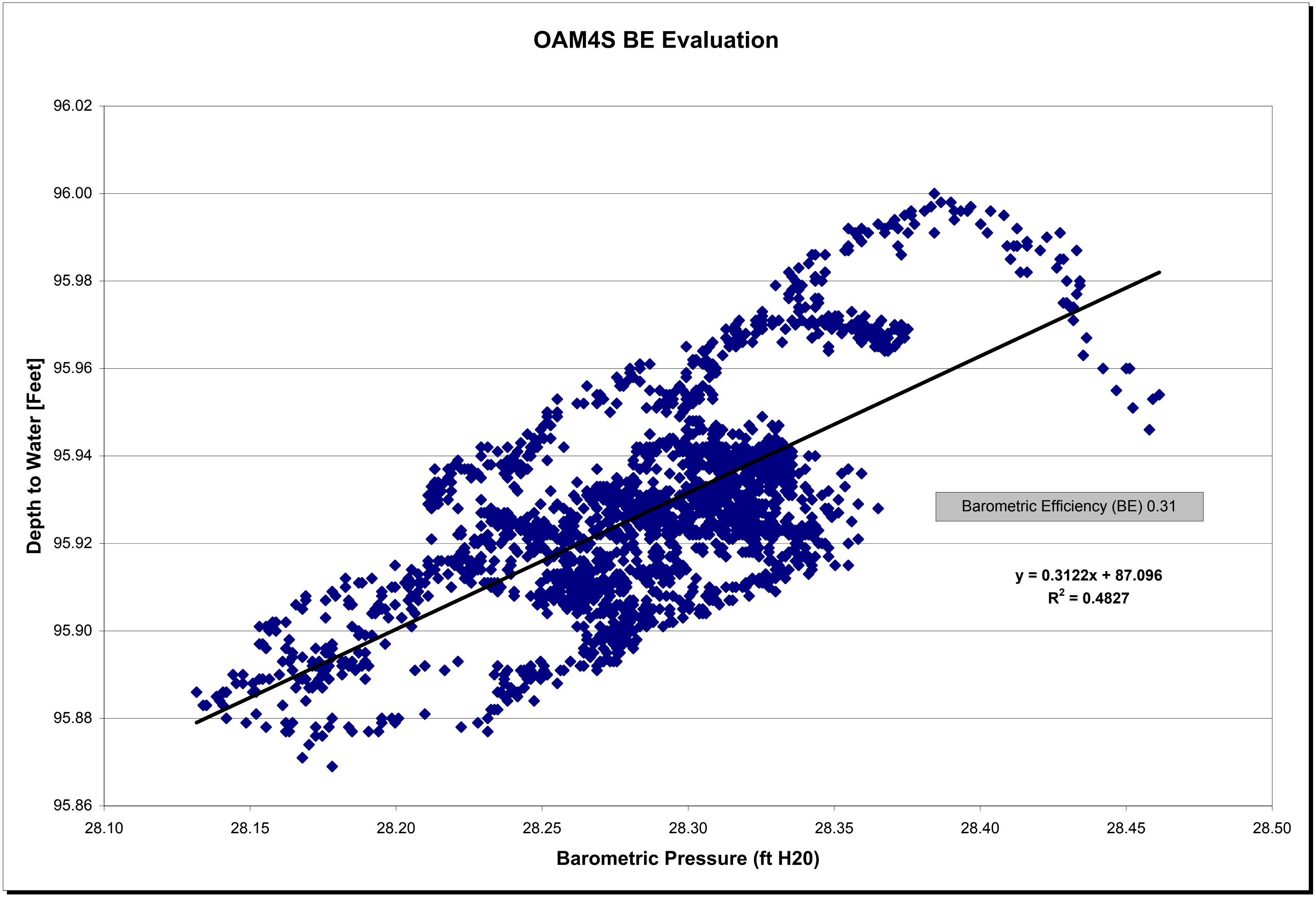

UM3R BE Evaluation
Assessment of Barometric Efficiency (BE) for UM3R is not valid because water levels in well have not reached equilibrium.
y = 3.0388x + 227.64
R2 = 0.3986
Depth to Water [feet]
315.0
314.5
314.0
313.5
313.0
312.5
312.0
27.8
27.9
28.0
28.1
28.2
28.3
28.4
28.5
28.6
28.7
28.8
Barometric Pressure (ft H20)

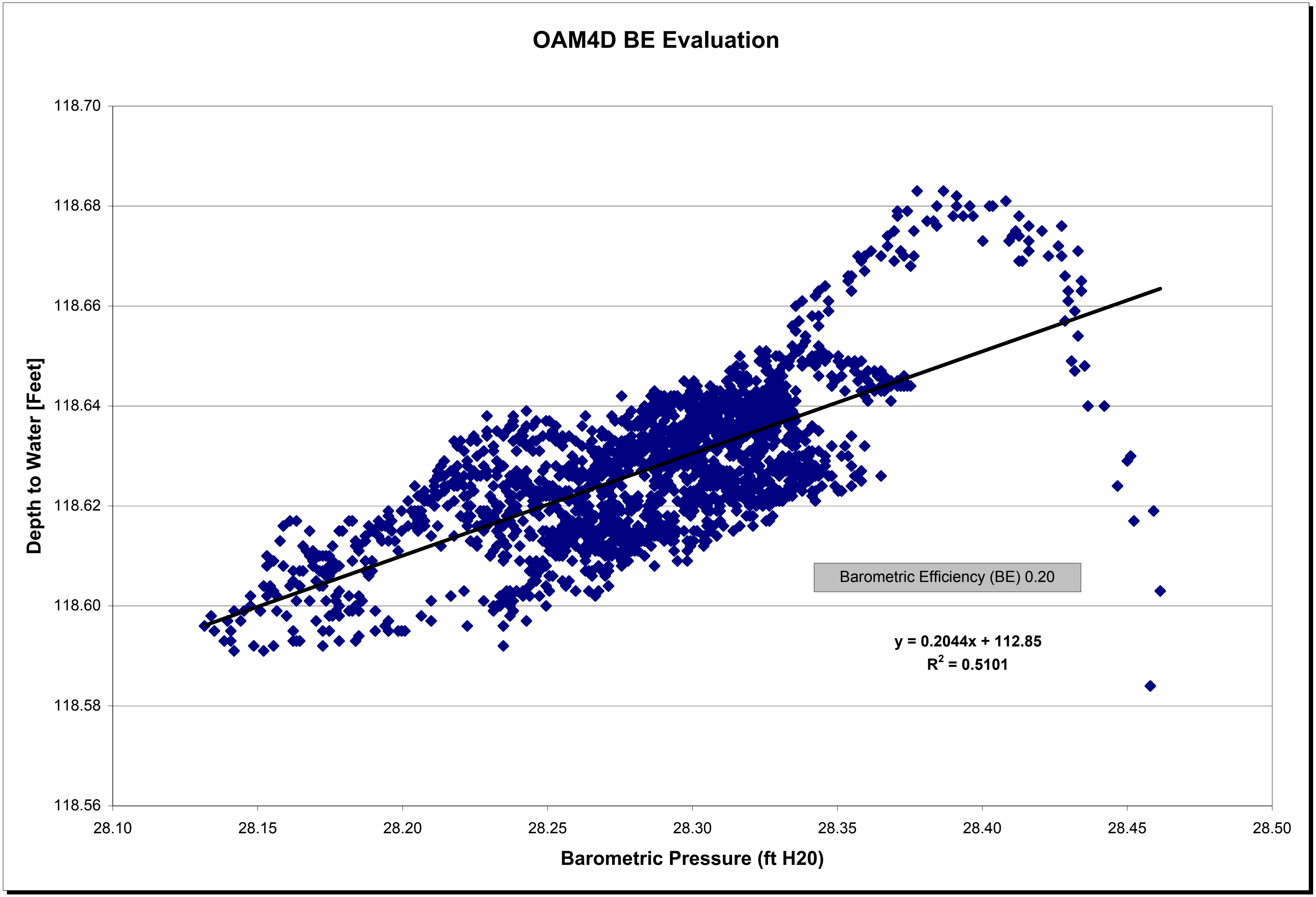
PZM4D PUMP TEST

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

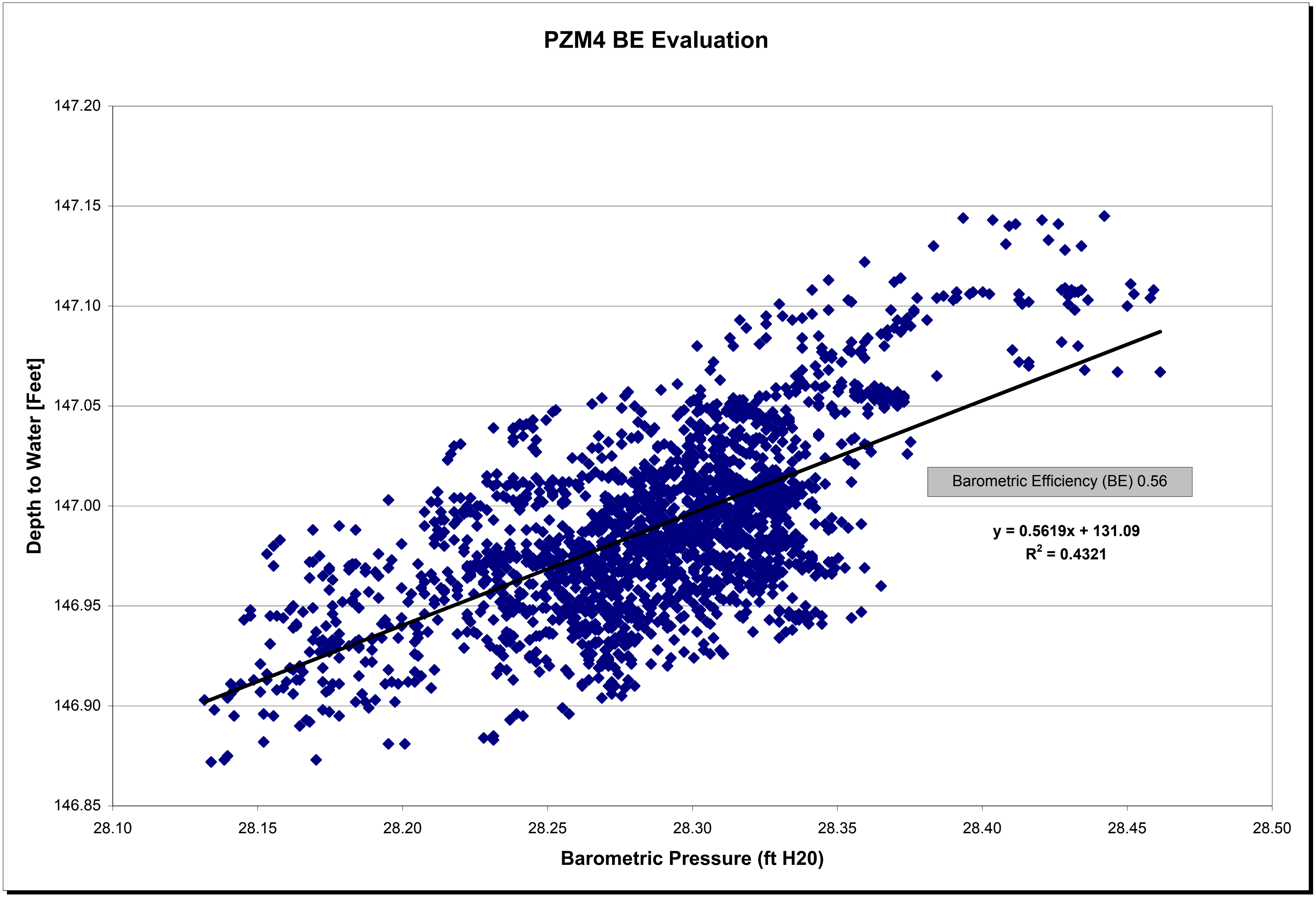


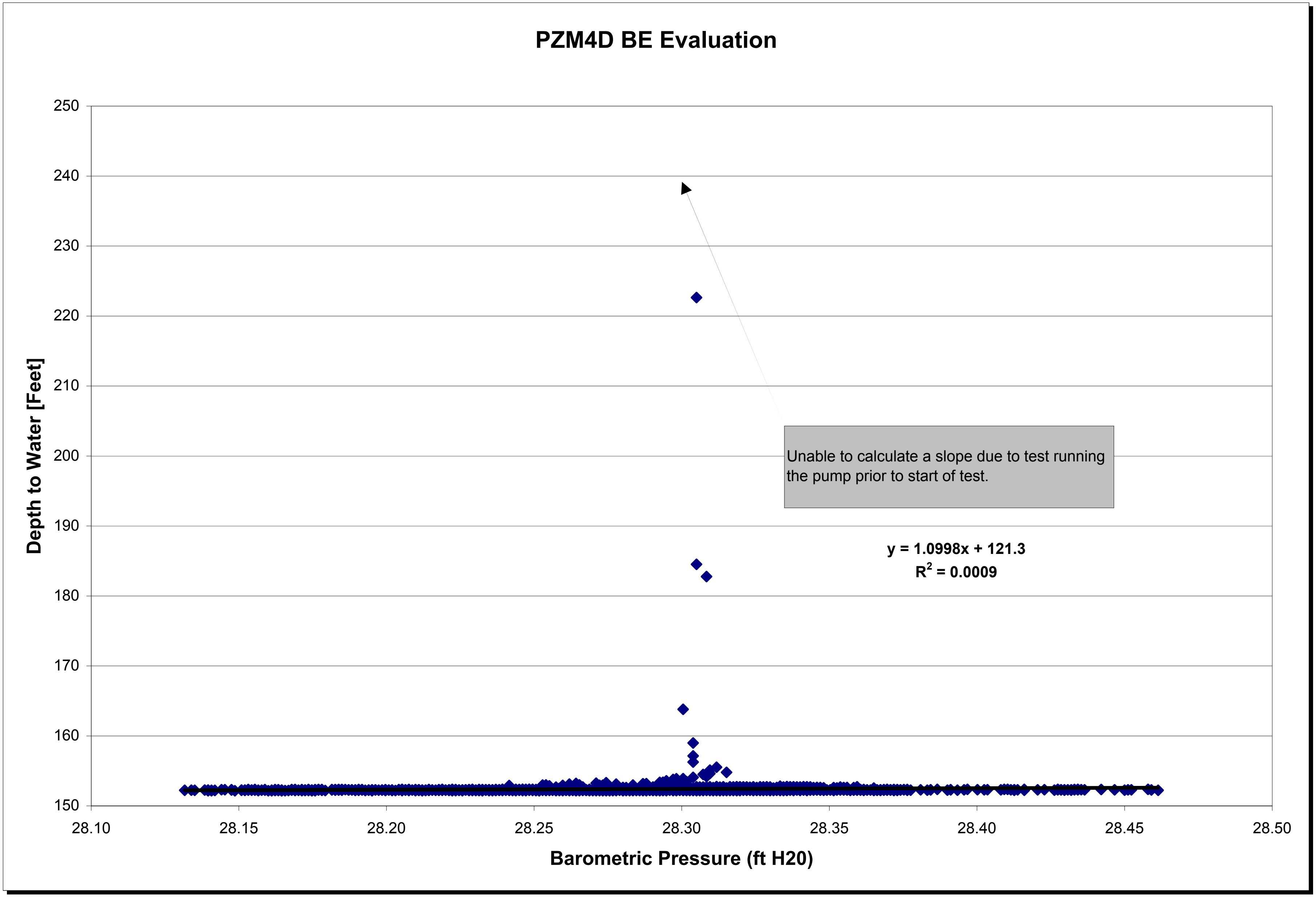
OM4 BE Evaluation
94.40
94.35
94.30
94.25
94.20
94.15
94.10
94.05
Depth to Water [Feet]
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)
Barometric Efficiency (BE) 0.64
y = 0.643x + 76.015
R2 = 0.9145


OAM4S BE Evaluation
96.02
96.00
95.98
95.96
95.94
95.92
95.90
95.88
95.86
Depth to Water [Feet]
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)
Barometric Efficiency (BE) 0.31
y = 0.3122x + 87.096
R2 = 0.4827

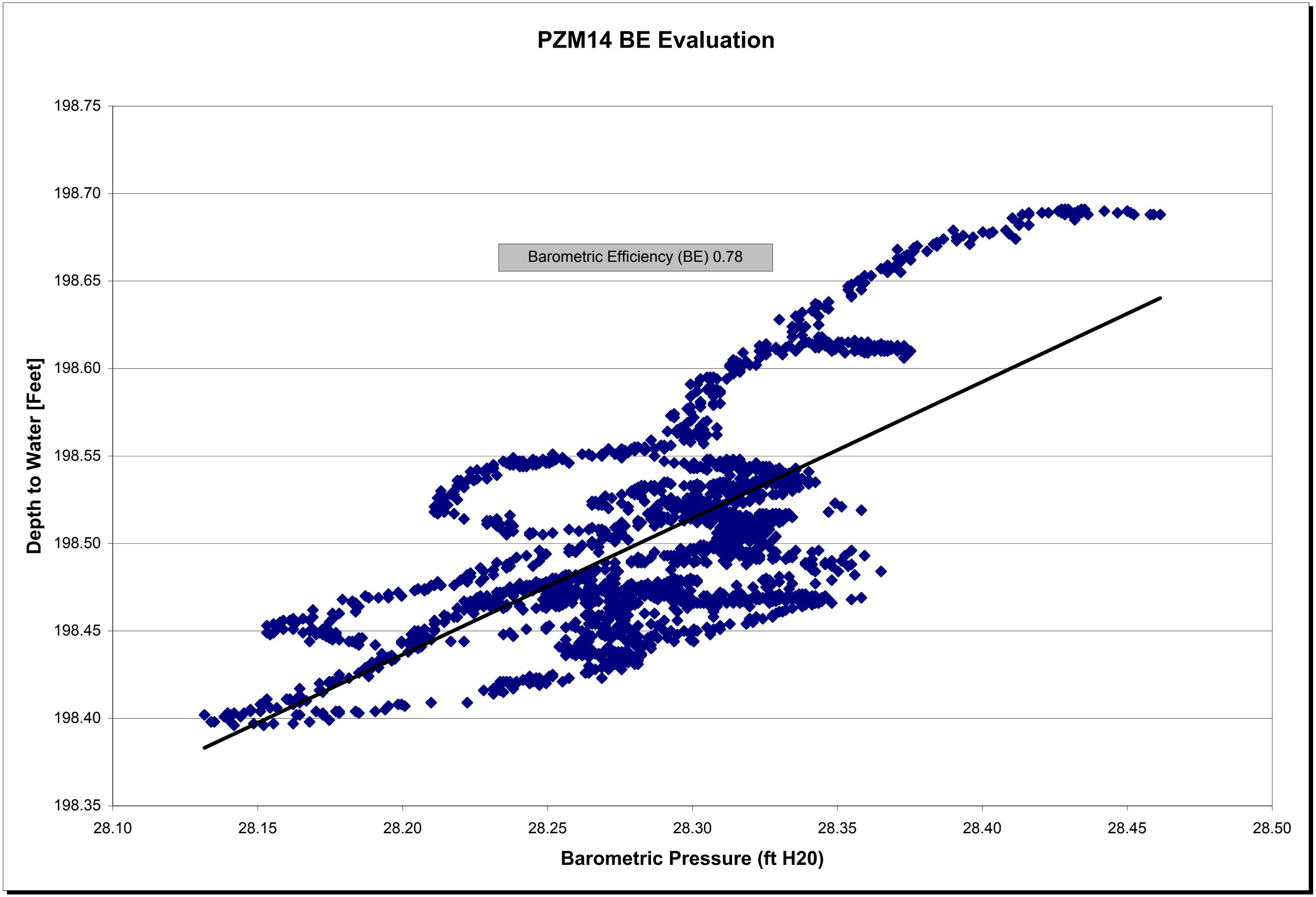


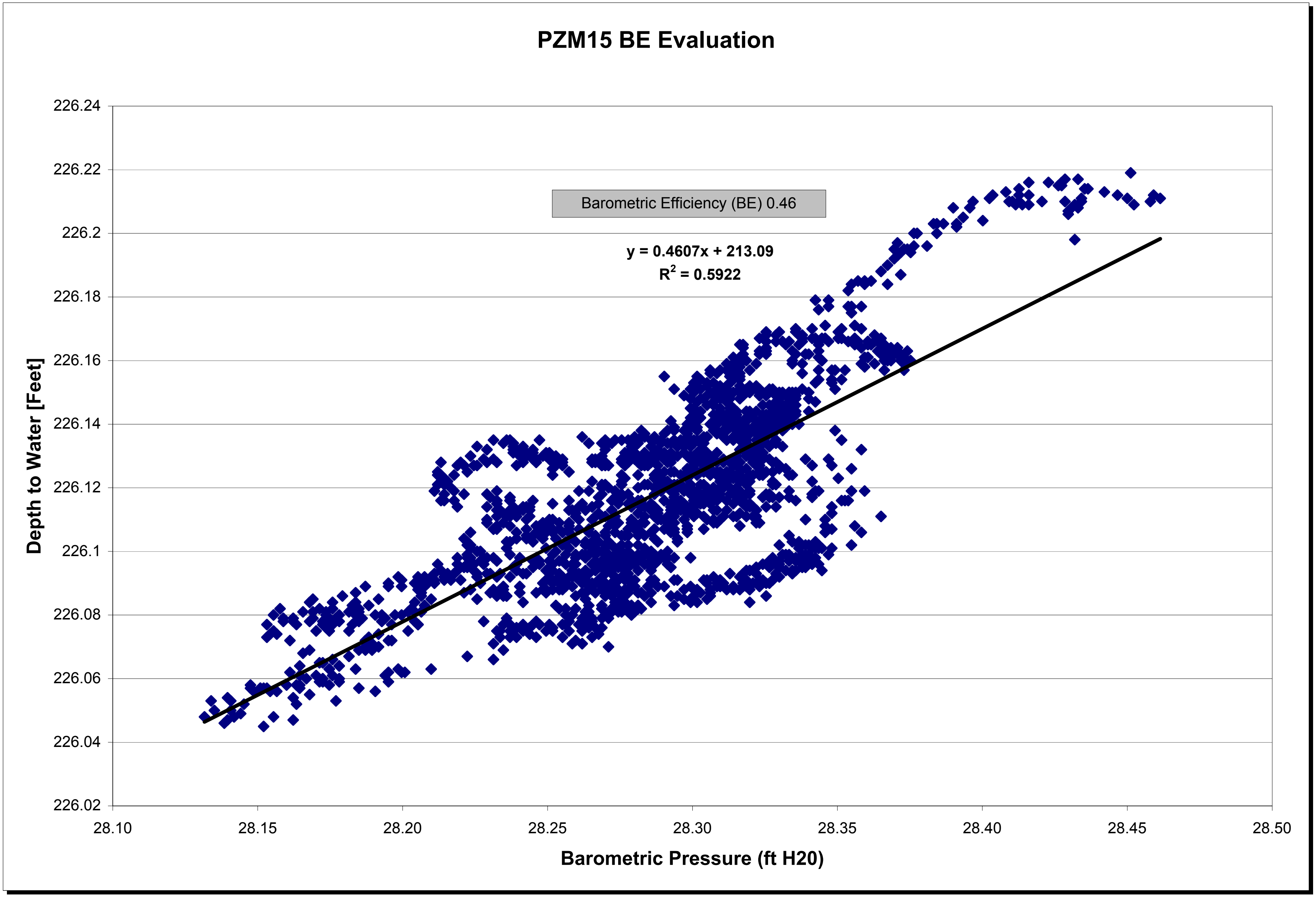
OAM4D BE Evaluation
118.70
118.68
118.66
118.64
118.62
118.60
118.58
118.56
Depth to Water [Feet]
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)
Barometric Efficiency (BE) 0.20
y = 0.2044x + 112.85
R2 = 0.5101


PZM4 BE Evaluation
147.20
147.15
147.10
147.05
147.00
146.95
146.90
146.85
Depth to Water [Feet]
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)
Barometric Efficiency (BE) 0.56
y = 0.5619x + 131.09
R2 = 0.4321

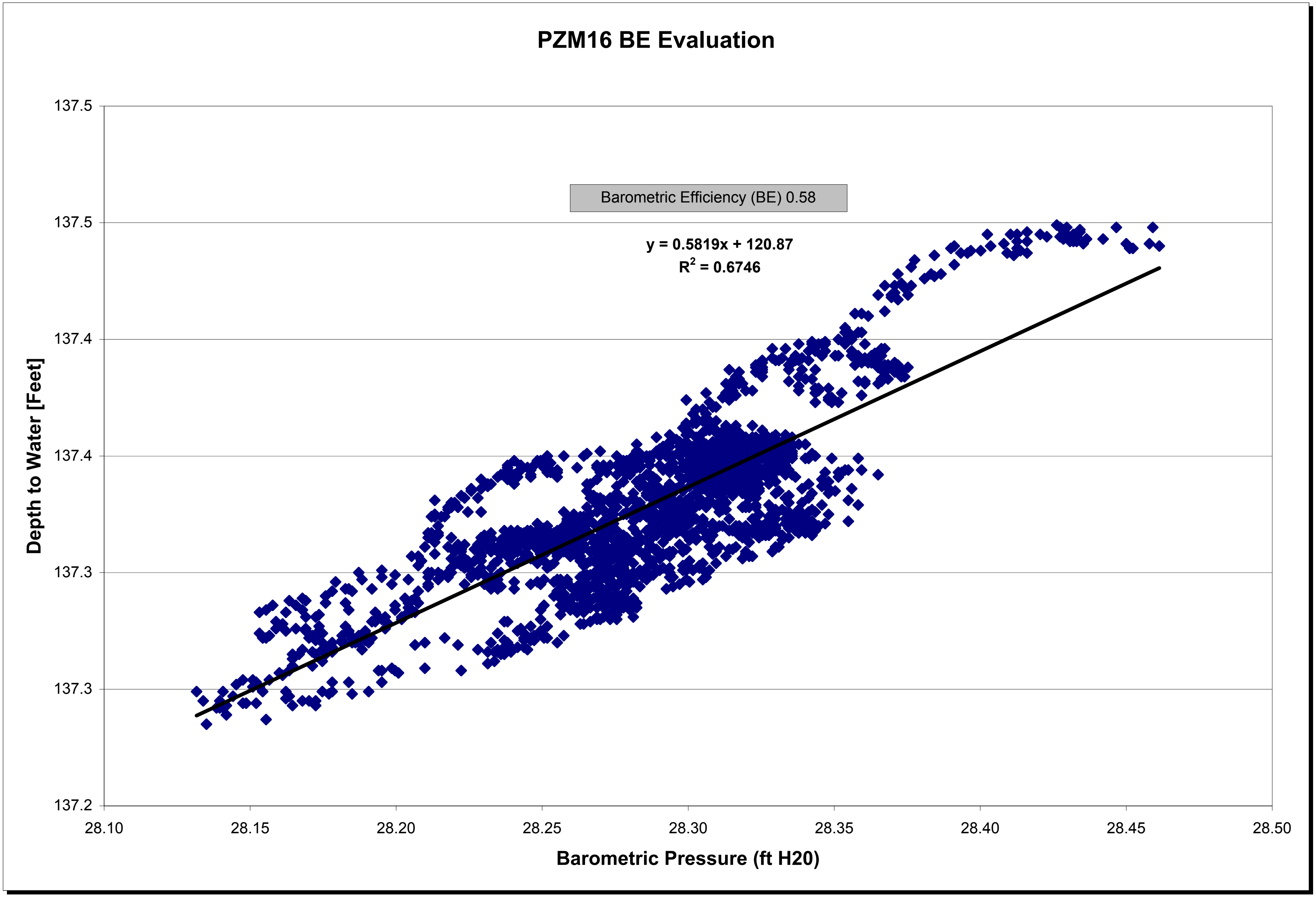


PZM4D BE Evaluation
250
240
230
220
210
200
190
180
170
160
150
Depth to Water [Feet]
Unable to calculate a slope due to test running the pump prior to start of test.
y = 1.0998x + 121.3
R2 = 0.0009
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)

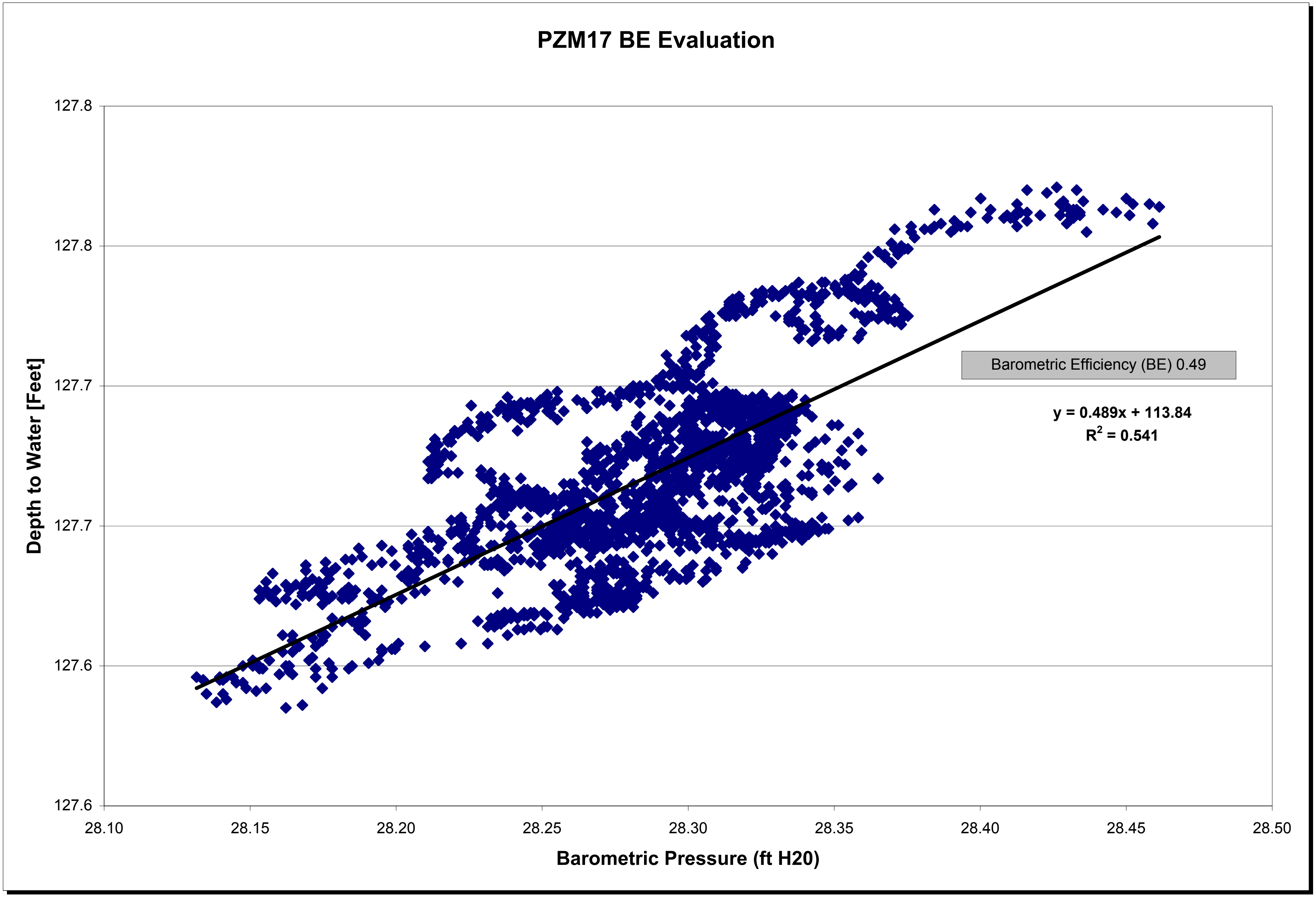

PZM14 BE Evaluation
Barometric Efficiency (BE) 0.78
Depth to Water [Feet]
198.75
198.70
198.65
198.60
198.55
198.50
198.45
198.40
198.35
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)



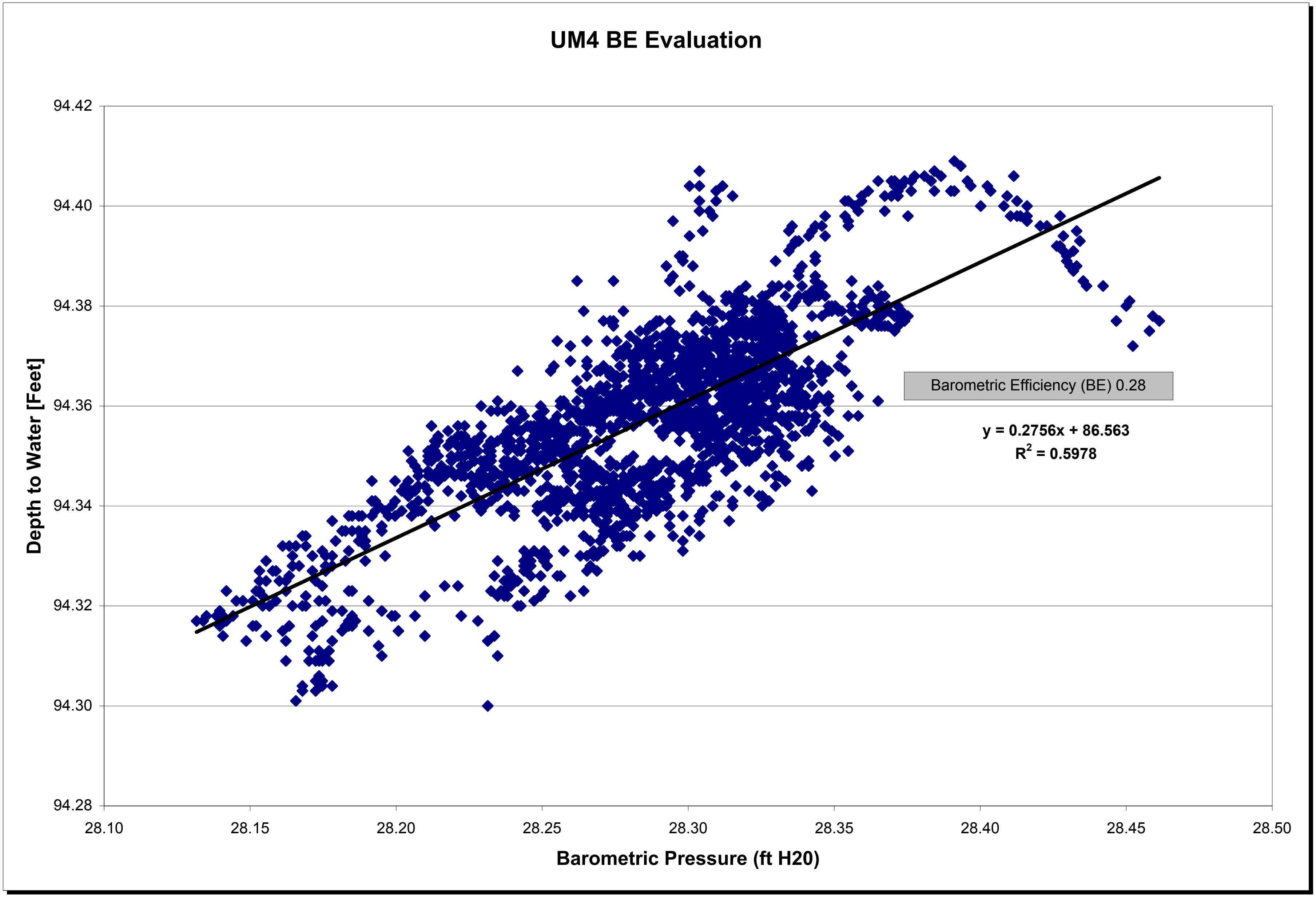
PZM15 BE Evaluation
Barometric Efficiency (BE) 0.46
y = 0.4607x + 213.09
R2 = 0.5922
Depth to Water [Feet]
226.24
226.22
226.2
226.18
226.16
226.14
226.12
226.1
226.08
226.06
226.04
226.02
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)



PZM16 BE Evaluation
Barometric Efficiency (BE) 0.58
y = 0.5819x + 120.87
R2 = 0.6746
137.5
137.5
137.4
137.4
137.3
137.3
137.2
Depth to Water [Feet]
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)



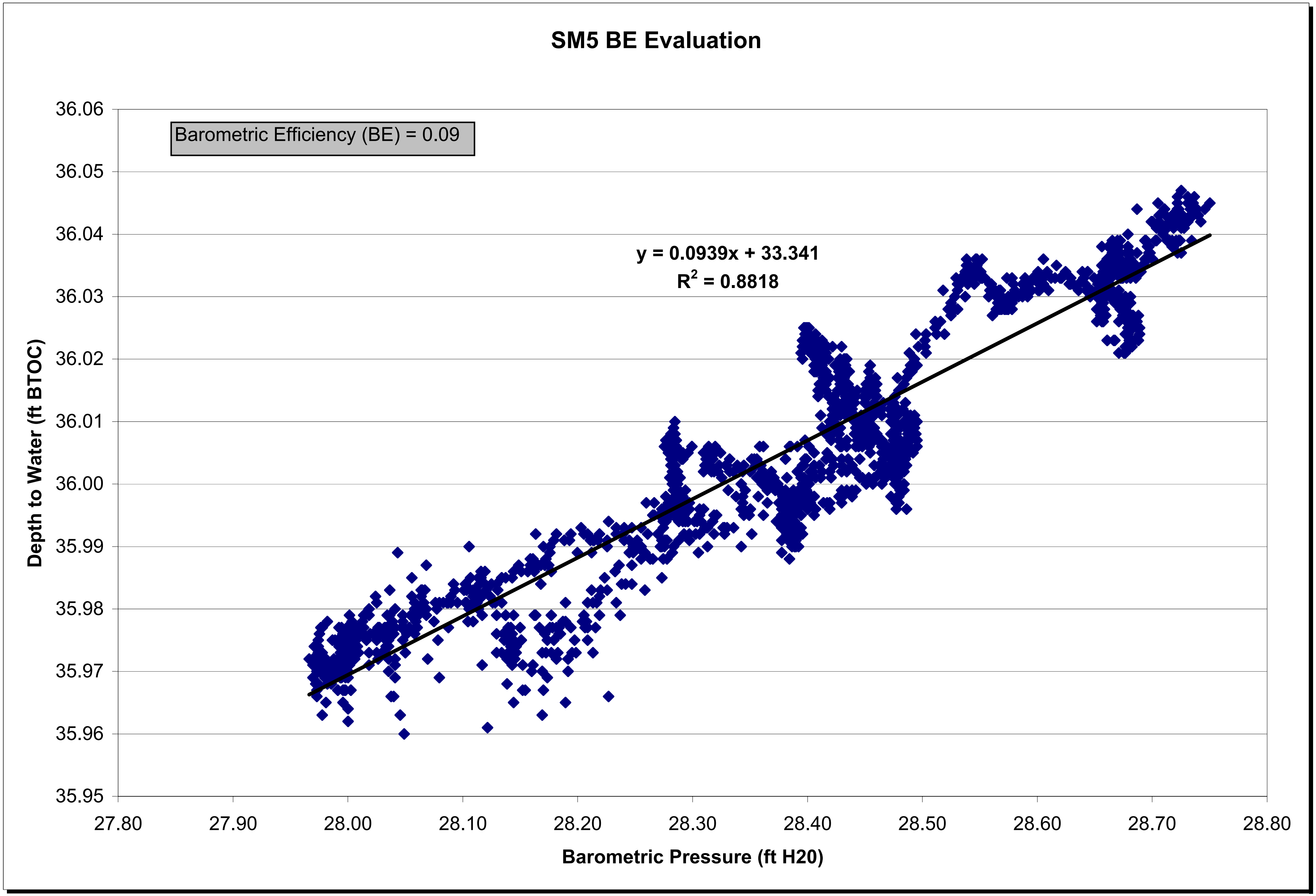
PZM17 BE Evaluation
127.8
127.8
127.7
127.7
127.6
127.6
Depth to Water [Feet]
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)
Barometric Efficiency (BE) 0.49
y = 0.489x + 113.84
R2 = 0.541

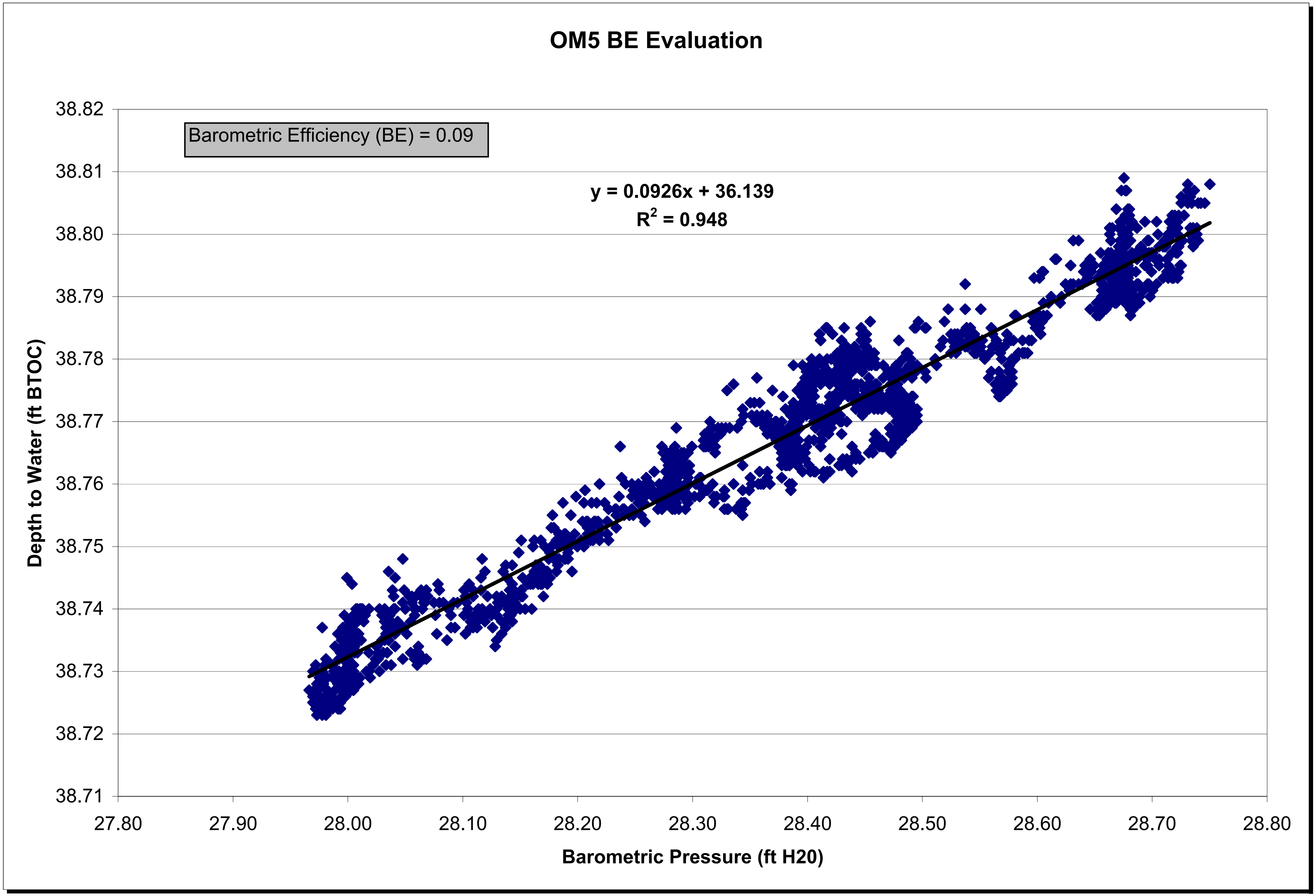


UM4 BE Evaluation
94.42
94.40
94.38
94.36
94.34
94.32
94.30
94.28
Depth to Water [Feet]
28.10
28.15
28.20
28.25
28.30
28.35
28.40
28.45
28.50
Barometric Pressure (ft H20)
Barometric Efficiency (BE) 0.28
y = 0.2756x + 86.563
R2 = 0.5978

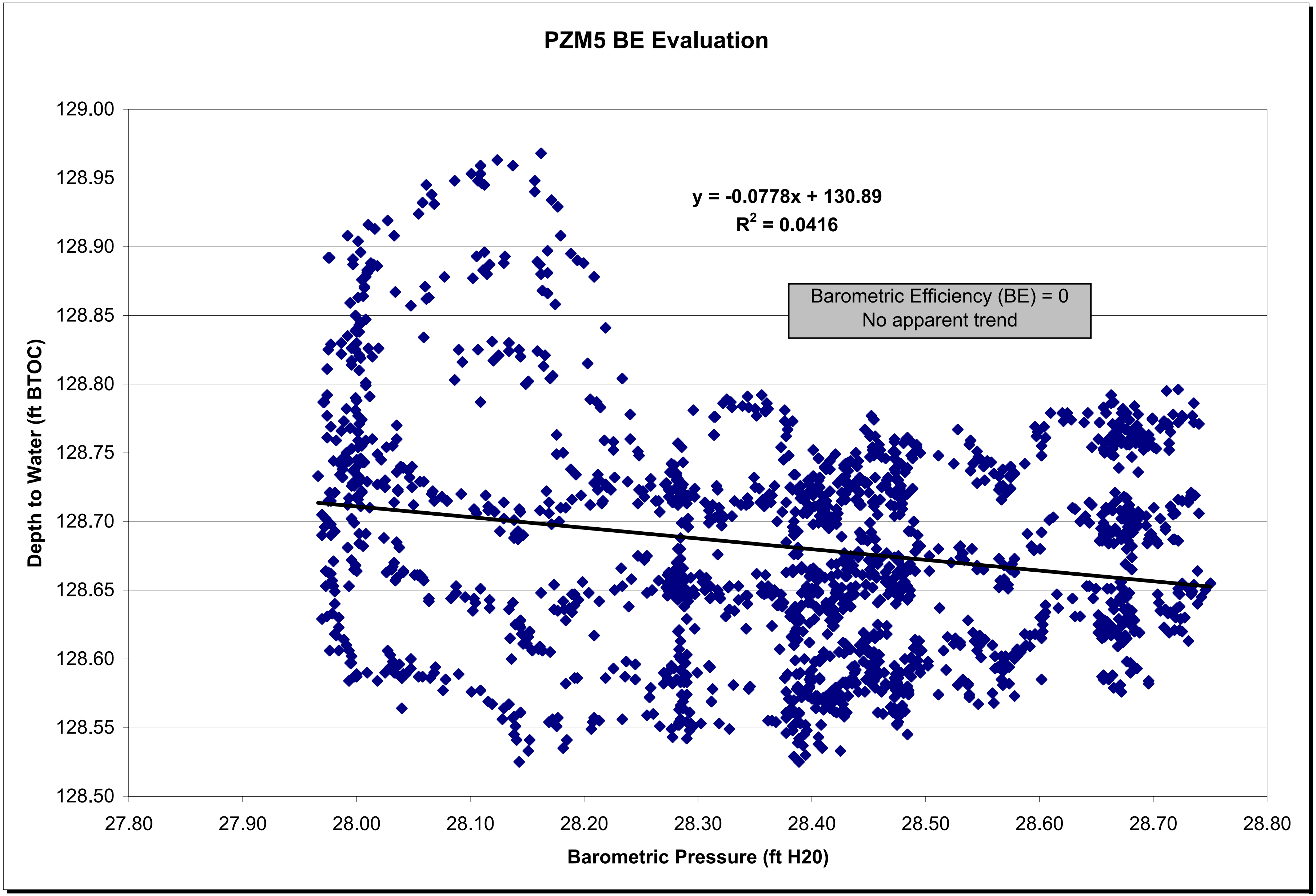
PZM5 PUMP TEST

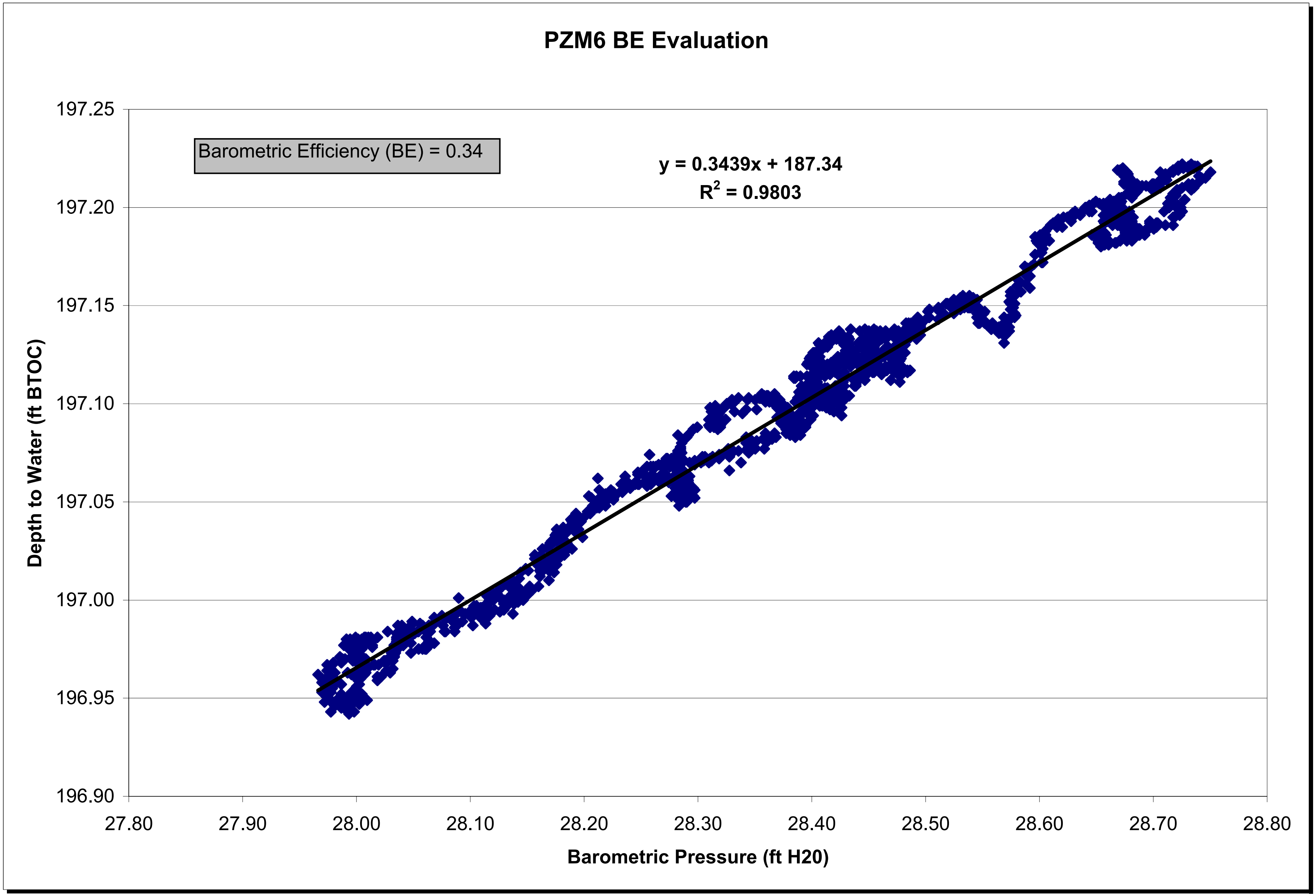
WATER LEVEL ELEVATIONS VS. BAROMETRIC PRESSURE AND MONITOR WELL BAROMETRIC EFFICIENCY EVALUATIONS

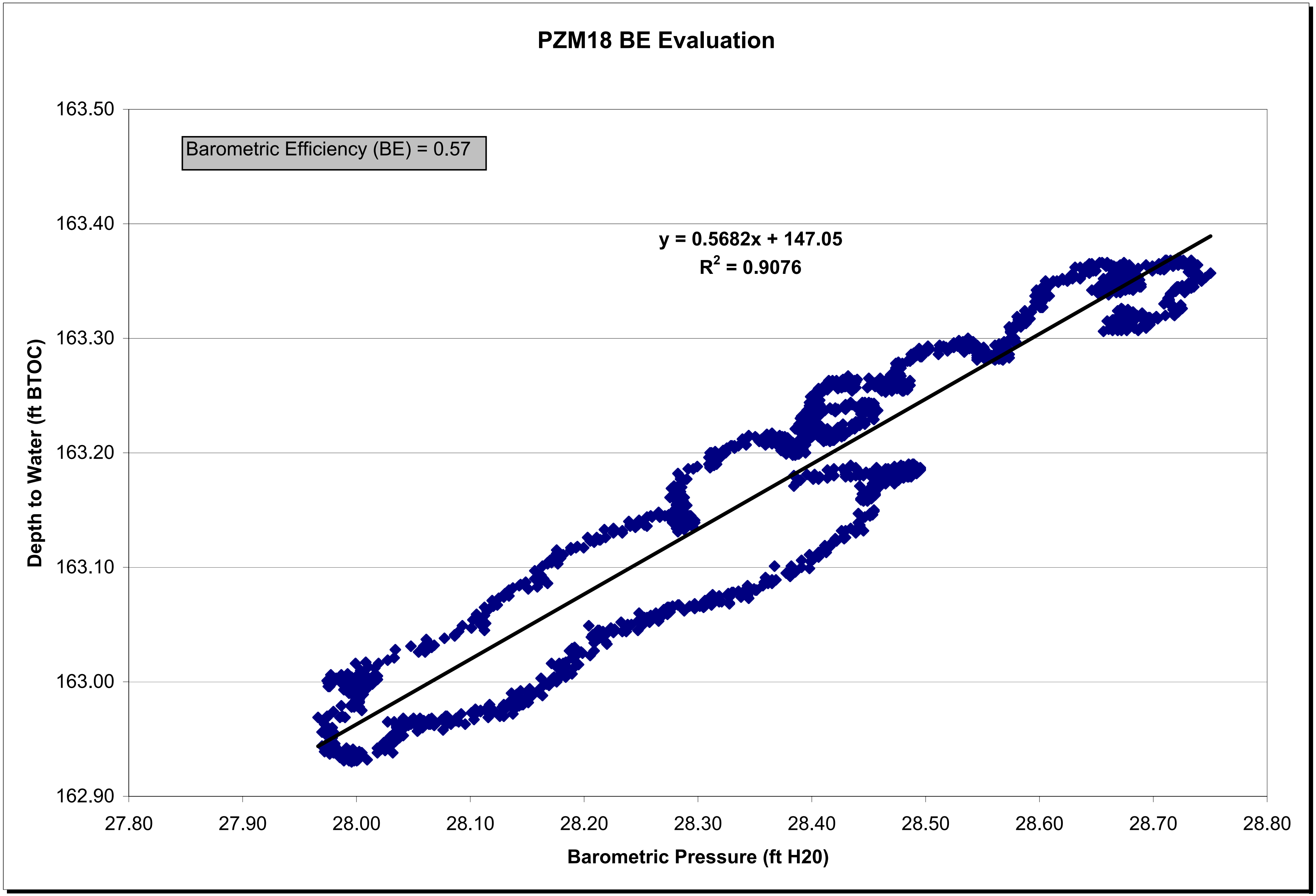

SM5 BE Evaluation
Barometric Efficiency (BE) = 0.09
y = 0.0939x + 33.341
R2 = 0.8818
Depth to Water (ft BTOC)
36.06
36.05
36.04
36.03
36.02
36.01
36.00
35.99
35.98
35.97
35.96
35.95
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
28.60
28.70
28.80
Barometric Pressure (ft H20)

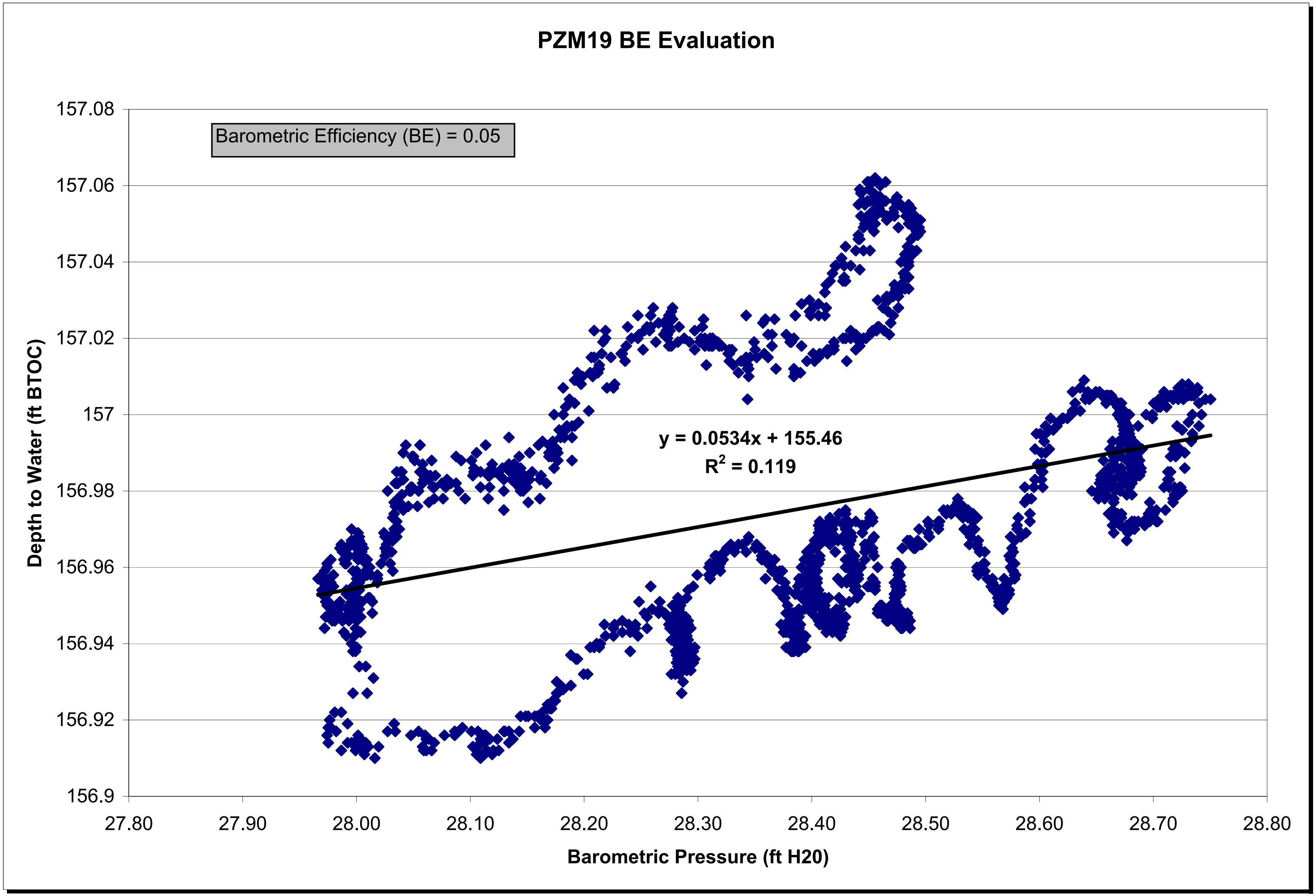


OM5 BE Evaluation
Barometric Efficiency (BE) = 0.09
y = 0.0926x + 36.139
R2 = 0.948
38.82
38.81
38.80
38.79
38.78
38.77
38.76
38.75
38.74
38.73
38.72
38.71
Depth to Water (ft BTOC)
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
28.60
28.70
28.80
Barometric Pressure (ft H20)

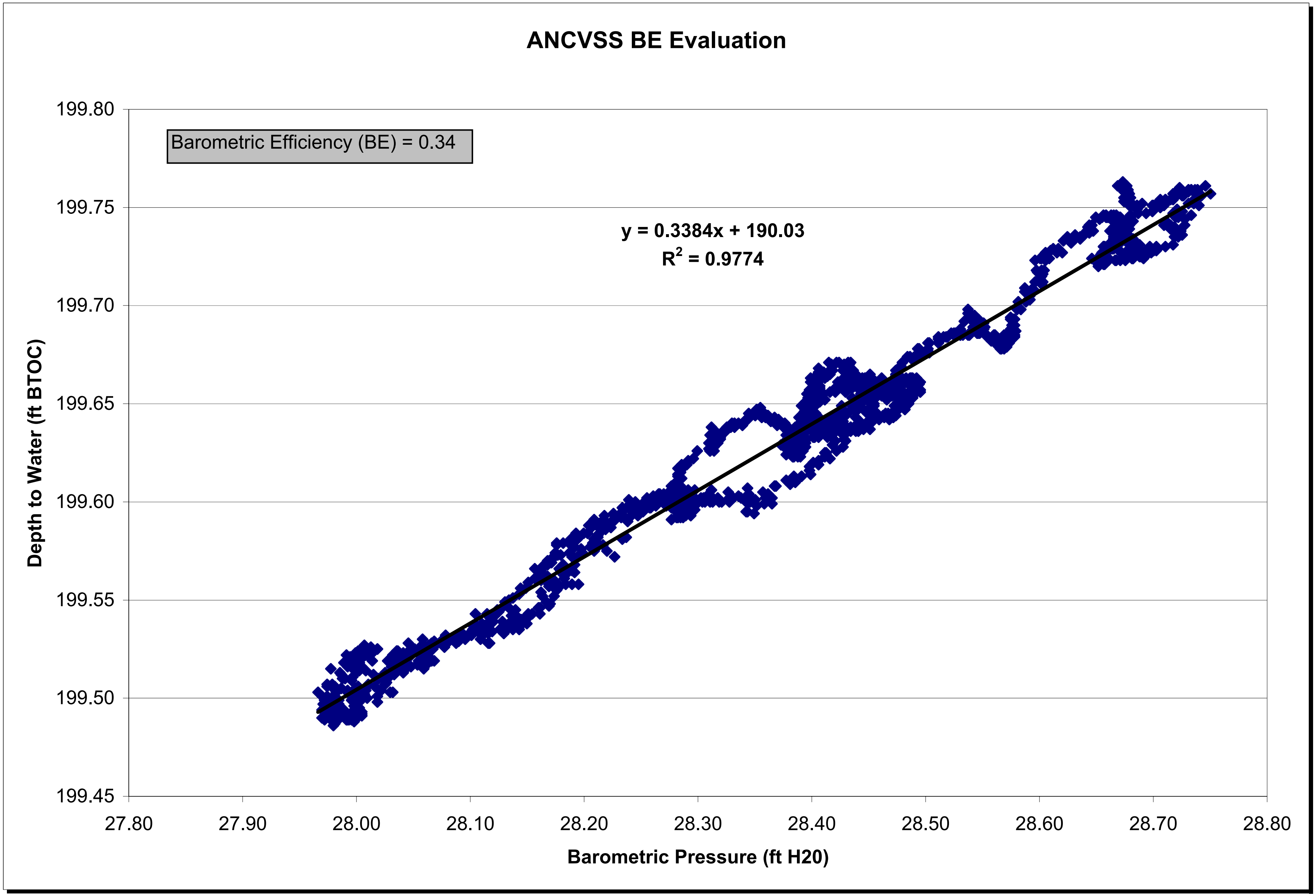

PZM5 BE Evaluation
y = -0.0778x + 130.89
R2 = 0.0416
Barometric Efficiency (BE) = 0
No apparent trend
Depth to Water (ft BTOC)
129.00
128.95
128.90
128.85
128.80
128.75
128.70
128.65
128.60
128.55
128.50
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
28.60
28.70
28.80
Barometric Pressure (ft H20)


PZM6 BE Evaluation
Barometric Efficiency (BE) = 0.34
y = 0.3439x + 187.34
R2 = 0.9803
197.25
197.20
197.15
197.10
197.05
197.00
196.95
196.90
Depth to Water (ft BTOC)
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
28.60
28.70
28.80
Barometric Pressure (ft H20)

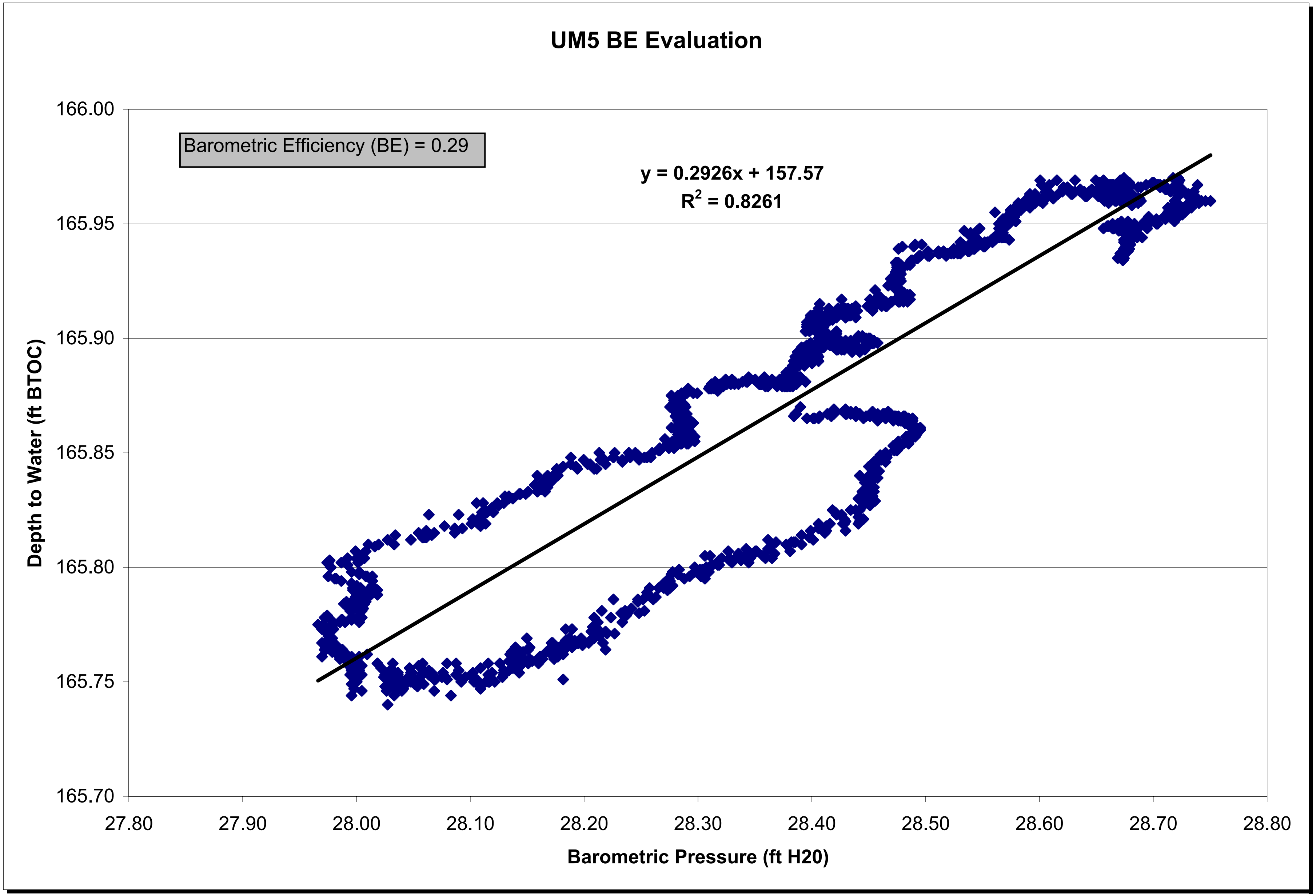

PZM18 BE Evaluation
Barometric Efficiency (BE) = 0.57
y = 0.5682x + 147.05
R2 = 0.9076
Depth to Water (ft BTOC)
163.50
163.40
163.30
163.20
163.10
163.00
162.90
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
28.60
28.70
28.80
Barometric Pressure (ft H20)



PZM19 BE Evaluation
Barometric Efficiency (BE) = 0.05
y = 0.0534x + 155.46
R2 = 0.119
Depth to Water (ft BTOC)
157.08
157.06
157.04
157.02
157
156.98
156.96
156.94
156.92
156.9
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
28.60
28.70
28.80
Barometric Pressure (ft H20)



ANCVSS BE Evaluation
Barometric Efficiency (BE) = 0.34
y = 0.3384x + 190.03
R2 = 0.9774
199.80
199.75
199.70
199.65
199.60
199.55
199.50
199.45
Depth to Water (ft BTOC)
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
28.60
28.70
28.80
Barometric Pressure (ft H20)


UM5 BE Evaluation
Barometric Efficiency (BE) = 0.29
y = 0.2926x + 157.57
R2 = 0.8261
166.00
165.95
165.90
165.85
165.80
165.75
165.70
Depth to Water (ft BTOC)
27.80
27.90
28.00
28.10
28.20
28.30
28.40
28.50
28.60
28.70
28.80
Barometric Pressure (ft H20)

APPENDIX C

RAW WATER LEVEL DATA

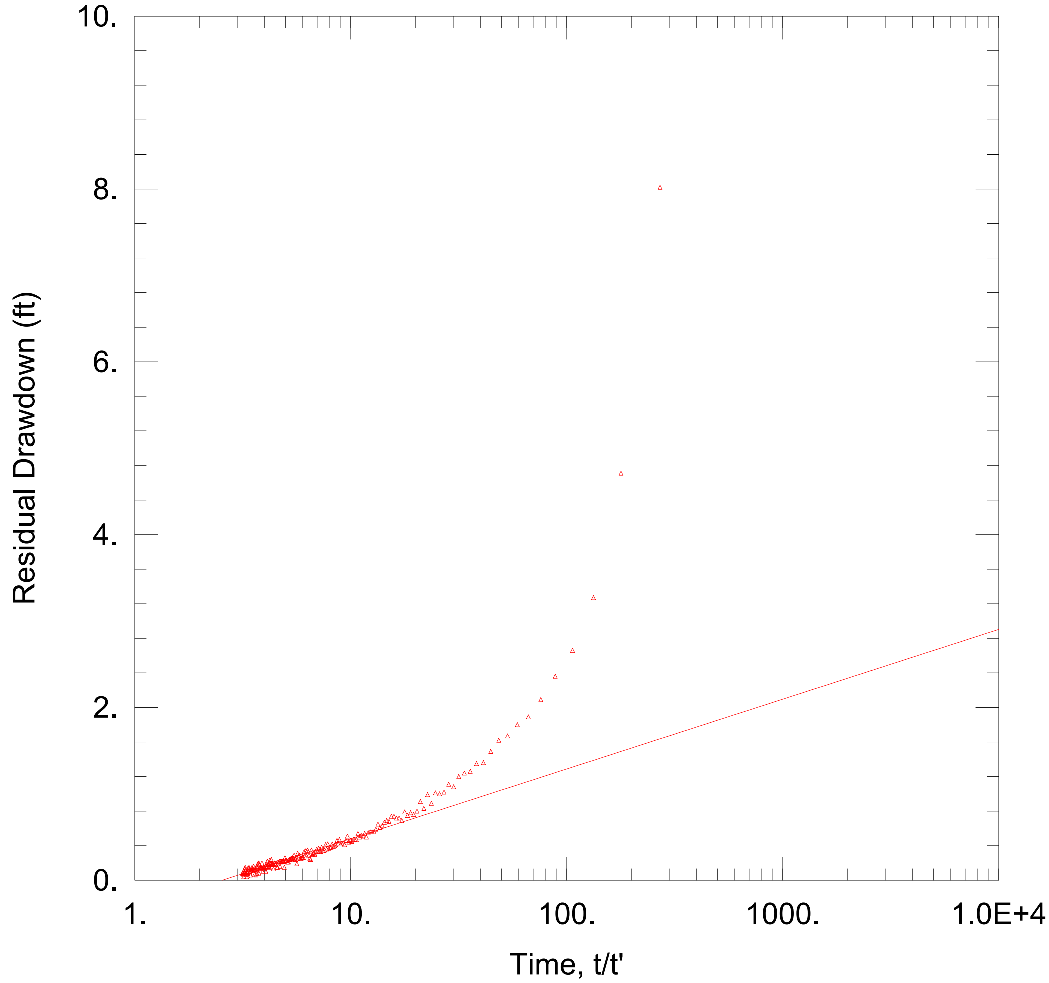
(Included with report as seperate file)

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 (Kz/Kr): 1.

WELL DATA

Pumping Wells

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

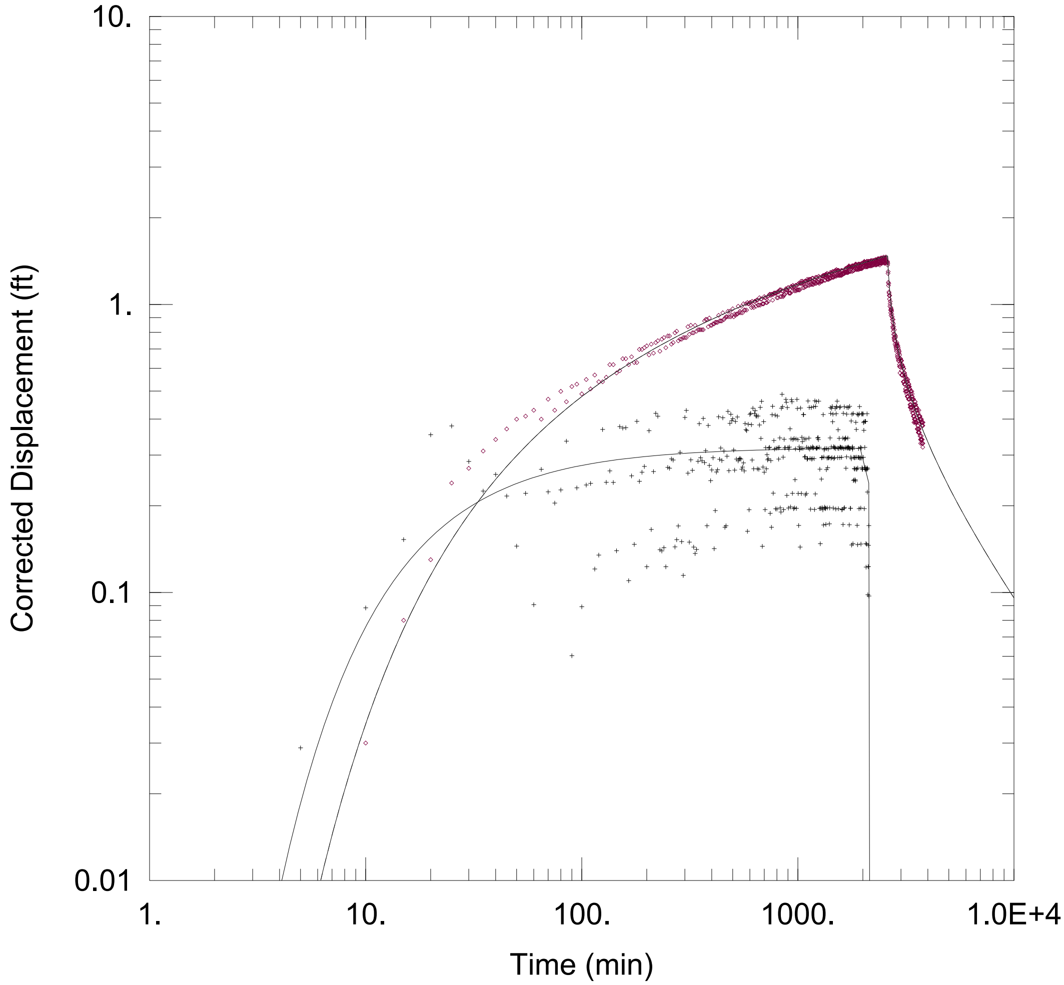
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 388.8 ft^2/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

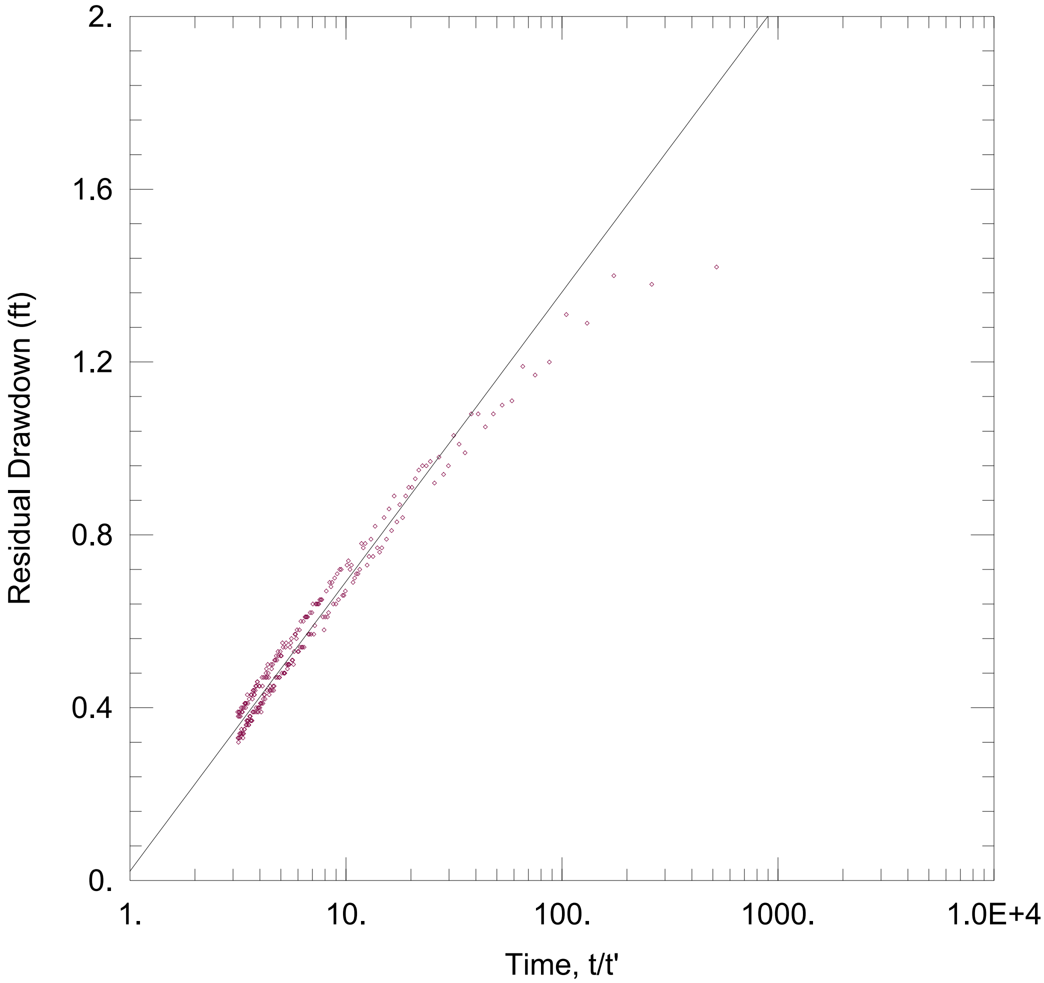
Observation Wells

Well Name	X (ft)	Y (ft)
◦ PZM9	536271.8	1156709.4

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 427.4 ft^2/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 (Kz/Kr): 1.

WELL DATA

Pumping Wells

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

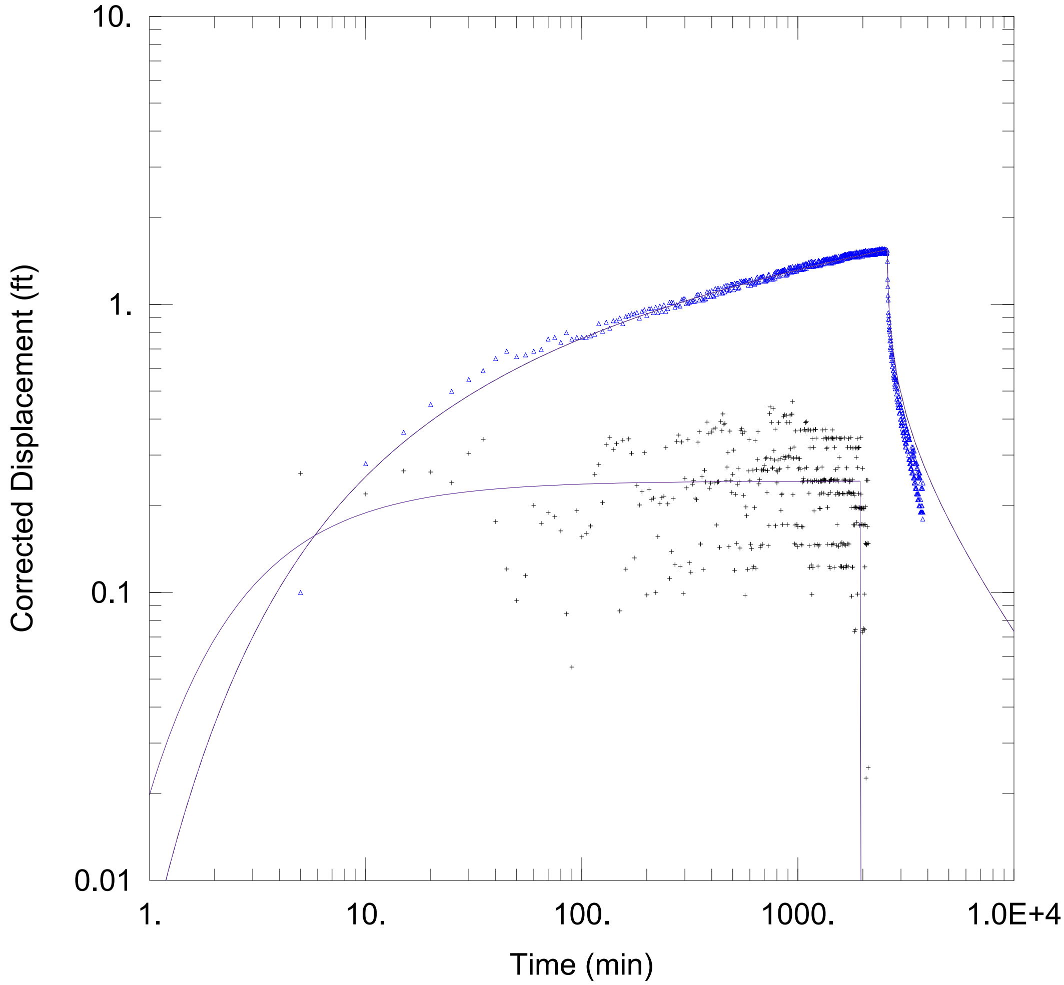
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 468.6 ft^2/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

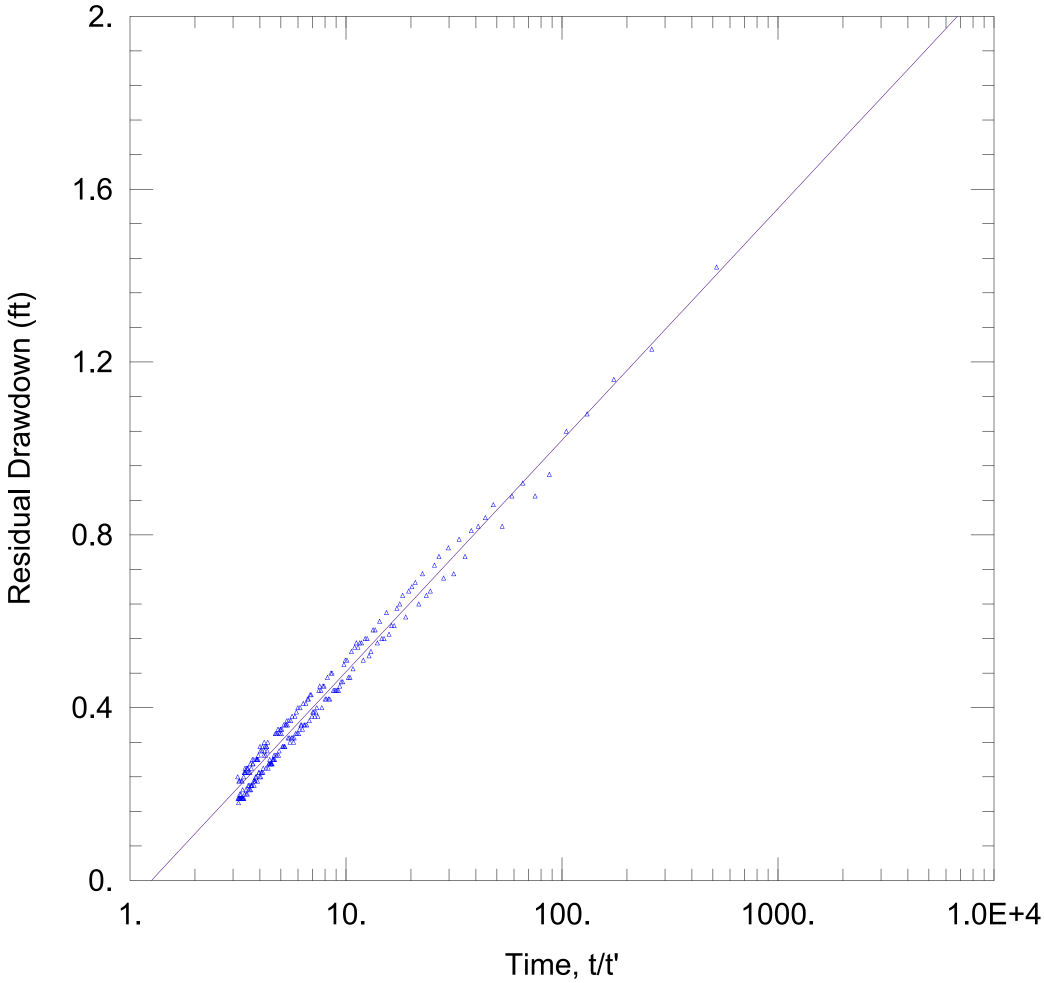
Solution Method: Theis

T = 559.3 ft^2/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 (Kz/Kr): 1.

WELL DATA

Pumping Wells

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

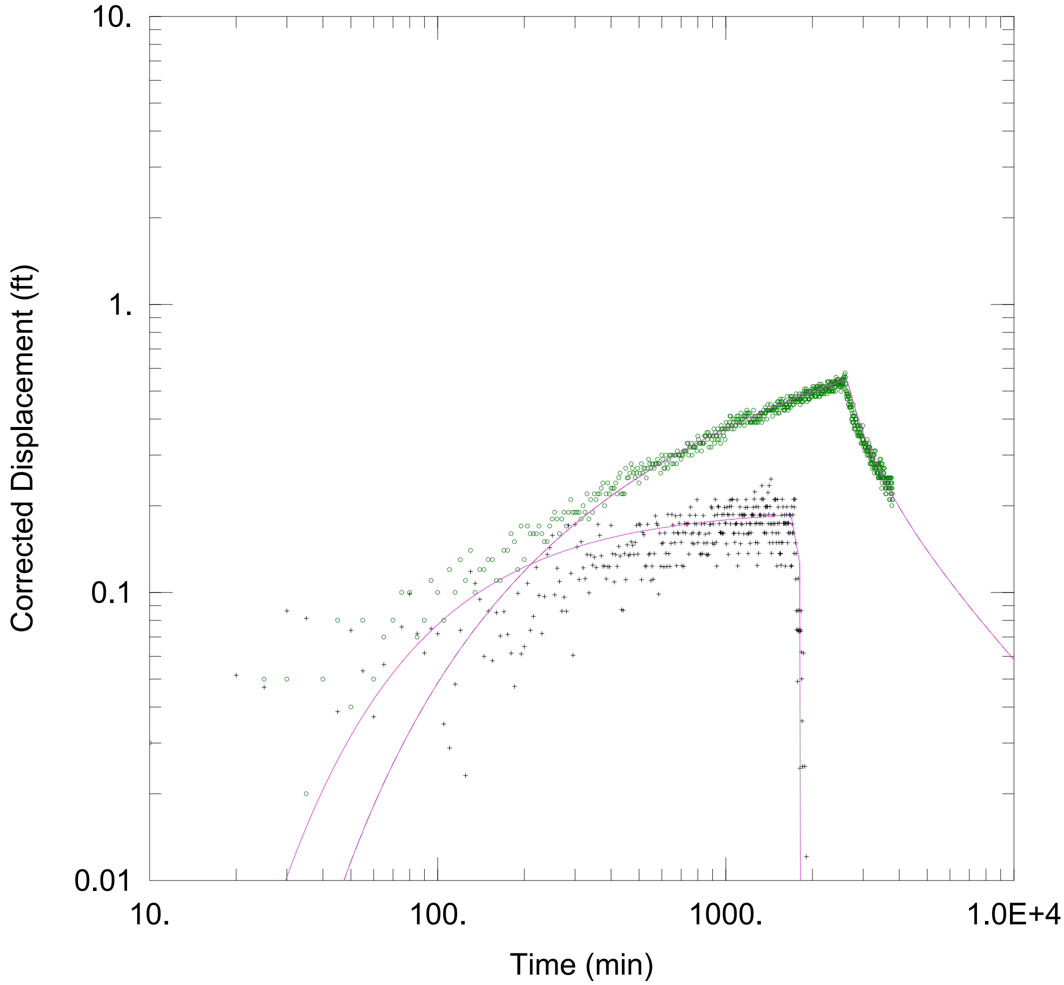
Observation Wells

Well Name	X (ft)	Y (ft)
PZM8	536245.3	1156590.1

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 585.6 ft^2/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

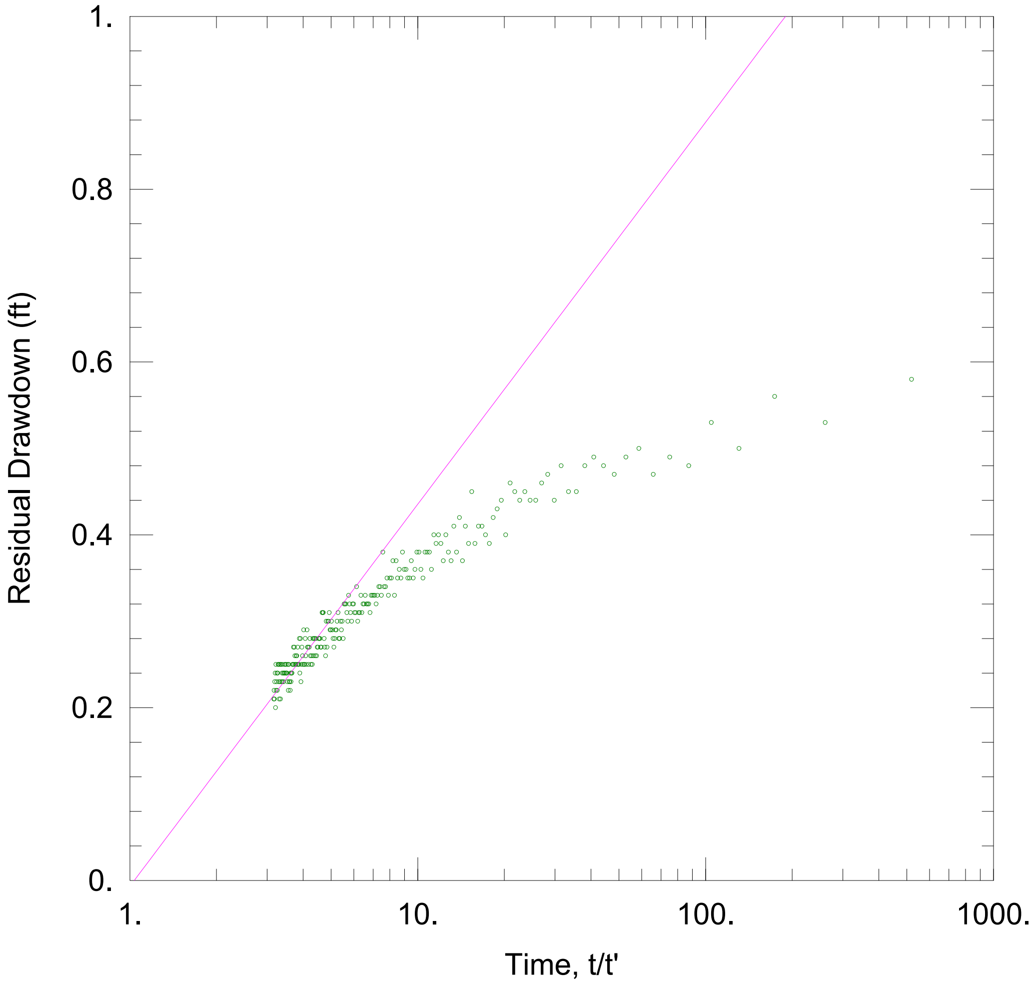
Observation Wells

Well Name	X (ft)	Y (ft)
PZM10	535998.9	1156627.2

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 693.7 ft^2/day
Kz/Kr = 1.
S = 0.003249
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 (Kz/Kr): 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

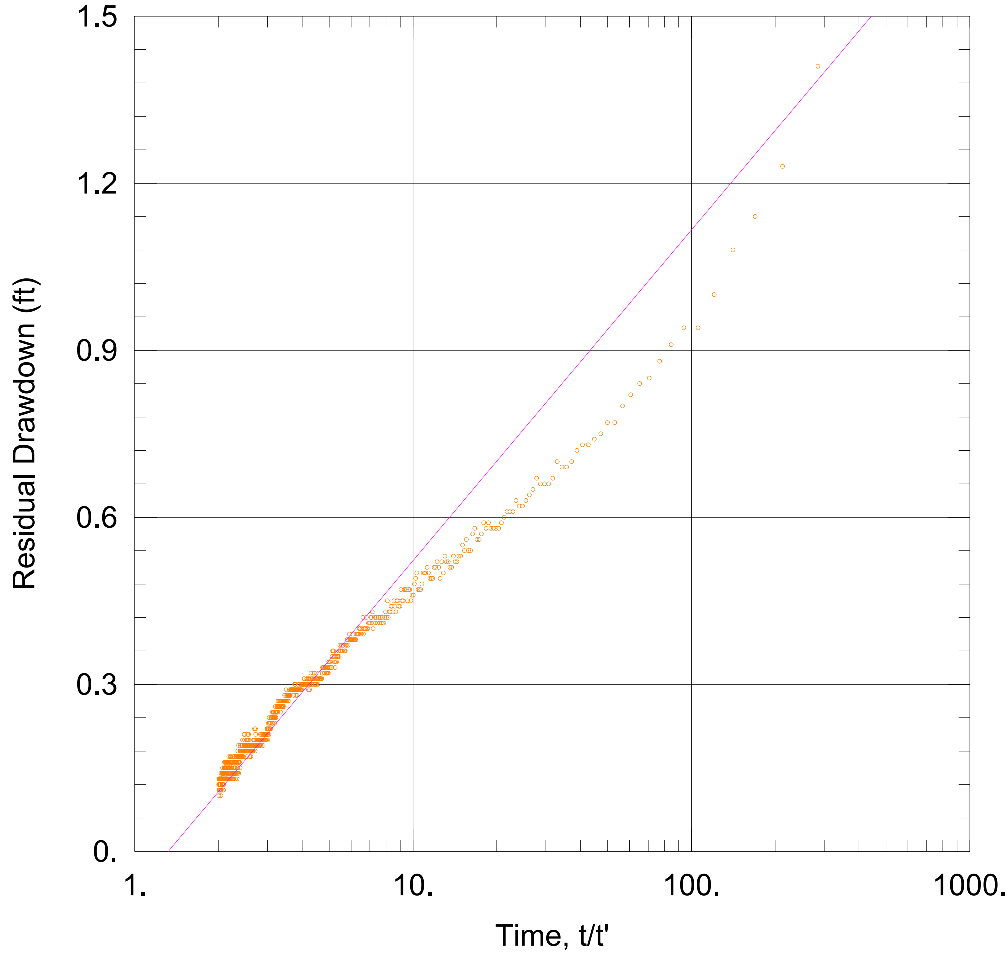
SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Recovery)

T = 710.2 ft^2/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

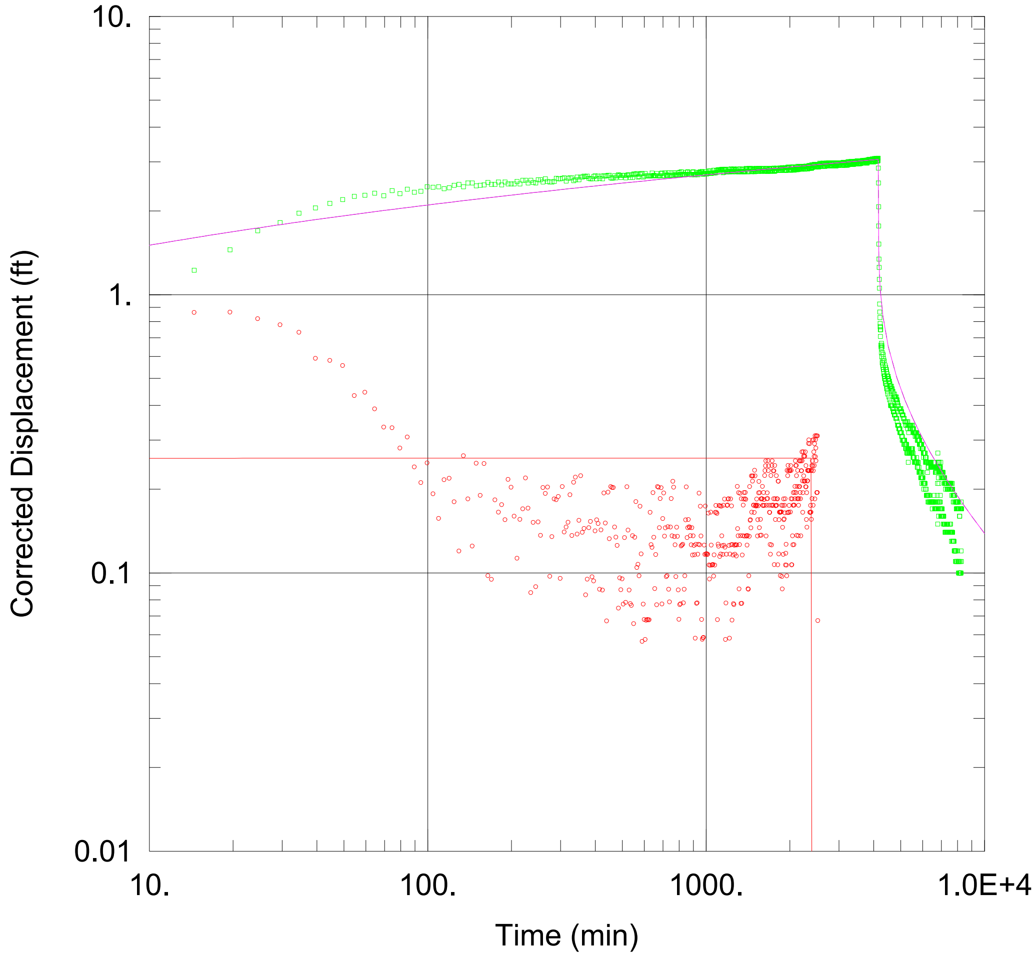
Observation Wells

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

SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Recovery)

T = 588.1 ft^2/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

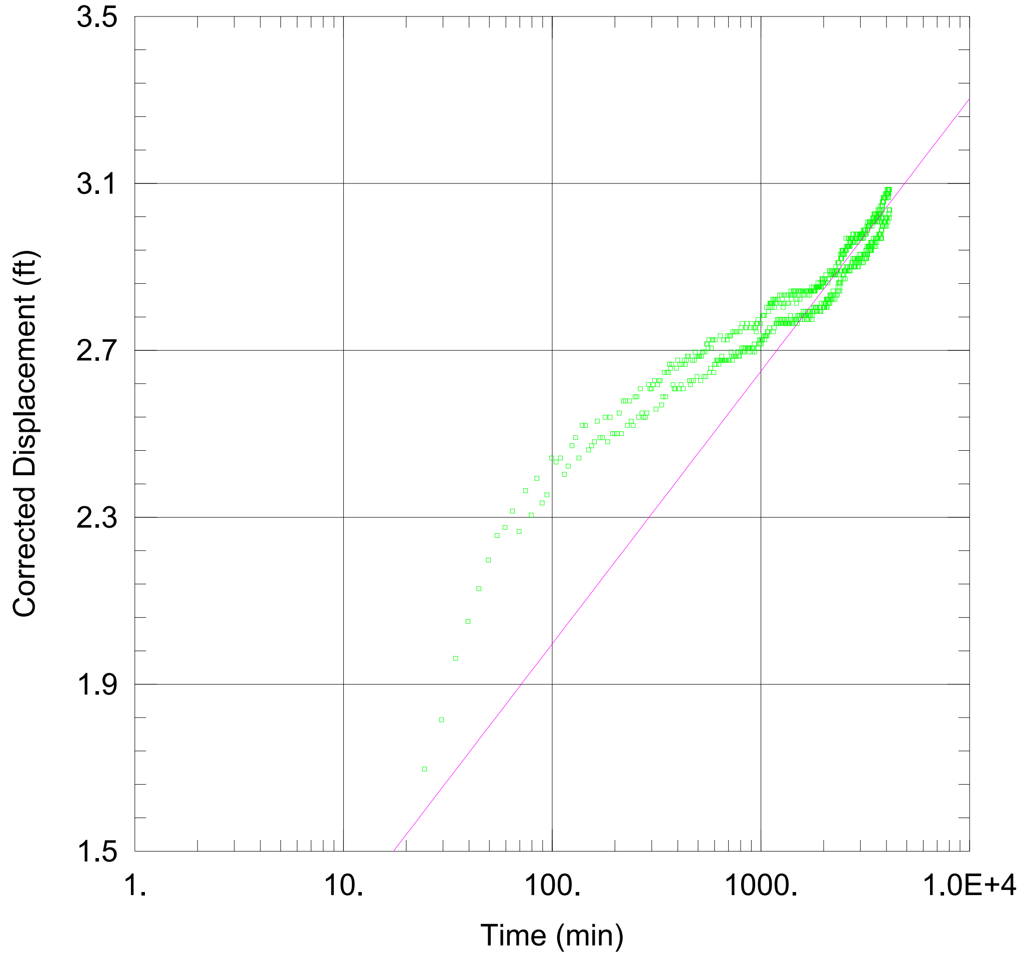
Solution Method: Theis

T = 586.7 ft^2/day

Kz/Kr = 1.

S = 1.0E-5

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

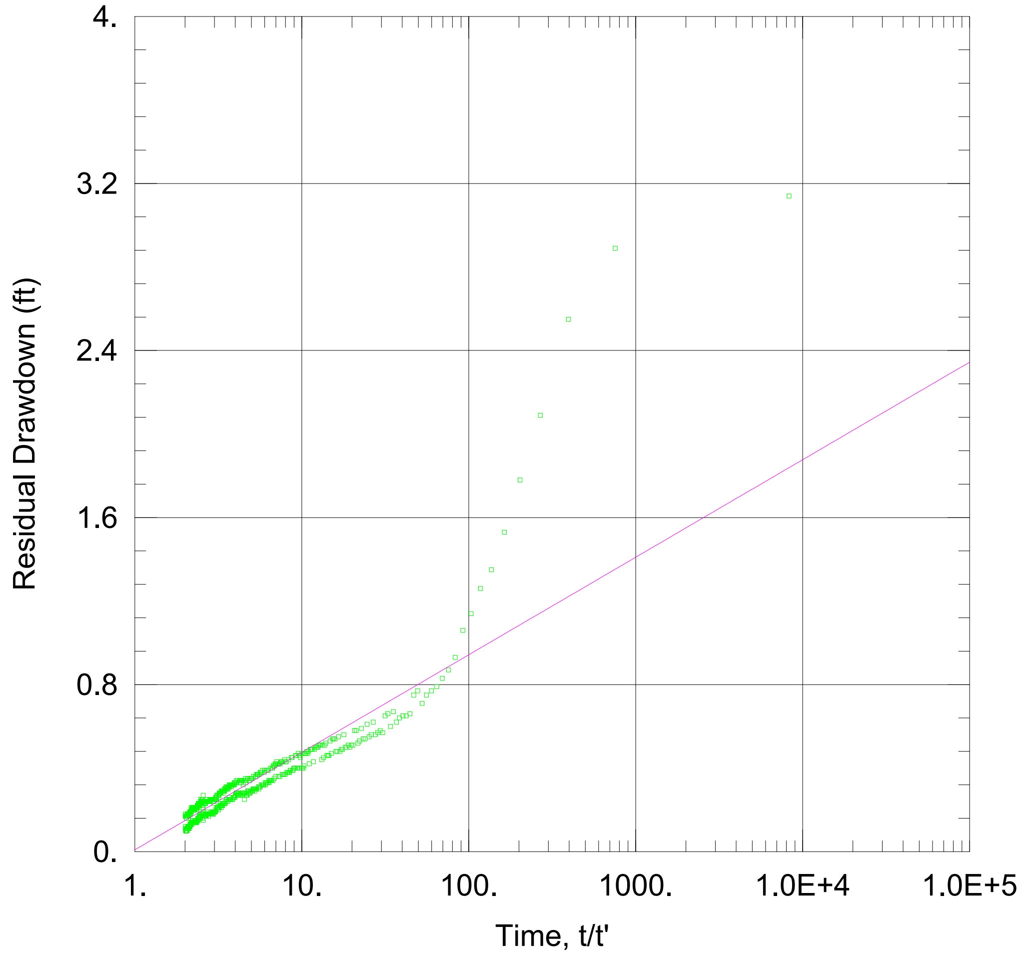
Observation Wells

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

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 534.6 ft^2/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

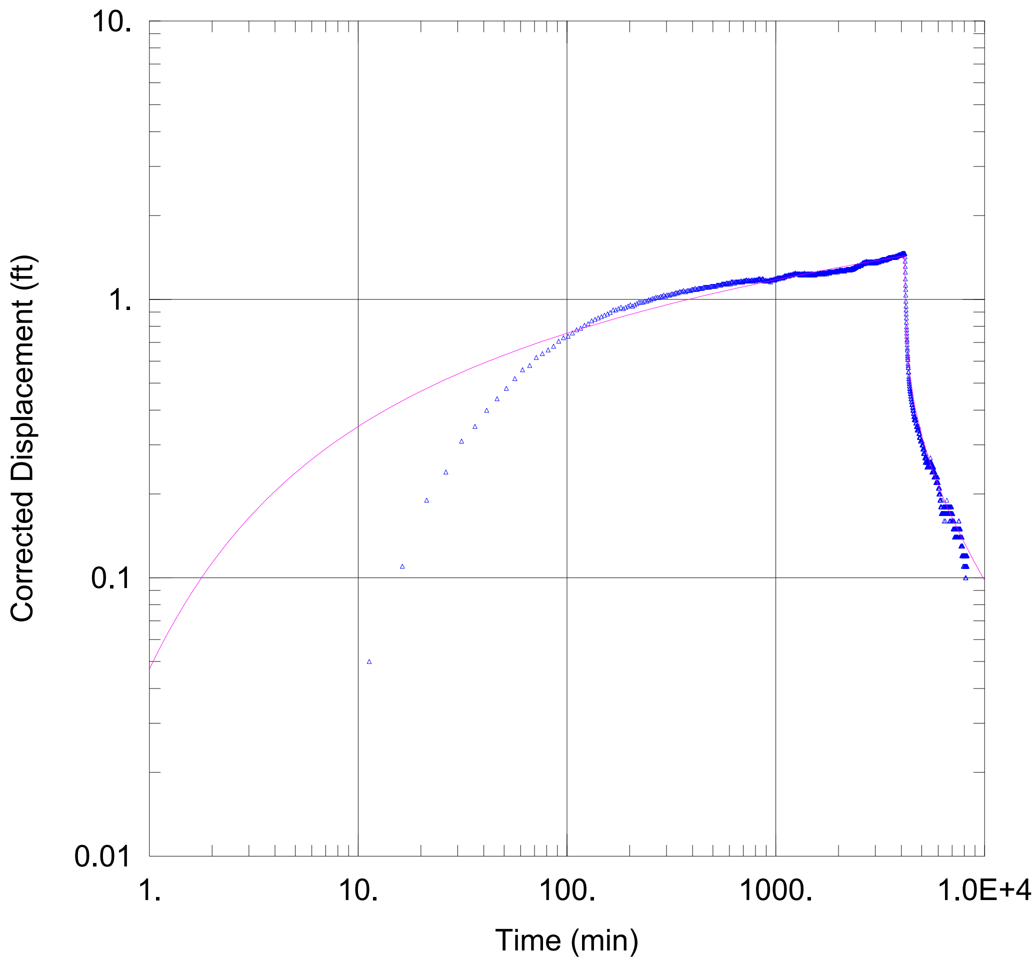
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 747.6 ft^2/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

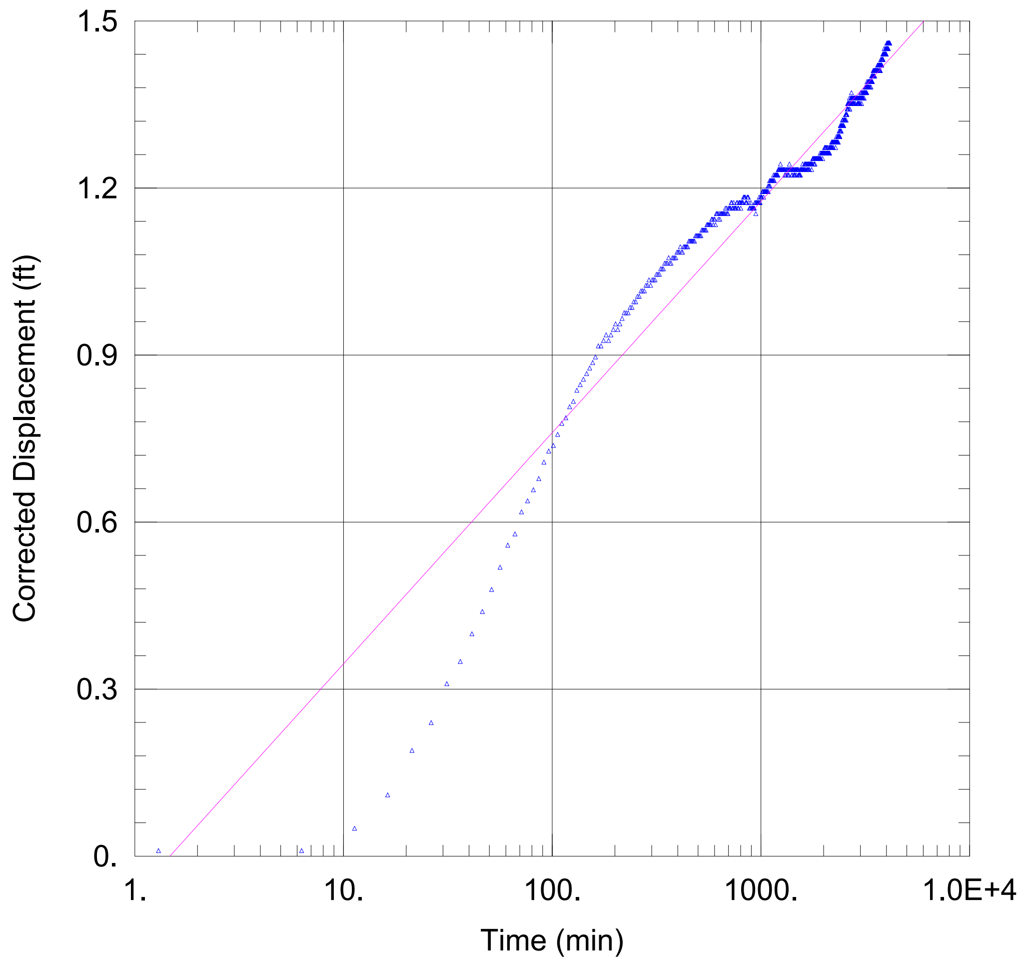
Observation Wells

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

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 829.8 ft^2/day
Kz/Kr = 1.
S = 0.0002009
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

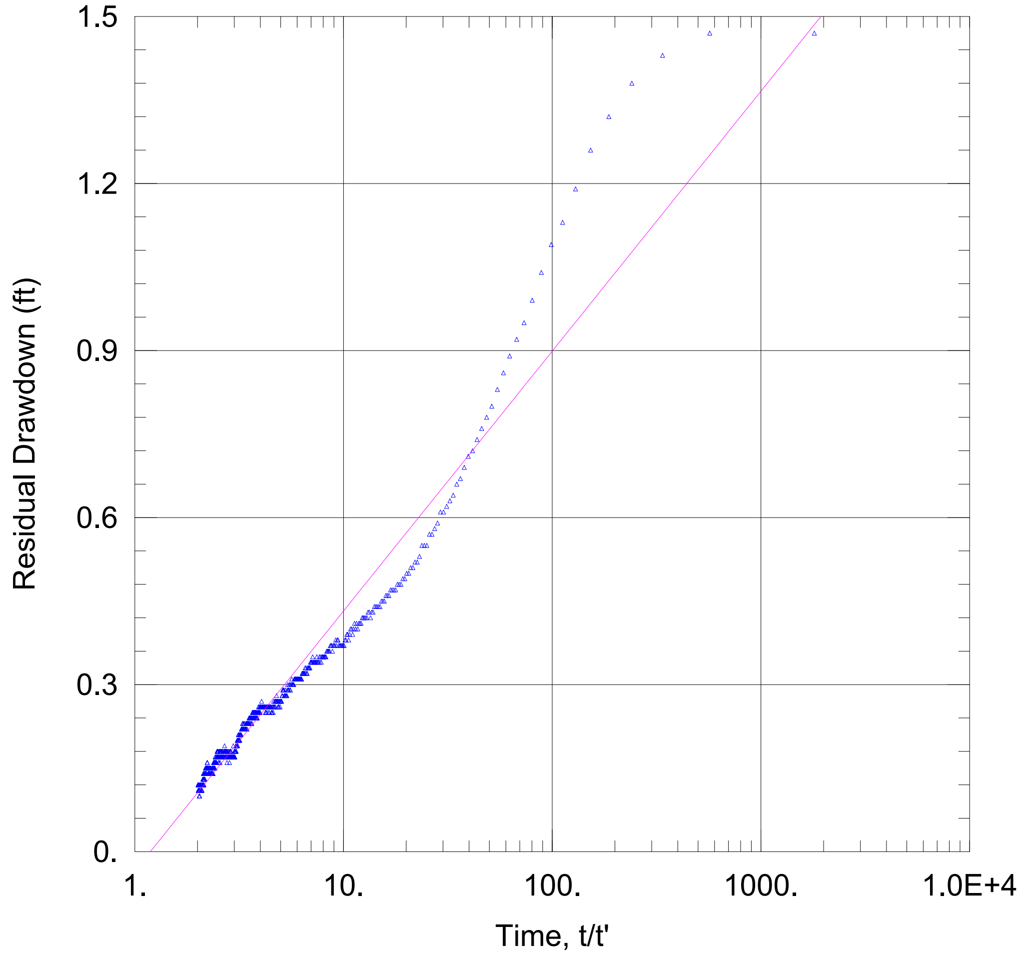
Observation Wells

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

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 841.1 ft^2/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 (Kz/Kr): 1.

WELL DATA

Pumping Wells

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

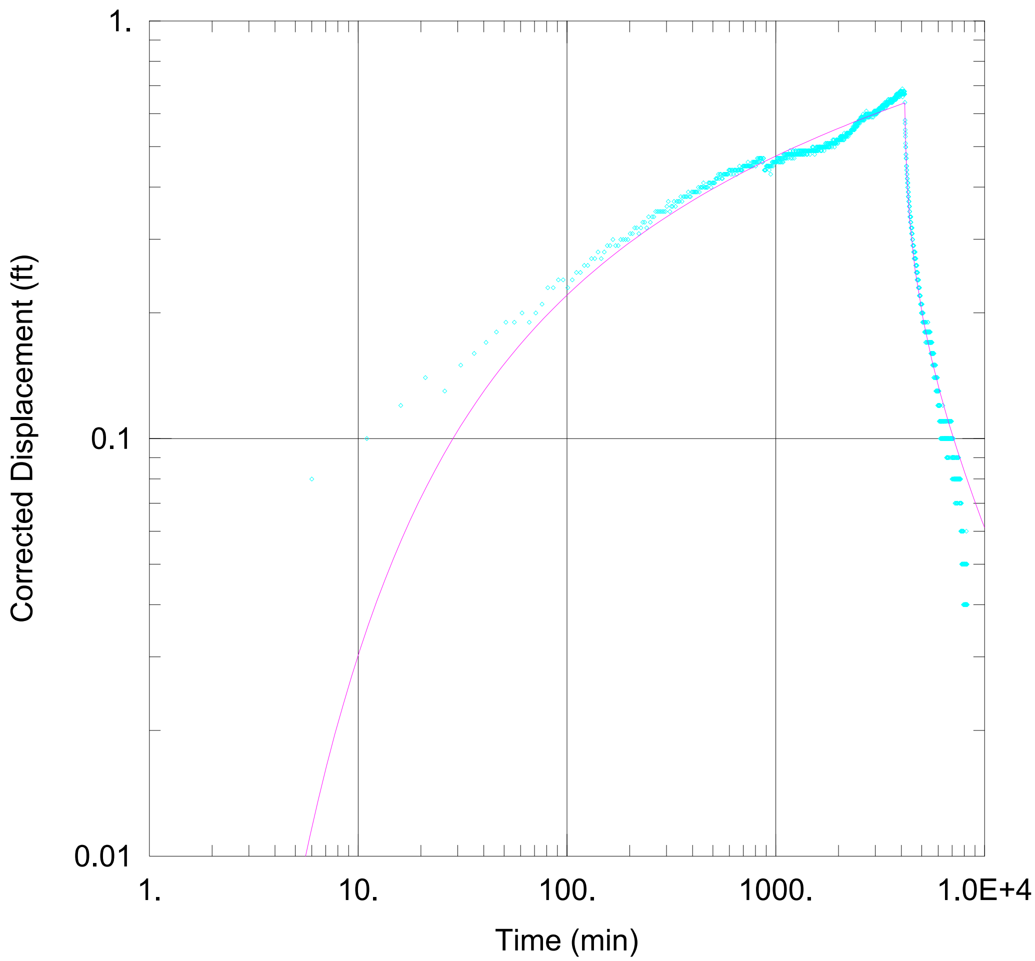
Observation Wells

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

SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Recovery)

T = 748.1 ft^2/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

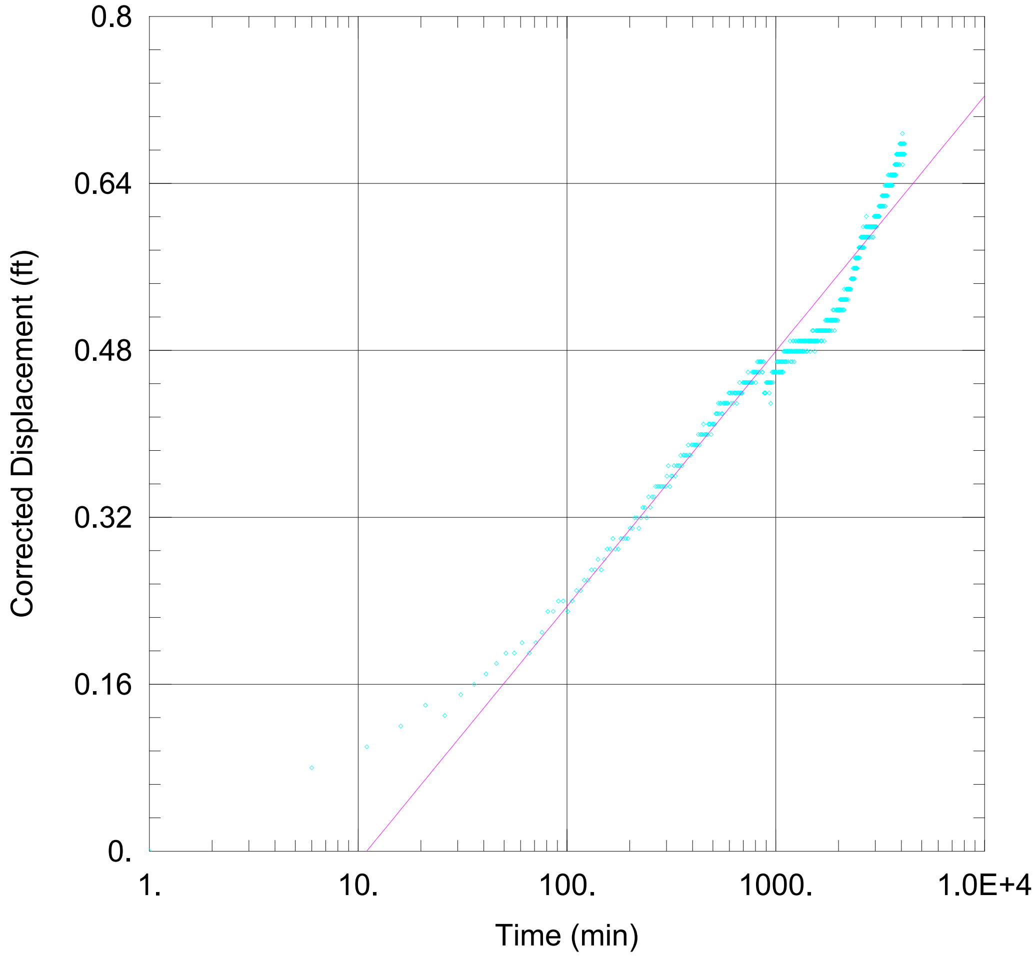
Observation Wells

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

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 1326.9 ft^2/day
Kz/Kr = 1.
S = 0.0008279
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

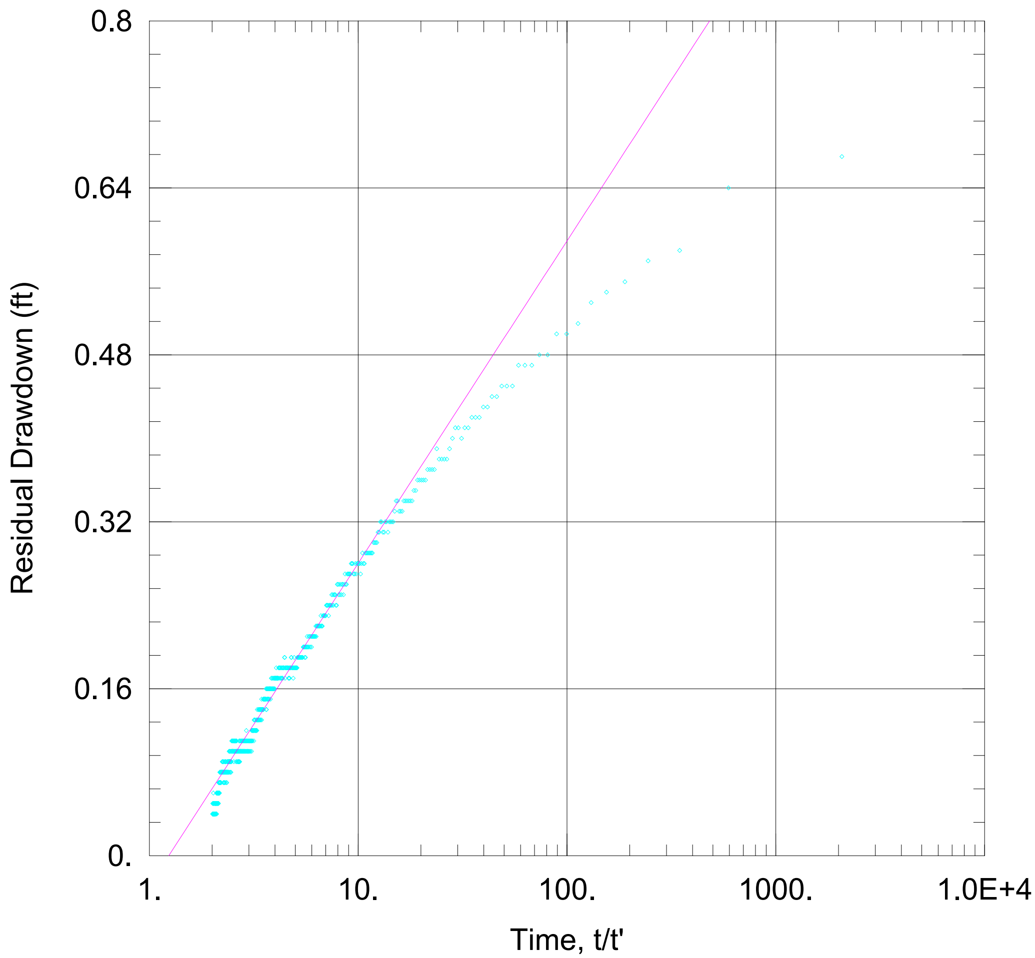
Observation Wells

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

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 1427.7 ft^2/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

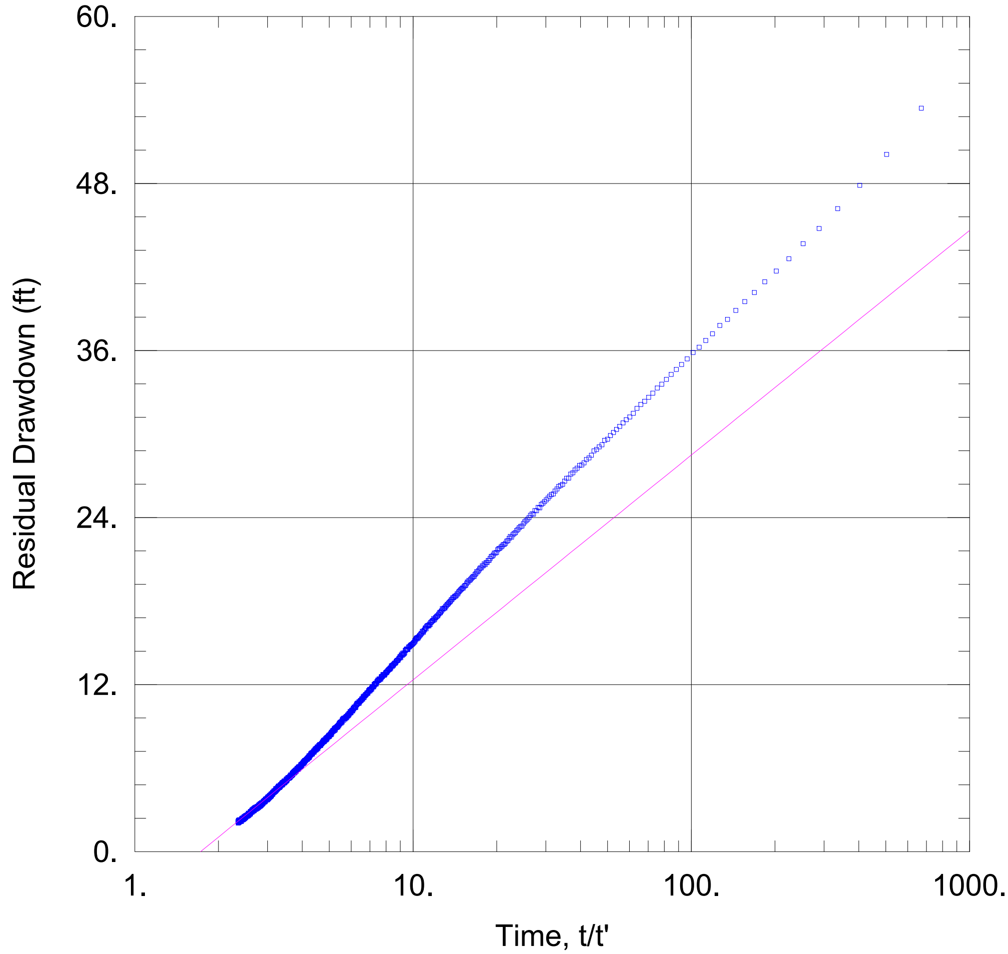
SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 1130.8 ft^2/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

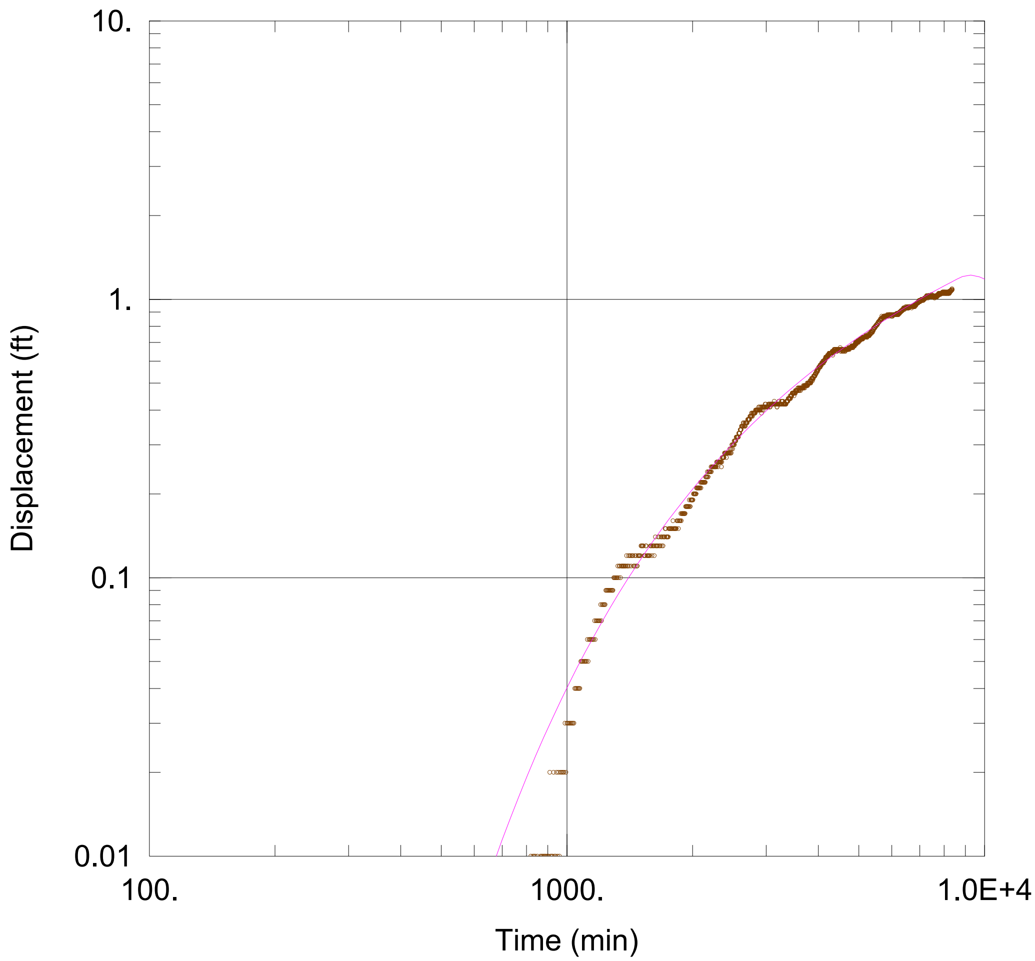
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 30.8 ft^2/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

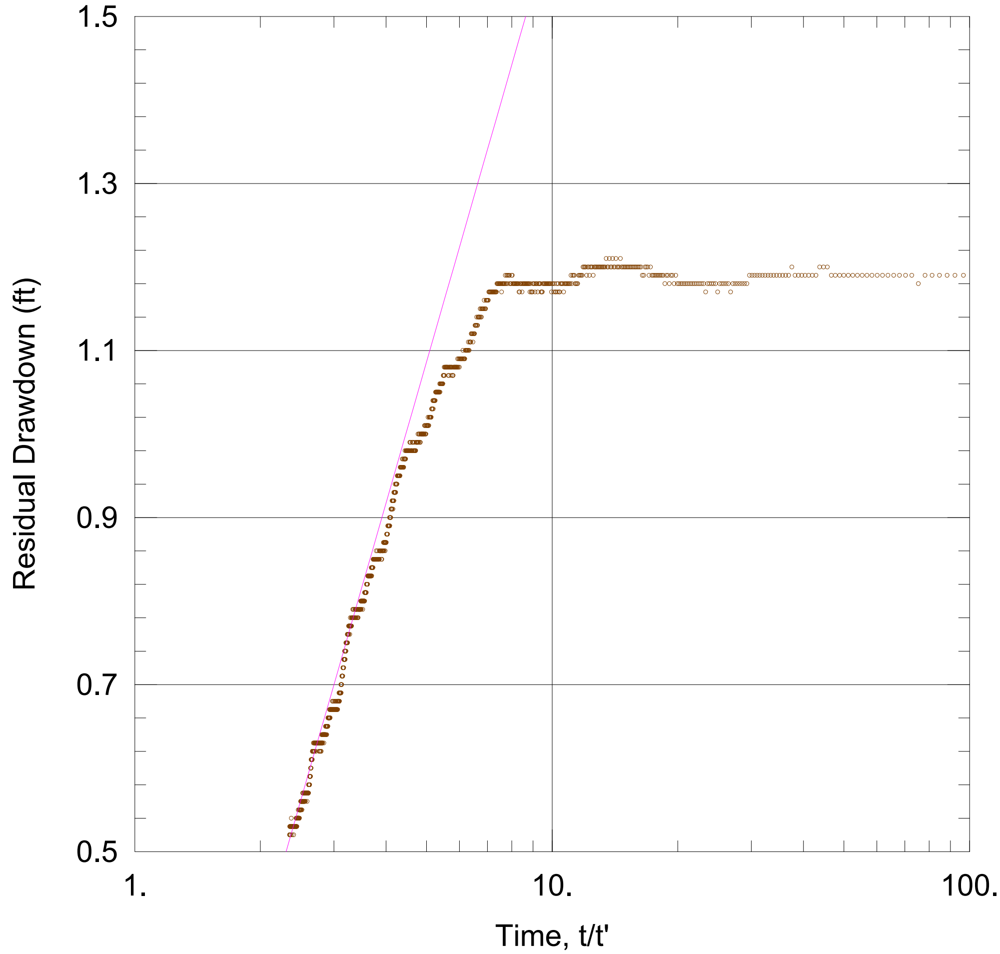
Observation Wells

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

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 229.2 ft^2/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

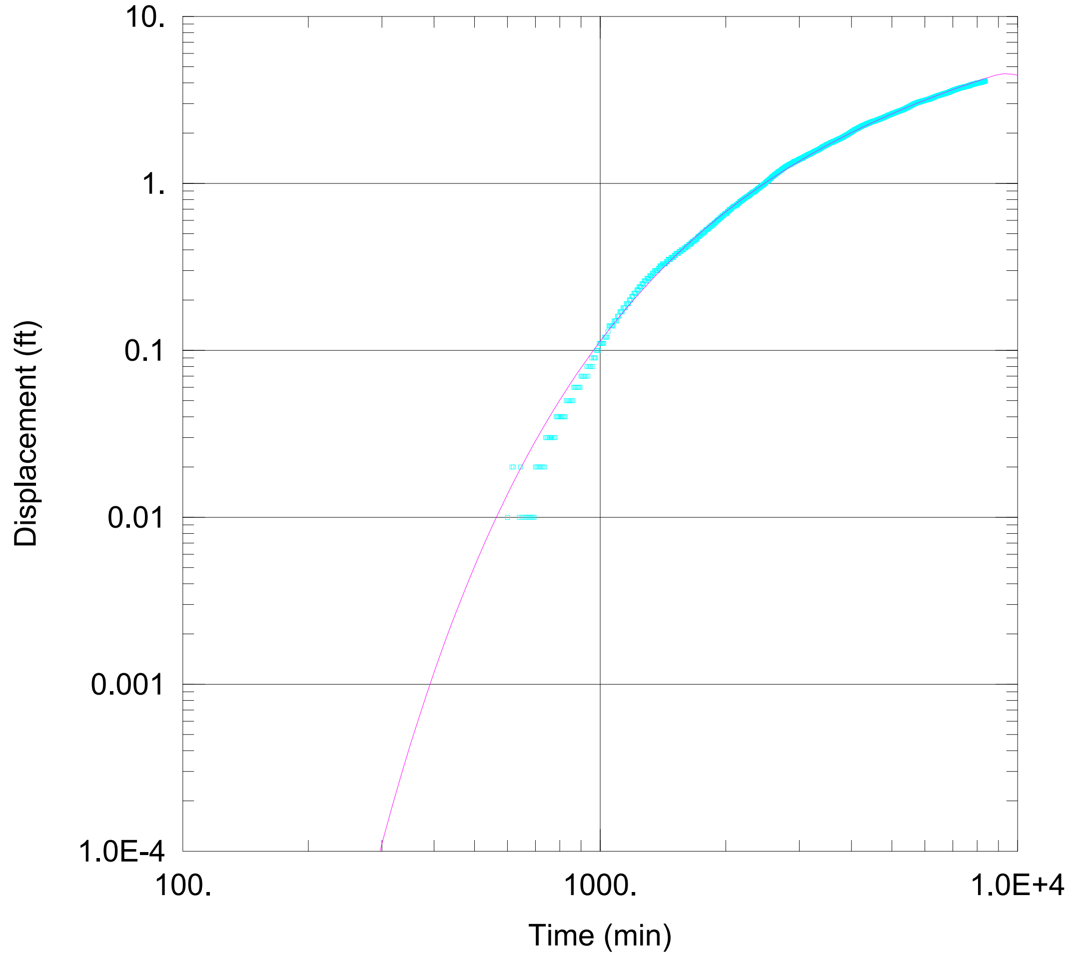
Observation Wells

Well Name	X (ft)	Y (ft)
PZM16	525890.05	1154203.76

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 285.6 ft^2/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

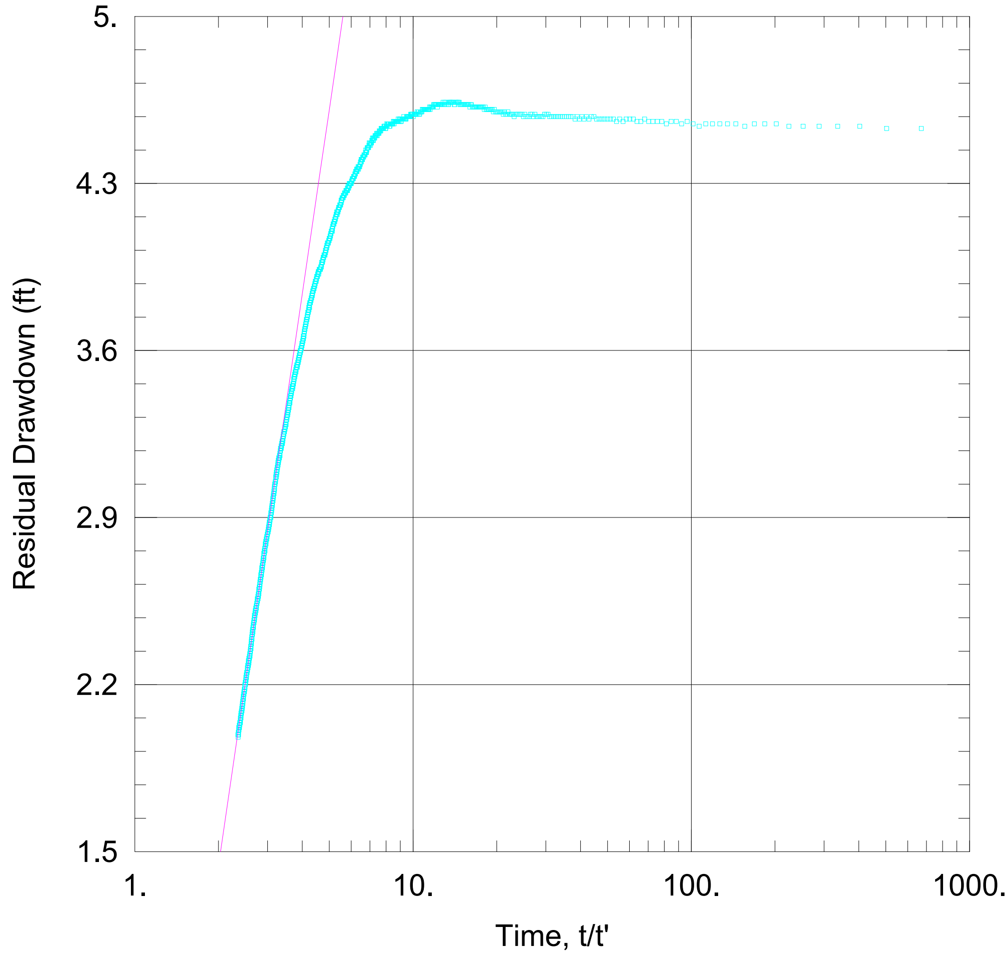
Observation Wells

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

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 57.16 ft^2/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 (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)
PZM15	527720.66	1155604.3

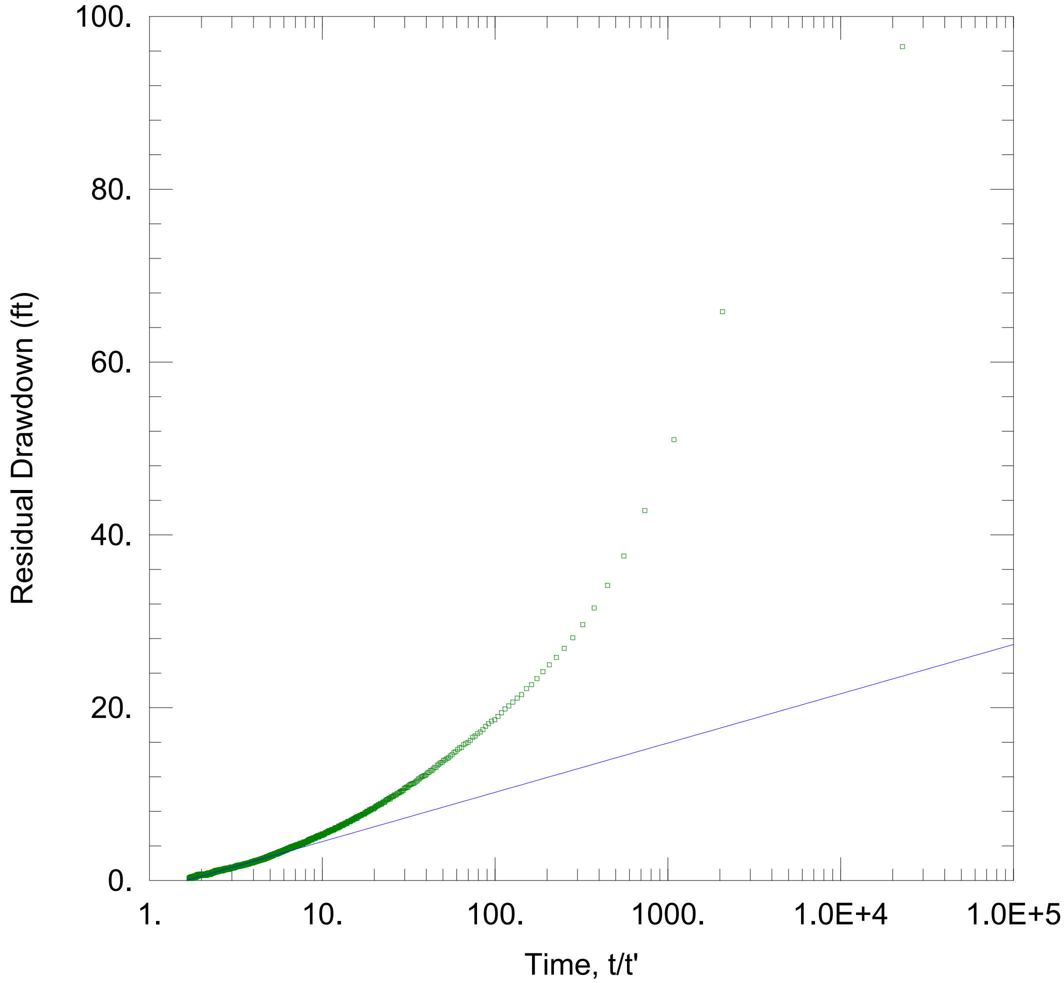
SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 62.52 ft^2/day S/S' = 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 (Kz/Kr): 1.

WELL DATA

Pumping Wells

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

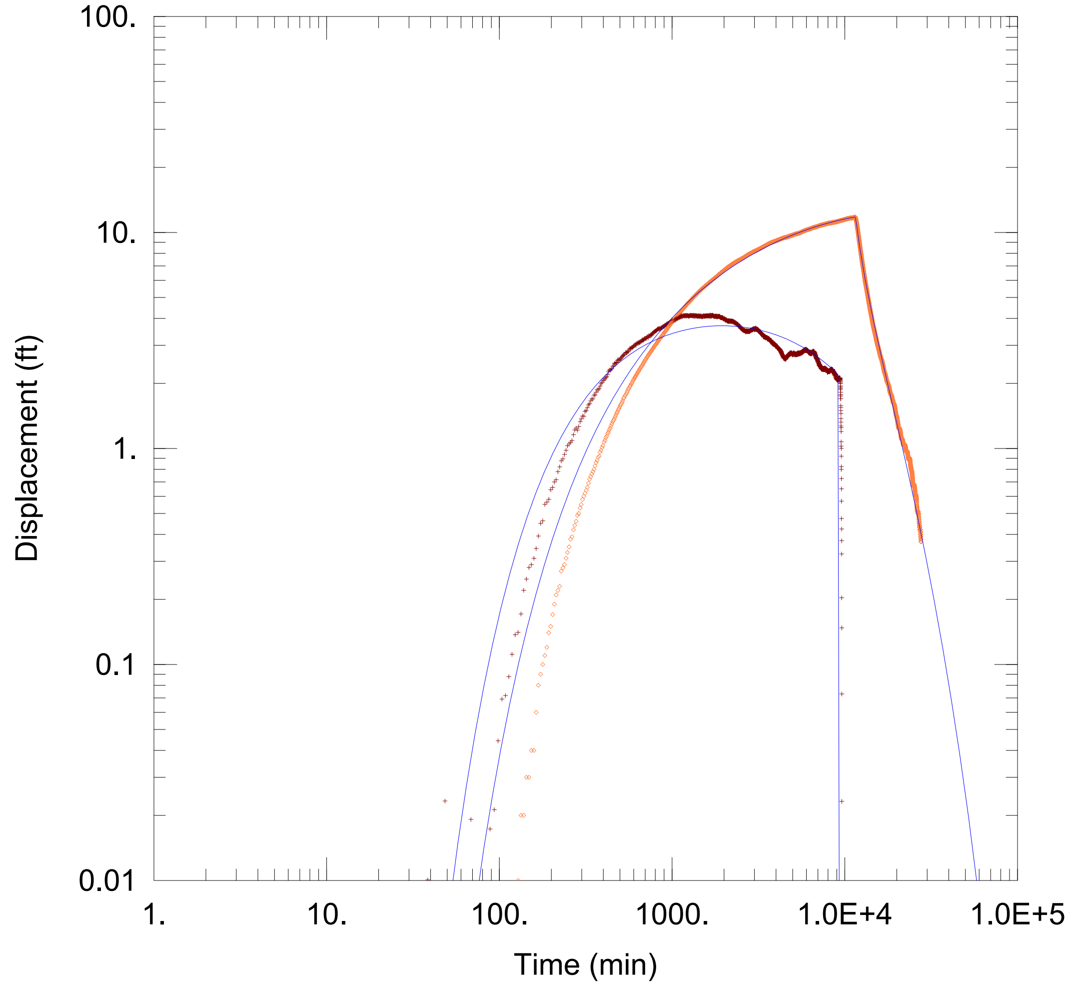
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 61.83 ft^2/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)
PZM-20	517756.21	1149561.08

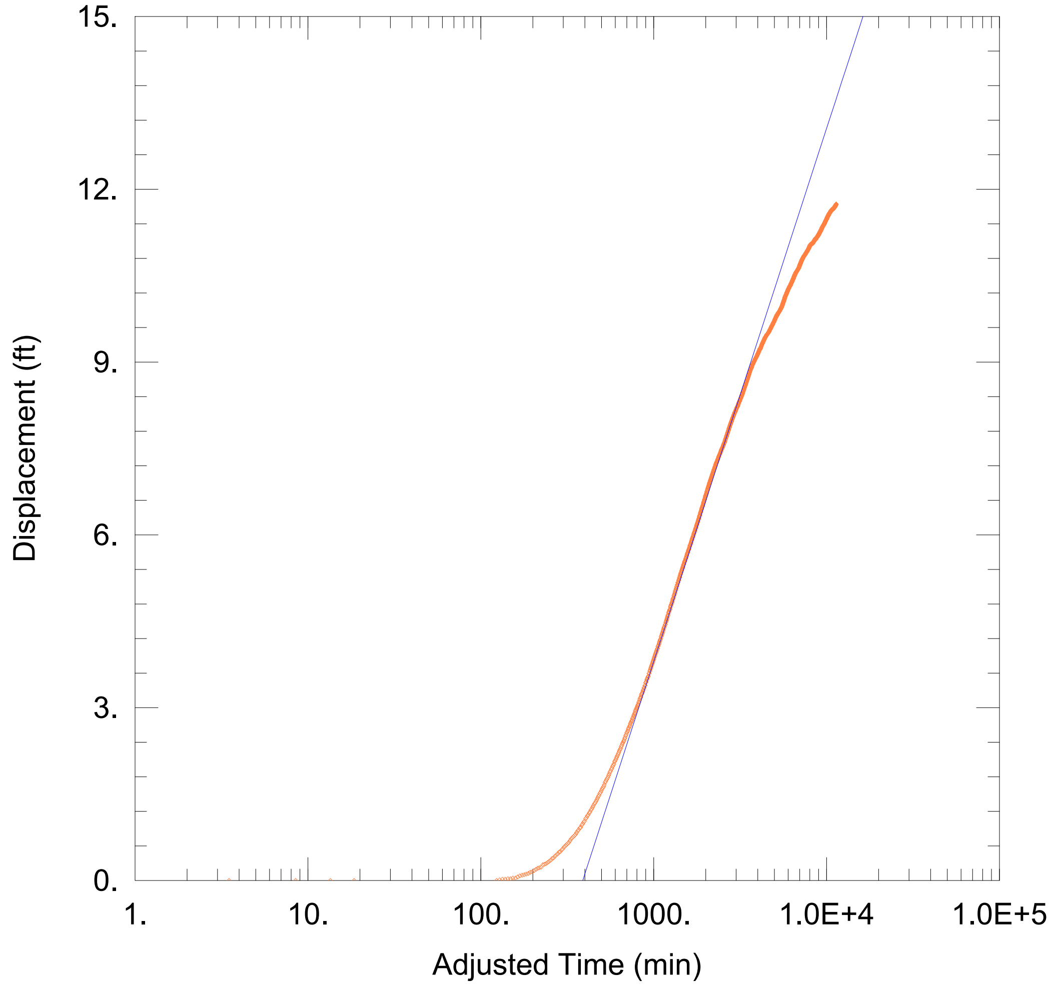
SOLUTION

Aquifer Model: Leaky

Solution Method: Hantush-Jacob

T = 20.23 ft^2/day
1/B = 0.0007172 ft^{-1}
b = 47. ft

S = 7.871E-5
Kz/Kr = 1.



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

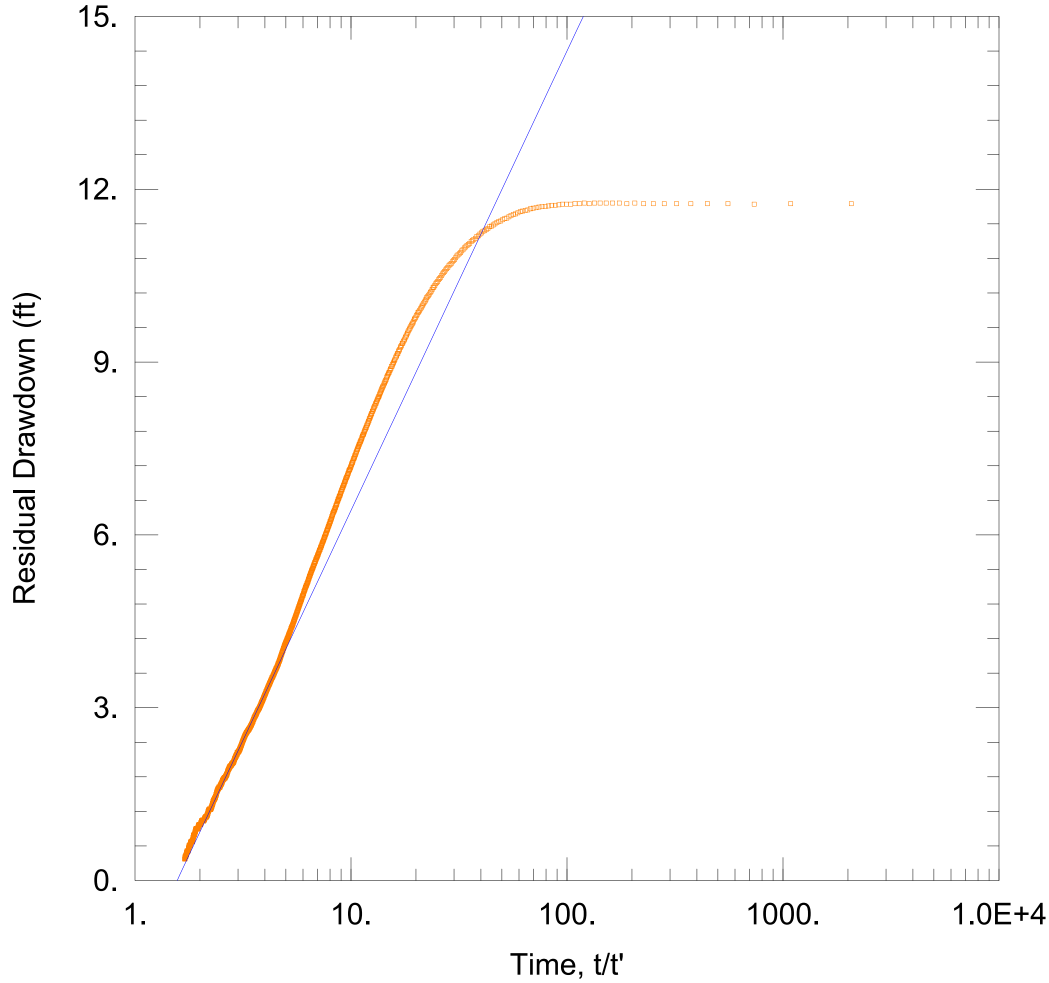
Observation Wells

Well Name	X (ft)	Y (ft)
PZM-20	517756.21	1149561.08

SOLUTION

Aquifer Model: Confined Solution Method: Cooper-Jacob

T = 26.67 ft^2/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 (Kz/Kr): 1.

WELL DATA

Pumping Wells

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

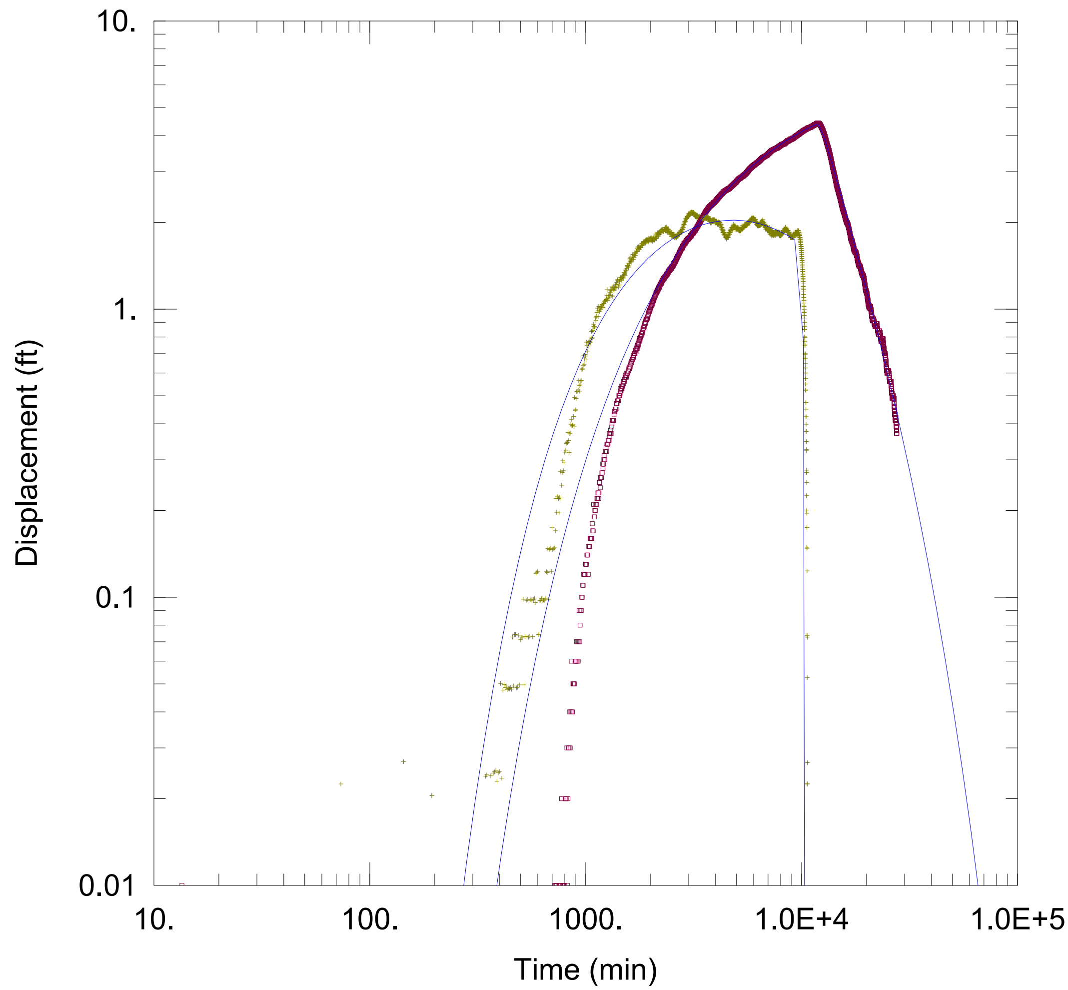
Observation Wells

Well Name	X (ft)	Y (ft)
PZM-20	517756.21	1149561.08

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 30.95 ft^2/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

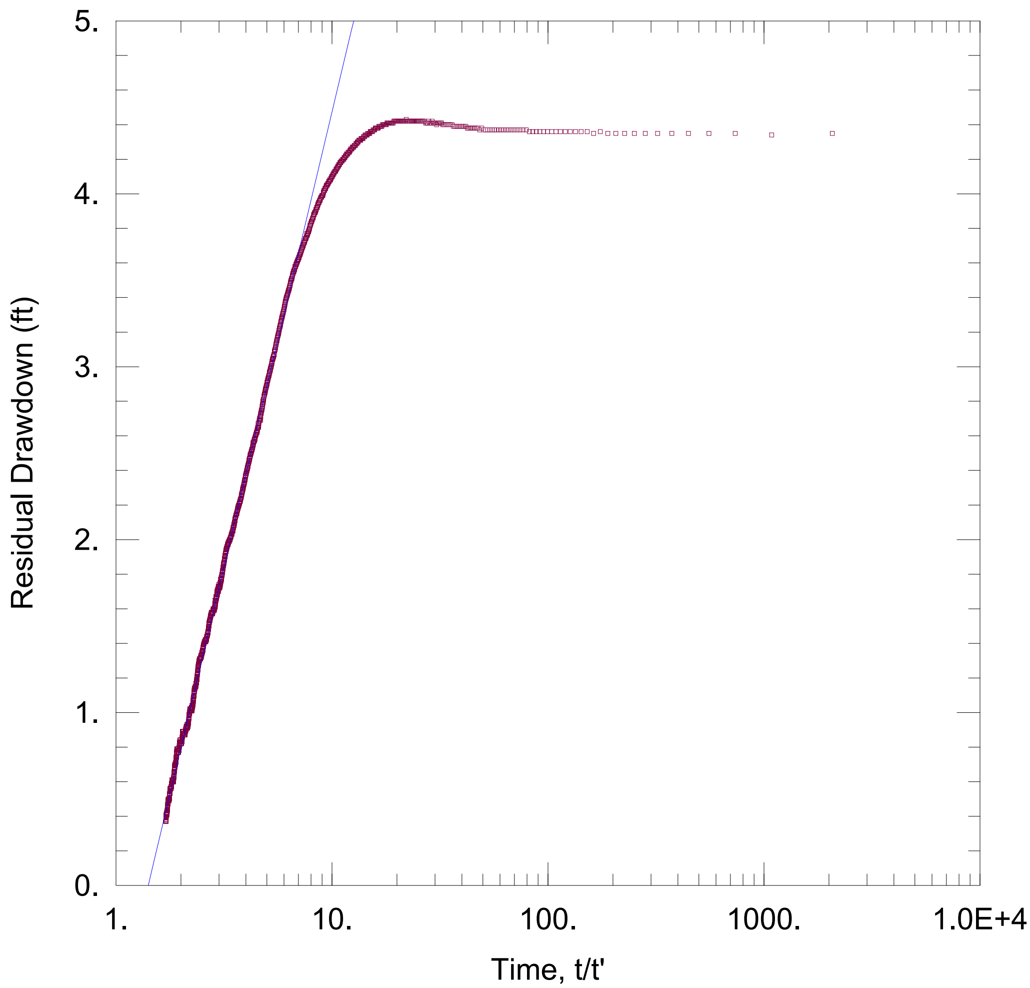
SOLUTION

Aquifer Model: Leaky

Solution Method: Hantush-Jacob

T = 26.02 ft^2/day
1/B = 0.0006687 ft^{-1}
b = 56. ft

S = 0.0001109
Kz/Kr = 1.



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 (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)
PZM-19	518231.32	1150272.01

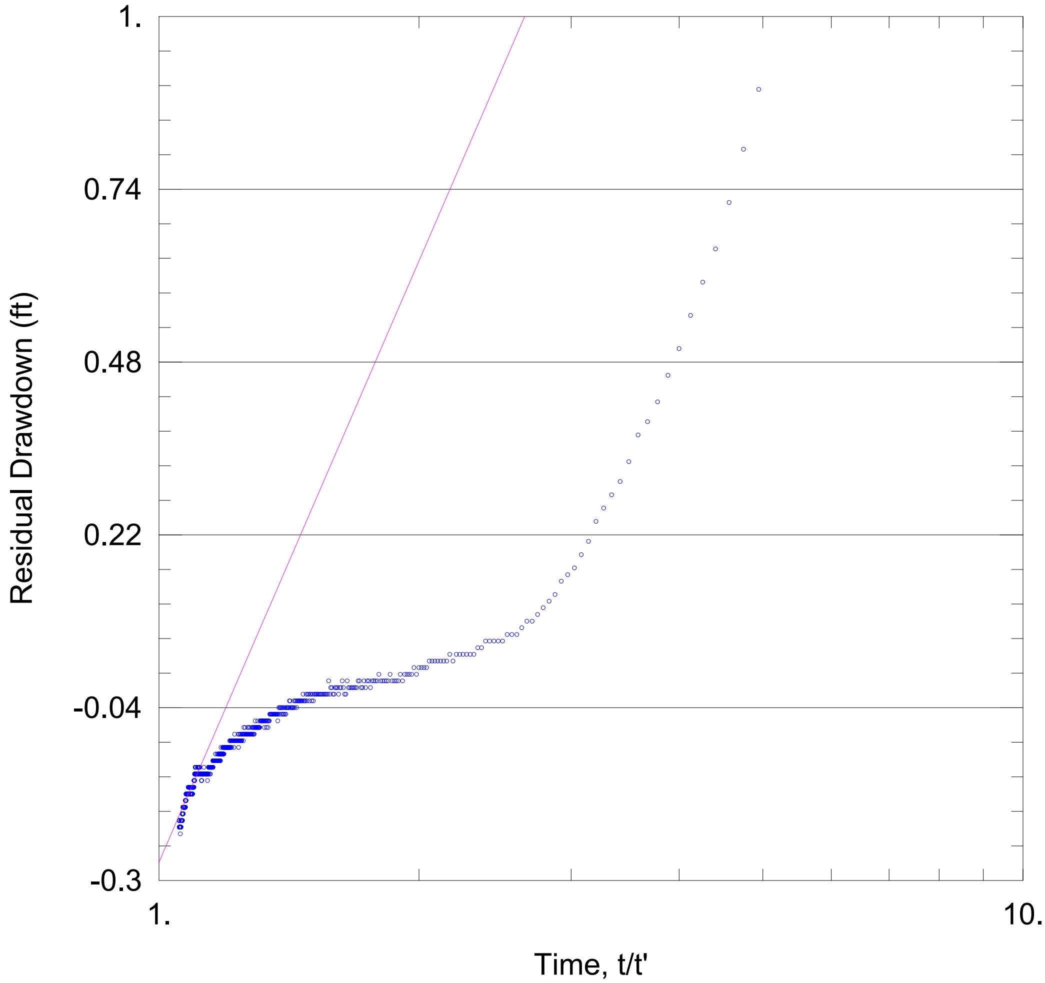
SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 46.96 ft^2/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

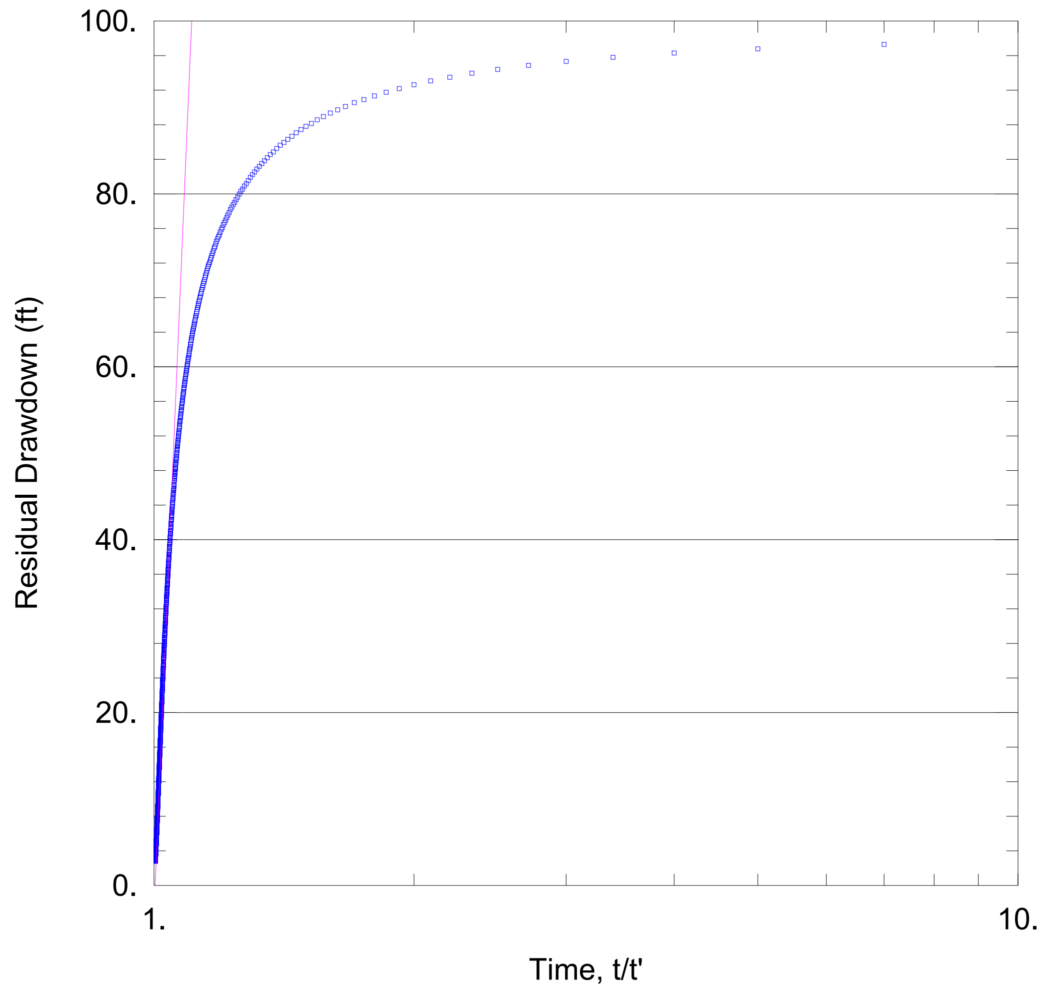
Observation Wells

Well Name	X (ft)	Y (ft)
◦ OM1	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 39.08 ft^2/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 (Kz/Kr): 1.

WELL DATA

Pumping Wells

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

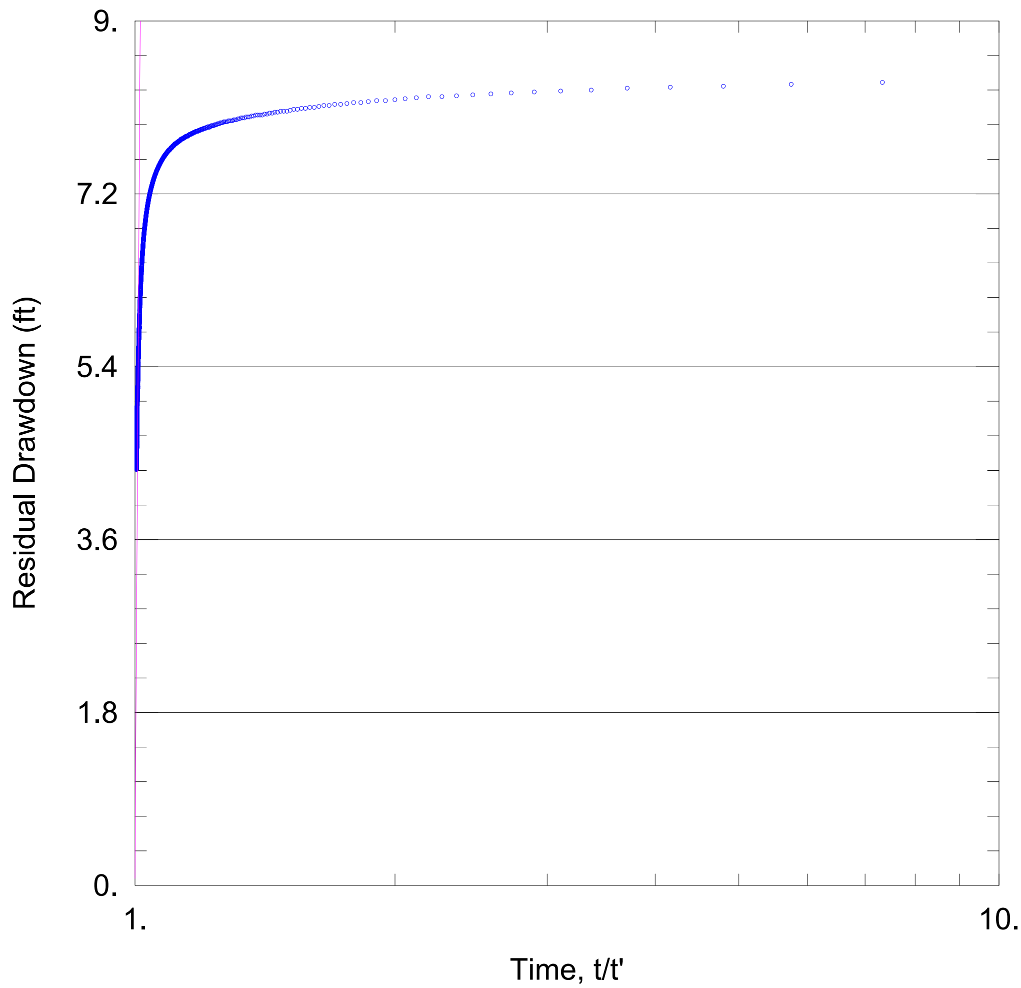
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 0.09162 ft^2/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

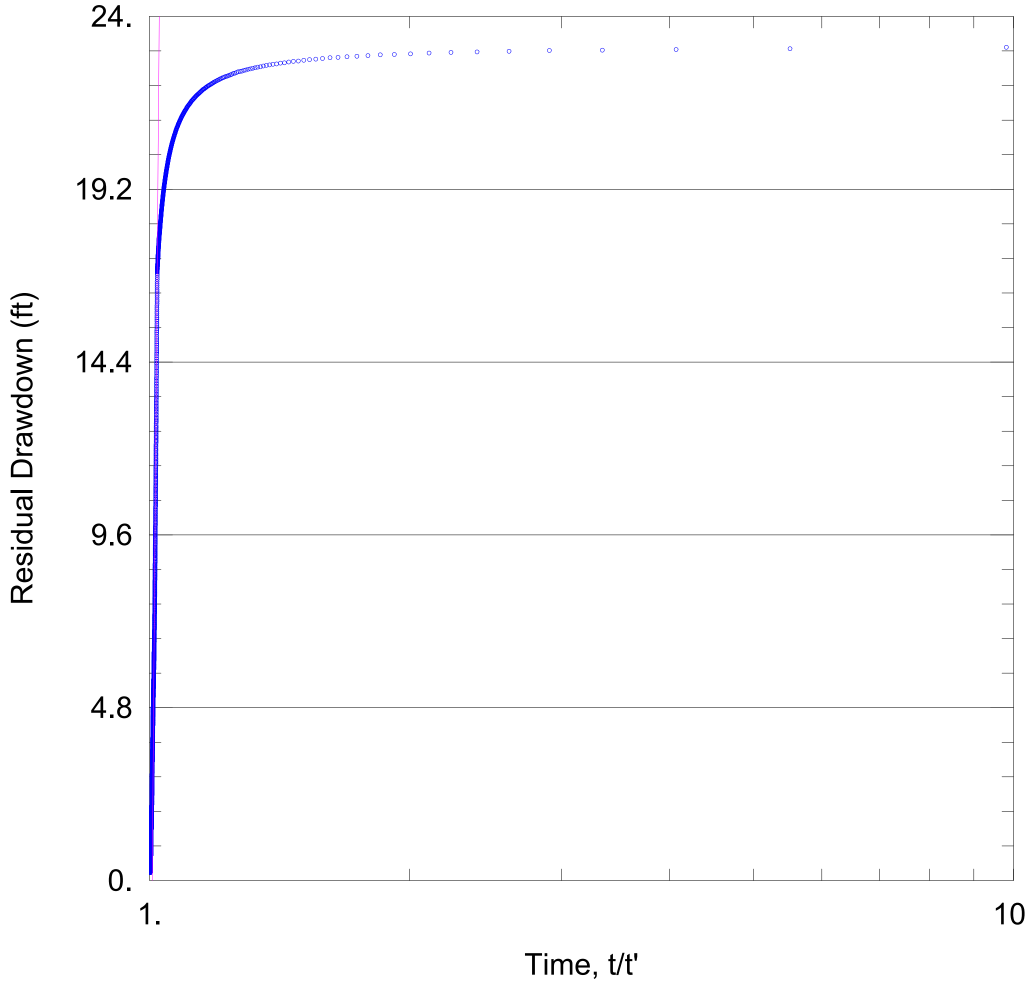
Observation Wells

Well Name	X (ft)	Y (ft)
◦ SM3	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 0.01404 ft^2/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

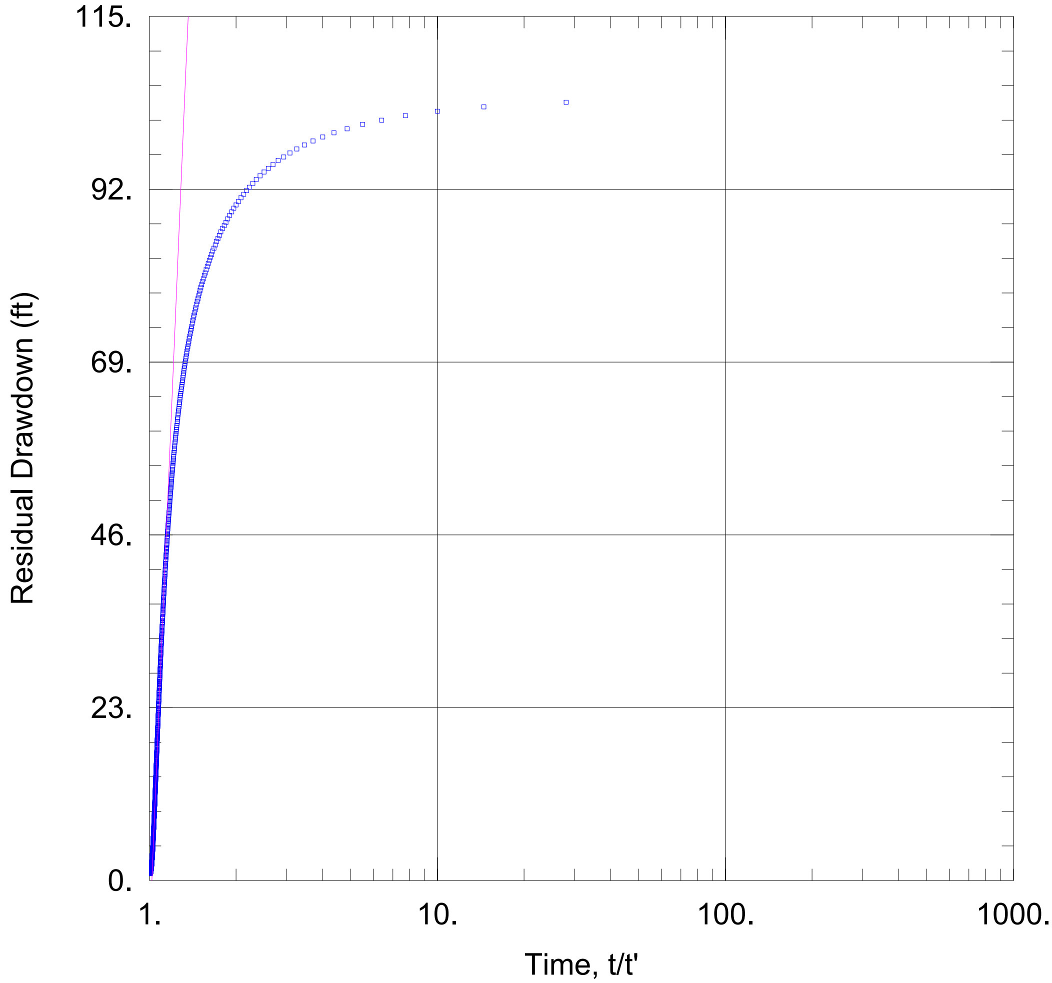
Observation Wells

Well Name	X (ft)	Y (ft)
◦ OM3	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 0.04866 ft^2/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

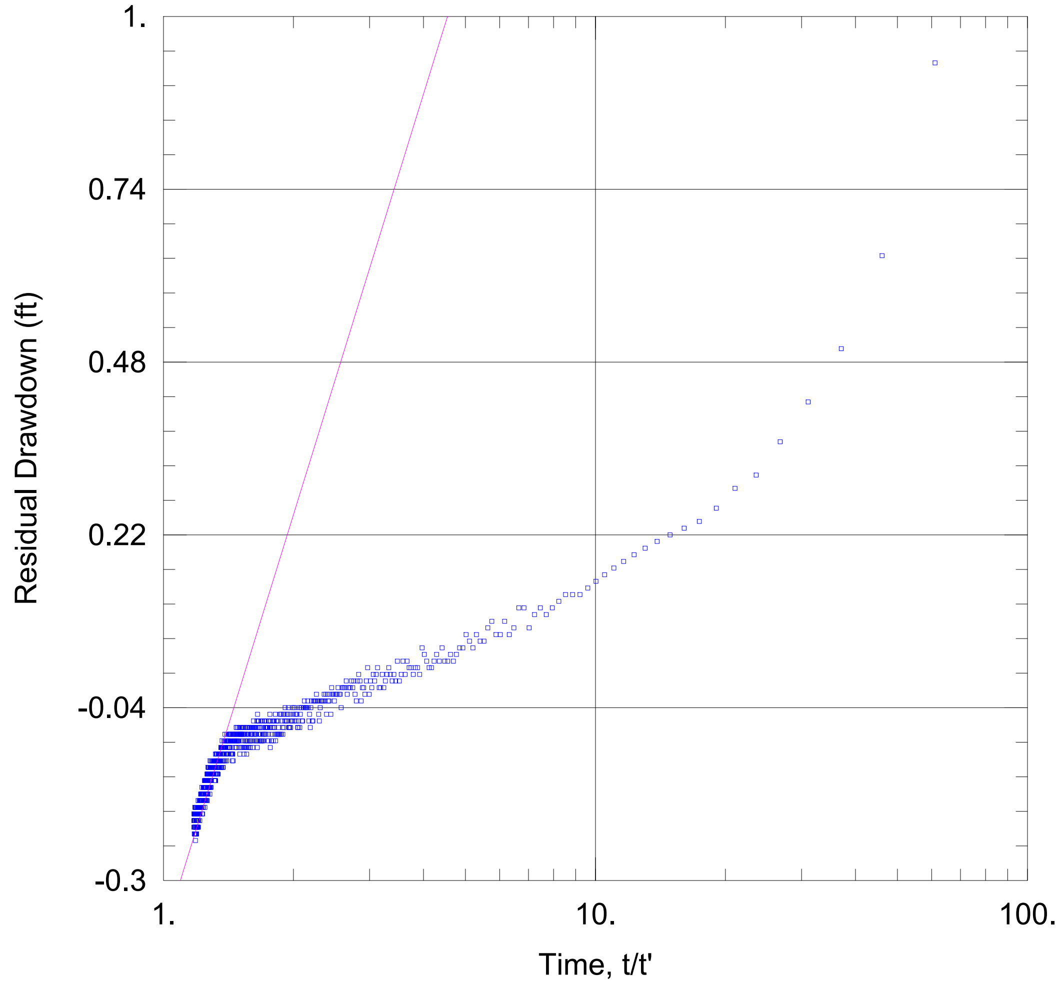
Observation Wells

Well Name	X (ft)	Y (ft)
▫ UM3R	0	0

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 0.07352 ft^2/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

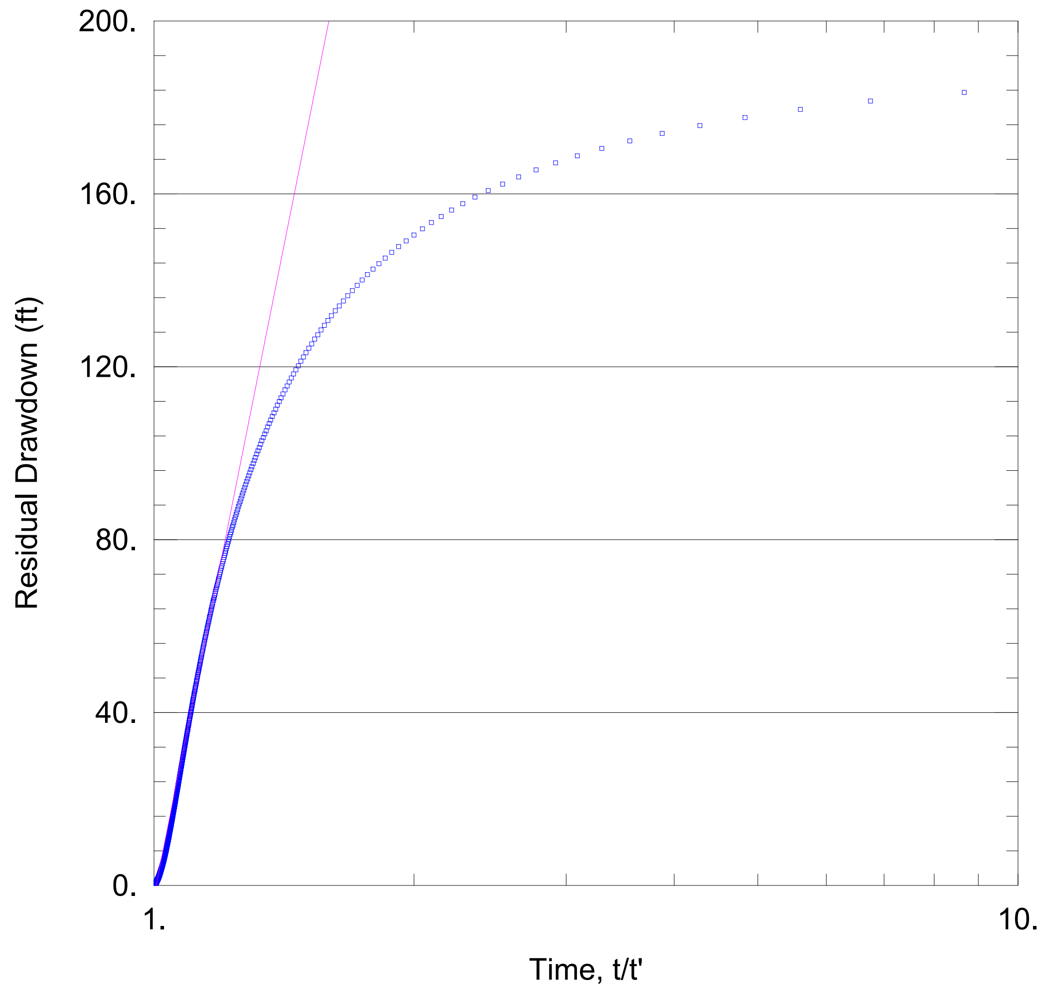
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 62.91 ft^2/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

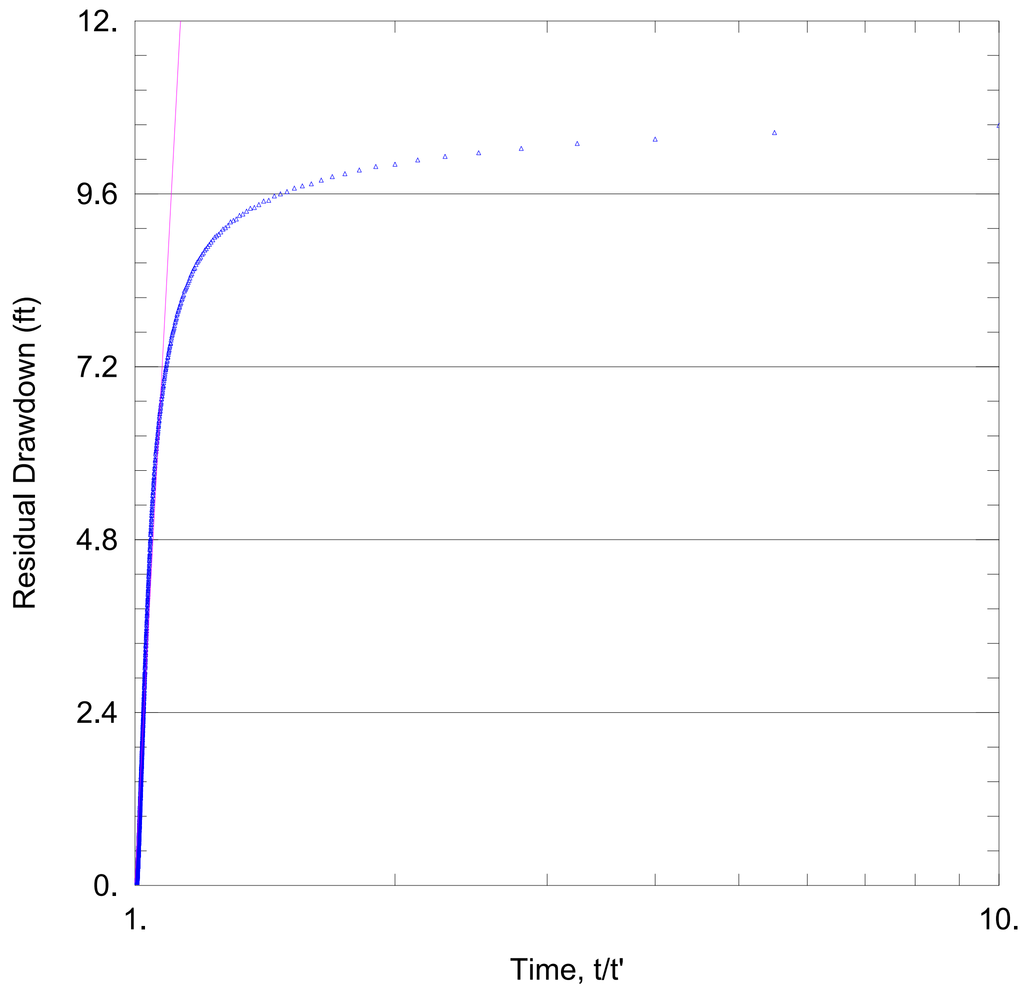
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 0.2152 ft^2/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

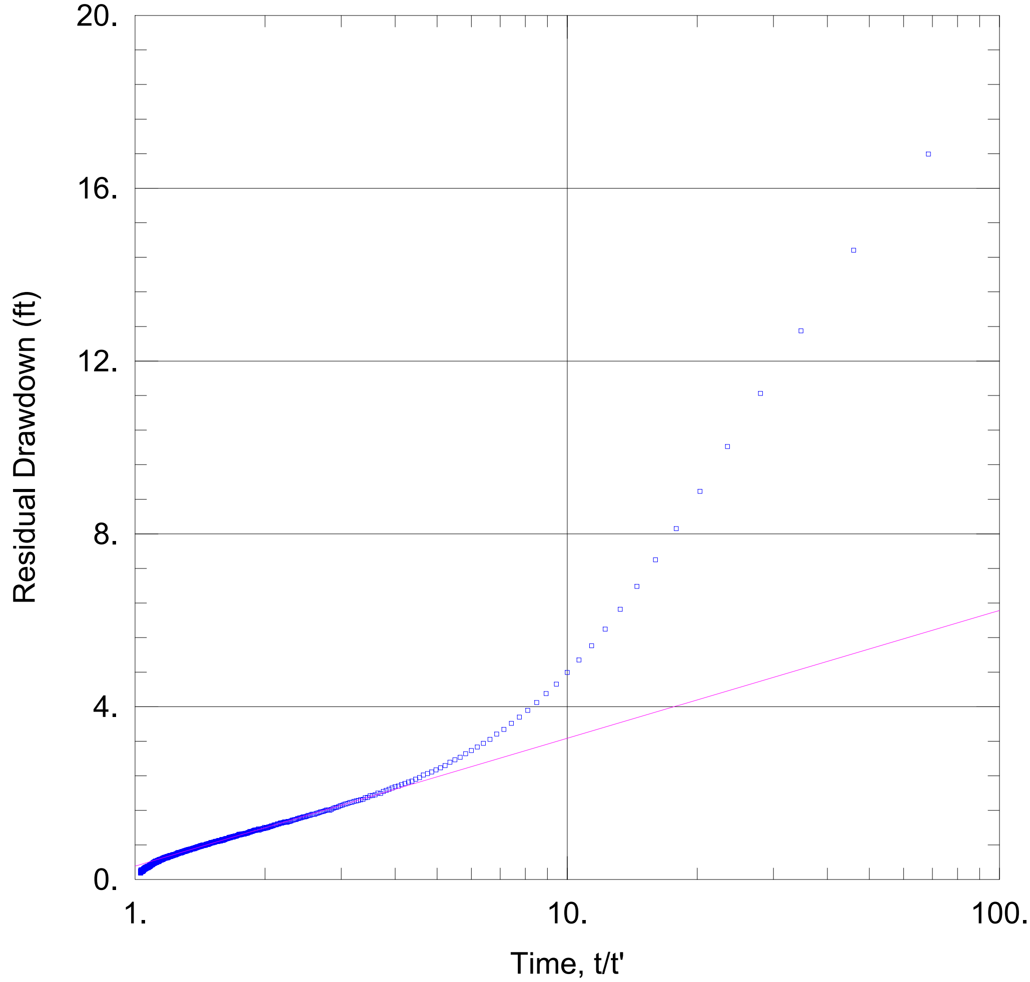
Observation Wells

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

SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Recovery)

T = 0.2597 ft^2/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 (Kz/Kr): 1.

WELL DATA

Pumping Wells

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

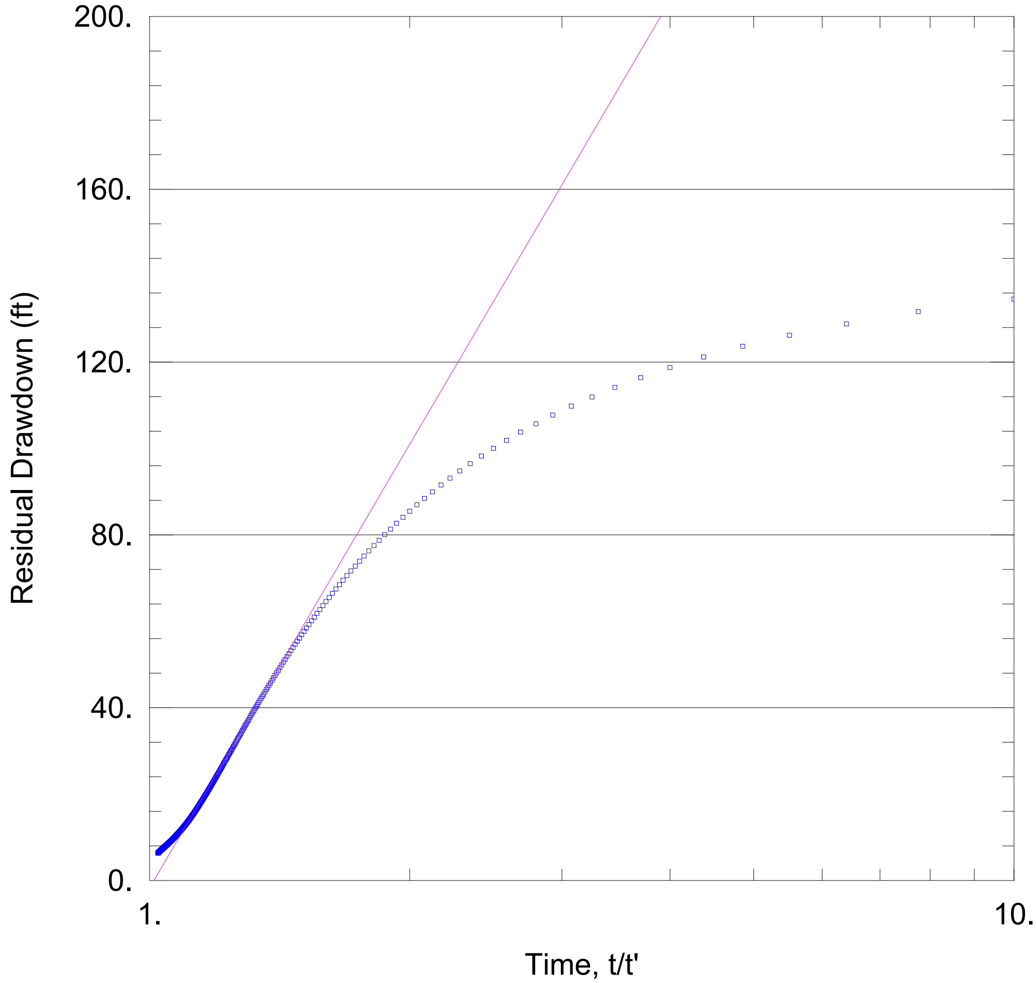
Observation Wells

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

SOLUTION

Aquifer Model: Confined Solution Method: Theis (Recovery)

T = 39.1 ft^2/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 ft^2/day S/S' = 1.012

APPENDIX E

WELL CONSTRUCTION DETAILS

PZM1 PUMP TEST

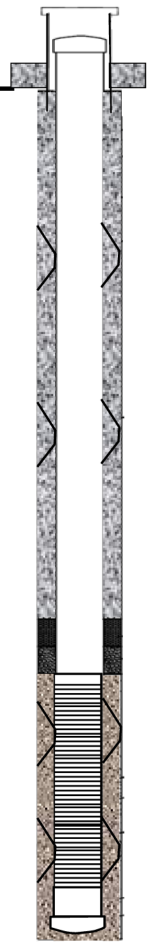
WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	OM1	Drilling Company (Case)	Eagle Drilling
SEO #	193231	Drill Rig Number (Case)	Eagle #1
Casing Date	9/28/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Overlying	Datum	Ground Level

Form Completed by: LH



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

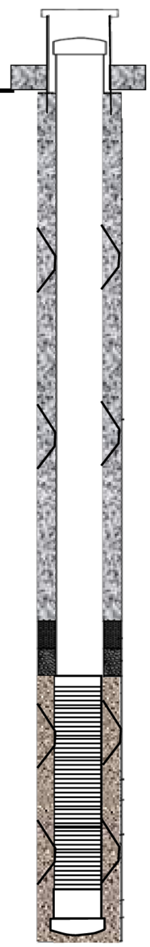
Comments:

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM1	Drilling Company (Case)	Eagle Drilling
SEO #	193262	Drill Rig Number (Case)	Eagle #1
Casing Date	10/12/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level

Form Completed by: LH



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

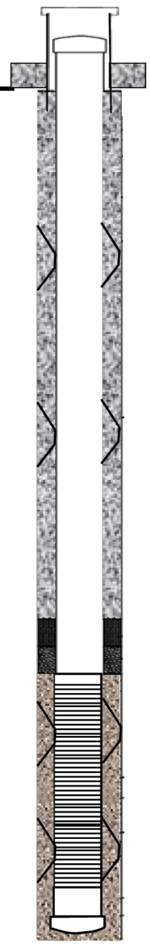
Comments:

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM10	Drilling Company (Case)	Eagle Drilling
SEO #	193243	Drill Rig Number (Case)	Eagle #1
Casing Date	10/4/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level

Form Completed by: LH



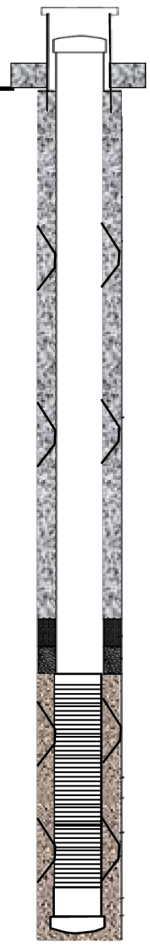
Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	418.5
Grount Weight (lbs/gal)	14.5	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	617	Casing Nominal ID (in)	4.5
Number of cement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

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM8	Drilling Company (Case)	Eagle Drilling
SEO #	193241	Drill Rig Number (Case)	Eagle #1
Casing Date	9/27/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	LH		



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

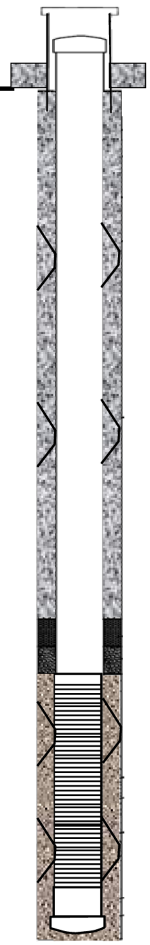
Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM9	Drilling Company (Case)	Eagle Drilling
SEO #	193242	Drill Rig Number (Case)	Eagle #1
Casing Date	9/30/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level

Form Completed by: LH



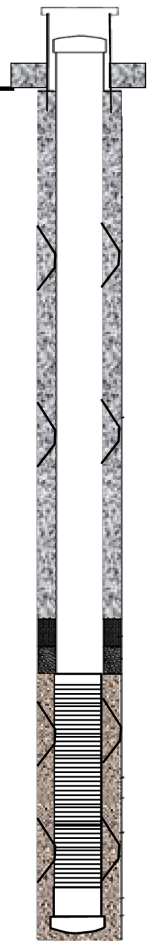
Annular Seal Material	Cement w/ bentonite	Well Use	Pump Test Observation
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	492.75
Grount Weight (lbs/gal)	14.6	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	727	Casing Nominal ID (in)	4.5
Number of cement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

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	UM1	Drilling Company (Case)	Eagle Drilling
SEO #	193254	Drill Rig Number (Case)	Eagle #1
Casing Date	10/7/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Underlying	Datum	Ground Level
Form Completed by:	LH		



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

Comments

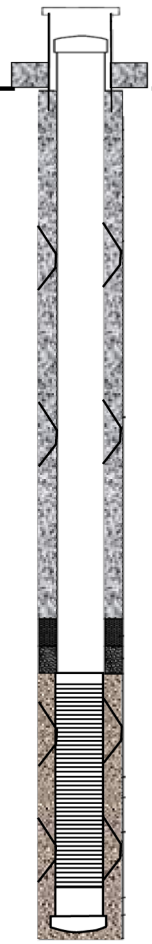
PZM3 PUMP TEST

WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	SM3	Drilling Company (Case)	K.E. Taylor
SEO #	NA	Drill Rig Number (Case)	6
Casing Date	7/7/2011	Driller (Case)	Ryan
Screened Aquifer Zone	Shallow	Datum	Ground Level
Form Completed by:	LH		



Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	81
Grount 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)	50
Number of CaCl sacks (50 lbs)	0	Casing Manufacturer	J-M Manufacturing
Type of Centralizers	Stainless Steel	1st Centralizer on Casing depth (ft)	80
Number of Centralizers	3	Sacks/pails of pellets used	1
Top of bentonite chips (ft)	38	Screen O.D. (in)	4.5
Top of Secondary Fiter Pack (ft)	44	Screen type	Factory Slotted PVC
Top of Screen (ft)	50	Screen diameter (in)	4
Screen Length (ft)	30	Screen slot size (in)	0.03
Ream Bit Diameter (in)	8.75	Top of # 8 - 12 Pri. Filter pack (ft)	46.5
Total Ream Depth (ft)	80	Silt Trap w/ end cap Length (ft)	0
Silt Trap Diameter (in)	na	Bottom of # 8 - 12 Pri. Filter pack (ft)	80
Bottom of Screen (ft)	80	Cement Depth (ft)	38

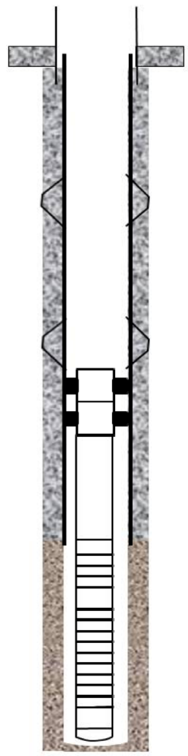
Comments ____________________

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	OM3
SEO #	193233
Casing Date	7/1/2011
Screened Aquifer Zone	Overlying
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
Grount Weight (lbs/gal)	14.2
Total Volume of Grout Used (gals)	390
Number of cement sacks (94 lbs)	36
Number of bentonite sacks (50 lbs)	2.0
Number of CaCl sacks (50 lbs)	0
Type of Centralizers	Stainless Steel
Number of Centralizers	6
Top of bentonite chips (ft)	na
Top of Secondary Fiter Pack (ft)	na
Top of Screen (ft)	150
Screen Length (ft)	20
Ream Bit Diameter (in)	8.75
Total Ream Depth (ft)	160
Silt Trap Diameter (in)	na
Bottom of Screen (ft)	170

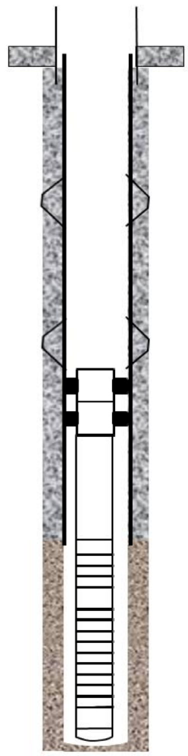
Well Use	Observation/Monitor
Gallons of Water in Grout Mix	264.6
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	150
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	150
Sacks/pails of pellets used	na
Screen O.D. (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)	150
Under-ream blade (in)	10.5
Top of Riser Pipe (ft)	0
Riser pipe length (ft)	0
Date screen installed	7/11/2011
Pilot TD (FT)	175
Well developed	7/11/2011
Time of development (hrs)	3
Method	airlift
Displacement gallons	111
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	PZM11	Drilling Company (Case)	DC drilling
SEO #	193244	Drill Rig Number (Case)	5
Casing Date	7/28/2011	Driller (Case)	Carmine
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	km		



Annular Seal Material	Cement w/ bentonite
Grout Emplacement Technique	Pump through Casing
Grount 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	10
Top of bentonite chips (ft)	na
Top of Secondary Fiter Pack (ft)	na
Top of Screen (ft)	365
Screen Length (ft)	20
Ream Bit Diameter (in)	8.75
Total Ream Depth (ft)	385
Silt Trap Diameter (in)	na
Bottom of Screen (ft)	385

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)	365
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	360
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)	365
Under-ream blade (in)	10
Top of Riser Pipe (ft)	355
Riser pipe length (ft)	10
Date screen installed	8/1/2011
Pilot TD (FT)	430
Well developed	8/1/2011
Time of development (hrs)	3
Method	H20/airlift
Displacement gallons	276
Est. Flow (gpm)	3
Cement in casing (ft)	yes
Wellhead hold pressure	yes

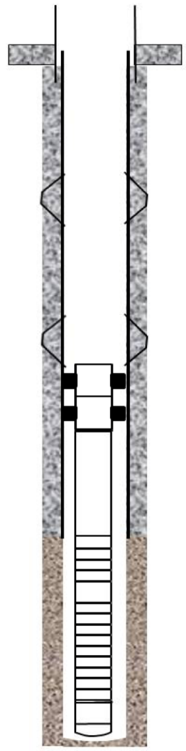
Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	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
Grount 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 Fiter 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

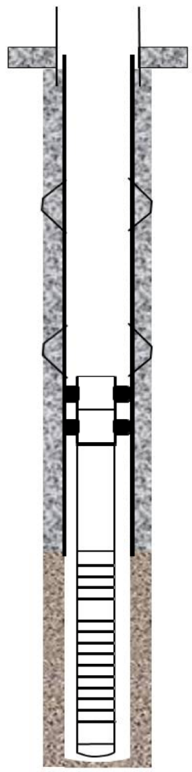
Well Use	Baseline Monitor
Gallons of Water in Grout Mix	588
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	370
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	367
Sacks/pails of pellets used	na
Screen O.D. (in)	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	H20/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	Drilling Company (Case)	DC drilling
SEO #	193246	Drill Rig Number (Case)	5
Casing Date	8/2/2011	Driller (Case)	Carmine
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	km		

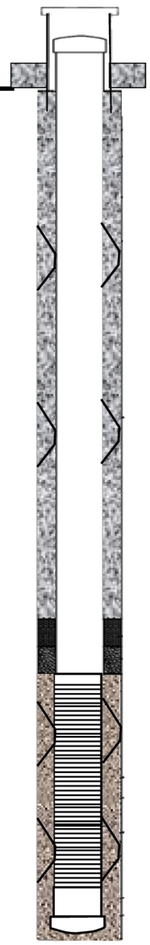


Annular Seal Material	Cement w/ bentonite	Well Use	Baseline Monitor
Grout Emplacement Technique	Pump through Casing	Gallons of Water in Grout Mix	593
Grount Weight (lbs/gal)	14.3	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	875	Casing Nominal ID (in)	4.5
Number of cement sacks (94 lbs)	80	Casing Nominal OD (in)	4.95
Number of bentonite sacks (50 lbs)	4.6	Casing Depth (ft)	357
Number of CaCl sacks (50 lbs)	0	Casing Manufacturer	CertainTeed
Type of Centralizers	Stainless Steel	1st Centralizer on Casing depth (ft)	352
Number of Centralizers	10	Sacks/pails of pellets used	na
Top of bentonite chips (ft)	na	Screen O.D. (in)	3.5
Top of Secondary Fiter Pack (ft)	na	Screen type	Factory Slotted PVC
Top of Screen (ft)	357	Screen diameter (in)	3
Screen Length (ft)	20	Screen slot size (in)	0.03
Ream Bit Diameter (in)	8.75	Top of # 8 - 12 Pri. Filter pack (ft)	na
Total Ream Depth (ft)	377	Silt Trap w/ end cap Length (ft)	0
Silt Trap Diameter (in)	na	Bottom of # 8 - 12 Pri. Filter pack (ft)	na
Bottom of Screen (ft)	377	Cement Depth (ft)	357
		Under-ream blade (in)	10
		Top of Riser Pipe (ft)	347
		Riser pipe length (ft)	10
		Date screen installed	8/8/2011
Comments:		Pilot TD (FT)	430
		Well developed	8/8/2011
		Time of development (hrs)	3
		Method	H20/air
		Displacement gallons	271
		Est. Flow (gpm)	10
		Cement in casing (ft)	yes
		Wellhead hold pressure	yes

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM3	Drilling Company (Case)	D.C. Drilling
SEO #	193263	Drill Rig Number (Case)	4
Casing Date	8/3/2011	Driller (Case)	Carmine
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	LH		



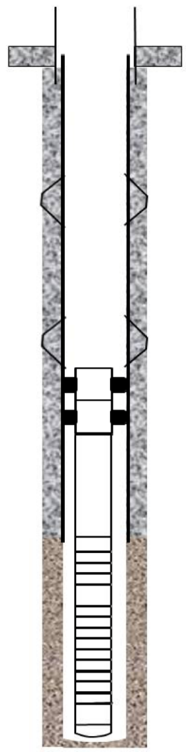
Annular Seal Material	Cement w/ bentonite	Well Use	Pump Well for Pump Test
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	513
Grount Weight (lbs/gal)	14.3	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	784	Casing Nominal ID (in)	5
Number of cement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

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	UM3R	Drilling Company (Case)	DC drilling
SEO #	193389	Drill Rig Number (Case)	5
Casing Date	10/6/2011	Driller (Case)	Carmine
Screened Aquifer Zone	Underlying	Datum	Ground Level
Form Completed by:	KM		



Annular Seal Material	Cement w/ bentonite	Well Use	Baseline Monitor
Grout Emplacement Technique	Pump through Casing	Gallons of Water in Grout Mix	764
Grount Weight (lbs/gal)	14.3	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	1128	Casing Nominal ID (in)	4.5
Number of cement sacks (94 lbs)	80	Casing Nominal OD (in)	4.95
Number of bentonite sacks (50 lbs)	5.9	Casing Depth (ft)	459
Number of CaCl sacks (50 lbs)	0	Casing Manufacturer	CertainTeed
Type of Centralizers	Stainless Steel	1st Centralizer on Casing depth (ft)	453
Number of Centralizers	13	Sacks/pails of pellets used	na
Top of bentonite chips (ft)	na	Screen O.D. (in)	3.5
Top of Secondary Fiter Pack (ft)	na	Screen type	Factory Slotted PVC
Top of Screen (ft)	459	Screen diameter (in)	3
Screen Length (ft)	20	Screen slot size (in)	0.03
Ream Bit Diameter (in)	8.75	Top of # 8 - 12 Pri. Filter pack (ft)	na
Total Ream Depth (ft)	480	Silt Trap w/ end cap Length (ft)	0
Silt Trap Diameter (in)	na	Bottom of # 8 - 12 Pri. Filter pack (ft)	na
Bottom of Screen (ft)	479	Cement Depth (ft)	459
		Under-ream blade (in)	10
		Top of Riser Pipe (ft)	450
Comments		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	H20/air
		Displacement gallons	336
		Est. Flow (gpm)	1
		Cement in casing (ft)	yes
		Wellhead hold pressure	no

PZM4D PUMP TEST

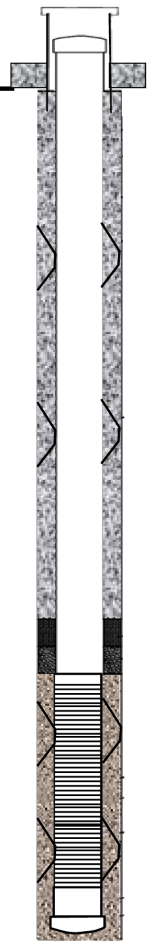
WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	OM4	Drilling Company (Case)	Eagle Drilling
SEO #	193234	Drill Rig Number (Case)	Eagle #1
Casing Date	12/2/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Overlying	Datum	Ground Level

Form Completed by: LH



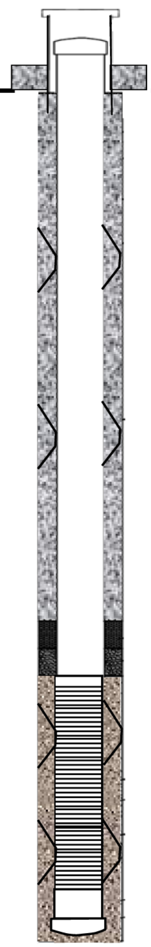
Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	270
Grount Weight (lbs/gal)	14.5	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	398	Casing Nominal ID (in)	4.5
Number of cement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

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	OAM4D	Drilling Company (Case)	K.E. Taylor Drilling
SEO #	NA	Drill Rig Number (Case)	# 4
Casing Date	4/13/2011	Driller (Case)	Bobby
Screened Aquifer Zone	Overlying Aquitard	Datum	Ground Level
Form Completed by:	LH		



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

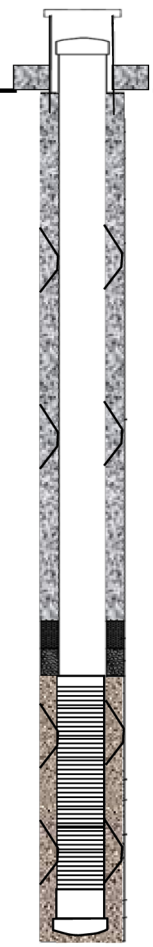
Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	OAM4S	Drilling Company (Case)	K.E. Taylor Drilling
SEO #	NA	Drill Rig Number (Case)	#4
Casing Date	4/14/2011	Driller (Case)	Bobby
Screened Aquifer Zone	Overlying Aquitard	Datum	Ground Level

Form Completed by: LH



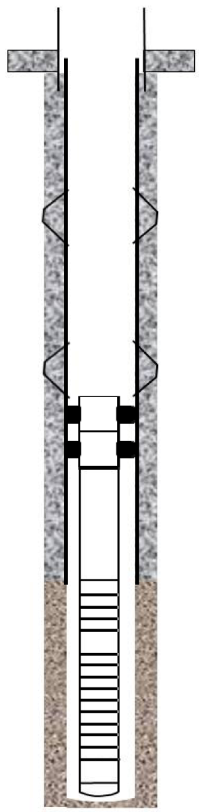
Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	311
Grount Weight (lbs/gal)	13.1	Casing Material	SCH 40 PVC belled glue joint
Total Volume of Grout Used (gals)	424	Casing Nominal ID (in)	4
Number of cement sacks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

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM4	Drilling Company (Case)	K.E. Taylor Drilling
SEO #	193261	Drill Rig Number (Case)	4
Casing Date	7/1/2011	Driller (Case)	Bobby
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	LH		



Annular Seal Material	Cement w/ bentonite	Well Use	Pump Test Observation
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	419
Grount Weight (lbs/gal)	14.3	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	617	Casing Nominal ID (in)	5
Number of cement sacks (94 lbs)	62	Casing Nominal OD (in)	5.563
Number of bentonite sacks (50 lbs)	3.3	Casing Depth (ft)	235
Number of CaCl sacks (50 lbs)	0	Casing Manufacturer	CertainTeed
Type of Centralizers	Stainless Steel	:t Centralizer on Casing depth (ft)	200
Number of Centralizers	6	Sacks/pails of pellets used	3
Top of bentonite chips (ft)	211	Screen O.D. (in)	3.5
Top of Secondary Fiter Pack (ft)	216	Screen type	Factory Slotted PVC
Top of Screen (ft)	235	Screen diameter (in)	3
Screen Length (ft)	20	Screen slot size (in)	0.03
Ream Bit Diameter (in)	9.875	'op of # 8 - 12 Pri. Filter pack (ft)	218
Total Ream Depth (ft)	266	Silt Trap w/ end cap Length (ft)	0
Silt Trap Diameter (in)	na	Bottom of # 8 - 12 Pri. Filter pack (ft)	235
Bottom of Screen (ft)	255	Cement Depth (ft)	211
		Under-ream blade (in)	10.5
		Top of Riser Pipe (ft)	225
		Riser pipe length (ft)	10
		Date screen installed	7/5/2011
		Well developed	7/5/2011
		Time of development (hrs)	3
		Method	airlift
		Est. Flow (gpm)	5

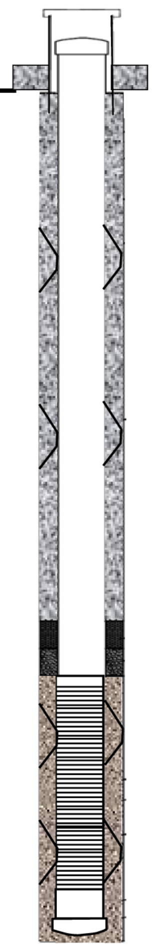
Comments:

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM14	Drilling Company (Case)	Eagle Drilling
SEO #	193247	Drill Rig Number (Case)	Eagle #1
Casing Date	2/15/2011	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level

Form Completed by: LH



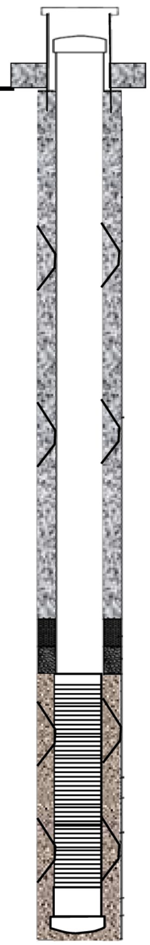
Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	486
Grount Weight (lbs/gal)	14.5	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	717	Casing Nominal ID (in)	4.5
Number of cement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

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
Drilling Company (Case)	Eagle Drilling
Drill Rig Number (Case)	Eagle #1
Driller (Case)	Todd Taylor
Datum	Ground Level
Form Completed by:	LH



Annular Seal Material	Cement w/ bentonite
Grout Emplacement Technique	Tremie Pipe
Grount Weight (lbs/gal)	14.5
Total Volume of Grout Used (gals)	936
Number of cement sacks (94 lbs)	94
Number of bentonite sacks (50 lbs)	5.0
Number of CaCl sacks (50 lbs)	0
Type of Centralizers	Stainless Steel
Number of Centralizers	12
Top of bentonite chips (ft)	399
Top of Secondary Fiter Pack (ft)	403
Top of Screen (ft)	420
Screen Length (ft)	20
Ream Bit Diameter (in)	9
Total Ream Depth (ft)	443
Silt Trap Diameter (in)	4.95
Bottom of Screen (ft)	440

Well Use	Observation/Monitor
Gallons of Water in Grout Mix	635
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	420
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	420
Sacks/pails of pellets used	2
Screen O.D. (in)	4.95
Screen type	Factory Slotted PVC
Screen diameter (in)	4.5
Screen slot size (in)	0.03
Top of # 8 - 12 Pri. Filter pack (ft)	404
Silt Trap w/ end cap Length (ft)	0
Bottom of # 8 - 12 Pri. Filter pack (ft)	443
Cement Depth (ft)	399

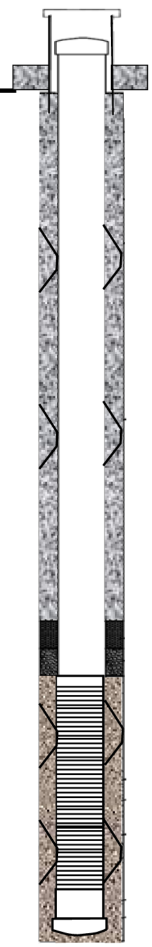
Comments

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	Cement w/ bentonite
Grout Emplacement Technique	Tremie Pipe
Grount Weight (lbs/gal)	14.5
Total Volume of Grout Used (gals)	677
Number of cement sacks (94 lbs)	68
Number of bentonite sacks (50 lbs)	3.6
Number of CaCl sacks (50 lbs)	0
Type of Centralizers	Stainless Steel
Number of Centralizers	9
Top of bentonite chips (ft)	273
Top of Secondary Fiter Pack (ft)	277
Top of Screen (ft)	295
Screen Length (ft)	20
Ream Bit Diameter (in)	9
Total Ream Depth (ft)	318
Silt Trap Diameter (in)	4.95
Bottom of Screen (ft)	315

Well Use	Observation/Monitor
Gallons of Water in Grout Mix	459
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	295
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	295
Sacks/pails of pellets used	2.5
Screen O.D. (in)	4.95
Screen type	Factory Slotted PVC
Screen diameter (in)	4.5
Screen slot size (in)	0.03
Top of # 8 - 12 Pri. Filter pack (ft)	280
Silt Trap w/ end cap Length (ft)	0
Bottom of # 8 - 12 Pri. Filter pack (ft)	315
Cement Depth (ft)	273

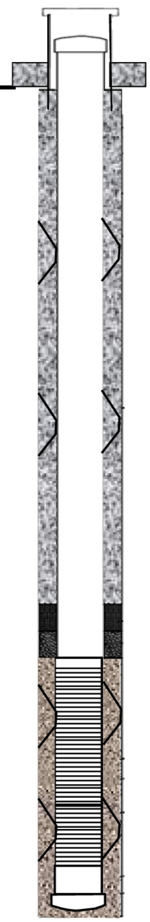
Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM17	Drilling Company (Case)	Eagle Drilling
SEO #	193250	Drill Rig Number (Case)	Eagle #1
Casing Date	12/15/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level

Form Completed by: LH



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

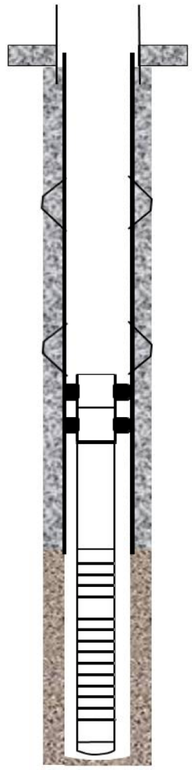
Comments

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



Annular Seal Material	Cement w/ bentonite
Grout Emplacement Technique	Pump through Casing
Grount Weight (lbs/gal)	14.3
Total Volume of Grout Used (gals)	781
Number of cement sacks (94 lbs)	72
Number of bentonite sacks (50 lbs)	4.1
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 Fiter Pack (ft)	na
Top of Screen (ft)	311
Screen Length (ft)	60
Ream Bit Diameter (in)	9
Total Ream Depth (ft)	325
Silt Trap Diameter (in)	4.95
Bottom of Screen (ft)	371

Comments:

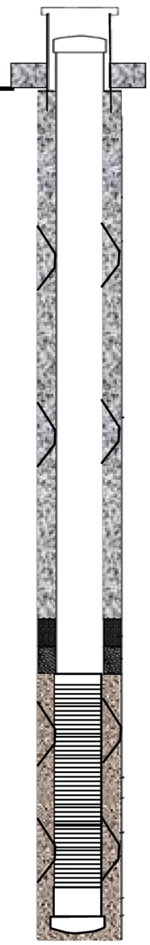
Well Use	Pump Well for Pump Test
Gallons of Water in Grout Mix	529.2
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	311
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	295
Sacks/pails of pellets used	na
Screen O.D. (in)	3.5
Screen type	W.O.P 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)	311
Under-ream blade (in)	10.5
Top of Riser Pipe (ft)	300
Riser pipe length (ft)	10
Date screen installed	6/27/2011
Pilot TD (FT)	389
Well developed	6/27/2011
Time of development (hrs)	3
Method	airlift
Displacement gallons	240
Est. Flow (gpm)	20
Cement in casing (ft)	yes
Wellhead hold pressure	yes

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	UM4	Drilling Company (Case)	Eagle Drilling
SEO #	193257	Drill Rig Number (Case)	Eagle #1
Casing Date	11/18/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Underlying	Datum	Ground Level

Form Completed by: LH



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

Comments

PZM5 PUMP TEST

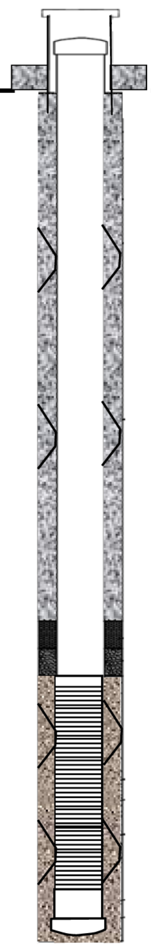
WELL CONSTRUCTION DETAILS

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	SM5	Drilling Company (Case)	Eagle Drilling
SEO #	NA	Drill Rig Number (Case)	Eagle #1
Casing Date	8/18/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Shallow	Datum	Ground Level

Form Completed by: LH



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

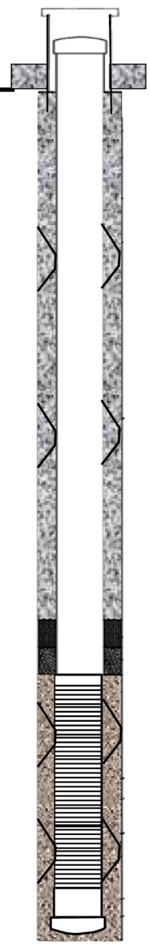
Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	OM5	Drilling Company (Case)	Eagle Drilling
SEO #	193235	Drill Rig Number (Case)	Eagle Drilling #1
Casing Date	8/18/2010	Driller (Case)	T. Taylor
Screened Aquifer Zone	Overlying	Datum	Ground Level

Form Completed by: LH



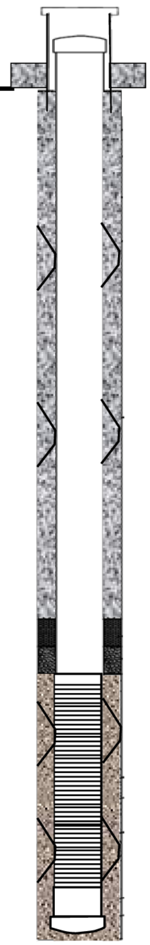
Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	108
Grount Weight (lbs/gal)	14.5	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	160	Casing Nominal ID (in)	4.5
Number of cement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

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	Drilling Company (Case)	Eagle Drilling
SEO #	193251	Drill Rig Number (Case)	Eagle #12
Casing Date	9/10/2010	Driller (Case)	Ceasar Domingez
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	LH		



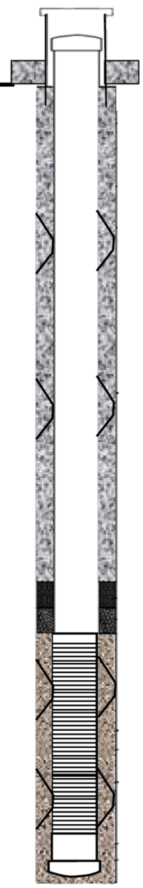
Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	378
Grount Weight (lbs/gal)	14.5	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	558	Casing Nominal ID (in)	4.5
Number of cement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

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM19	Drilling Company (Case)	Eagle Drilling
SEO #	193252	Drill Rig Number (Case)	Eagle #1
Casing Date	12/8/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	LH		



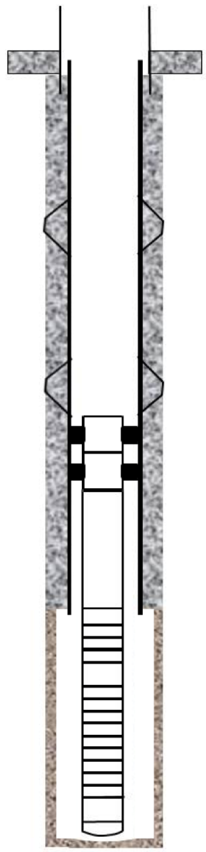
Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	459
Grount Weight (lbs/gal)	14.4	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	677	Casing Nominal ID (in)	4.5
Number of cement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

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM20	Drilling Company (Case)	Eagle Drilling
SEO #	193253	Drill Rig Number (Case)	Eagle #1
Casing Date	1/27/2011	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	LH		



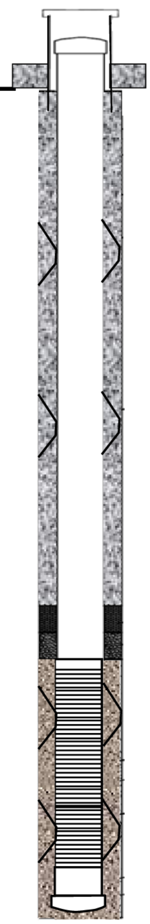
Annular Seal Material	Cement w/ bentonite	Well Use	Pump Test Observation
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	594
Grount Weight (lbs/gal)	14.5	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	832	Casing Nominal ID (in)	5
Number of cement sacks (94 lbs)	88	Casing Nominal OD (in)	5.563
Number of bentonite sacks (50 lbs)	4.7	Casing Depth (ft)	312
Number of CaCl sacks (50 lbs)	0	Casing Manufacturer	CertainTeed
Type of Centralizers	Stainless Steel	t Centralizer on Casing depth (ft)	292
Number of Centralizers	9	Sacks/pails of pellets used	0
Top of bentonite chips (ft)	na	Screen O.D. (in)	4.5
Top of Secondary Fiter Pack (ft)	na	Screen type	Factory Slotted PVC
Top of Screen (ft)	312	Screen diameter (in)	4
Screen Length (ft)	20	Screen slot size (in)	0.03
Ream Bit Diameter (in)	9.875	'op of # 8 - 12 Pri. Filter pack (ft)	312
Total Ream Depth (ft)	312	Silt Trap w/ end cap Length (ft)	0
Silt Trap Diameter (in)	na	Bottom of # 8 - 12 Pri. Filter pack (ft)	332
Bottom of Screen (ft)	332	Cement Depth (ft)	312

Comments Filter pack in screens. Inner screen 2" dia. Outer screen 4" dia. Drliied 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	Drilling Company (Case)	Eagle Drilling
SEO #	193264	Drill Rig Number (Case)	Eagle #1
Casing Date	8/17/2010	Driller (Case)	T. Taylor
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	LH		



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

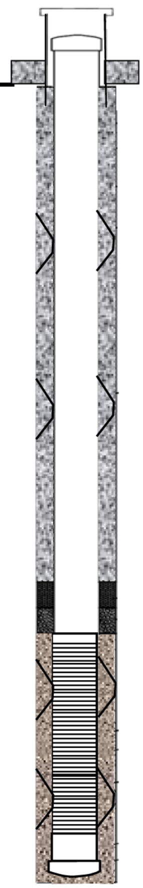
Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM6	Drilling Company (Case)	Eagle Drilling
SEO #	193239	Drill Rig Number (Case)	Eagle #12
Casing Date	9/2/2010	Driller (Case)	Ceasar Domingez
Screened Aquifer Zone	Production Zone	Datum	Ground Level

Form Completed by: LH



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

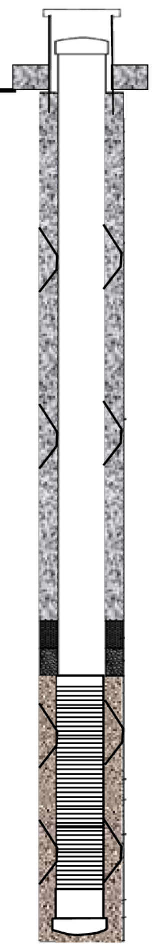
Comments

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	Cement w/ bentonite
Grout Emplacement Technique	Tremie Pipe
Grount Weight (lbs/gal)	14.4
Total Volume of Grout Used (gals)	1100
Number of cement sacks (94 lbs)	110
Number of bentonite sacks (50 lbs)	5.83
Number of CaCl sacks (50 lbs)	0
Type of Centralizers	Stainless Steel
Number of Centralizers	12
Top of bentonite chips (ft)	414
Top of Secondary Fiter Pack (ft)	418
Top of Screen (ft)	424
Screen Length (ft)	20
Ream Bit Diameter (in)	9
Total Ream Depth (ft)	445
Silt Trap Diameter (in)	4.95
Bottom of Screen (ft)	444

Well Use	Observation/Monitor
Gallons of Water in Grout Mix	742.5
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	424
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	425
Sacks/pails of pellets used	2.5
Screen O.D. (in)	4.95
Screen type	Factory Slotted PVC
Screen diameter (in)	4.5
Screen slot size (in)	0.03
Top of # 8 - 12 Pri. Filter pack (ft)	422
Silt Trap w/ end cap Length (ft)	0
Bottom of # 8 - 12 Pri. Filter pack (ft)	445
Cement Depth (ft)	414

Comments

BASELINE WELLS

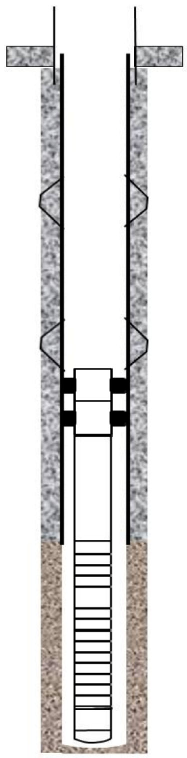
WELL CONSTRUCTION DETAILS

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



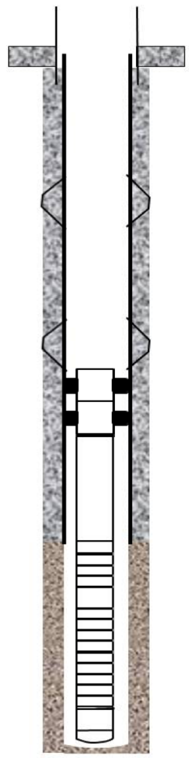
Annular Seal Material	Cement w/ bentonite
Grout Emplacement Technique	Pump through Casing
Grount Weight (lbs/gal)	14.4
Total Volume of Grout Used (gals)	477
Number of cement sacks (94 lbs)	44
Number of bentonite sacks (50 lbs)	2.5
Number of CaCl sacks (50 lbs)	0
Type of Centralizers	Stainless Steel
Number of Centralizers	7
Top of bentonite chips (ft)	na
Top of Secondary Fiter Pack (ft)	na
Top of Screen (ft)	201
Screen Length (ft)	20
Ream Bit Diameter (in)	8.75
Total Ream Depth (ft)	211
Silt Trap Diameter (in)	na
Bottom of Screen (ft)	221
Comments	

Well Use	Baseline Monitor
Gallons of Water in Grout Mix	323.4
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	201
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	201
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)	201
Under-ream blade (in)	10.5
Top of Riser Pipe (ft)	190
Riser pipe length (ft)	10
Date screen installed	7/12/2011
Pilot TD (FT)	225
Well developed	7/12/2011
Time of development (hrs)	3
Method	airlift
Displacement gallons	151
Est. Flow (gpm)	1
Cement in casing (ft)	yes
Wellhead hold pressure	yes

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	PZM2	Drilling Company (Case)	K.E. Taylor Drilling
SEO #	193238	Drill Rig Number (Case)	6
Casing Date	6/29/2011	Driller (Case)	Ryan
Screened Aquifer Zone	Lower Production Zone	Datum	Ground Level
Form Completed by:	LH		

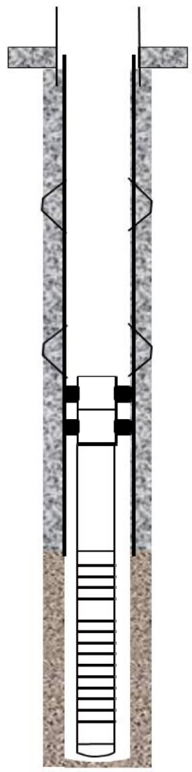


Annular Seal Material	Cement w/ bentonite	Well Use	Baseline Monitor
Grout Emplacement Technique	Pump through Casing	Gallons of Water in Grout Mix	588
Grount Weight (lbs/gal)	14.4	Casing Material	SDR 17 PVC spline and groove
Total Volume of Grout Used (gals)	868	Casing Nominal ID (in)	4.5
Number of cement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

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	UM2	Drilling Company (Case)	K.E. Taylor Drilling
SEO #	193255	Drill Rig Number (Case)	6
Casing Date	7/6/2011	Driller (Case)	Ryan
Screened Aquifer Zone	Underlying	Datum	Ground Level
Form Completed by:	LH		



Annular Seal Material	Cement w/ bentonite
Grout Emplacement Technique	Pump through Casing
Grount Weight (lbs/gal)	14.3
Total Volume of Grout Used (gals)	1041
Number of cement sacks (94 lbs)	96
Number of bentonite sacks (50 lbs)	5.4
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 Fiter Pack (ft)	na
Top of Screen (ft)	423
Screen Length (ft)	20
Ream Bit Diameter (in)	8.75
Total Ream Depth (ft)	433
Silt Trap Diameter (in)	na
Bottom of Screen (ft)	443
Comments	

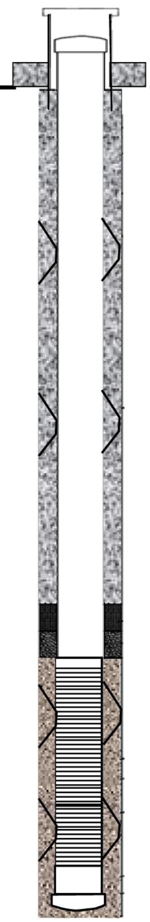
Well Use	Baseline Monitor
Gallons of Water in Grout Mix	705.6
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	423
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	423
Sacks/pails of pellets used	na
Screen O.D. (in)	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)	423
Under-ream blade (in)	10.5
Top of Riser Pipe (ft)	411
Riser pipe length (ft)	12
Date screen installed	7/12/2011
Pilot TD (FT)	450
Well developed	7/12/2011
Time of development (hrs)	4
Method	airlift
Displacement gallons	326
Est. Flow (gpm)	1
Cement in casing (ft)	yes
Wellhead hold pressure	yes

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	SM6	Drilling Company (Case)	Eagle Drilling
SEO #	NA	Drill Rig Number (Case)	Eagle #1
Casing Date	9/7/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Shallow	Datum	Ground Level

Form Completed by: LH



Annular Seal Material	Cement w/ bentonite	Well Use	Observation/Monitor
Grout Emplacement Technique	Tremie Pipe	Gallons of Water in Grout Mix	81
Grount 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 Fiter 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

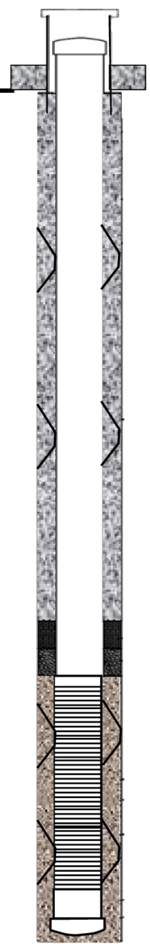
Comments ____________________

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	Cement w/ bentonite
Grout Emplacement Technique	Tremie Pipe
Grount Weight (lbs/gal)	14.5
Total Volume of Grout Used (gals)	528
Number of cement sacks (94 lbs)	53
Number of bentonite sacks (50 lbs)	2.8
Number of CaCl sacks (50 lbs)	0
Type of Centralizers	Stainless Steel
Number of Centralizers	7
Top of bentonite chips (ft)	214
Top of Secondary Fiter Pack (ft)	219
Top of Screen (ft)	227
Screen Length (ft)	10
Ream Bit Diameter (in)	9
Total Ream Depth (ft)	238
Silt Trap Diameter (in)	4.95
Bottom of Screen (ft)	237

Well Use	Observation/Monitor
Gallons of Water in Grout Mix	357.75
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	227
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	227
Sacks/pails of pellets used	2.5
Screen O.D. (in)	4.95
Screen type	Factory Slotted PVC
Screen diameter (in)	4.5
Screen slot size (in)	0.03
Top of # 8 - 12 Pri. Filter pack (ft)	220
Silt Trap w/ end cap Length (ft)	0
Bottom of # 8 - 12 Pri. Filter pack (ft)	238
Cement Depth (ft)	214

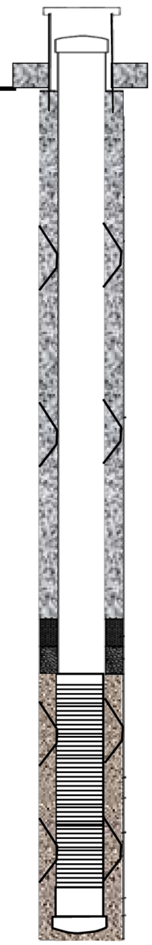
Comments ______

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	UM6	Drilling Company (Case)	Eagle Drilling
SEO #	193259	Drill Rig Number (Case)	Eagle #1
Casing Date	9/1/2010	Driller (Case)	Todd Taylor
Screened Aquifer Zone	Underlying	Datum	Ground Level

Form Completed by: LH



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

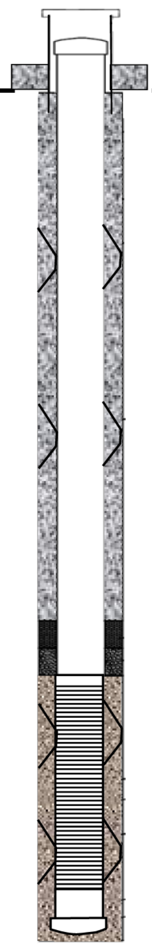
Comments

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	Cement w/ bentonite
Grout Emplacement Technique	Tremie Pipe
Grount Weight (lbs/gal)	14.2
Total Volume of Grout Used (gals)	119
Number of cement sacks (94 lbs)	12
Number of bentonite sacks (50 lbs)	0.6
Number of CaCl sacks (50 lbs)	0
Type of Centralizers	Stainless Steel
Number of Centralizers	3
Top of bentonite chips (ft)	45
Top of Secondary Fiter Pack (ft)	50
Top of Screen (ft)	55
Screen Length (ft)	20
Ream Bit Diameter (in)	8.75
Total Ream Depth (ft)	78
Silt Trap Diameter (in)	na
Bottom of Screen (ft)	75

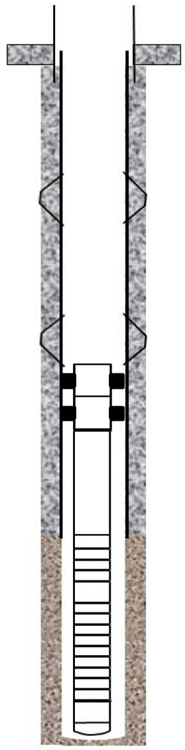
Well Use	Baseline Monitor
Gallons of Water in Grout Mix	81
Casing Material	SCH 40 PVC belled glue joint
Casing Nominal ID (in)	4
Casing Nominal OD (in)	4.5
Casing Depth (ft)	55
Casing Manufacturer	J-M Manufacturing
1st Centralizer on Casing depth (ft)	55
Sacks/pails of pellets used	2
Screen O.D. (in)	4.5
Screen type	Factory Slotted PVC
Screen diameter (in)	4
Screen slot size (in)	0.03
Top of # 8 - 12 Pri. Filter pack (ft)	51.5
Silt Trap w/ end cap Length (ft)	0
Bottom of # 8 - 12 Pri. Filter pack (ft)	75
Cement Depth (ft)	45

Comments

AUC LLC

The Reno Creek Project - Monitor Well Completion Report

Well ID	OM7	Drilling Company (Case)	K.E. Taylor Drilling
SEO #	193237	Drill Rig Number (Case)	6
Casing Date	7/8/2011	Driller (Case)	Ryan
Screened Aquifer Zone	Overlying	Datum	Ground Level
Form Completed by:	LH		



Annular Seal Material	Cement w/ bentonite
Grout Emplacement Technique	Pump through Casing
Grount 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 Fiter 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

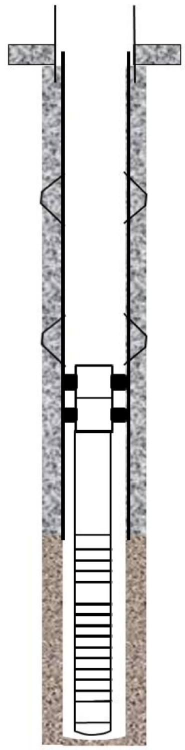
Well Use	Baseline Monitor
Gallons of Water in Grout Mix	235.2
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	130
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	130
Sacks/pails of pellets used	na
Screen O.D. (in)	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	Drilling Company (Case)	K.E. Taylor Drilling
SEO #	193240	Drill Rig Number (Case)	2
Casing Date	7/6/2011	Driller (Case)	Todd
Screened Aquifer Zone	Production Zone	Datum	Ground Level
Form Completed by:	LH		



Annular Seal Material	Cement w/ bentonite
Grout Emplacement Technique	Pump through Casing
Grount 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 Fiter 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

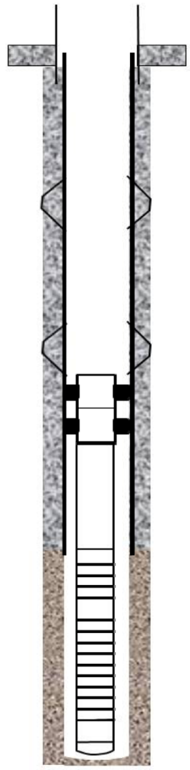
Well Use	Baseline Monitor
Gallons of Water in Grout Mix	499.8
Casing Material	SDR 17 PVC spline and groove
Casing Nominal ID (in)	4.5
Casing Nominal OD (in)	4.95
Casing Depth (ft)	298
Casing Manufacturer	CertainTeed
1st Centralizer on Casing depth (ft)	298
Sacks/pails of pellets used	na
Screen O.D. (in)	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	Drilling Company (Case)	K.E. Taylor Drilling
SEO #	193260	Drill Rig Number (Case)	2
Casing Date	7/7/2011	Driller (Case)	Todd
Screened Aquifer Zone	Underlying	Datum	Ground Level
Form Completed by:	LH		



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