MONTGOMERY
& ASSOCIATES
Water Resource Consultants

November 7, 2019

Aquifer Testing Results for Skunk Camp Hydrogeologic Investigation

Pinal and Gila Counties, Arizona

Prepared for:

Resolution Copper

102 Magma Heights, Superior, Arizona

Prepared by:

Montgomery & Associates

1550 E. Prince Road, Tucson, Arizona

Contents

Tables

Figures

Appendices

1 EXECUTIVE SUMMARY

M&A provided professional hydrogeologic services to conduct aquifer testing at the Skunk Camp investigation area in Pinal and Gila Counties, Arizona. The aquifer testing was carried out at recently installed Resolution Copper wells between June and August 2019 to gather additional and detailed information about the hydraulic properties of geologic units within the area of the proposed Skunk Camp Tailings Storage Facility (TSF). Results are summarized as follows:

- Eight pumping and slug tests were conducted in Gila Conglomerate (Tcg) and one constant-head injection test was conducted in Quaternary Alluvium (Qal).

- Constant-rate pumping tests were conducted at six wells. The tests lasted between 20 hours and two weeks; pumping rates varied from six to 165 gallons per minute. All pumping test wells were completed in Tcg and yielded hydraulic conductivities that ranged from 1.1E-04 to 1.3E-03 centimeters per second (cm/s).

- One constant-head injection test lasting a total of two hours was conducted at well RC19-8C, completed in Qal. Approximately 14,000 gallons of water were injected into mostly unsaturated Qal at the base of the well. A constant head (water column height above pre-test water level) of 21.3 feet was maintained for 50 minutes with a steady injection rate of 61.2 gallons per minute (gpm), followed by a constant head of 29.3 feet maintained for 17 minutes at a steady injection rate of 179.9 gpm. Results indicated a saturated hydraulic conductivity of approximately 5.1E-03 to 1.3E-02 cm/s. During testing, nearby well RC19-8B completed in Tcg was monitored in order to investigate the level of hydraulic connectivity between Qal and Tcg. The results of the test indicate a measurable degree of hydraulic connectivity between the two systems at the test location.

- Slug tests were conducted at wells RC18-4 and RC19-10, both completed in Gila Conglomerate. The tests consisted of falling and rising head tests carried out with solid slugs. Initial water level displacements varied from 0.79 to 3.35 feet, and recovery times ranged from 30 minutes (RC18-4) to up to 17 hours (RC19-10). The estimated hydraulic conductivity at RC18-4 was 1.7E-04 cm/s, and at RC19-10 was 7.3E-07 cm/s.

  The majority of the tests were conducted at wells in the vicinity of mapped fault systems, including wells RC19-3, RC18-4, RC19-7, RC19-8B, RC19-8D, RC19-13, and RC19-15. The results of these tests generally had higher hydraulic conductivities (average of 5.4E-04 cm/s) than tests at wells not in the vicinity of fault systems (well RC19-10 with a hydraulic conductivity of 7.3E-07 cm/s). This finding suggests that local fault systems may be more transmissive than surrounding Gila Conglomerate material and may enhance groundwater movement. A map showing the locations of test wells is presented on Figure 5-1. The results of the aquifer tests providing estimated ranges for selected aquifer hydraulic parameters are summarized in Table 1-1.

Table 1-1. Summary of Aquifer Testing Results

Test Type	Number of Wells Tested	Hydrogeologic Units Tested	Estimated Hydraulic Parameters	
			Hydraulic Conductivity (cm/s)	Storage Parameters
Constant-rate Pumping	6	Gila Conglomerate (Tcg)	1.1E-04 to 1.3E-03	S [a] = 4.5E-04 to 2.0E-03 S_y = 0.04 to 0.08
Constant-head Injection	1	Quaternary Alluvium (Qal)	5.1E-03 to 1.3E-02	-
Slug	2	Gila Conglomerate (Tcg)	7.3E-07 to 1.7E-04	-

[a] elastic storage coefficient

The following report includes a description of field methods and procedures, analytical methods, and results of aquifer testing at Skunk Camp. Supplemental information and tabulated results may be found in Appendices A through E, as outlined below:

- Appendix A: Tabulated results of pumping tests, injection test, and step tests
- Appendix B: Hydrographs, field parameters, and analytical solutions for pumping tests
- Appendix C: Analytical solutions for slug tests
- Appendix D: Well schematics prepared by Klohn Crippen Berger
- Appendix E: Well information for selected regional wells

2 BACKGROUND

2.1 Scope of Investigations

Resolution Copper (RC) is investigating the Skunk Camp site as a potential location for a future Tailings Storage Facility (TSF). Site assessment includes hydrogeologic investigations that comprise drilling of wells and piezometers for monitoring and testing.

2.1.1 Well Drilling and Construction

From late November 2018 through mid-July 2019, 12 hydrogeologic characterization wells were installed under the oversight of Klohn Crippen Berger (KCB). The completed wells targeted specific hydrogeologic units within and adjacent to the footprint of the proposed TSF. The wells include RC19-3, RC18-4, RC19-7, RC19-8, RC19-8A, RC19-8B, RC19-8C, RC19-8D, RC18-9, RC19-10, RC19-13, and RC19-15. Details of well drilling and construction are provided in Appendix D.

During well drilling, lithology was characterized, geophysical logging was conducted, and testing was conducted in the open boreholes. Based on the information obtained during drilling, the wells were constructed to target specific hydrogeologic features.

2.1.2 Aquifer Testing Program

The aquifer testing program included constant-rate pumping tests at wells with sustainable pumping rates, slug tests at low-yielding wells, and a constant-head injection test at alluvial well RC19-8C.

Testing was conducted by M&A between June and August 2019 and included constant-rate pumping tests at RC19-3, RC19-7, RC19-8B, RC19-8D, RC19-13, and RC19-15; slug tests at RC18-4 and RC19-10; and a constant-head injection test at RC19-8C. Results of testing are described in this report.

2.2 Hydrogeologic Conditions

The proposed Skunk Camp TSF lies within Dripping Spring basin, a half-graben basin, bounded on the west side by a steeply dipping normal fault, with the east side down-dropped relative to the west side. Quaternary alluvial deposits and Miocene basin-fill deposits (Gila Conglomerate) underlie most of the proposed TSF footprint. The alluvial deposits and basin fill overlie Paleozoic and younger Precambrian bedrock units. The bedrock units bound the west and east sides of Dripping Spring basin. The basin is asymmetric with a thick wedge of Tertiary Gila

Conglomerate (Tcg) along the western edge of the basin. The wedge of sediments tapers toward the eastern edge of the basin (Cornwall and others, 1971). Paleozoic and Precambrian bedrock units outcrop in the Pinal Mountains on the east side of Dripping Spring Valley and in the Dripping Springs Mountains on the west side of the valley. These units generally dip to the southwest.

2.3 Aquifer Testing Objectives

Aquifer testing was conducted to characterize the hydrogeology of the groundwater system in the vicinity of the proposed Skunk Camp TSF. The objectives included developing initial estimates of aquifer hydraulic parameters for the Gila Conglomerate and Quaternary Alluvium aquifers including aquifer transmissivity, hydraulic conductivity, and storage. Additional objectives included evaluating the hydraulic connectivity between aquifers based on hydraulic response at monitoring wells during testing. Water quality samples were obtained during pumping tests in order to establish preliminary characterization of hydrochemistry for the site conceptual model.

3 FIELD METHODS AND PROCEDURES

Descriptions of field methods and procedures implemented for the pumping tests, injection test, and slug tests are presented below.

3.1 Pumping Tests

Pumping tests were conducted using temporary submersible pumps that were installed and operated by Cascade Environmental, LLC (Cascade). Discharge assemblies were attached to riser columns at the wellhead, and included 1-inch to 4-inch galvanized steel pipes with horizontal lengths of 13.2 to 15.7 feet. The assemblies were equipped with a magnetic or impeller flow meter, a pressure gauge, a gate valve to adjust flow rate, and a hose bib for obtaining water samples. Pumping rate and discharge line pressure were regularly monitored and recorded during testing activities. Approximately 100 to 900 feet of lay flat hose was attached to the ends of the assemblies and used to convey discharged water away from the well sites toward the nearest ephemeral drainage.

Best management practices were employed to manage the discharge of pumped groundwater in accordance with discharge authorization number AZDM74824 under the Arizona Pollutant Discharge Elimination System (AZPDES) De Minimus General Permit (DMGP). For most tests, discharged groundwater was directed onto plastic sheeting to prevent scouring and mobilization of sediment, and straw wattles were installed downstream of the plastic sheeting to disperse the discharge stream. During pumping, flow rate and water quality parameters were monitored hourly. In addition, pre and post-test photo documentation of the discharge locations were collected.

Pre-tests and step tests were conducted prior to constant-rate pumping tests at most wells. Pre-tests consisted of turning the pump on for approximately 20 minutes to in order assess the operation of the pump and discharge assembly components. Step tests consisted of pumping the well at two or three flow rates (“steps”) for approximately 2 hours each, and increasing the flow rate with each successive step. Water level drawdown data from the step tests were analyzed to project drawdown through time and select appropriate flow rates for the constant-rate pumping tests.

Field water quality parameters of pumped water were measured using either YSI Professional Plus multi-meters with attached flow cells, or Myron L Ultrameter II instruments. Recorded field water quality parameters included pH, electrical conductivity (EC), and temperature. Turbidity was regularly measured using a Hach 2100Q turbidity meter or Hach DR 890 colorimeter. In addition, pumped water was periodically collected using a calibrated 1-liter Imhoff cone in order to measure sand content.

During pumping and subsequent recovery periods, water level pressures in pumped wells and observation wells were recorded using non-vented In-Situ Level TROLL integrated dataloggers/pressure transducers (Level TROLLs). In pumped wells, the Level TROLLs were installed below anticipated water level drawdown depths and programmed to record pressures at 1-minute intervals. Additional water level measurements were manually collected with sounders and used to confirm Level TROLL readings.

In observation wells located within 500 feet of the pumped wells, Level TROLLs were installed below water level and recorded hydraulic head pressures at 10-minute intervals; in observation wells located further than 500 feet from the pumped wells, pressures were recorded at 1-hour intervals. After the constant-rate pumping periods were complete, monitoring of water level recoveries continued for a period equal-to or greater-than the duration of pumping.

Barometric pressures were monitored with In-Situ BaroTROLLs installed in the vaults of pumped wells and surrounding observation wells. BaroTROLLs recorded barometric pressure at 10-minute intervals during testing activities. Following completion of the tests, the barometric pressure measurements were used to distinguish water level stresses due to pumping from stresses caused by changes in atmospheric pressure.

3.2 Injection Test

Testing was conducted at RC19-8C in order to obtain aquifer parameters for the alluvial deposits overlying the Tcg unit. Due to the unsaturated conditions of the alluvial deposits at the location, injection testing was conducted rather than a conventional pumping test.

The RC19-8C injection test was carried out using a Multiquip QP2TH water pump located approximately 20 feet away from the wellhead at the ground surface. Water was pumped from a Baker storage tank through a horizontal steel pipe discharge assembly and directed into the well. Additional water was transferred to the pumped Baker tank from two water trucks and a second Baker tank during the tests. The horizontal discharge assembly included a gate valve that was used to control the injection rate, and a magnetic flowmeter used to measure flow. Two-inch steel drop pipe was installed in RC19-8C to convey pumped water vertically down the well, where it was discharged approximately 2 feet above well bottom (69 feet below land surface [bls]). During the test, water level was manually measured at one-minute intervals using a water level meter installed between the drop pipe and well casing.

3.3 Slug Tests

Falling-head and rising-head slug tests were conducted using solid-volume slugs. Falling-head tests consisted of near-instantaneous upward displacements of water levels in the wells, while monitoring subsequent water level declines (falling heads) as a function of time. Rising-head tests consisted of near-instantaneous downward displacements of water levels in the wells, while monitoring subsequent water level rises (rising heads) as a function of time. Upward and downward displacements were initiated using solid slugs of known volumes. To cause upward displacements, the slugs were quickly lowered from slightly above water level to slightly below water level; to cause downward displacements, fully submerged slugs were lifted out of the water.

The slugs consisted of 2-inch diameter Schedule 40 PVC joints ranging from 1.5 to 4.4 feet in length. Each joint was filled with sand and sealed on both ends with glued end caps. Calibrated polyester tether was used to lower and lift the slugs by attaching the tether to screw eyes located on the end caps. In order to vary the magnitude of water level displacements, slugs were deployed as single PVC joints or multiple PVC joints linked together.

Water level data were collected using non-vented Level TROLLs. The Level TROLLs were programmed to collect measurements at 5-second to 1-minute intervals, depending on the expected rate of water level response at each well. Barometric data was collected using a BaroTROLL that was maintained in the RC19-10 well vault during slug testing.

4 ANALYTICAL METHODS

Analytical methods applied to pumping, injection, and slug test data are described in the following sections.

4.1 Pumping Tests

Analytical solutions were developed for the constant-rate pumping tests using the commercially available aquifer test software AQTESOLV (HydroSOLVE, 2012). The following considerations informed the interpretation of tests and development of analytical solutions:

- Geological conceptual model—including effective porosity of the porous media, degree of fracturing in geophysical logs, and hydraulically confined or unconfined conditions
- Inner boundary conditions—well bore storage effects, well bore skin, and potential lateral extent of fracture systems
- Outer boundary conditions—potential no-flow boundaries and constant-head boundaries
- Characteristic flow regimes—presence of radial flow conditions and the prevailing flow dimensions throughout the test

In addition, analytical methods included the use of diagnostic flow interpretation based on derivative analysis. The flow diagnostics and analytical solutions implemented in the analysis of the pumping tests are detailed below.

4.1.1 Analytical Diagnostics

Workflow for development of a conceptual model for testing activities included reviewing local-scale geologic setting, well construction details, observations from well drilling and lithologic descriptions, and borehole geophysical logs. Data processing of pumping tests routinely included construction of hydrographs showing linear-linear, log-linear, and log-log time versus water level axes for pumped well and observation well data.

After data processing, further development of the conceptual model for analysis of testing results included preparation of diagnostic flow plots and derivative analysis using the aquifer testing analysis software program AQTESOLV (HydroSOLVE, 2012). Diagnostic flow and derivative analysis plots included analysis of radial flow conditions for identifying infinite acting radial flow (IARF) behavior and wellbore storage. The pressure derivative method was used to delineate early, intermediate, and late-time curves related to various well and aquifer types and flow geometries. Plotting the derivative on a log-log plot, as shown in Figure 4-1, has the advantage of making the identification of the IARF period more evident, as well as other late-time aquifer boundary effects such as delayed gravity response and constant-head boundary conditions. Derivative data was processed in AQTESOLV according to methods described by Spane and Wurstner (1993) and Bourdet and others (1989).

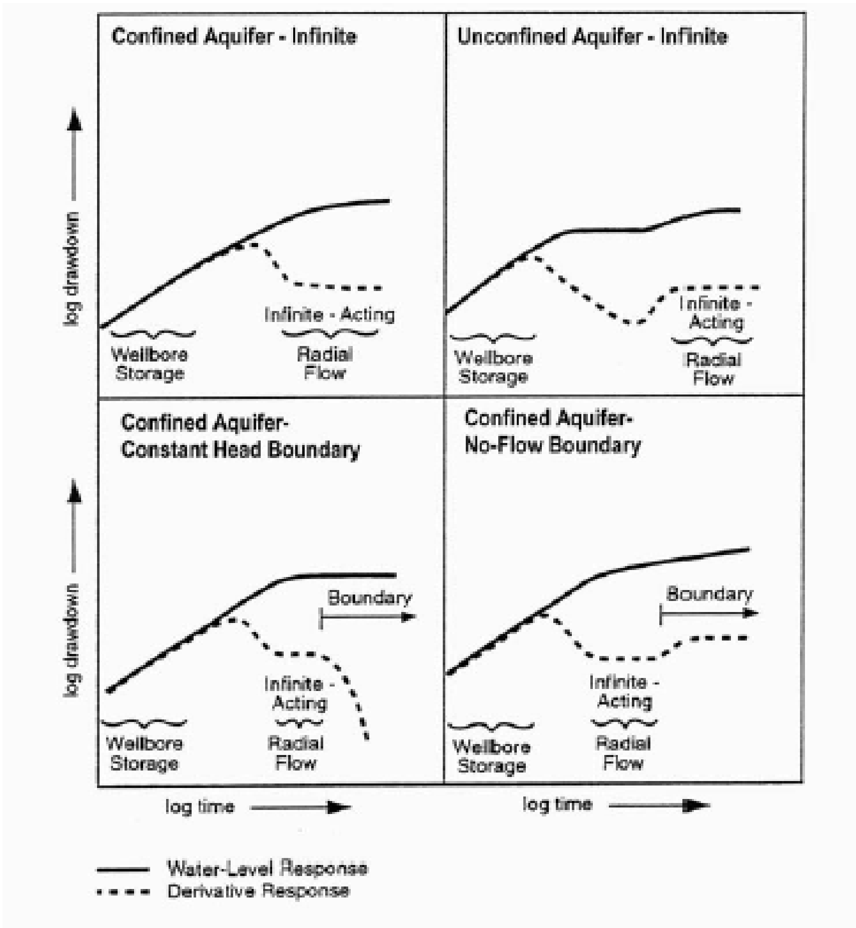


Figure 4-1. Diagnostic Log-Log Drawdown and Drawdown Derivative Plots

Source: Spane and Wurstner, 1993

4.1.2 Analytical Solution Methods

The pumping test data was analyzed using the software AQTESOLV and analytical solutions developed for pumping tests in unconfined aquifers. For tests with diagnostic periods of IARF, the Cooper-Jacob (1946) semi-log straight-line solution was implemented for analysis of drawdown and recovery data from the pumped well. This solution involved fitting a straight line through drawdown data as a function of log time. For selected tests, the slope of this line was substituted into the Moench solution (1997) and Tartakovsky-Neuman solution (2007) to estimate aquifer parameters. The Moench and Tartakovsky-Neuman solutions account for partially penetrating wells and delayed gravity response, while the Moench solution also accounts for wellbore storage and skin effects. Under the same simplifying assumptions applicable for the Theis (1935) solution, the slope of a straight-line fit to recovery data plotted as a function of the log of the ratio of time after pumping started to time after pumping stopped also provides aquifer parameter estimates. Analytical solutions used for estimating aquifer parameters for each pumping test are detailed in Section 5.1 and included in Appendix A, Table A-1. A summary of analytical methods is provided as follows:

ANALYTICAL SOLUTION METHODS USED FOR ANALYSIS OF AQUIFER TESTS
Agarwal, R.G., 1980. A new method to account for producing time effects when drawdown type curves are used to analyze pressure buildup and other test data, SPE Paper 9289 presented at the 55th SPE Annual Technical Conference and Exhibition, Dallas, Texas, September 21-24, 1980.
Cooper, H.H., Jr. and Jacob, C.E., 1946. A generalized graphical method for evaluating formation constants and summarizing well-field history, American Geophysical Union Transactions, vol. 27, pp. 526-534.
Moench, A.F., 1997, Flow to a well of finite diameter in a homogeneous, anisotropic water-table aquifer: Water Resources Research, vol. 33, no. 6, pp. 1397-1407.
Tartakovsky, G.D. and S.P. Neuman, 2007. Three-dimensional saturated-unsaturated flow with axial symmetry to a partially penetrating well in a compressible unconfined aquifer, Water Resources Research, W01410, doi:1029/2006WR005153.
Theis, C.V., 1935. The relationship between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage, American Geophysical Union Transactions, vol. 16, pp. 519-524.

Using the most applicable analytical method, estimates of aquifer parameters were derived, specifically for aquifer transmissivity, hydraulic conductivity, and storativity. Transmissivity (T) is the product of hydraulic conductivity (K) multiplied by aquifer thickness (b) and is defined as the rate of flow of groundwater through a vertical column of aquifer which is 1 foot wide, extending through the full saturated thickness of the aquifer, under a unit hydraulic gradient (Lohman, 1972). In this report, transmissivity is expressed in cubic feet per day per foot width of aquifer (ft^3/d/ft, which simplifies to ft^2/d) or cubic meters per day per meter width of aquifer (m^3/d/m, which simplifies to m^2/d). Hydraulic conductivity is the quotient of transmissivity divided by aquifer thickness, and is defined as the rate of flow of groundwater through a square foot of aquifer under a unit hydraulic gradient (Lohman, 1972). In this report, hydraulic conductivity is expressed in feet per day (ft/d) or centimeters per second (cm/s).

At observation wells, in addition to estimating transmissivity, storativity (S) is also determined. Storativity is defined as the volume of water that an aquifer releases or takes into storage per unit surface area of the aquifer per unit change in head (Lohman, 1972), and is dimensionless. Storativity is also known by the terms storage coefficient and coefficient of storage.

In an unconfined aquifer, storativity is given by:

$$S = S_y + S_s b$$

where S_y is specific yield, S_s is specific storage, and b is aquifer thickness. Specific yield (S_y) is defined as the volume of water released from storage by an unconfined aquifer per unit surface area of aquifer per unit decline of the water table. The product of specific storage and aquifer thickness, $S_s b$, is sometimes referred to as elastic storage coefficient, S. Bear (1979) relates specific yield to total porosity (n) as follows:

$$n = S_y + S_r$$

where S_r is specific retention, the amount of water retained by capillary forces during gravity drainage of an unconfined aquifer. Specific yield, which is sometimes called effective porosity, is less than the total porosity of an unconfined aquifer (Bear 1979). Because $S_s b$ is typically small in comparison to S_y, storativity in an unconfined aquifer is essentially equal to specific yield. Morris and Johnson (1967) report specific yields ranging from about 0.05 for clayey materials to over 0.30 for fine to coarse sandy materials.

Specific storage is the volume of water that a unit volume of aquifer releases from storage per unit decline in head by the expansion of water and compression of the aquifer. Specific storage is related to the compressibility of the aquifer (or aquitard) and water as follows:

$$S_s = \rho g(\alpha + n_e\beta)$$

where ρ is mass density of water, g is gravitational acceleration, α is aquifer compressibility, n_e is effective porosity (dimensionless), and β is compressibility of water. Batu (1998) shows representative S_s values of materials in units of feet^{-1} ranging from less than 10^{-6} for unfractured rock to 10^{-5} for dense sands. Loose, sandy materials are reported to be in the range of 10^{-4}.

4.2 Injection Test

The constant-head injection test was analyzed to estimate saturated hydraulic conductivity, K_{sat}, for the tested intervals using the Glover (1953) and Nasberg-Terletskata (Nasberg, 1951; Terletskata, 1954) analytical solutions for flow from a constant-head borehole permeameter in the vadose zone. Both solutions compute K_{sat} based on the final ("steady") injection rate, the constant head (length of wetted borehole) established for the test, and the borehole radius. The Glover and Nasberg-Terletskata solutions are valid analytical solutions for tests where the height of the water column in the borehole is equal to the length of borehole in hydraulic contact with the formation—i.e., the constant-head (water level) is within the perforated interval. Both solutions are commonly used for computing K_{sat} and assume homogeneous conditions of the sediment intervals tested.

Results for Glover and Nasberg-Terletskata analytical solutions for each of two constant heads established during testing are given in Appendix A, Table A-2 and provide representative ranges of K_{sat} values for the sediment intervals tested. The K_{sat} values derived from the Glover and Nasberg-Terletskata solutions are composite hydraulic conductivities that combine vertical and horizontal components of flow. Neither solution accounts for the effects of capillary flow (unsaturated flow at the edges of the primary saturated flow field); however, based on the large K_{sat} of the Qal, the effects of capillary flow are considered relatively insignificant once steady injection rates and constant-heads have been established.

4.3 Slug Tests

Analytical solutions were prepared for slug tests in AQTESOLV (HydroSOLVE, 2012) using the Bouwer-Rice method and KGS model for overdamped (i.e., non-oscillatory) responses to water level displacements. Bouwer and Rice (1976) developed a straight-line method for analyzing slug tests in partially or fully penetrating wells in unconfined aquifers, which ignores elastic storage in the aquifer. Hyder and others (1994) developed a fully transient model, also known as the KGS (Kansas Geological Survey) model, which is suitable for slug tests conducted in fully or partially penetrating wells in confined or unconfined aquifers. The KGS model uses type curve matching and considers elastic aquifer storage and well skin effects.

AQTESOLV parameter inputs for slug test solutions are shown in Appendix A, Table A-3. For both wells tested, RC18-4 and RC19-10, the open intervals were used as the effective well screen lengths, since the filter pack permeability was much greater than that of the surrounding formation (Fetter, 2001). Additionally, the radius of the perforated interval was specified as the radius of the borehole, because the filter pack was much more permeable than the surrounding formation (Butler, 1997). Static water column height was calculated as the difference between the pre-test depth to water level and the depth to bottom of the effective well screen length.

For tests conducted in well RC19-10, water level data was first processed to remove background water trends prior to analysis. The removal process entailed developing a polynomial regression equation fitted to background water level trend data and applying the equation to correct water level data during the period of the tests. Observed barometric effects relative to the magnitude of water level displacements and recoveries did not significantly affect results and were not removed from the test data.

5 RESULTS OF AQUIFER TESTS

The locations of the pumping tests, injection test, and slug tests are shown on Figure 5-1 on the following page. The results of the aquifer tests are presented in the following sections. Tabulated results are included in Appendix A, Tables A1 through A3.

5.1 Pumping Tests

Constant-rate pumping tests were carried out at six wells between June 22 and August 27, 2019 with responses monitored at numerous observation wells. The tested wells included: RC19-3, RC19-8B, RC19-8D, RC19-7, RC19-13, and RC19-15. Pumping periods lasted between 20 hours and two weeks and pumping rates varied from six to 165 gpm. Maximum water level drawdowns at the wells varied from 28.7 feet to 168.2 feet. Table 5-1 summarizes the pumping test characteristics.

Table 5-1. Constant-rate Pumping Test Wells and Characteristics

Pumping Test Well	Observation Well(s)	Pumping Duration	Pumping Rate (gpm)	Pre-Test Water Level (ft bls)	Maximum Water Level Drawdown (ft)
RC19-3	DH19-3A-VWP(A,B,C)	3 days	100	262.88	168.2
RC19-7 (upper) RC19-7 (both) [a]	DH19-7-VWP(A,B,C)	1 day 20 hours	60 165	295.21 295.43	41.9 67.0
RC19-8B	DH19-8B-VWP(A,B,C)	1 day	7	70.57	28.7
RC19-8D	RC19-8 RC19-8AS RC19-8AD RC19-8B RC19-8C DH19-8B-VWP(A,B,C) Lower Well	2 weeks	90	72.61	148.9
RC19-13	Headquarters Well #2 Headquarters Well #3	1 week	6	22.14	35.5
RC19-15	RC18-4 RC19-10	1 week	150	411.57	40.6

[a] RC19-7 included two tests—one of the upper screened interval and one for both screened intervals

The remainder of Section 4.1 provides detailed descriptions of field data, analysis, and results for each of the constant-rate pumping tests. Hydrographs and AQTESOLV plots for pumping tests are included in Appendix B.

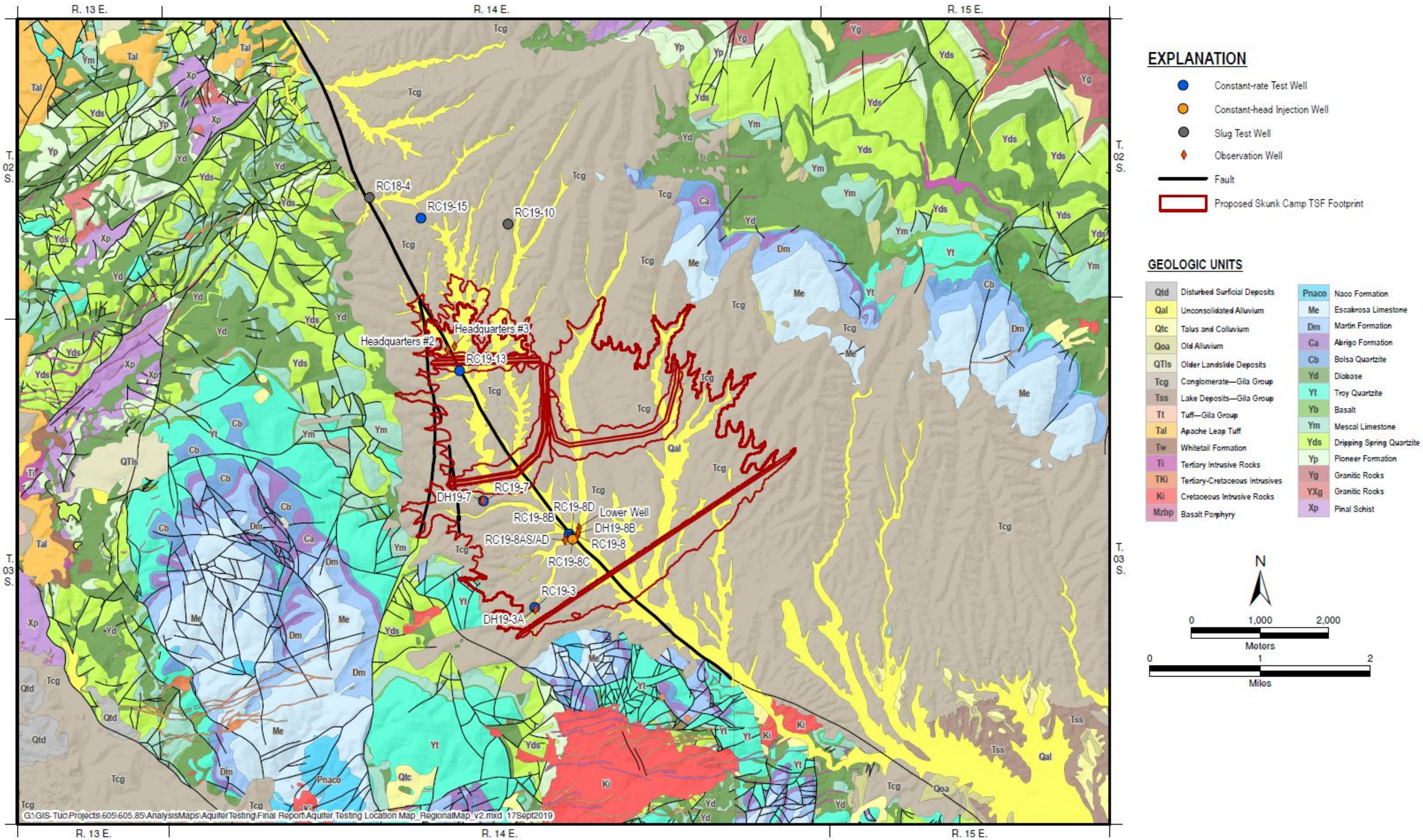


Figure 5-1. Skunk Camp Aquifer Testing Locations

Note: Observation wells for aquifer tests shown on close-up maps for individual tests in the following sections.

5.1.1 Well RC19-3

The locations of pumped well RC19-3 and observation well DH19-3A are shown on Figure 5-2.

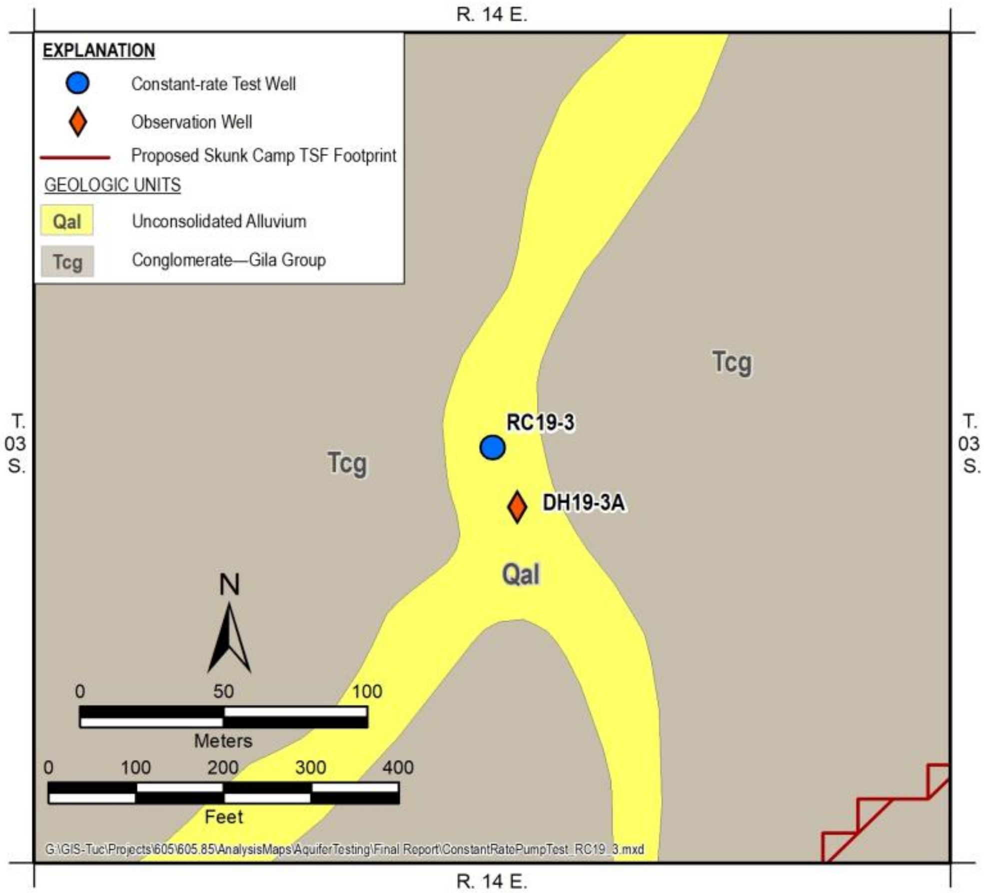


Figure 5-2. RC19-3 Pumping Test Well Locations

Both wells are located in the southwestern corner or the proposed TSF footprint, within alluvial sediments overlaying Gila Conglomerate (Figure 5-1). As shown in Figure 5-3, DH19-3A is located approximately 75 feet away from RC19-3 and has three fully-grouted vibrating wire piezometer pressure transducers (VWP) installed at depths of 338, 628, and 923 feet bls (adjusted for 75-degree hole inclination).

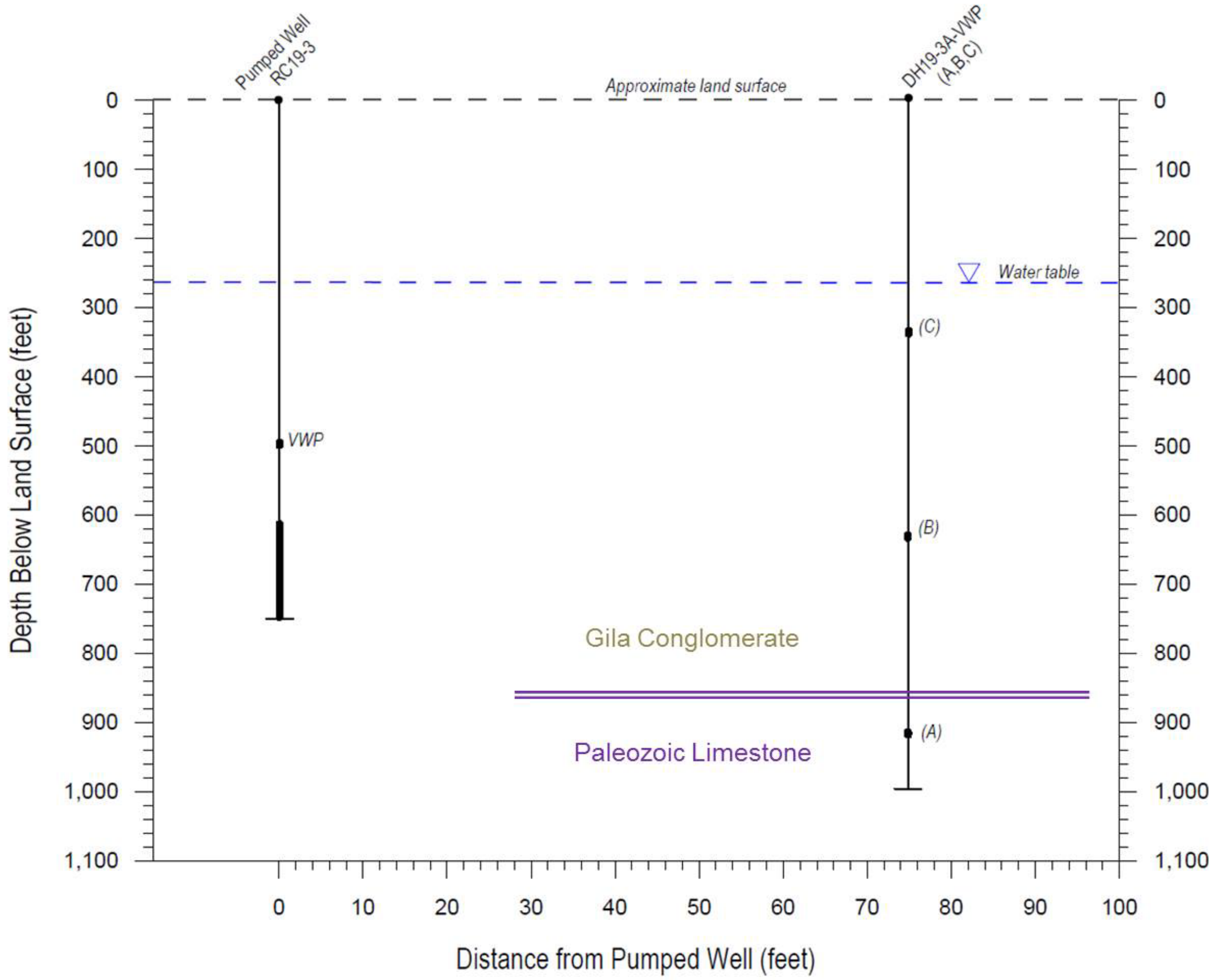


Figure 5-3. RC19-3 Pumping Test - Schematic Cross Section

Note: Well screens and open intervals denoted with bold lines; VWPs indicated by points

RC19-3 is completed in Gila Conglomerate with a screened interval that extends from 610 to 750 feet bls. DH19-3A is an inclined hole completed with three fully grouted VWPs—the upper two installed in Gila Conglomerate, and the lower one installed in Paleozoic Limestone. Based on the inclination of DH19-3A and geologic log, the depth of the limestone contact is approximately 861 feet. Detailed well construction schematics for RC19-3 and DH19-3A are included in Appendix D.

Hydrographs for RC19-3 and DH19-3A VWPs during testing activities are included in Appendix B. At pumped well RC19-3, depth to pre-pumping water level was 262.88 feet bls. Using the pre-pumping water level depth and local thickness of the Gila Conglomerate (as determined from the DH19-3A core log) the saturated aquifer thickness at this location is assumed to be about 598 feet. Duration of the constant-rate pumping test was three days at an average rate of 100 gpm. Near the end of the pumping period, drawdown was 168.2 feet and specific capacity was 0.6 gallons per minute per foot (gpm/ft) (Appendix A, Table A-1).

Hydrographs for DH19-3A vibrating wire piezometers B and C, installed in Gila Conglomerate, show response to pumping in a manner consistent with wells located in the pumped aquifer. Measured hydraulic responses from these VWPs were used in the type curve analysis to estimate aquifer parameters. The hydrograph for piezometer A, installed in Paleozoic Limestone, shows a maximum reduction in hydraulic pressure during the test equal to 8.3 feet of water (Appendix B). The drawdown observed in the Paleozoic Limestone, at a depth of approximately 200 feet below the screened interval of the pumped well, indicates that hydraulic pressure is readily transmitted between the Tertiary Gila and Paleozoic units at the test location.

Field water quality parameters collected from pumped water during the test are shown in Appendix B. On average, groundwater pH was 7.69, and electrical conductivity was 494 micro-Siemens per centimeter (µS/cm). Groundwater temperature varied from 75.1 to 79.3 degrees Fahrenheit (°F) during day and night.

An analytical solution for the test is included in Appendix B. The analytical solution considers drawdown and derivative data for pumped well RC19-3 and DH19-3A vibrating wire piezometers B and C. The solution is based on the Moench (1997) formulation for water level response to pumping in an unconfined aquifer with possible vertical anisotropy, wellbore skin, partial well penetration, and delayed gravity response.

An optimized solution of composite data for RC19-3 and VWPs B and C of DH19-3A suggests a large wellbore skin effect that may be the result of the wellbore skin development during drilling, or low well efficiency due to well construction materials or poor well development. The rapid rate of water level drawdown at RC19-3 after the start of pumping (approximately 87 feet in the first two minutes) supports the idea of considerable wellbore skin or poor well efficiency.

The optimized-fit type curve analysis to measured data for the pumped well and observation well provides the following estimates: transmissivity of 1,275 ft^2/d; anisotropy ratio of vertical to radial hydraulic conductivity, K_z/K_r, of 0.2, and storage parameters for Gila Conglomerate of approximately S = 2.0E-03 and S_y = 0.08. Based on the estimated transmissivity and assumed aquifer thickness of 598 feet, hydraulic conductivity is computed to be on the order of 7.5E-04 cm/s. Given the short-duration of the test, the S_y estimate is considered approximate; longer duration testing is needed to increase the certainty of the estimate. Results for the RC19-3 pumping test are summarized in Appendix A, Table A-1.

5.1.2 Well RC19-7

The locations of pumped well RC19-7 and observation well DH19-7 are shown on Figure 5-4.

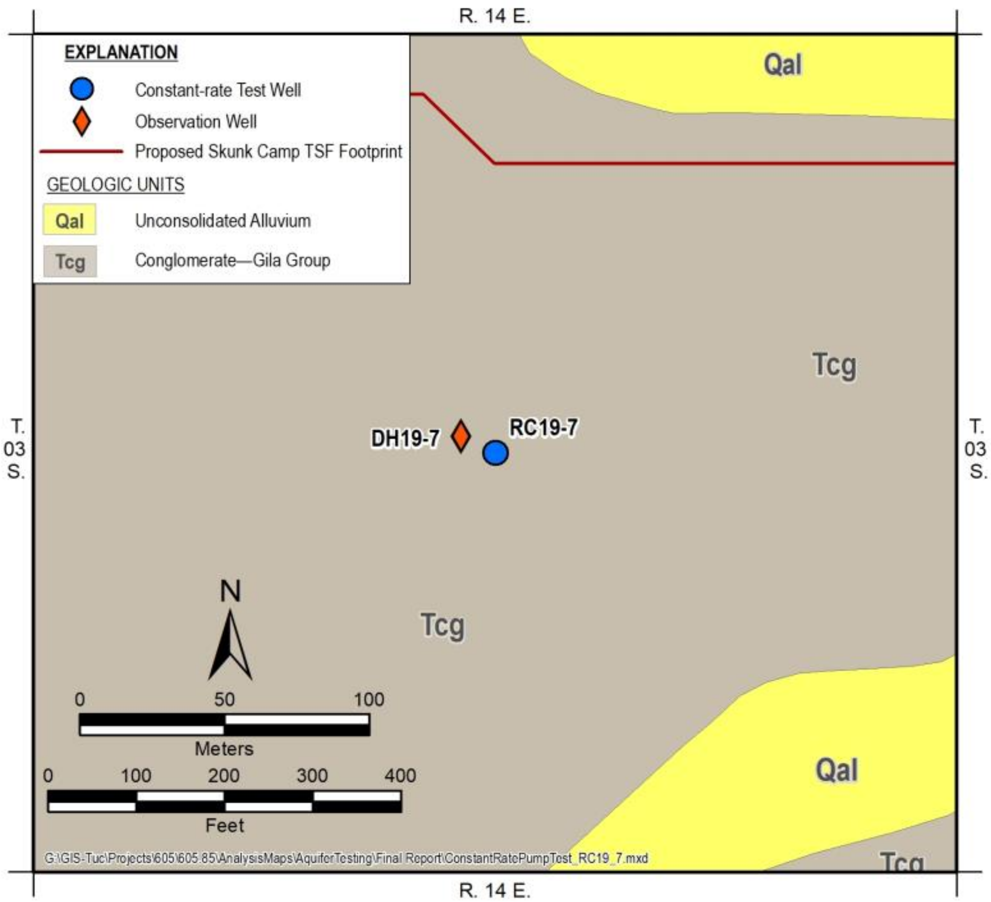
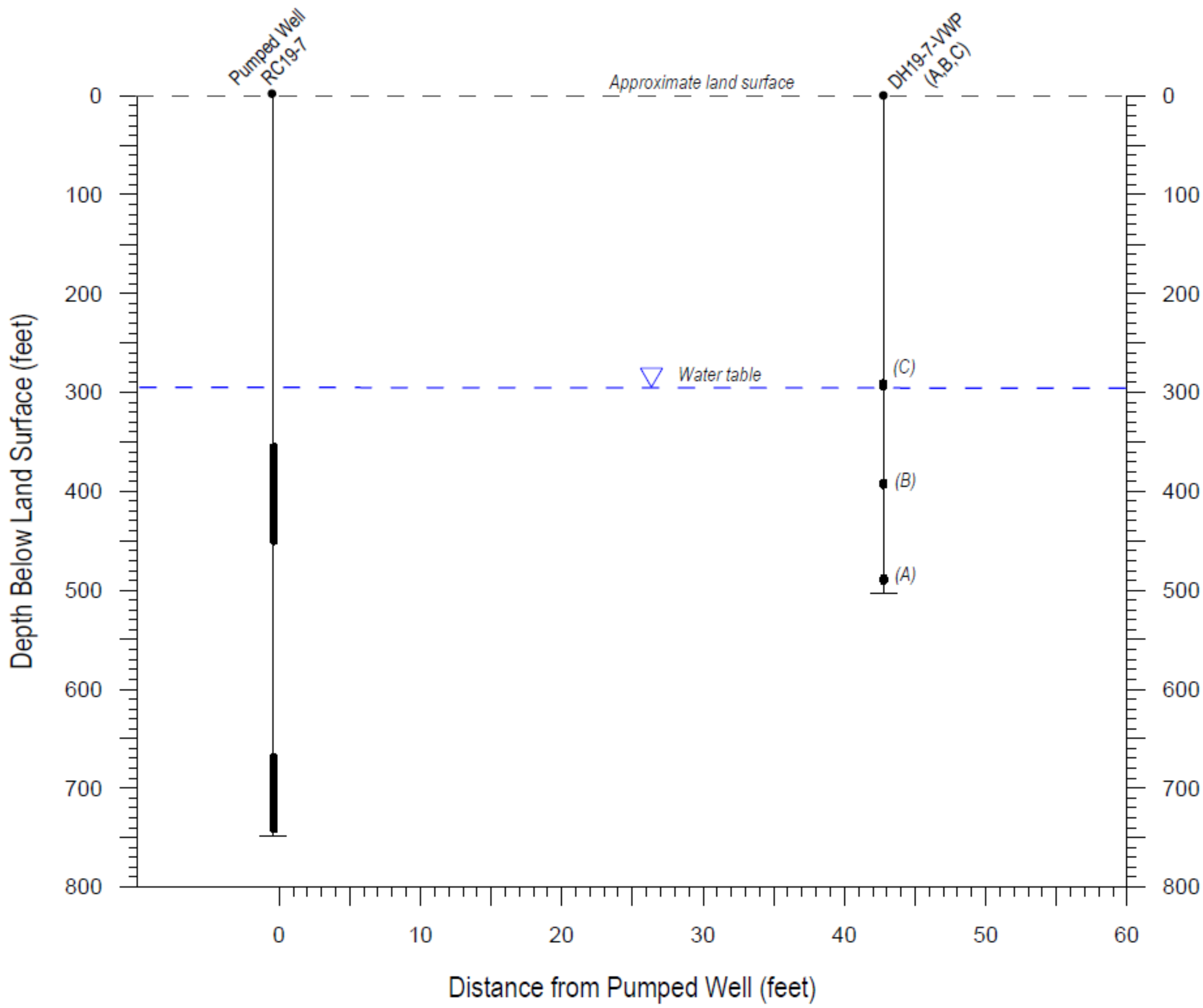


Figure 5-4. RC19-7 Pumping Test Well Locations

Both wells are located in the western portion or the proposed TSF footprint, atop a narrow ridge consisting primarily of Gila Conglomerate (Figure 5-1). The location of the wells is in the area of a fault splay, and bordered by drainages to the north and south overlain with mapped alluvial deposits. As shown in the cross section on Figure 5-5, observation well DH19-7 is located approximately 43 feet away from pumped well RC19-7, and has three VWPs installed at depths of 294, 390, and 489 feet bls.

Figure 5-5. RC19-7 Pumping Test - Schematic Cross Section



Note: Well screens and open intervals denoted with bold lines; VWPs indicated by points

RC19-7 is completed in Gila Conglomerate (interbedded conglomerate and sandstone sequences) with two screened intervals that extend from 350 to 450 feet bls, and 670 to 750 feet bls. DH19-7 is a vertical core hole completed with three VWPs in Gila Conglomerate. Detailed well construction schematics for RC19-7 and DH19-7 are included in Appendix D.

In order to assess potential differences in the hydraulic properties of Tcg with depth, two tests were conducted at well RC19-7. The first test pumped only from the upper screened interval of the well, with the lower screened interval sealed off by an inflatable packer; the second test pumped from the upper and lower screened intervals. The two tests are presented in sequence below.

5.1.2.1 Upper Perforated Zone

Hydrographs for RC19-7 and DH19-7 VWPs during testing activities are included in Appendix B. Depth to pre-pumping water level was 295.21 feet bls. Using the depth to water and total drilled depth, the saturated thickness of the aquifer is assumed to be about 465 feet. Duration of the constant-rate pumping test was 24 hours at an average rate of 60 gpm. Near the end of the pumping period, drawdown was 41.9 feet and specific capacity was 1.4 gpm/ft (Appendix A, Table A-1).

Analysis of the RC19-7 hydrograph indicates that recirculation of pumped water from the point of discharge to the pumped well occurred approximately 50 minutes into the test. Discharged water was directed approximately 100 feet south of RC19-7, down a steep side of the ridge leading towards a nearby drainage. During the test, the discharged water was observed flowing down the ridge but disappearing below ground before reaching the drainage. Given the depth to water (about 295 feet bls) and speed at which the discharge reached the water table (approximately 50 minutes), the upper unsaturated zone is considered highly transmissive at the well location, and possibly related to fault systems.

Field water quality parameters collected from pumped water during the test are shown in Appendix B. On average, groundwater pH was 7.43 and electrical conductivity was 557 µS/cm. Groundwater temperature varied from 71.4 to 73.0 ºF during day and night.

An analytical solution for the test is included in Appendix B. The analytical solution considers drawdown and derivative data for pumped well RC19-7 (upper perforated zone only) and DH19-7 vibrating wire piezometers A and B. The solution is based on the Moench (1997) equation for water level response to pumping in an unconfined aquifer with possible anisotropy, wellbore skin, partial well penetration, and delayed gravity response.

The optimized type curve analysis of measured data provides the following estimates: transmissivity of 1,475 ft^2/d; K_z/K_r of 0.5; wellbore skin of 2.1 feet; and storage parameters for Gila Conglomerate of approximately S = 1.7E-03 and S_y = 0.08. Based on the estimated transmissivity and assumed aquifer thickness of 465 feet, hydraulic conductivity is computed to be on the order of 1.1E-03 cm/s. Results for the RC19-7 upper perforated zone test are summarized in Appendix A, Table A-1.

5.1.2.2 Upper and Lower Perforated Zones

For the upper and lower perforated zones test, depth to pre-pumping water level was 295.43 feet, and saturated thickness of the aquifer was assumed to be about 465 feet. The duration of pumping was 20 hours at an average rate of 165 gpm. Near the end of the pumping period, drawdown was 67.0 feet and specific capacity was 2.5 gpm/ft (Appendix A, Table A-1).

Due to the occurrence of recirculation of pumped water during the upper perforated zone test, the discharge hose length was extended to 900 feet and redirected eastward further down the ridge. Analysis of the RC19-7 during the second test shows that recirculation of pumped water from the point of discharge occurred approximately 8 hours after the start of pumping. The recirculation caused the water level drawdown in RC19-7 to stabilize, and then begin to rise. The test was terminated early, following 20 hours of pumping, once the recirculation became apparent. As with the upper perforated zone test, the rapid rate of recirculation of discharged water, even at a much greater distance from the pumped well, suggests that the upper unsaturated zone is highly transmissive in the area of the pumping test.

Field water quality parameters collected from pumped water during the test are shown in Appendix B. On average, groundwater pH was 7.42 and electrical conductivity was 518 µS/cm. Groundwater temperature varied from 72.6 to 74.6 ºF during day and night.

An analytical solution for the test is included in Appendix B. In order to simulate pumping from the two perforated zones, two pumping wells were installed at the same RC19-7 location and the total pumping rate was equally distributed across the length of both perforated zones—92 gpm from the upper perforated zone, and 73 gpm from the lower perforated zone. The Moench solution (1997) for hydraulic response to pumping in an unconfined aquifer was applied to drawdown and derivative data for VWPA and VWPB of observation well DH19-7.

The composite type curve analysis for the two VWPs provides the following estimates: transmissivity of 1,650 ft2/d; Kz/Kr of 0.18; and storage parameters for Gila Conglomerate of approximately S = 5.0E-04 and Sy = 0. 04. Assuming an aquifer thickness of 465 feet, hydraulic conductivity is computed to be on the order of 1.3E-03 cm/s. Results for the RC19-7 upper and lower perforated zones test are summarized in Appendix A, Table A-1.

5.1.3 Well RC19-8B

The locations of pumped well RC19-8B and observation well DH19-8B are shown on Figure 5-6.

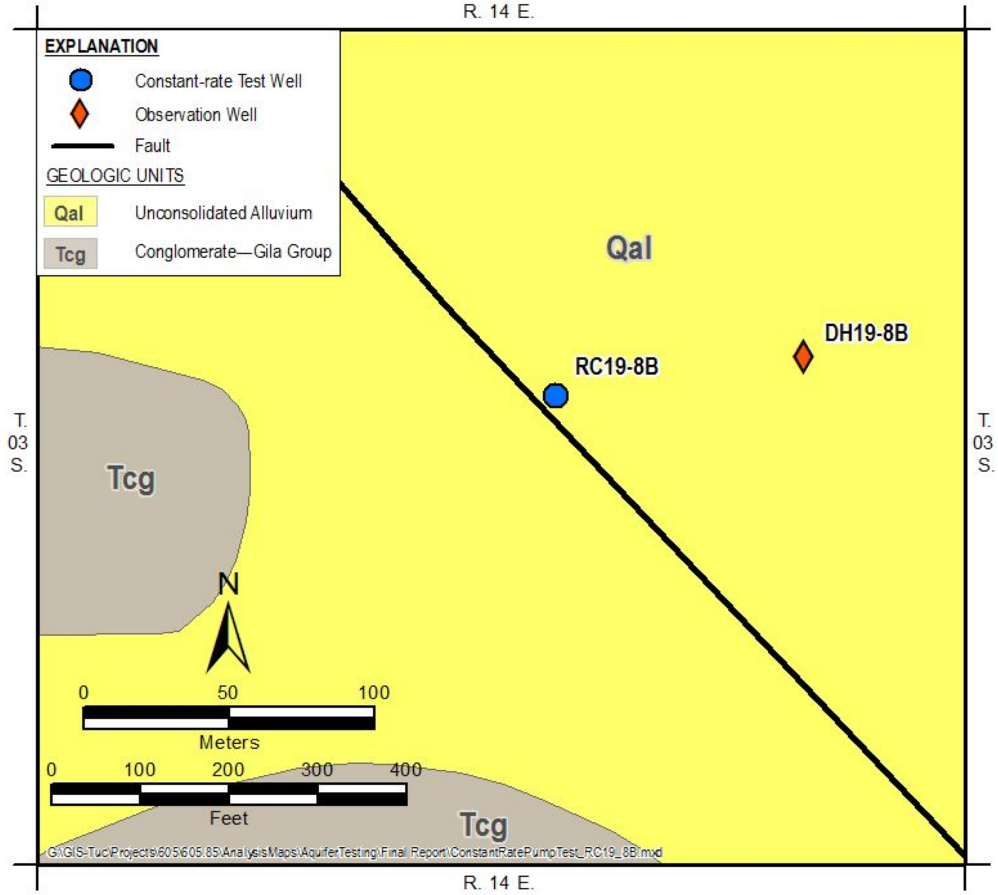


Figure 5-6. RC19-8B Pumping Test Well Locations

The pumped well and observation well are located alongside the Dripping Spring Wash near the southern end of the proposed TSF footprint (Figure 5-1). Figure 5-7 shows the horizontal distance of the pumped well from the observation well, and the depths of screened intervals and VWPs. Hydraulic pressure data from the uppermost VWP at the observation well ("C"), which is installed within the screened interval depth of RC19-8B, was used in the test analysis to estimate storage parameters.

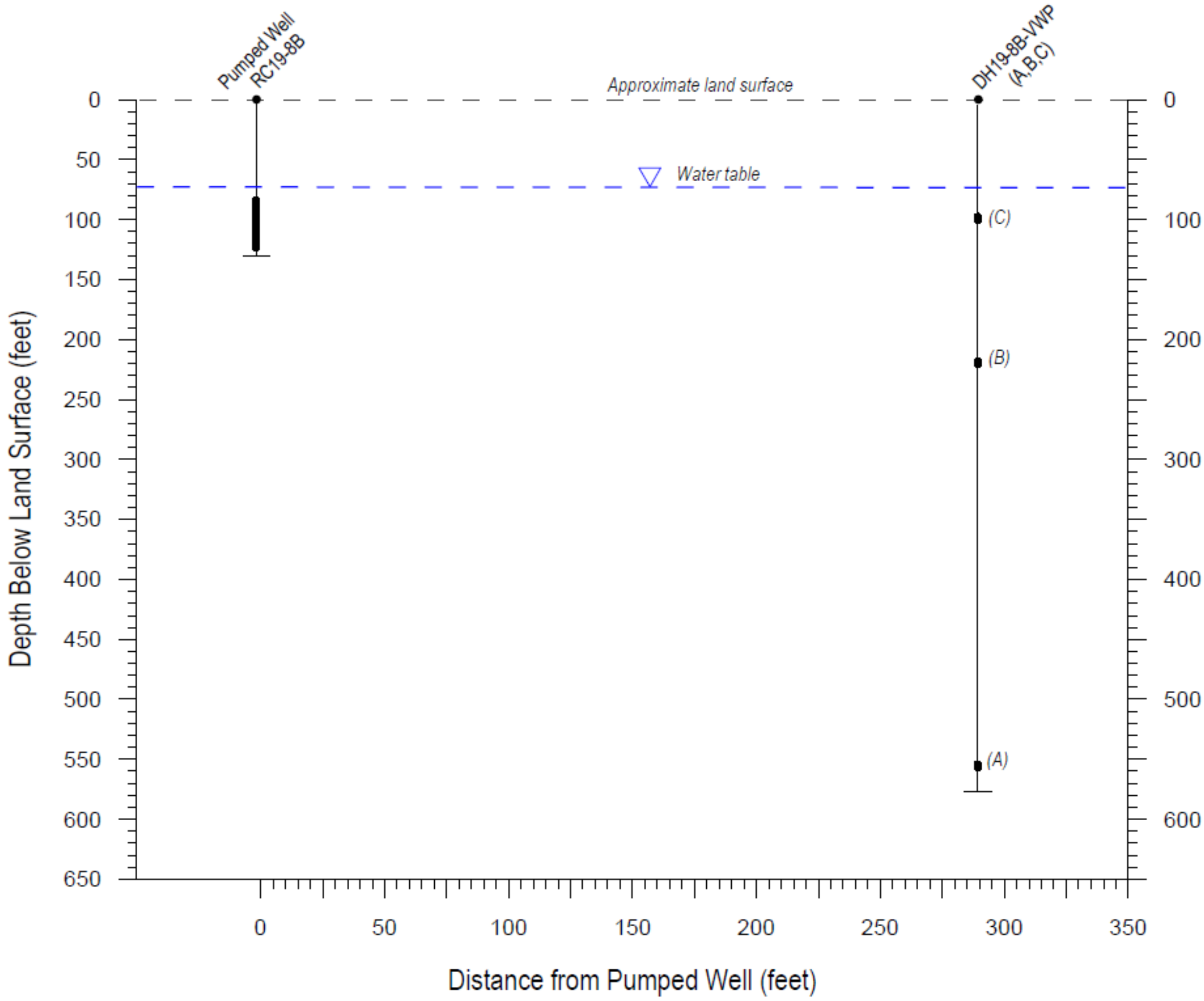


Figure 5-7. RC19-8B Pumping Test - Schematic Cross Section

Note: Well screens and open intervals denoted with bold lines; VWPs indicated by points

RC19-8B is completed in Gila Conglomerate (interbedded conglomerate and sandstone sequences) with a screened interval that extends from 85 to 125 feet bls. DH19-8B is located approximately 284 feet away from RC19-8B and has three VWPs installed in Gila Conglomerate at depths of 97, 221, and 555 ft bls (adjusted for 62-degree hole inclination). Detailed well construction schematics for the wells are included in Appendix D.

Hydrographs for RC19-8B and DH19-8B are included in Appendix B. Depth to pre-pumping water level was 70.57 feet bls. The aquifer saturated thickness was assumed to be approximately 578 feet based on the total drilled depth of DH19-8B, which is the deepest well in the area and is completed in Tcg. Duration of the constant-rate pumping test was 24 hrs at an average rate of seven gpm. Near the end of the pumping period, drawdown was 28.7 feet and specific capacity was 0.2 gpm/ft (Appendix A, Table A-1).

Field water quality parameters collected from pumped water during the test are shown in Appendix B. On average, groundwater pH was 7.45 and electrical conductivity was 548 µS/cm. Groundwater temperature varied from 71.4 to 74.2 ºF during day and night.

An analytical solution for the test is included in Appendix B. The analytical solution matches drawdown and derivative data for pumped well RC19-8B and DH19-8B-VWPC, and is based on the Moench (1997) equation for water level response to pumping in an unconfined aquifer with possible anisotropy, wellbore skin, partial well penetration, and delayed gravity response.

The type curve analysis of measured composite data for the pumped and observation wells provides the following estimates for aquifer parameters: transmissivity of 330 ft2/d; Kz/Kr of 0.1; wellbore skin of -2.5 feet (slight increased permeability around the wellbore); and storage parameters for Gila Conglomerate of approximately S = 4.5E-04 and Sy = 0.07. Based on the estimated transmissivity and assumed aquifer thickness, hydraulic conductivity is computed to be on the order of 2.0E-04 cm/s. Results for the RC19-8B pumping test are summarized in Appendix A, Table A-1.

5.1.4 Well RC19-8D

The test conducted at RC19-8D was a two-week constant-rate pumping test that included seven nearby observation wells installed in Tcg and Qal. The test provided opportunities to analyze aquifer properties at several different depths and distances from the pumped well, and posed challenges that included accounting for well construction characteristics and recycled discharge water from the pumped well. In order to more adequately present the test results and findings, a separate technical memorandum is currently being prepared by M&A. This section presents composite results for the RC19-8D test in a manner consistent with the other pumping tests included in this report.

The locations of pumped well RC19-8D and seven observation wells are shown on Figure 5-8.

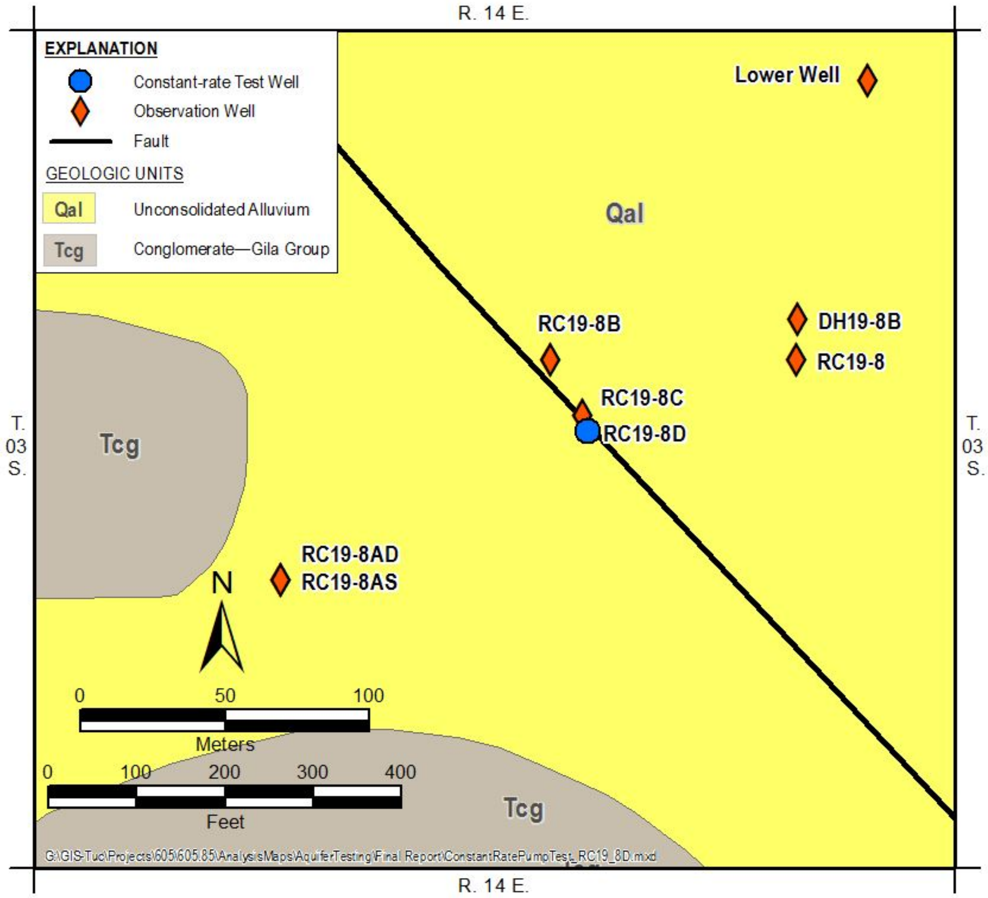


Figure 5-8. RC19-8D Pumping Test Well Locations

The pumped well, RC19-8D, and observation wells are located near the Dripping Spring Wash towards the south end of the proposed TSF footprint (Figure 5-1). Site RC19-8A consists of a shallow and deep well identified as RC19-8AS and RC19-8AD, respectively. All of the wells are completed with screened intervals or VWP instrumentation in Gila Conglomerate with the exception of well RC19-C, which is completed in Quaternary Alluvium. Lower Well has a recorded total depth of 250 feet, however the depth of the screened interval is unknown.
Figure 5-9 shows the horizontal distances of the observation wells from RC19-8D, as well as the depths of screened intervals and VWPs. Detailed well construction schematics for the RC wells are included in Appendix D; well construction details for Lower Well are shown in Appendix E.

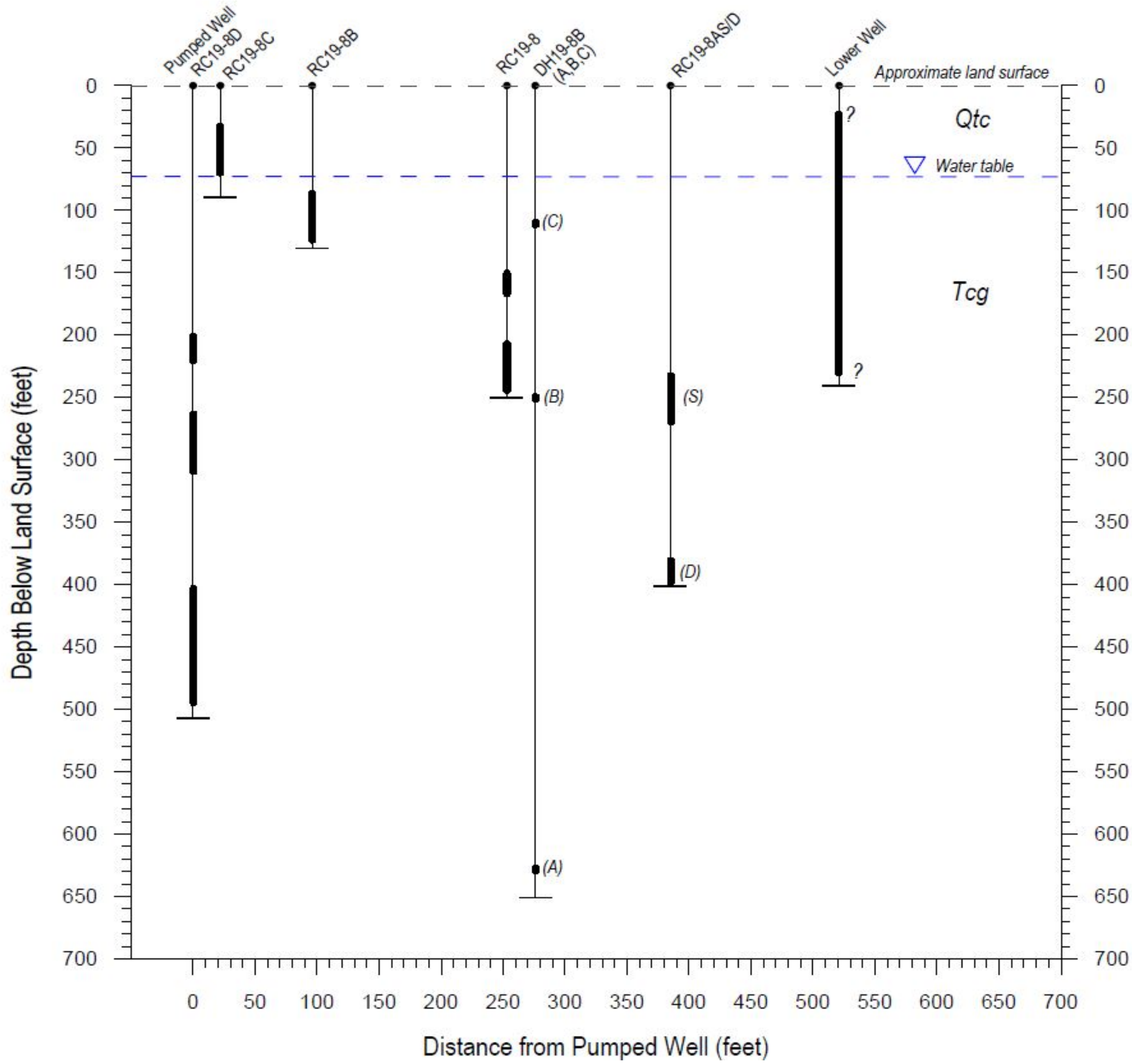


Figure 5-9. RC19-8D Pumping Test - Schematic Cross Section

Note: Well screens and open intervals denoted with bold lines; VWPs indicated by points

RC19-8D penetrates Gila Conglomerate (interbedded conglomerate and sandstone sequences) to a depth of 507 feet. Depth to pre-pumping water level was 72.61 feet bls. The well has three perforated intervals that extend from 202 to 222 feet, 262 to 322 feet, and from 402 to 502 feet. Using the pre-pumping water level depth and well bottom, the saturated aquifer thickness is assumed to be about 598 feet. Duration of pumping was 14 days at an average rate of 90 gpm. Near the end of the pumping period, drawdown was 148.9 feet and specific capacity was 0.6 gpm/ft (Appendix A, Table A-1).

At this location, the Gila Conglomerate is comprised of alternating layering of sandstone to matrix supported conglomerate sequences. Borehole optical logs are interpreted to show no large-scale faulting or fracturing of the Gila Conglomerate. Therefore, primary permeability (intergranular) is assumed to control groundwater movement rather than large-scale secondary permeability via fracture networks. Based on lithologic logs and borehole geophysics, the thicknesses of the alluvial deposits and Gila Conglomerate are assumed to be approximately 75 feet and 578 feet, respectively. The thickness of the Gila Conglomerate is based on the total depth of drilling and installation of the deepest piezometer at the site (DH19-8B). A thin veneer at the bottom of the Qal may be saturated at the site of the aquifer test; however for analytical modeling purposes, the Qal was assumed to be unsaturated and the Tcg fully saturated at the start of the pumping test.

RC19-8D penetrates Gila Conglomerate (interbedded conglomerate and sandstone sequences) to a depth of 507 feet. Depth to pre-pumping water level was 72.61 feet bls. The well has three perforated intervals that extend from 202 to 222 feet, 262 to 322 feet, and from 402 to 502 feet. A nominal 6-inch diameter steel production casing was installed with wire-wrap screen along three intervals of the well. A sand filter pack was installed in the annulus of well with no seals between screened intervals. The uppermost depth to the top and lowermost depth to the bottom of the screen were located 129 and 429 ft, respectively, below the initial water table. For analytical modeling purposes, the pumped well is considered partially penetrating the aquifer with a simplifying assumption of screen length extending from the top of the uppermost screen depth to the bottom of the lowermost screened interval.

Duration of pumping was 14 days at an average rate of 90 gpm. Near the end of the pumping period, drawdown was 148.9 feet and specific capacity was 0.6 gpm/ft (Appendix A, Table A-1). The hydrograph for well RC19-8C (Appendix B) indicated that the thin, saturated interval of Qal drained into underlying Tcg during the pumping period of the test. It is also noteworthy that the water level did not immediately begin to recover following the end of pumping, as seen in nearby wells completed in Tcg. The rate of water level draining during pumping provides qualitative information about the hydraulic connection between the Qal and Tcg at the test location. Additionally, the subdued water level response during the recovery period provides useful evidence that the water level being monitored at the bottom of well RC19-8C is representative of the alluvial system rather than the Gila Conglomerate aquifer.

Aquifer parameter estimates were obtained using drawdown data from select deep observation wells analyzed for the entire testing period allowing for estimating the effects of delayed water table unconfined response and the drainage parameter, Sy. At shallow observation wells and piezometers, recycling of the pumped discharge water to the shallow part of the aquifer system was evident as a transient recharge or constant-head effect and caused the inability to analyze water level data from these wells after its detection. However, sufficient time-series of water level data still existed at these locations prior to the constant-head effect allowing for estimating aquifer properties using standard methods of analysis for aquifer transmissivity and elastic storage response of the aquifer.

Based on the type curve analysis fitted to measured data, the estimated average hydraulic parameter values for the RC19-8D test are: transmissivity, 180 ft2/d; radial hydraulic conductivity (Kr), 0.309 ft/d or 1.09E-04 cm/s; vertical hydraulic conductivity (Kv), 0.109 ft/d or 3.82E-05 cm/s; vertical anisotropy ratio Kz/Kr, 0.35; elastic storage coefficient (S) 5.05E 04; and specific yield (Sy), 0.08.

These estimates are derived using averaging methods for the composite drawdown and recovery results for the deeper aquifer observation wells and piezometers. Based on the shallow well observation analysis, it is likely the upper 100 feet of the aquifer represents an aquifer layer with approximately 15 percent larger Kr and 30 percent larger S compared to the composite average for the deeper aquifer layer represented by deep observation wells and piezometers. Radially in the deeper aquifer layers, the DDH19-8B location to the NE from the pumped well location shows lower Kr, by approximately 20 percent, and 80 percent lower S compared to the RC19-8A location SW from the pumped location. In the NE direction, Kv is also apparently lower compared to the SW direction. The deep piezometer location, DH19-8B showed the lowest Kz/Kr estimate, on the order of a ratio of 0.2.

5.1.5 Well RC19-13

The locations of pumped well RC19-13 and two observation wells, Headquarters Well #2 and Headquarters Well #3, are shown on Figure 5-10.

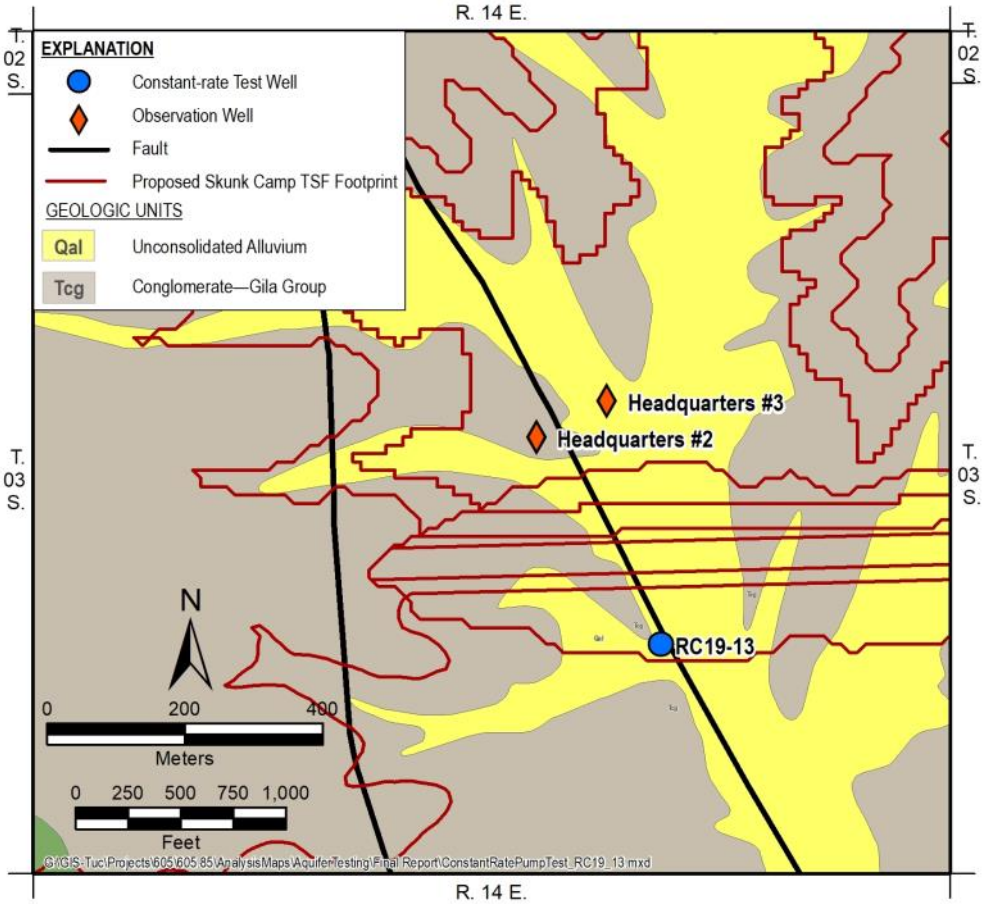


Figure 5-10. RC19-13 Pumping Test Well Locations

The pumped well and observation wells are located in the northern portion of the proposed TSF footprint (Figure 5-1). The wells are completed in Gila Conglomerate that is underlying alluvium and surficial deposits of varying thicknesses within close proximity of the Dripping Spring Wash. Headquarters Well #2 is a windmill well located on top of a small hill, 75 feet above RC19-13. Headquarters #3 is a domestic supply well operated with a solar pump system, located 35 feet above RC19-13. The pumps for both Headquarters wells were shut-off three days prior to the start of the RC19-13 test.

Figure 5-11 shows the horizontal and vertical distances of the observation wells from RC19-13, and the depths of the screened intervals. Detailed well construction schematics for pumped well RC19-13 are included in Appendix D; available well construction details for the Headquarters observation wells are tabulated in Appendix E.

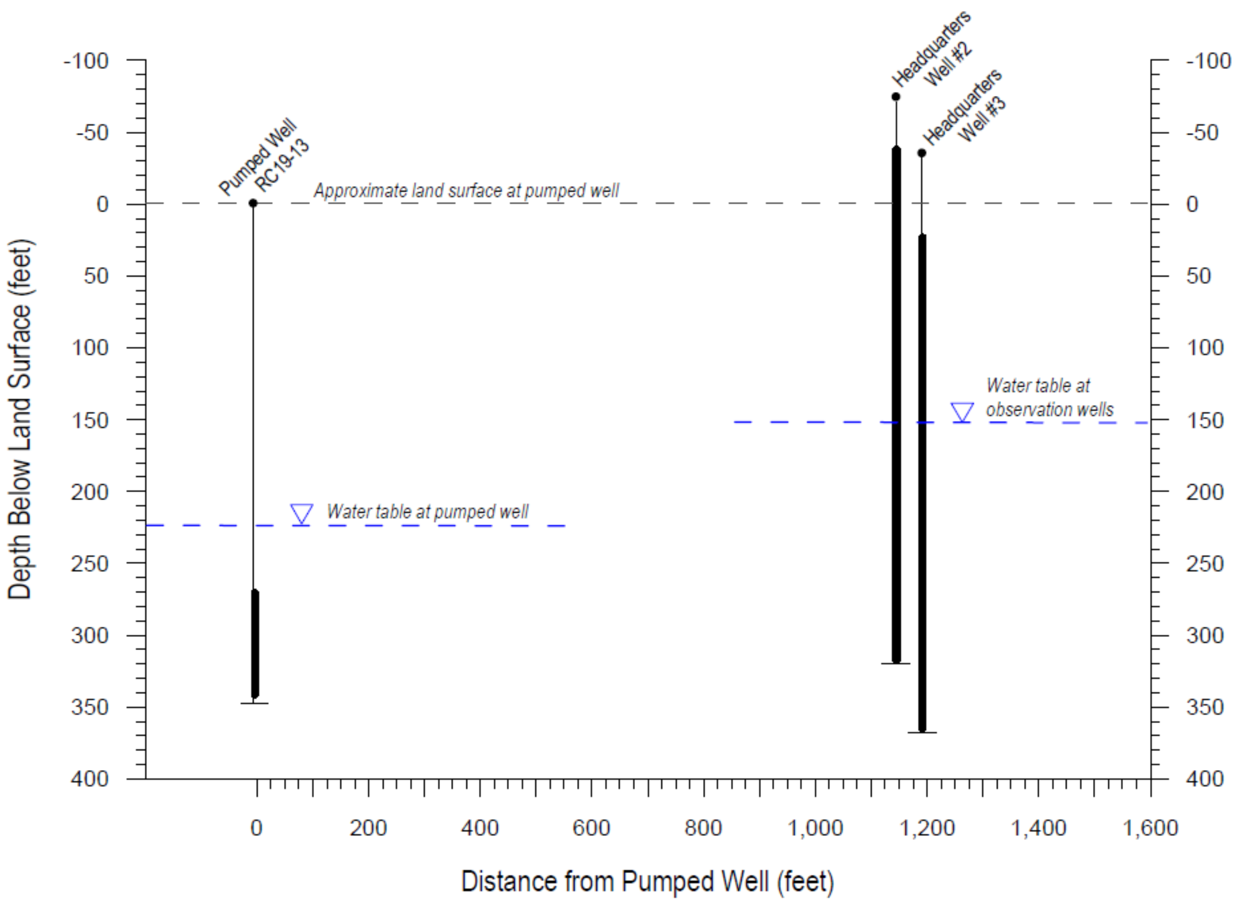


Figure 5-11. RC19-13 Pumping Test - Schematic Cross Section

Note: Well screens and open intervals denoted with bold lines

Hydrographs for RC19-13 and observation wells during testing activities are included in Appendix B. The hydrographs for Headquarters Well #2 and #3 do not show measurable drawdown from pumping activities at RC19-13, and were therefore not used in the type curve analysis. Depth to pre-pumping water level was 222.04 feet bls. The well penetrates Gila Conglomerate to a depth of 350 feet. Using the pre-pumping water level depth and well bottom, the saturated aquifer thickness is assumed to be about 128 feet. Duration of pumping was seven days at an average rate of six gpm. Near the end of the pumping period, drawdown was 35.5 feet and specific capacity was 0.2 gpm/ft (Appendix A, Table A-1).

Field water quality parameters collected from pumped water during the test are shown in Appendix B. On average, groundwater pH was 7.47 and electrical conductivity was 520 µS/cm. Groundwater temperature averaged 74.1 °F.

An analytical solution for the test is included in Appendix B. The analytical solution considers drawdown and derivative data for pumped well RC19-13, and is based on the Cooper-Jacob

(1946) semi-log straight-line method for water level response to pumping in an unconfined aquifer. The straight-line was fit through the majority of test data, beginning around 300 minutes after the start of pumping. Analysis of derivative data suggests IARF conditions from approximately 300 minutes until the end of the pumping period. Although a deviation from the straight-line occurs at around 500 minutes, the analytical solution captures the average hydraulic parameters exhibited over seven days of pumping.

The estimated transmissivity from the Cooper-Jacob solution was 40 ft^2/d. The hydraulic conductivity of the Gila Conglomerate at the well location, estimated by dividing transmissivity by the assumed aquifer thickness, was 1.1E-04 cm/s. Results for the RC19-13 pumping test are summarized in Appendix A, Table A-1. Storage parameter results generated by type curve analysis are not considered reliable estimates for single-well tests, and therefore are not shown in Table A-1.

5.1.6 Well RC19-15

The locations of pumped well RC19-15 and observation wells RC18-4 and RC19-10 are shown on Figure 5-12.

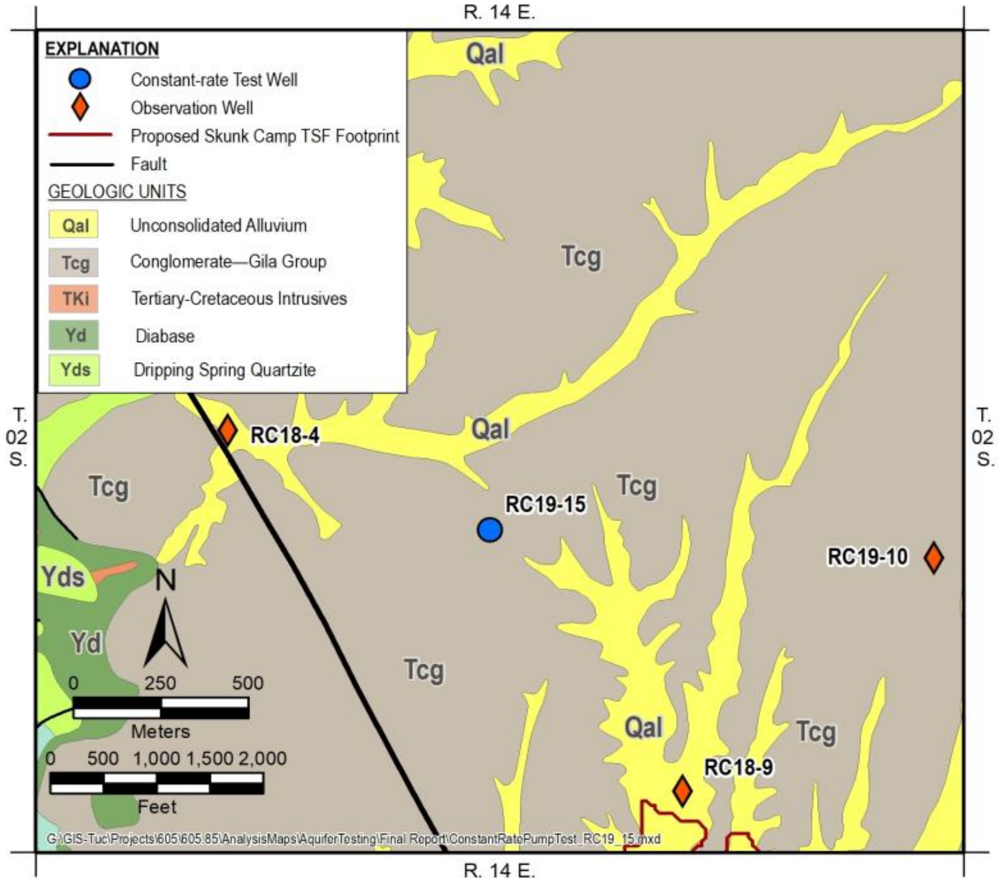


Figure 5-12. RC19-15 Pumping Test Well Locations

Pumped well RC19-15 is located approximately half a mile north of the proposed TSF footprint atop the watershed divide separating the Dripping Spring and Mineral Creek watersheds (Figure 5-1). Observation well RC18-4 is located 2,650 feet northwest of RC19-15 in the Mineral Creek watershed, while observation well RC19-10 is located 4,180 feet east of RC19-15 in the Dripping Spring watershed. Figure 5-13 shows a schematic cross section of the horizontal and vertical distances of the observation wells from RC19-15.

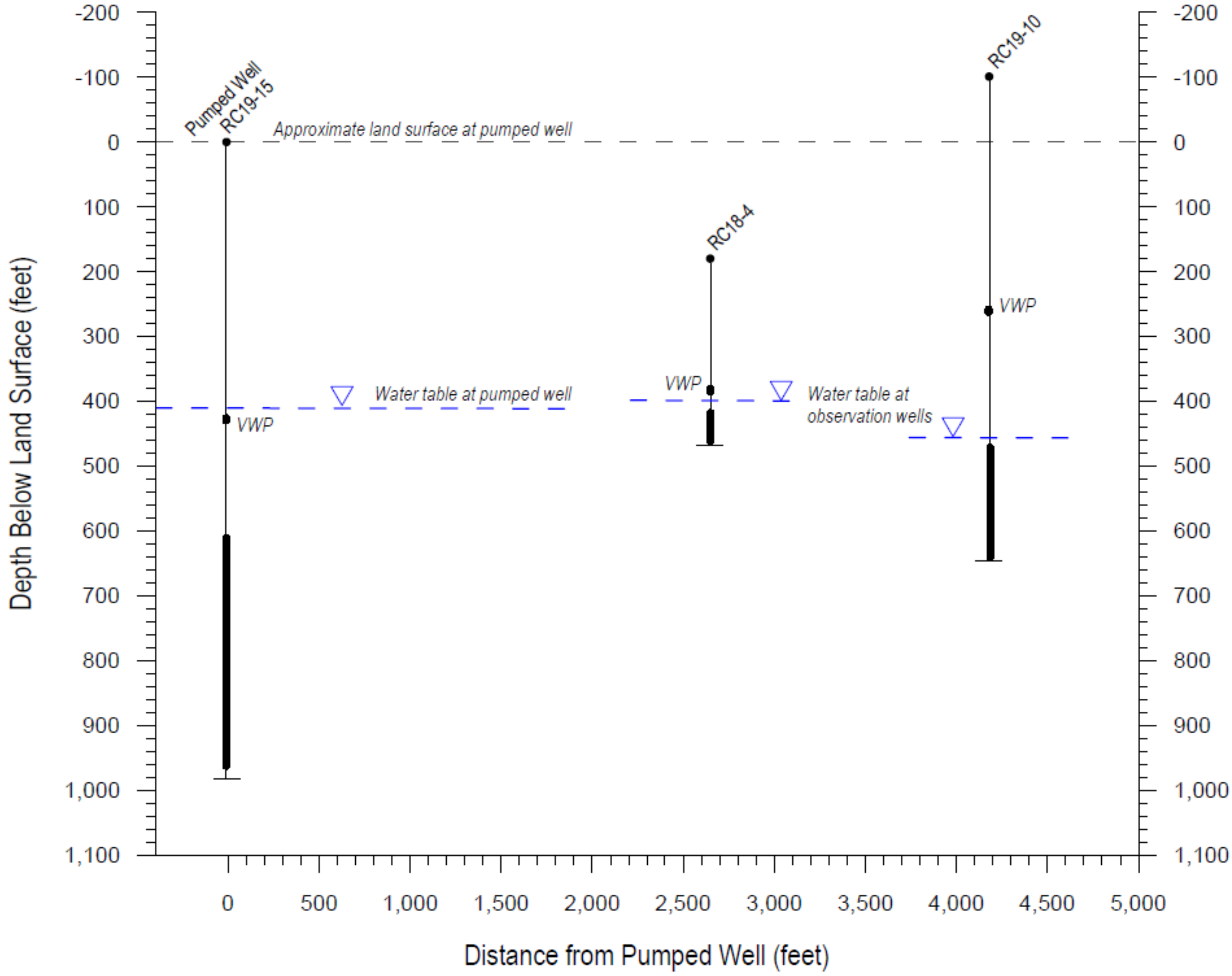


Figure 5-13. RC19-15 Pumping Test - Schematic Cross Section

Note: Well screens and open intervals denoted with bold lines; VWPs indicated by points

RC19-15 penetrates Gila Conglomerate to a depth of 985 feet, with a perforated interval that extends from 595 to 975 feet bls. Both observation wells RC18-4 and RC19-10 are also completed in Gila Conglomerate. Detailed well construction schematics for the wells are included in Appendix D.

Hydrographs for RC19-15 and observation wells during testing activities are included in Appendix B. Depth to pre-pumping water level was 411.57 feet bls. Using the pre-pumping water level depth and well bottom, the saturated aquifer thickness is assumed to be about 573 feet. Duration of pumping was seven days at an average rate of 150 gpm. Near the end of the pumping period, drawdown was 40.6 feet and specific capacity was 3.7 gpm/ft (Appendix A, Table A-1).

The hydrograph for well RC18-4, located 2,650 feet away from RC19-15, shows a measurable amount of water level drawdown due to pumping at RC19-15. During the seven-day pumping period, water level drawdown at RC18-4 reached a maximum of approximately 1.5 feet (Appendix B). Forward modeling based on test results indicates water level drawdown of less than 0.03 feet at a radial distance of 1,000 feet; therefore, the 1.5 feet of drawdown observed at RC18-4 suggests that the two wells are likely connected by a hydraulically conductive fault system. The hydrograph for well RC19-10, located 4,180 feet away from RC19-15 and apparently isolated from near-scale faulting, shows no measurable water level drawdown attributable to pumping at RC19-15.

Field water quality parameters collected from pumped water during the test are shown in Appendix B. On average, groundwater pH was 7.52 and electrical conductivity was 462 µS/cm. Groundwater temperature varied from 75.4 to 78.8 ºF during day and night.

The optimized-fit type curve analysis to measured data for the pumped well and observation well provides the following estimates: transmissivity of 1,275 ft^2/d; anisotropy ratio of vertical to radial hydraulic conductivity, K_z/K_r, of 0.2, and storage parameters for Gila Conglomerate of approximately S = 2.0E-03 and S_y = 0.08. Based on the estimated transmissivity and assumed aquifer thickness of 598 feet, hydraulic conductivity is computed to be on the order of 7.5E-04 cm/s. Given the short duration of the test, the S_y estimate is considered approximate; longer duration testing is needed to increase the certainty of the estimate. Results for the RC19-3 pumping test are summarized in Appendix A, Table A-1.

An analytical solution for the test is included in Appendix B. The analytical solution considers drawdown and derivative data for pumped well RC19-15, and is based on the Cooper-Jacob (1946) semi-log straight-line method for water level response to pumping in an unconfined aquifer. The straight-line fit through test data was optimized for late time, when derivative data exhibits IARF, between approximately 1,000 and 10,000 minutes after the start of pumping. The resulting transmissivity was 920 ft^2/d. The hydraulic conductivity of the Gila Conglomerate at the well location, estimated by dividing transmissivity by the assumed aquifer thickness, was 5.7E-04 cm/s. Results for the RC19-15 pumping test are summarized in Appendix A, Table A-1. Storage parameter results generated by type curve analysis are not considered reliable estimates for single-well tests, and therefore are not shown in Table A-1.

5.1.7 Summary

Results for constant-rate pumping tests are presented in Appendix A, Table A-1 and summarized in Table 5-2 below. AQTESOLV plots of the analytical solutions are included in Appendix B.

Table 5-2. Summary of Constant-rate Pumping Test Results

Well ID	Hydrogeologic Unit Tested	Analytical Method(s)	Transmissivity T, (ft^2/d) [a]	Hydraulic Conductivity (cm/s) [a]	Storage Parameters [b,c]
RC19-3	Gila Conglomerate (Tcg)	Moench (1997); Cooper-Jacob (1946)	1275	7.5E-04	S = 2.0E-03 S_y = 0.08
RC19-7 (upper)	Gila Conglomerate (Tcg)	Moench (1997); Cooper-Jacob (1946)	1475	1.1E-03	S = 1.7E-03 S_y = 0.08
RC19-7 (both) [d]			1650	1.3E-03	S = 5.0E-04 S_y = 0.04
RC19-8B	Gila Conglomerate (Tcg)	Moench (1997); Cooper-Jacob (1946)	330	2.0E-04	S = 4.5E-04 S_y = 0.07
RC19-8D	Gila Conglomerate (Tcg)	Moench (1997)	180	1.1E-04	S = 5.1E-04 S_y = 0.08
RC19-13	Gila Conglomerate (Tcg)	Moench (1997); Cooper-Jacob (1946)	40	1.1E-04	-
RC19-15	Gila Conglomerate (Tcg)	Cooper-Jacob (1946)	920	5.7E-04	-

[a] Metric and imperial unit conversions of T and K values are included in Appendix A, Table A-1
[b] S = elastic storage coefficient
[c] Storage parameters not considered reliable estimates for single-well tests (RC19-13 and RC19-15)
[d] Test conducted with pumping from both upper and lower screens

5.2 Injection Test

A constant-head injection test was conducted at RC19-8C in order to obtain aquifer parameters for the alluvial deposits overlying the Tcg unit. Due to the unsaturated conditions of the alluvial deposits at the location, injection testing was conducted rather than a conventional pumping test.

The objectives of the test were to estimate the saturated hydraulic conductivity (K_{sat}) of the alluvium in the area of the proposed TSF, and to qualitatively assess the hydraulic connectivity between the Quaternary Alluvium and Gila Conglomerate. Descriptions of testing, well construction, and results are provided below.

5.2.1 Well RC19-8C

Well RC19-8C is located near the Dripping Spring Wash towards the southern end of the proposed TSF footprint (Figure 5-1). A close-up map of the locations of test well RC19-8C and observation well RC19-8B is shown on Figure 5-14.

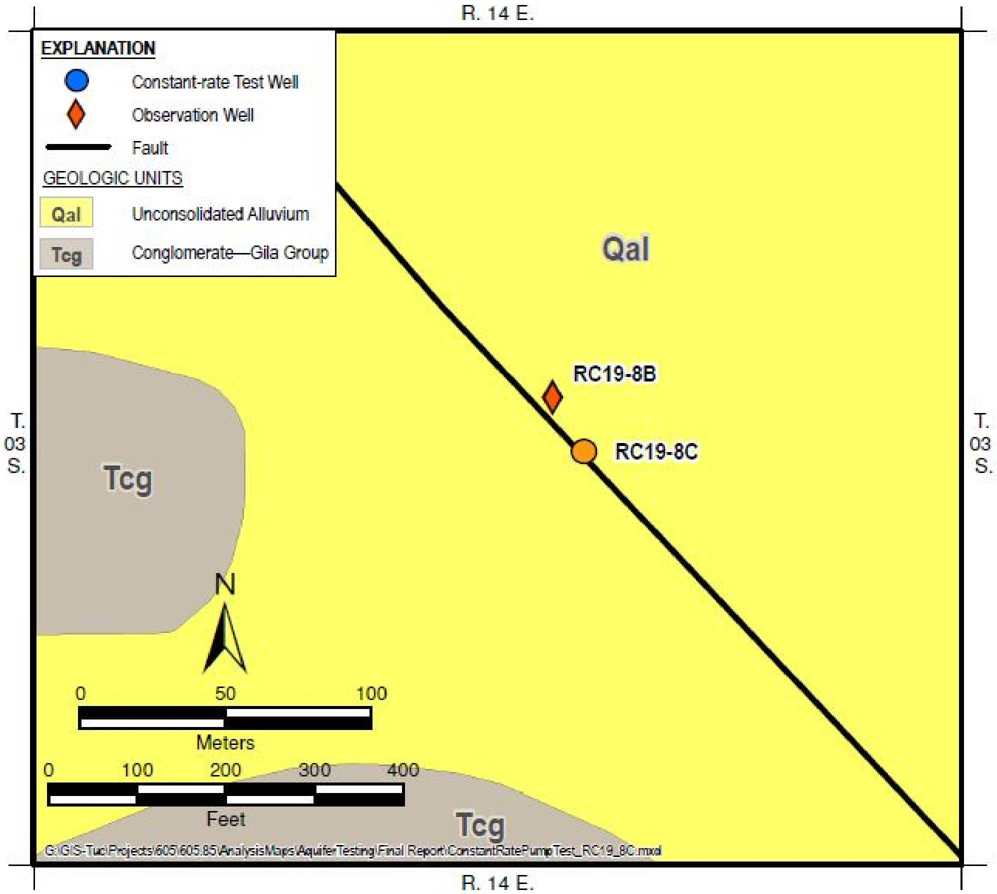


Figure 5-14. RC19-8C Injection Test Well Locations

Well RC19-8C is constructed with wire-wrap screen extending from 31 to 71 feet bls, surrounded by gravel pack that extends from 28 to 72 feet bls. According to the well schematic (Appendix D), the contact between Quaternary Alluvium and Gila Conglomerate is estimated to occur at 67 feet bls; however, geophysical logs were not collected for RC19-8C, and therefore the contact depth is considered approximate.

During the constant-rate pumping test at nearby RC19-8D, the water level at RC19-8C responded in a manner consistent with that of a distinct aquifer, rather than that of the same Gila Conglomerate aquifer being pumped. The differences in water level responses are quite apparent when comparing the hydrograph for RC19-8C with the hydrographs for wells installed in Gila Conglomerate, such as RC19-8, RC19-8B, and RC19-8AS (Appendix B). Consequently, for analysis of the RC19-8C injection test, it was assumed that the contact depth of the Gila Conglomerate is close to the well bottom at 71 feet bls.

Additionally, prior to the start of injection at RC19-8C a small amount of water was present at the bottom of the well. The water level was measured at 70.29 feet bls—approximately 0.7 feet above well bottom. As a result, calculations of K_{sat} were based on the water column head above the pre-test water level rather than the bottom of the well.

Water levels in nearby RC19-8B were monitored to assess hydraulic connectivity between the Quaternary Alluvium and Gila Conglomerate aquifers. A cross section showing horizontal and vertical distances between the wells is presented below.

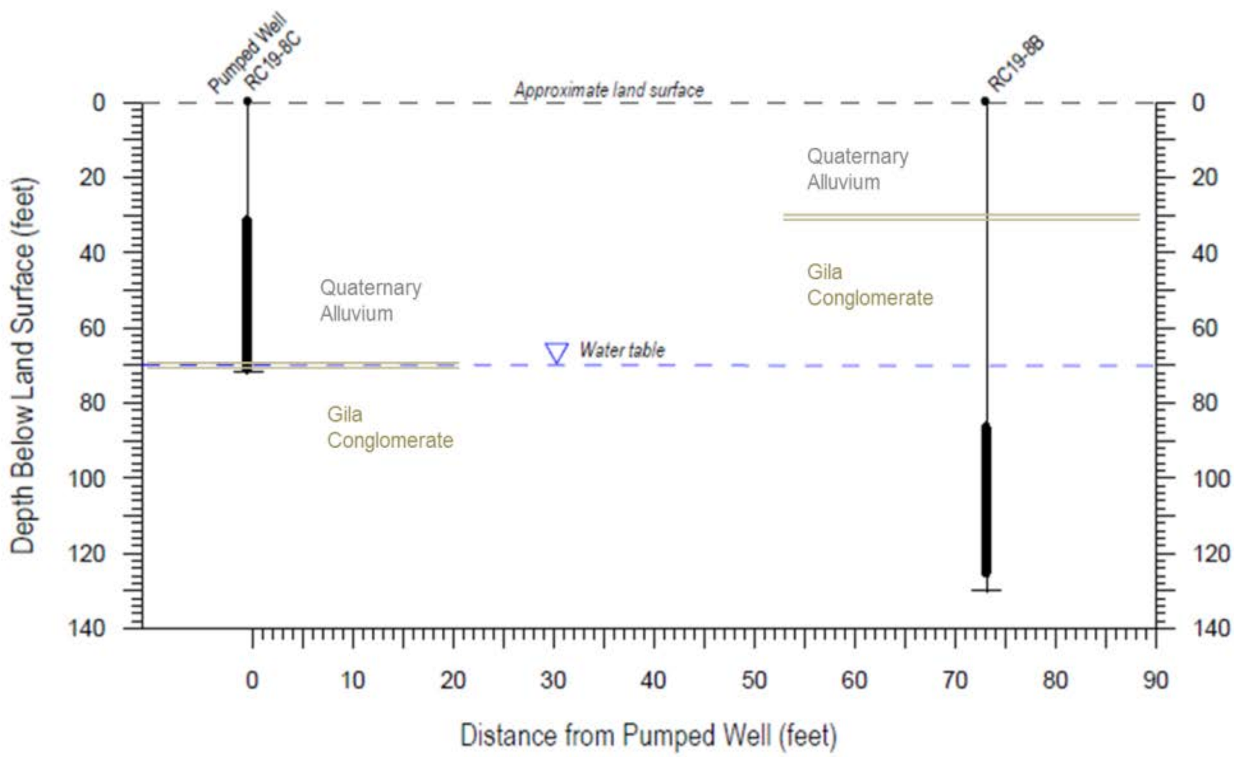


Figure 5-15. RC19-8C Injection Test - Schematic Cross Section

Note: Well screens and open intervals denoted with bold lines.

The test began at 0930 hours on August 20, 2019. Water was injected into RC19-8C at approximately 60 gpm, while the rise in water level in the well was monitored. After the first 10 minutes of the test, water level and injection rate stabilized. For the remaining 50 minutes of the first hour, an average head of 21.3 above pre-test water level feet (with a standard deviation, σ, of 0.03 feet) and an average injection rate was 61.2 gpm (σ = 0.39 gpm) was maintained.

Following one hour, the injection rate was increased at 1030 hrs. After approximately 43 minutes, water level and injection rate stabilized and an average head of 29.3 feet above pre-test water level (σ = 0.13 feet) was maintained for an additional 17 minutes. The average injection rate was 179.9 gpm (σ = 1.02 gpm) over the last 17 minutes of the second hour.

A chart showing injection rates and head of water column during testing is shown on Figure5-16. During the test, the water level in well RC19-8B, which is completed in the Gila Conglomerate, rose approximately 0.4 feet over eight hours (Figure 5-17). The response of the RC19-8B water level to injection of water in the alluvium demonstrates that hydraulic connectivity exists between the Gila Conglomerate and Quaternary Alluvium aquifers at the test location.

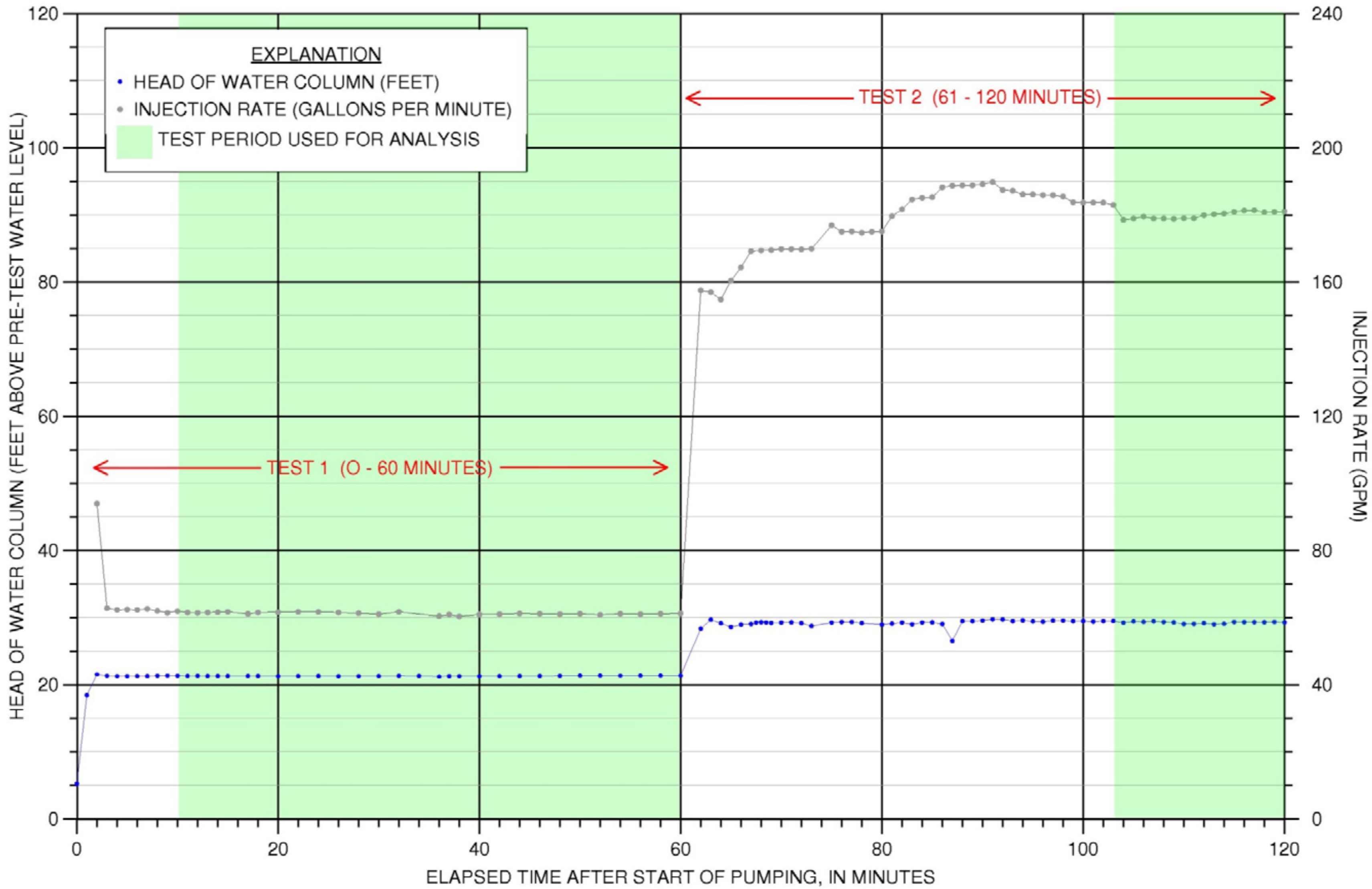


Figure 5-16. Injection Test at RC19-8C

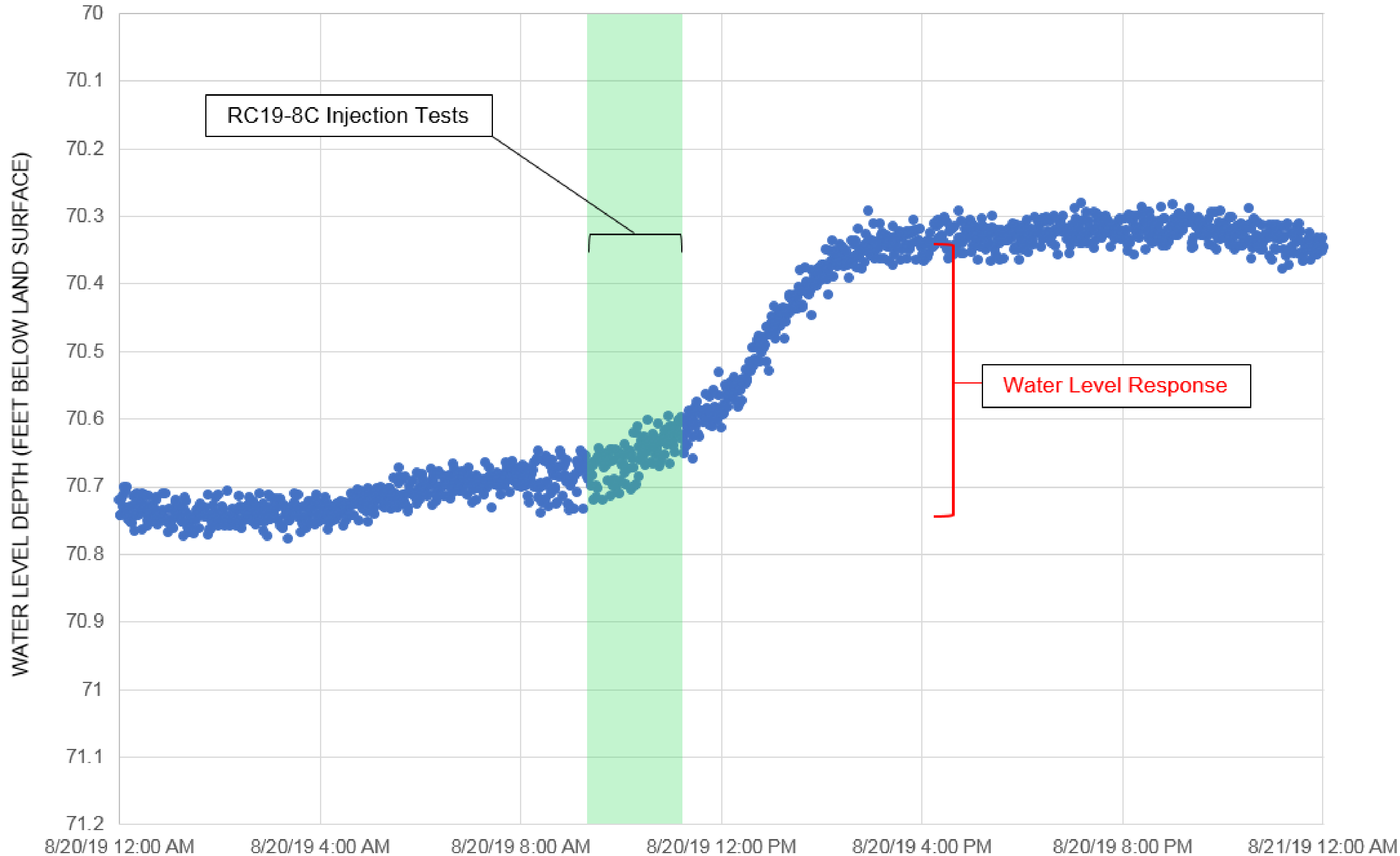


Figure 5-17. Hydrograph for Observation Well RC18-8B during the RC18-8C Injection Test

Constant-head injection test results for well RC19-8C are presented in Appendix A, Table A-2 and summarized in Table 5-3 below.

Table 5-3. Summary of Constant-head Injection Test Results

Well ID	Hydrogeologic Unit Tested	Steady Injection Rate (gpm)	Average Constant-head (feet above pre-test water level)	Analytical Method	Saturated Hydraulic Conductivity, K_{sat}	
					(ft/d)	(cm/s)
RC19-8C	Quaternary Alluvium (Qal)	61.2	21.3	Glover (1953)	14	5.1E-03
				Nasberg-Terletskaya (1954)	21	7.5E-03
		179.9	29.3	Glover (1953)	24	8.6E-03
				Nasberg-Terletskaya (1954)	37	1.3E-02

5.3 Slug Tests

Slug tests were carried out at wells RC18-4 and RC19-10 between June 6 and 28, 2019. A total of 11 individual slug tests were conducted at the two wells, both of which were completed in Gila Conglomerate. The locations of these wells are shown on Figure 5-1, and well construction diagrams are included in Appendix D. A summary of well construction characteristics is presented in Table 5-4 below.

Table 5-4. Well Construction Characteristics of Slug Test Wells

Well ID	Well Diameter (in)	Total Depth (ft bls)	Open Interval (ft bls) [a]	Hydrogeologic Unit at Open Interval
RC18-4	4	269	223 - 269	Gila Conglomerate (Tcg)
RC19-10	4	647.3	437.2 - 650	Gila Conglomerate (Tcg)

[a] Includes well screen and gravel pack

The number of tests at each well and hydraulic characteristics of the tests are summarized in Table 5-5.

Table 5-5. Hydraulic Characteristics of Slug Tests

Well ID	# of Slug Tests	Pre-Test Water Level (ft bls) [a]	Initial Water Level Displacement (ft)	Approximate Test Duration (hrs)
RC18-4	8	217.2	1.26 - 3.35	0.5 - 1
RC19-10	3	563.6	1.48 - 2.96	13 - 17

[a] Approximate and does not indicate static conditions

5.3.1 Well RC18-4

Eight rising and falling-head tests were carried out at RC18-4, located approximately one mile northwest of the proposed TSF footprint adjacent to the principal fault (Figure 5-1). Observed initial water level displacements ranged from 1.26 to 3.35 feet. Water levels fully recovered at RC18-4 within 30 minutes to an hour, depending on the magnitude of the initial displacement. The water level displacements of the first two and last two tests were repeated to check for consistency and well development effects (Butler, 1997). Detailed information for each of the tests—including initial water level depths, saturated thicknesses, slug volumes, observed displacements, and test durations—is included in Appendix A, Table A-3.

5.3.2 Well RC19-10

Three rising-head tests were carried out at RC19-10, located approximately one mile north of the proposed TSF footprint and relatively more isolated than the other test wells from the primary fault trend system (Figure 5-1). Well RC19-10 is screened across the water table; therefore, only rising-head tests were carried out in order to maintain a constant test interval length (Butler, 1997). Initial water level displacements ranged from 1.48 to 2.96 feet, and recovered within 13 to 17 hours. The initial water level displacements of the first and last test were repeated to check for consistency and well development effects. Detailed information for each of the tests is included in Appendix A, Table A-3.

5.3.3 Summary

Results for slug tests are presented in Appendix A, Table A-3 and summarized in Table 5-6 below.

Table 5-6. Summary of Slug Test Results

Well ID	Hydrogeologic Unit(s) at the Screened Interval	Analytical Method(s)	Average Hydraulic Conductivity (ft/d)	Average Hydraulic Conductivity (cm/s)
RC18-4	Gila Conglomerate (Tcg)	Bouwer-Rice [a]	4.8E-01	1.7E-04
RC19-10 [b]	Gila Conglomerate (Tcg)	KGS [b]	2.1E-03	7.3E-07

[a] Bouwer and Rice (1976)
[b] RC19-10 results based on rising-head tests only
[c] Kansas Geological Society (KGS) Model, Hyder et al. (1994)

AQTESOLV plots of the Bouwer-Rice and KGS analytical solutions for the slug tests are included in Appendix C.

6 CONCLUSIONS

Aquifer testing at Skunk Camp has provided valuable information about the hydraulic properties of the Gila Conglomerate and Quaternary Alluvium in the area of the proposed TSF. The results include quantitative estimates of transmissivity, hydraulic conductivity, and storage, and qualitative assessments of the groundwater flow behavior near fault systems and between geologic units.

Analytical results for the tests demonstrated hydraulic conductivities of Gila Conglomerate ranging from 1E-03 to 7E-07 cm/s, and saturated hydraulic conductivities (K_{sat}) of Quaternary Alluvium of approximately 8E-03 to 1E-02 cm/s. Results for Gila Conglomerate are based on pumping and slug tests conducted at eight wells distributed within and around the area of the proposed TSF, while results for Quaternary Alluvium are based on an injection test conducted at a single well located in the southern part of the proposed TSF footprint.

Storage parameter estimates were developed for Gila Conglomerate based on pumping tests using observation wells and piezometers. Results for the multi-well tests provided the following estimates: S (elastic storage coefficient) on the order of 5E-04 to 2E-03, and S_y (specific yield) in the range of 0.04 to 0.08. The ratio of vertical to radial hydraulic conductivity (K_z/K_r) varied from 0.1 to 0.8 for the multi-well tests, which is consistent with some degree of horizontal layering observed in Gila Conglomerate. The S_y and K_z/K_r results should be considered approximate with significant uncertainty due to factors such as short duration of tests, inherent construction characteristics of exploration wells, and recharging of discharge water from the pumped well via the permeable unsaturated alluvial sediments overlying the Gila Conglomerate.

6.1 Permeability of Fault Systems

The results of aquifer testing indicate that there may be enhancement of groundwater movement in the proximity of fault structures. Most of the test wells are located near mapped fault systems oriented NW-SE along Dripping Spring Wash with the exception of one which had much lower hydraulic conductivity.

Observations made during pumping tests also indicate that local fault systems alone may enhance directional groundwater movement. The rapid recirculation of pumped water during the pumping test at RC19-7 was more indicative of flow through fractures or faults than flow through matrix Gila Conglomerate. Additionally, water level drawdown observed at RC18-4 during the RC19-15 pumping test suggests that the two wells are likely connected by a conductive fault system. Although RC18-4 is located 2,650 feet away from RC19-15, drawdown began approximately 20 hours after the start of pumping at RC19-15, and reached a maximum drawdown of 1.5 feet after one week of pumping (Appendix B).

6.2 Hydraulic Connection of Geologic Units

Hydraulic connectivity between geologic units was observed during three aquifer tests: the pumping tests at RC19-3 and RC19-8D, and the injection test at RC19-8C. During the pumping test at RC19-3, hydraulic head pressures were monitored by three VWPs at nearby DH19-3A. The deepest VWP, installed in Paleozoic limestone, showed a simultaneous response to pumping from the Gila Conglomerate aquifer at RC19-3 (Appendix B). The VWP in the deeper limestone recorded a decrease in hydraulic head of approximately 8.3 feet during the test (compared to a maximum water level drawdown of 168.2 feet in the pumped well).

The response of the water table in the alluvium indicated a measurable degree of hydraulic connectivity between the Quaternary Alluvium and Gila Conglomerate at the RC19-8D well location. During the pumping test conducted in Gila Conglomerate, the water level in the Quaternary Alluvium was monitored at well RC19-8C in the thin, saturated interval in the lower part of the well. The hydrograph of RC19-8C during the test (Appendix B) showed drainage from the alluvium as water level drawdown occurred in the underlying Gila Conglomerate during pumping at RC19-8D.

Similarly, the hydraulic connection between the Quaternary Alluvium and Gila Conglomerate was observed in the opposing direction (mounding) during the constant-head injection test at RC19-8C. During the injection test, approximately 14,000 gallons of water were pumped into unsaturated Quaternary Alluvium over two hours. The water level monitored at RC19-8B, completed in the upper part of the Gila Conglomerate, showed a rise of approximately 0.4 feet as a result of the injected water (Figure 5-17). The water level response at RC19-8B provided a second demonstration of hydraulic connectivity between Qal and Tcg at the test location.

MONTGOMERY & ASSOCIATES

7 REFERENCES

Agarwal, R.G., 1980. A new method to account for producing time effects when drawdown type curves are used to analyze pressure buildup and other test data, SPE Paper 9289 presented at the 55th SPE Annual Technical Conference and Exhibition, Dallas, Texas, Sep. 21-24, 1980.

Batu, V., 1998, Aquifer hydraulics: a comprehensive guide to hydrogeologic data analysis: John Wiley & Sons, New York, 727 p.

Bear, J., 1979, Hydraulics of Groundwater: McGraw-Hill, New York, 569 p.

Bourdet, D.J., Ayoub, J.A., and Pirard, Y.M., 1989, Use of pressure derivative in well-test interpretation: SPE Formation Evaluation, June 1989, pp. 293-302.

Bourdet, D., 2002, Well Test Analysis: The Use of Advanced Interpretation Models: Elsevier, New York, 426 p.

Bouwer, H., 1989, The Bouwer and Rice slug test--an update, Ground Water, vol. 27, no. 3, pp. 304-309.

Bouwer, H. and R.C. Rice, 1976, A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

Butler, J.J., Jr., 1997, The Design, Performance, and Analysis of Slug Tests, 1st Edition.

Butler, J.J., Jr., W. Jin, G. Mohammed, and E.C. Reboulet, 2011, New insights from well responses to fluctuations in barometric pressure: Ground Water, 49(4), pp. 525-533.

Chirlin, G.R., 1989, A critique of the Hvorslev method for slug test analysis: The fully penetrating well, Ground Water Monitor. Rev., 9(2), 130.

Cooper, H.H., Jr. and Jacob, C.E., 1946. A generalized graphical method for evaluating formation constants and summarizing well-field history, American Geophysical Union Transactions, vol. 27, pp. 526-534.

Cornwall, H.R., Banks, N.G., and Phillips, C.H., 1971, Geologic map of the Sonora Quadrangle, Pinal and Gila Counties, Arizona: United States Geological Survey, Geologic Quadrangle Map GQ-1442, 1:24,000.

Dougherty, D.E and D.K. Babu, 1984, Flow to a partially penetrating well in a double-porosity reservoir: Water Resources Research, vol. 20, no. 8, pp. 1116-1122.

Ehlig-Economides C.A., Hegeman P., and S. Vik, 1994, Guidelines simplify well test analysis. Oil Gas Journal, vol. 92, pp. 33–40.

Fetter, C.W., 2001, Applied Hydrogeology. 4th Edition, Upper Saddle River, N.J.: Prentice Hall.

Glover, R.E., 1953, Flow from a test-hole located above ground-water level in Theory and problems of water percolation: United States Bureau of Reclamation Engineering Monograph No. 8, pp. 69-71.

Hyder, Z., J.J. Butler, Jr., C.D. McElwee and W. Liu, 1994, Slug tests in partially penetrating wells, Water Resources Research, vol. 30, no. 11, pp. 2945-2957.

HydroSOLVE, Inc., 2012, AQTESOLV for Windows 95/98/NT/2000/XP/Vista: HydroSOLVE, Inc., Reston, Virginia, version 4.51.002 – Professional.

Lohman, S.W., 1972, Ground-water hydraulics: U.S. Geological Survey Professional Paper 708, 70 p.

Moench, A.F., 1997, Flow to a well of finite diameter in a homogeneous, anisotropic water-table aquifer: Water Resources Research, vol. 33, no. 6, pp. 1397-1407.

Morris, D.A. and A.I. Johnson, 1967, Summary of hydrologic and physical properties of rock and soil materials as analyzed by the Hydrologic Laboratory of the U.S. Geological Survey: U.S. Geological Survey Water-Supply Paper 1839-D, 42 p.

Nasberg, V.M., 1951, The problem of flow in an unsaturated soil for injection under pressure: Ixvestja Akademia Nauk. SSR Odt Tekh Nauk, No. 9.

Renard, P., Glenz, D., and Mejias, M. 2008, Understanding diagnostic plots for well-test interpretation: Hydrogeology Journal, published online November 20, 2008, doi:10.1007/s10040-008-0392-0.

Richard, S.M., 1998, Geologic map of portions of the Globe 30’ X 60’ Quadrangle, Arizona: Arizona Geological Survey Digital Geologic Map DI-13, v. 1.0.

Spane, F.A., Jr., and S.K. Wurstner, 1993. DERIV: A computer program for calculating pressure derivatives for use in hydraulic test analysis, Ground Water, vol. 31, no. 5, pp. 814-822.

Spencer, J.E., Richard, S.M., and Pearthree, P.A., 1998, Geologic map of the Mesa 30’ X 60’ Quadrangle, Arizona: Arizona Geological Survey Digital Geologic Map DI-11, v. 1.0.

Tartakovsky, G.D. and S.P. Neuman, 2007. Three-dimensional saturated-unsaturated flow with axial symmetry to a partially penetrating well in a compressible unconfined aquifer, Water Resources Research, W01410, doi:1029/2006WR005153.

Terletskata, N. M., 1954, Determination of permeability in dry soils: Hydroelectric Waterworks No. 2, Moscow, U.S.S.R., February 1954.

Theis, C.V., 1935. The relationship between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage, American Geophysical Union Transactions, vol. 16, pp. 519-524.

8 ACRONYMS & ABBREVIATIONS

AZPDES ....Arizona Pollutant Discharge Elimination System
α ....aquifer compressibility; also, non-instantaneous drainage constant in Moench (1997)
b......................aquifer thickness
β ....compressibility of water
bls...................below land surface
cm/s ....centimeters per second
DMGP............De Minimus General Permit
EC ....electrical conductivity
ºF ....degrees Fahrenheit
ft/d ....feet per day
ft^2/d.................square feet per day
g......................gravitational acceleration
gpm ....gallons per minute
gpm/ft.............gallons per minute per foot
hrs...................hours
IARF ....infinite-acting radial flow
K.....................hydraulic conductivity
KCB ....Klohn Crippen Berger Ltd.
K_{sat} ....saturated hydraulic conductivity
K_z/K_r ....ratio of vertical to radial hydraulic conductivity
ln ....natural logarithm
m^2/d ....square meters per day
n......................total porosity
n_e ....effective porosity
ρ......................mass density of water
pH...................potential hydrogen
RC ....Resolution Copper
S ....Storativity; also elastic storage coefficient
S_r ....specific retention
S_s ....specific storage
S_y....................specific yield
T ....transmissivity
µS/cm ....micro-Siemens per centimeter
VWP...............vibrating wire piezometer

Appendix A

Aquifer Testing Results Summary Tables

TABLE A-1. CONSTANT-RATE PUMPING TEST RESULTS

SKUNK CAMP INVESTIGATION AREA
PINAL AND GILA COUNTIES, ARIZONA

PUMPED WELL	TEST START (dd-mm-yy hh:mm)	TEST END (dd-mm-yy hh:mm)	PUMPING DURATION	OBSERVATION WELLS	PUMPING RATE (gpm) [a]	PRE-PUMPING WATER LEVEL DEPTH (ft bls) [b]	MAXIMUM WATER LEVEL DRAWDOWN (ft)	SPECIFIC CAPACITY (gpm/ft) [c]	HYDROGEOLOGIC UNIT TESTED	WELL CONSTRUCTION AND AQUIFER TYPE	SATURATED THICKNESS OF UNIT(S) TESTED (ft)	ANALYTICAL METHOD(S)	TEST TYPE	HYDRAULIC PARAMETERS: TRANSMISSIVITY, T		HYDRAULIC CONDUCTIVITY, K [d]		ELASTIC STORAGE COEFFICIENT, S [e]	SPECIFIC YIELD, Sy [e]	Ratio Kz / Kr
														(ft^2/d)	(m^2/d)	(ft/d)	(cm/s)			
RC19-3	24-Aug-19 08:00	27-Aug-19 08:00	3 days	DH19-3A-VWP(A,B,C)	100	262.88	168.2	0.6	Gila Conglomerate (Tcg)	Unconfined, Partially penetrating	598	Moench (1997), Cooper-Jacob (1946)	Multiple Well, Constant-rate Pumping	1275	119	2.1E+00	7.5E-04	2.0E-03	0.08	0.2
RC19-7 [Upper Screen]	03-July-19 16:30	04-July-19 16:30	24 hrs	DH19-7-VWP(A,B,C)	60	295.21	41.9	1.4	Gila Conglomerate (Tcg)	[Upper Screen Only] Unconfined, Partially penetrating	465	Moench (1997), Cooper-Jacob (1946)	Multiple Well, Constant-rate Pumping	1475	137	3.2E+00	1.1E-03	1.7E-03	0.08	0.5
RC19-7 [Upper and Lower Screens]	10-July-19 09:00	11-July-19 05:00	20 hrs	DH19-7-VWP(A,B,C)	165	295.43	67.0	2.5	Gila Conglomerate (Tcg)	[Upper and Lower Screens] Unconfined, Partially penetrating	465	Moench (1997), Cooper-Jacob (1946)	Multiple Well, Constant-rate Pumping	1650	153	3.5E+00	1.3E-03	5.0E-04	0.04	0.2
RC19-8B	16-Aug-19 11:15	17-Aug-19 11:15	24 hrs	DH19-8B-VWP(A,B,C)	7	70.57	28.7	0.2	Gila Conglomerate (Tcg)	Unconfined, Partially penetrating	578	Moench (1997), Cooper-Jacob (1946)	Multiple Well, Constant-rate Pumping	330	31	5.7E-01	2.0E-04	4.5E-04	0.07	0.1
RC19-8D	16-Jul-19 09:00	30-Jul-19 09:00	14 days	RC19-8 RC19-8AS RC19-8AD RC19-8B RC19-8C DH19-8B-VWP(A,B,C) Lower Well	90	72.61	148.9	0.6	Gila Conglomerate (Tcg)	Unconfined, Partially penetrating	578	Moench (1997), Argawal Time	Multiple Well, Constant-rate Pumping	180	17	3.1E-01	1.1E-04	5.1E-04	0.08	0.35
RC19-13	22-Jun-19 08:35	29-Jun-19 08:35	7 days	Headquarters Well #2 Headquarters Well #3	6	222.04	35.5	0.2	Gila Conglomerate (Tcg)	Unconfined, Partially penetrating	128	Cooper-Jacob (1946)	Single Well, Constant-rate Pumping	40	4	3.1E-01	1.1E-04	-	-	-
RC19-15	06-Aug-19 09:00	13-Aug-19 09:00	7 days	RC18-4 RC19-10	150	411.57	40.6	3.7	Gila Conglomerate (Tcg)	Unconfined, Partially penetrating	573	Cooper-Jacob (1946)	Single Well, Constant-rate Pumping	920	86	1.6E+00	5.7E-04	-	-	-

Note:
[a] gallons per minute
[b] feet below land surface
[c] gallons per minute per foot of drawdown
[d] Calculated by dividing transmissivity by saturated thickness of test unit; hydraulic conductivity is equivalent to radial hydraulic conductivity (K_r) when K_z/K_r is less than one
[e] Storage parameters not considered reliable estimates for single-well tests

MONTGOMERY & ASSOCIATES

TABLE A-2. CONSTANT-HEAD INJECTION TEST RESULTS

SKUNK CAMP INVESTIGATION AREA
PINAL AND GILA COUNTIES, ARIZONA

													SATURATED HYDRAULIC CONDUCTIVITY [b]			
													GLOVER (1953)		NASBERG-TERLETSKATA (1954)	
WELL ID	TEST START (dd-mm-yy hh:mm)	TEST END (dd-mm-yy hh:mm)	INJECTION DURATION	STEADY INJECTION RATE (gpm)	TEST PERIOD USED FOR ANALYSIS	TOTAL WELL DEPTH (ft bls)	PRE-TEST WATER LEVEL (ft bls) [a]	AVERAGE CONSTANT-HEAD (ft above pre-test water level)	HYDROGEOLOGIC UNIT TESTED	WELL CONSTRUCTION AND AQUIFER TYPE	ANALYTICAL METHOD(S)	TEST TYPE	K_{sat} (ft/d)	K_{sat} (cm/s)	K_{sat} (ft/d)	K_{sat} (cm/s)
RC19-8C	20-Aug-19 09:30	20-Aug-19 10:30	1 hr	61.2	last 50 minutes	72.4	70.3	21.3	Quaternary Alluvium (Qal)	Fully Penetrating; Mostly Unsaturated Vadose Zone	Glover (1953), Nasberg-Terletskata (1954)	Constant-head Injection	14	5.1E-03	21	7.5E-03
	20-Aug-19 10:30	20-Aug-19 11:30	1 hr	179.9	last 17 minutes	72.4	70.3	29.3	Quaternary Alluvium (Qal)	Fully Penetrating; Mostly Unsaturated Vadose Zone	Glover (1953), Nasberg-Terletskata (1954)	Constant-head Injection	24	8.6E-03	37	1.3E-02

Note:
[a] Approximate static water level
[b] Composite of vertical and radial flow components

MONTGOMERY
& ASSOCIATES

TABLE A-3. SLUG TEST RESULTS

SKUNK CAMP INVESTIGATION AREA
PINAL AND GILA COUNTIES, ARIZONA

Well ID	Slug Test Type	Slug Type	Test Date (dd/mm/yr)	Time of Test Start (hh:mm)	Approx. Test Duration (hh:mm)	Slug Volume (ft^3)	Initial WL (ft bls) [a]	Calculated Initial WL Displacement (ft)	Observed Initial WL Displacement (ft)	Well Screened Across WL	Aquifer Saturated Thickness, b (ft)	H (ft)	Depth to Well Screen, d (ft)	Length of Well Screen, L (ft)	Penetration	Aquifer Type	Hydrogeologic Unit Tested	Hydraulic Conductivity, K (cm/s)		
																		Bouwer-Rice [b]	KGS [c]	Representative Geomean K
RC18-4	Falling Head	Solid	06/06/19	13:59	0:30	0.129	214.55	1.56	1.26	No	51.75	51.75	5.75	46.00	Partial	Unconfined	Gila Congomerate (Tcg)	1.70E-04	-	1.7E-04
	Rising Head	Solid	06/06/19	14:31	0:30	0.129	214.54	1.56	1.27		51.75	51.75	5.75	46.00	Partial	Unconfined	Gila Congomerate (Tcg)	1.70E-04	-	
	Falling Head	Solid	06/06/19	15:05	0:45	0.215	214.55	2.46	1.93		51.75	51.75	5.75	46.00	Partial	Unconfined	Gila Congomerate (Tcg)	1.70E-04	-	
	Rising Head	Solid	06/06/19	15:49	0:45	0.215	214.53	2.46	1.98		51.75	51.75	5.75	46.00	Partial	Unconfined	Gila Congomerate (Tcg)	1.70E-04	-	
	Falling Head	Solid	06/07/19	9:21	0:50	0.368	214.52	4.22	3.31		51.75	51.75	5.75	46.00	Partial	Unconfined	Gila Congomerate (Tcg)	1.60E-04	-	
	Rising Head	Solid	06/07/19	10:10	0:50	0.368	214.50	4.22	3.35		51.75	51.75	5.75	46.00	Partial	Unconfined	Gila Congomerate (Tcg)	1.60E-04	-	
	Falling Head	Solid	06/07/19	11:04	0:26	0.129	214.52	1.56	1.30		51.75	51.75	5.75	46.00	Partial	Unconfined	Gila Congomerate (Tcg)	1.80E-04	-	
	Rising Head	Solid	06/07/19	11:30	0:26	0.129	214.51	1.56	1.37		51.75	51.75	5.75	46.00	Partial	Unconfined	Gila Congomerate (Tcg)	1.70E-04	-	
RC-10 [d]	Rising Head	Solid	06/07/19	8:23	13:20	0.174	564.41	0.73	0.87	Yes	78.40	78.40	0.00	78.40	Partial	Unconfined	Gila Congomerate (Tcg)	-	8.00E-07	7.3E-07
	Rising Head	Solid	06/20/19	11:01	16:40	0.436	563.28	1.82	1.68		78.40	78.40	0.00	78.40	Partial	Unconfined	Gila Congomerate (Tcg)	-	8.00E-07	
	Rising Head	Solid	06/28/19	7:37	13:20	0.174	563.20	0.73	0.79		78.40	78.40	0.00	78.40	Partial	Unconfined	Gila Congomerate (Tcg)	-	6.00E-07	

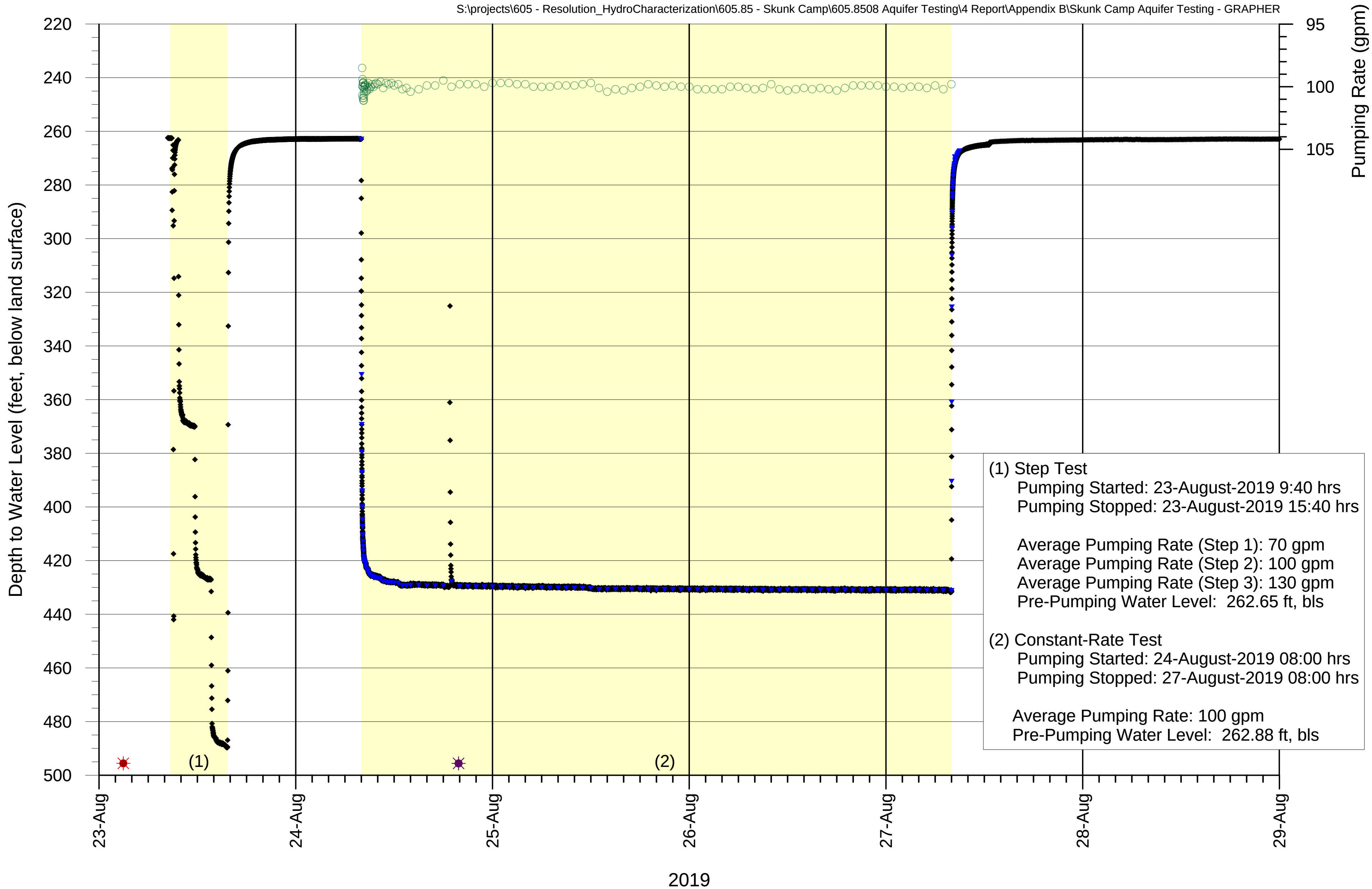
Note:
[a] feet below land surface
[b] Bouwer and Rice (1976)
[c] Kansas Geological Society (KGS) Model, Hyder et al. (1994)
[d] Well RC19-10 is screened across the water table, and therefore only rising-head tests were carried out in order to maintain a constant test interval length

MONTGOMERY
& ASSOCIATES

Appendix B

Pumping Test Hydrographs, Field Parameters, and Analytical Solutions

RC19-3



EXPLANATION

- ▼ Water Level (manual)
- ◆ Water Level (transducer)
- ○ Pumping Rate (instantaneous)

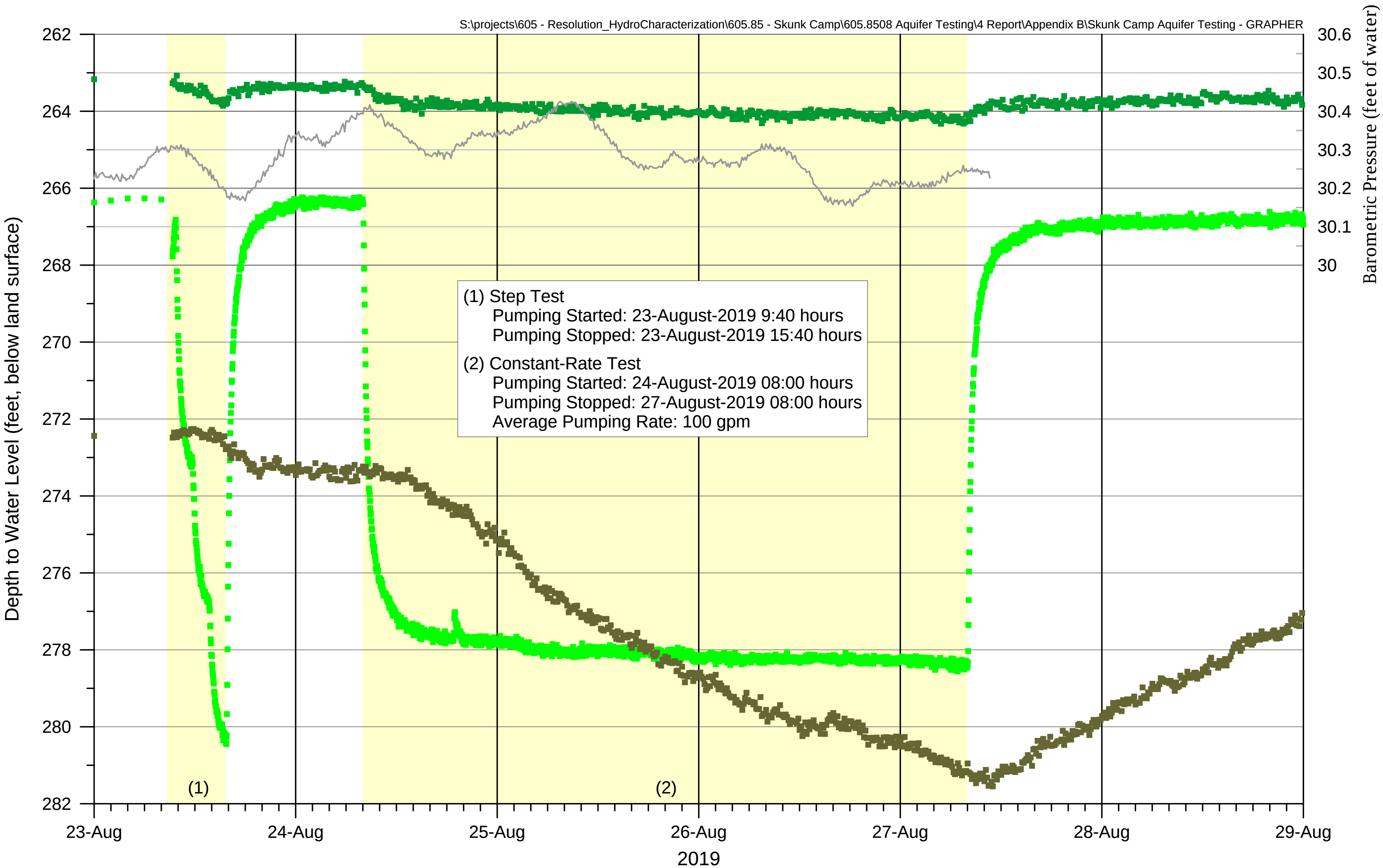
Data Gaps

- ✷ Pump Installed - Transducer removed
- ✷ Pump stopped from 18:47 - 18:49 (2 minutes)

HYDROGRAPH FOR PUMPED WELL RC19-3 DURING STEP AND CONSTANT-RATE PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



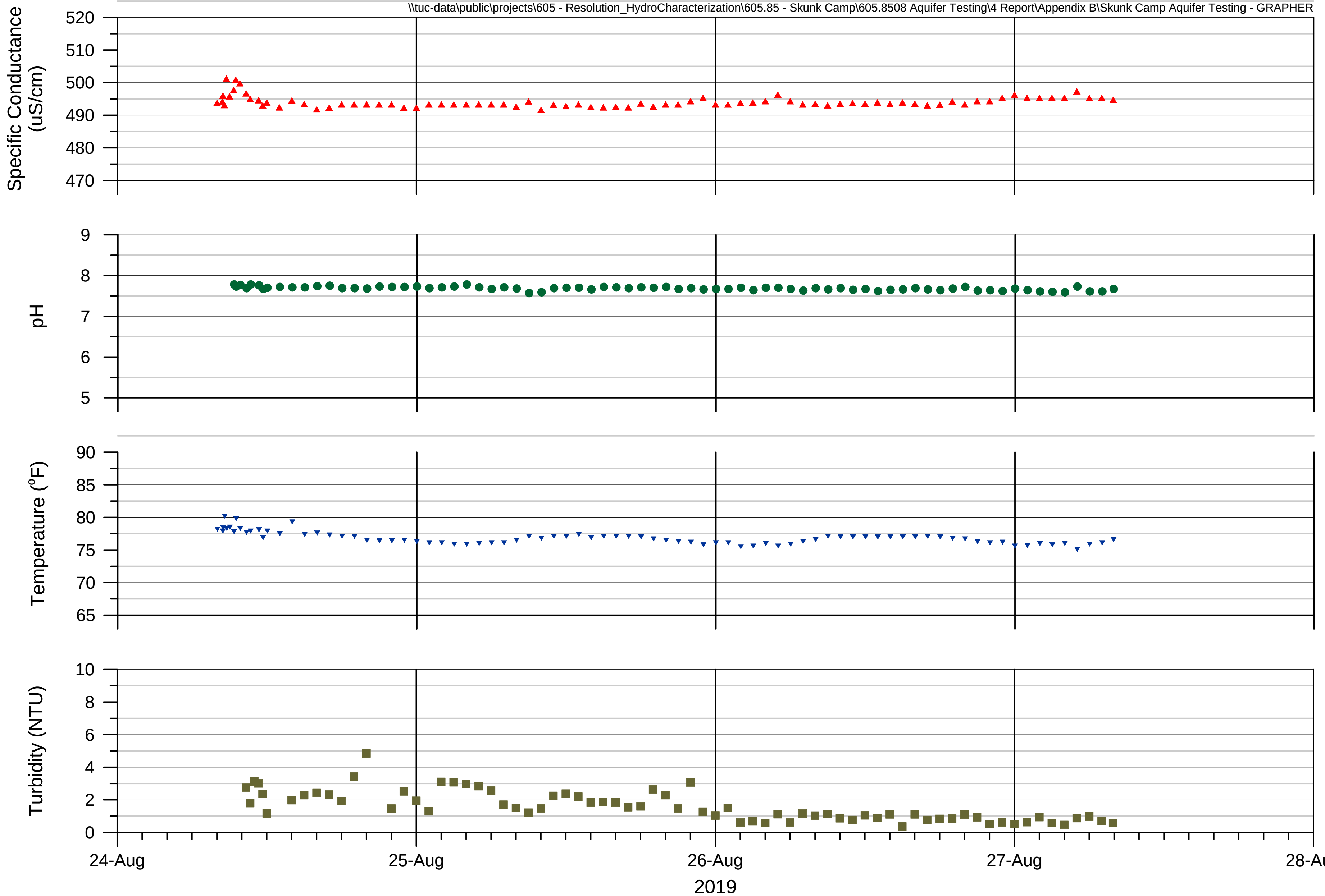
EXPLANATION

- DH19-3A (VWP 3021)
- DH19-3A (VWP 2732)
- DH19-3A (VWP 2437)
- Barometric Pressure at RC19-8

HYDROGRAPHS FOR OBSERVATION WELL DH19-3A VWPS DURING RC19-3 PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



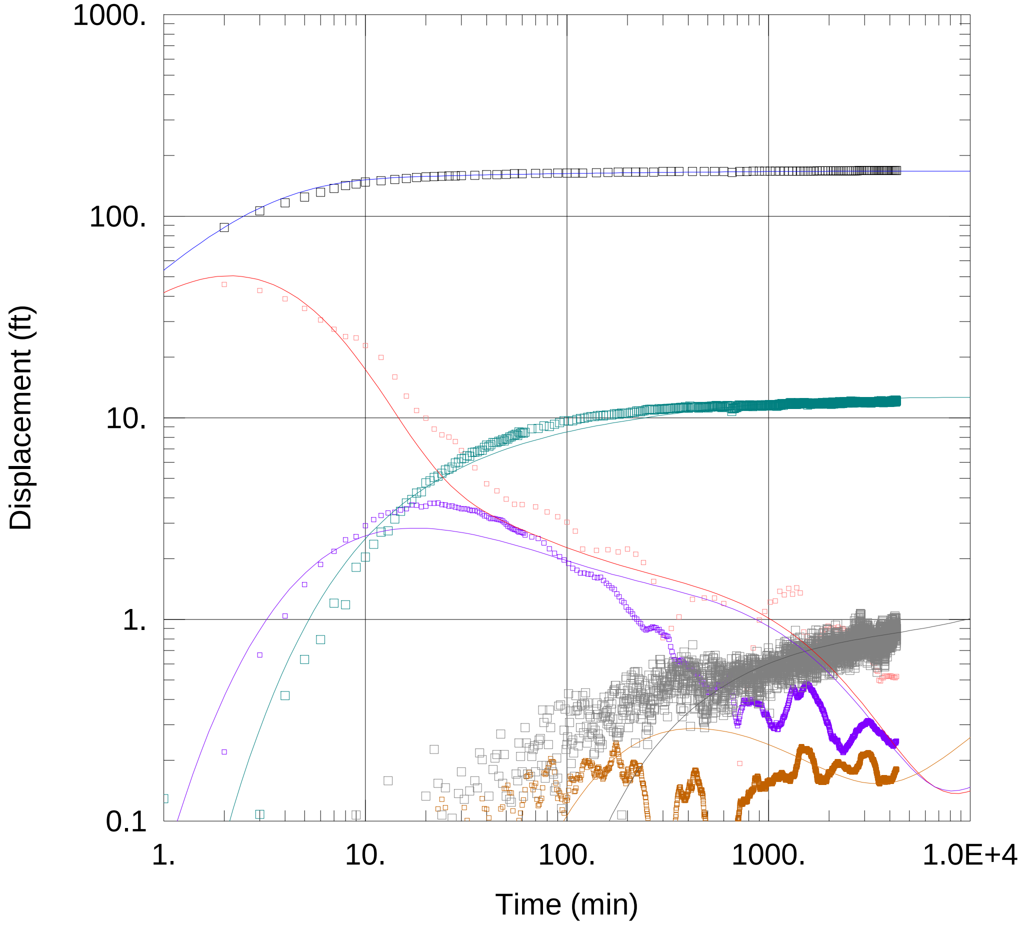
EXPLANATION

- Specific Electrical Conductance
- pH
- Temperature
- Turbidity

FIELD MEASUREMENTS OF SPECIFIC CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC19-3

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



RC19-3 CONSTANT-RATE PUMPING TEST

Data Set: S:\...\RC19-3_DH19-3A_B_C_ddMoench_cg(roundedcoords).aqt
Date: 08/31/19 Time: 08:18:45

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC19-3
Test Date: 24-27 Aug 2019

AQUIFER DATA

Saturated Thickness: 598. ft Anisotropy Ratio (Kz/Kr): 0.2

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-3	1009065	790263

Observation Wells

Well Name	X (ft)	Y (ft)
RC19-3	1009065	790263
DH19-3A_B	1009093	790194
DH19-3A_C	1009093	790194

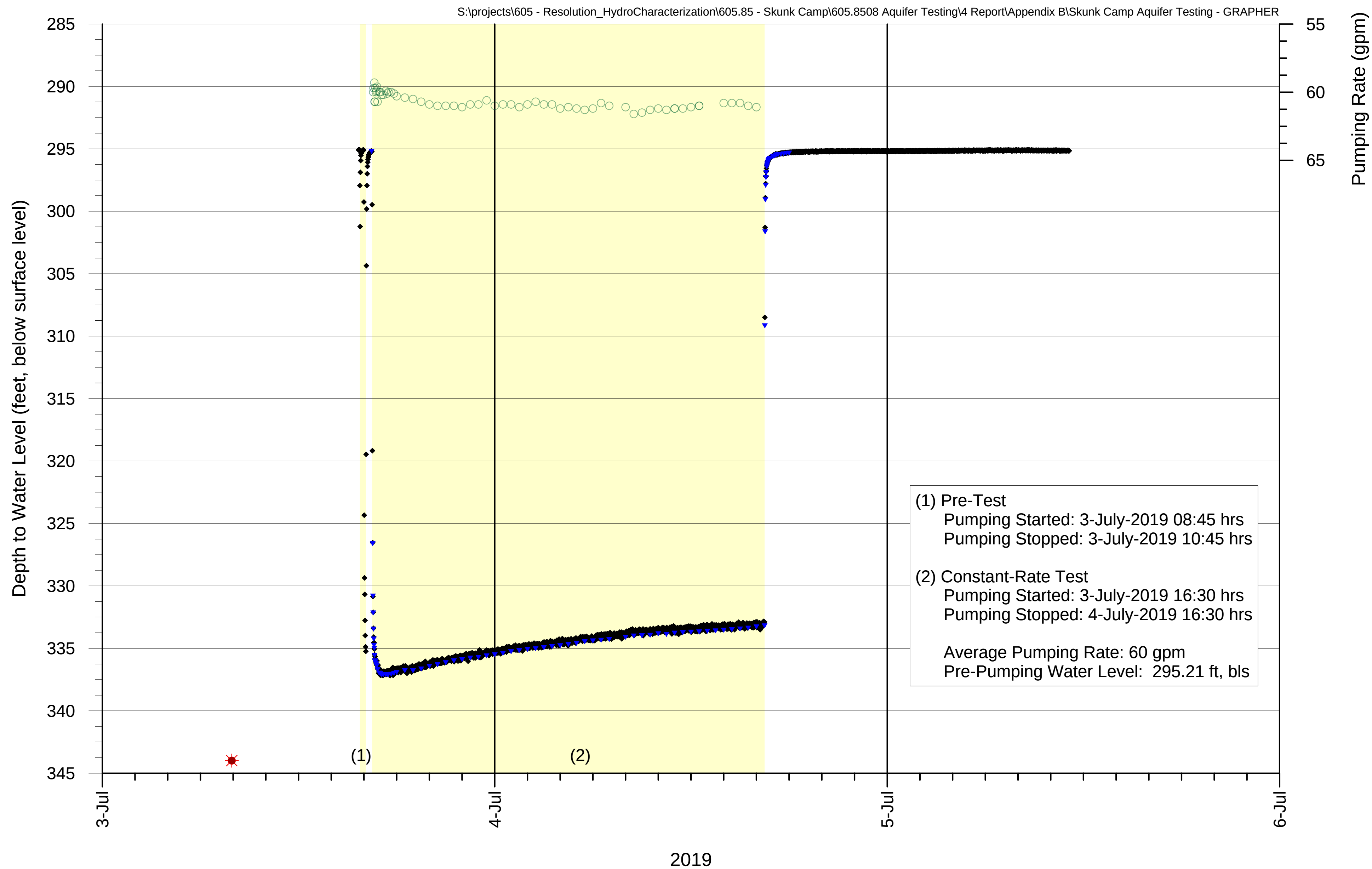
SOLUTION

Aquifer Model: Unconfined Solution Method: Moench

T = 1275. ft^2/day
Sy = 0.08
Sw = 10.
r(c) = 0.25 ft

S = 0.002
Kz/Kr = 0.2
r(w) = 0.4427 ft
alpha = 1.0E+30 min^{-1}

RC19-7 [Upper Screened Interval]



EXPLANATION

- Water Level (manual)
- Water Level (transducer)
- Pumping Rate (instantaneous)

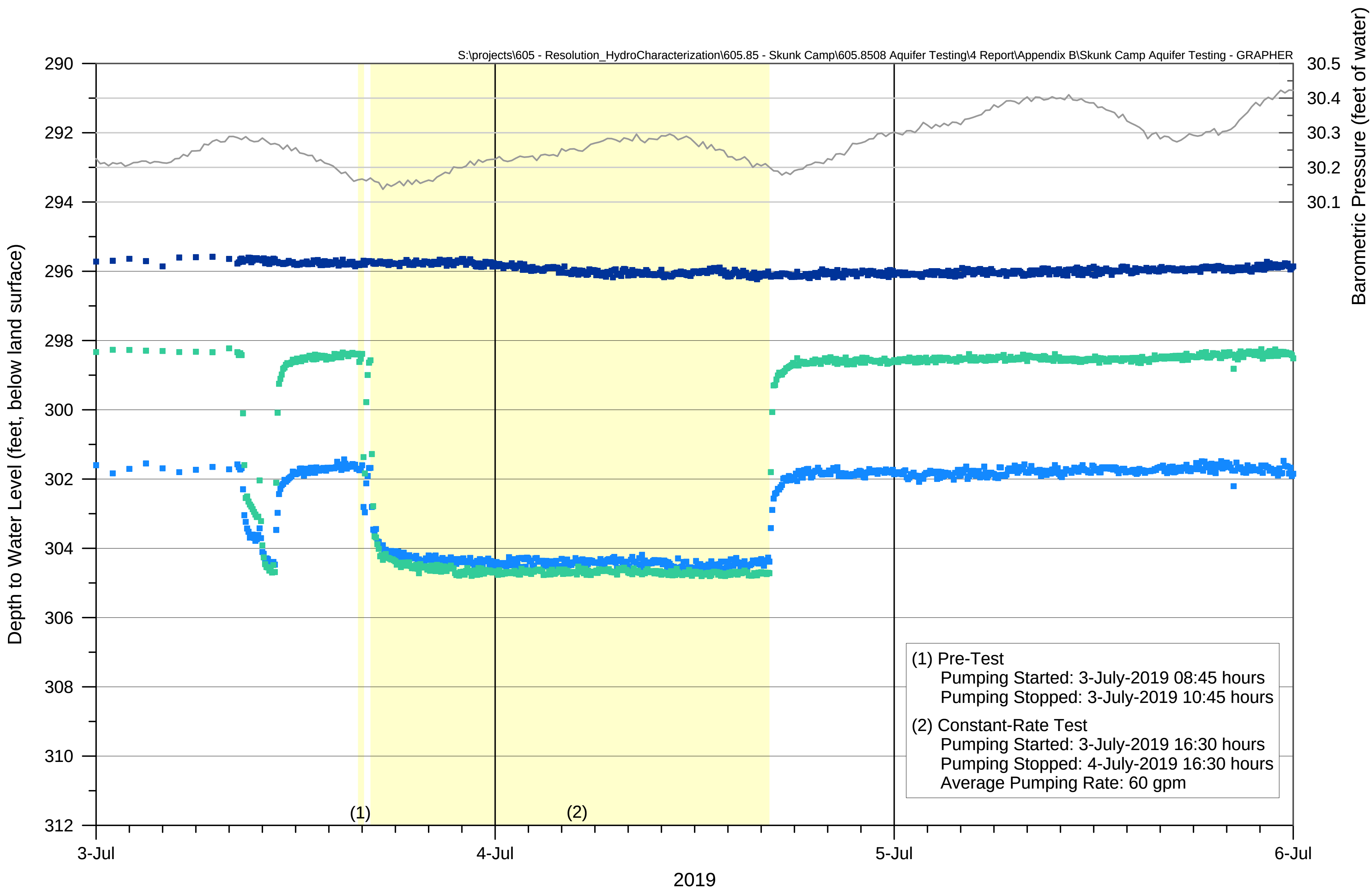
Data Gaps

- Pump Installed - Transducer removed

HYDROGRAPH FOR PUMPED WELL RC19-7 DURING PRE-TEST AND CONSTANT-RATE PUMPING TEST [UPPER SCREENED INTERVAL]

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



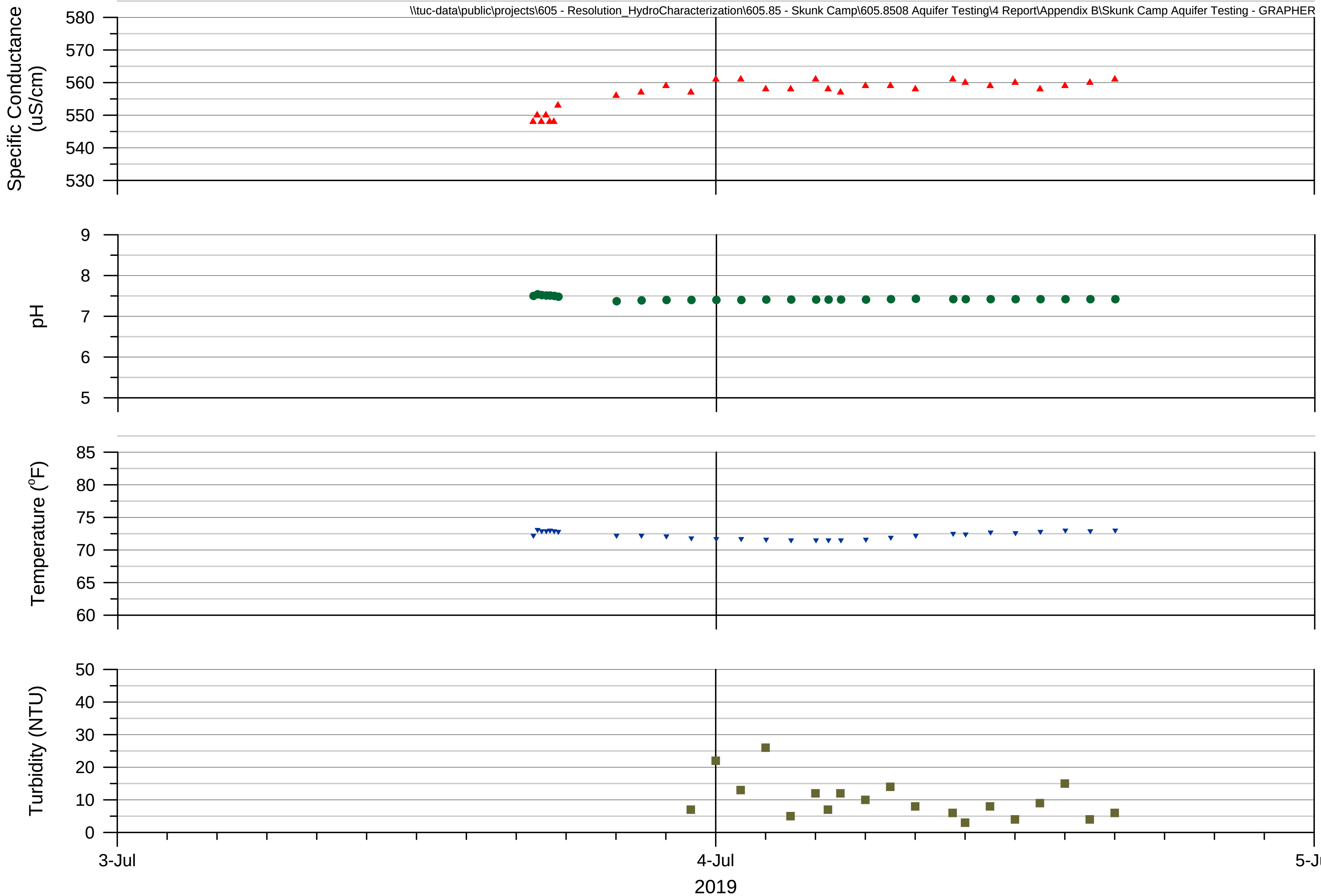
EXPLANATION

- DH19-7 (VWP 3140)
- DH19-7 (VWP 3044)
- DH19-7 (VWP 2945)
- Barometric Pressure at RC19-8

HYDROGRAPHS FOR OBSERVATION WELL DH19-7 VWPS DURING RC19-7 PUMPING TESTS [UPPER SCREENED INTERVAL]

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



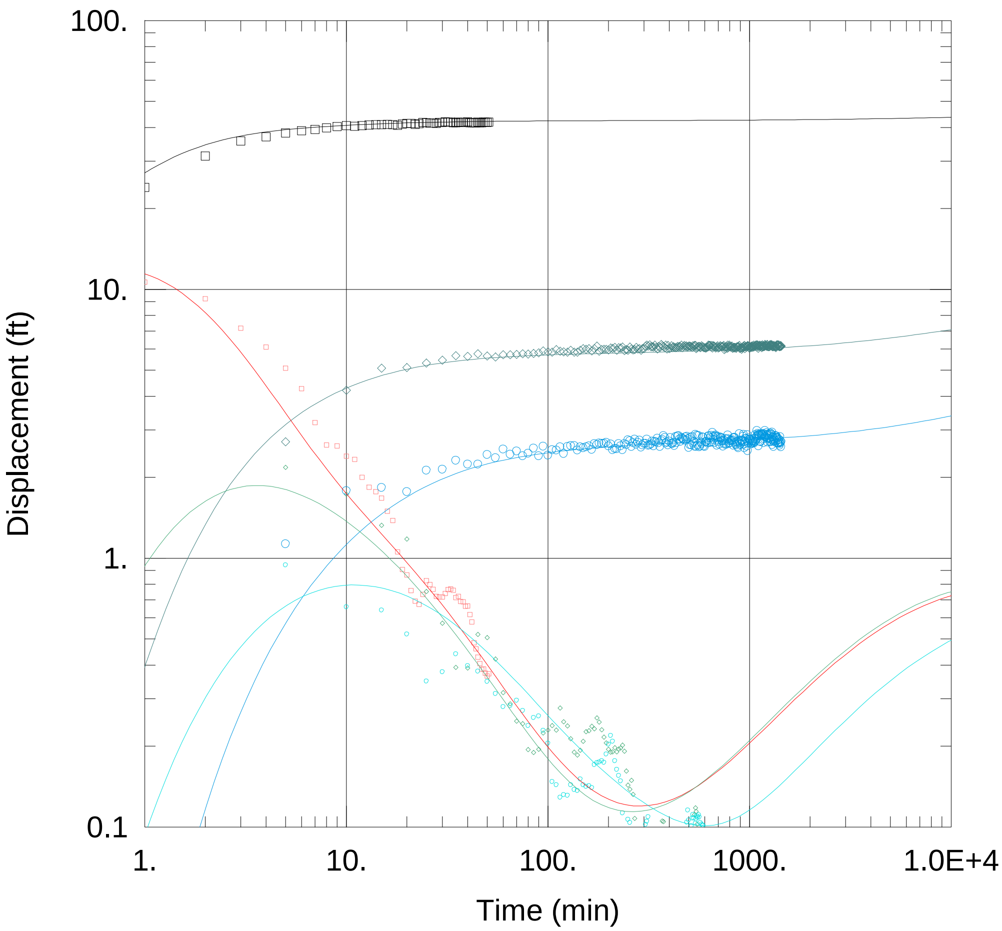
EXPLANATION

- Specific Electrical Conductance
- pH
- Temperature
- Turbidity

FIELD MEASUREMENTS OF SPECIFIC CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC19-7 [UPPER SCREENED INTERVAL]

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



RC19-7 CONSTANT-RATE PUMPING TEST (UPPER SCREEN)

Data Set: S:\...\RC-7_UPPER_Moench_dd_ObsDH-A-B_Kz0.5.aqt
Date: 08/31/19 Time: 09:32:15

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC19-7
Test Date: 03-04 Jul 2019

AQUIFER DATA

Saturated Thickness: 465. ft Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-7	1006604	795353

Observation Wells

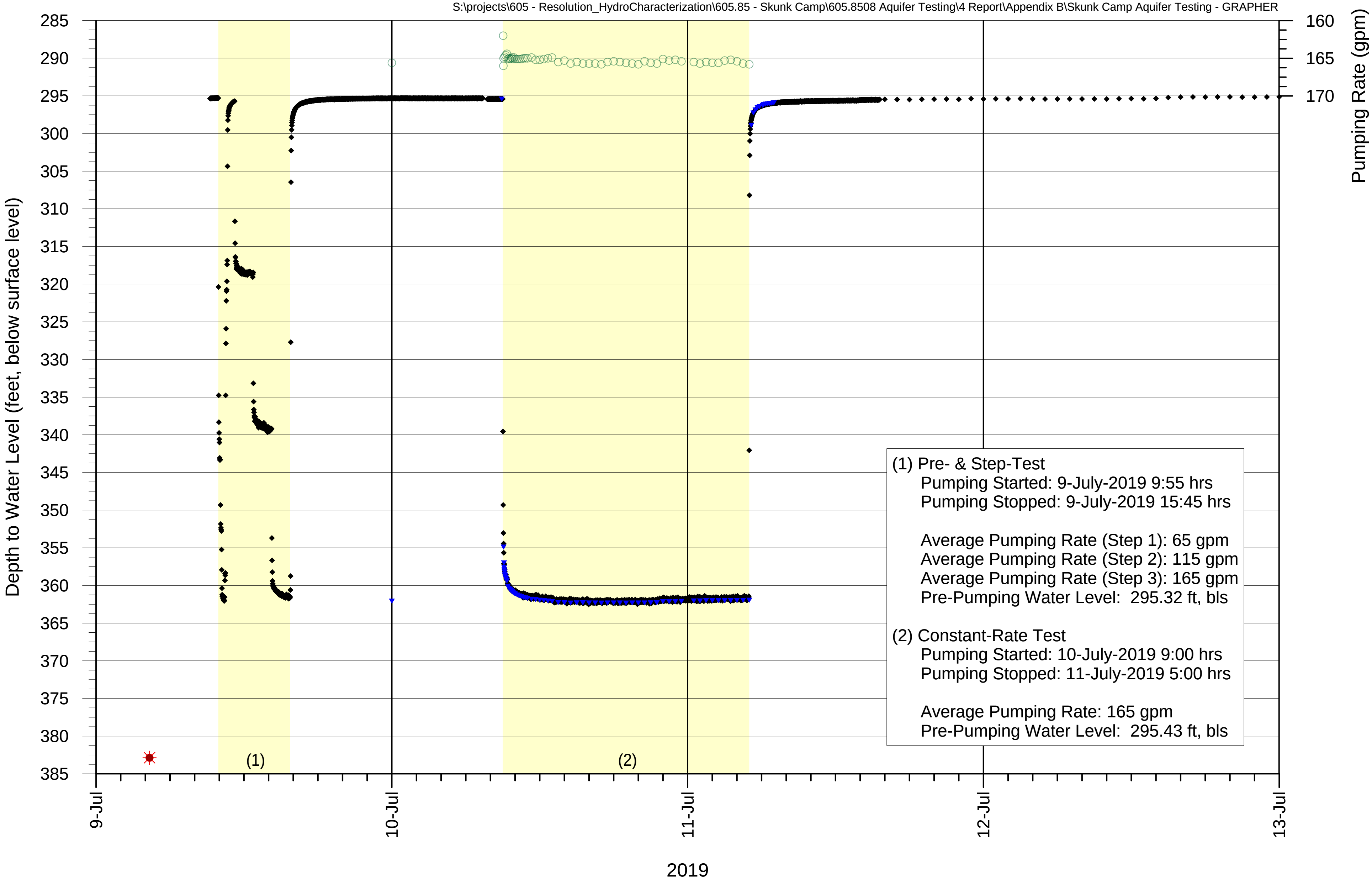
Well Name	X (ft)	Y (ft)
□ RC19-7	1006604	795353
◇ DH19-7_B	1006566	795373
○ DH19-7_A	1006566	795373

SOLUTION

Aquifer Model: Unconfined Solution Method: Moench

T = 1475. ft^2/day
S = 0.0017
Sy = 0.08
Kz/Kr = 0.5
Sw = 2.1
r(w) = 0.4427 ft
r(c) = 0.25 ft
alpha = 1.0E+30 min^{-1}

RC19-7 [Upper and Lower Screened Intervals]



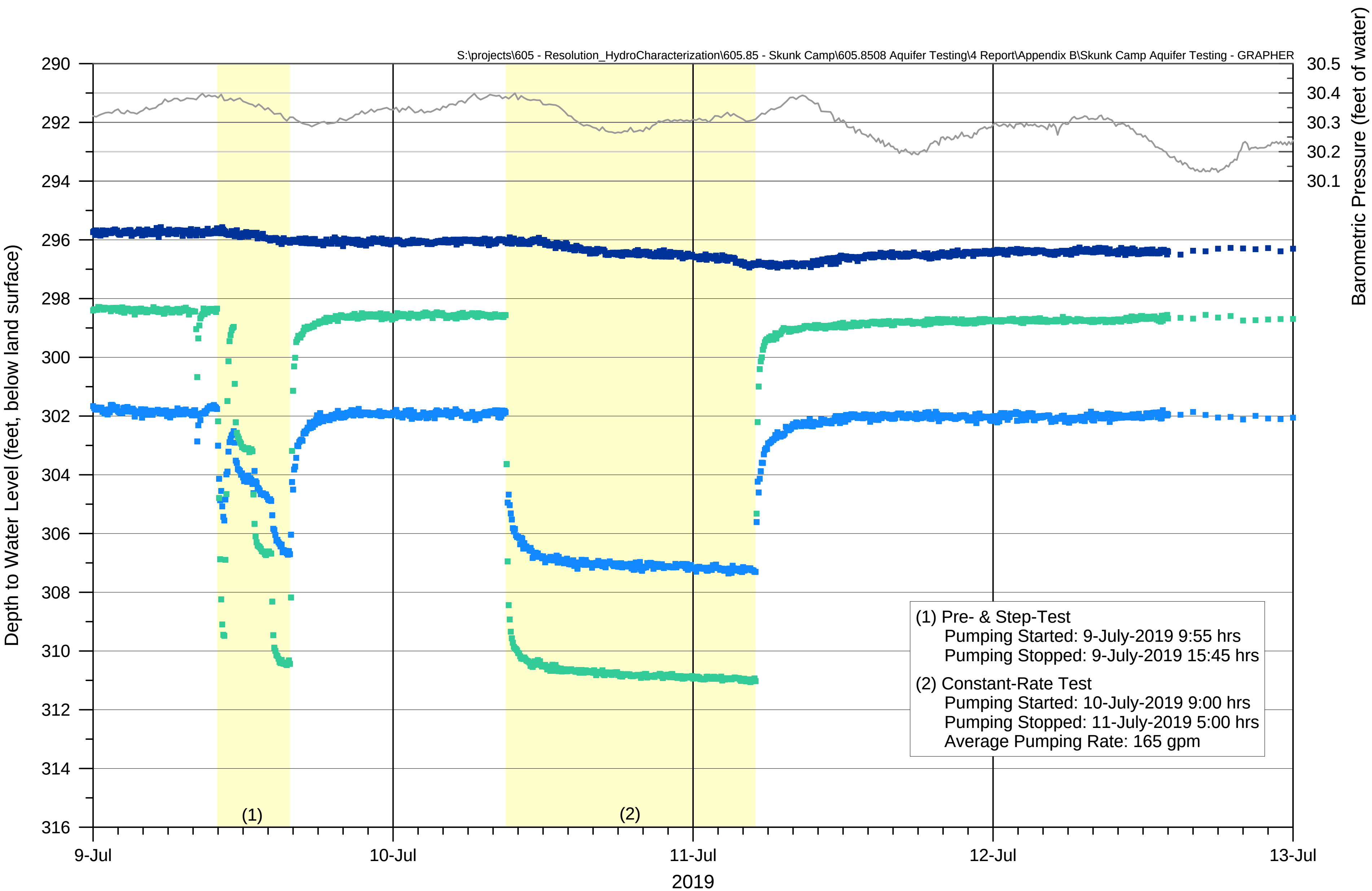
EXPLANATION
- ▼ Water Level (manual)
- ◆ Water Level (transducer)
- ○ Pumping Rate (instantaneous)

Data Gaps
- ✷ Pump Installed - Transducer removed

HYDROGRAPH FOR PUMPED WELL RC19-7 DURING STEP AND CONSTANT-RATE PUMPING TESTS [UPPER AND LOWER SCREENED INTERVALS]

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



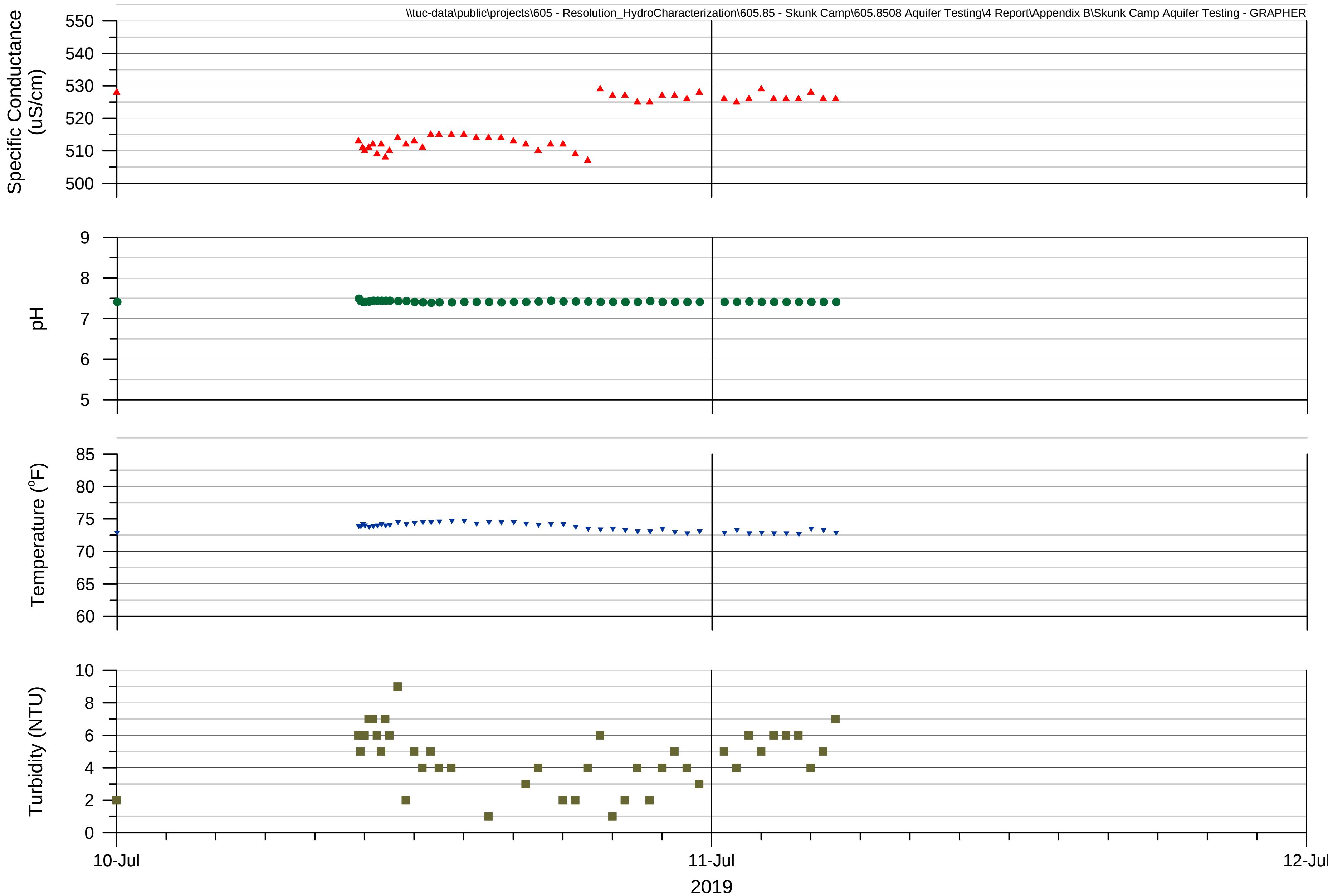
EXPLANATION

- DH19-7 (VWP 2945)
- DH19-7 (VWP 3140)
- DH19-7 (VWP 3044)
- Barometric Pressure at RC19-8

HYDROGRAPHS FOR OBSERVATION WELL DH19-7 VWPS DURING RC19-7 PUMPING TESTS [UPPER AND LOWER SCREENED INTERVALS]

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



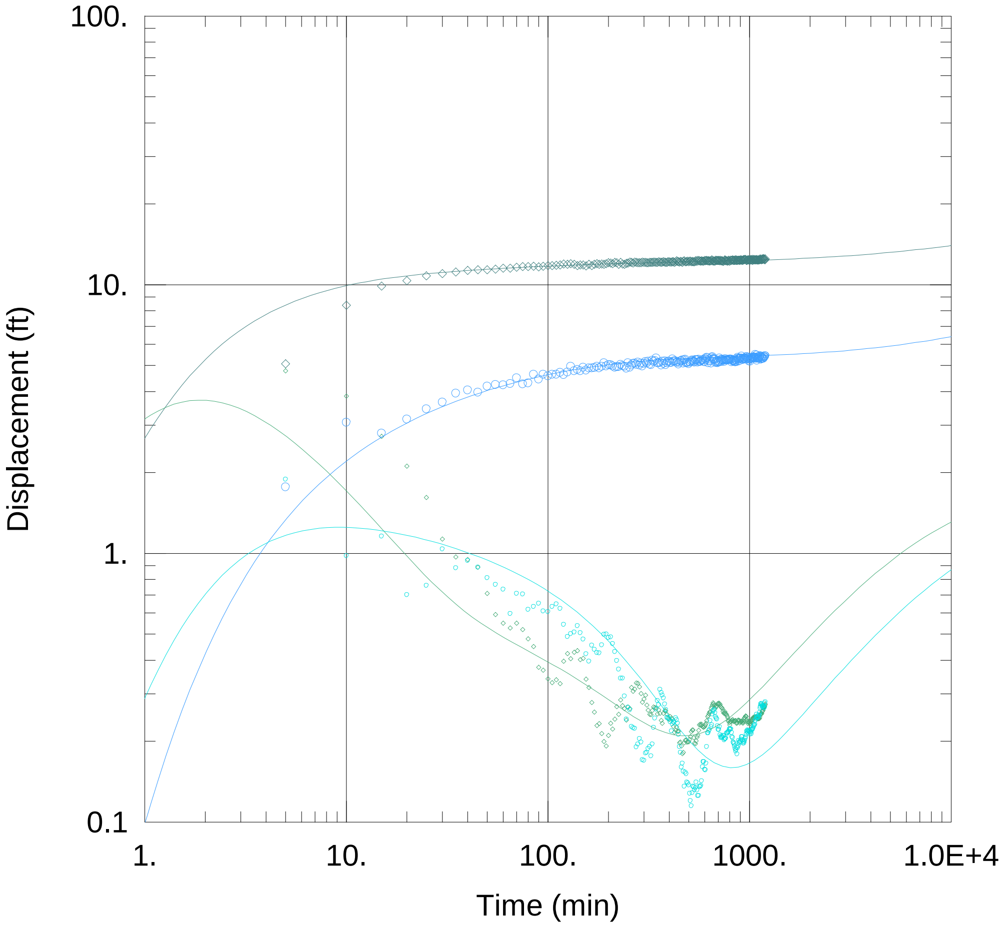
EXPLANATION

- Specific Electrical Conductance
- pH
- Temperature
- Turbidity

FIELD MEASUREMENTS OF SPECIFIC CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC19-7 [UPPER AND LOWER SCREENED INTERVALS]

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



RC19-7 CONSTANT-RATE PUMPING TEST (UPPER AND LOWER SCREENS)

Data Set: S:\...\RC19-7_DH19-7_Moench_dd_cg.aqt
Date: 09/03/19 Time: 17:01:48

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC19-7
Test Date: 10-11 Jul 2019

AQUIFER DATA

Saturated Thickness: 465. ft
Anisotropy Ratio (Kz/Kr): 0.18

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-7_Upper Screen	1006604	795353
RC19-7_Lower Screen	1006604	795353

Observation Wells

Well Name	X (ft)	Y (ft)
◇ DH19-7_B	1006566	795373
○ DH19-7-A	1006566	795373

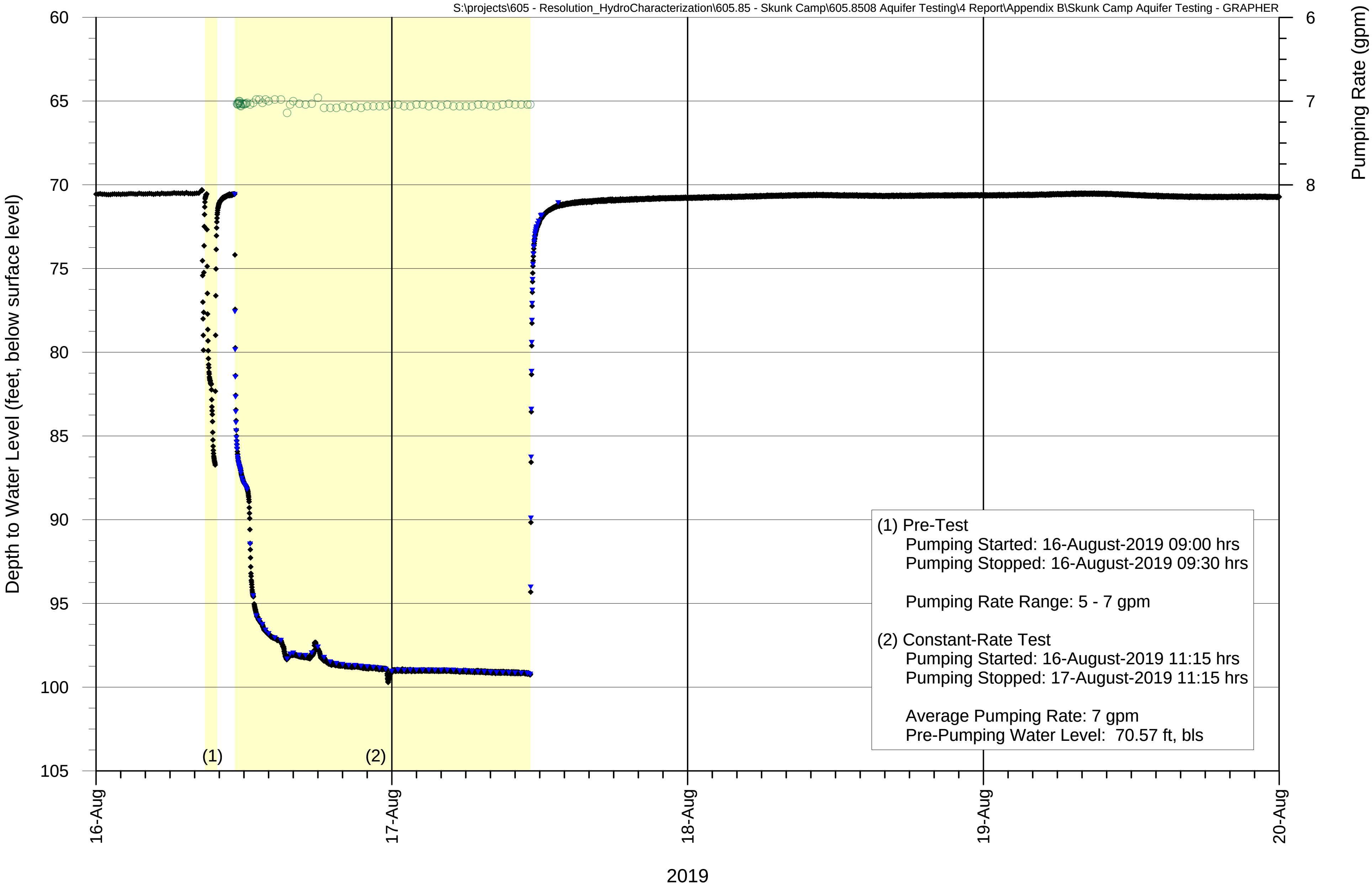
SOLUTION

Aquifer Model: Unconfined
Solution Method: Moench

T = 1650. ft^2/day
Sy = 0.04
Sw = 0.
r(c) = 0.25 ft

S = 0.0005
Kz/Kr = 0.18
r(w) = 0.4427 ft
alpha = 1.0E+30 min^{-1}

RC19-8B



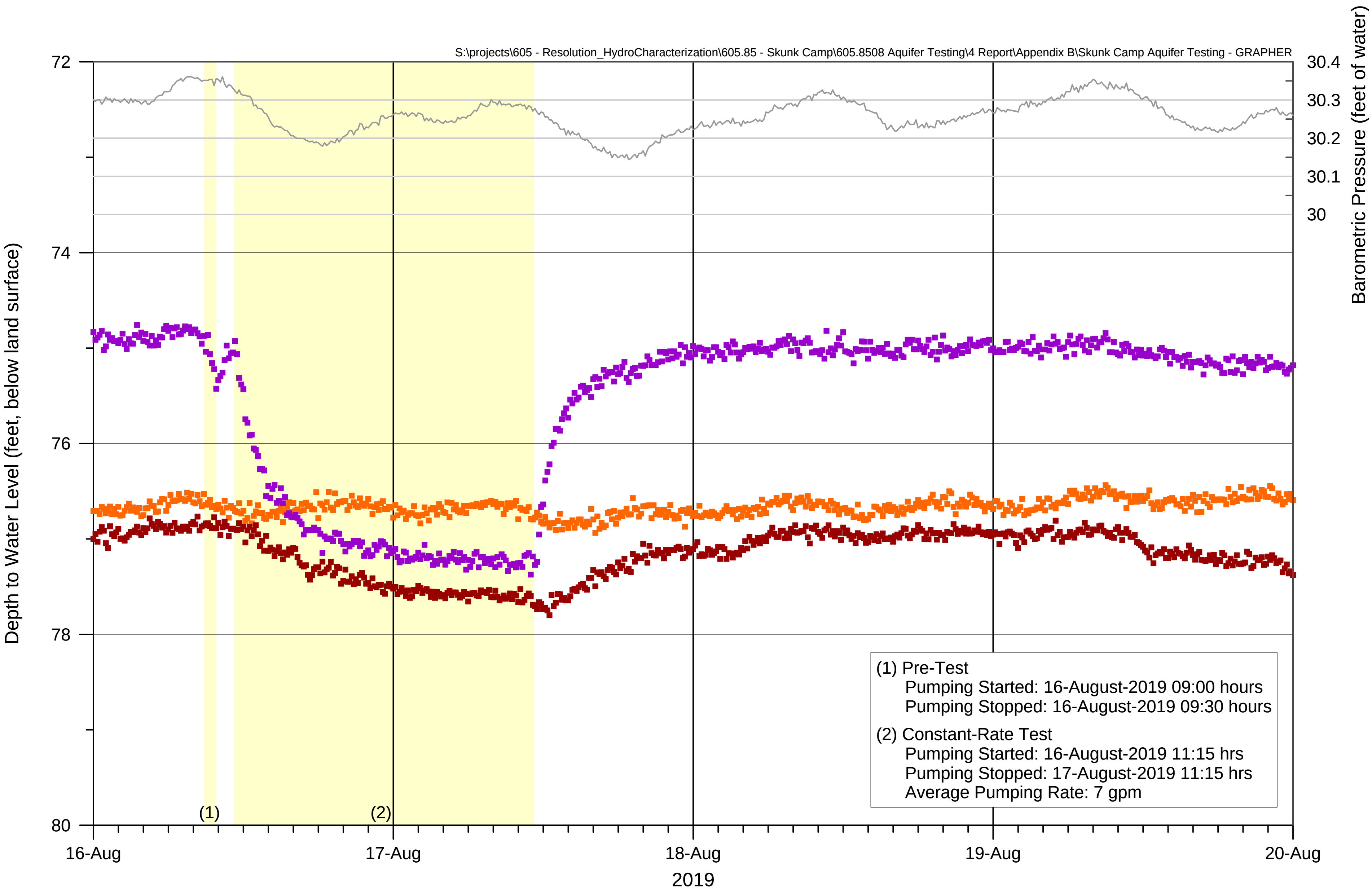
EXPLANATION

- ▼ Water Level (manual)
- ◆ Water Level (transducer)
- ○ Pumping Rate (instantaneous)

HYDROGRAPH FOR PUMPED WELL RC19-8B
DURING PRE-TEST AND CONSTANT-RATE PUMPING TEST

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



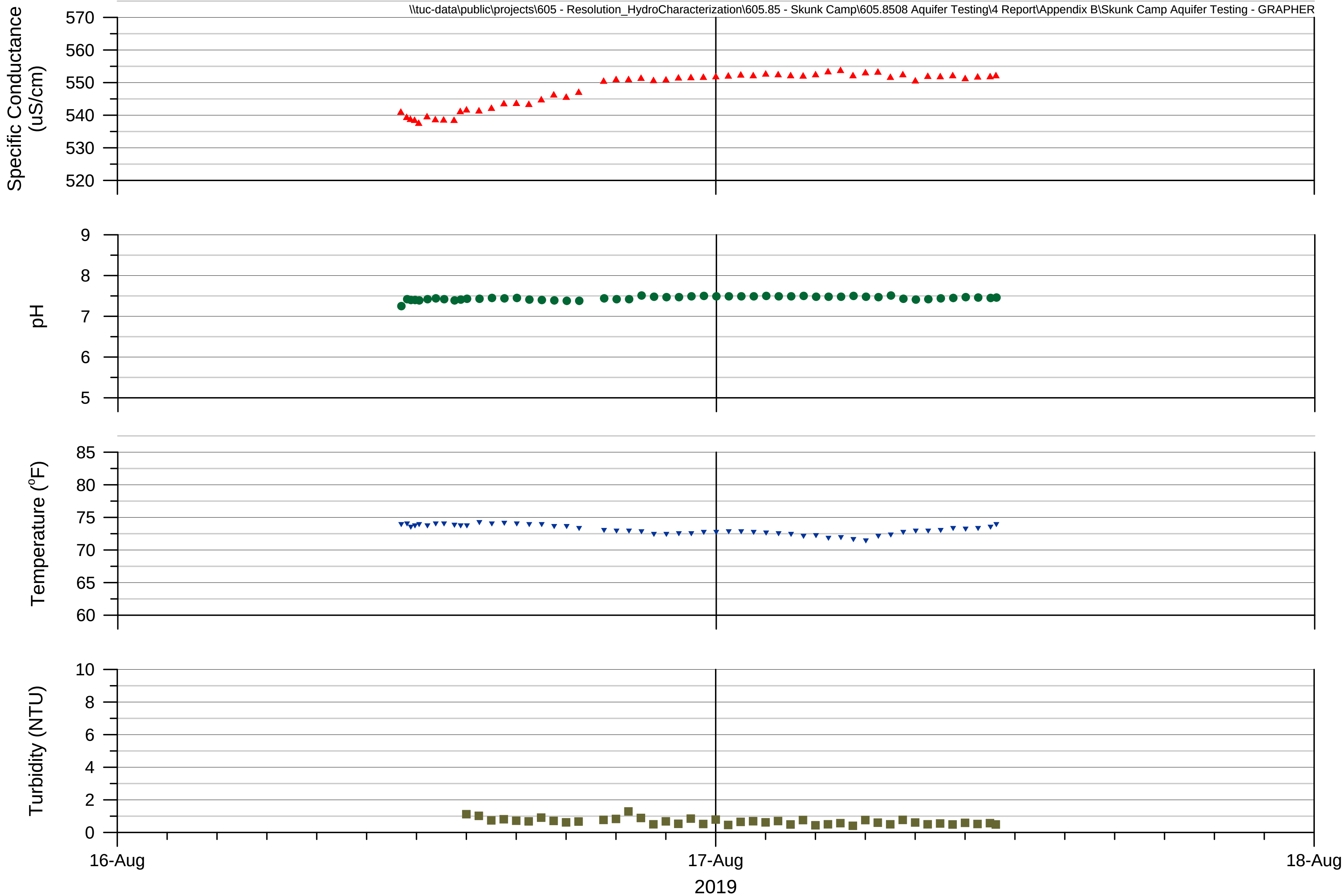
EXPLANATION

- DH19-8B (VWP 3067)
- DH19-8B (VWP 2943)
- DH19-8B (VWP 2609)
- Barometric Pressure at RC19-8

HYDROGRAPHS FOR OBSERVATION WELL DH19-8B VWPS DURING RC-8B PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



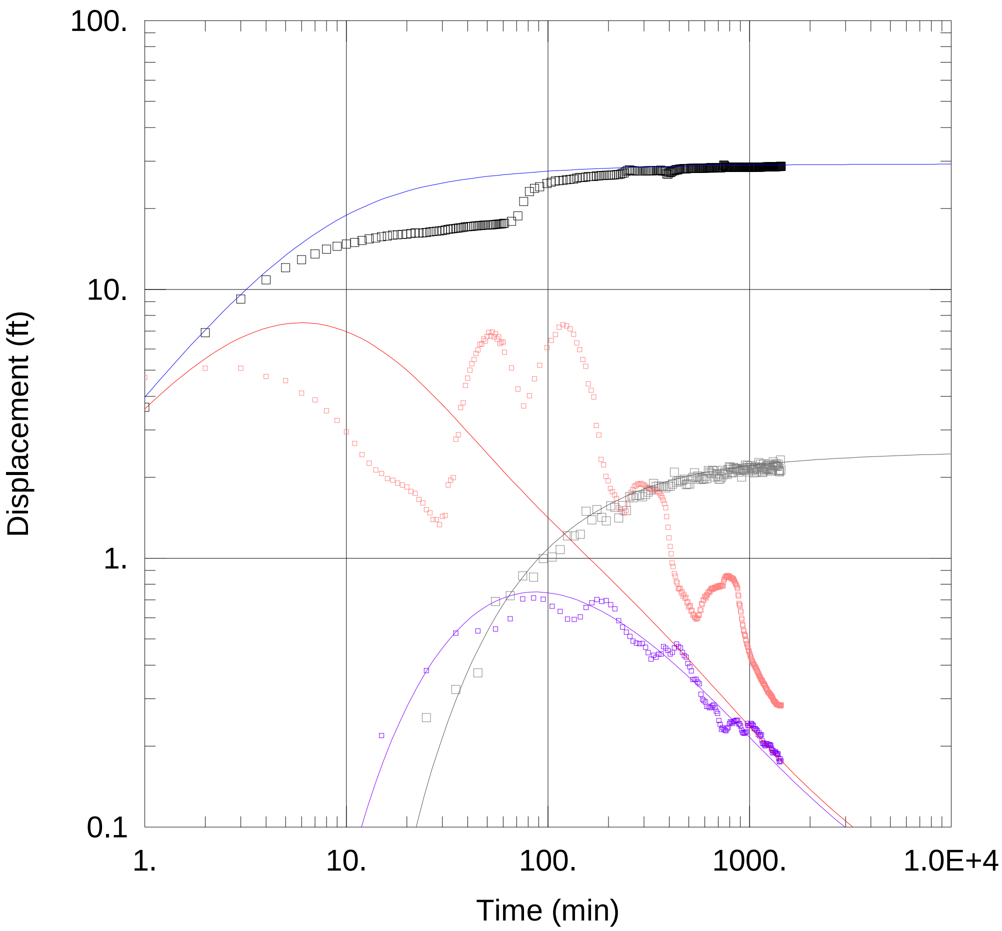
EXPLANATION

- Specific Electrical Conductance
- pH
- Temperature
- Turbidity

FIELD MEASUREMENTS OF SPECIFIC CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC19-8B

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



RC19-8B CONSTANT-RATE PUMPING TEST

Data Set: S:\...\RC19-8B_DH19-8B_dd_deriv_Moench_cg.aqt
Date: 10/02/19 Time: 14:55:47

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC19-8B
Test Date: 16-17 Aug 2019

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-8B	1010830	793752

Observation Wells

Well Name	X (ft)	Y (ft)
RC19-8B	1010830	793752
DH19-8B-VWPC	1011110	793799

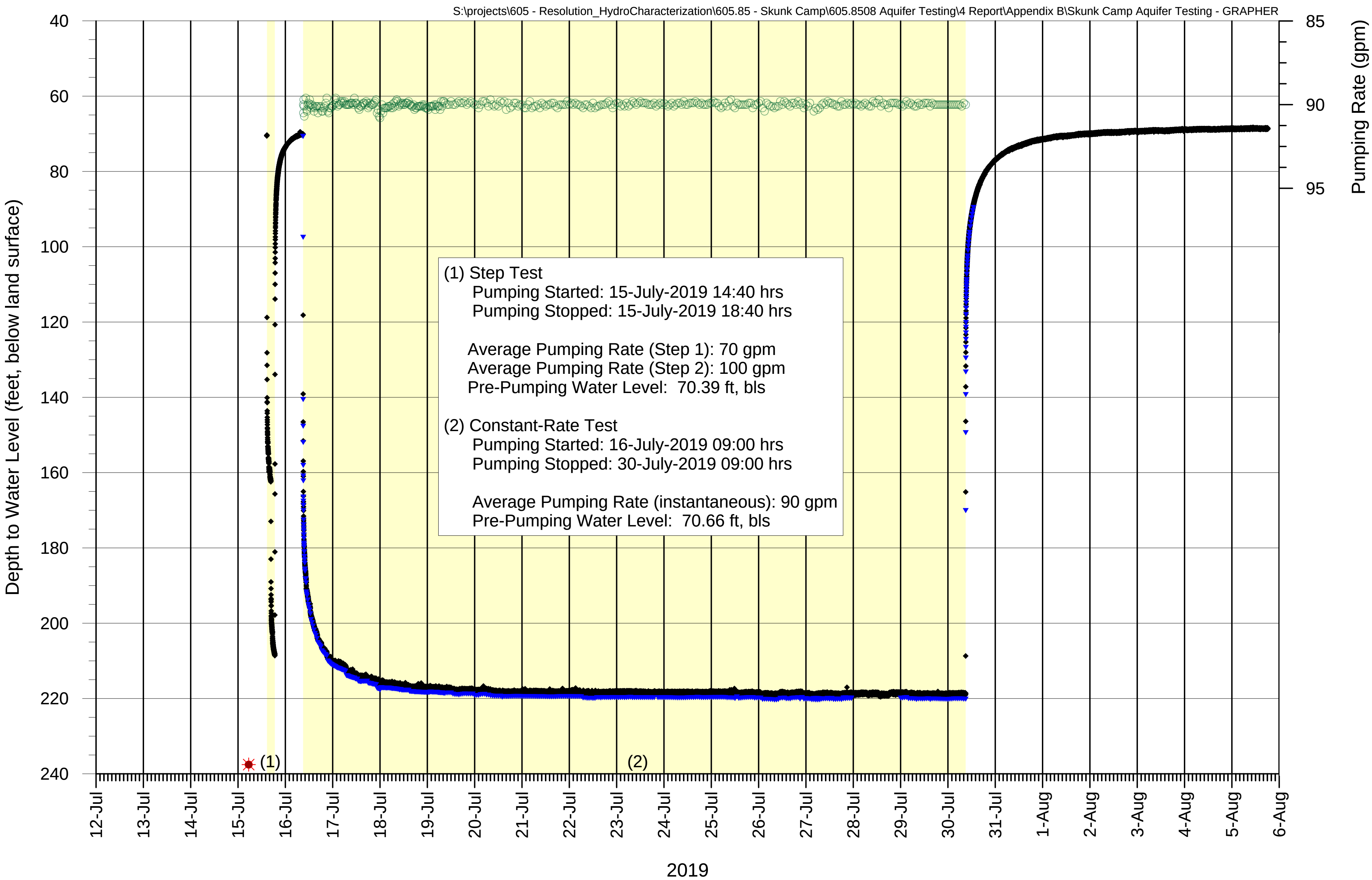
SOLUTION

Aquifer Model: Unconfined
Solution Method: Moench

T = 330. ft^2/day
Sy = 0.07
Sw = -2.5
r(c) = 0.25 ft

S = 0.00045
Kz/Kr = 0.1
r(w) = 0.4227 ft
alpha = 1.585E-6 min^{-1}

RC19-8D



EXPLANATION

- Water Level (manual)
- Water Level (transducer)
- Pumping Rate (instantaneous)

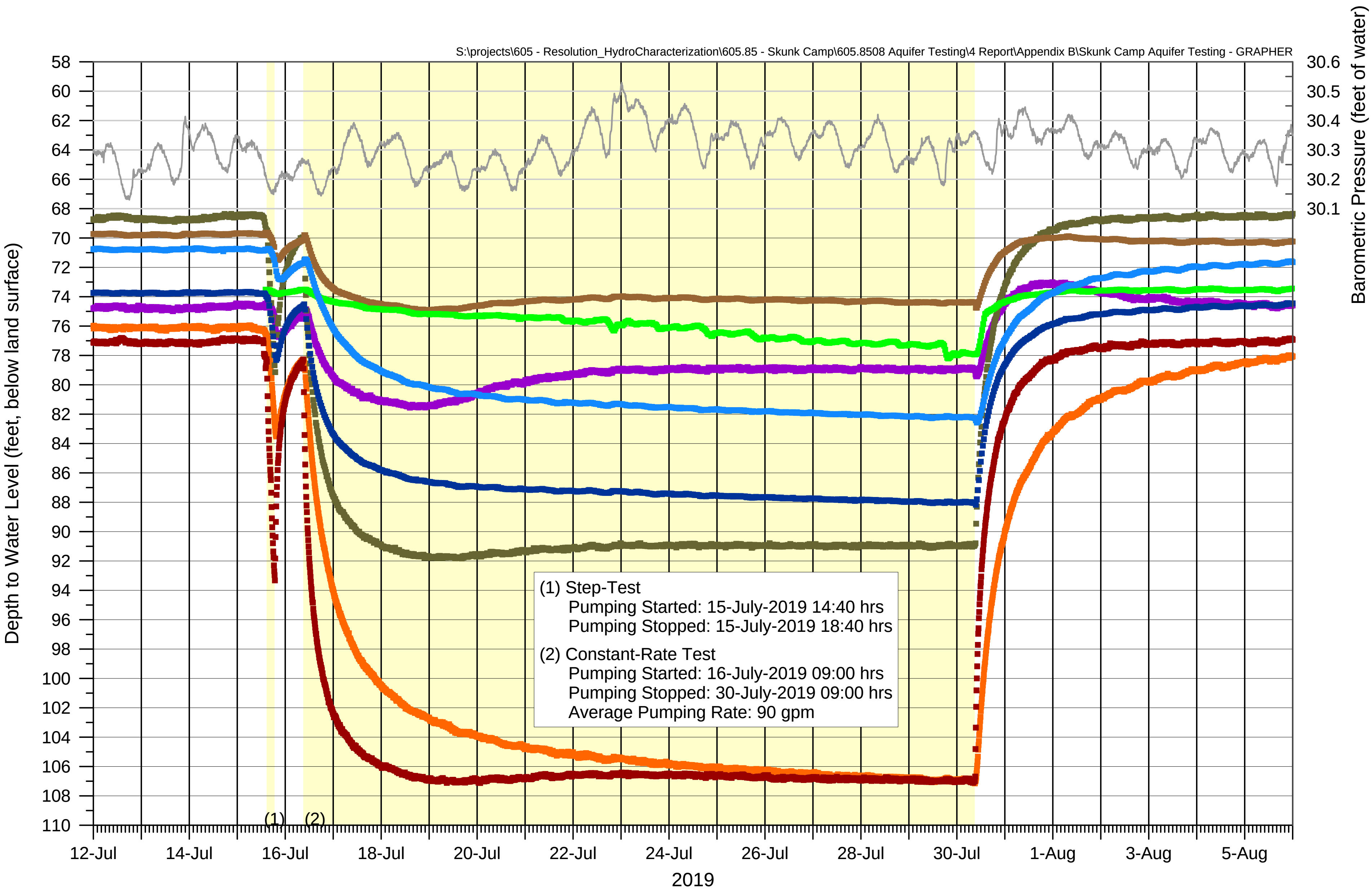
Data Gaps

- Pump Installed - Transducer removed

HYDROGRAPH FOR PUMPED WELL RC19-8D
DURING STEP AND CONSTANT-RATE PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

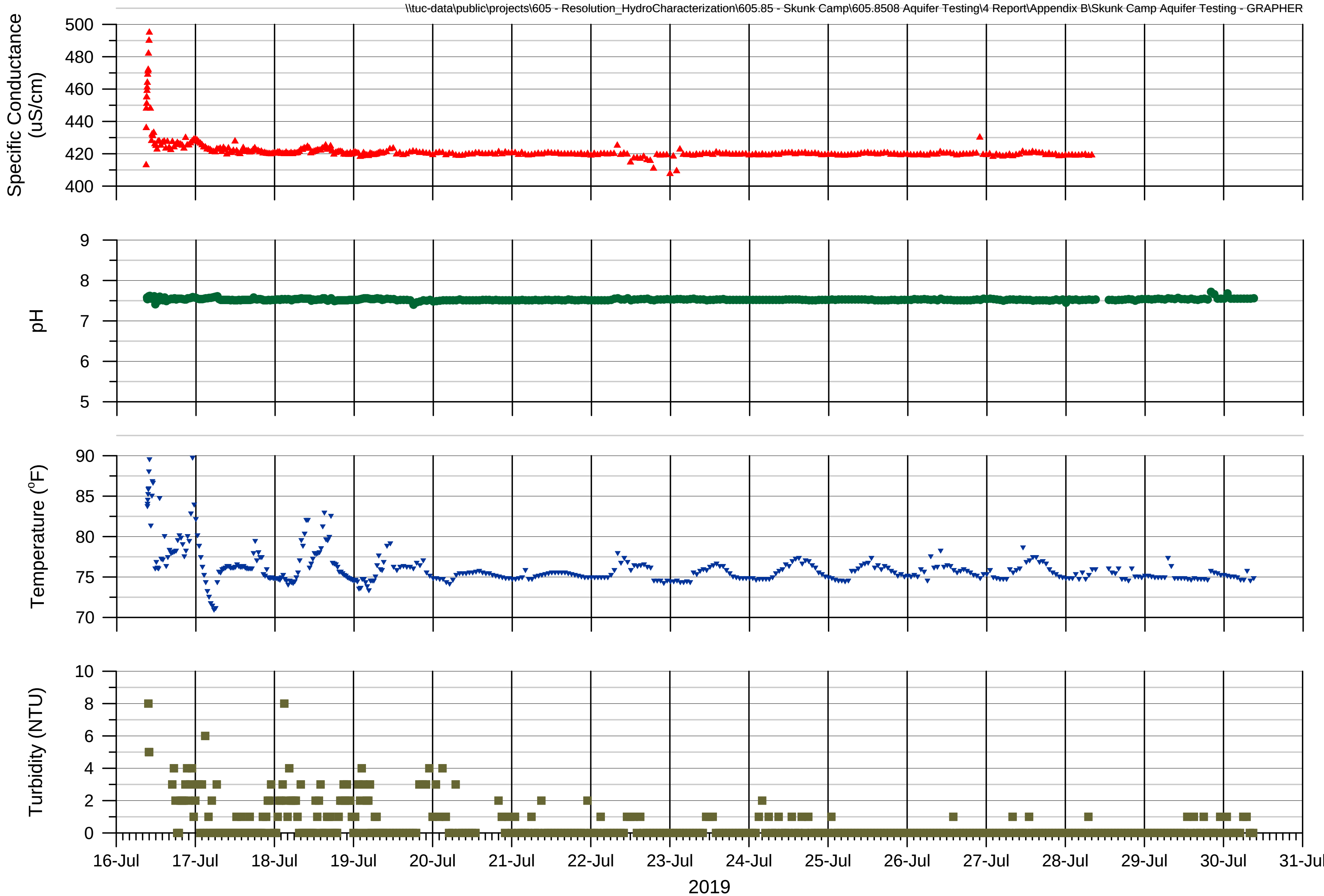
MONTGOMERY & ASSOCIATES



HYDROGRAPHS FOR OBSERVATION WELLS AND VWPS DURING RC19-8D PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

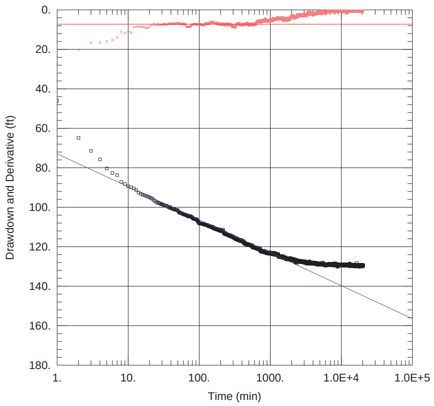
- Specific Electrical Conductance
- pH
- Temperature
- Turbidity

Note: Specific conductance values over last two days of test unavailable due to instrument error.

FIELD MEASUREMENTS OF SPECIFIC CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC19-8D

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



SEMI-LOG DRAWDOWN GRAPH FOR PUMPED WELL RC19-8D

PROJECT INFORMATION

Company: Montgomery & Associates
Client: RCM
Project: 605.8508
Location: Skunk Camp
Test Well: RC19-8D
Test Date: 16-July-2019

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-8D	0	0

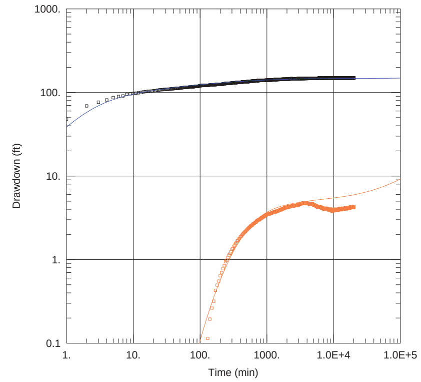
Observation Wells

Well Name	X (ft)	Y (ft)
RC19-8D	0	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Cooper-Jacob

T = 190. ft^2/day
S = 0.0005



LOG-LOG DRAWDOWN GRAPH FOR PUMPED WELL RC19-8D AND OBSERVATION WELL RC19-8B

PROJECT INFORMATION

Company: Montgomery & Associates
Client: RCM
Project: 605.8508
Location: Skunk Camp, AZ
Test Well: RC-8D
Test Date: 16-July-2019

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.17

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-8D	0	0

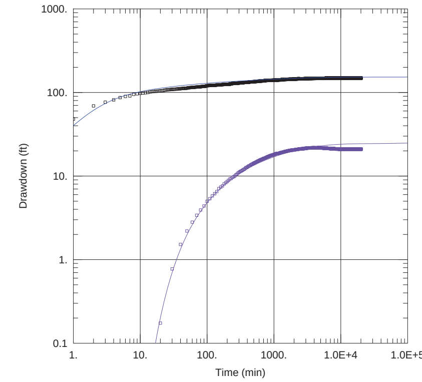
Observation Wells

Well Name	X (ft)	Y (ft)
RC19-8D	0	0
RC19-8B	96	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Moench

T = 220. ft^2/day
Sy = 0.08
Sw = -0.7
r(c) = 0.25 ft
S = 0.00074
Kz/Kr = 0.17
r(w) = 0.5 ft
alpha = 6.31E-5 min^{-1}



LOG-LOG DRAWDOWN GRAPH FOR PUMPED WELL RC19-8D AND OBSERVATION WELL RC19-8

PROJECT INFORMATION

Company: Montgomery & Associates
Client: RCM
Project: 605.8508
Location: Skunk Camp, AZ
Test Well: RC-8D
Test Date: 16-July-2019

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.2

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-8D	0	0

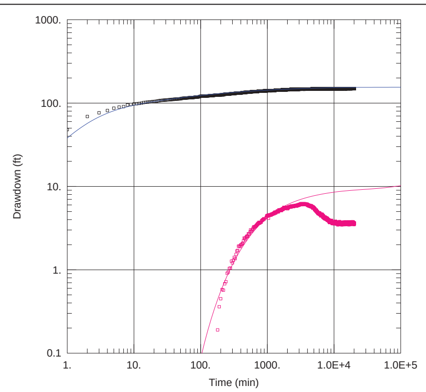
Observation Wells

Well Name	X (ft)	Y (ft)
RC19-8D	0	0
RC19-8	253	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Moench

T = 215. ft^2/day
Sy = 0.08
Sw = -0.9
r(c) = 0.25 ft
S = 0.0003
Kz/Kr = 0.2
r(w) = 0.5 ft
alpha = 9.0E-7 min^{-1}



LOG-LOG DRAWDOWN GRAPH FOR PUMPED WELL RC19-8D AND OBSERVATION WELL DH19-8B(B)

PROJECT INFORMATION

Company: Montgomery & Associates
Client: RCM
Project: 605.8508
Location: Skunk Camp, AZ
Test Well: RC-8D
Test Date: 16-July-2019

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.11

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC-8D	0	0

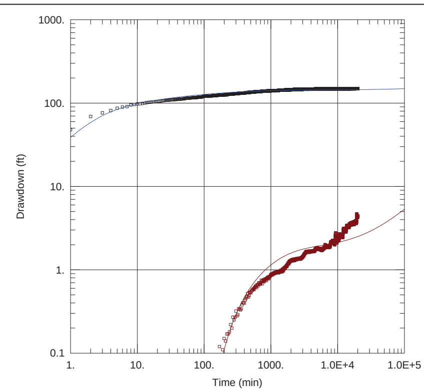
Observation Wells

Well Name	X (ft)	Y (ft)
RC-8D	0	0
DH19-8B(C)	276	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Moench

T = 220. ft^2/day
Sy = 0.08
Sw = -0.7
r(c) = 0.25 ft
S = 0.00086
Kz/Kr = 0.11
r(w) = 0.5 ft
alpha = 4.06E-6 min^{-1}



LOG-LOG DRAWDOWN GRAPH FOR PUMPED WELL RC19-8D AND OBSERVATION WELL LOWER WELL

PROJECT INFORMATION

Company: Montgomery & Associates
Client: RCM
Project: 605.8508
Location: Skunk Camp, AZ
Test Well: RC-8D
Test Date: 16-July-2019

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.6

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC-8D	0	0

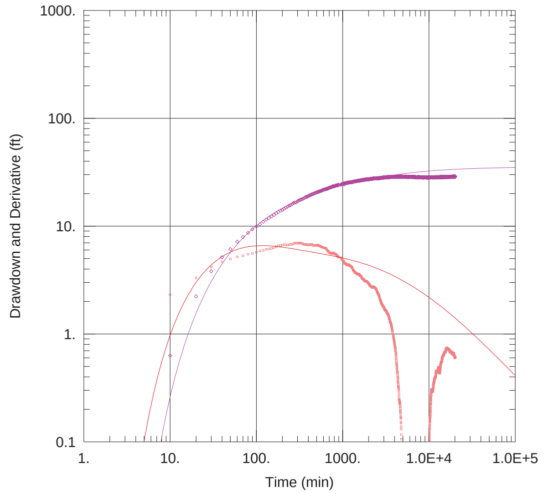
Observation Wells

Well Name	X (ft)	Y (ft)
RC-8D	0	0
Lower Well	521	0

SOLUTION

Aquifer Model: Unconfined
Solution Method: Moench

T = 190. ft^2/day
Sy = 0.08
Sw = -0.7
r(c) = 0.25 ft
S = 0.0009
Kz/Kr = 0.6
r(w) = 0.5 ft
alpha = 0.0067 min^{-1}



LOG-LOG DRAWDOWN GRAPH FOR OBSERVATION PIEZOMETER DH19-8B(B)

AQUIFER DATA

Saturated Thickness: 578. ft   Anisotropy Ratio (Kz/Kr): 0.18

WELL DATA

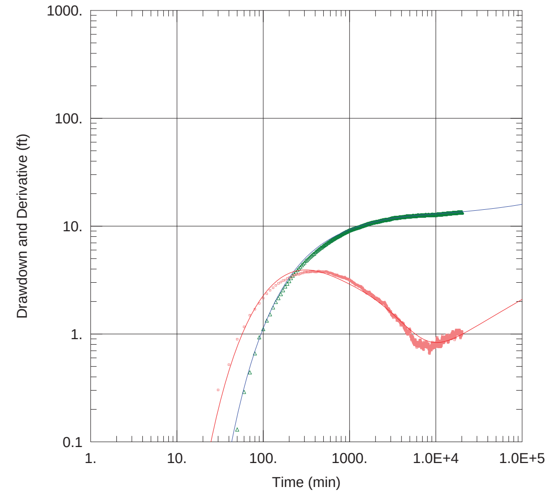
Pumping Wells		
Well Name	X (ft)	Y (ft)
RC19-8D	1010870.665	793666.031

Observation Wells		
Well Name	X (ft)	Y (ft)
◇ DH19-8B(B)	1011112.431	793798.942

SOLUTION

Aquifer Model: Unconfined   Solution Method: Tartakovsky-Neuman

T = 175. ft^2/day   S = 0.00017
Sy = 0.08   Kz/Kr = 0.18
kD = 0.0001



LOG-LOG DRAWDOWN GRAPH FOR OBSERVATION WELL RC19-8A(S)

AQUIFER DATA

Saturated Thickness: 578. ft   Anisotropy Ratio (Kz/Kr): 0.23

WELL DATA

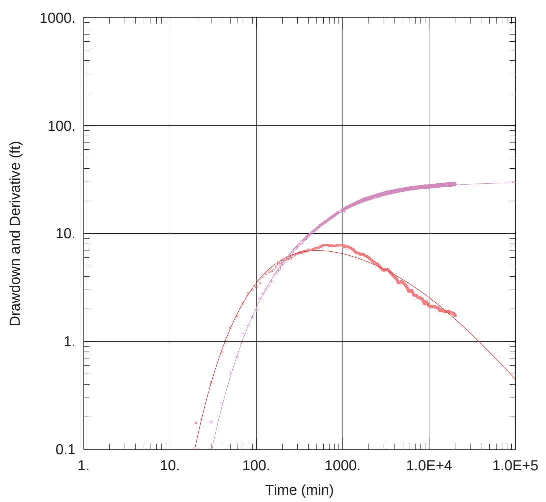
Pumping Wells		
Well Name	X (ft)	Y (ft)
RC19-8D	1010870.665	793666.031

Observation Wells		
Well Name	X (ft)	Y (ft)
△ RC19-8AS	1010523.881	793497.87

SOLUTION

Aquifer Model: Unconfined   Solution Method: Tartakovsky-Neuman

T = 185. ft^2/day   S = 0.00049
Sy = 0.08   Kz/Kr = 0.23
kD = 5.



LOG-LOG DRAWDOWN GRAPH FOR OBSERVATION PIEZOMETER DH19-8B(A)

AQUIFER DATA

Saturated Thickness: 578. ft   Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA

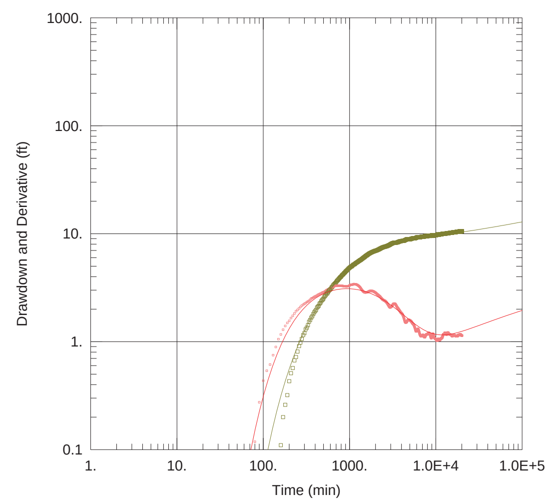
Pumping Wells		
Well Name	X (ft)	Y (ft)
RC19-8D	1010870.665	793666.031

Observation Wells		
Well Name	X (ft)	Y (ft)
◇ DH19-8B(A)	1011112.431	793798.942

SOLUTION

Aquifer Model: Unconfined   Solution Method: Tartakovsky-Neuman

T = 170. ft^2/day   S = 0.00025
Sy = 0.07   Kz/Kr = 0.25
kD = 0.0001



LOG-LOG DRAWDOWN GRAPH FOR OBSERVATION PIEZOMETER RC19-8A(D)

AQUIFER DATA

Saturated Thickness: 578. ft   Anisotropy Ratio (Kz/Kr): 0.55

WELL DATA

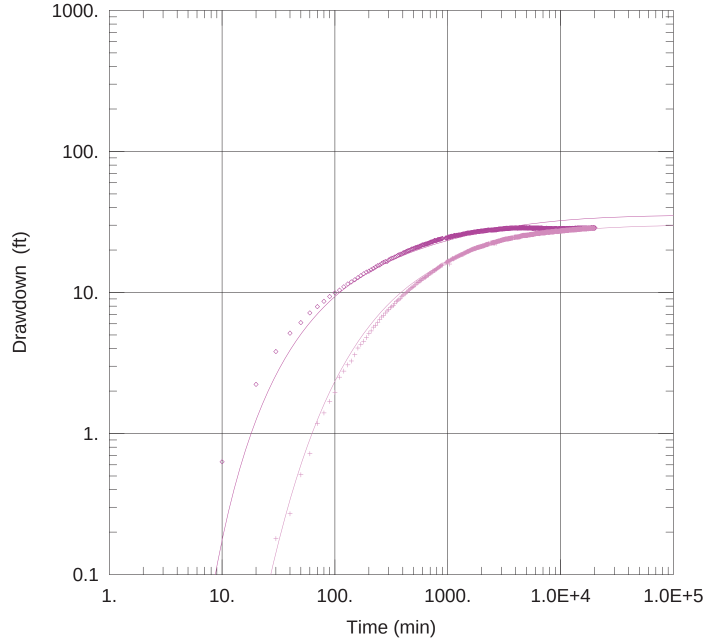
Pumping Wells		
Well Name	X (ft)	Y (ft)
RC19-8D	1010870.665	793666.031

Observation Wells		
Well Name	X (ft)	Y (ft)
□ RC19-8AD	1010523.881	793497.87

SOLUTION

Aquifer Model: Unconfined   Solution Method: Tartakovsky-Neuman

T = 220. ft^2/day   S = 0.0015
Sy = 0.08   Kz/Kr = 0.55
kD = 1.5



LOG-LOG DRAWDOWN GRAPH FOR RC19-8B(B) AND RC19-8B(A)

AQUIFER DATA

Saturated Thickness: 578. ft

Anisotropy Ratio (Kz/Kr): 0.18

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-8D	1010870.665	793666.031

Observation Wells

Well Name	X (ft)	Y (ft)
DH19-8B(B)	1011112.431	793798.942
DH19-8B(A)	1011112.431	793798.942

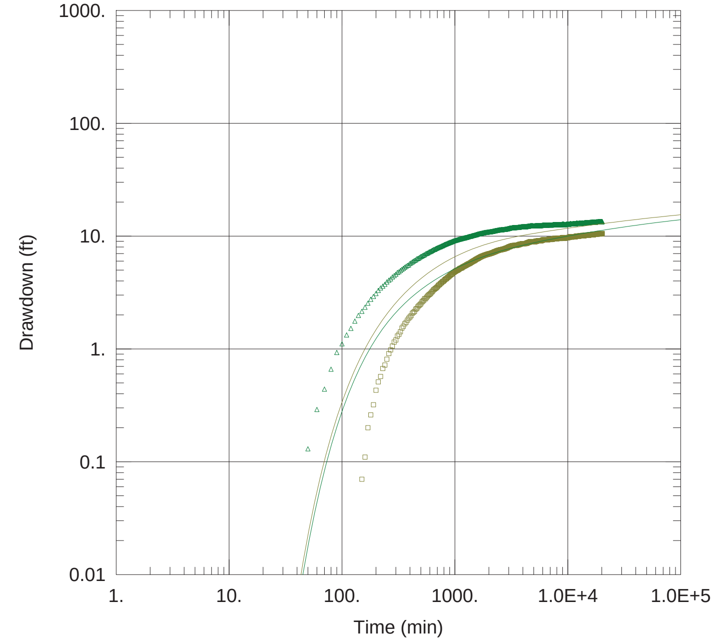
SOLUTION

Aquifer Model: Unconfined

Solution Method: Tartakovsky-Neuman

T = 175. ft^2/day
Sy = 0.08
kD = 1.0E-5

S = 0.00019
Kz/Kr = 0.18



LOG-LOG DRAWDOWN GRAPH FOR RC19-8A(S) AND RC19-8A(D)

AQUIFER DATA

Saturated Thickness: 578. ft

Anisotropy Ratio (Kz/Kr): 0.62

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-8D	1010870.665	793666.031

Observation Wells

Well Name	X (ft)	Y (ft)
RC19-8A(S)	1010523.881	793497.87
RC19-8A(D)	1010523.881	793497.87

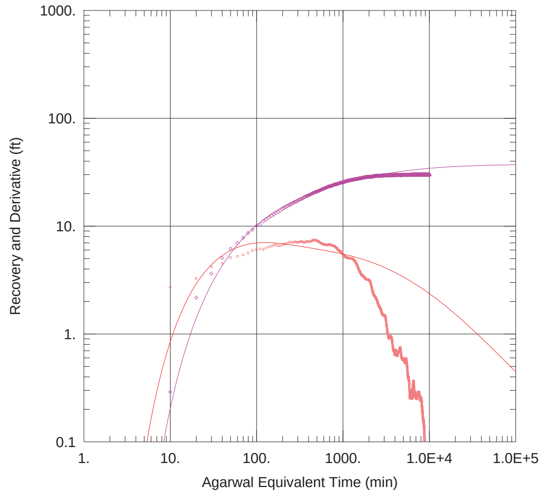
SOLUTION

Aquifer Model: Unconfined

Solution Method: Tartakovsky-Neuman

T = 200. ft^2/day
Sy = 0.08
kD = 0.2

S = 0.00085
Kz/Kr = 0.62



LOG-LOG RECOVERY GRAPH FOR DH19-8B(B)

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.2

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC-8D	1010870.665	793666.031

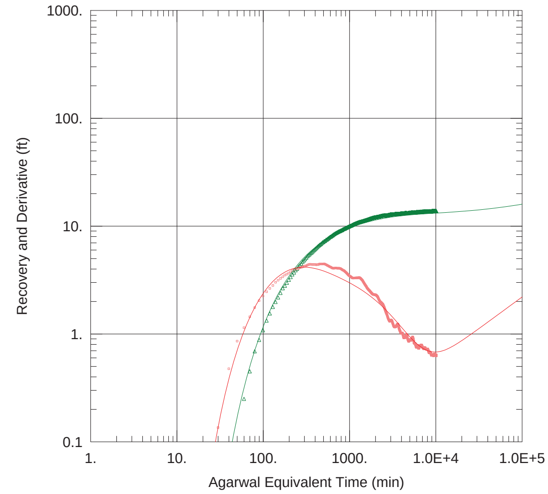
Observation Wells

Well Name	X (ft)	Y (ft)
◦ DH19-8B(B)	1011112.431	793798.942

SOLUTION

Aquifer Model: Unconfined
Solution Method: Tartakovsky-Neuman

T = 160. ft^2/day
Sy = 0.08
kD = 0.0001
S = 0.00017
Kz/Kr = 0.2



LOG-LOG RECOVERY GRAPH FOR RC19-8A(S)

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC-8D	1010870.665	793666.031

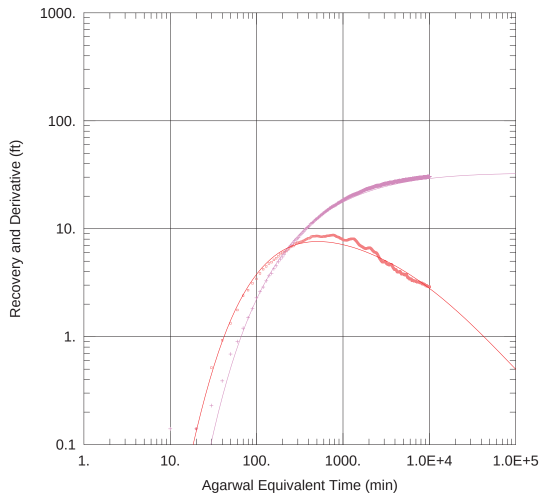
Observation Wells

Well Name	X (ft)	Y (ft)
▵ RC19-8A(S)	1010523.881	793497.87

SOLUTION

Aquifer Model: Unconfined
Solution Method: Tartakovsky-Neuman

T = 170. ft^2/day
Sy = 0.08
kD = 10.
S = 0.00046
Kz/Kr = 0.25



LOG-LOG RECOVERY GRAPH FOR DH19-8B(A)

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.25

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC-8D	1010870.665	793666.031

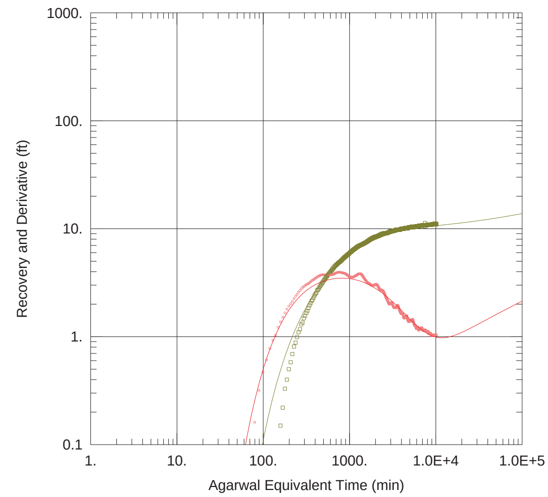
Observation Wells

Well Name	X (ft)	Y (ft)
+ DH19-8B(A)	1011112.431	793798.942

SOLUTION

Aquifer Model: Unconfined
Solution Method: Tartakovsky-Neuman

T = 155. ft^2/day
Sy = 0.08
kD = 0.0001
S = 0.00023
Kz/Kr = 0.25



LOG-LOG RECOVERY GRAPH FOR RC19-8A(D)

AQUIFER DATA

Saturated Thickness: 578. ft
Anisotropy Ratio (Kz/Kr): 0.5

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC-8D	1010870.665	793666.031

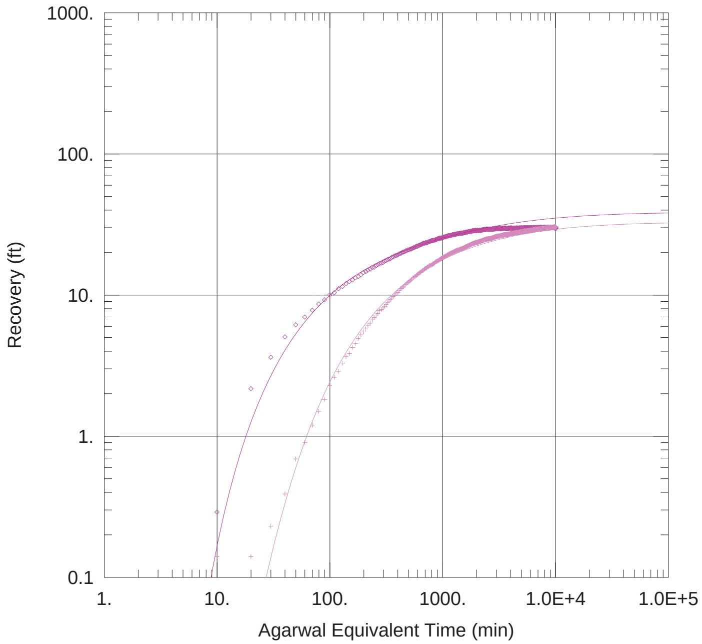
Observation Wells

Well Name	X (ft)	Y (ft)
▫ RC19-8A(D)	1010523.881	793497.87

SOLUTION

Aquifer Model: Unconfined
Solution Method: Tartakovsky-Neuman

T = 200. ft^2/day
Sy = 0.08
kD = 3.
S = 0.0012
Kz/Kr = 0.5



LOG-LOG RECOVERY GRAPH FOR DH19-8B(B) AND DH19-8B(A)

AQUIFER DATA

Saturated Thickness: 578. ft

Anisotropy Ratio (Kz/Kr): 0.18

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC-8D	1010870.665	793666.031

Observation Wells

Well Name	X (ft)	Y (ft)
DH19-8B(B)	1011112.431	793798.942
DH19-8B(A)	1011112.431	793798.942

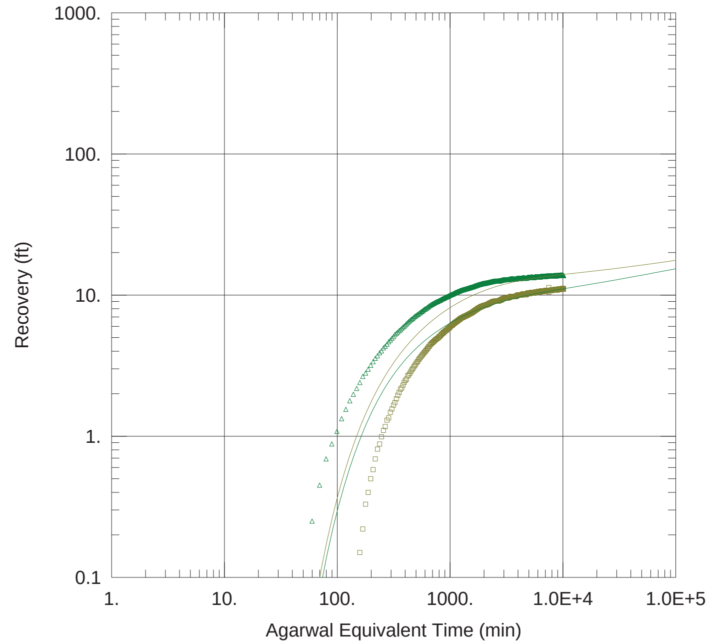
SOLUTION

Aquifer Model: Unconfined

Solution Method: Tartakovsky-Neuman

T = 160. ft^2/day
Sy = 0.08
kD = 0.0001

S = 0.00018
Kz/Kr = 0.18



LOG-LOG RECOVERY GRAPH FOR RC19-8A(S) AND RC19-8A(D)

AQUIFER DATA

Saturated Thickness: 578. ft

Anisotropy Ratio (Kz/Kr): 0.4

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC-8D	1010870.665	793666.031

Observation Wells

Well Name	X (ft)	Y (ft)
RC19-8A(S)	1010523.881	793497.87
RC19-8A(D)	1010523.881	793497.87

SOLUTION

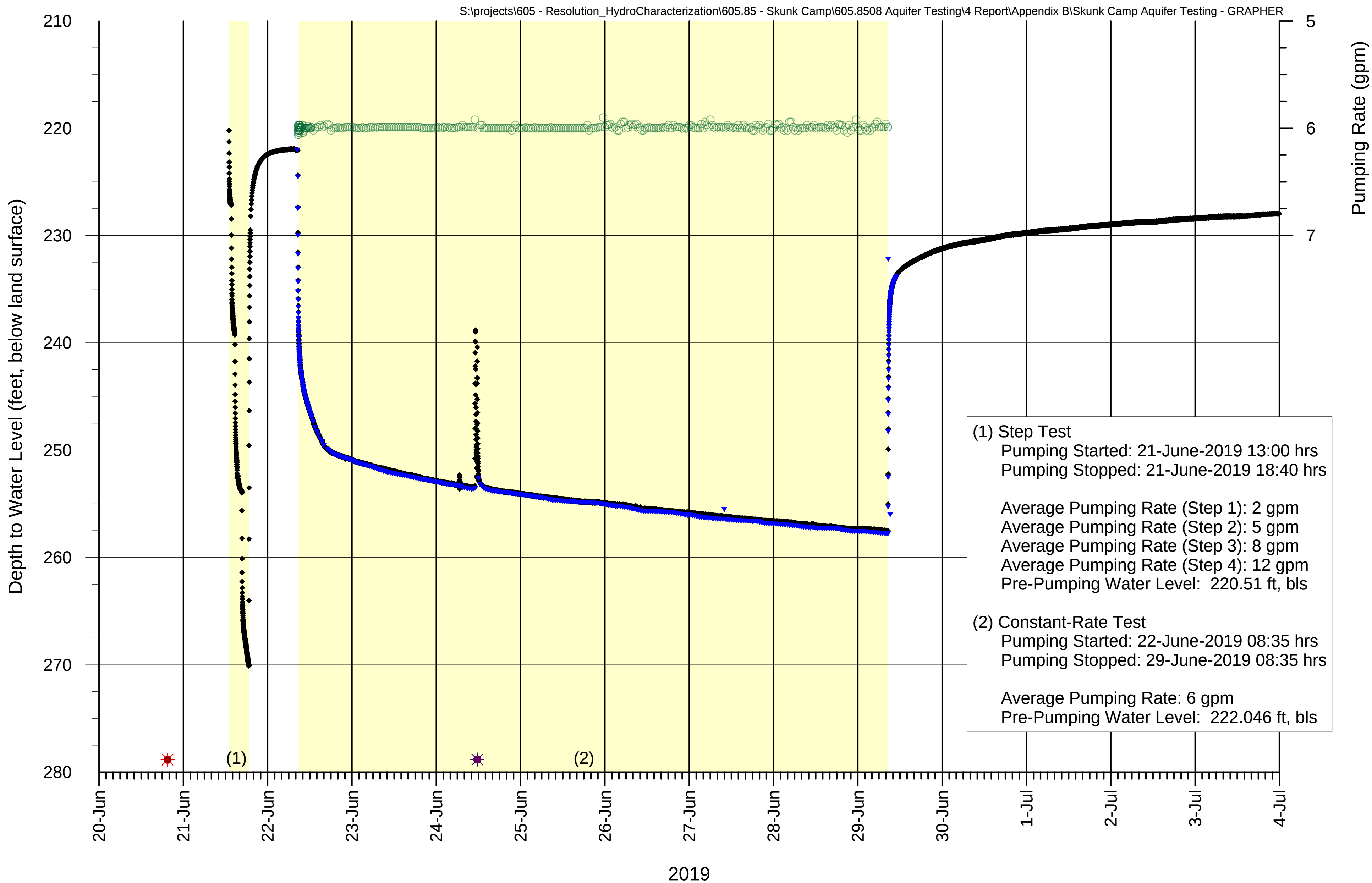
Aquifer Model: Unconfined

Solution Method: Tartakovsky-Neuman

T = 180. ft^2/day
Sy = 0.08
kD = 1.

S = 0.0008
Kz/Kr = 0.4

RC19-13



EXPLANATION

- Water Level (transducer)
- Water Level (manual)
- Pumping Rate (instantaneous)

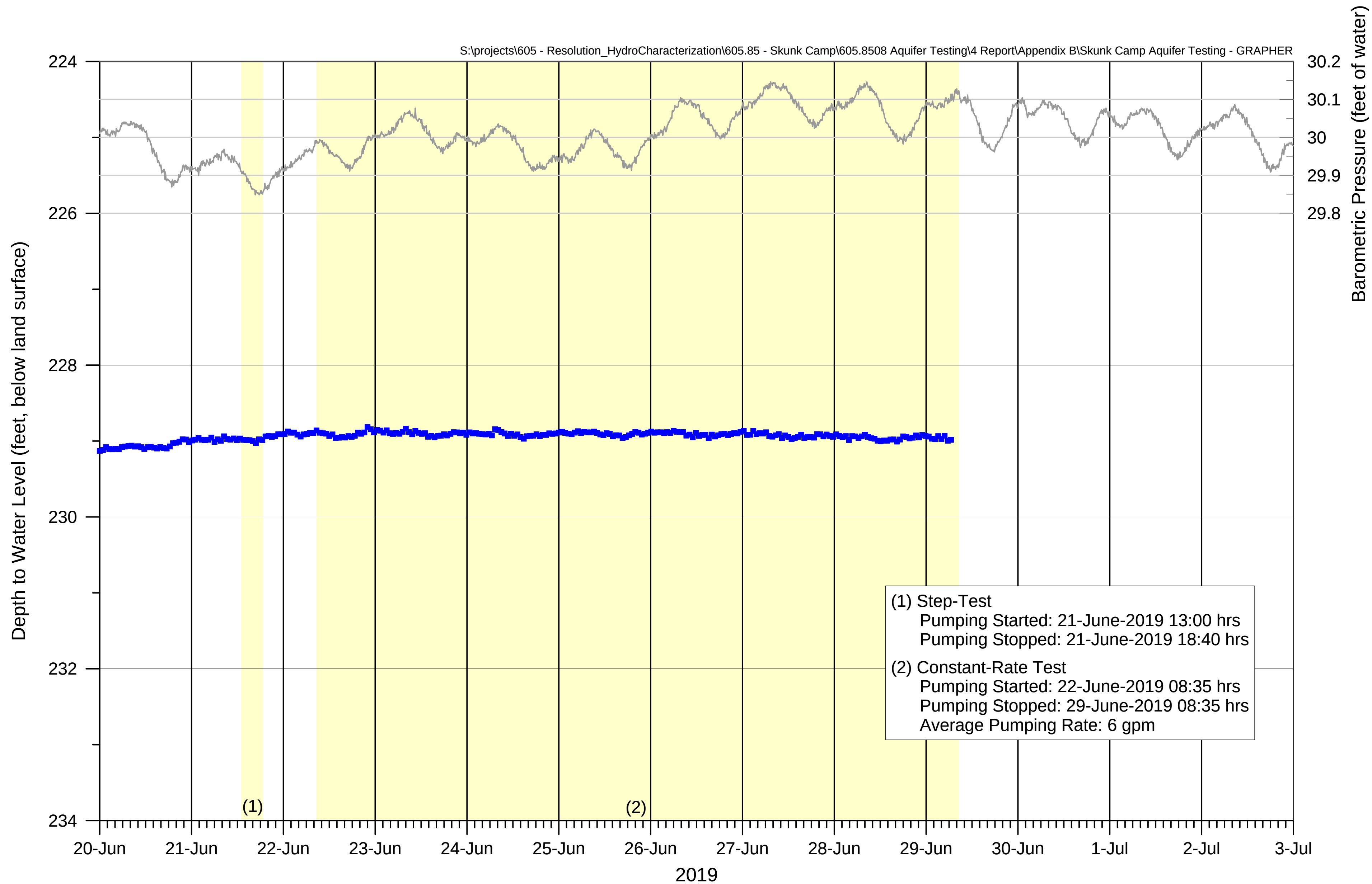
Data Gaps

- Pump Installed - Transducer removed
- Pump stopped from 11:01 - 11:45 hrs (44 minutes)

HYDROGRAPH FOR PUMPED WELL RC19-13 DURING STEP AND CONSTANT-RATE PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



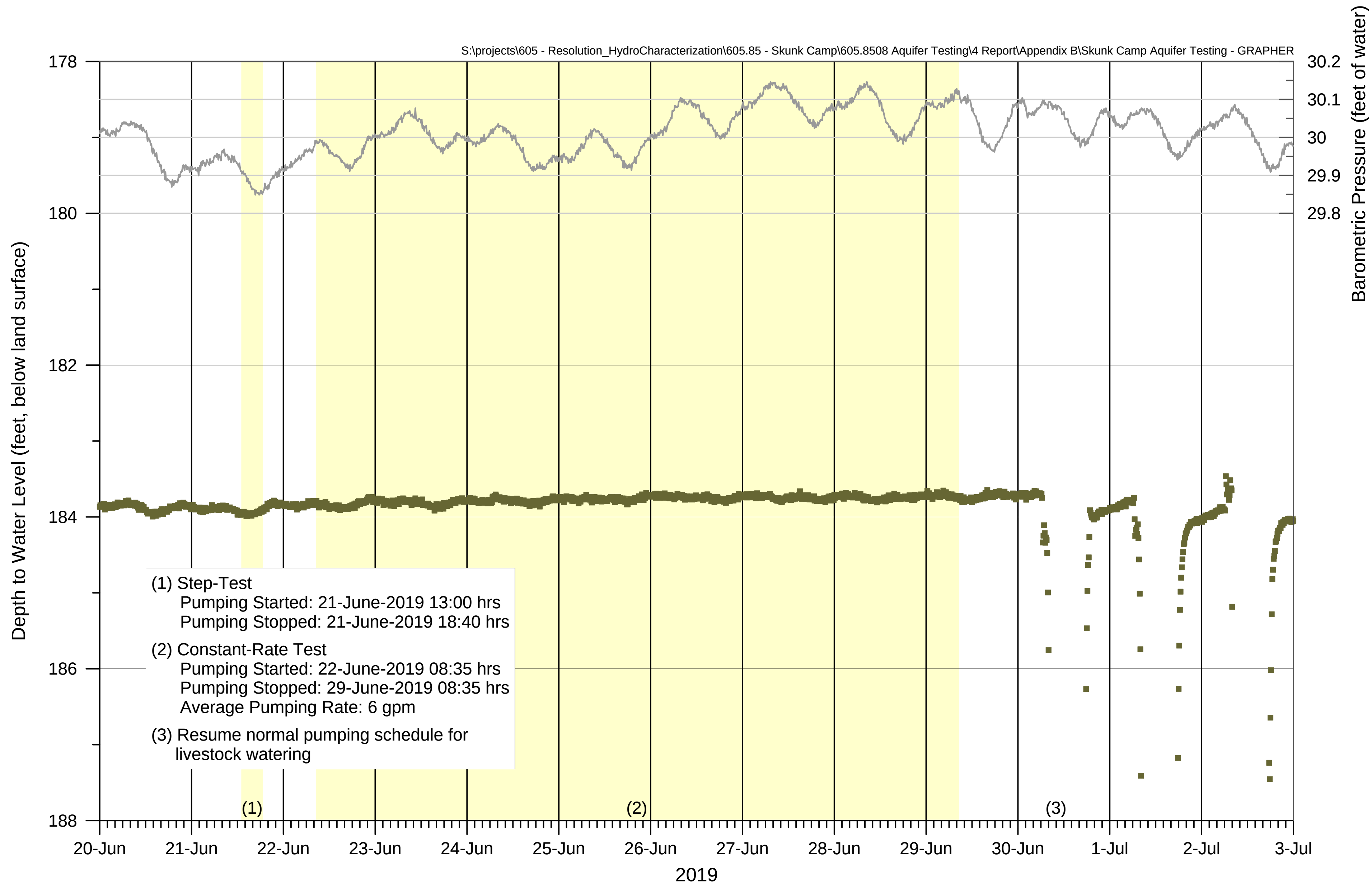
EXPLANATION

- Headquarters #2
- Barometric Pressure at Headquarters

HYDROGRAPH FOR OBSERVATION WELL HEADQUARTERS #2 DURING RC-13 PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



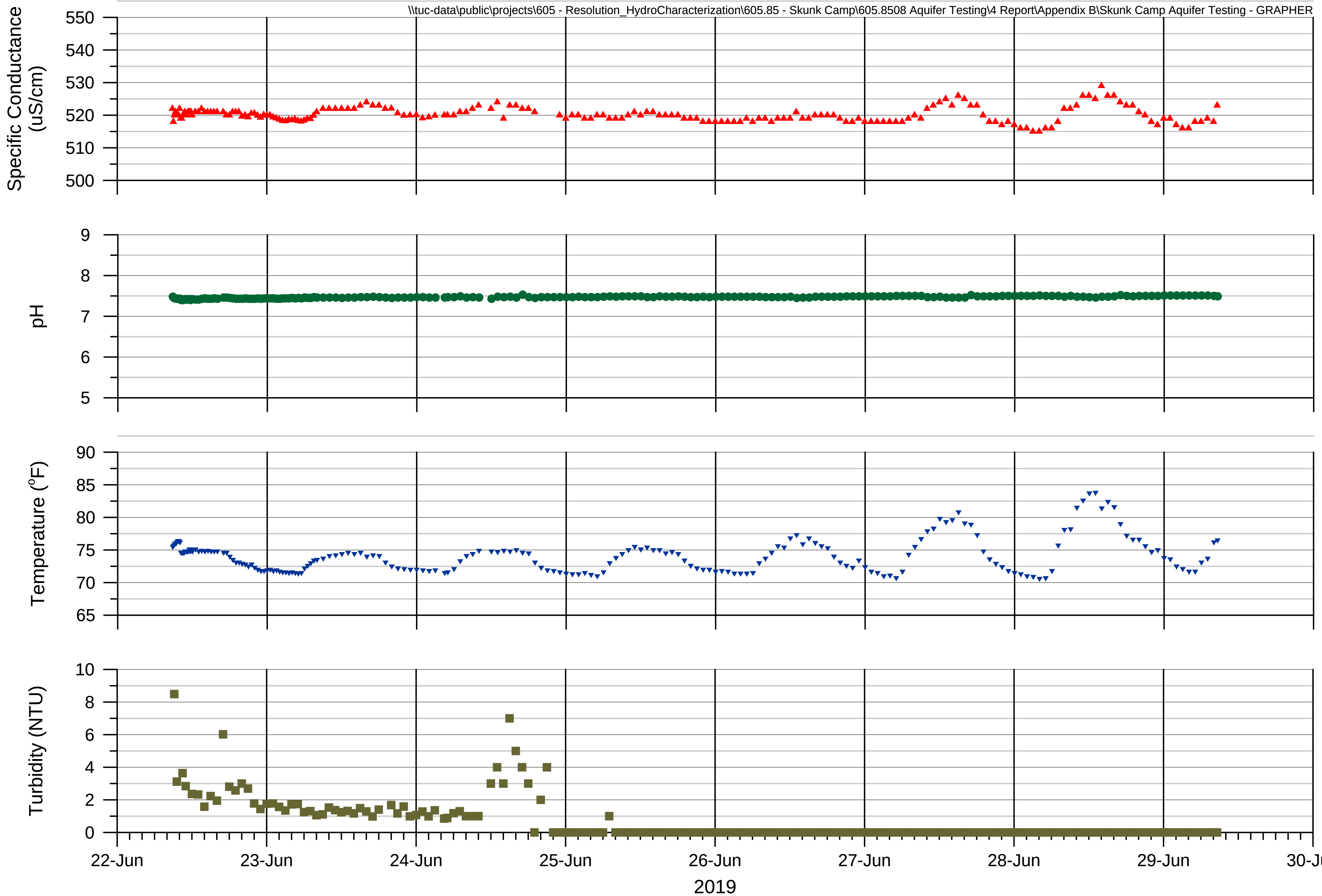
EXPLANATION

- Headquarters #3
- Barometric Pressure at Headquarters

HYDROGRAPH FOR OBSERVATION WELL HEADQUARTERS #3 DURING RC-13 PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



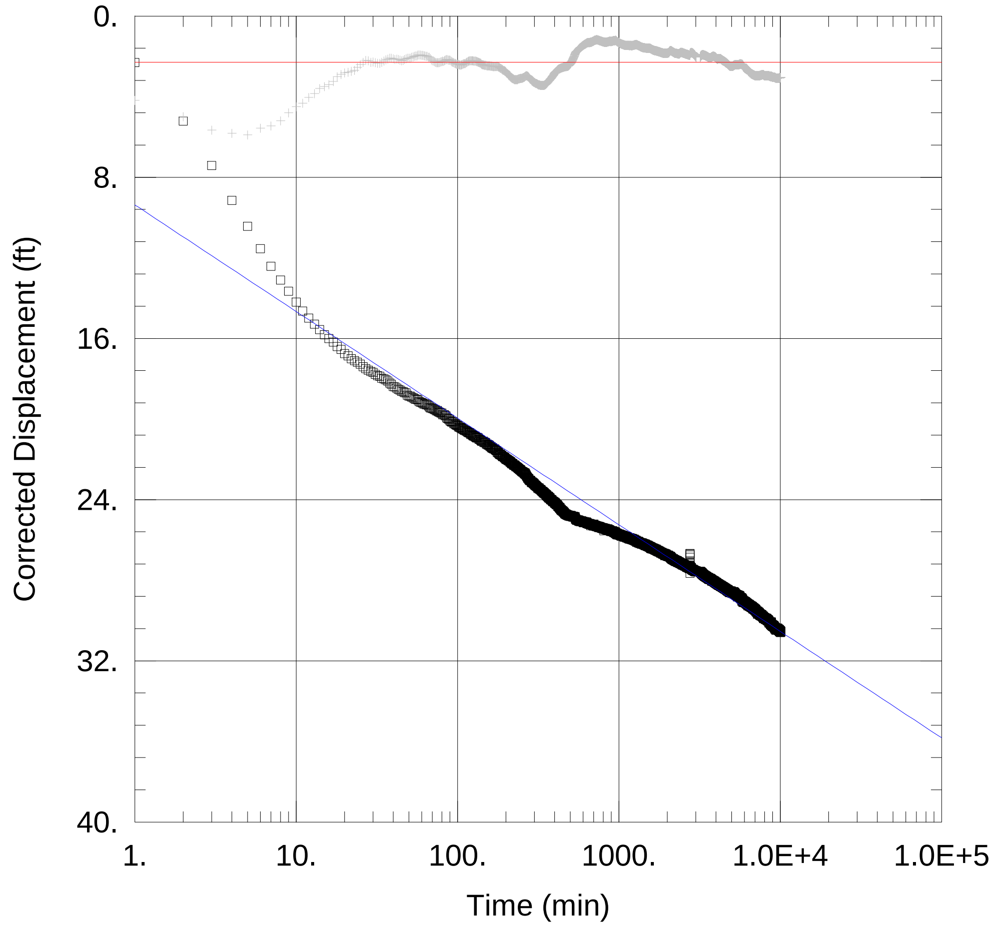
EXPLANATION

- Specific Electrical Conductance
- pH
- Temperature
- Turbidity

FIELD MEASUREMENTS OF SPECIFIC CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC19-13

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



RC19-13 CONSTANT-RATE PUMPING TEST

Data Set: S:\...\RC19-13_CJ_dd_dsw1.aqt
Date: 08/31/19 Time: 08:28:18

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC19-13
Test Date: 22-29 Jun 2019

AQUIFER DATA

Saturated Thickness: 127.9 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-13	1005466	801570

Observation Wells

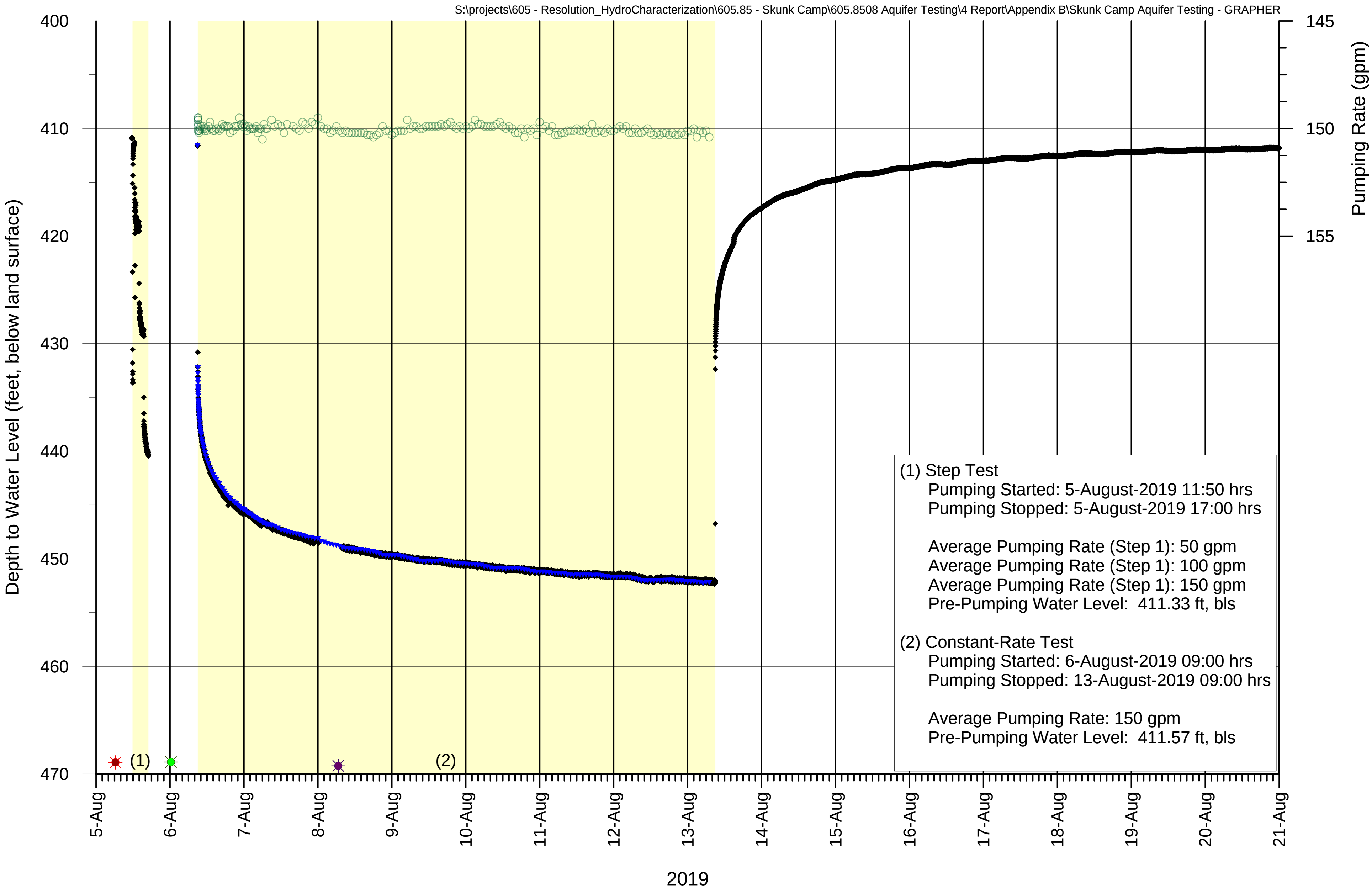
Well Name	X (ft)	Y (ft)
□ RC19-13	1005466	801570

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 40. ft^2/day S = 0.01442

RC19-15



EXPLANATION

- ◆ Water Level (transducer)
- ▼ Water Level (manual)
- ○ Pumping Rate (instantaneous)

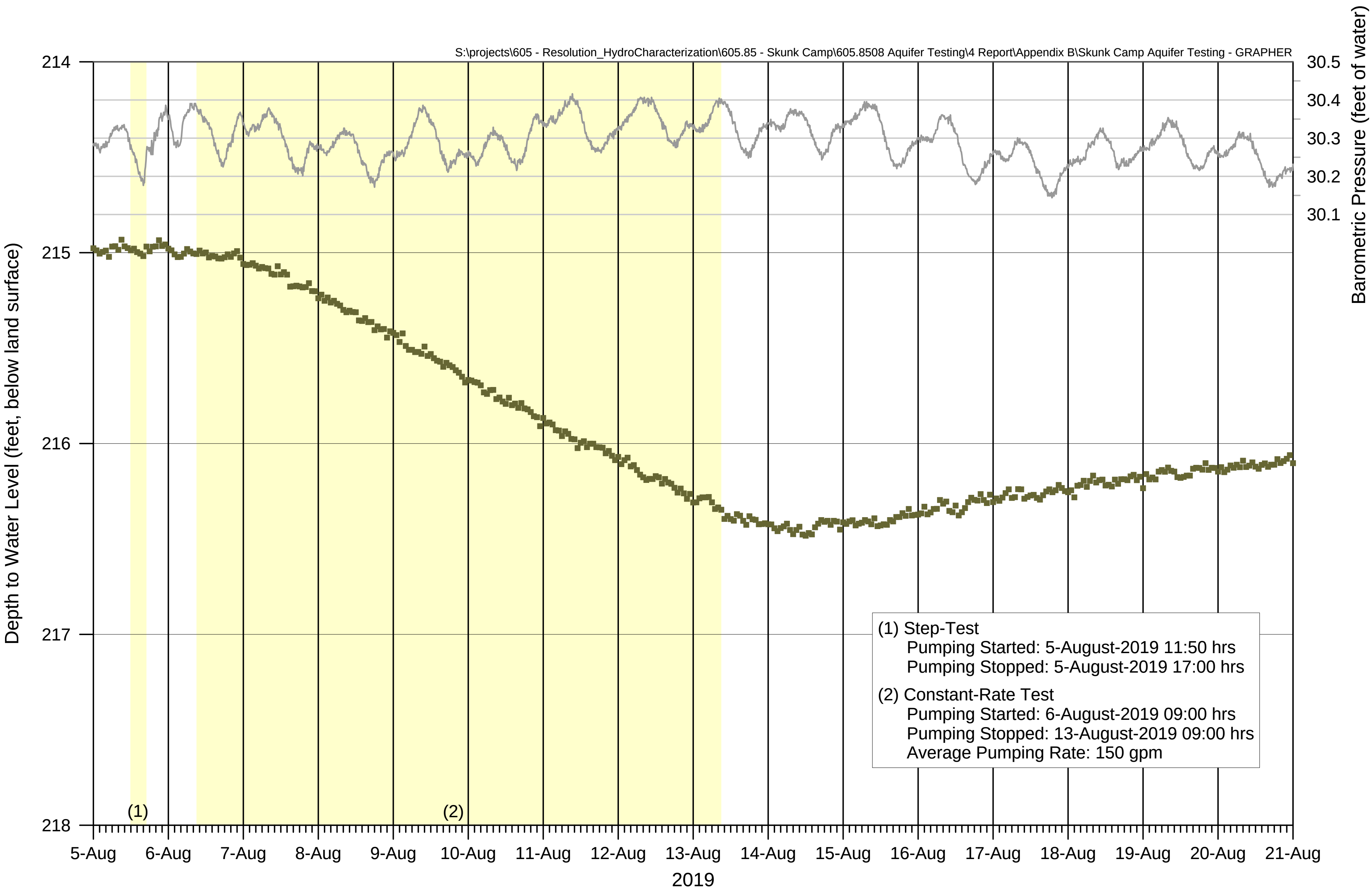
Data Gaps

- Pump Installed - Transducer removed
- No Data
- Transducer damaged

HYDROGRAPH FOR PUMPED WELL RC19-15 DURING STEP AND CONSTANT-RATE PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



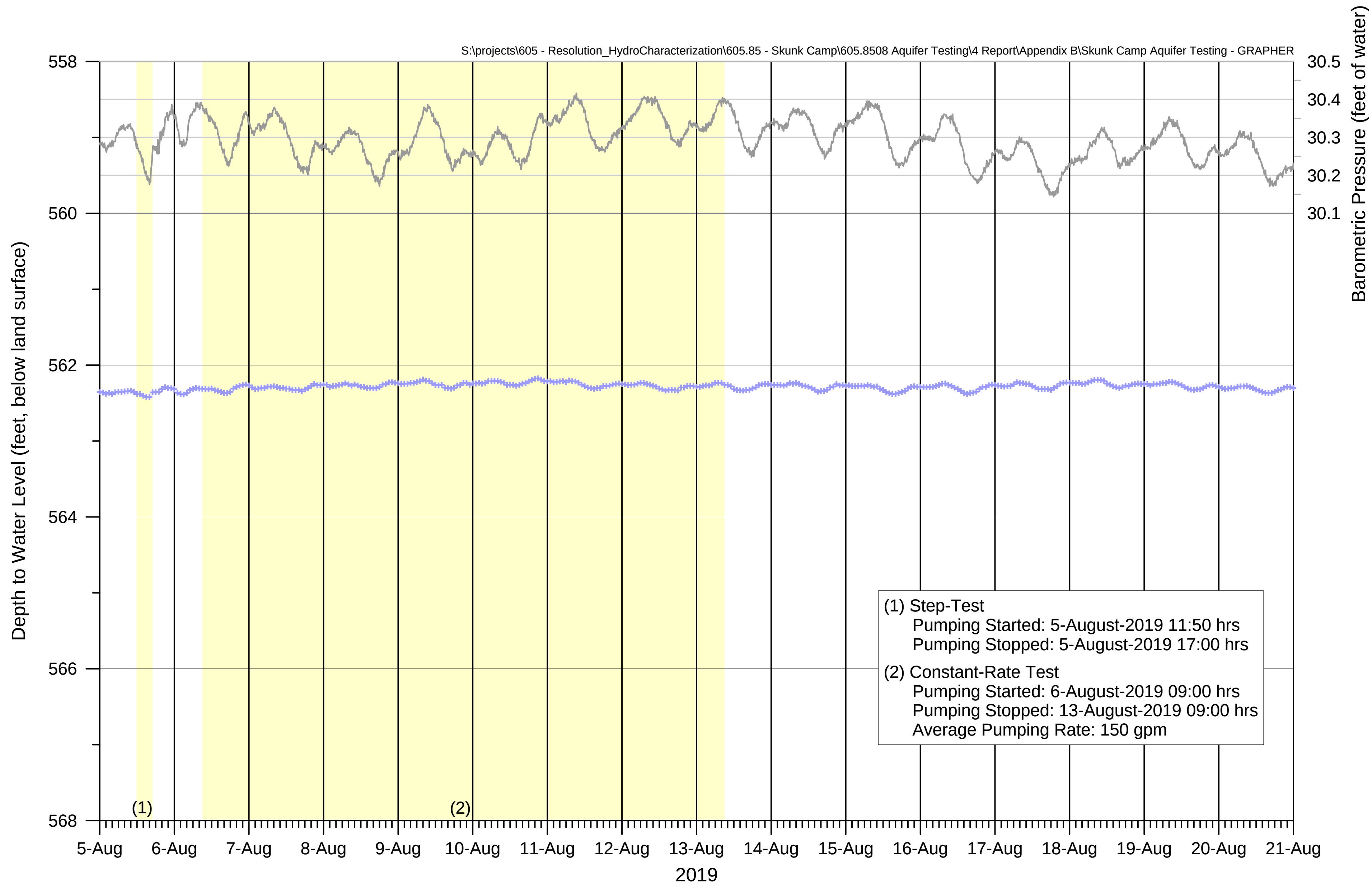
EXPLANATION

- RC18-4
- Barometric Pressure at RC19-8

HYDROGRAPH FOR OBSERVATION WELL RC18-4
DURING RC-15 PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



EXPLANATION

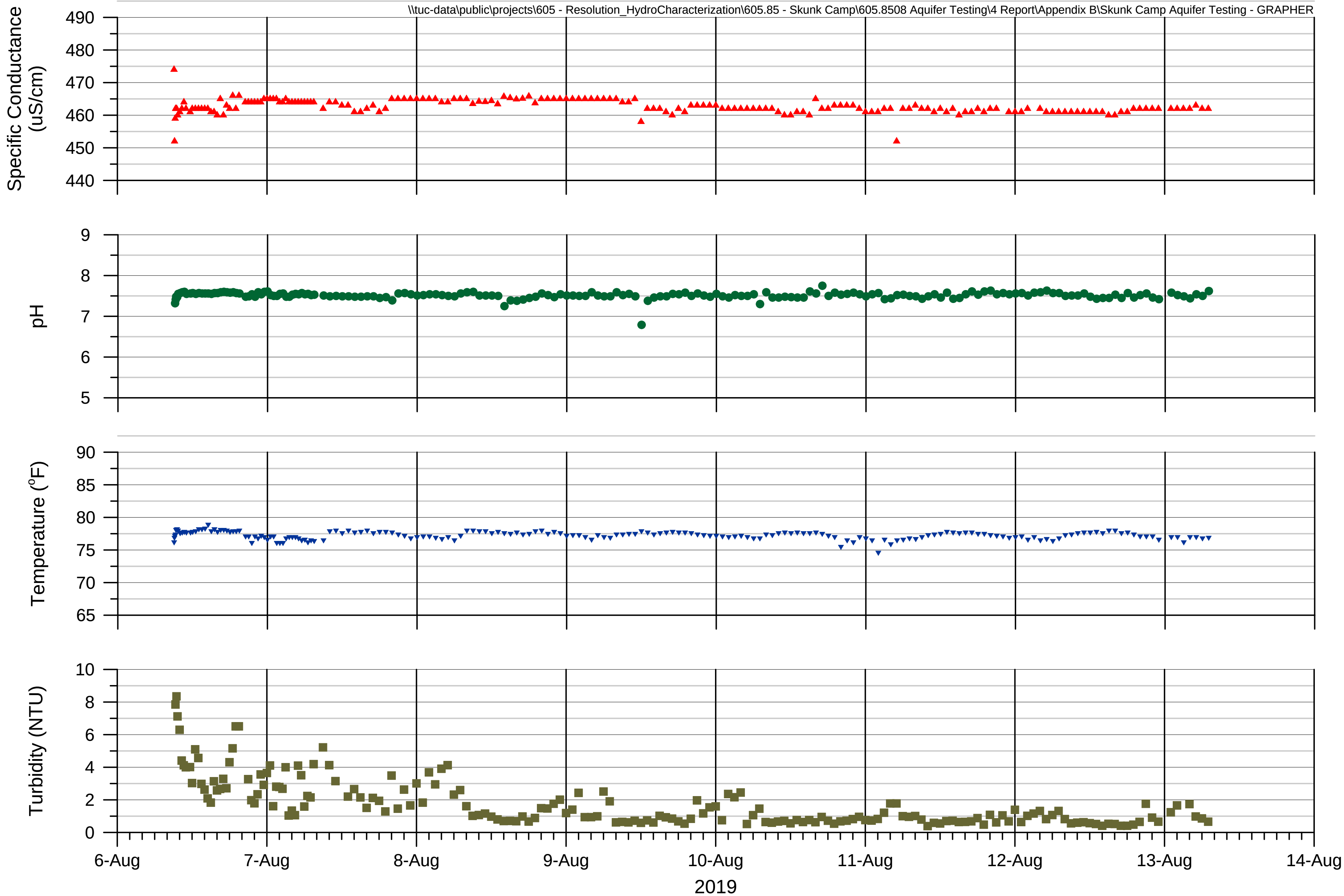
+ RC19-10

— Barometric Pressure at RC19-8

HYDROGRAPH FOR OBSERVATION WELL RC19-10
DURING RC-15 PUMPING TESTS

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



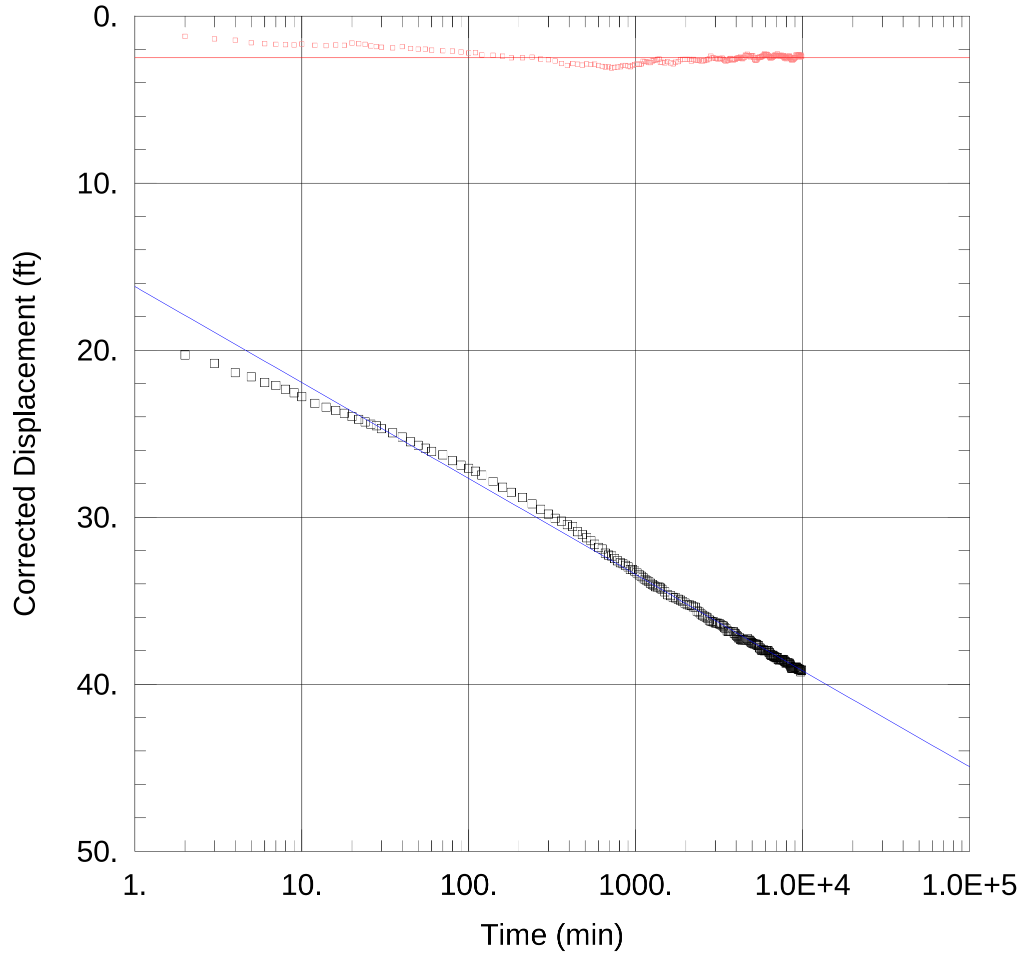
EXPLANATION

- ▲ Specific Electrical Conductance
- ● pH
- ▼ Temperature
- ■ Turbidity

FIELD MEASUREMENTS OF SPECIFIC CONDUCTANCE, pH, TEMPERATURE, AND TURBIDITY DURING PUMPING AT WELL RC19-15

Client: Resolution Copper
Project: Skunk Camp Aquifer Testing
Location: Pinal and Gila Counties, AZ

MONTGOMERY & ASSOCIATES



RC19-15 CONSTANT-RATE PUMPING TEST

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC19-15
Test Date: 06-13 Aug 2019

AQUIFER DATA

Saturated Thickness: 571. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
RC19-15	1003615	808854

Observation Wells

Well Name	X (ft)	Y (ft)
□ RC19-15	1003615	808854

SOLUTION

Aquifer Model: Unconfined

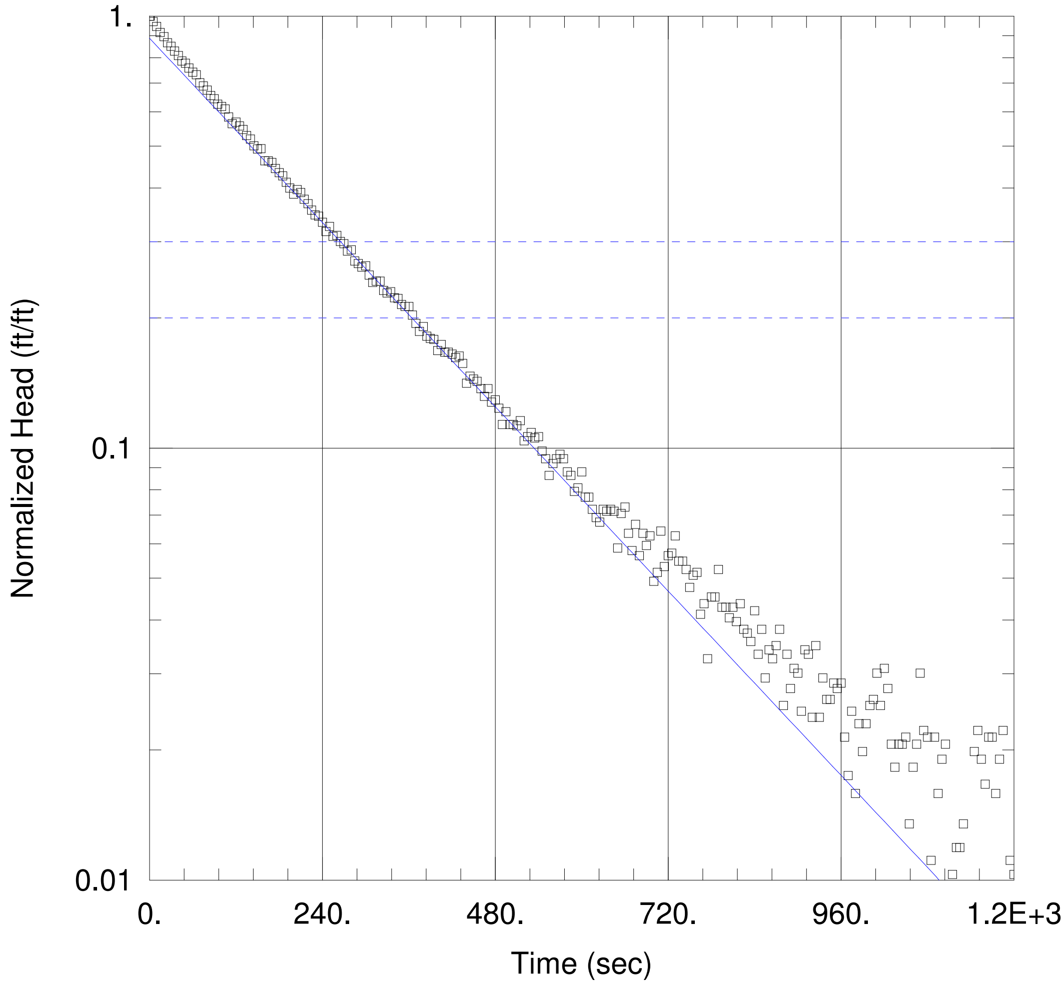
Solution Method: Cooper-Jacob

T = 920. ft^2/day

S = 0.01122

Appendix C

Slug Test Analytical Solutions



RC18-4 SLUG TEST #1: FALLING HEAD

Data Set: S:\...\RC18-4_slug1-IN_B-R.aqt
Date: 08/30/19 Time: 07:02:43

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC18-4
Test Date: 6 June 2019

AQUIFER DATA

Saturated Thickness: 51.75 ft
Anisotropy Ratio (Kz/Kr): 1.

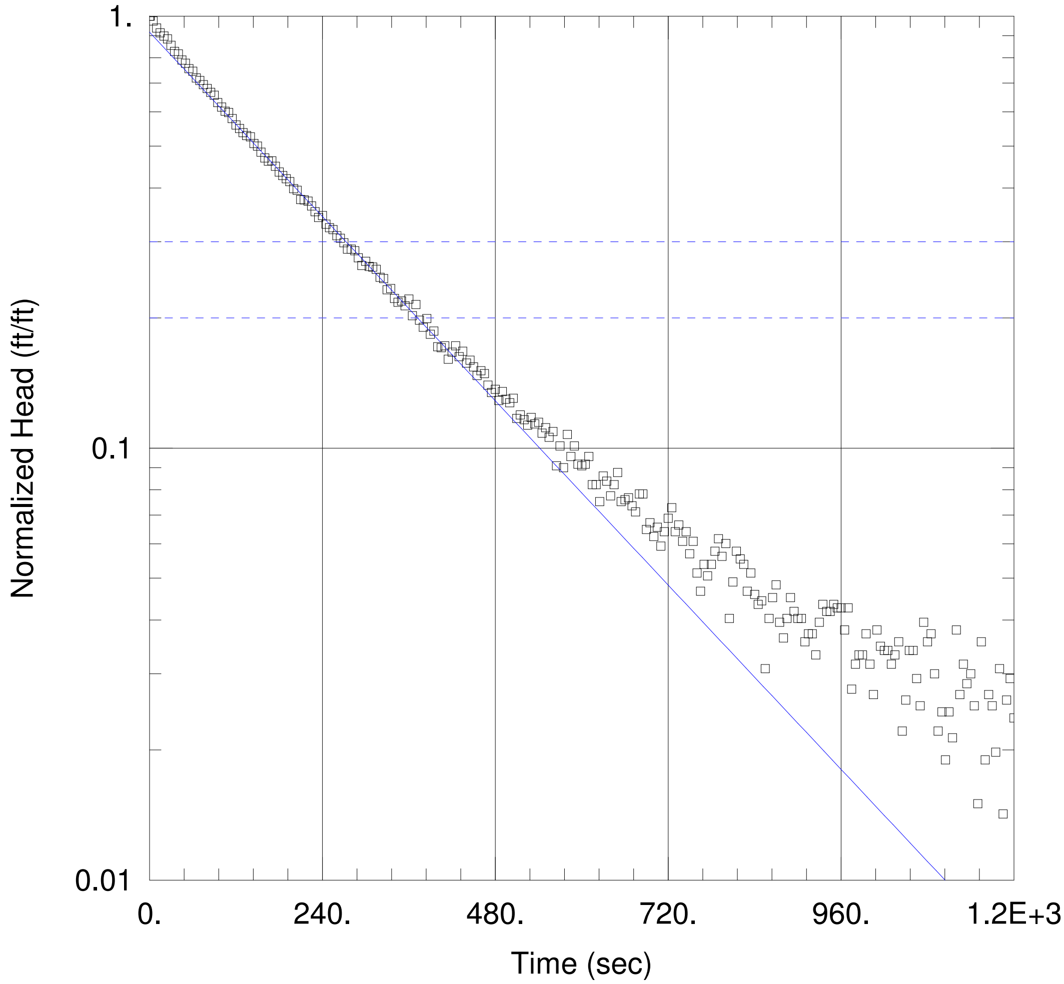
WELL DATA (RC18-4)

Initial Displacement: 1.261 ft
Total Well Penetration Depth: 51.75 ft
Casing Radius: 0.1667 ft
Static Water Column Height: 51.75 ft
Screen Length: 46. ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.00017 cm/sec
y0 = 1.12 ft



RC18-4 SLUG TEST #1: RISING HEAD

Data Set: S:\...\RC18-4_slug1-OUT_B-R.aqt
Date: 08/30/19 Time: 07:04:20

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC18-4
Test Date: 6 June 2019

AQUIFER DATA

Saturated Thickness: 51.75 ft Anisotropy Ratio (Kz/Kr): 1.

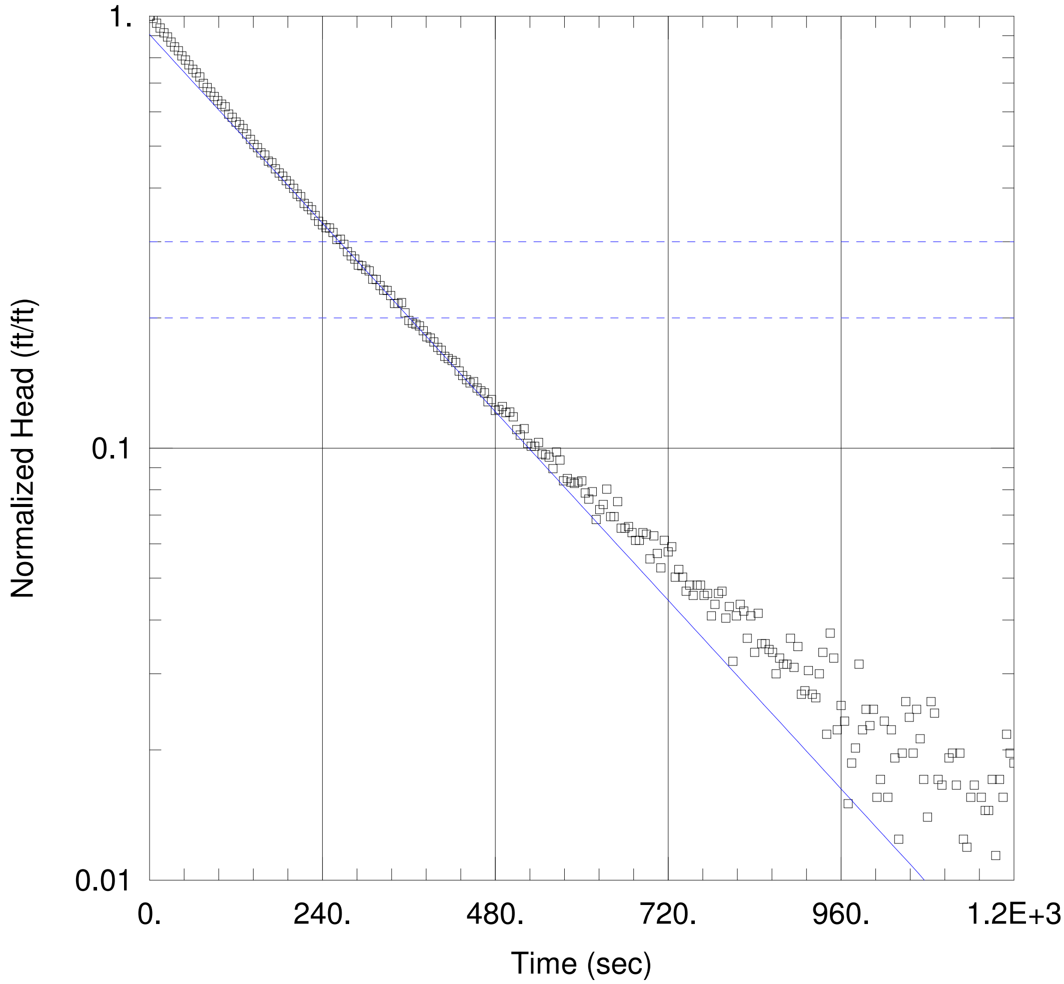
WELL DATA (RC18-4)

Initial Displacement: 1.265 ft
Total Well Penetration Depth: 51.75 ft
Casing Radius: 0.1667 ft
Static Water Column Height: 51.75 ft
Screen Length: 46. ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00017 cm/sec y0 = 1.16 ft



RC18-4 SLUG TEST #2: FALLING HEAD

Data Set: S:\...\RC18-4_slug2-IN_B-R.aqt
Date: 08/30/19 Time: 07:07:10

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC18-4
Test Date: 6 June 2019

AQUIFER DATA

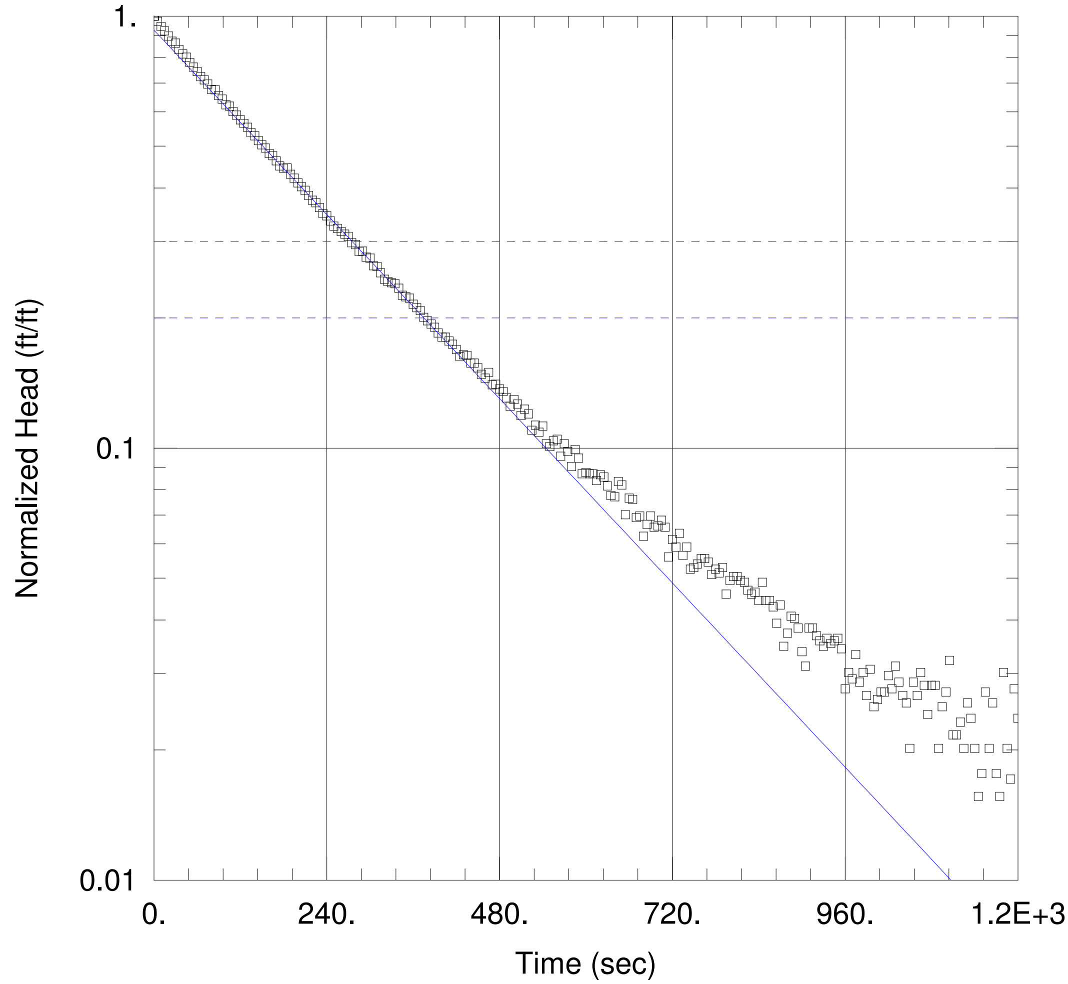
Saturated Thickness: 51.75 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RC18-4)

Initial Displacement: 1.931 ft
Total Well Penetration Depth: 51.75 ft
Casing Radius: 0.1667 ft
Static Water Column Height: 51.75 ft
Screen Length: 46. ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.000174 cm/sec
y0 = 1.75 ft



RC18-4 SLUG TEST #2: RISING HEAD

Data Set: S:\...\RC18-4_slug2-OUT_B-R.aqt
Date: 08/30/19 Time: 07:07:47

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC18-4
Test Date: 6 June 2019

AQUIFER DATA

Saturated Thickness: 51.75 ft
Anisotropy Ratio (Kz/Kr): 1.

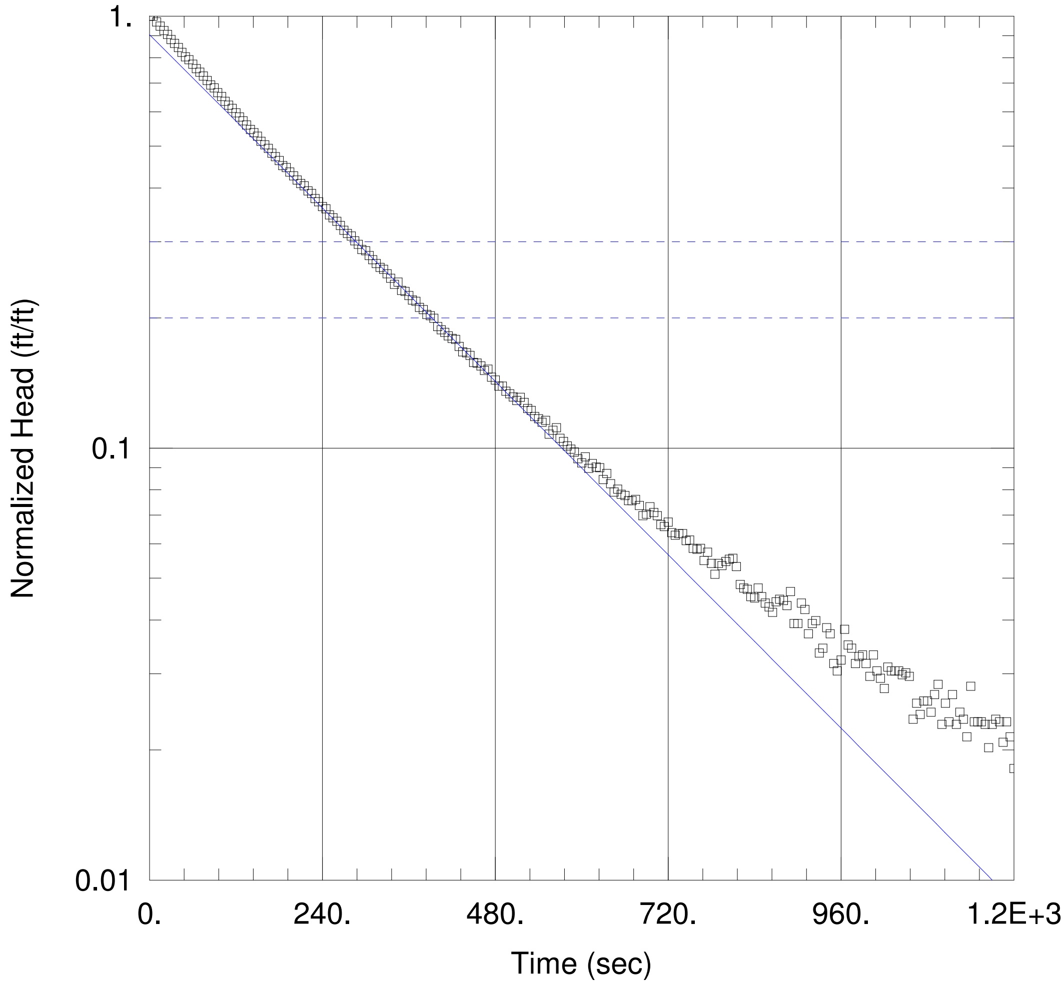
WELL DATA (RC18-4)

Initial Displacement: 1.984 ft
Total Well Penetration Depth: 51.75 ft
Casing Radius: 0.1667 ft
Static Water Column Height: 51.75 ft
Screen Length: 46. ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.00017 cm/sec
y0 = 1.84 ft



RC18-4 SLUG TEST #3: FALLING HEAD

Data Set: S:\...\RC18-4_slug3-IN_B-R.aqt
Date: 08/30/19 Time: 07:08:32

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC18-4
Test Date: 7 June 2019

AQUIFER DATA

Saturated Thickness: 51.75 ft Anisotropy Ratio (Kz/Kr): 1.

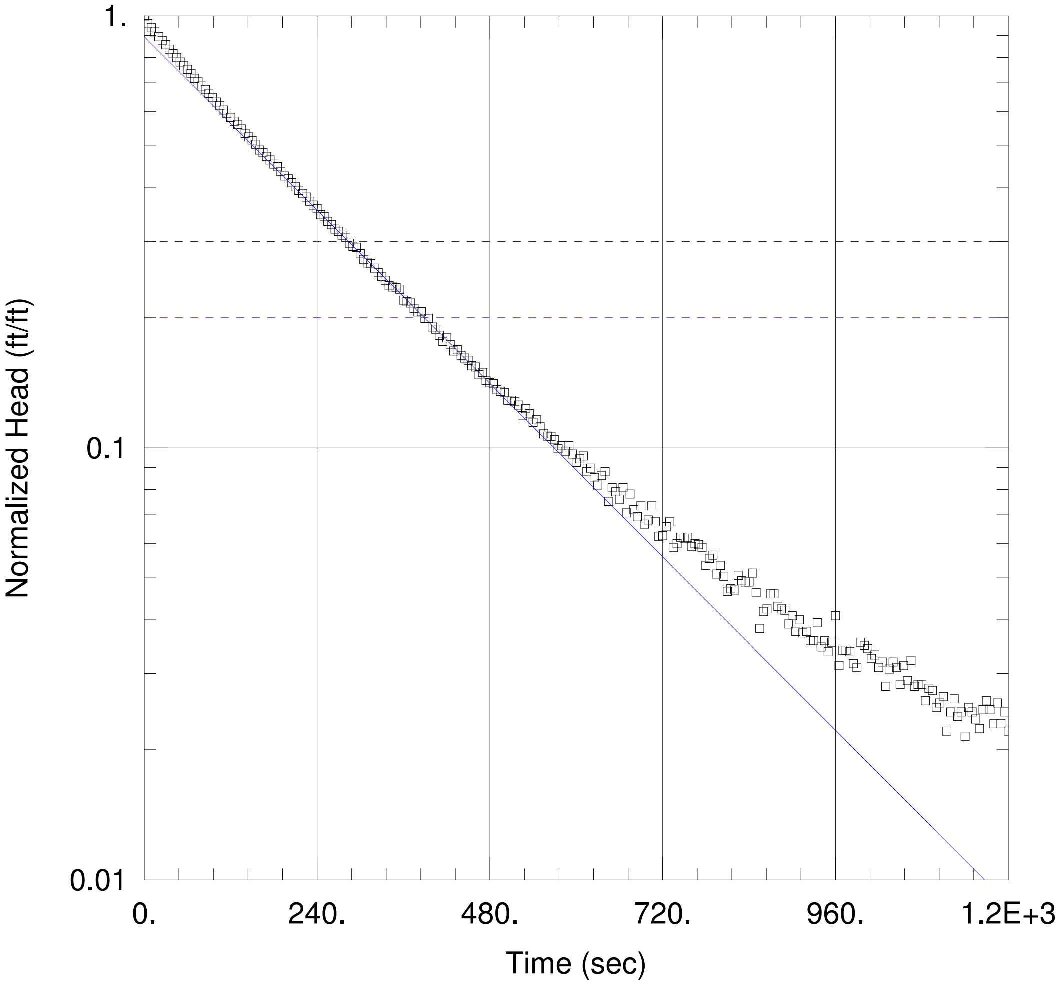
WELL DATA (RC18-4)

Initial Displacement: 3.312 ft Static Water Column Height: 51.75 ft
Total Well Penetration Depth: 51.75 ft Screen Length: 46. ft
Casing Radius: 0.1667 ft Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00016 cm/sec y0 = 3. ft



RC18-4 SLUG TEST #3: RISING HEAD

Data Set: S:\...\RC18-4_slug3-OUT_B-R.aqt
Date: 08/30/19 Time: 07:09:06

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC18-4
Test Date: 7 June 2019

AQUIFER DATA

Saturated Thickness: 51.75 ft Anisotropy Ratio (Kz/Kr): 1.

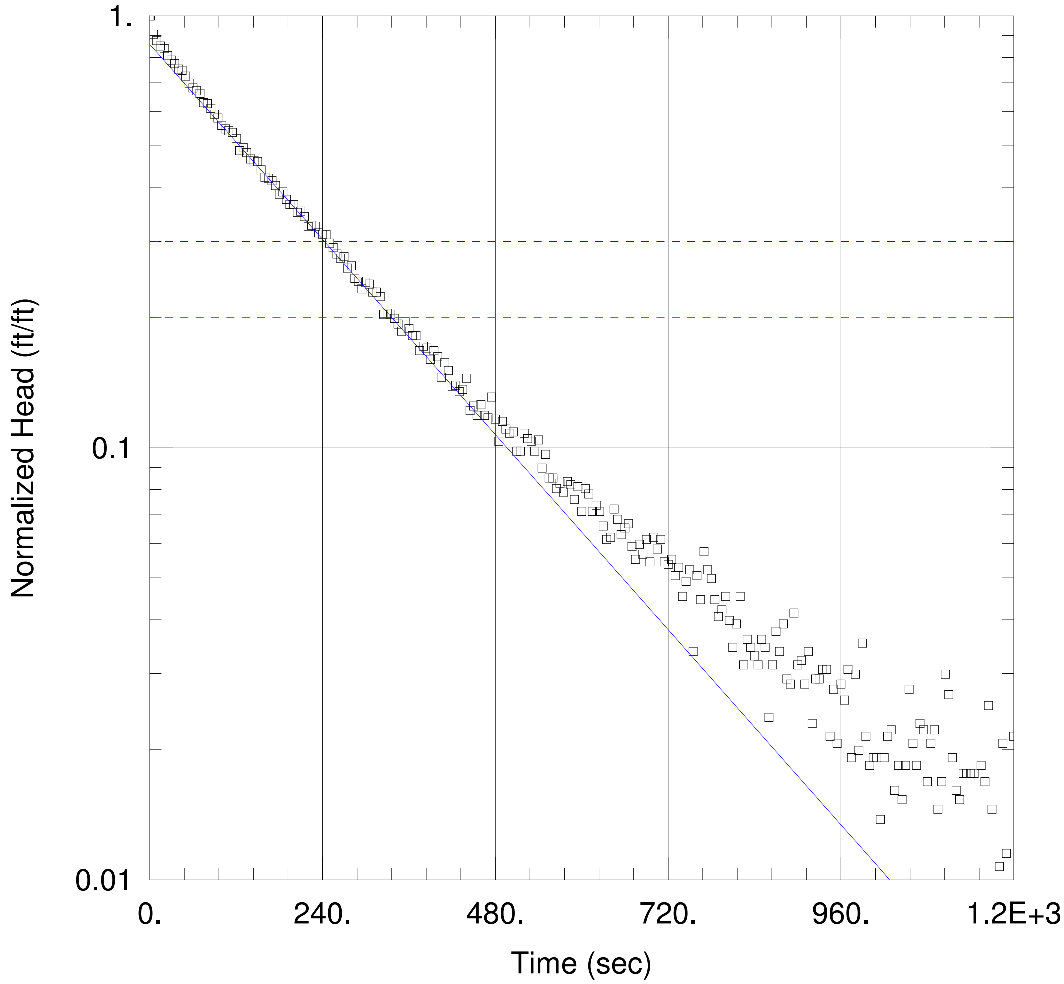
WELL DATA (RC18-4)

Initial Displacement: 3.352 ft
Total Well Penetration Depth: 51.75 ft
Casing Radius: 0.1667 ft
Static Water Column Height: 51.75 ft
Screen Length: 46. ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00016 cm/sec y0 = 3. ft



RC18-4 SLUG TEST #4: FALLING HEAD

Data Set: S:\...\RC18-4_slug4-IN_B-R.aqt
Date: 08/30/19 Time: 07:09:45

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC18-4
Test Date: 7 June 2019

AQUIFER DATA

Saturated Thickness: 51.75 ft
Anisotropy Ratio (Kz/Kr): 1.

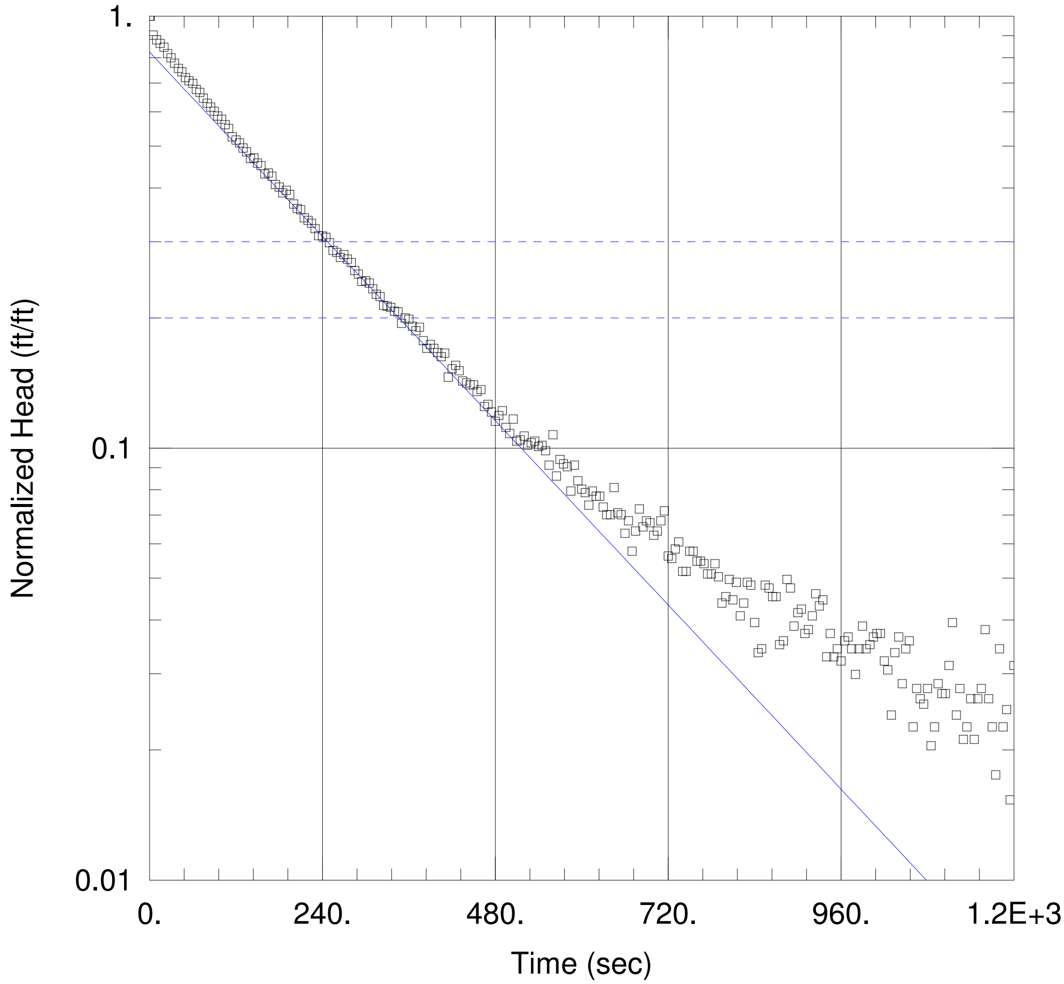
WELL DATA (RC18-4)

Initial Displacement: 1.304 ft
Total Well Penetration Depth: 51.75 ft
Casing Radius: 0.1667 ft
Static Water Column Height: 51.75 ft
Screen Length: 46. ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.00018 cm/sec
y0 = 1.12 ft



RC18-4 SLUG TEST #4: RISING HEAD

Data Set: S:\...\RC18-4_slug4-OUT_B-R.aqt
Date: 08/30/19
Time: 07:10:42

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC18-4
Test Date: 7 June 2019

AQUIFER DATA

Saturated Thickness: 51.75 ft
Anisotropy Ratio (Kz/Kr): 1.

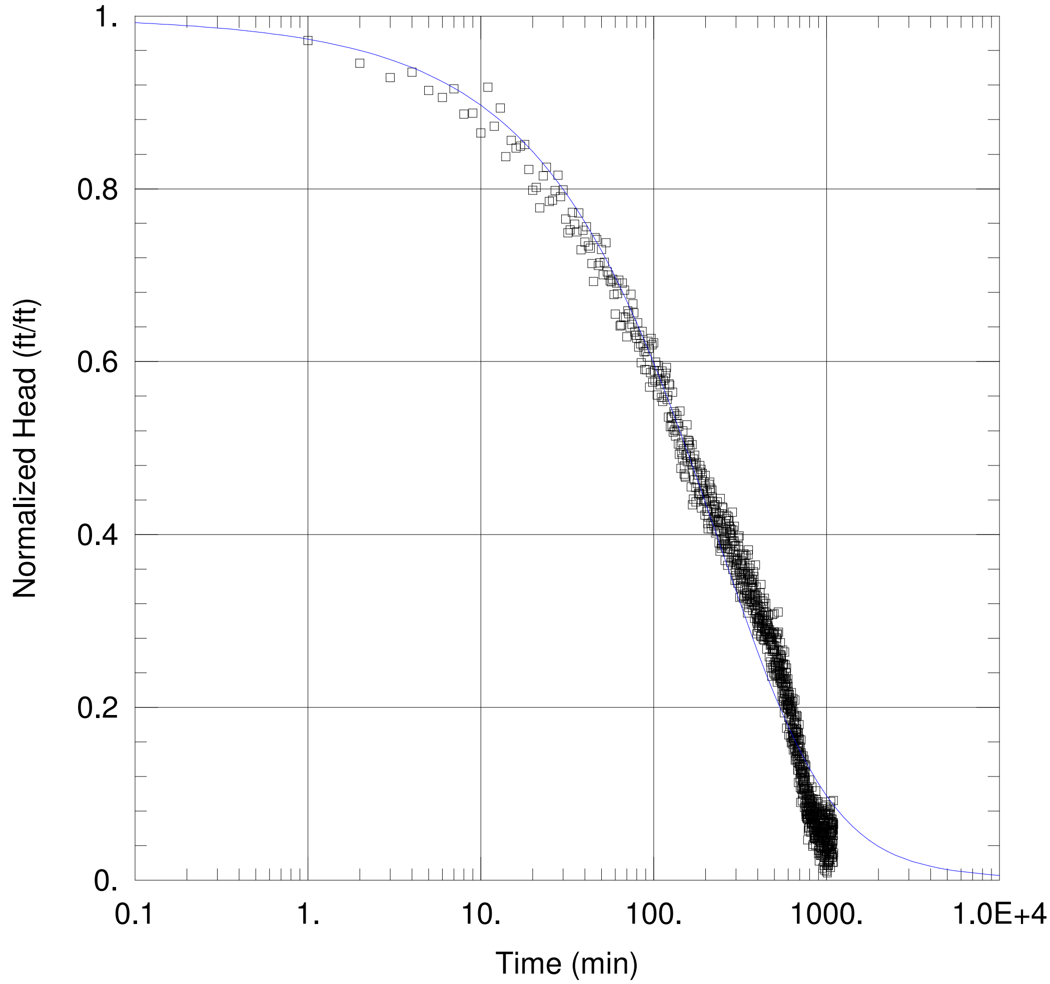
WELL DATA (RC18-4)

Initial Displacement: 1.37 ft
Total Well Penetration Depth: 51.75 ft
Casing Radius: 0.1667 ft
Static Water Column Height: 51.75 ft
Screen Length: 46. ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.00017 cm/sec
y0 = 1.13 ft



RC-10 SLUG TEST #1: RISING HEAD

Data Set: S:\...\RC-10_slug1-OUT_KGS.aqt
Date: 08/30/19 Time: 07:14:05

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC-10
Test Date: 7 June 2019

AQUIFER DATA

Saturated Thickness: 78.4 ft

WELL DATA (RC-10)

Initial Displacement: 0.8736 ft
Total Well Penetration Depth: 78.4 ft
Casing Radius: 0.1667 ft

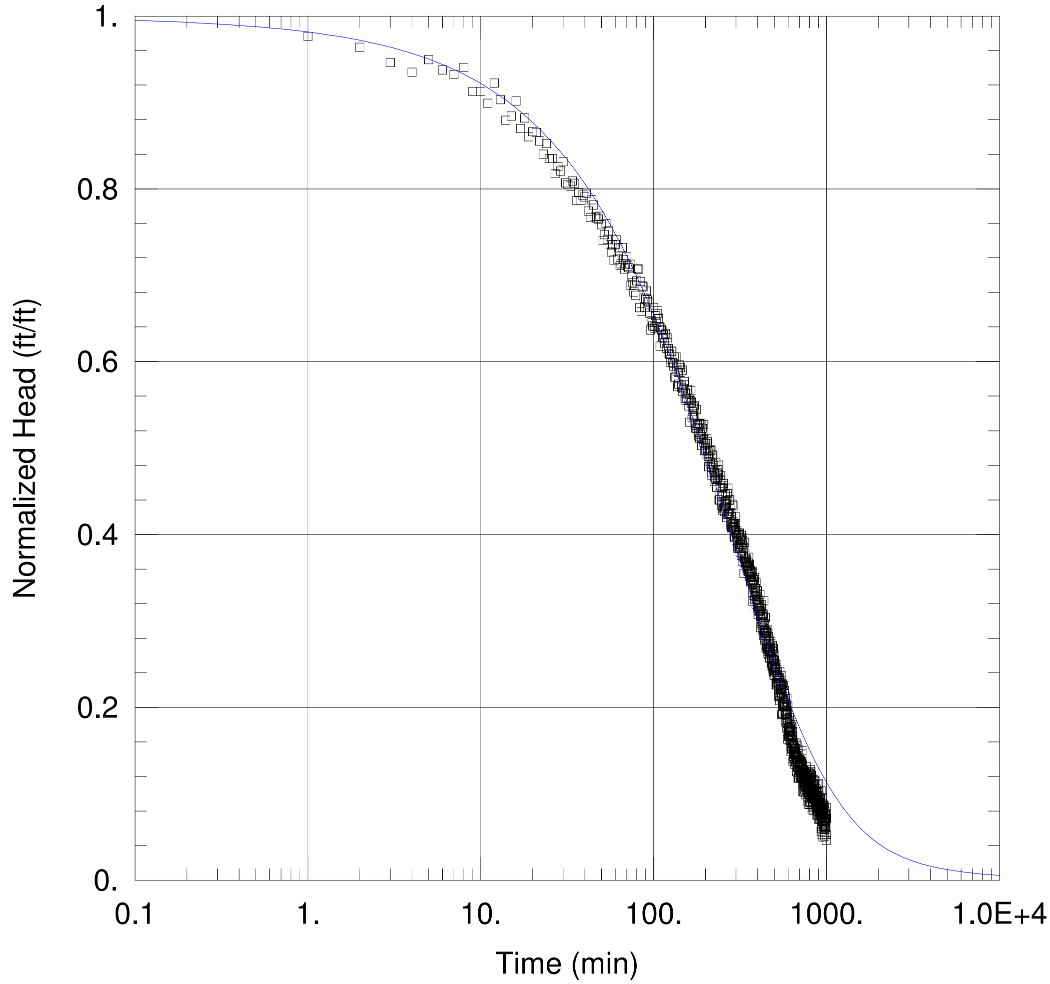
Static Water Column Height: 78.4 ft
Screen Length: 78.4 ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 8.0E-7 cm/sec
Kz/Kr = 1.

Ss = 0.0003 ft^{-1}



RC-10 SLUG TEST #2: RISING HEAD

Data Set: S:\...\RC-10_slug2-OUT_KGS.aqt
Date: 08/30/19 Time: 07:16:38

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC-10
Test Date: 20 June 2019

AQUIFER DATA

Saturated Thickness: 78.4 ft

WELL DATA (RC-10)

Initial Displacement: 1.678 ft
Total Well Penetration Depth: 78.4 ft
Casing Radius: 0.1667 ft

Static Water Column Height: 78.4 ft
Screen Length: 78.4 ft
Well Radius: 0.1667 ft

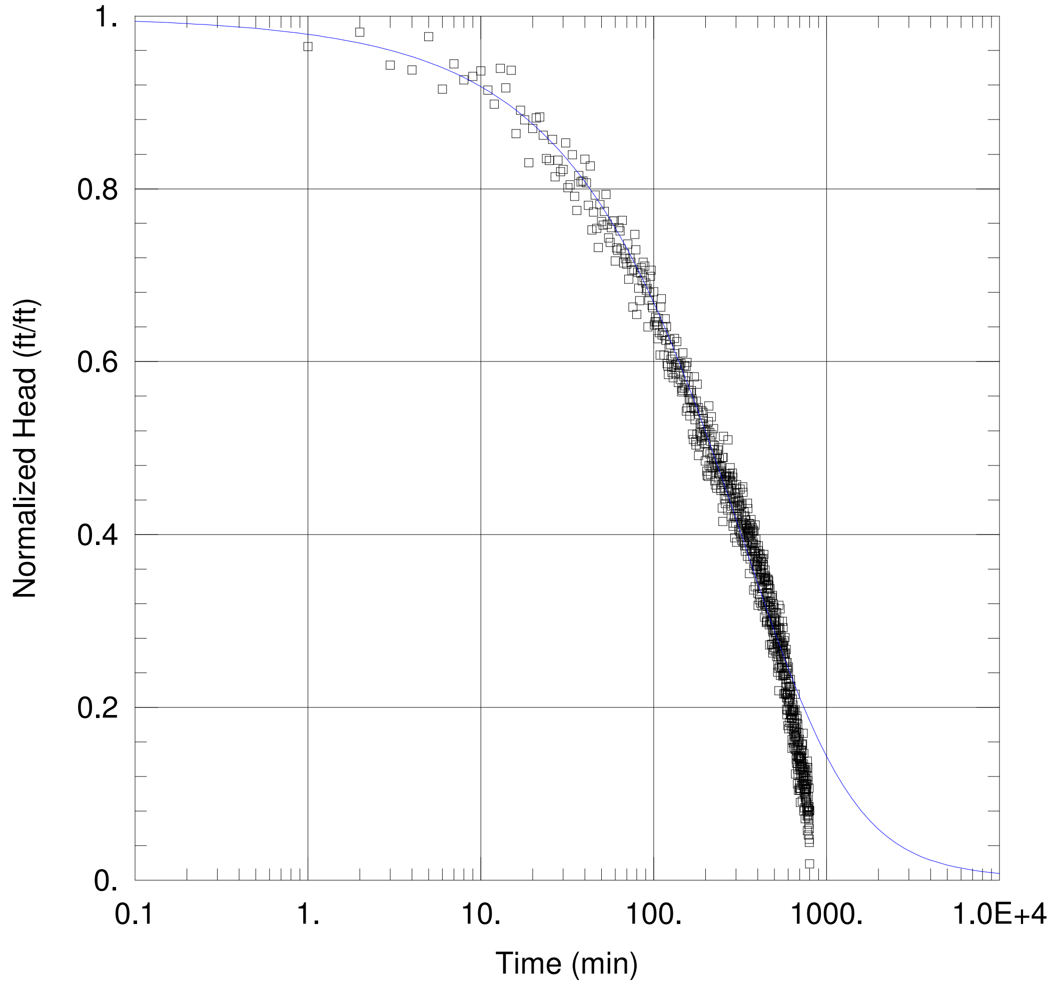
SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 8.0E-7 cm/sec
Kz/Kr = 1.

Ss = 0.00012 ft^{-1}



RC-10 SLUG TEST #3: RISING HEAD

Data Set: S:\...\RC-10_slug3-OUT_KGS.aqt
Date: 08/30/19 Time: 07:15:51

PROJECT INFORMATION

Company: Montgomery & Associates
Client: Resolution Copper
Project: 605.8508
Location: Skunk Camp
Test Well: RC-10
Test Date: 28 June 2019

AQUIFER DATA

Saturated Thickness: 78.4 ft

WELL DATA (RC-10)

Initial Displacement: 0.7949 ft
Total Well Penetration Depth: 78.4 ft
Casing Radius: 0.1667 ft

Static Water Column Height: 78.4 ft
Screen Length: 78.4 ft
Well Radius: 0.1667 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 6.0E-7 cm/sec
Kz/Kr = 1.

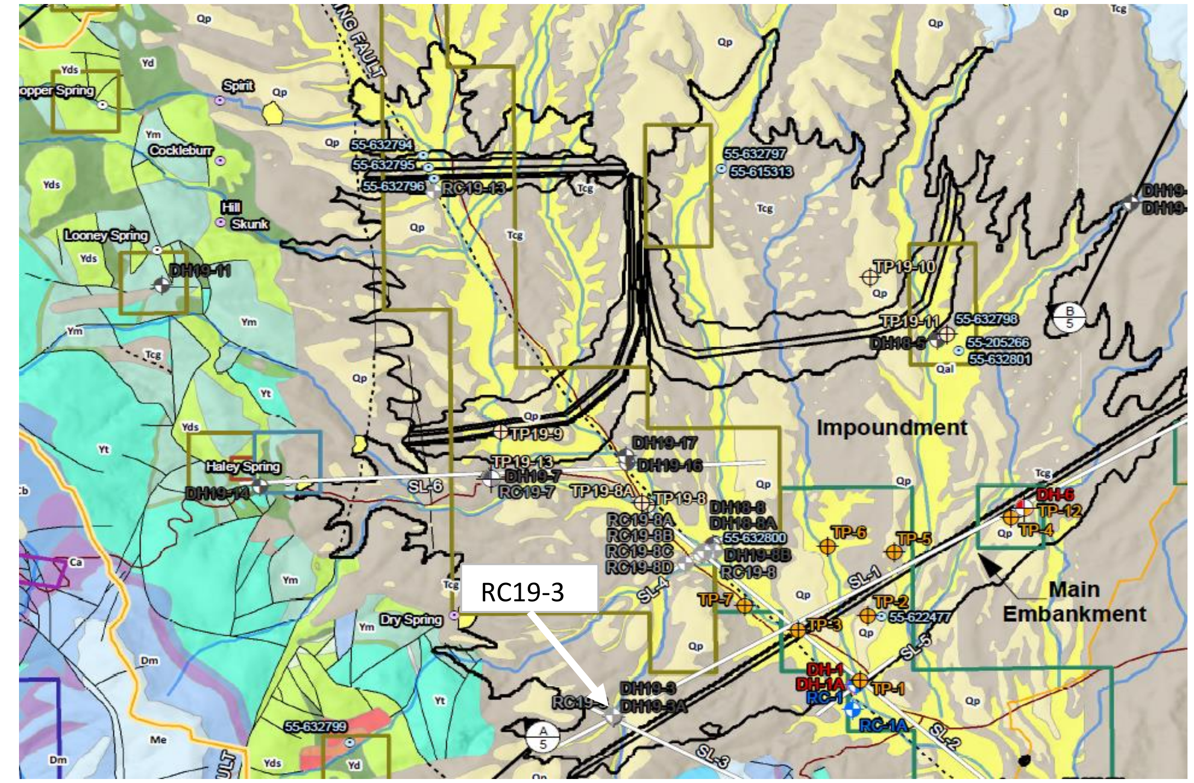
Ss = 0.00025 ft^{-1}

Appendix D

Draft Well Schematics

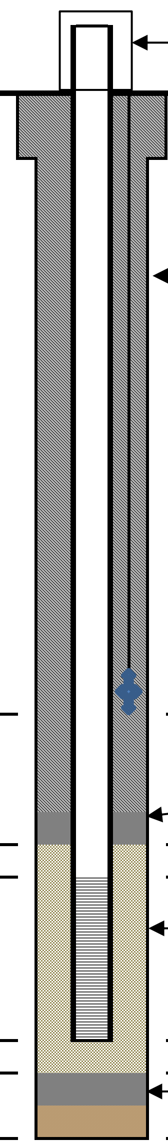
RC19-3 - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-04-06
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-05-01
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-3-PW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	West Dam Abutment	Pipe Riser Diameter:	6.5" (O.D.); 1/8" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	6.5" (O.D.); 1/8" wall; steel
Easting (ft):	1009059	Screen Slot Size:	1/8" x 3" slots; 12 rows of 4 slots per ft.
Northing (ft):	790214	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3360	Sand / Gravel Pack:	1/4" passing - crusher-run gravel
		Sump Details:	N/A



Installation Details

Drilling Method	Depth[2] (fbgl)	Elev.[3] (ft.)	Installation and Backfill	Formation[1]
			Stickup = 2.85 ft. agl (Vault)[4]	
Ground Surface		3360 ft.		
			14.5 ft.	Quaternary Alluvium
Drilling Method (0' to 27.2'): Air Rotary Casing Hammer (5000 lbs) and tricone bit; Casing Diameter: 11.75" (O.D.); Casing Depth (removed)	27.2 fbgl	3333 ft.	El. 3346 ft.	Tertiary Conglomerate
			0' to 579.8' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.03 Bentonite)	
Drilling Method (27.2' to 540'): Air Rotary Hammer; Drill-bit Diameter: 10.625" (O.D.)				
	500.2 fbgl	2860 ft.	RC19-3-VWP (SN: 1845399) Initial Readings: B - 8696.6, 27.5 °C	
			579.8' to 590': Bentonite Coated Pellets (1/4")	
	590 fbgl	2770 ft.	Top of Filter Pack	
	610 fbgl	2750 ft.	Top of Slotted Screen	
Drilling Method (540' to 815'): Tricone Bit; Drill-bit Diameter: 10.625" (O.D.)			590' to 789.1': Gravel Filter	
	750 fbgl	2610 ft.	Bottom of Slotted Screen	
	789.1 fbgl	2571 ft.	Bottom of Filter Pack	
			789.1' to 798': Bentonite Coated Pellets (1/4")	
End of Hole	815 fbgl	2545 ft.	798' to 815': Slough	



NOT TO SCALE

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

(5) The Vibrating Wire Piezometer specifications are:
RC19-3-VWP (SN: 1845399) - Geokon model 4500S rated for 3 Mpa.

(6) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

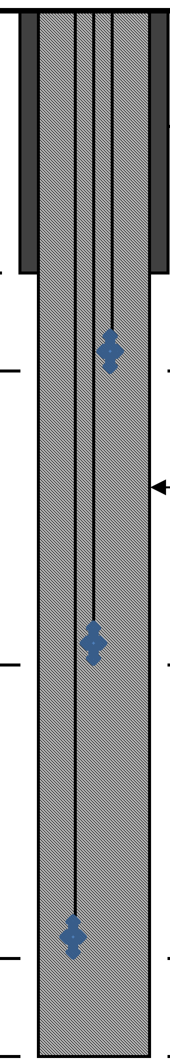
KCB Consultants Ltd.

DH19-3A - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-05-15
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-05-25
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Bentonite (PQ3), poly-water (HQ3 Core)
Well ID:	N/A	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	West Dam Abutment	Pipe Riser Diameter:	N/A
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	N/A
Easting (ft):	1009076	Screen Slot Size:	N/A
Northing (ft):	790145	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3363	Sand / Gravel Pack:	N/A
		Sump Details:	N/A

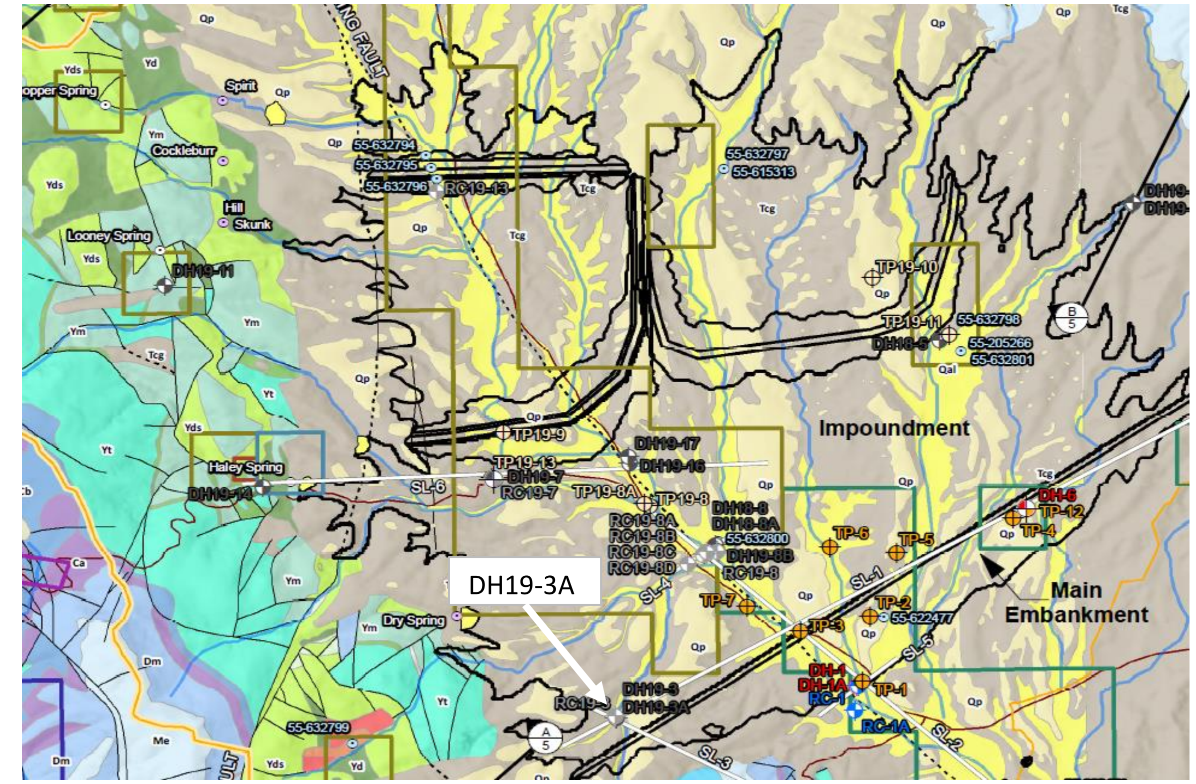
Installation Details

Drilling Method	Depth[2] (ft)^	Elev.[3] (ft.)	Installation and Backfill		Formation[1]
Ground Surface		3363 ft.			
Drilling Method (0' to 247'): PQ3 Core (4.8" O.D.) Hole Diameter: 4.8" (O.D.) PQ3 rods grouted to act as casing			0' to 247' Grouted PQ casing	16.5 ft.^ El. 3097 ft.*	Colluvium
Casing Depth (left in)	247 ft^	3124 ft.*			Tertiary Conglomerate
PQ3 bit drilled out by HQ3 bit					
	350 ft^	3025 ft.*	DH19-3A-VWPC (SN: 1845398) Initial Readings: B - 8744.4, 22.8 °C		
Inclination of Hole: -75° **Azimuth: 220°**			0' to 1032.5' Cement-Bentonite Grout (2.5 Water : 1 Cement : 0.3 Bentonite)		
	650 ft^	2735 ft.*	DH19-3A-VWPB (SN: 1845401) Initial Readings: B - 8677, 22.2 °C		
Drilling Method (247' to 1030.'): HQ3 Core Rod Drill Diameter: 3.5" (O.D.) / 3" (I.D.)				891.4 ft.^ El. 2499 ft.*	Paleozoic Limestone
	955.5 ft^	2440 ft.*	DH19-3A-VWPA (SN: 1847876) Initial Readings: B - 8777.8, 22.3 °C		Basalt Porphyry
End of Hole	1032.5 ft^	2366 ft.*			Paleozoic Limestone



NOT TO SCALE

^ All depths measured along Testhole axis. Not adjusted for inclination of hole.
* Elevations adjusted due to inclination of hole (-75°).



Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) The Vibrating Wire Piezometer specifications are:
- DH19-3A-VWPA (SN: 1847876) - Geokon model 4500SH rated for 5 MPa.
- DH19-3A-VWPB (SN: 1845401) - Geokon model 4500S rated for 3 Mpa.
- DH19-3A-VWPC (SN: 1845398) - Geokon model 4500S rated for 3 Mpa.

(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe and the drill rods.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

RC18-4 - Installation Details and As-Built

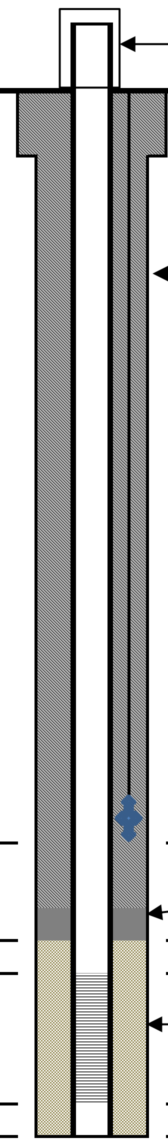
Client:	Resolution Copper Mining LLC	Date Started Drilling:	2018-12-10
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2018-12-16
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC18-4-MW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Mineral Creek	Pipe Riser Diameter:	4.5" (O.D.); 0.5" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	4.5" (O.D.); 0.5" wall; steel
Easting (ft):	1001150.8	Screen Slot Size:	1/8" x 3" slots; 12 rows of 2 slots per ft.
Northing (ft):	809836.8	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3535.6	Sand / Gravel Pack:	1/4" passing - crusher-run gravel
		Sump Details:	4.5" (O.D.); 0.5" wall; steel

Installation Details

Drilling Method

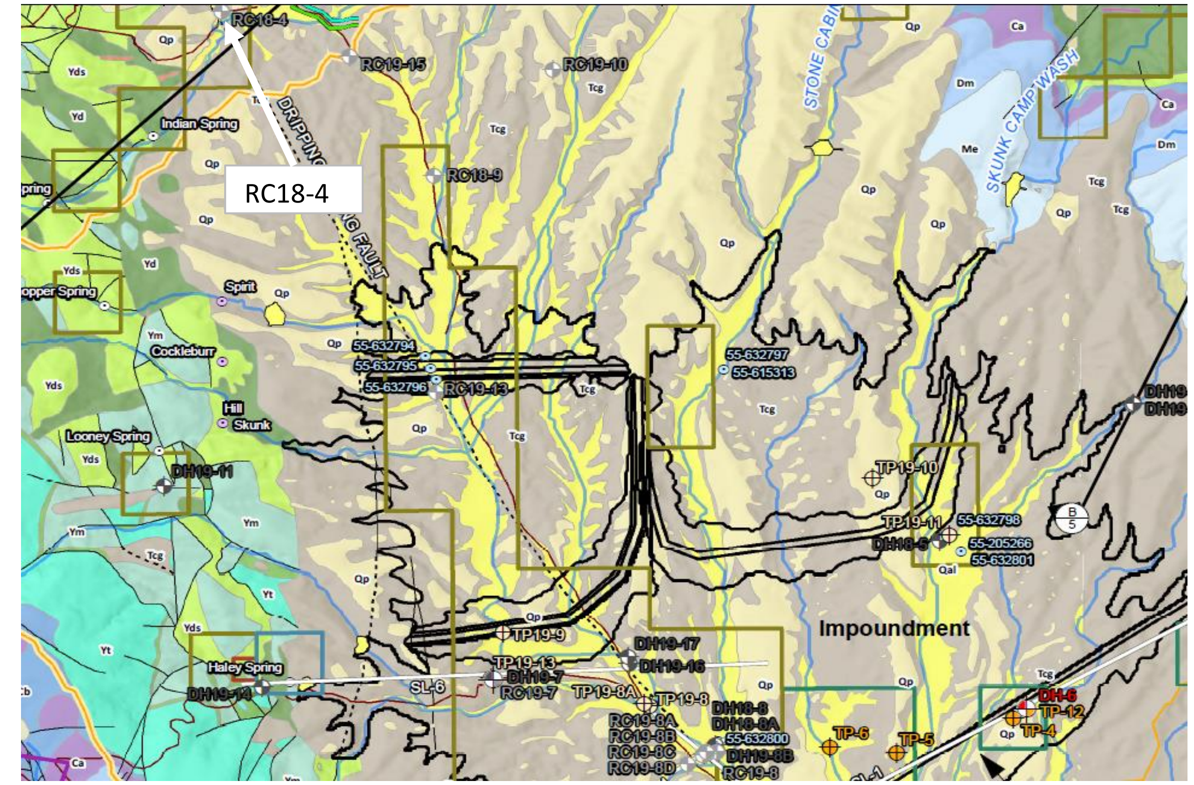
Installation and Backfill

Formation(1)



Drilling Method	Depth(2) (fbgl)	Elev.(3) (ft.)	Installation and Backfill	Formation(1)
			Stickup = 2.70 ft. agl (Vault)(4)	
Ground Surface		3535.6 ft.		
Drilling Method (0' to 11'): Air Rotary Casing Hammer (5000 lbs) and tricone bit; Casing Diameter: 11.75" (O.D.); Casing Depth (removed)	11 fbgl	3525 ft.		Quaternary Alluvium (11 ft., El. 3525 ft.)
Drilling Method (11' to 270'): Downhole hammer; Drill-bit Diameter: 10 5/8" (O.D.)			0' to 210' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.03 Bentonite)	Tertiary Conglomerate
	194 fbgl	3342 ft.	RC18-4-VWP (SN: 1839432) Initial Readings: B - 8764.6, 11.2 °C	
			210' to 223': Bentonite Coated Pellets (1/4")	
	223 fbgl	3313 ft.		
	227 fbgl	3309 ft.	Slotted Screen Begins	
			223' to 270': Gravel Pack	
	267 fbgl	3269 ft.	Slotted Screen Ends	
End of Hole	269 fbgl	3267 ft.	267' to 269': Sump	

NOT TO SCALE



Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

(5) The Vibrating Wire Piezometer specifications are:
RC18-4-VWP (SN: 1839432) - Geokon Model 4500S rated for 1 Mpa.

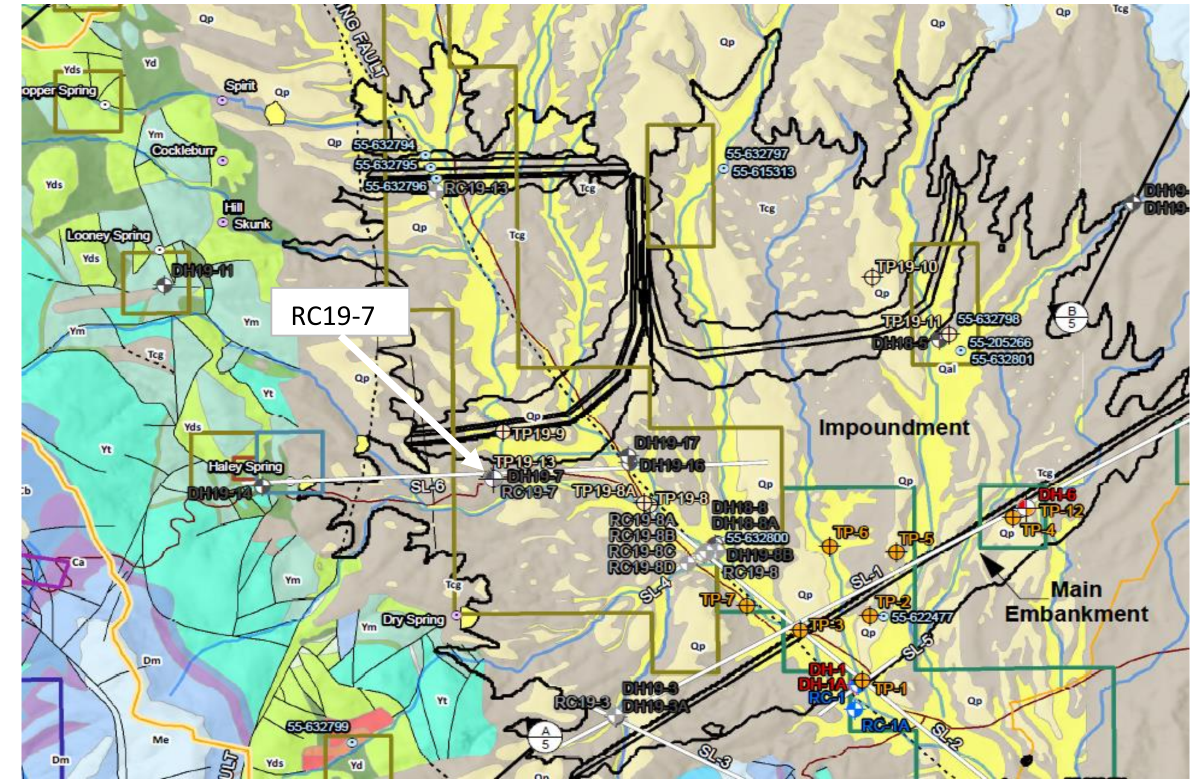
(6) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

RC19-7 - Installation Details and As-Built

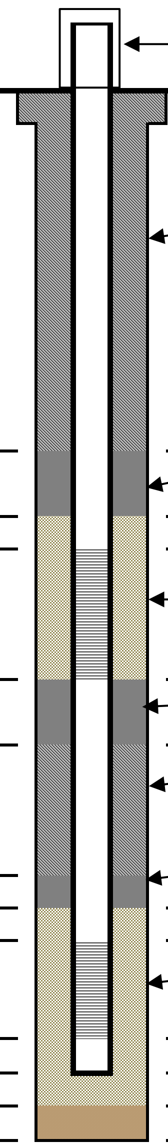
Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-05-28
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-06-10
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-7-PW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Ransome Fault near Haley Spring	Pipe Riser / Screen Diameter:	6.5" (O.D.); 0.5" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Upper Screen:	0.015" wire wound screen
Easting (ft):	1006610	Upper Screen Filter Pack:	12/20 Filter Sand
Northing (ft):	795337	Lower Screen:	0.150" x 3" slots; 12 rows of 2 slots per ft.
Surface Elevation (ft):	3427	Lower Screen Filter Pack:	3/8" to 3/16" Gravel Pack
		Sump Details:	6.5" (O.D.); 0.5" wall; steel



Installation Details

Drilling Method | **Installation and Backfill** | **Formation**(1)

Depth(2) (fbgl) | Elev.(3) (ft.)



Stickup = 2.71 ft. agl (Vault)(4)

Drilling Method	Depth (fbgl)	Elev. (ft.)	Installation and Backfill
Ground Surface		3427 ft.	
Drilling Method (0' to 5'): Air Rotary Casing Hammer and tricone bit; Casing Diameter: 11.75" (O.D.); Casing Depth (removed)	5 fbgl	3422 ft.	0' to 316' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.05 Bentonite)
	316 fbgl	3111 ft.	316' to 340': Bentonite Coated Pellets (1/4")
	340 fbgl	3087 ft.	Top of 12/20 Filter Sand
	350 fbgl	3077 ft.	Top of Upper Screen
Drilling Method (5' to 760'): Downhole hammer; Drill-bit Diameter: 10 5/8" (O.D.)			340' to 451': 12/20 Filter Sand
	450 fbgl	2977 ft.	Base of Upper Screen
			451' to 503': Bentonite Coated Pellets
	503 fbgl	2924 ft.	
			503' to 630' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.05 Bentonite)
	630 fbgl		630' to 649.5': Bentonite Coated Pellets
	649.5 fbgl	2777.5 ft.	Top of Gravel Pack
	670 fbgl	2757 ft.	Top of Lower Screen
			649.5' to 758': Gravel Pack
	750 fbgl	2677 ft.	Base of Lower Screen
	755 fbgl	2672 ft.	Base of Sump
	758 fbgl	2669 ft.	Base of Gravel Pack
End of Hole	760 fbgl	2667 ft.	758' to 760': Slough

Depth / Elevation	Formation(1)
5 ft. / El. 3422 ft.	Surficial Deposits
20 ft. / El. 3407 ft.	Tertiary Conglomerate
65 ft. / El. 3362 ft.	Tertiary Sandstone
175 ft. / El. 3252 ft.	Tertiary Conglomerate
	Tertiary Sandstone

NOT TO SCALE

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

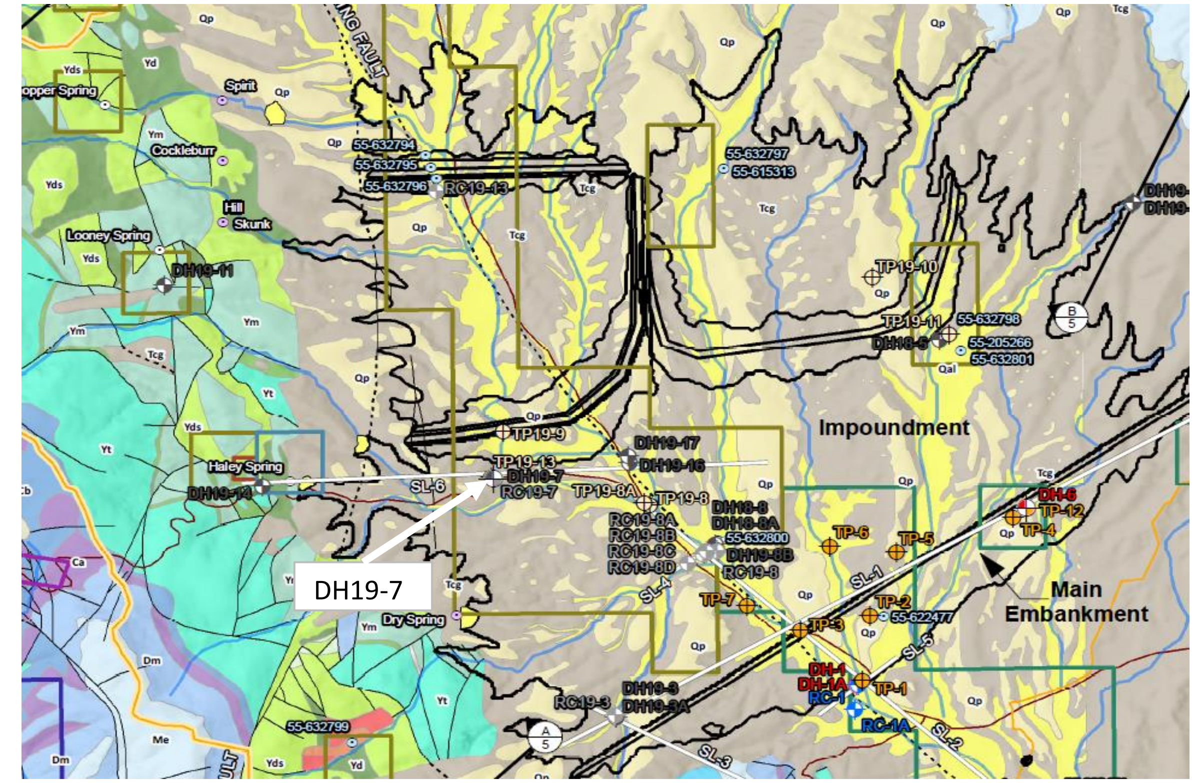
(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

DH19-7 - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-04-17
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-04-30
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Bentonite (Tricone),water (HQ3 Core)
Well ID:	N/A	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Haley Spring Road	Pipe Riser Diameter:	N/A
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	N/A
Easting (ft):	1006607	Screen Slot Size:	N/A
Northing (ft):	795338	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3427	Sand / Gravel Pack:	N/A
		Sump Details:	N/A



Installation Details

Drilling Method | Depth[2] (fbgl) | Elev.[3] (ft.) | **Installation and Backfill** | **Formation[1]**

Ground Surface — 3427.0 ft.

Drilling Method (0' to 59'):
HQ3 Core followed by
HWT Tricone Bit
Hole Diameter: 5.875" (O.D.)

Casing Depth (removed) — 294 fbgl — 3133 ft.

8.3 ft. — El. 3419 ft. — Surficial Deposits

0' to 502' Cement-Bentonite Grout
(2.5 Water : 1 Cement : 0.3 Bentonite)

Tertiary Conglomerate

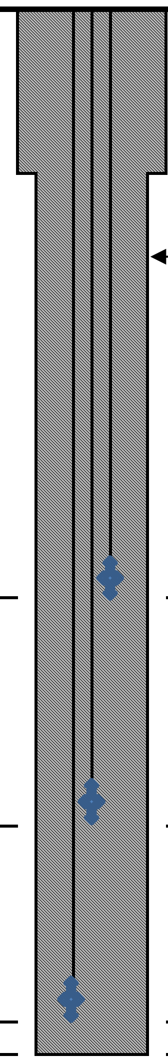
294 fbgl — 3133 ft. — DH19-7-VWPC (SN: 1847025)
Initial Readings: B - 8896, 13.5 °C

Drilling Method (59' to 502'):
HQ3 Core
Drill Diameter: 3.5" (O.D.) / 3" (I.D.)

390 fbgl — 3037 ft. — DH19-7-VWPB (SN: 1847022)
Initial Readings: B - 8747.5, 12.8 °C

489 fbgl — 2938 ft. — DH19-7-VWPA (SN: 1847402)
Initial Readings: B - 8782, 12.9 °C

End of Hole — 502 fbgl — 2925 ft.



NOT TO SCALE

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) The Vibrating Wire Piezometer specifications are:
- DH19-7-VWPA (SN: 1845402) - Geokon model 4500S rated for 3 MPa.
- DH19-7-VWPB (SN: 1847022) - Geokon model 4500S rated for 2 Mpa.
- DH19-7-VWPC (SN: 1847025) - Geokon model 4500S rated for 2 Mpa.

(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

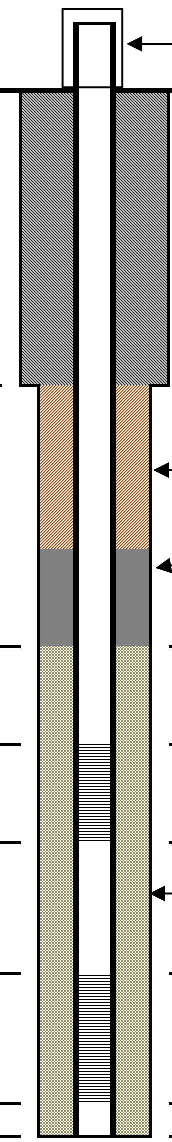
RC19-8 - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-01-14
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-01-23
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-8-PW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Dripping Springs Wash	Pipe Riser Diameter:	6.5" (O.D.); 0.5" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	6.5" (O.D.); 0..5" wall; steel
Easting (ft):	1011109.1	Screen Slot Size:	1/8" x 3" slots; 12 rows of 2 slots per ft.
Northing (ft):	793751.5	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3162.0	Sand / Gravel Pack:	1/4" passing - crusher-run gravel
		Sump Details:	6.5" (O.D.); 0.5" wall; steel

Installation Details

Drilling Method | **Installation and Backfill** | **Formation[1]**

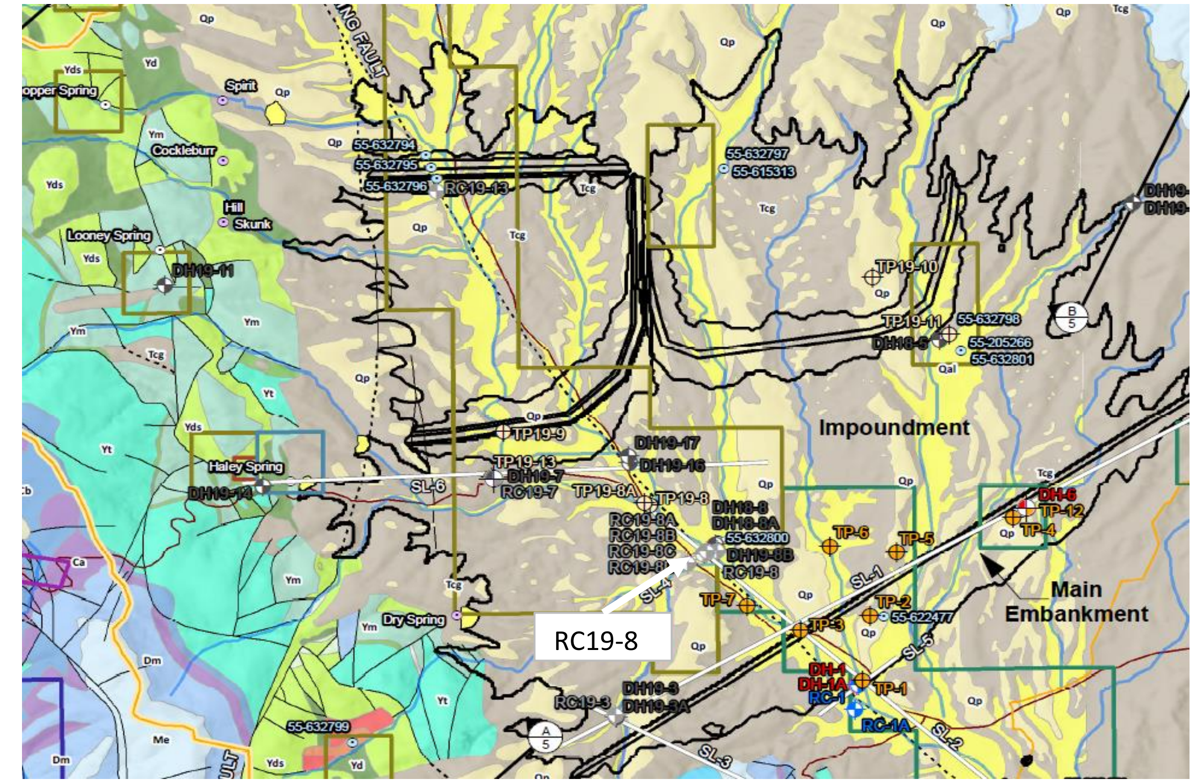
Depth[2] (fbgl) | Elev.[3] (ft.)



Stickup = 2.71 ft. agl (Vault)[4]

Drilling Method	Depth (fbgl)	Elev. (ft.)	Installation and Backfill	Formation boundary	Formation
Ground Surface		3162.0 ft.			
Drilling Method (0' to 70.5'): Air Rotary Casing Hammer (5000 lbs) and tricone bit; Casing Diameter: 11.75" (O.D.)			0' to 71' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.03 Bentonite)		Quaternary Alluvium
				60 ft. / El. 3102 ft.	
Casing Depth (removed)	70.5 fbgl	3091.5 ft.			Tertiary Sandstone
				83 ft. / El. 3079 ft.	
			71' to 108': Bentonite Chips		Tertiary Conglomerate
			108' to 130': Bentonite Coated Pellets (1/4")		
				125.5 ft. / El. 3037 ft.	Tertiary Sandstone
Drilling Method (70.5' to 250'): Downhole hammer; Drill-bit Diameter: 10 5/8" (O.D.)	130 fbgl	3032 ft.		134 ft. / El. 3028 ft.	Tertiary Conglomerate
				143 ft. / El. 3019 ft.	
	148 fbgl	3014 ft.	Slotted Screen Begins		Tertiary Sandstone
	168 fbgl	2994 ft.	Slotted Screen Ends		
			130' to 250': Gravel Pack		
	208 fbgl	2954 ft.	Slotted Screen Begins		
	248 fbgl	2914 ft.	Slotted Screen Ends		
End of Hole	250 fbgl	2912 ft.	248' to 250': Sump		

NOT TO SCALE



Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

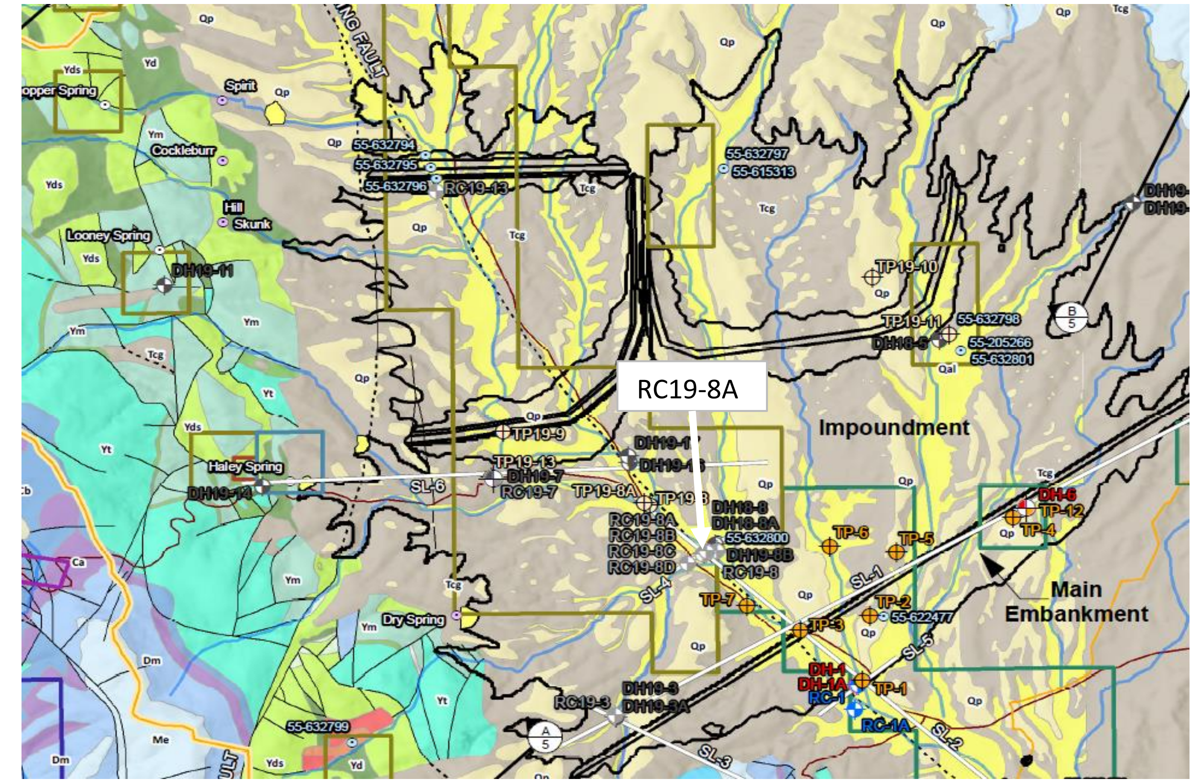
(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

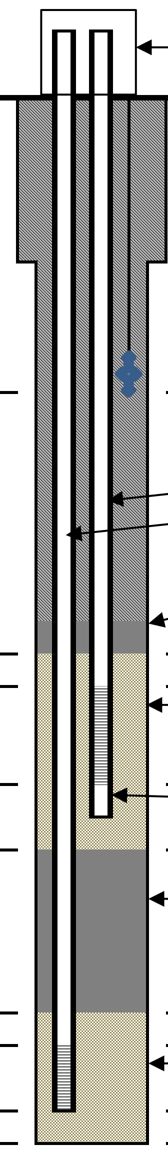
RC19-8A - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-01-05
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-01-13
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-8AS, RC19-8AD**	Borehole Diameter:	see below
Site Area:	Skunk Camp	4" Well (RC19-8AS) Details:	
Specific Location:	Dripping Springs Wash	Pipe Riser Diameter:	4.5" (O.D.); 0.5" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	4.5" (O.D.); 0.5" wall; steel
Easting (ft):	1010522.9	Screen Slot Size:	1/8" x 3" slots; 12 rows of 2 slots per ft.
Northing (ft):	793495.9	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3178.6	Sand / Gravel Pack:	1/4" passing - crusher-run gravel
		Sump Details:	4.5" (O.D.); 0.5" wall; steel



Installation Details

Drilling Method | Depth[2] (fbgl) | Elev.[3] (ft.) | **Installation and Backfill** | **Formation[1]**



Stickup = 2.94 ft. agl (Vault)[4]

Drilling Method	Depth (fbgl)	Elev. (ft.)	Installation and Backfill	Formation
Ground Surface		3178.6 ft.		
Drilling Method (0' to 57.5'): Air Rotary Casing Hammer (5000 lbs) and tricone bit; Casing Diameter: 11.75" (O.D.)			0' to 215.5' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.03 Bentonite)	Quaternary Alluvium (to 53 ft., El. 3126 ft.)
Casing Depth (removed)	57.5 fbgl	3121.1 ft.		
	110 fbgl	3068.6 ft.	RC19-8A-VWP (SN: 1839293) Initial Readings: B - 8758.2, 14.4 °C	
Drilling Method (57.5' to 401'): Downhole hammer; Drill-bit Diameter: 10 5/8" (O.D.)			RC19-8AS (4" I.D. Well); RC19-8AD (2" Well)	Tertiary Sandstone
			215.5' to 224.6': Bentonite Coated Pellets (1/4")	
	224.6 fbgl	2954 ft.		
	230 fbgl	2948.6 ft.	Slotted Screen Begins - 4" Well; 224.6' to 274.5': Gravel Pack	
	270 fbgl	2909 ft.	Slotted Screen Ends - 4" Well; 270' to 272': Sump	
	274.5 fbgl	2904.1 ft.	274.5' to 371.5': Bentonite Coated Pellets (1/4")	278 ft. El. 2901 ft. — Tertiary Conglomerate — 322.5 ft. El. 2856 ft.
	371.5 fbgl	2807.1 ft.		Tertiary Sandstone
	378 fbgl	2801 ft.	Slotted Screen Begins - 2" Well; 371.5' to 398': Gravel Pack	
	398 fbgl	2781 ft.	Slotted Screen Ends - 2" Well	
End of Hole	401 fbgl	2777.6 ft.	398' to 401': Slump	

NOT TO SCALE

2" Well (RC19-8AD) Details:	
Pipe Riser Diameter:	2" PVC Schedule 80
Screen Diameter:	2" PVC Schedule 80
Screen Slot Size:	0.020" machine slotted
Minimum Collapse Strength:	
Sand / Gravel Pack:	1/4" passing - crusher-run gravel
Sump Details:	2" PVC Schedule 80

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

(5) The Vibrating Wire Piezometer specifications are:
RC19-8A-VWP (SN: 1839293) - Geokon Model 4500S rated for 2 Mpa.

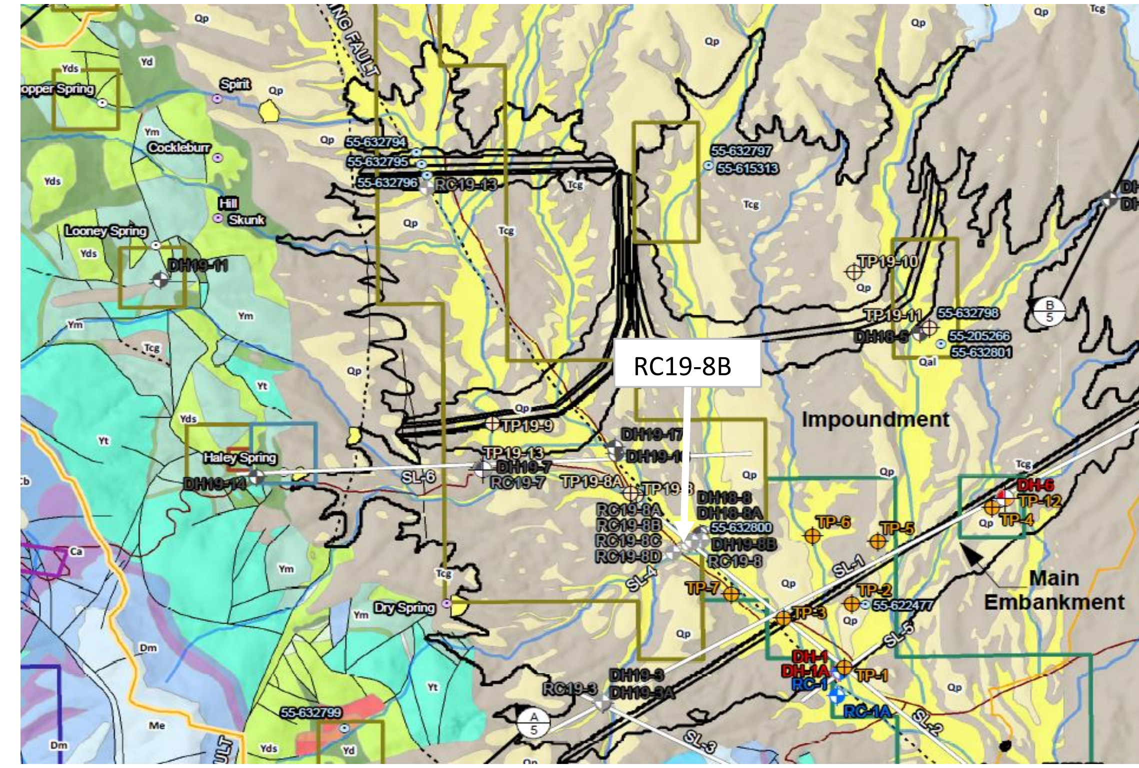
(6) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

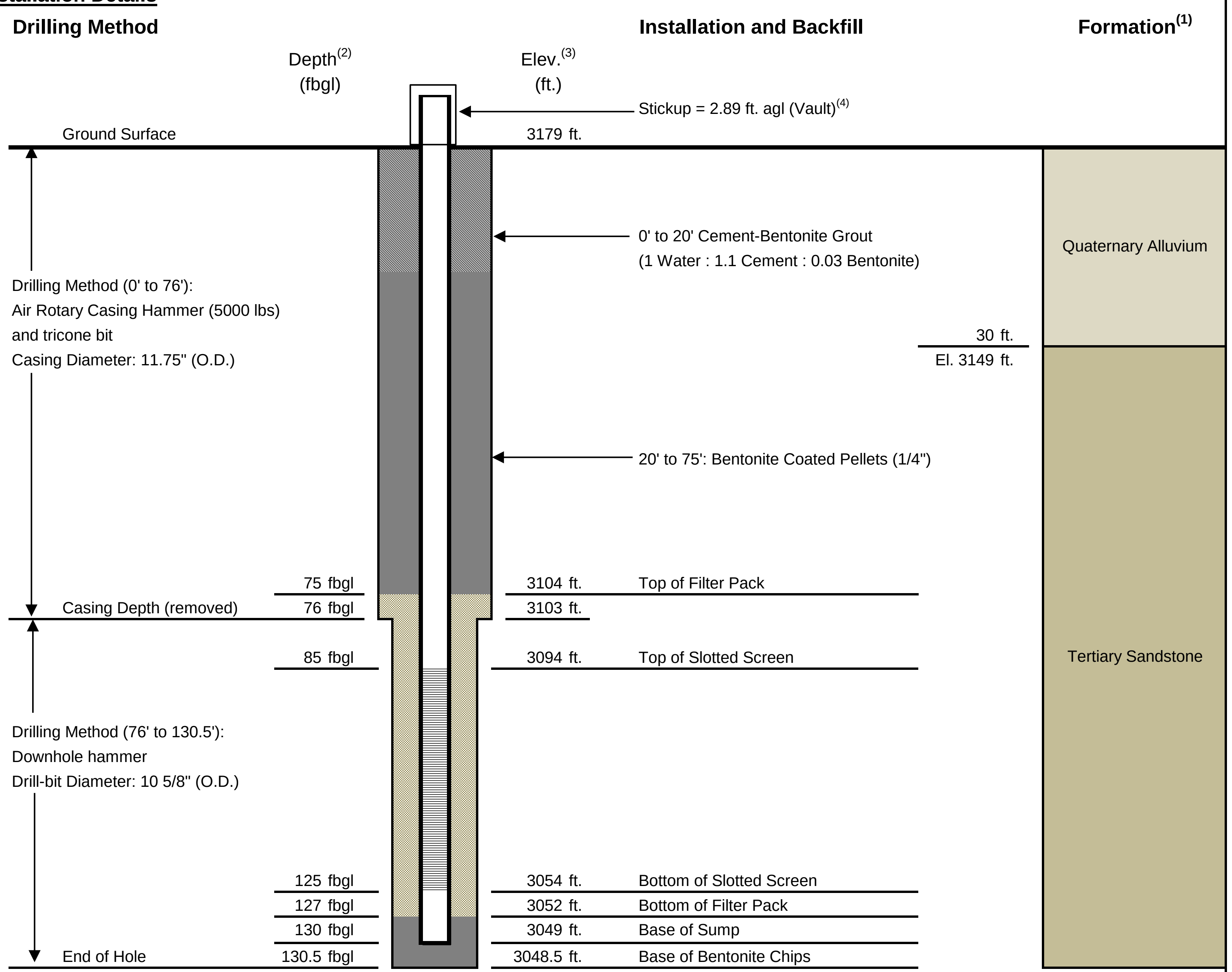
KCB Consultants Ltd.

RC19-8B - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-05-23
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-05-26
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-8B-MW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Dripping Springs Wash	Pipe Riser Diameter:	6" (I.D.) Sch40 PVC
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	6" (I.D.) Sch40 PVC
Easting (ft):	1010904	Screen Slot Size:	0.015" diameter slots
Northing (ft):	793715	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3179	Sand / Gravel Pack:	10/20 Filter Sand
		Sump Details:	6" (I.D.) Sch40 PVC



Installation Details



NOT TO SCALE

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

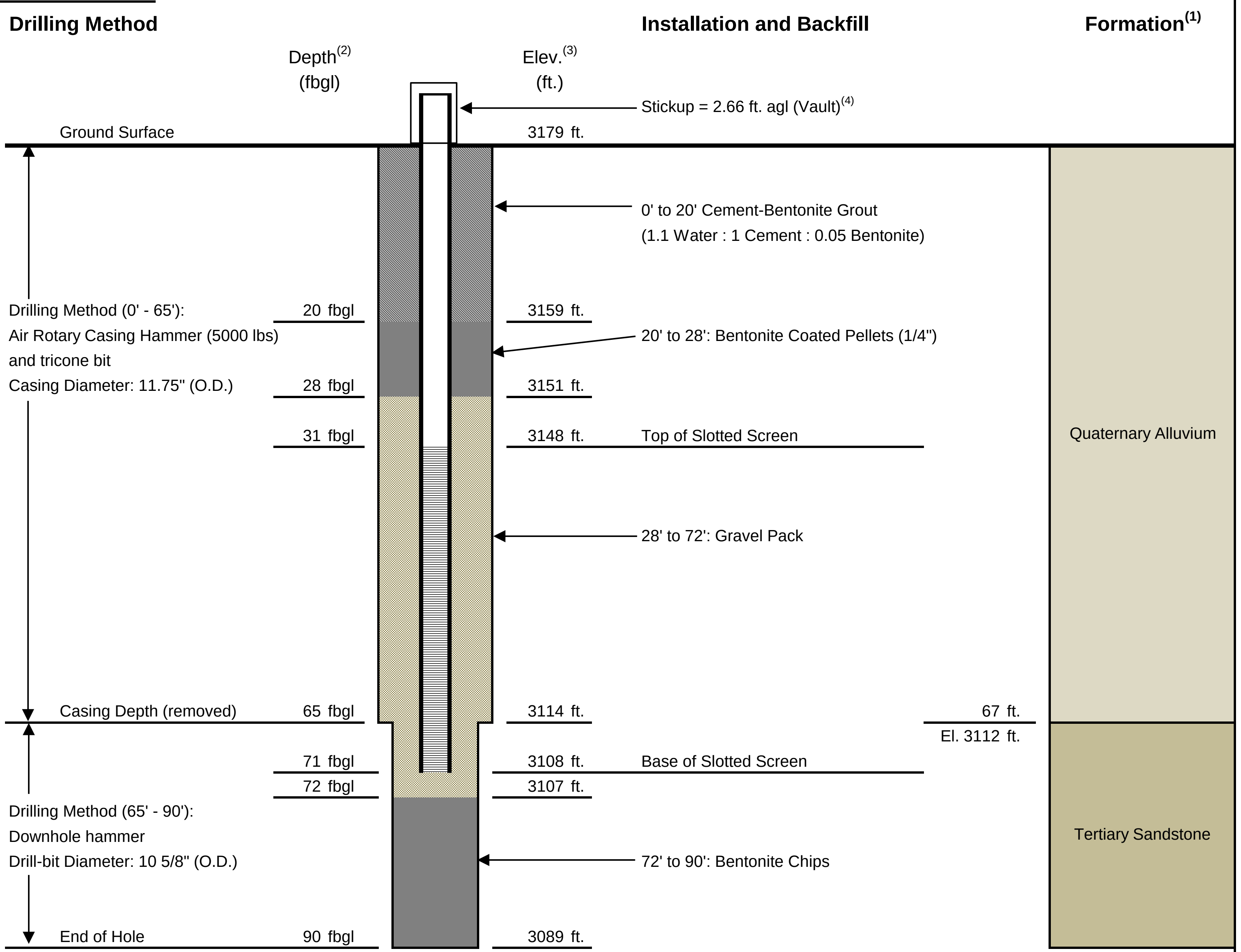
Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

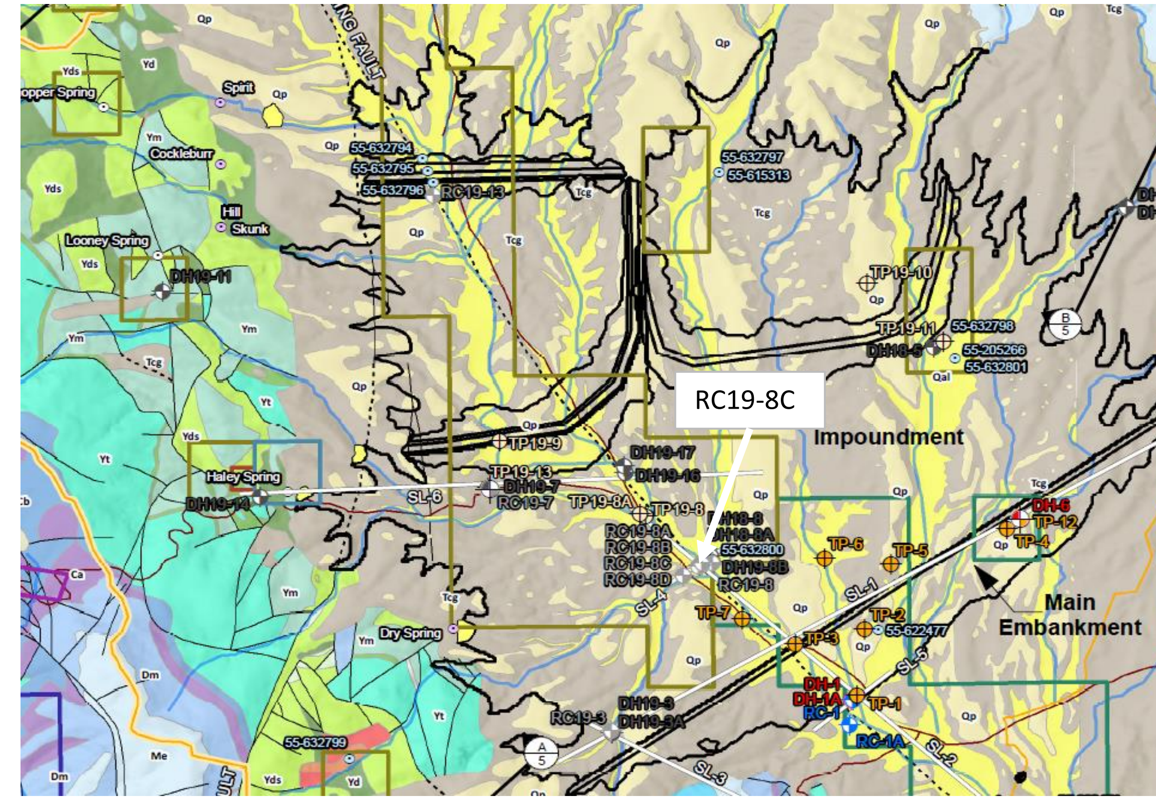
RC19-8C - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-06-26
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-06-29
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-8C-MW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Dripping Springs Wash	Pipe Riser Diameter:	6.5" (O.D.); 0.5" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	6.5" (O.D.); 0.5" wall; steel
Easting (ft):	1010904	Screen Slot Size:	0.015" diameter slots, wire wound
Northing (ft):	793715	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3179	Sand / Gravel Pack:	3/8" to 3/16" crusher-run gravel
		Sump Details:	N/A

Installation Details



NOT TO SCALE



Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

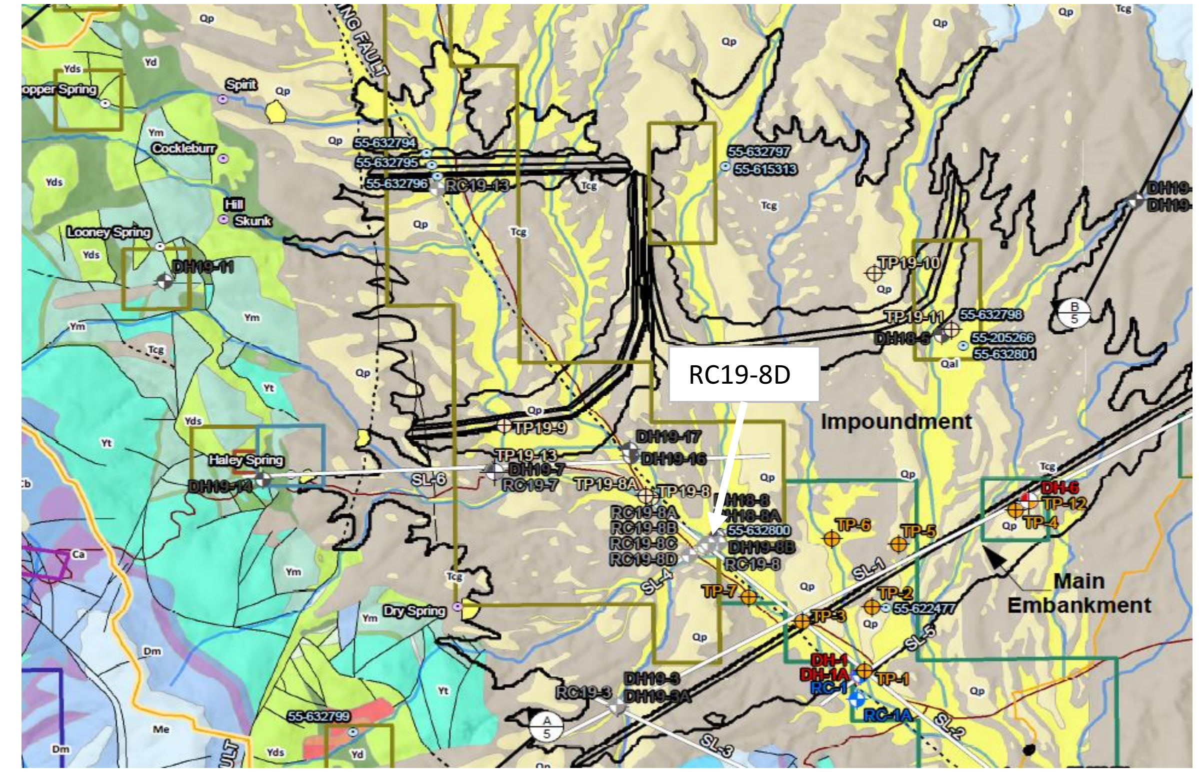
(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

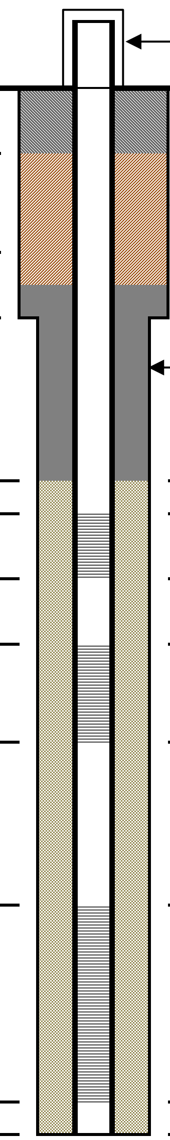
KCB Consultants Ltd.

RC19-8D - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-06-15
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-06-23
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-8D-PW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Dripping Springs Wash	Pipe Riser Diameter:	6.5" (O.D.); 0.5" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	6.5" (O.D.); 0..5" wall; steel
Easting (ft):	1010904	Screen Slot Size:	0.020" diameter slots, wire wound
Northing (ft):	793715	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3179	Sand / Gravel Pack:	12/20 Filter Sand
		Sump Details:	6.5" (O.D.); 0.5" wall; steel



Installation Details



Drilling Method	Depth[2] (fbgl)	Elev.[3] (ft.)	Installation and Backfill		Formation[1]
			Stickup = 2.54 ft. agl (Vault)[4]		
Ground Surface		3179 ft.			
Drilling Method (0' - 75'):			0' to 18' Cement-Bentonite Grout	5 ft.	Topsoil
Air Rotary Casing Hammer	18 fbgl	3161 ft.	(1 Water : 1.1 Cement : 0.03 Bent.)	El. 3174 ft.	
(5000 lbs) and tricone bit					Quaternary Alluvium
Casing Diameter: 11.75" (O.D.)			18' to 70' Bentonite Chips		
(0' to 44.3' Removed)	44.3 fbgl	3134.7 ft.		65 ft.	
				El. 3114 ft.	Tertiary Sandstone
Casing Depth	74.3 fbgl	3104.7 ft.			
(44.3' to 74.3' Casing left downhole)				115 ft.	
			70' to 180': 1/4" Coated Bentonite Pelle	El. 3064 ft.	Tertiary Conglomerate
				160 ft.	
	180 fbgl	2999 ft.	Top of 12/20 Filter Pack	El. 3019 ft.	
	202 fbgl	2977 ft.	Top of Slotted Screen		
	222 fbgl	2957 ft.	Base of Slotted Screen		
Drilling Method (75' - 507'):	262 fbgl	2917 ft.	Top of Slotted Screen		Tertiary Sandstone
Downhole hammer					
Drill-bit Diameter: 10 5/8" (O.D.)					
	322 fbgl	2857 ft.	Base of Slotted Screen		
				400 ft.	
	402 fbgl	2777 ft.	Top of Slotted Screen	El. 2779 ft.	
					Tertiary Conglomerate
	502 fbgl	2677 ft.	Base of Slotted Screen		
End of Hole	507 fbgl	2671.9 ft.	502' to 507': Sump		

NOT TO SCALE

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

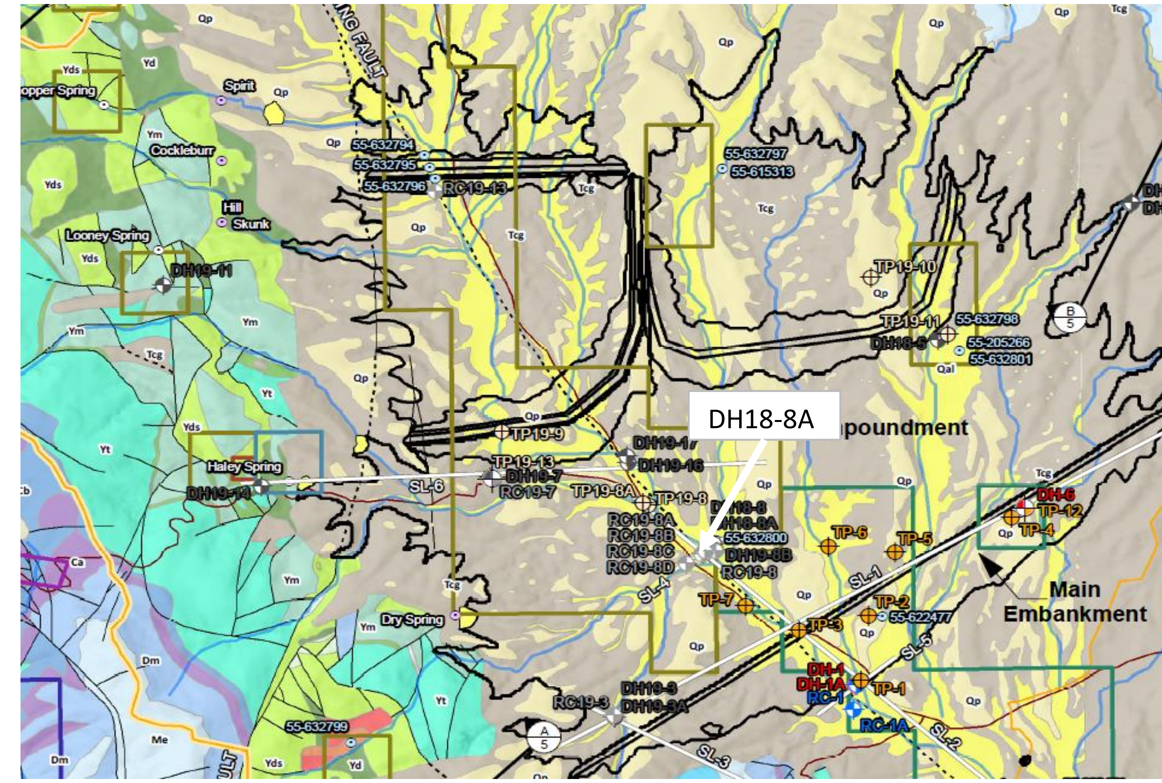
(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

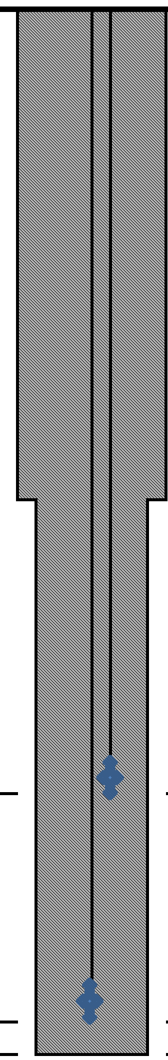
DH18-8A - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2018-12-14
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2018-12-18
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Bentonite (Tricone),water (HQ3 Core)
Well ID:	N/A	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Dripping Spring Wash	Pipe Riser Diameter:	N/A
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	N/A
Easting (ft):	1010856.0	Screen Slot Size:	N/A
Northing (ft):	793710.5	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3165.0	Sand / Gravel Pack:	N/A
		Sump Details:	N/A



Installation Details

Drilling Method	Depth[2] (fbgl)	Elev.[3] (ft.)	Installation and Backfill	Formation[1]
Ground Surface		3165.0 ft.		
			0' to 82' Cement-Bentonite Grout (2.5 Water : 1 Cement : 0.3 Bentonite)	
Drilling Method (0' to 39.5'): HWT Tricone Bit Drill Diameter: 5.875" (O.D.)				Quaternary Alluvium
Casing Depth (removed)	39.5 fbgl	3126 ft.		
Drilling Method (39.5' to 82'): HQ3 Core Rod Drill Diameter: 3.5" (O.D.) / 3" (I.D.)				
	63 fbgl	3102 ft.	DH18-8A-VWPB (SN: 1839433) Initial Readings: B - 8713.3, 8.5 °C	
				64.5 ft. El. 3101 ft.
				Tertiary Sandstone
	81.5 fbgl	3084 ft.	DH18-8A-VWPA (SN: 1839431)	
End of Hole	82 fbgl	3083 ft.	Initial Readings: B - 8716.9, 8.3 °C	



NOT TO SCALE

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) The Vibrating Wire Piezometer specifications are:
DH18-8A-VWPA (SN: 1839431) - Geokon model 4500S rated for 2 Mpa.
DH18-8A-VWPB (SN: 1839433) - Geokon model 4500S rated for 2 Mpa.

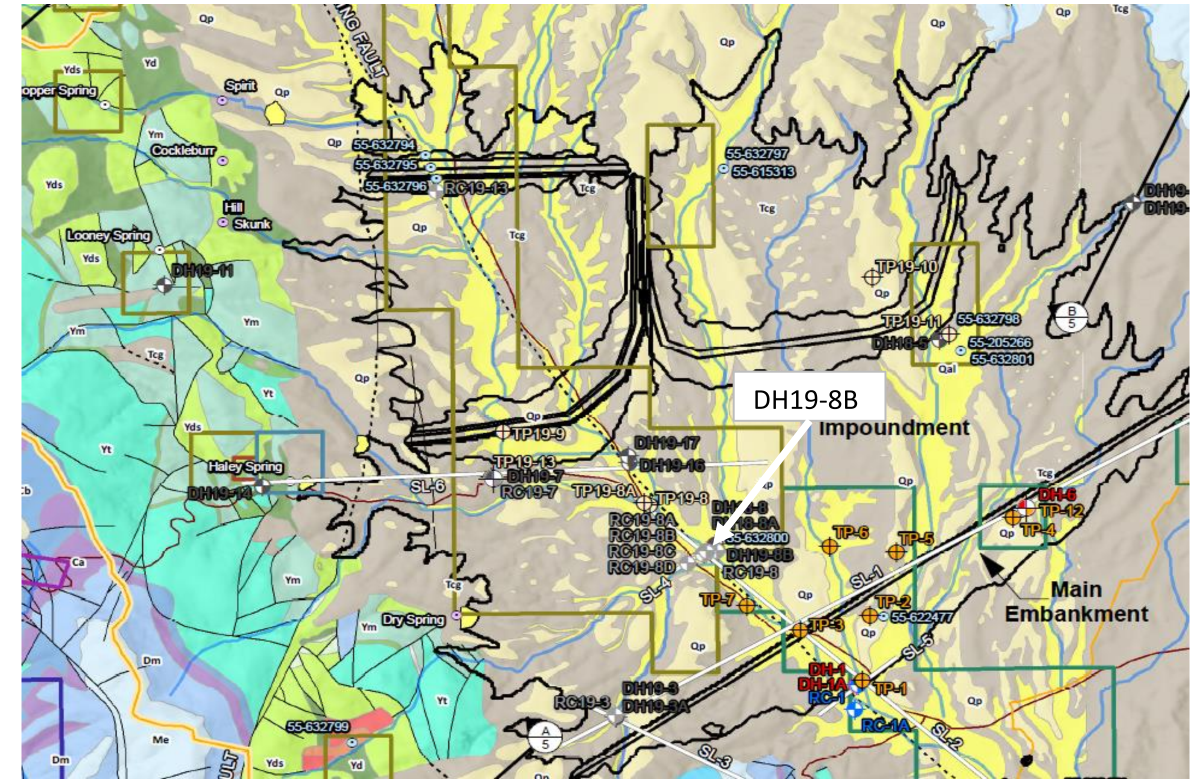
(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

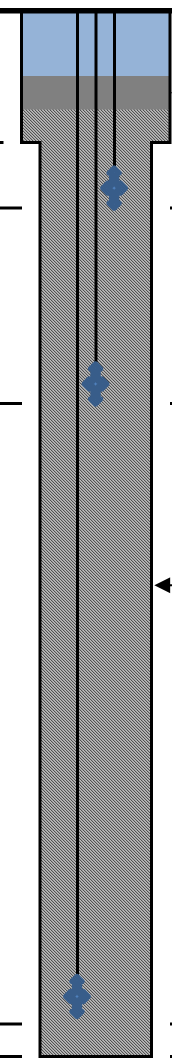
DH19-8B - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-01-07
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-01-27
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Bentonite (Tricone),water (HQ3 Core)
Well ID:	N/A	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Dripping Springs Wash	Pipe Riser Diameter:	N/A
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	N/A
Easting (ft):	1011109.9	Screen Slot Size:	N/A
Northing (ft):	793799.0	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3163.8	Sand / Gravel Pack:	N/A
		Sump Details:	N/A



Installation Details

Drilling Method	Depth[(2)] (ft)^	Elev.[(3)] (ft.)	Installation and Backfill		Formation[(1)]
Ground Surface		3163.8 ft.			
Drilling Method (0' to 70'): HQ3 Core Rod; Drill Diameter: 3.5" (O.D.) / 3" (I.D.)			0' to 20' Neat Cement (1W : 1C)		Quaternary Alluvium
			20' to 30' Bentonite Pellets		
followed by: HWT Tricone Bit; Drill Diameter: 5.875" (O.D.)	70 ft^	3102 ft.*			
HW Casing Depth (removed)	110 ft^	3067 ft.*	DH19-8B-VWPC (SN: 1839289) Initial Readings: B - 8772.0, 12.9 °C	75.5 ft.^ El. 3097 ft.*	
	250.5 ft^	2943 ft.*	DH19-8B-VWPB (SN: 1839288) Initial Readings: B - 8761.6, 12.9 °C		Tertiary Sandstone
Inclination of Hole: -62° **Azimuth: 220°**					
Drilling Method (70' to 651'): HQ3 Core Rod; Drill Diameter: 3.5" (O.D.) / 3" (I.D.)			30' to 651' Cement-Bentonite Grout (3 Water : 1 Cement : 0.3 Bentonite)		
				476 ft.^ El. 2744 ft.*	Tertiary Conglomerate
	628.5 ft^	2609 ft.*	DH19-8B-VWPA (SN: 1839057)		
End of Hole	651 ft^	2589 ft.*	Initial Readings: B - 8971.3, 13.4 °C		



NOT TO SCALE

^ All depths measured along Testhole axis. Not adjusted for inclination of hole.
* Elevations adjusted due to inclination of hole (-62°).

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) The Vibrating Wire Piezometer specifications are:
DH19-8B-VWPA (SN: 1839057) - Geokon model 4500S rated for 2 MPa.
DH19-8B-VWPB (SN: 1839288) - Geokon model 4500S rated for 2 Mpa.
DH19-8B-VWPC (SN: 1839289) - Geokon model 4500S rated for 2 Mpa.

(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

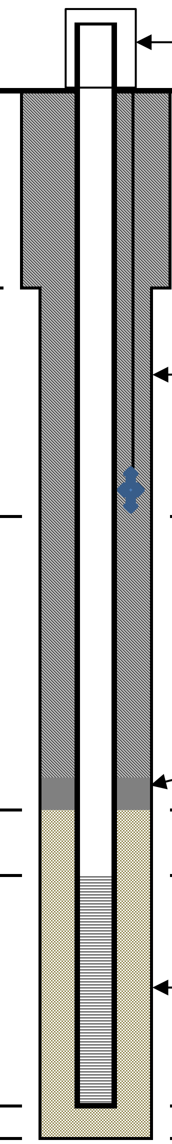
KCB Consultants Ltd.

RC19-10 - Installation Details and As-Built

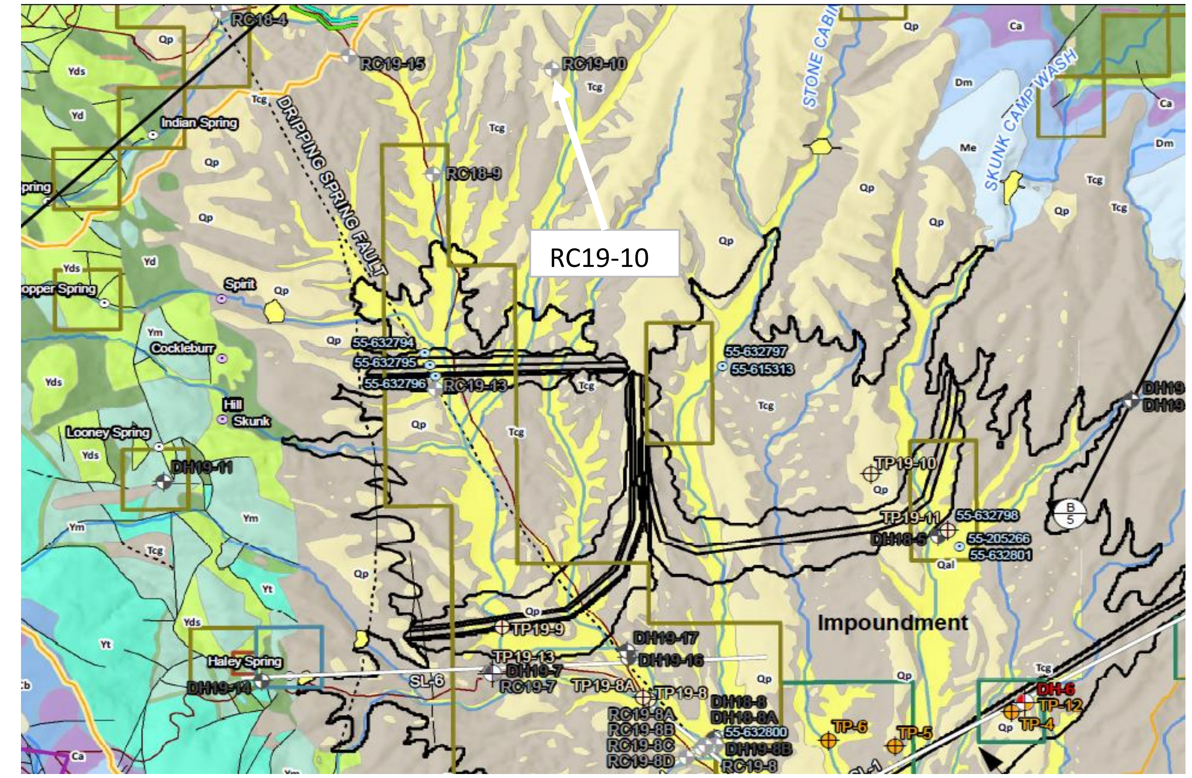
Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-05-04
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-05-22
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-10-MW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Unnamed Wash North of Impoundment	Pipe Riser Diameter:	4.5" (O.D.); 0.25" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	4.5" (O.D.); 0.25" wall; steel
Easting (ft):	1007815	Screen Slot Size:	1/8" x 2" slots; 4 rows of 3 slots per ft.
Northing (ft):	808586	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3815	Sand / Gravel Pack:	1/4" passing - crusher-run gravel
		Sump Details:	4.5" (O.D.); 0.25" wall; steel

Installation Details

Drilling Method	Depth[2] (fbgl)	Elev.[3] (ft.)	Installation and Backfill	Formation[(1)]
			Stickup = 3.12 ft. agl (Vault)[(4)]	
Ground Surface		3815.0 ft.		
Drilling Method (0' to 131'): Air Rotary Casing Hammer (5000 lbs) and tricone bit. Casing Diameter: 11.75" (O.D.)				Quaternary Pediment
			25 ft. El. 3790 ft.	
Casing Depth (removed)	131 fbgl	3684 ft.		
			0' to 427.5' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.03 Bentonite)	
Drilling Method (131' to 650'): Downhole hammer. Drill-bit Diameter: 10 5/8" (O.D.)	260 fbgl	3555 ft.	RC19-10-VWP (SN: 1845400) Initial Readings: B - 8831.4, 19.4 °C	Tertiary Conglomerate
			427.5' to 437.2': Bentonite Coated Pellets (1/4")	
	437.2 fbgl	3377.8 ft.	Top of Filter Pack	
	465.3 fbgl	3349.7 ft.	Top of Slotted Screen	
			437.2' to 650': Gravel Pack	
	647.3 fbgl	3167.7 ft.	Base of Slotted Screen	
End of Hole	650 fbgl	3165 ft.		



NOT TO SCALE



Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

(5) The Vibrating Wire Piezometer specifications are:
RC19-10-VWP (SN: 1845400) - Geokon model 4500S rated for 3 Mpa.

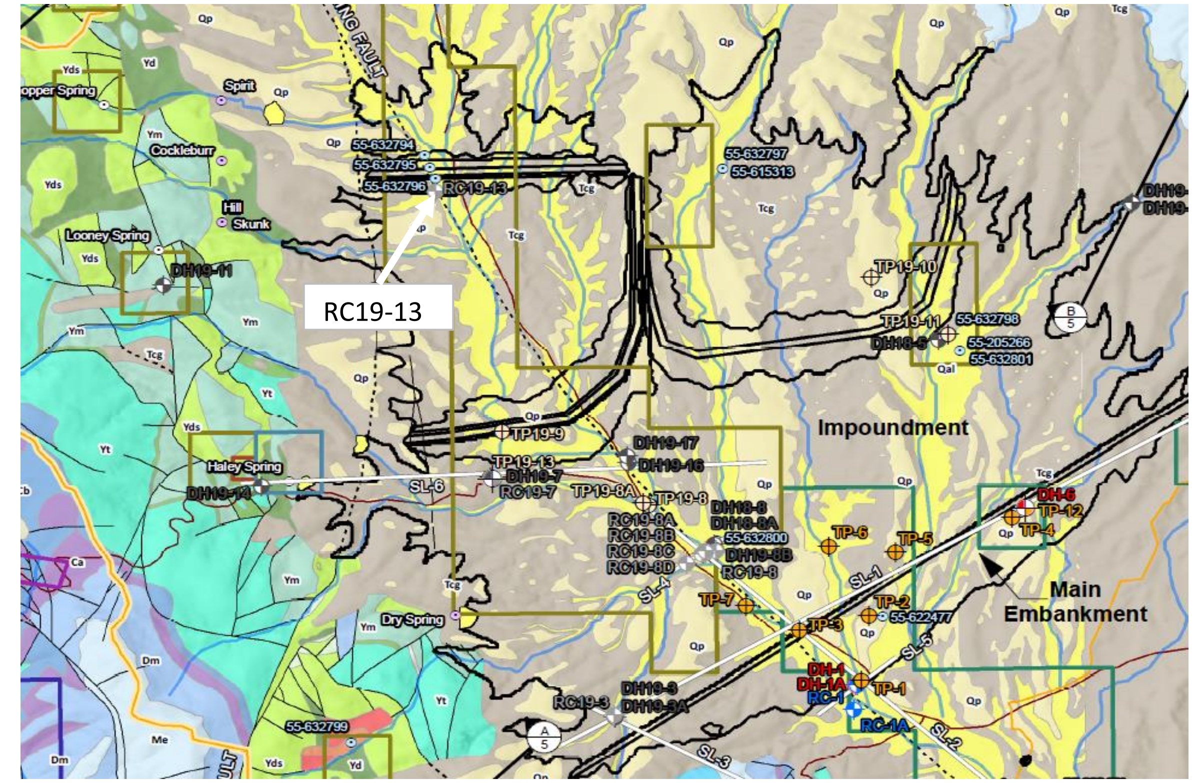
(6) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

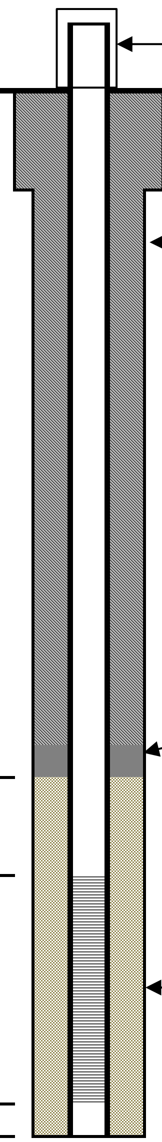
RC19-13 - Installation Details and As-Built

Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-01-28
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-02-01
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-13-PW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Slashs Ranch	Pipe Riser Diameter:	6.5" (O.D.); 0.5" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Diameter:	6.5" (O.D.); 0.5" wall; steel
Easting (ft):	1005466.3	Screen Slot Size:	1/8" x 3" slots; 12 rows of 2 slots per ft.
Northing (ft):	801569.9	Minimum Collapse Strength:	N/A
Surface Elevation (ft):	3404.7	Sand / Gravel Pack:	1/4" passing - crusher-run gravel
		Sump Details:	6.5" (O.D.); 0.5" wall; steel



Installation Details

Drilling Method | Depth[2] (fbgl) | Elev.[3] (ft.) | **Installation and Backfill** | **Formation[1]**



Drilling Method	Depth (fbgl)	Elev. (ft.)	Installation and Backfill	Formation
			Stickup = 2.58 ft. agl (Vault)[4]	
Ground Surface		3404.7 ft.		
Drilling Method (0' to 40.6'): Air Rotary Casing Hammer (5000 lbs) and tricone bit; Casing Diameter: 11.75" (O.D.); Casing Depth (removed)	27 fbgl	3377.7 ft.		Quaternary Alluvium (27 ft., El. 3378 ft.)
			0' to 219' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.03 Bentonite)	Tertiary Sandstone (86 ft., El. 3319 ft.)
Drilling Method (40.6' to 350'): Downhole hammer; Drill-bit Diameter: 10 5/8" (O.D.)			219' to 230.5': Bentonite Coated Pellets (1/4")	Tertiary Conglomerate
	230.5 fbgl	3174.2 ft.		
	268 fbgl	3136.7 ft.	Slotted Screen Begins	
			230.5' to 350': Gravel Pack	
	348 fbgl	3056.7 ft.	Slotted Screen Ends	
End of Hole	350 fbgl	3054.7 ft.	348' to 350': Sump	

NOT TO SCALE

Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

(5) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

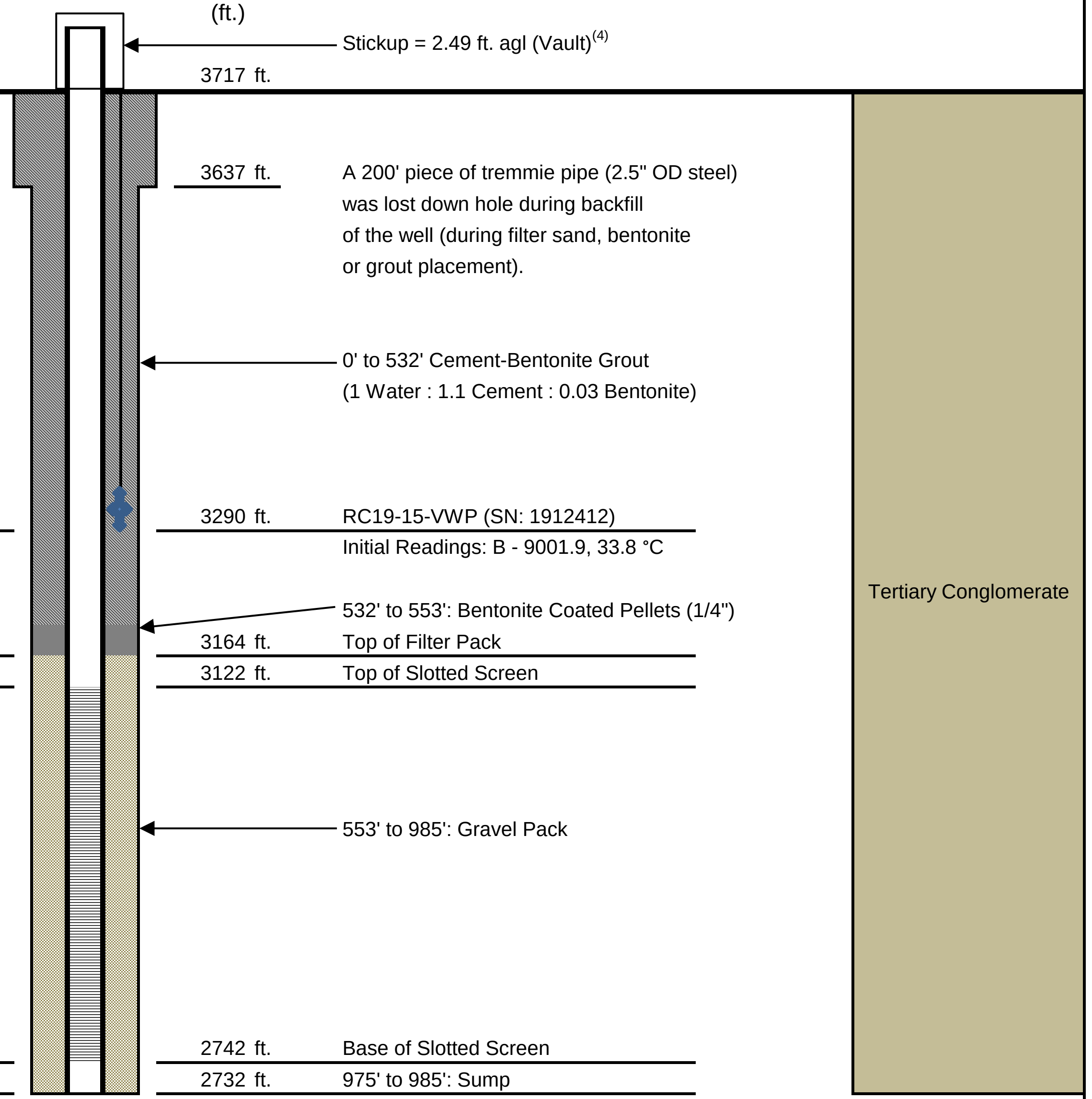
Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

RC19-15 - Installation Details and As-Built

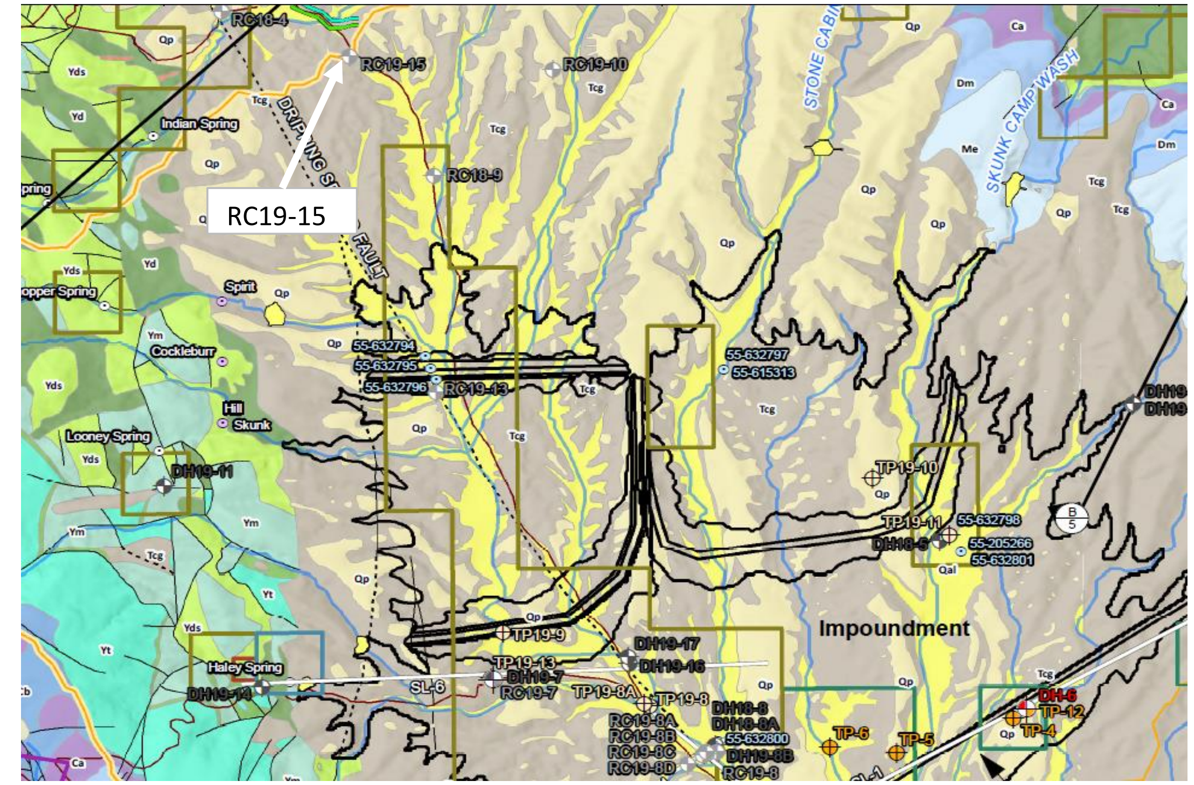
Client:	Resolution Copper Mining LLC	Date Started Drilling:	2019-06-26
Project Name:	Skunk Camp Site Investigation	Date Finished Installation:	2019-07-14
Project Number:	UM09441A21	Drilling Method:	see below
		Drilling Fluid:	Air and water
Well ID:	**RC19-15-PW**	Borehole Diameter:	see below
Site Area:	Skunk Camp		
Specific Location:	Saddle Between Dripping Spring Wash and Mineral Creek	Pipe Riser Diameter:	6.5" (O.D.); 0.5" wall; steel
		Screen Diameter:	6.5" (O.D.); 0.5" wall; steel
Drillhole Coordinates (Arizona State Plane, NAD 83):		Screen Slot Size:	0.150" diameter slots, wire wound
Easting (ft):	1003619	Minimum Collapse Strength:	N/A
Northing (ft):	808854	Sand / Gravel Pack:	3/8" to 3/16" crusher-run gravel
Surface Elevation (ft):	3717	Sump Details:	6.5" (O.D.); 0.5" wall; steel

Installation Details



Drilling Method	Depth[2] (fbgl)	Elev.[3] (ft.)	Installation and Backfill	Formation[(1)]
			Stickup = 2.49 ft. agl (Vault)[(4)]	
Ground Surface		3717 ft.		
Drilling Method (0' to 80'): Air Rotary Casing Hammer (5000 lbs) and tricone bit Casing Diameter: 11.75" (O.D.)	80 fbgl	3637 ft.	A 200' piece of tremmie pipe (2.5" OD steel) was lost down hole during backfill of the well (during filter sand, bentonite or grout placement).	Tertiary Conglomerate
Casing Depth (removed)				
			0' to 532' Cement-Bentonite Grout (1 Water : 1.1 Cement : 0.03 Bentonite)	
	427 fbgl	3290 ft.	RC19-15-VWP (SN: 1912412) Initial Readings: B - 9001.9, 33.8 °C	
Drilling Method (80' to 985'): Downhole hammer Drill-bit Diameter: 10 5/8" (O.D.)			532' to 553': Bentonite Coated Pellets (1/4")	
	553 fbgl	3164 ft.	Top of Filter Pack	
	595 fbgl	3122 ft.	Top of Slotted Screen	
			553' to 985': Gravel Pack	
	975 fbgl	2742 ft.	Base of Slotted Screen	
End of Hole	985 fbgl	2732 ft.	975' to 985': Sump	

NOT TO SCALE



Notes and Completion Details

(1) The geological formations shown are for reference only and are based upon conditions encountered in the field. In general, the boundaries between lithologic layers (ie. Alluvium and Gila Conglomerate) are not as distinct as shown. Refer to the drill hole logs for greater detail.

(2) Depths shown are in feet below ground level (fbgl) at the time of drilling.

(3) Elevations shown are in reference to the surface elevation, which is taken as the pad elevation.

(4) Stickup is the height of the vault above the pad.

(5) The Vibrating Wire Piezometer specifications are:
RC19-15-VWP (SN: 1912412) - Geokon model 4500S rated for 2 Mpa.

(6) Cement-Bentonite Grout was placed from the bottom of the grouted zone by a tremie pipe.

Drawing by:	CE
Checked by:	CK
Date:	14-Aug-19

KCB Consultants Ltd.

Appendix E

Well Information for Selected Regional Wells

WELL INFORMATION FOR SELECTED REGIONAL WELLS

SKUNK CAMP INVESTIGATION AREA
PINAL AND GILA COUNTIES, ARIZONA

WELL NAME	REGISTRY NO.	TYPE	OWNER	USE	…..UTM COORDINATES….. EAST (m)	NORTH (m)	ELEVATION (ft amsl) [a]	WELL DEPTH (ft)	CASING DEPTH (ft)	CASING DIAMETER (in)	INSTALLATION DATE	APPROXIMATE WATER LEVEL (ft bls) [b]	COMMENT
Headquarters Well #2	55-632795	Private well	Hebbard & Webb	Stock	1004878.41	802568.64	3480	400	34	8	8/1/1941	230	Inside pasture at Slash S Ranch on Sonora/Hot Tamale Peak 7.5' quad
Headquarters Well #3	55-632794	Private well	Hebbard & Webb	Domestic	1005213.23	802745.37	3440	400	57	8	5/1/1943	185	On hill at Slash S Ranch on Sonora/Hot Tamale Peak 7.5' quad
Lower Well	55-632800	Private well	Hebbard & Webb	Stock	1011190.66	794076.86	3180	250	250	8	5/1/1940	70	Legacy windmill well on Sonora/Hot Tamale Peak 7.5' quad at 10dcc

Note:
[a] feet above mean sea level
[b] feet below land surface

Victoria Boyne

From: ResolutionProjectRecord
Subject: FW: 404 Workgroup Action Item - Aquifer Testing Technical Report
Attachments: MA Report_Skunk Camp Aquifer Testing_Nov2019.pdf

From: Peacey, Victoria (RC) <Victoria.Peacey@riotinto.com>
Sent: Monday, November 11, 2019 1:40 PM
To: Rasmussen, Mary C -FS <mary.rasmussen@usda.gov>; Langley, Michael SPL (Michael.W.Langley@usace.army.mil) <Michael.W.Langley@usace.army.mil>; Hoffman, Hugo <Hoffman.Hugo@epa.gov>
Cc: 'Brian Lindenlaub (blindenlaub@westlandresources.com)' <blindenlaub@westlandresources.com>; Ghidotti, Greg (G&I) <Gregory.Ghidotti@riotinto.com>; Patterson, Kate <KPatterson@klohn.com>; TIMOTHY BAYLEY <tbayley@elmontgomery.com>; Chris Garrett <cgarrett@swca.com>; Donna Morey <dmorey@swca.com>; Owens, Steve <steve.owens@squirepb.com>; Ballard, Kami (RC) <Kami.Ballard@riotinto.com>
Subject: 404 Workgroup Action Item - Aquifer Testing Technical Report

EXTERNAL: This email originated from outside SWCA. Please use caution when replying.

Hello Mary, Mike and Hugo:

At the 404 working group meeting on 11/5/2019 aquifer testing information was presented for the Skunk Camp TSF alternative. As a follow up action and for your review and consideration, please see the attached technical report by Montgomery and Associates titled “Aquifer testing results for Skunk Camp Hydrogeologic Investigation.” The attached report was completed in addition to the hydrogeologic information contained in the KCB Site Investigation Report (submitted on 11/5/2019).

Thanks,

Vicky Peacey
Senior Manager Permitting and Approvals

RESOLUTION COPPER
102 Magma Heights
Superior, AZ 85173, United States
T: +1 520.689.3313 M: +1 520.827.1136
Victoria.peacey@riotinto.com www.resolutioncopper.com