

APPENDIX E

EVALUATION OF HYDRAULIC TESTS AT MO-2007-SERIES WELLS

TASK 2.4 OF AQUIFER CHARACTERIZATION PLAN

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**TASK 2.4 OF AQUIFER CHARACTERIZATION PLAN
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1. INTRODUCTION

This document describes the performance, analysis, and results of hydraulic tests conducted at MO-2007-Series (MO-Series) groundwater monitoring well nests installed under Task 2.4 of the Sierrita work plan (Hydro Geo Chem, Inc. [HGC], 2006). Locations and screened intervals of the wells in the nests are shown in Figure E.1 and construction details are summarized in Table E.1. Geologic logs for the MO-2007-Series wells and a detailed description of each well nest are provided in the well installation report (Appendix D to main text).

The purpose of the tests was to evaluate basin fill aquifer hydraulic properties, including transmissivity, vertical hydraulic conductivity, and storage coefficient, in the vicinity of each well nest. In addition, tests were conducted at multiple pumping rates (thereby constituting step rate tests), to enable evaluation of pumping well efficiency parameters. Pumping well efficiency parameters quantify the proportion of drawdown in the pumped well that is due to resistance to flow into the well bore and include non-linear head losses related to flow through well screen slots. In some cases, especially where the permeability of the aquifer is relatively high, the drawdown in the well is dominated by these head losses. This effect is illustrated in Figure E.2.

2. HYDRAULIC TEST PROCEEDURES

Hydraulic tests at the MO-2007-Series well nests consisted of step-rate pumping of one of the wells in the nest, measuring the pumping rates, and measuring the water levels in the pumping well and nearby observation wells before, during, and after pumping. Observation wells were typically other wells in the nest that were screened at intervals deeper or shallower than the pumped well. Barometric pressure was also measured during each test to allow correction for any barometrically induced water level changes. Collected data were analyzed to estimate pumped well efficiency parameters and basin fill aquifer hydraulic properties in the vicinities of the well nests. Hereafter, for convenience, wells will be referred to using a shorthand designation, for example MO-6B, rather than MO-2007-6B.

2.1 Pumping Procedures

Hydraulic tests were conducted subsequent to development of each new well. A sufficient time was allowed between well development and testing to allow recovery after development. Submersible pumps were supplied, deployed, and operated by the drilling company (WDC Exploration and Wells [WDC]) that installed and developed the wells. Each well was pumped at multiple, increasing, rates to allow analysis of pumping well efficiency parameters. Target rates were approximately 15, 30, and 50 gallons per minute (gpm); actual rates varied depending on pump capacities and well productivities. In some cases (for example MO-5C), the well was pumped at only two rates due to low productivity. In general, the duration of pumping at the first two rates was approximately 1 hour for each, and at the maximum rate, approximately 8 hours. Table E.2 lists actual pumping rates and durations for each test.

Pumping rates were measured using in-line flowmeters supplied by WDC and by measuring the time to fill a vessel of known volume (the “bucket and stopwatch” method). In most cases, the vessel consisted of a calibrated, 55-gallon drum that allowed very accurate calculation of actual pumping rates because of its large capacity.

2.2 Water Level Monitoring

Water level monitoring consisted of continuous monitoring of water levels in pumping and observation wells prior to, during, and after pumping. Observation wells included available wells near the location (within a hundred feet) of the pumped well. These were typically other wells in the newly installed well nest, screened at intervals either deeper or shallower than the pumped well. For example, MO-1A and MO-1C were used as observation wells during pumping of MO-1B. Relative to MO-1B, MO-1A is screened over a shallower interval, and MO-1C is screened over a deeper interval (Table E.1).

Water levels were typically monitored at 30 second intervals using In-Situ Level Trolls (Trolls). The Trolls, which are submersible instruments containing pressure transducers and data loggers, were initially placed at sufficient depths below the static water levels in the wells to remain submerged throughout each test. Most of the Trolls used in the tests were vented to the atmosphere, and therefore measured gauge pressures. The Troll used at MO- 2 was an absolute pressure transducer. In all cases, a second absolute pressure Troll at the surface continuously recorded atmospheric pressure during each test.

The pressure ranges of the Trolls selected for each test were based on the anticipated maximum response in the well in which the Troll was to be deployed. For observation wells, Trolls with a range of 5 pounds per square inch (psi), or approximately 12 feet of water, were typically used. For many of the pumped wells, Trolls with ranges of as much as 30 psi (approximately 70 feet of water) were used.

As an independent verification of the Troll data, water level measurements in pumping and observation wells were collected by hand using an electric water level sounder as frequently as practical. In many cases, hand collection of water levels was not possible over the entire duration of a test due to binding-up of the water level probe. Binding resulted from crowding within the narrow diameter (2 - inch) sounding tubes which accommodated the vent lines and cables for the Trolls, and provided the only access for the water level sounder.

2.3 Data Analysis

Water level data from the Trolls were downloaded and converted to depths to water and to water level drawdowns for purposes of analysis. In cases where automatically logged data were shown to be inaccurate through comparison to the hand collected data, and sufficient measurements were available (for example, at MO-4C and MO-5C), the hand collected depths to water were converted to water level drawdowns and analyzed independently. In all cases, hand-measured depths to water were compared with depths to water calculated from Troll readings as a check on Troll accuracy.

For purposes of analysis, the total number of automatically logged drawdown records was reduced. Typically, the first 5 to 10 records at the beginning of each pumping step were retained for analysis. Then, every second, then third, then fourth, etc, record was retained, until the beginning of the next pumping step. This was necessary in most cases to meet input requirements for the software used to analyze the data, and to improve the rate at which automatic parameter estimation could proceed.

Drawdown and pumping rate data were analyzed using WHIP, a well hydraulics interpretation package developed and marketed by HGC (HGC, 1988). WHIP has solutions that account for variable pumping rates, vertical flow and leakage, wellbore storage, and partial penetration of pumping and observation wells within a vertically anisotropic aquifer. WHIP also accounts for head losses in the pumped well resulting from well efficiency effects. Direct estimation of vertical hydraulic conductivities is available as part of the vertically anisotropic aquifer solution provided in WHIP.

In all cases, except at MO-2, the vertically anisotropic, partially penetrating well solution available in WHIP was used to estimate hydraulic properties and pumping well efficiency parameters. Because MO-2 was the only well installed at this location, and was fully penetrating, the ‘homogeneous aquifer’ solution was used because it assumes full well penetration and allows faster parameter estimation than the partial penetration solution.

Hydraulic parameters estimated from each test included transmissivity, vertical hydraulic conductivity, storage coefficient, and pumped well efficiency parameters. In each case, pumping and recovery data were analyzed together to obtain the best fit to all collected data. The

automatic parameter estimation routines were utilized when needed to improve the fits between measured and simulated drawdowns. In cases where a nearby observation well completed at a different depth interval than the pumping well showed no response to pumping, the lack of response was used to provide a limit on the vertical conductivity estimated from analysis of the pumped well data. Furthermore, in many cases, water level trends measured in the observation wells that were related to changes in atmospheric pressure or changes in pumping rates at remote production wells were used to correct drawdowns measured at the pumped well to improve the fits between measured and simulated drawdowns.

Because drawdowns were not detectable at observation wells, and accurate estimation of storage coefficient is usually not possible using only data from the pumping well, a value of 0.001 was assumed, which is generally representative of aquifer behavior that is between confined and unconfined. In some cases the storage coefficient was adjusted to improve the fit between measured and simulated drawdowns at the pumped well even though analyzable observation well data were not obtained. The assumption of a storage coefficient of 0.001 and the constraint that measurable drawdowns were not detected at the observation wells resulted in generally low estimates of vertical hydraulic conductivity. To test the sensitivity of the analyses to storage coefficient and vertical hydraulic conductivity, alternate analyses were performed for the middle depth ('B') wells at locations MO-1, MO-3, MO-4, and MO-5. In these analyses, the storage coefficient was assumed to be as high as 0.1, and vertical conductivity was adjusted to provide an acceptable fit to the pumping well data with the constraint that detectable drawdowns did not occur at monitored observation wells.

When analyzing the tests, the partial penetration of pumping and observation wells was represented. The aquifer thickness was based on the interval between the top of the bedrock defined by drilling and the static (pre-pumping) water level in the well. Except at MO-6, where a 140 foot thick silty/clayey layer separated MO-6A from MO-6B, none of the pumping wells were considered to be screened in aquifer horizons separated from the other wells in the nest by confining or semi-confining (leaky) layers. The effective (horizontal) hydraulic conductivities of the aquifer intervals penetrated by the pumped wells can be approximated by dividing the estimated transmissivity by the aquifer thicknesses assumed in the respective analyses.

An alternate method of analyzing the tests at partially penetrating wells would be to consider the pumped well to be fully penetrating, the aquifer to be only as thick as the pumped well screened interval, and to represent any vertical flow as leakage from intervals above (or below). When analyzing a test this way, a lower transmissivity would be calculated because the assumed aquifer thickness is correspondingly smaller. The effective hydraulic conductivity computed would be similar using this method of analysis, however, because the reduced transmissivity estimate would be nearly compensated by the reduced aquifer thickness assumed.

3. RESULTS

The results of analyzing pumping rate and drawdown data at the MO-Series well nests are discussed in the following Sections.

3.1 MO-1 Series

Results of testing the MO-1 well nest are provided in Table E.3 and Figures E.3 through E.6. No measurable responses were obtained 1) at MO-1B or MO-1A during pumping of MO-1C, 2) at MO-1C or MO-1A during pumping of MO-1B, or at 3) MO-1C or MO-1B during pumping of MO-1A. MO-1A is completed in the shallow portion of the aquifer, MO-1B in the middle portion, and MO-1C in the deepest portion of the aquifer (Table E.1). Transmissivity estimates ranged from 7,000 feet squared per day (ft^2/day) at MO-1C to 25,000 ft^2/day at MO-1B. The estimate of 20,000 ft^2/day at MO-1B was lower than the 25,000 ft^2/day estimated at MO-1A, but was more than twice the value of 7,000 ft^2/day estimated for MO-1C. Sensitivity analyses at MO-1B indicated that vertical hydraulic conductivity could range from <0.1 to 1 feet per day (ft/day) as assumed storage coefficient ranges from 0.001 to 0.01.

Drawdown data obtained from pumping MO-1B were corrected for a change in atmospheric pressure and a change in regional water levels based on data collected from observation well MO-1A. Water levels in MO-1A responded to both changes in atmospheric pressure, which produced increases and decreases in water level of less than about 0.1 foot (ft), and to a regional decline in water levels of approximately 0.008 feet per hour (ft/hr) over the course of the test. The rate of regional water level decline was calculated as the total water level

change over the test divided by the test duration. Applying the correction allowed a better fit to the latter portions of the drawdown data (within pumping step #3), and to the recovery data.

3.2 MO-2

Only one well was completed and tested at the location of MO-2 because the aquifer is only about 110 ft thick at this location. The results of the analysis are provided in Table E.3 and Figure E.7. The transmissivity was estimated to be 13,000 ft²/day.

3.3 MO-3 Series

Results of testing the MO-3 well nest are provided in Table E.3 and Figures E.8 through E.12. MO-3C was the first well installed and tested at this location. Automatically logged data were noisy and strongly influenced by changes in water levels unrelated to pumping of MO-3C. The most likely cause of these water level changes, which affected mainly the last step of the test, is pumping of water supply wells in the basin. An additional difficulty in analyzing data from the first and second steps was that drawdowns were nearly constant to declining during portions of these steps, indicating that near-bore permeability or well efficiency may have been increasing as a result of the pumping. Recovery data were not analyzed due to a faulty check valve on the pump that released water from the discharge line back into the well casing when pumping ceased.

Transmissivity estimates for MO-3C ranged from 10,100 to 11,600 ft²/day, and vertical hydraulic conductivity estimates from 0.0001 to 2.63 ft/day. Results of the analyses are provided

in Table E.3 and Figures E.10 through E.12, which show the fits obtained when assuming different transmissivity and vertical hydraulic conductivity values.

MO-3B was the second well tested at this location. No measurable response to pumping at MO-3B was detected at MO-3C or nearby well NP-2. MO-3C is completed in a deeper portion of the aquifer, and NP-2 in a shallower portion of the aquifer, than MO-3B (Table E.1). This suggests that the average vertical hydraulic conductivity is at the lower end of estimates obtained when analyzing the data from the test at MO-3C. A vertical hydraulic conductivity of 0.02 ft/day, and a transmissivity of 17,700 ft²/day, were estimated from the test at MO-3B when a storage coefficient of 0.001 was assumed (Table E.3 and Figure E.8). Sensitivity analyses at MO-3B indicated that vertical hydraulic conductivity could be as high as 0.1 ft/day if the storage coefficient is assumed to be 0.1 (Table E.3 and Figure E.9).

As shown in Figures 8 and 9, improved fits between measured and simulated drawdowns, especially during recovery, were obtained when a correction was applied to drawdowns in the third step after approximately 3.3 hours of pumping. The correction increased linearly from zero to approximately 0.7 feet between about 3.3 and 6 hours into the test, and remained constant thereafter. The magnitude of the correction indicates it cannot be due to barometric effects, and is likely the result of recovery of water levels from cessation of pumping of a remote production well or wells in the basin. Application of the correction does not change the interpretation, however, which was based primarily on the first 3 hours of pumping, and the recovery portion of the test.

3.4 MO-4 Series

Results of testing the MO-4 series wells are provided in Table E.3 and Figures E.13 through E.21. Based on testing at MO-4C prior to installation of other wells in the nest, transmissivity was estimated to range from 8,680 to 9,000 ft²/day, and vertical hydraulic conductivity from 0.0114 to 0.02 ft/day (Table E.3 and Figures E.18 and E.19). Comparison of drawdowns computed from the Troll in the pumped well to hand measured drawdowns indicated that the response of the Troll was inaccurate (low) by about 8 feet during the third step (Figure E.20). Enough data was collected by hand during the test to independently estimate aquifer properties and well efficiency parameters (Table E.3 and Figure E.21). Independent analysis of aquifer properties using the hand collected data did not change the estimates, however, because the shape of the drawdown curves during each step were nearly identical. Only the estimates of pumped well efficiency parameters changed, because the large, sharp, increases in drawdown that occur when pumping rates are increased are mainly a function of well efficiency.

MO-4A was the next well tested in the nest. A transmissivity of 7,500 ft²/day and a vertical hydraulic conductivity of 0.01 ft/day were estimated (Figure E.13 and Table E.3). Measurable responses to pumping MO-4A were not detected at MO-4B or MO-4C which are completed at intervals deeper than MO-4A (Table E.1).

MO-4B was the final well tested in the nest. Drawdowns related to pumping MO-4B were not detected at MO-4A or MO-4C, completed at intervals shallower and deeper, respectively, than MO-4B (Table E.1). Drawdown data were corrected for a water level change

of approximately 0.0022 ft/min (calculated by dividing the total change in water over the test by the test duration) that resulted in water levels after recovery that were higher than the initial (pre-pumping) water levels. This water level change is likely due to changes in pumping at remote production wells in the basin. The early portion of the recovery data was not useful because a faulty check valve released water from the pump discharge line into the well casing at the cessation of pumping. Analysis of the corrected drawdown data yielded a transmissivity estimate of 10,000 ft²/day, a vertical hydraulic conductivity estimate of 0.01 ft/day, and a storage coefficient estimate of 0.005 (Figure E.14 and Table E.3). Analysis of uncorrected drawdown data yielded a transmissivity estimate of 20,000 ft²/day, a vertical hydraulic conductivity estimate of 0.1 ft/day, and a storage coefficient estimate of 0.005 (Figure E.15 and Table E.3). Sensitivity analyses indicated that vertical hydraulic conductivity could be as high as about 1 ft/day if a storage coefficient of 0.1 is assumed (Table E.3 and Figures E.16 and E.17).

3.5 MO-5 Series

Results of testing the MO-5 series wells are provided in Table E.3 and Figures E.22 through E.26. MO-5C was the first well installed and tested at this location. Only two pumping steps were used due to low productivity. Drawdowns related to pumping MO-5C were not detected at nearby well CW-3, which is completed in a shallower portion of the aquifer. Estimated transmissivity was 785 ft²/day and vertical hydraulic conductivity 0.0014 ft/day (Figure E.24 and Table E.3). As during testing MO-4, hand collected data indicated that the Troll used in the pumped well underestimated drawdowns, especially during the second step (Figure E.25). Independent analysis of the hand-measured drawdowns changed estimated well efficiency parameters but did not change the estimates of aquifer properties (Figure E.26).

Again, the apparent inaccuracy of the Troll readings were not sufficient to significantly change the shape of the drawdown curves during each step.

MO-5B was the last well tested at this location. Drawdown data were corrected for a water level change of approximately 0.00094 ft/min that resulted in water levels after recovery that were higher than the initial (pre-pumping) water levels. The corrected drawdown data yielded an estimated transmissivity of 31,200 ft²/day and a vertical hydraulic conductivity estimate of 0.01 ft/day when a storage coefficient of 0.001 was assumed (Table E.3 and Figure E.22). Sensitivity analyses at MO-5B indicated that vertical conductivity could be as high as 0.1 ft/day if a storage coefficient of 0.1 is assumed (Table E.3 and Figure E.23). No measurable response to pumping at MO-5B was detected at MO-3C or CW-3. MO-5C is completed in a deeper portion of the aquifer, and CW-3 in a shallower portion of the aquifer, than MO-5B (Table E.1).

3.6 MO-6 Series

Results of testing the MO-6 series wells are provided in Table E.3 and Figures E.27 through E.32. MO-6A was the first well tested at this nest. During pumping of MO-6A, no measurable response was detected at MO-6B, which is completed in the deepest portion of the aquifer at this location (Table E.1). An approximately 140 foot thick silty and clayey layer was logged between the screened intervals of MO-6A and MO-6B, between approximately 630 and 770 feet below land surface (ft bls) (Appendix C to main text). The test was analyzed assuming two conditions: 1) that the aquifer extended to a total depth of 960 ft bls, and 2) that the portion

of the aquifer in which MO-6A was screened extended only from the water table (approximately 305 ft bls) to the top of the silty/clayey layer at 630 ft bls.

Using the first assumption (a total aquifer thickness of 655 ft), transmissivity estimates varied between 8,000 and 17,000 ft²/day, and vertical hydraulic conductivity was estimated to be 0.1 ft/day or less (Table E.3 and Figures E.27 and E.28). The best fits to the drawdown data during pumping were obtained using the lower transmissivity estimate, although reasonable fits to both drawdown and recovery data were obtained using the higher estimate.

Using the second assumption (a total aquifer thickness of 325 ft), a reasonable fit to both drawdown and recovery data was obtained with a transmissivity estimate of 10,000 ft²/day, and a vertical hydraulic conductivity estimate of 0.1 ft/day or less (Figure E.29 and Table E.3). The best fit to drawdown data only was obtained using a transmissivity of 4,150 ft²/day (Figure E.30 and Table E.3).

MO-6B was tested last. During pumping of MO-6B, no measurable response was detected at MO-6A. The test was analyzed assuming two conditions: 1) that the aquifer extended from the water table (approximately 320 ft bls) to a total depth of 960 ft bls, and 2) that the portion of the aquifer in which MO-6B was screened extended only from the base of the silty/clayey layer at 770 ft bls to a total depth of 960 ft bls. This layer was assumed to be a leaky aquitard.

Using the first assumption (a total aquifer thickness of 640 ft), a transmissivity estimate of 750 ft²/day and a vertical hydraulic conductivity estimate of 0.01 ft/day were obtained

(Figure E.31 and Table E.3). Using the second assumption (a total aquifer thickness of 190 ft), a transmissivity estimate of 210 ft²/day, a vertical hydraulic conductivity estimate of 0.1 ft/day or less, and an aquitard hydraulic conductivity of 0.001 ft/day were obtained (Figure E.32 and Table E.3).

4. DISCUSSION

Some of the important results of the hydraulic testing include:

- 1) Many of the tested wells display relatively large, non-linear, head losses at the applied pumping rates (For example, see Figure E.2). This is expected because the wells were designed for water level and water quality monitoring purposes and not for production of water supply.
- 2) Estimated transmissivity imply hydraulic conductivities ranging from less than 1 ft/day to nearly 120 ft/day. The highest hydraulic conductivity was at MO-2 near the basin margin and the lowest conductivity at MO-5C in the deepest portion of the basin fill.
- 3) In general, estimated hydraulic conductivities in the deepest portion of the basin fill are less than the estimated conductivities for shallower portions. The highest conductivities often occur at middle depths in the basin fill, as shown by tests at MO-1B, MO-3B, MO-4B, and MO-5B (Table E.3). Lithologic logging of the MO-series wells has shown that the middle depth wells are typically completed in coarser-grained materials than the shallow or deep wells (Appendix D to main text).

As discussed in Section 2.3, the generally low estimates of vertical hydraulic conductivity are partly the result of the assumption of a storage coefficient of 0.001, although the average vertical conductivity is likely to be low due to the layered nature of the basin fill. Sandy and gravely materials containing fines that are frequently described in the lithologic logs are likely composed of alternating, relatively thin, layers of coarser and finer grained materials rather than uniform mixtures of coarser and finer grained materials. Although a vertically extensive low permeability horizon was detected only at MO-6, where predominantly silt and clay materials were logged between MO-6A and MO-6B from approximately 630-770 ft bls (Appendix D to main text), the effect of interbedded thin horizons of fine grained materials will act to lower the average vertical conductivity. Relatively low average vertical conductivity is also consistent with the head differences measured at wells within the same nest, such as at the MO-5 and MO-6 Series wells (Table E.1). At the MO-5 and MO-6 series wells the water level in the well

screened deepest in the aquifer was approximately 19 feet and 16 feet deeper, respectively, then the water level in the next shallower well.

As indicated by the sensitivity analyses, however, assuming a higher storage coefficient may result in estimation of a higher vertical hydraulic conductivity while maintaining a good fit to the measured data. Based on these sensitivity analyses, vertical hydraulic conductivity estimates as high as 1 ft/day are obtained if a storage coefficient of 0.1 is assumed. A storage coefficient as high as 0.1, which is characteristic of a specific yield related to a lowering of the water table, may be inappropriate because a lowering of the water table was not measured during tests at middle and shallow depth wells.

The measurements of generally higher conductivities within the middle depths of the basin fill are consistent with the generally coarser grained nature of the materials logged at these depths as described above. The measurements are also consistent with the relatively large water level fluctuations measured at the MO-5 well nest during the MO-5B test. As shown in Figure E.33, water level fluctuations of more than 1 foot that were unrelated to pumping of MO-5B occurred at MO-5B over the course of the measurement period which extended from about 13 hours prior to pumping to about 18 hours after pumping. Fluctuations that occur in CW-3 (completed at a shallower depth than MO-5B) and MO-5C (completed at a deeper depth than MO-5B) during this time are smaller in magnitude (a few tenths of a foot) and display an apparent lag with respect to the larger magnitude fluctuations at MO-5B. If the conductivities of all depths penetrated by these wells were about the same then water level fluctuations of similar magnitude and without the apparent lags would be expected. As shown in Figure E.34, water

level changes at CW-3 and MO-5C also strongly correlate with changes in atmospheric pressure over the latter portion of the measurement period.

Overall, the hydraulic tests indicate that within the tested area the basin fill can be considered an unconfined aquifer with a relatively low average vertical hydraulic conductivity. Vertical flow and sulfate transport at most locations will be slowed but not prevented by the low average vertical conductivity. In general, because horizontal hydraulic conductivities appear to be highest within the middle depths of the basin fill, the rate of transport is also expected to be higher within this zone than in deeper or shallower zones. For this reason wells completed at middle depths along the downgradient edge of the sulfate plume are likely to detect the arrival of the plume sooner than deeper or shallower wells. Furthermore, along the margins of the sulfate plume, changes in sulfate concentrations related to pumping of nearby water supply wells are likely to be greater at middle depths in the basin fill than in deeper or shallower horizons, because of the more rapid response expected from this horizon.

5. REFERENCES

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- HGC. 1988. WHIP. Well Hydraulics Interpretation Program. Version 3.22, User's Manual. July 1988.

6. LIMITATIONS STATEMENT

The opinions and recommendations presented in this report are based upon the scope of services and information obtained through the performance of the services, as agreed upon by HGC and the party for whom this report was originally prepared. Results of any investigations, tests, or findings presented in this report apply solely to conditions existing at the time HGC's investigative work was performed and are inherently based on and limited to the available data and the extent of the investigation activities. No representation, warranty, or guarantee, express or implied, is intended or given. HGC makes no representation as to the accuracy or completeness of any information provided by other parties not under contract to HGC to the extent that HGC relied upon that information. This report is expressly for the sole and exclusive use of the party for whom this report was originally prepared and for the particular purpose that it was intended. Reuse of this report, or any portion thereof, for other than its intended purpose, or if modified, or if used by third parties, shall be at the sole risk of the user.

TABLES

TABLE E.1
Well Construction Details

WELL NAME	ADWR WELL REGISTRY NUMBER	UTM NORTHING (NAD 83, meters)	UTM EASTING (NAD 83, meters)	DRILLED DEPTH (ft bls)	CASING DEPTH (feet)	CASING DIAMETER (inch)	DEPTH TO TOP OF SCREEN (ft bls)	DEPTH TO BOTTOM OF SCREEN (ft bls)	SCREEN LENGTH (feet)	MEASURING POINT ELEVATION (NAVD 88, ft amsl)	DATE MEASURED	DEPTH TO WATER BELOW MEASURING POINT (feet)	STATIC WATER LEVEL ELEVATION (ft amsl)
MO-2007-1A	907342	3529331.380	500016.947	620	610	5	460	600	140	2967.15	07/30/07	425.87	2541.28
MO-2007-1B	907210	3529325.119	500021.574	920	910	5	740	900	160	2966.35	07/30/07	425.67	2540.68
MO-2007-1C	907209	3529328.959	500013.405	1260	1190	5	1020	1180	160	2964.34	07/30/07	423.87	2540.47
MO-2007-2	906765	3527621.102	497912.410	740	685	5	520	680	160	3153.61	08/09/07	575.30	2578.31
MO-2007-3B	906816	3528508.801	500522.491	960	950	5	740	940	200	2910.75	09/10/07	359.38	2551.37
MO-2007-3C	906817	3528508.743	500529.713	1430	1330	5	1160	1320	160	2910.09	07/05/07	356.30	2553.79
MO-2007-4A	907213	3525634.956	500383.682	580	570	5	360	560	200	2923.47	10/09/07	307.67	2615.80
MO-2007-4B	907212	3525613.952	500380.947	960	950	5	700	940	240	2923.22	10/11/07	308.72	2614.50
MO-2007-4C	907211	3525624.484	500382.217	1153	1140	5	1090	1130	40	2923.49	08/12/07	307.13	2616.36
MO-2007-5B	907456	3523743.376	500013.850	980	970	5	660	960	300	2943.42	10/12/07	268.27	2675.15
MO-2007-5C	907457	3523736.459	500014.152	1370	1360	5	1150	1350	200	2944.33	08/23/07	294.04	2650.29
MO-2007-6A	907607	3521842.050	498367.161	630	620	5	310	390	80	3042.49	10/02/07	303.60	2738.89
							430	610	180				
MO-2007-6B	907606	3521849.495	498367.887	1060	950	5	780	940	160	3041.95	10/04/07	319.17	2722.78
Existing Wells at MO-2007 Sites													
CW-3	627483	3523809.985	500047.663	501	500	16	182	500	318	2941.44	06/06/07	265.35	2676.09
NP-2	605898	3528517.116	500582.904	515	515	12	331	515 ¹	184 ¹	2907.05	06/04/07	351.50	2555.55

Notes:

ADWR = Arizona Department of Water Resources

UTM = Universal Transverse Mercator (Zone 12)

NAD 83, meters = North American Datum of 1983

NAVD 88 = North American Vertical Datum of 1988

ft amsl = feet above mean sea level

ft bls = feet below land surface

¹ depth to bottom of screen and screen length are not provided in the ADWR well registry and therefore estimated

TABLE E.2
Pumping Rates and Durations

Well	Rate 1	Duration	Rate 2	Duration	Rate 3	Duration
MO-2007-1A	15.0*	67.0	25.0	65.5	50.0	485.5
MO-2007-1B	16.0*	62.5	30.0	63.0	47.5	485.0
MO-2007-1C	16.0*	78.5	30.0	71.5	47.5	490.0
MO-2007-2	16.4	61.0	30.5	62.5	37.5	506.0
MO-2007-3B	14.0	60.5	33.5	60.0	51.0	240.0
MO-2007-3C	13.8*	68.9	27.6	61.0	38*	479.5
MO-2007-4A	13.5*	61.0	26.0	65.0	43.0	242.5
MO-2007-4B	13.0	60.0	31.5	60.5	52.0	241.0
MO-2007-4C	16.0	61.0	28.0	61.5	60.0	481.5
MO-2007-5B	16.0*	61.0	30.0	61.5	55.0	300.5
MO-2007-5C	10.5	160.0	21.0	119.5	none	none
MO-2007-6A	13.0	65.5	28.0	63.0	55.0	481.0
MO-2007-6B	14.0	61.5	28.0	61.5	33.0	440.5

Notes:

**An initially high pumping rate was reduced to the indicated rate within the first minute or two of the test.*

Rates are in gpm and durations in minutes.

TABLE E.3
Summary of Hydraulic Parameters from MO-Series Wells

Well	T (ft ² /day)	S	K _v (ft/day)	b (ft)	K _c (ft/day)	c	n	Kh (ft/day)	drawdown correction
MO-2007-1A	20,000	0.001	<0.1	815	-	0.27	0.96	25	no
MO-2007-1B	25,000	0.001	<0.1	815	-	0.036	1.25	31	yes
MO-2007-1B	25,000	0.01	1	815	-	0.036	1.27	31	yes
MO-2007-1C	7,000	0.001	<0.1	815	-	0.042	1.46	8.6	no
MO-2007-2	13,000	0.001	-	110	-	0.03	1.2	118	no
MO-2007-3B	17,700	0.001	0.02	1060	-	0.001	1.88	17	yes
MO-2007-3B	17,700	0.1	0.1	1060	-	0.006	1.51	17	yes
MO-2007-3C	11,600	0.001	1 X 10 ⁻⁴	1060	-	0.001	2.16	11	no
MO-2007-3C	11,500	1.6 X 10 ⁻⁴	0.25	1060	-	0.001	2.17	11	no
MO-2007-3C	10,100	0.001	2.63	1060	-	0.001	2.18	9.5	no
MO-2007-4A	7,500	0.005	0.01	835	-	0.9	0.998	9	no
MO-2007-4B	20,000	0.005	0.1	835	-	0.0318	1.42	24	no
MO-2007-4B	20,000	0.1	1	835	-	0.0318	1.43	24	no
MO-2007-4B	10,000	0.005	0.01	835	-	0.0169	1.52	12	yes
MO-2007-4B	10,000	0.1	1	835	-	0.017	1.55	12	yes
MO-2007-4C	8,680	0.001	0.0114	835	-	8 X 10 ⁻⁵	3.02	10	no
MO-2007-4C ¹	8,680	0.001	0.0114	835	-	8.4 X 10 ⁻⁵	3.09	10	no
MO-2007-4C	9,000	0.001	0.02	835	-	1.8 X 10 ⁻⁴	2.82	11	no
MO-2007-5B	31,200	0.001	0.01	1085	-	0.0091	1.27	29	yes
MO-2007-5B	31,200	0.1	0.1	1085	-	0.016	1.19	29	yes
MO-2007-5C	785	0.001	0.011	1085	-	0.003	2.05	0.72	no
MO-2007-5C ¹	785	0.001	0.011	1085	-	0.045	1.65	0.72	no
MO-2007-6A	17,000	0.0057	0.1	655	-	0.0258	1.41	26	no
MO-2007-6A	8,000	0.0057	0.1	655	-	0.014	1.49	12	no
MO-2007-6A	10,000	0.0057	0.1	325	-	0.0277	1.4	31	no
MO-2007-6A	4,150	0.0057	0.1	325	-	0.014	1.5	13	no
MO-2007-6B	750	0.001	0.01	655	-	0.2	1.12	1.1	no
MO-2007-6B	210	0.001	0.1	190	0.001	0.4	0.95	1.1	no

Notes:

¹ = hand collected data

T = Transmissivity

S = Storage coefficient

K_v = Vertical hydraulic conductivity

K_c = Vertical hydraulic conductivity of confining layer

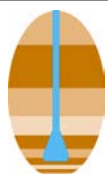
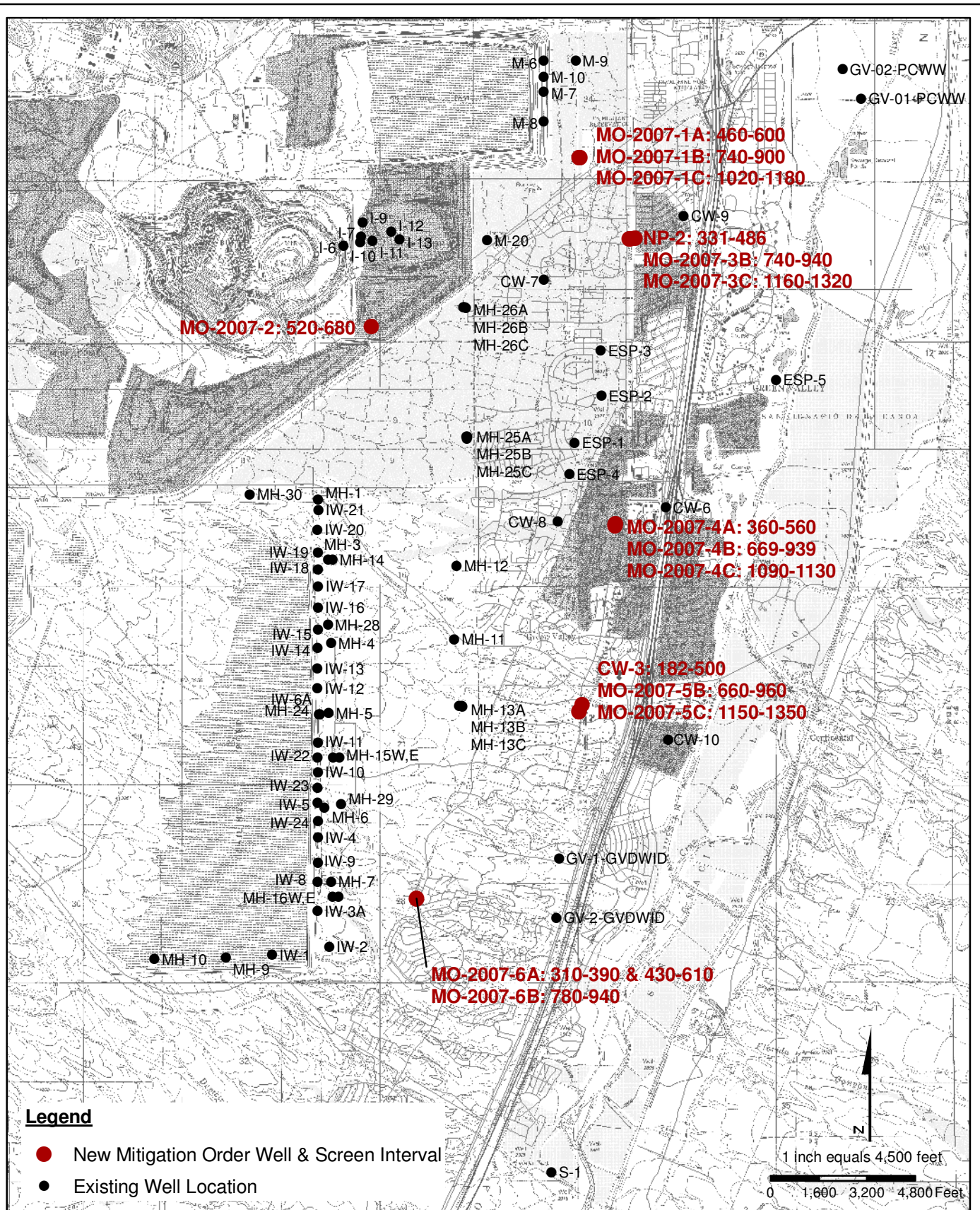
b = Assumed aquifer thickness

c = Well loss constant

n = Well loss exponent

Kh = horizontal hydraulic conductivity calculated as T/b

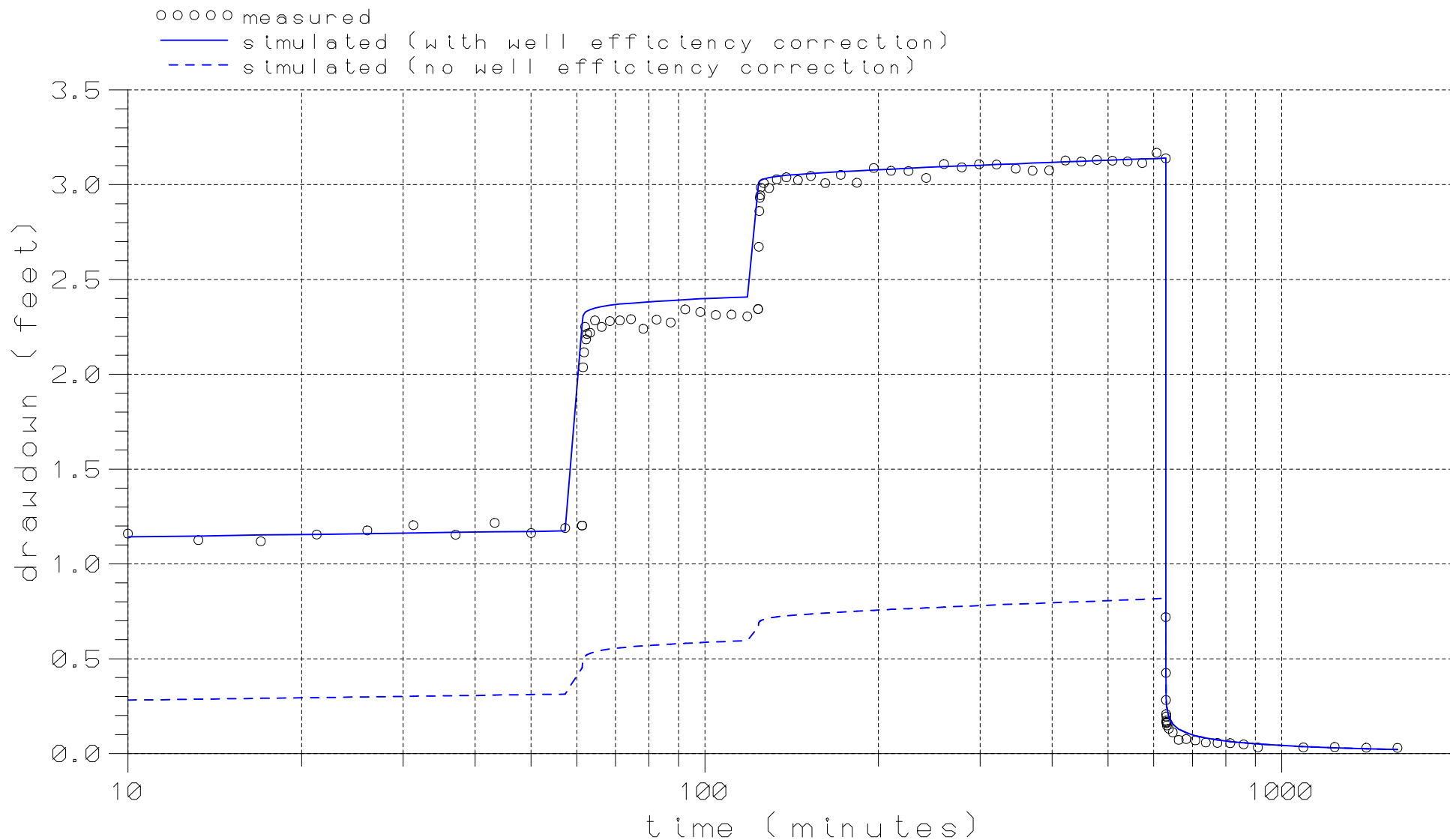
FIGURES



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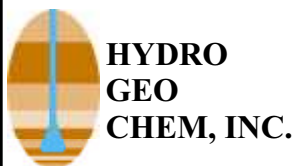
APPROXIMATE LOCATIONS OF WELL NESTS

Approved	Date	Author	Date	File Name	Figure
SS	10/18/07	RAM	10/18/07	7830108G	E.1



RESULTS

Transmissivity = 13000 ft²/day
 Storage coefficient = 0.001
 skin factor = 15
 well loss constant = 0.004
 well loss exponent = 1.52
 aquifer thickness = 110 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-2 DURING PUMPING AT 16.4, 30.5, AND 37.5 GPM SHOWING EFFECT OF WELL EFFICIENCY CORRECTION (analysis using WHIP)

APPROVED

SJS

DATE

10/30/07

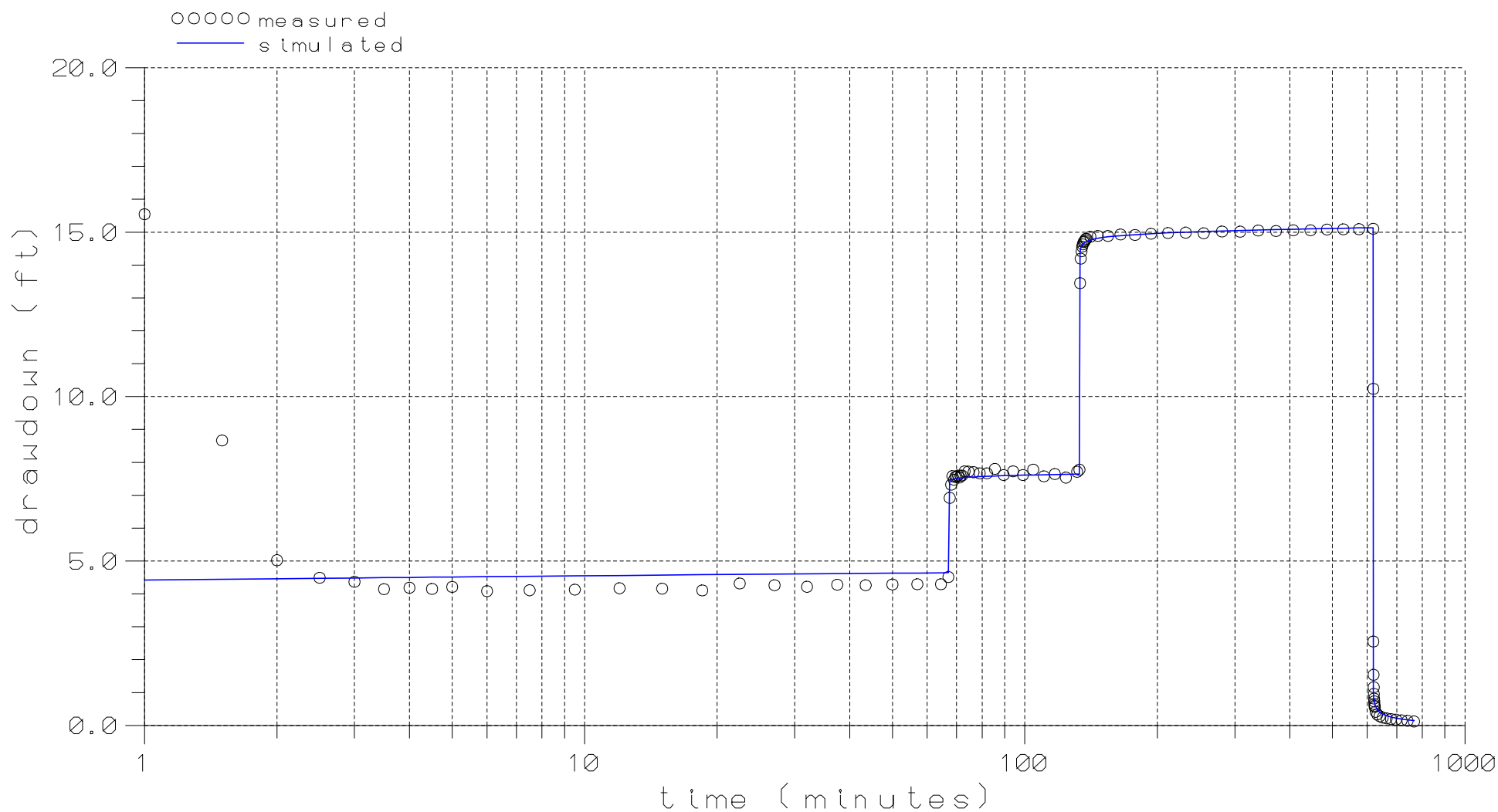
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H:/78300/78306.4/Pumping Tests
 MO-2 Pump Test/whip/mo2eff.srf

FIGURE

E.2

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 20000 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.27
 well loss exponent = 0.96
 assumed aquifer thickness = 755 ft



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MEASURED AND SIMULATED DRAWDOWNS AT MO-1A DURING PUMPING AT 15, 25, AND 50 GPM

(analysis using WHIP)

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SJS

DATE

10/30/07

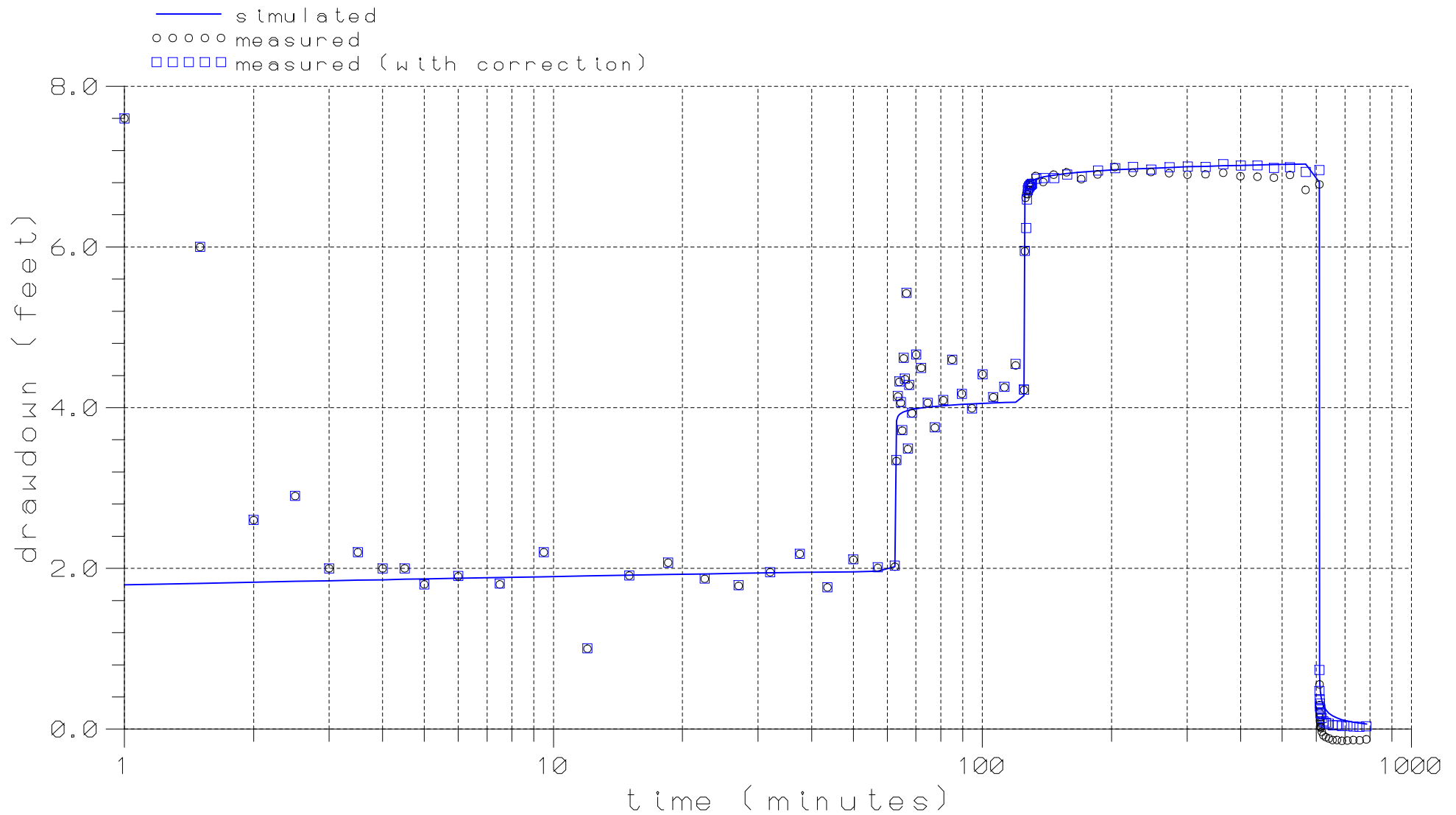
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FIGURE

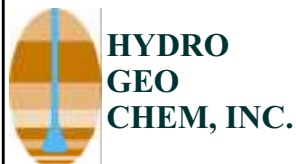
E.3

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 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 25,000 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.036
 well loss exponent = 1.25
 assumed aquifer thickness = 815 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-1B DURING PUMPING AT 16, 30, AND 47.5 GPM (data corrected for regional water level increase and barometric pressure change)

APPROVED

SJS

DATE

10/30/07

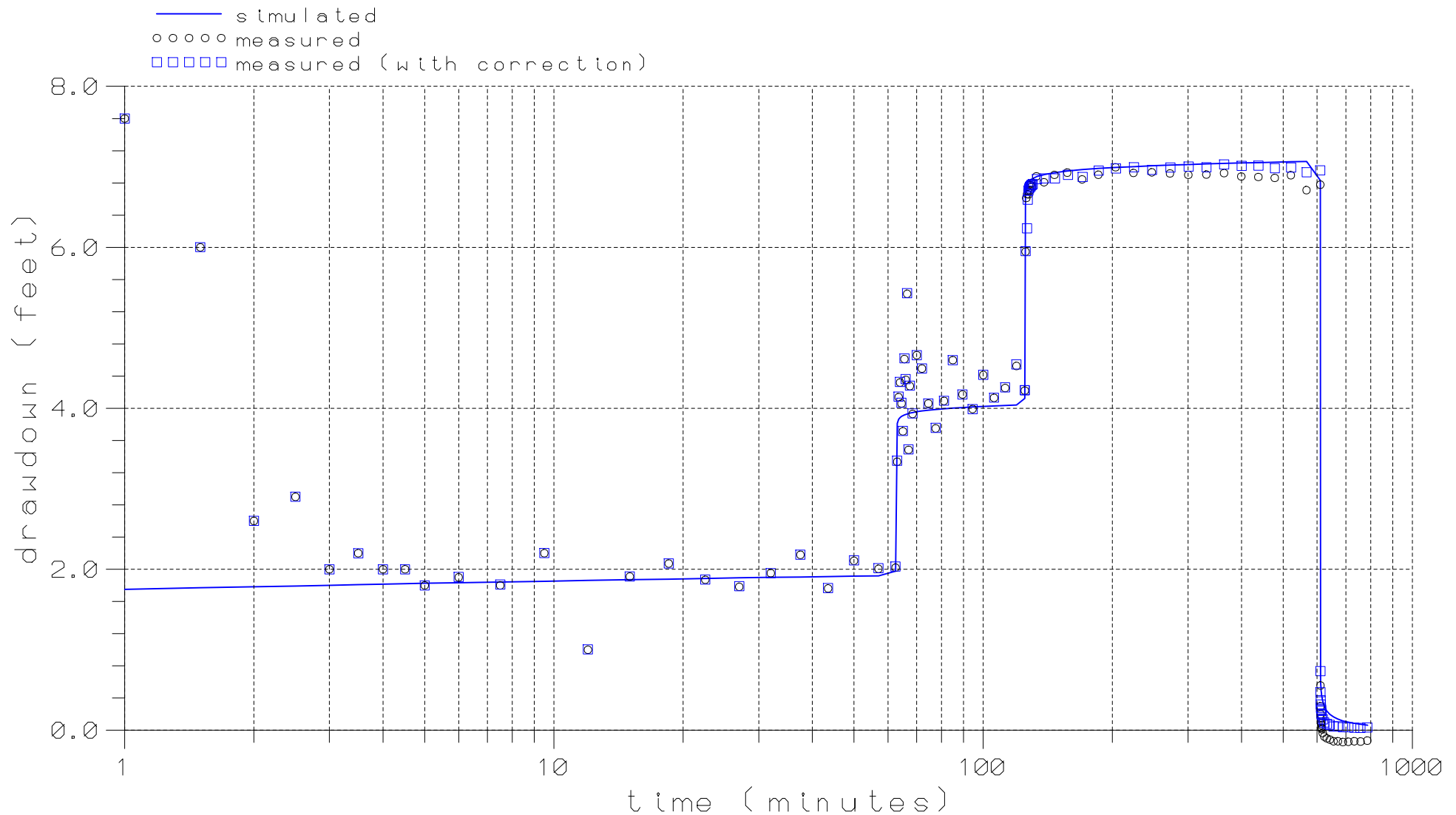
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FIGURE

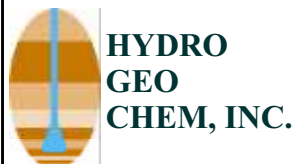
E.4

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 25,000 ft²/day
 Storage coefficient = 0.01
 Vertical Hydraulic Conductivity = 1.0 ft/day
 well loss constant = 0.036
 well loss exponent = 1.27
 assumed aquifer thickness = 815 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-1B DURING PUMPING AT 16, 30, AND 47.5 GPM (data corrected for regional water level increase and barometric pressure change)

APPROVED

SJS

DATE

10/30/07

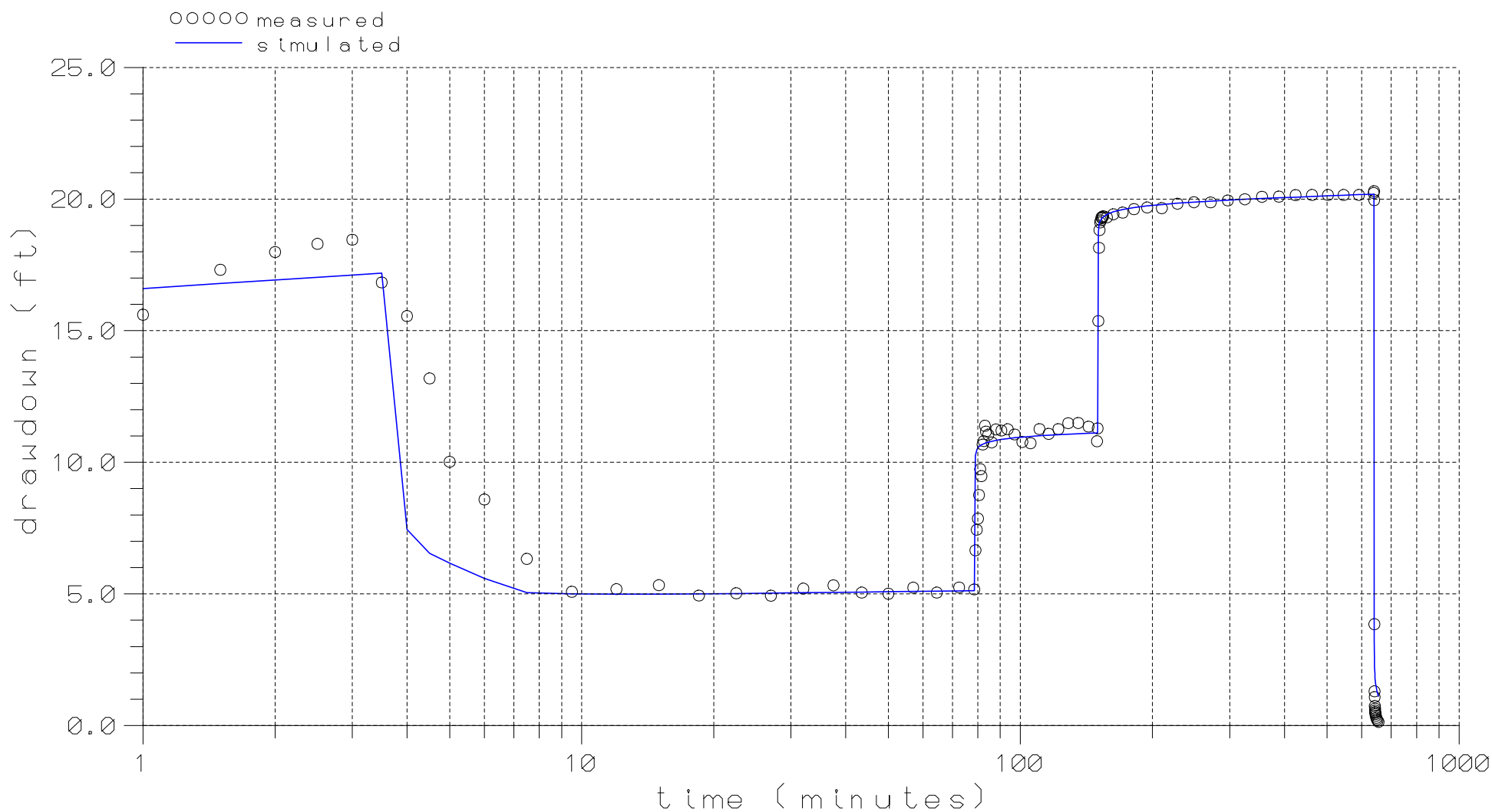
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 MO-1/MO-1B/whip/mo1bc2.srf

FIGURE

E.5

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 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 7000 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.042
 well loss exponent = 1.46
 assumed aquifer thickness = 756 ft



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MEASURED AND SIMULATED DRAWDOWNS AT MO-1C DURING PUMPING AT 16, 30, AND 47.5 GPM (analysis using WHIP)

APPROVED

SJS

DATE

10/30/07

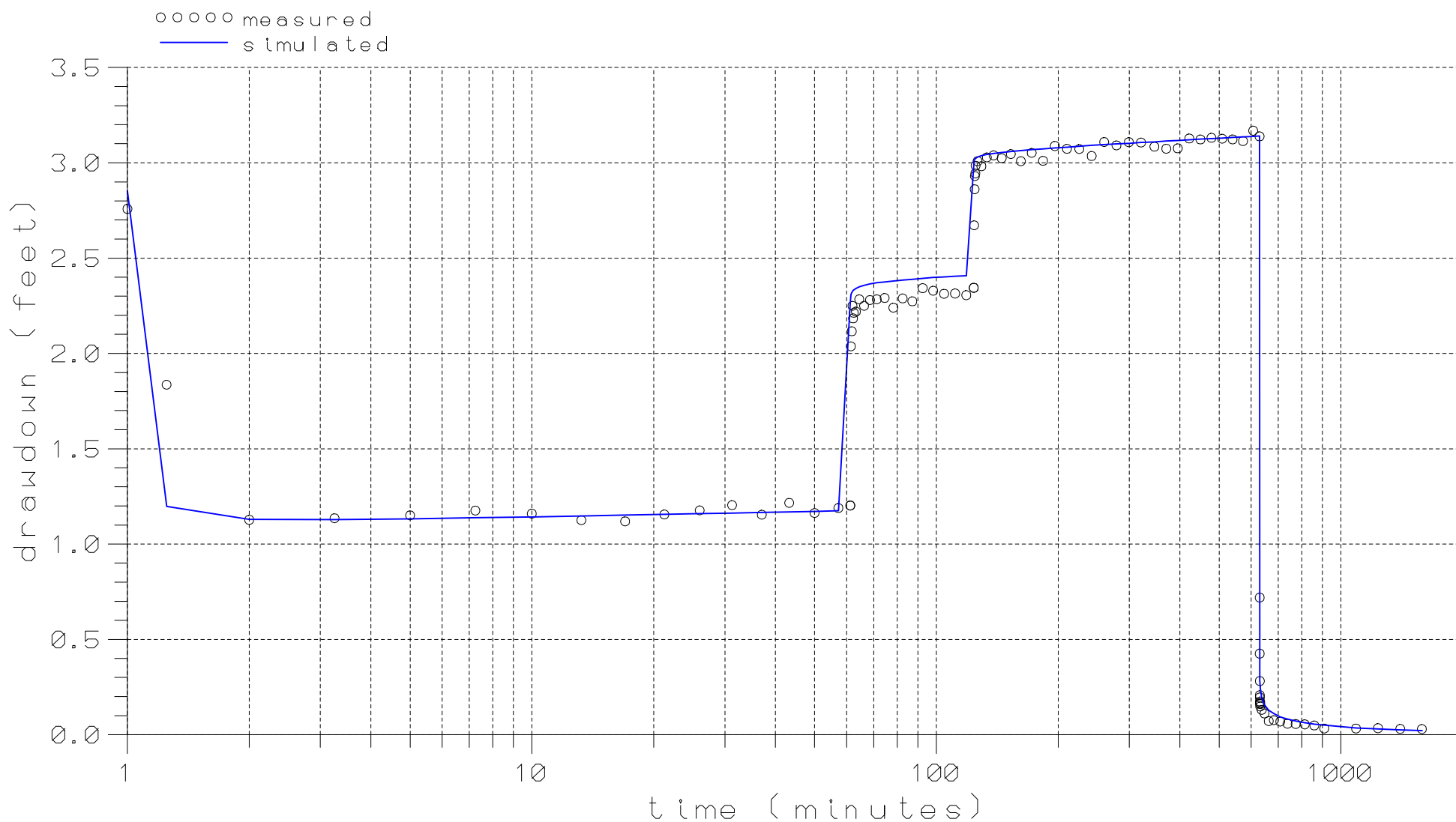
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FIGURE

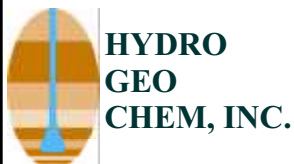
E.6

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 13000 ft²/day
 Storage coefficient = 0.001
 well loss constant = 0.03
 well loss exponent = 1.2
 aquifer thickness = 110 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-2 DURING PUMPING AT 16.4, 30.5, AND 37.5 GPM (analysis using WHIP)

APPROVED

SJS

DATE

10/30/07

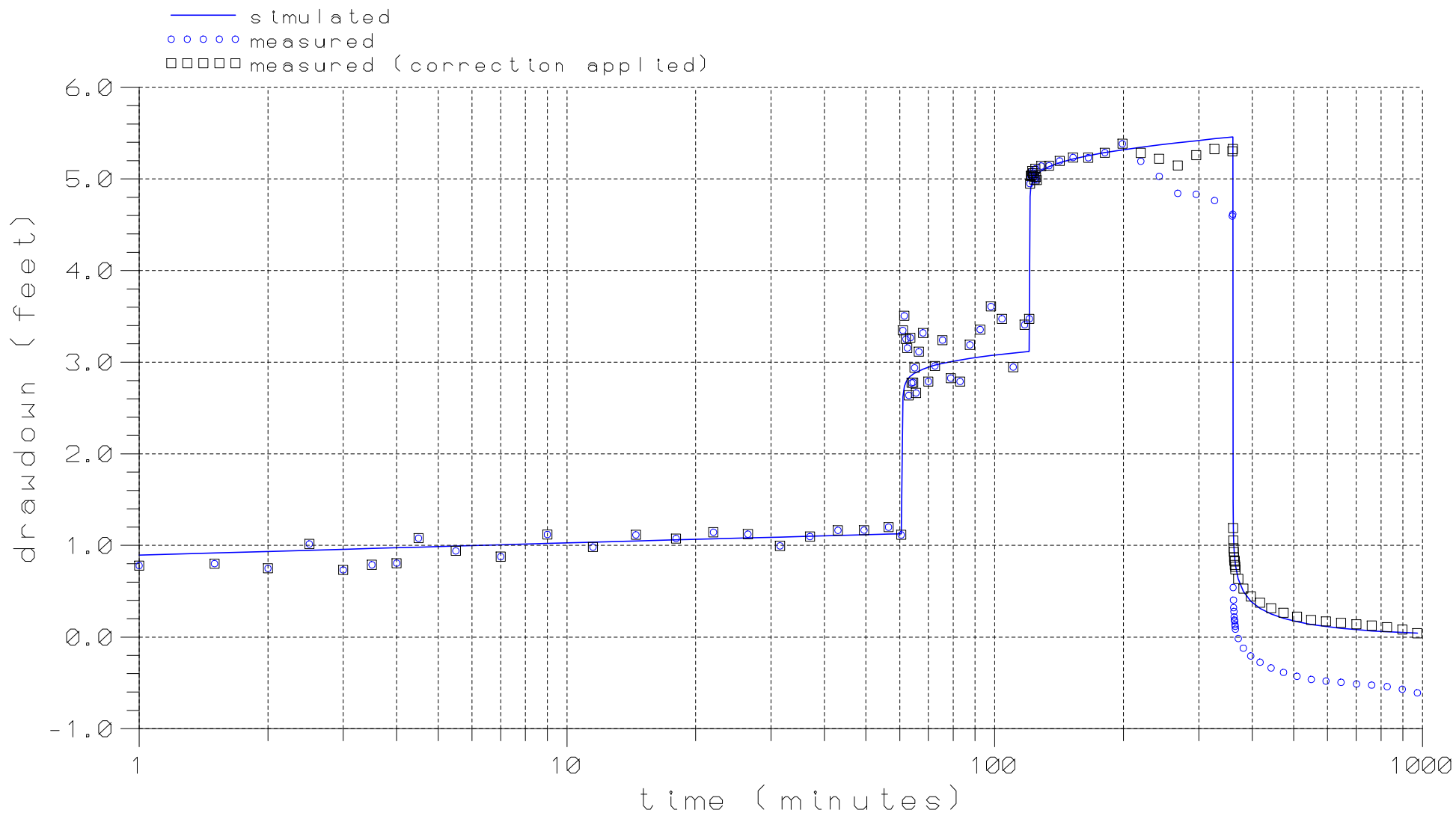
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FIGURE

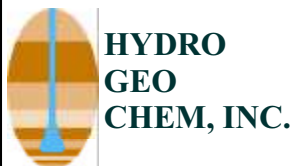
E.7

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 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 17,700 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.02 ft/day
 well loss constant = 0.001
 well loss exponent = 1.88
 assumed aquifer thickness = 1060 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-3B DURING PUMPING AT 14, 33.5, AND 51 GPM (analysis using WHIP)

APPROVED

SJS

DATE

10/30/07

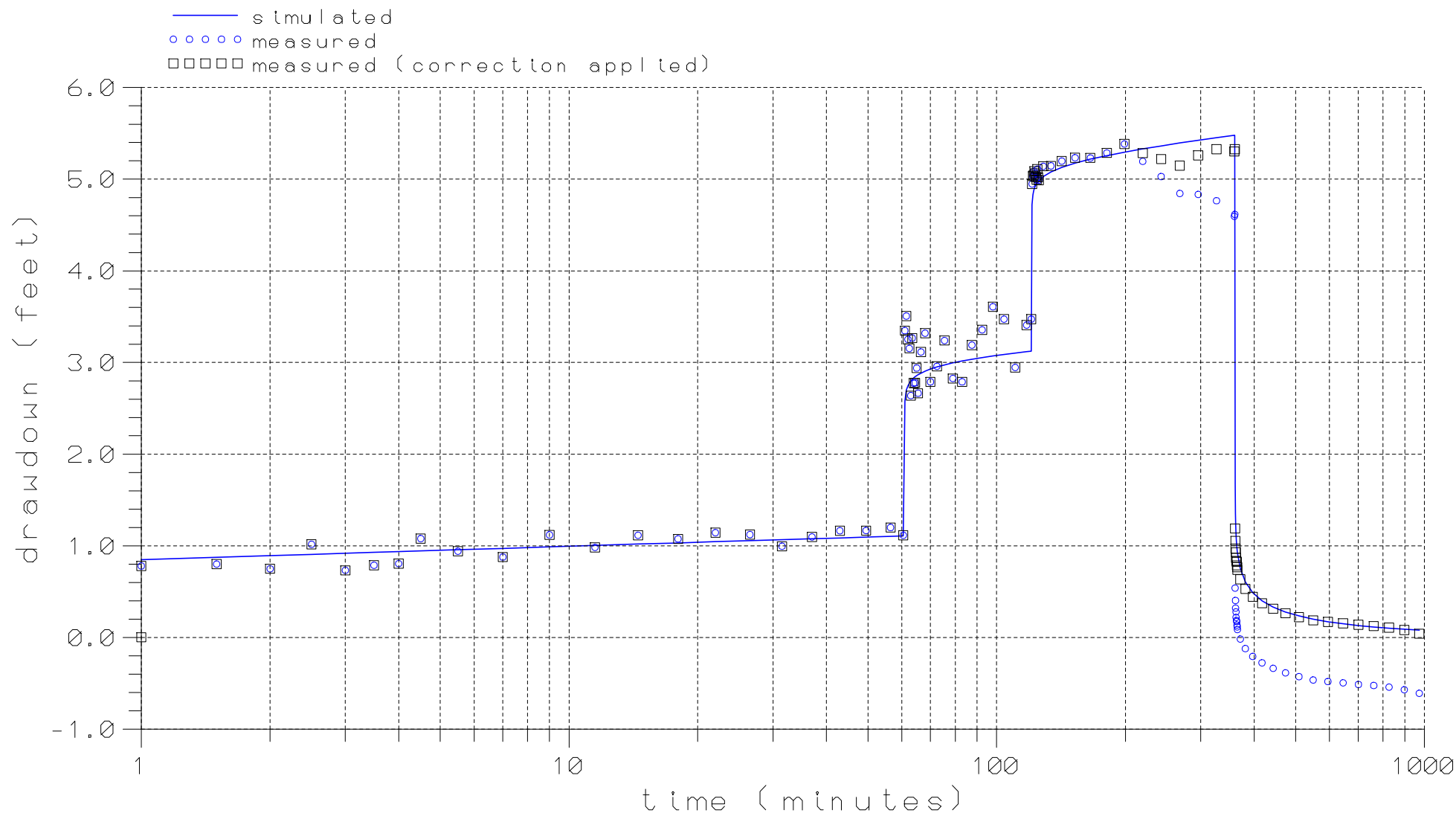
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FIGURE

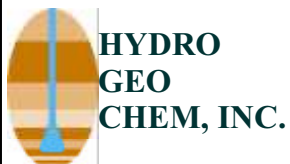
E.8

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 17,700 ft²/day
 Storage coefficient = 0.1
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.006
 well loss exponent = 1.51
 assumed aquifer thickness = 1060 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-3B DURING PUMPING AT 14, 33.5, AND 51 GPM (analysis using WHIP)

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DATE

10/30/07

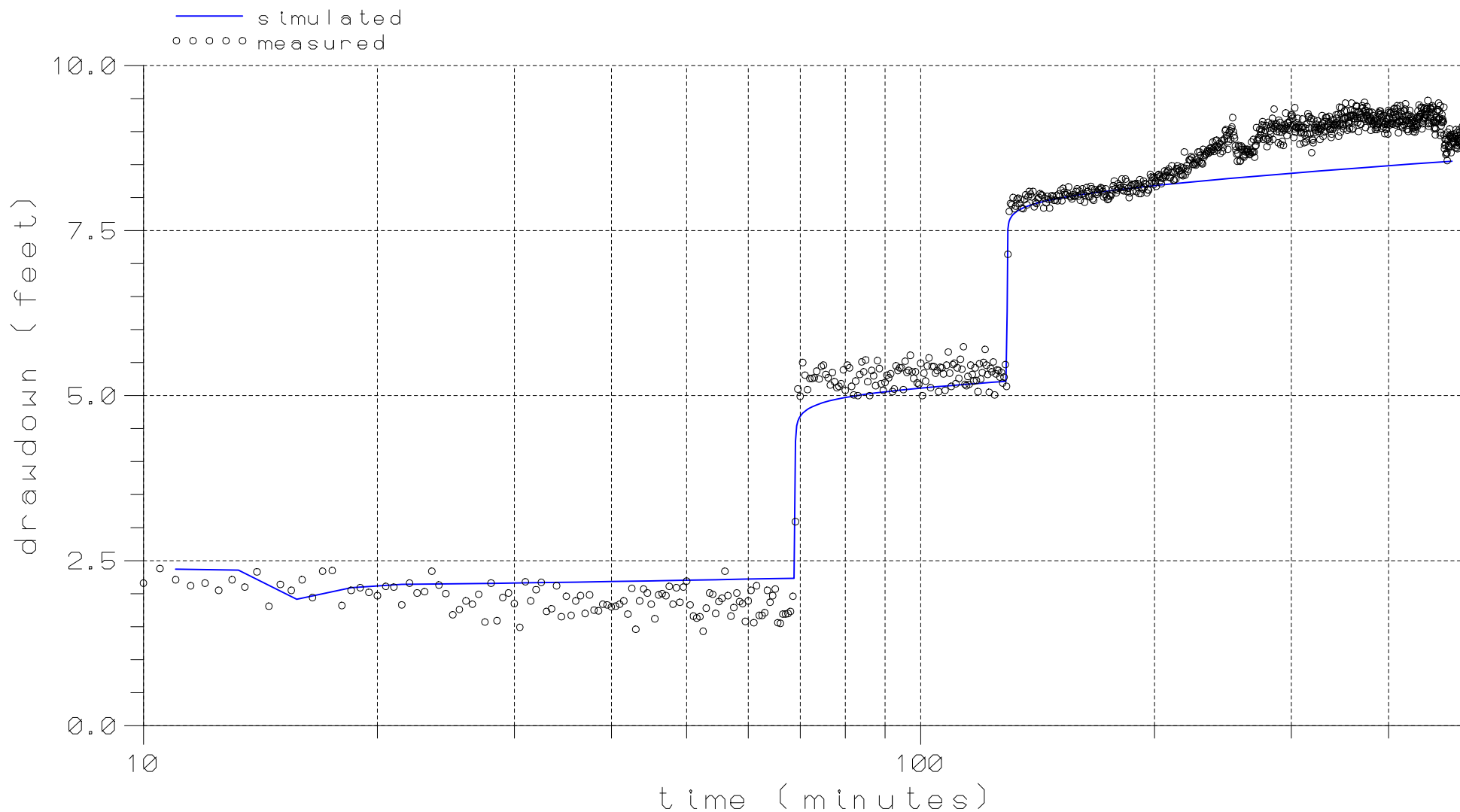
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FIGURE

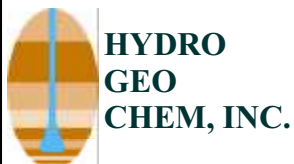
E.9

PRIVILEGED AND CONFIDENTIAL
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RESULTS

Transmissivity = 11600 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 1e-4 ft/day
 well loss constant = 0.001
 well loss exponent = 2.16
 assumed aquifer thickness = 1060 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-3C DURING PUMPING AT 13.8, 27.6, AND 38.3 GPM (analysis using WHIP)

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DATE

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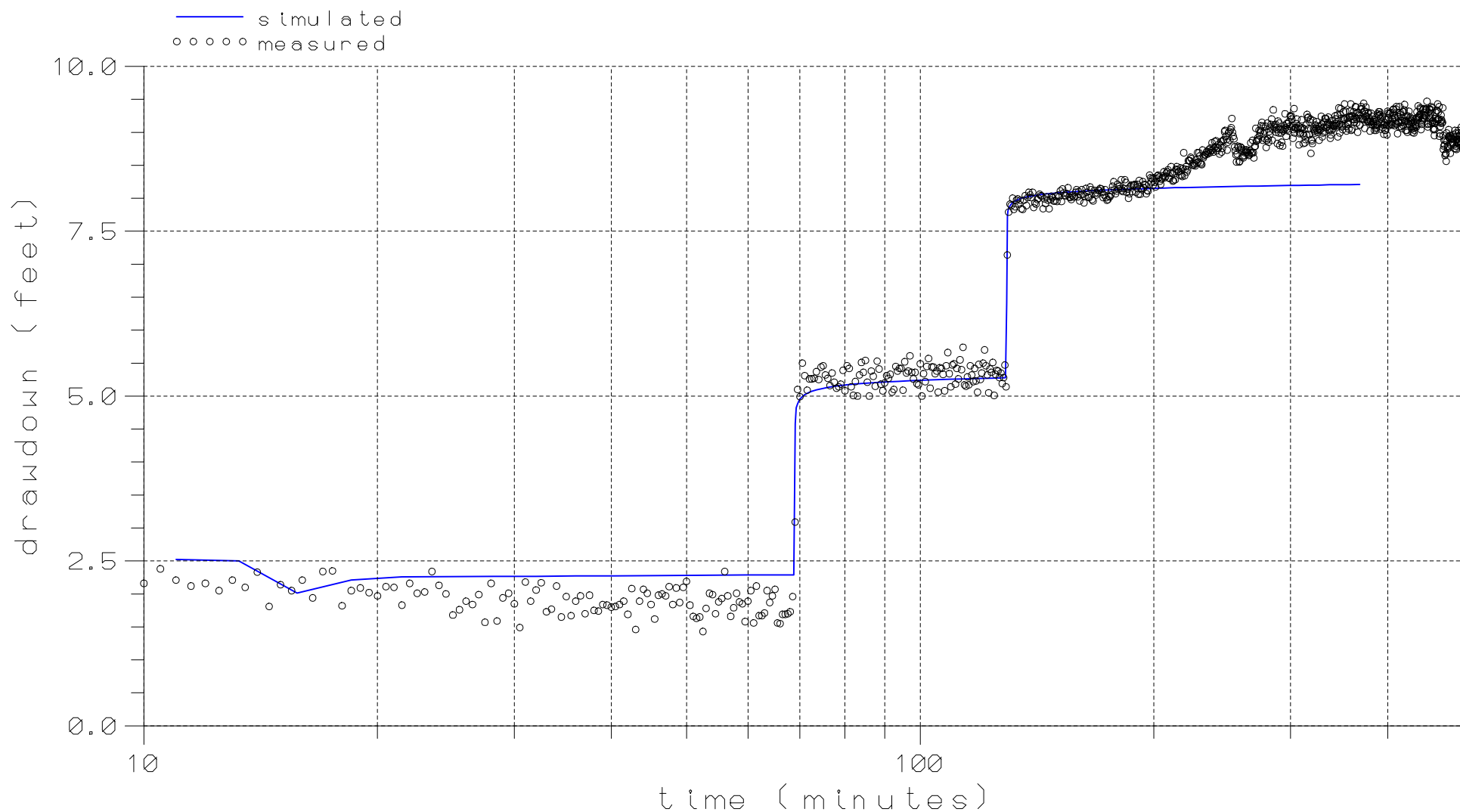
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 MO-3 PumpTest/mo-3c/whip/mo3c.srf

FIGURE

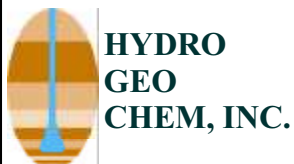
E.10

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RESULTS

Transmissivity = 11,500 ft²/day
 Storage coefficient = 1.6e-4
 Vertical Hydraulic Conductivity = 0.25 ft/day
 well loss constant = 0.001
 well loss exponent = 2.17
 assumed aquifer thickness = 1060 ft



**MEASURED AND SIMULATED DRAWDOWNS AT MO-3C
 DURING PUMPING AT 13.8, 27.6, AND 38.3 GPM
 (based on analysis of first portion of step3)
 (analysis using WHIP)**

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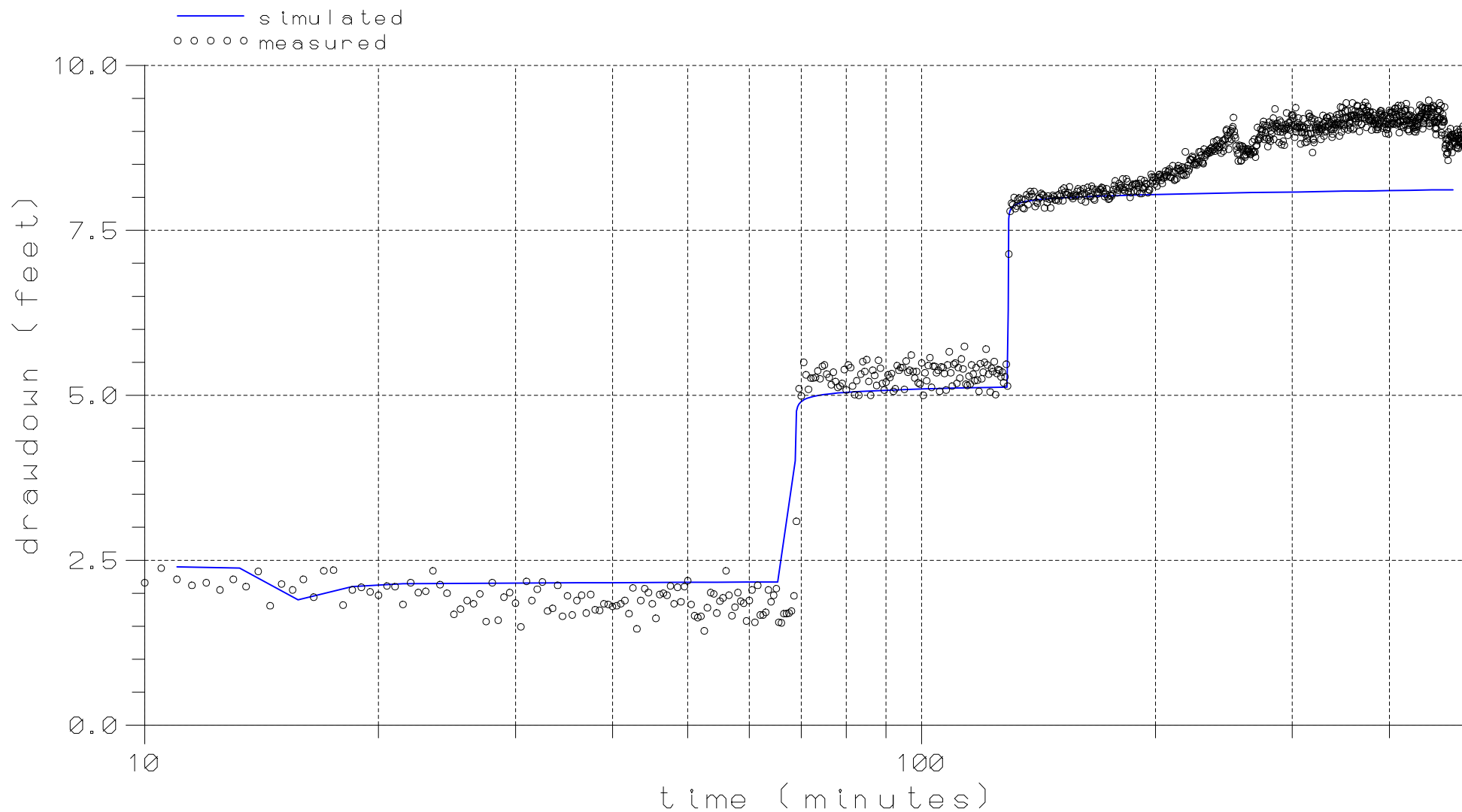
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FIGURE

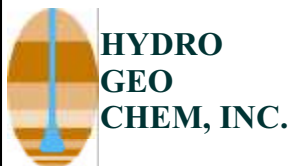
E.11

PRIVILEGED AND CONFIDENTIAL
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RESULTS

Transmissivity = 10,100 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 2.63 ft/day
 well loss constant = 0.001
 well loss exponent = 2.18
 assumed aquifer thickness = 1060 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-3C DURING PUMPING AT 13.8, 27.6, AND 38.3 GPM (analysis using WHIP)

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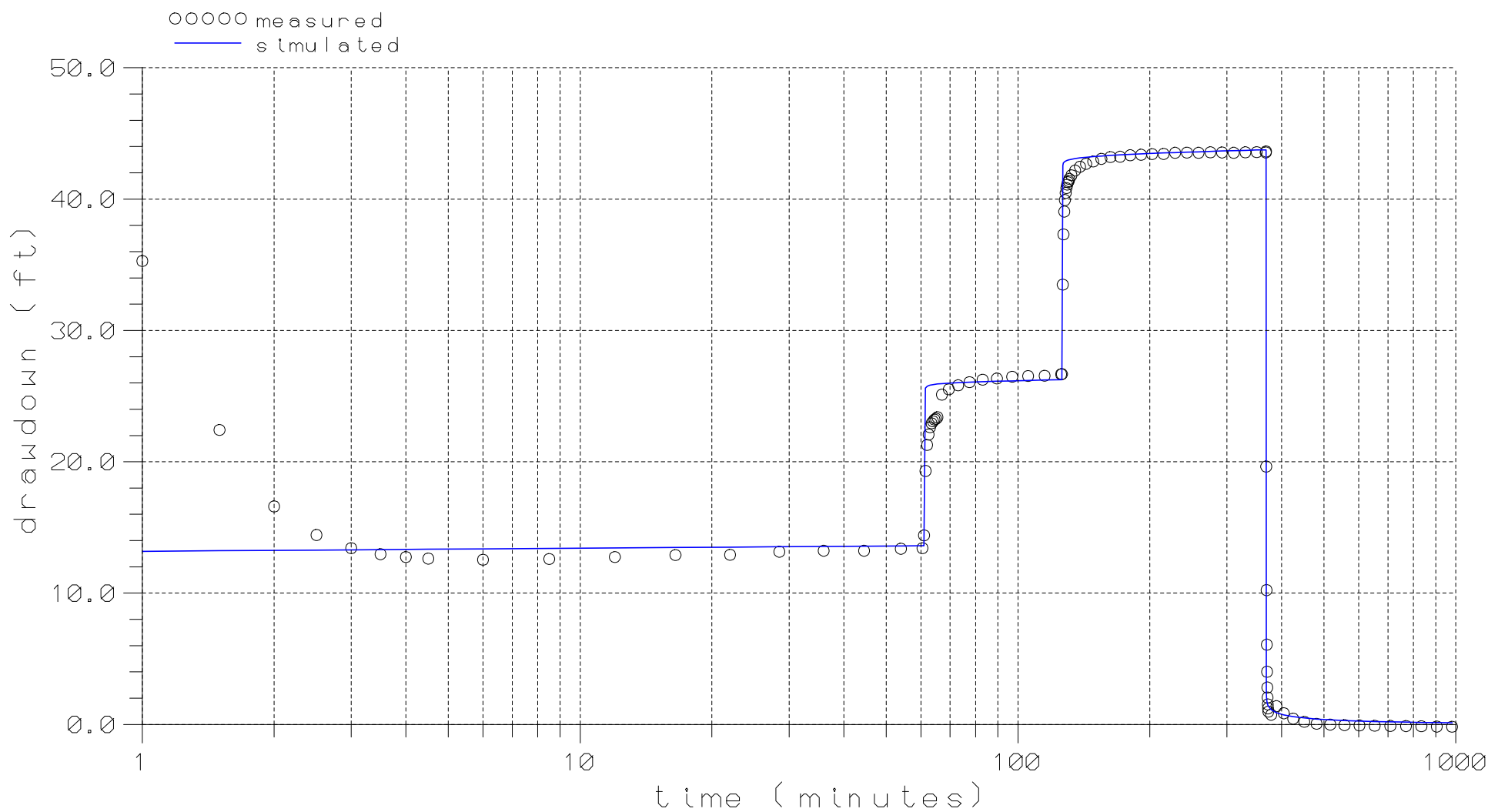
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 MO-3 PumpTest/mo-3c/whip/mo3cl.srf

FIGURE

E.12

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RESULTS

Transmissivity = 7500 ft²/day
 Storage coefficient = 0.005
 Vertical Hydraulic Conductivity = 0.01 ft/day
 well loss constant = 0.90
 well loss exponent = 0.998
 assumed aquifer thickness = 835 ft



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MEASURED AND SIMULATED DRAWDOWNS AT MO-4A DURING PUMPING AT 13.5, 26, AND 43 GPM (analysis using WHIP)

APPROVED

SJS

DATE

10/30/07

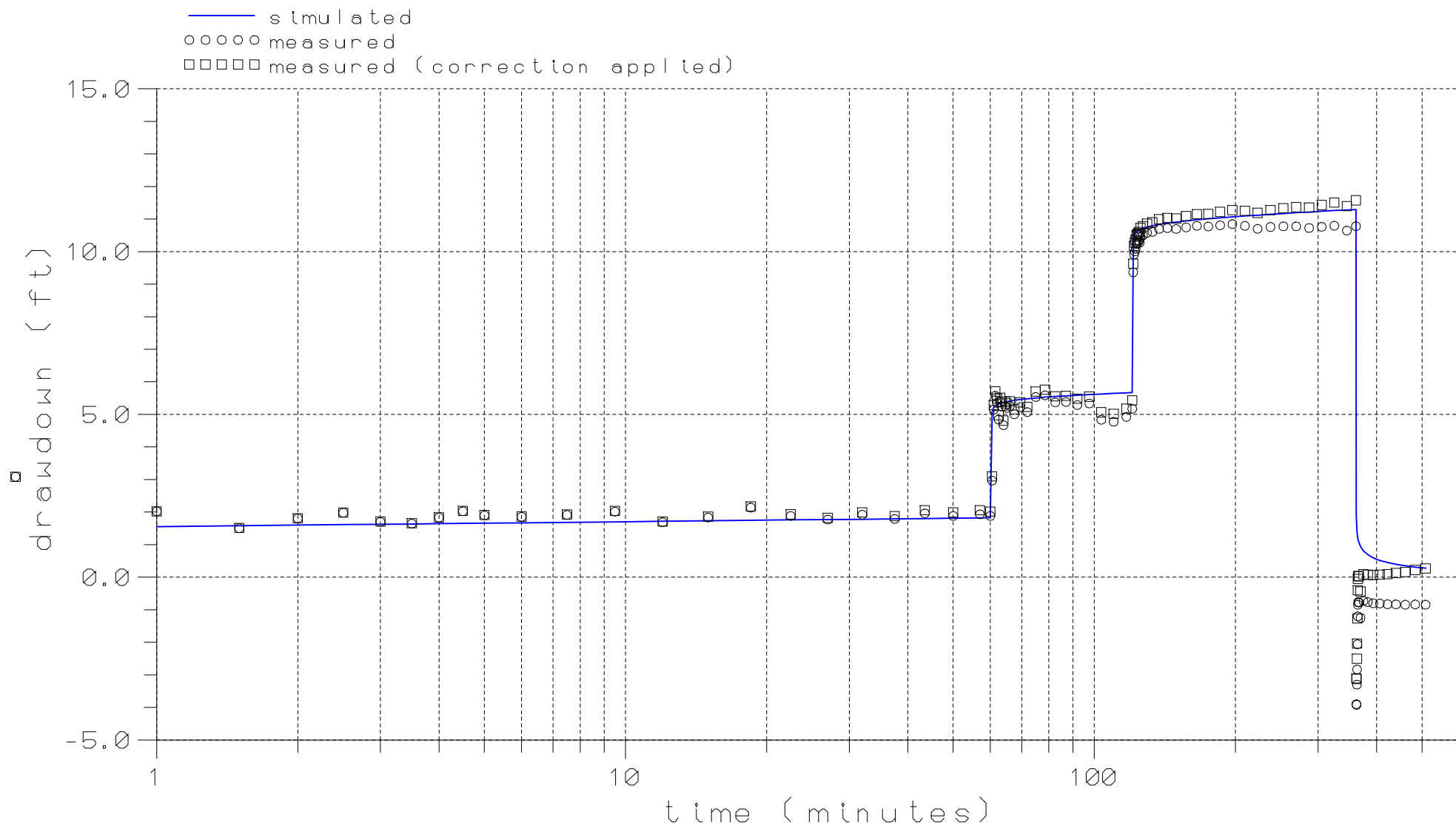
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MO-4/MO-4A/whip/mo4a.srf

FIGURE

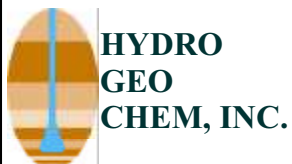
E.13

PRIVILEGED AND CONFIDENTIAL
Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 10,000 ft²/day
 Storage coefficient = 0.005
 Vertical Hydraulic Conductivity = 0.01 ft/day
 well loss constant = 0.0169
 well loss exponent = 1.52
 assumed aquifer thickness = 830 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-4B DURING PUMPING AT 13, 31.5, AND 52 GPM (corrected for regional water level change) (analysis using WHIP)

APPROVED

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DATE

10/30/07

REFERENCE

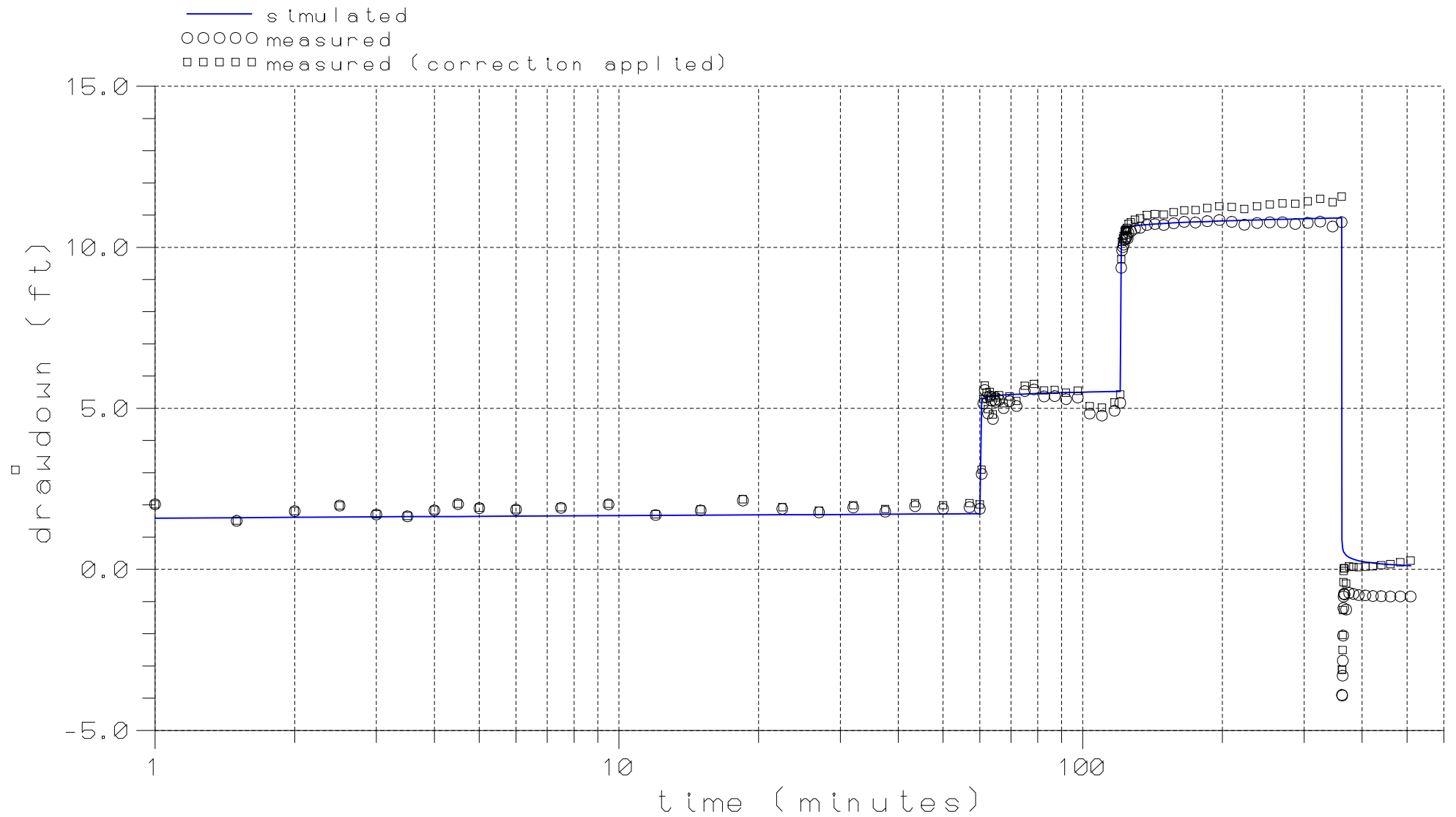
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FIGURE

E.14

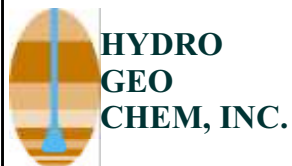
PRIVILEGED AND CONFIDENTIAL

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RESULTS

Transmissivity = 20,000 ft²/day
 Storage coefficient = 0.005
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.0318
 well loss exponent = 1.42
 assumed aquifer thickness = 830 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-4B DURING PUMPING AT 13, 31.5, AND 52 GPM (analysis using WHIP)

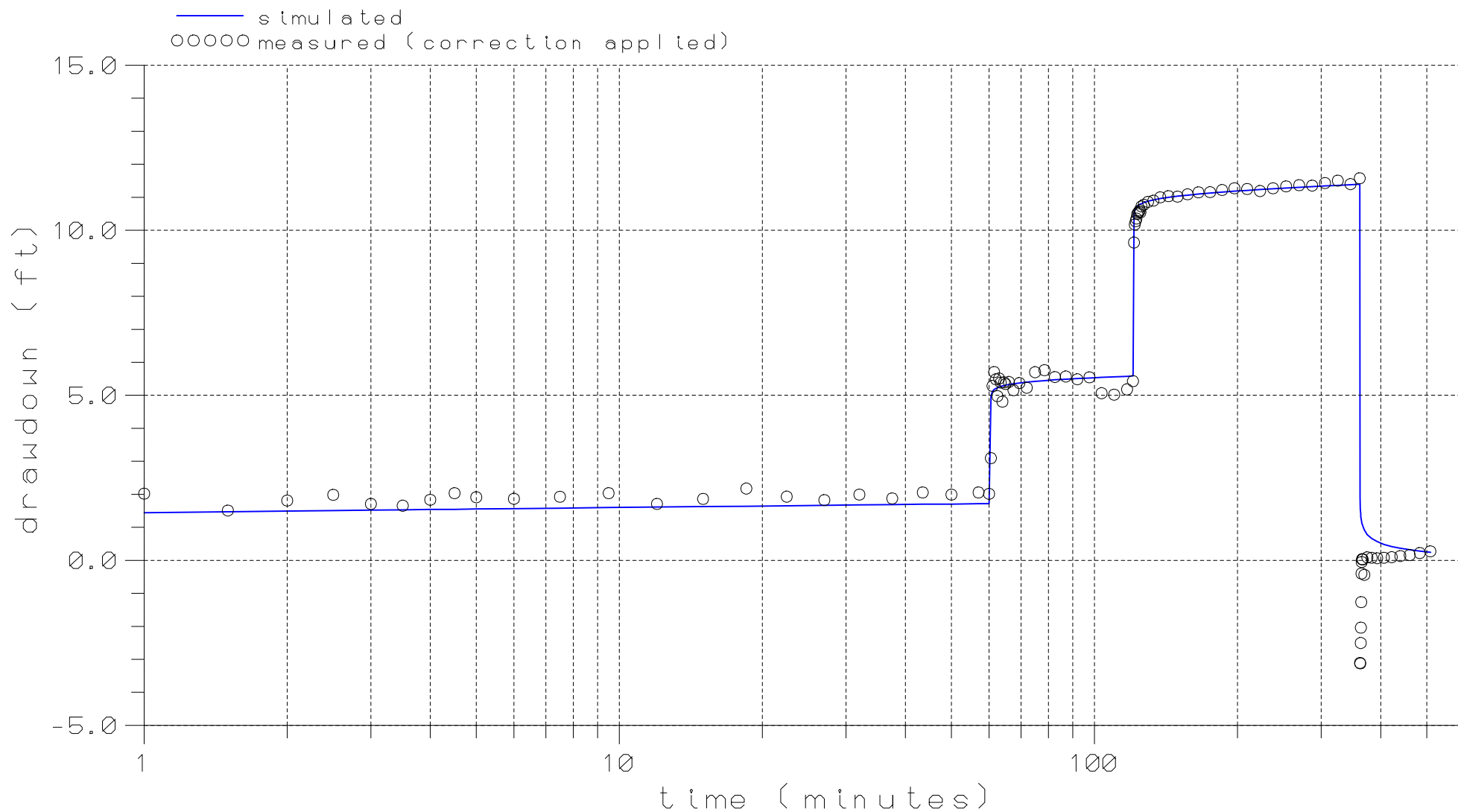
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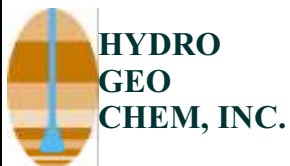
FIGURE
E.15

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RESULTS

Transmissivity = 10,000 ft²/day
 Storage coefficient = 0.1
 Vertical Hydraulic Conductivity = 1.0 ft/day
 well loss constant = 0.017
 well loss exponent = 1.55
 assumed aquifer thickness = 835 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-4B DURING PUMPING AT 13, 31.5, AND 52 GPM (corrected for regional water level change) (analysis using WHIP)

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SJS

DATE

10/30/07

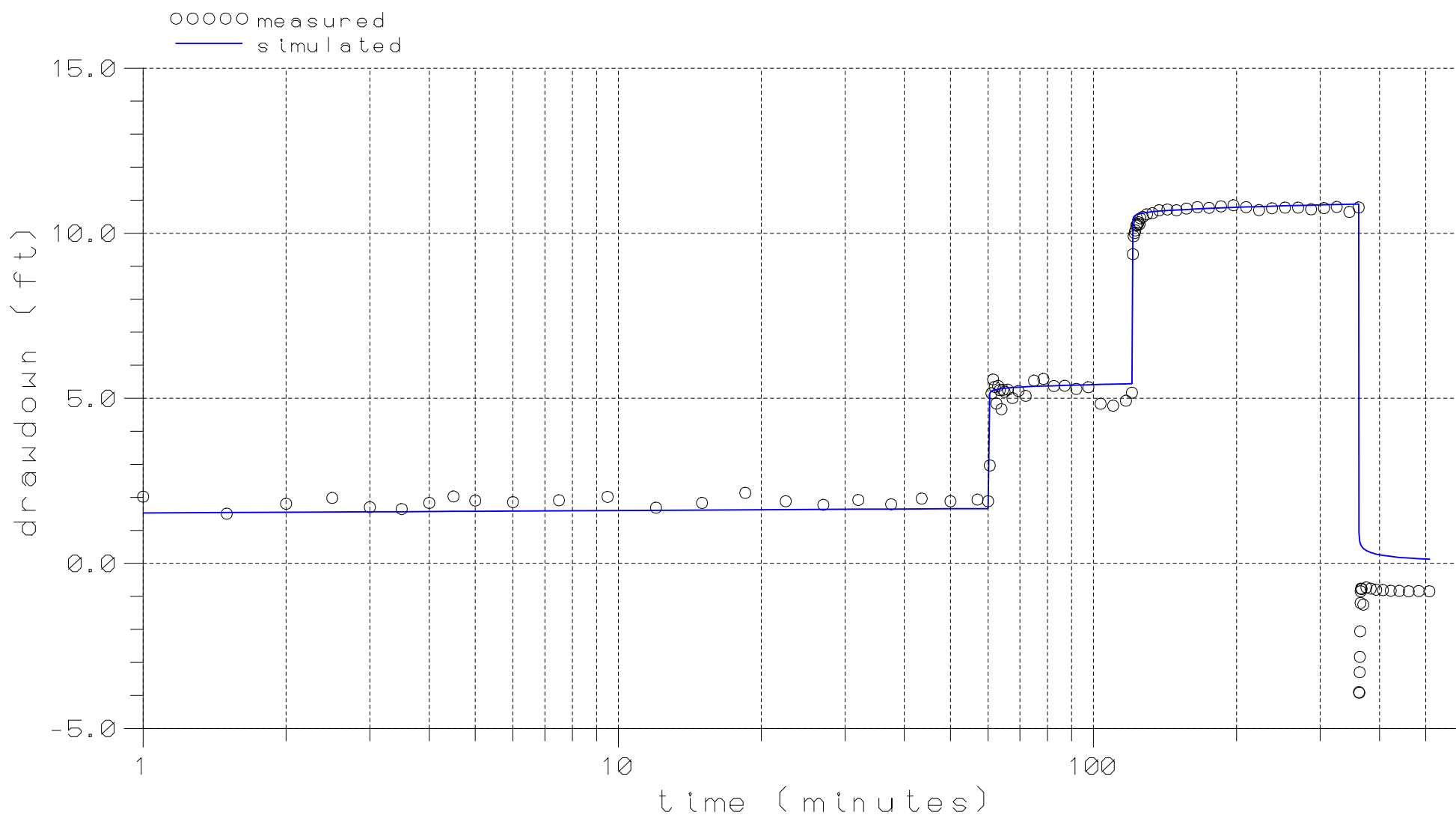
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H:/78300/78306.4/
 MO-4/MO-4B/whip/mo4bc2.srf

FIGURE

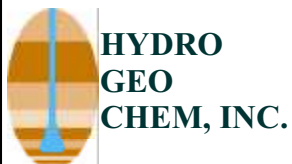
E.16

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 20,000 ft²/day
 Storage coefficient = 0.1
 Vertical Hydraulic Conductivity = 1.0 ft/day
 well loss constant = 0.0318
 well loss exponent = 1.43
 assumed aquifer thickness = 830 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-4B DURING PUMPING AT 13, 31.5, AND 52 GPM (analysis using WHIP)

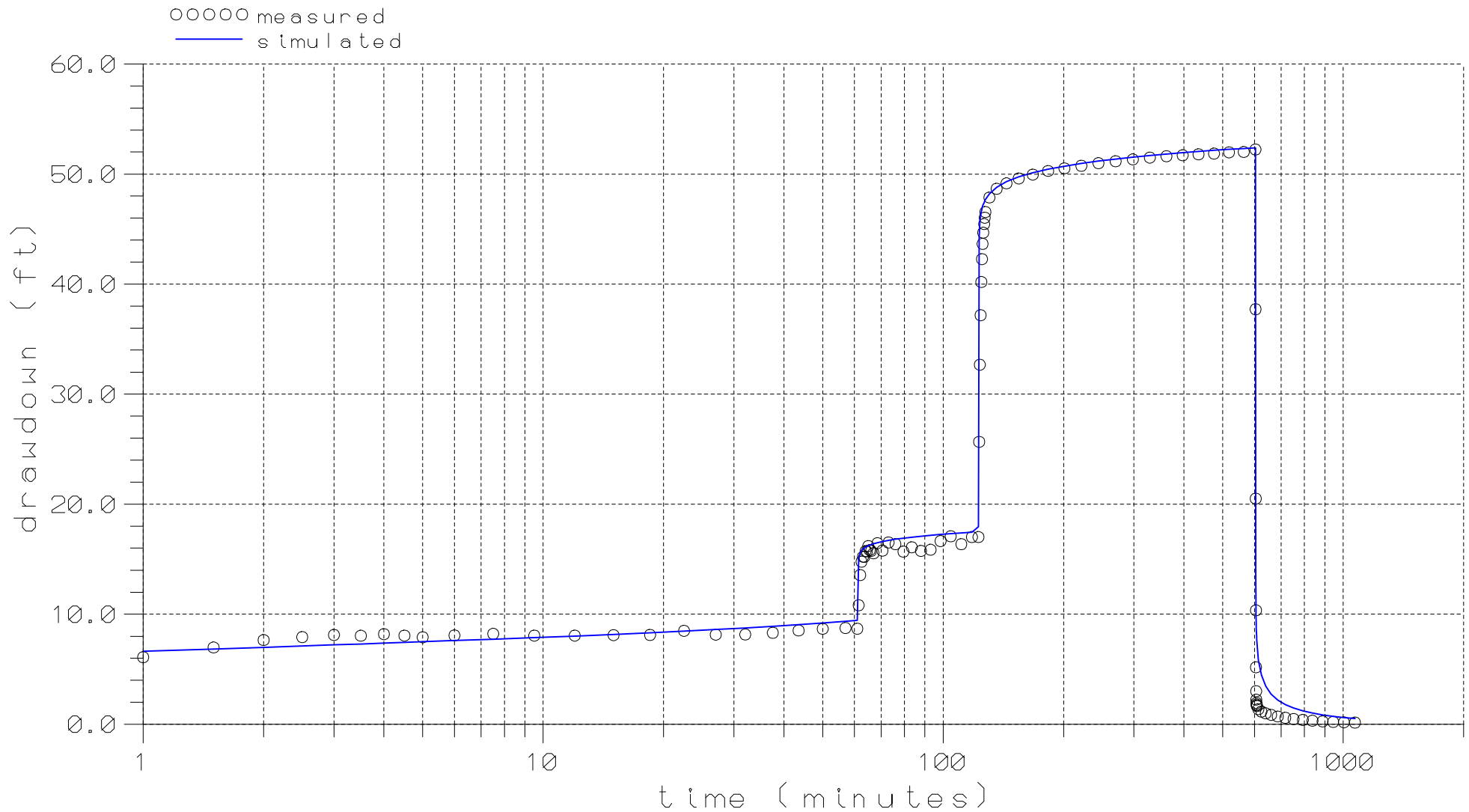
APPROVED
SJS

DATE
10/30/07

REFERENCE H:/78300/78306.4/
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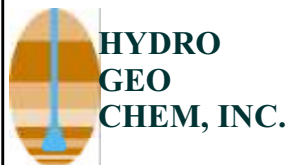
FIGURE
E.17

PRIVILEGED AND CONFIDENTIAL
Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 8680 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.0114 ft/day
 well loss constant = 8.e-5
 well loss exponent = 3.02
 assumed aquifer thickness = 835 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-4C DURING PUMPING AT 15-16.5, 28, AND 60 GPM (analysis using WHIP)

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DATE

10/30/07

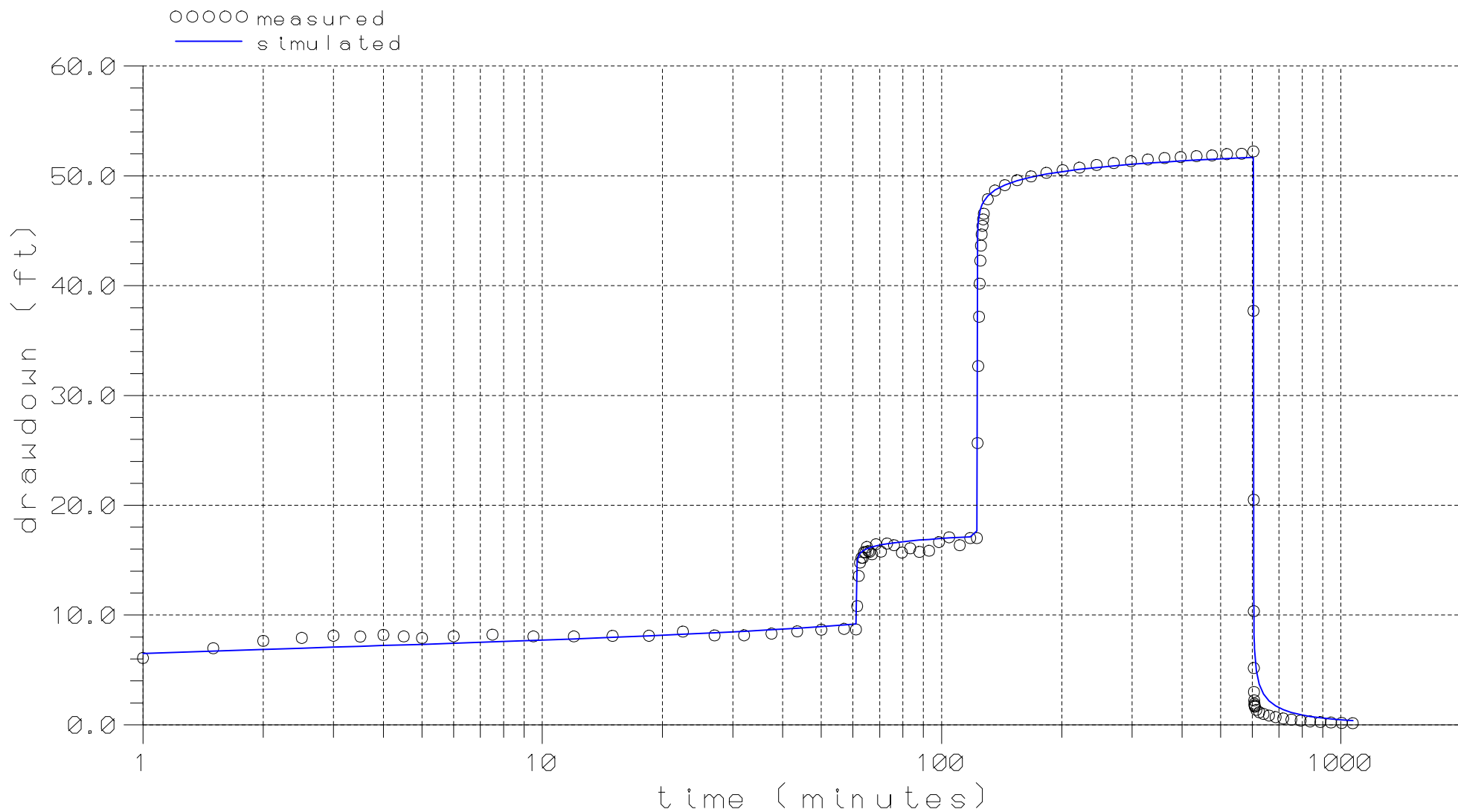
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H:/78300/78306.4/
MO-4/MO-4C/whip/mo4c.srf

FIGURE

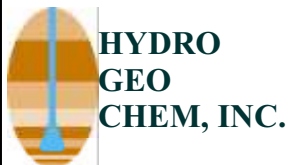
E.18

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 9000 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.02 ft/day
 well loss constant = 1.8e-4
 well loss exponent = 2.82
 assumed aquifer thickness = 835 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-4C DURING PUMPING AT 15-16.5, 28, AND 60 GPM (analysis using WHIP)

APPROVED

SJS

DATE

10/30/07

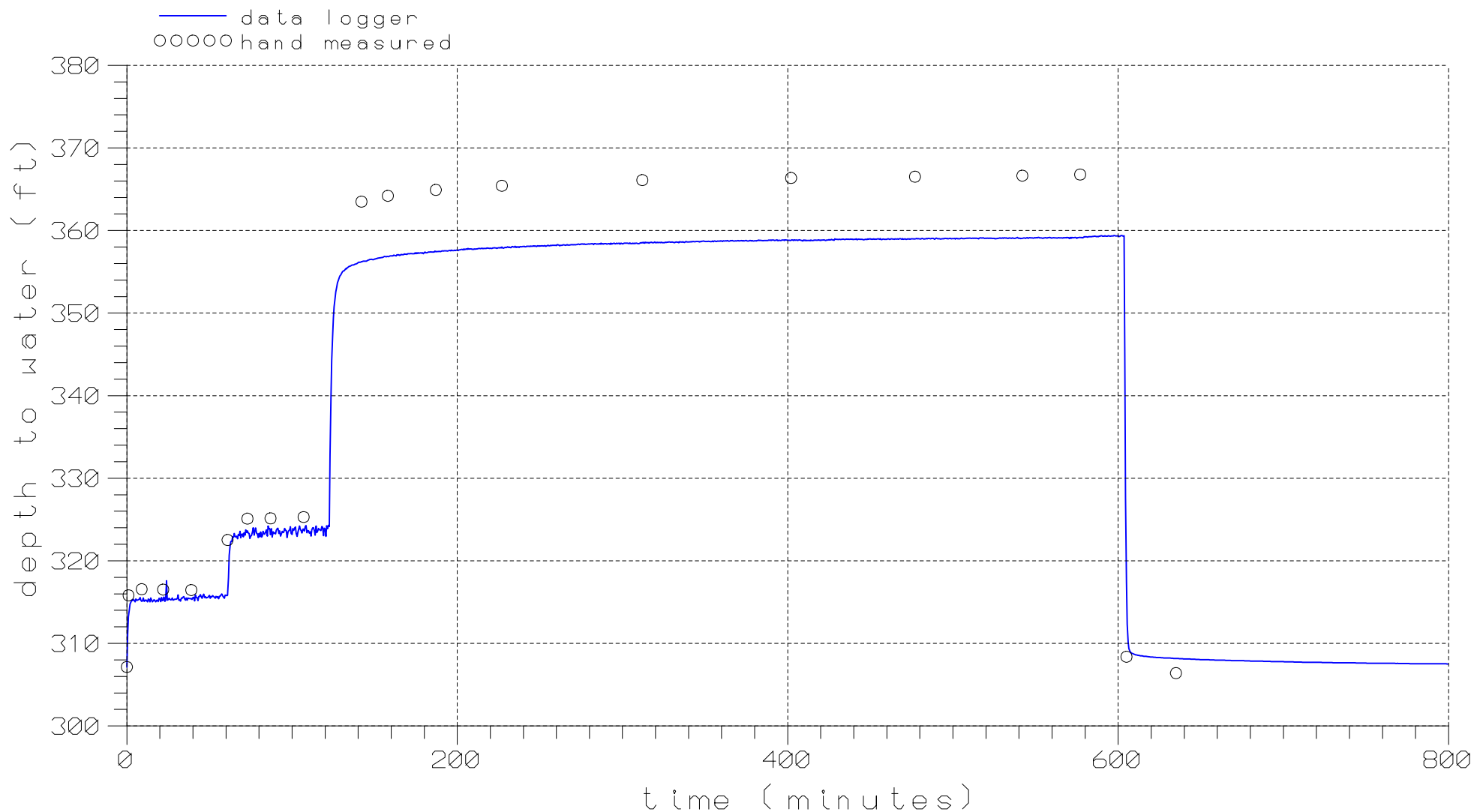
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H:/78300/78306.4/
MO-4/MO-4C/whip/mo4c2.srf

FIGURE

E.19

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Prepared at the Direction of Legal Counsel



**HYDRO
GEO
CHEM, INC.**

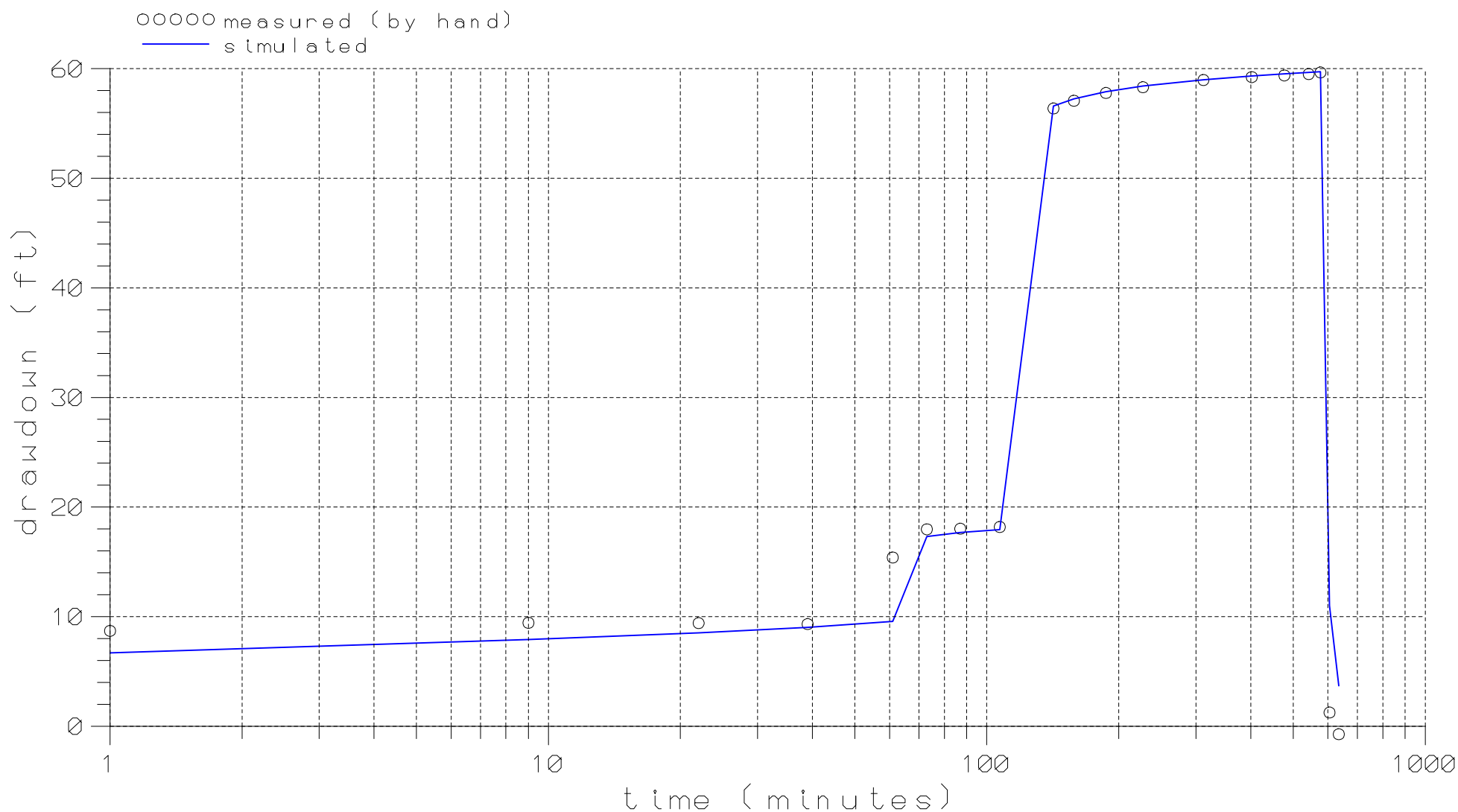
**COMPARISON OF DEPTHS TO WATER AT MO-4C
MEASURED BY HAND (USING A SOUNDER) AND
COMPUTED FROM AUTOMATICALLY LOGGED DATA
(analysis using WHIP)**

APPROVED
SJS

DATE
10/30/07

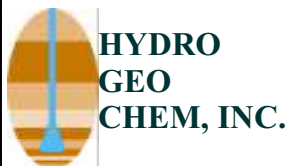
REFERENCE
H:/78300/78306.4/
MO-4/MO-4C/whip/mo4dtw.srf

FIGURE
E.20



RESULTS

Transmissivity = 8680 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.0114 ft/day
 well loss constant = 8.4e-5
 well loss exponent = 3.09
 assumed aquifer thickness = 835 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-4C DURING PUMPING AT 15-16.5, 28, AND 60 GPM (HAND COLLECTED DATA) (analysis using WHIP)

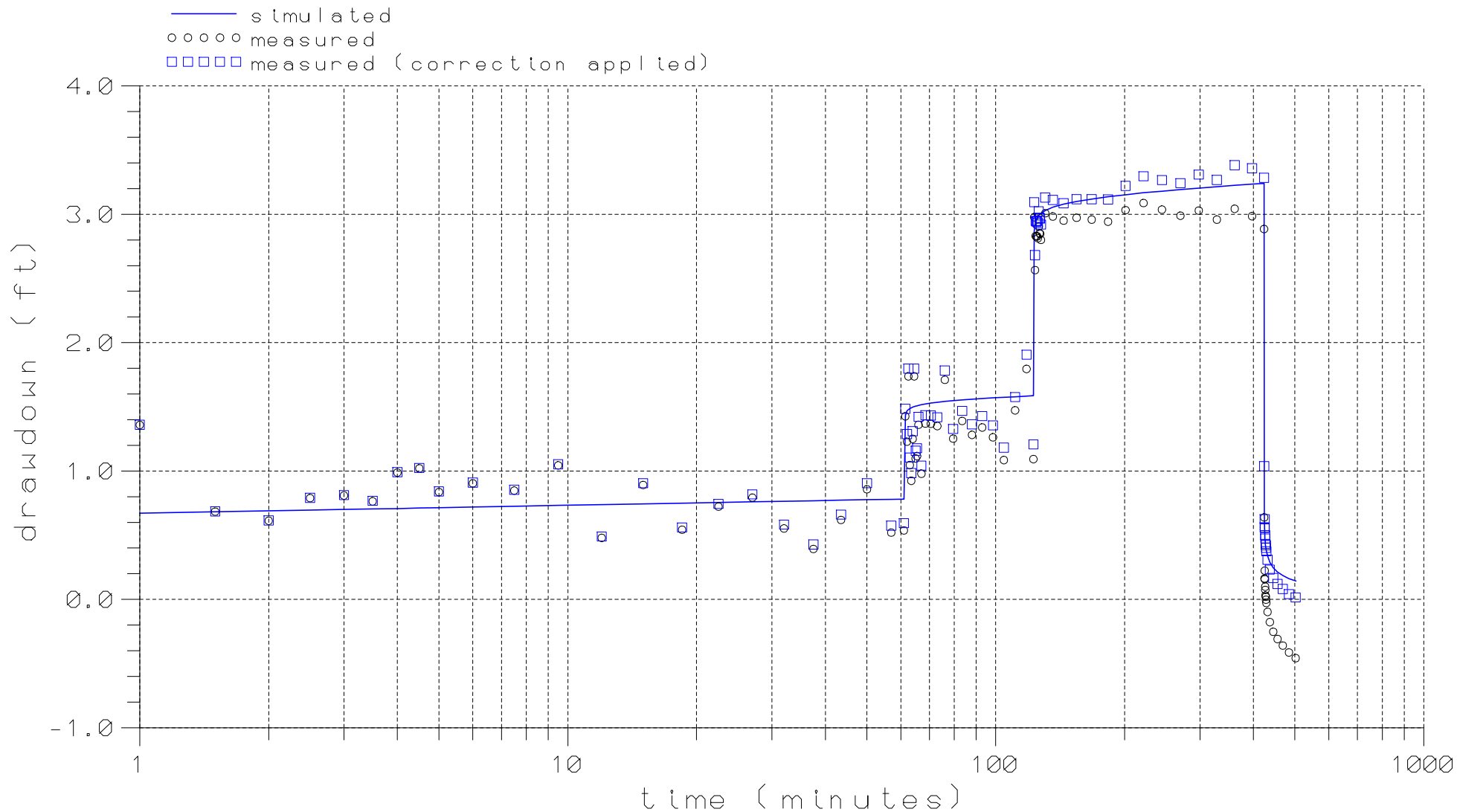
APPROVED
SJS

DATE
10/30/07

REFERENCE
H:/78300/78306.4/
MO-4/MO-4C/whip/mo4ch.srf

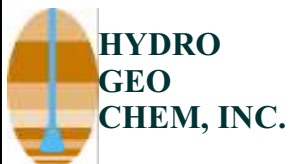
FIGURE
E.21

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 31,200 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.01 ft/day
 well loss constant = 0.0091
 well loss exponent = 1.27
 assumed aquifer thickness = 1085 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-5B
DURING PUMPING AT 16, 30, AND 55 GPM
(with linear correction for regional water level change)
(analysis using WHIP)

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DATE

10/30/07

REFERENCE

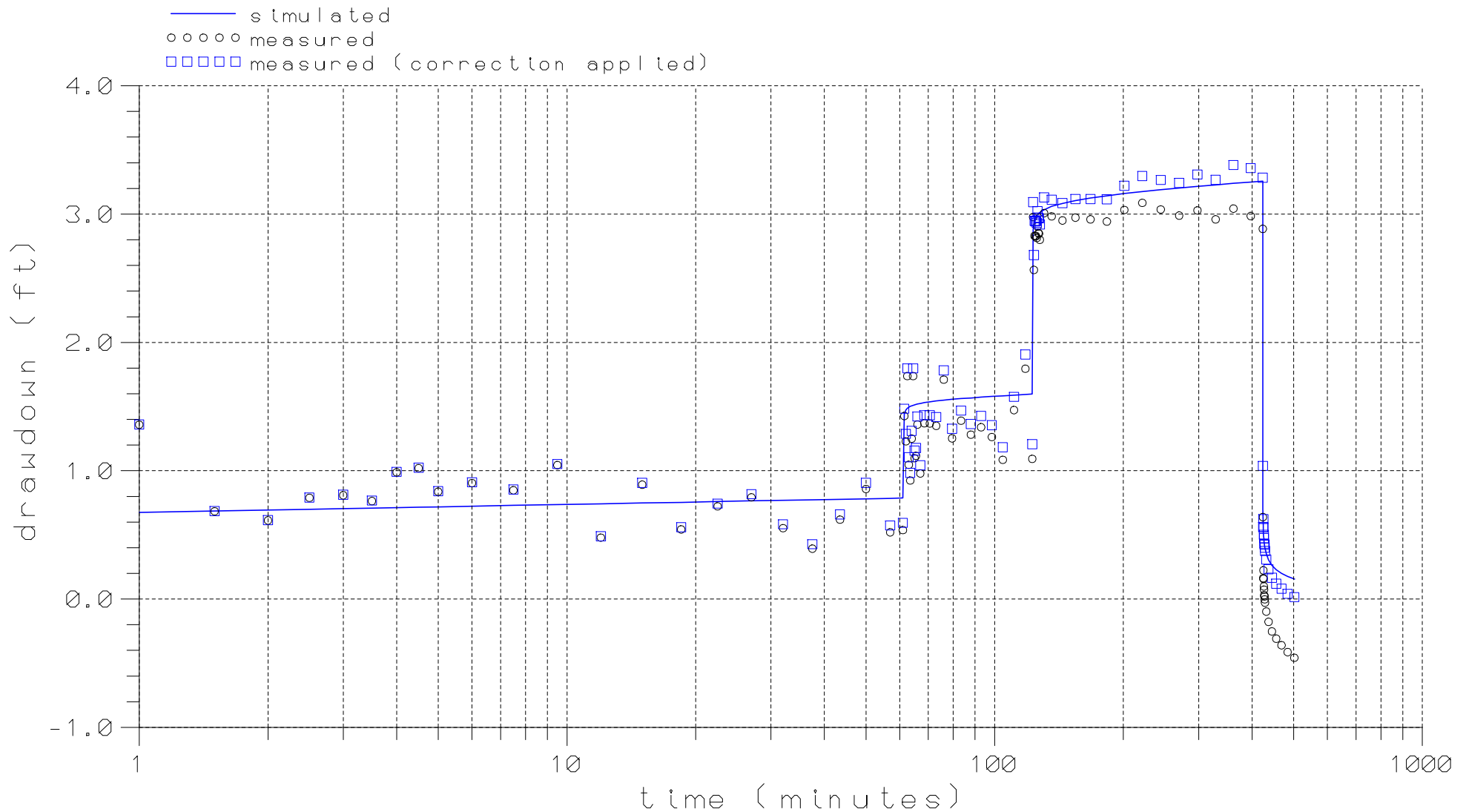
H:/78300/78306.4/
MO-5/MO-5B/whip/mo5bcor.srf

FIGURE

E.22

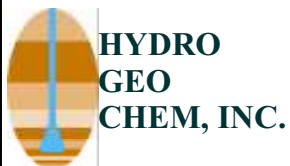
PRIVILEGED AND CONFIDENTIAL

Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 31,200 ft²/day
 Storage coefficient = 0.1
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.016
 well loss exponent = 1.19
 assumed aquifer thickness = 1085 ft



**MEASURED AND SIMULATED DRAWDOWNS AT MO-5B
 DURING PUMPING AT 16, 30, AND 55 GPM
 (with linear correction for regional water level change)
 (analysis using WHIP)**

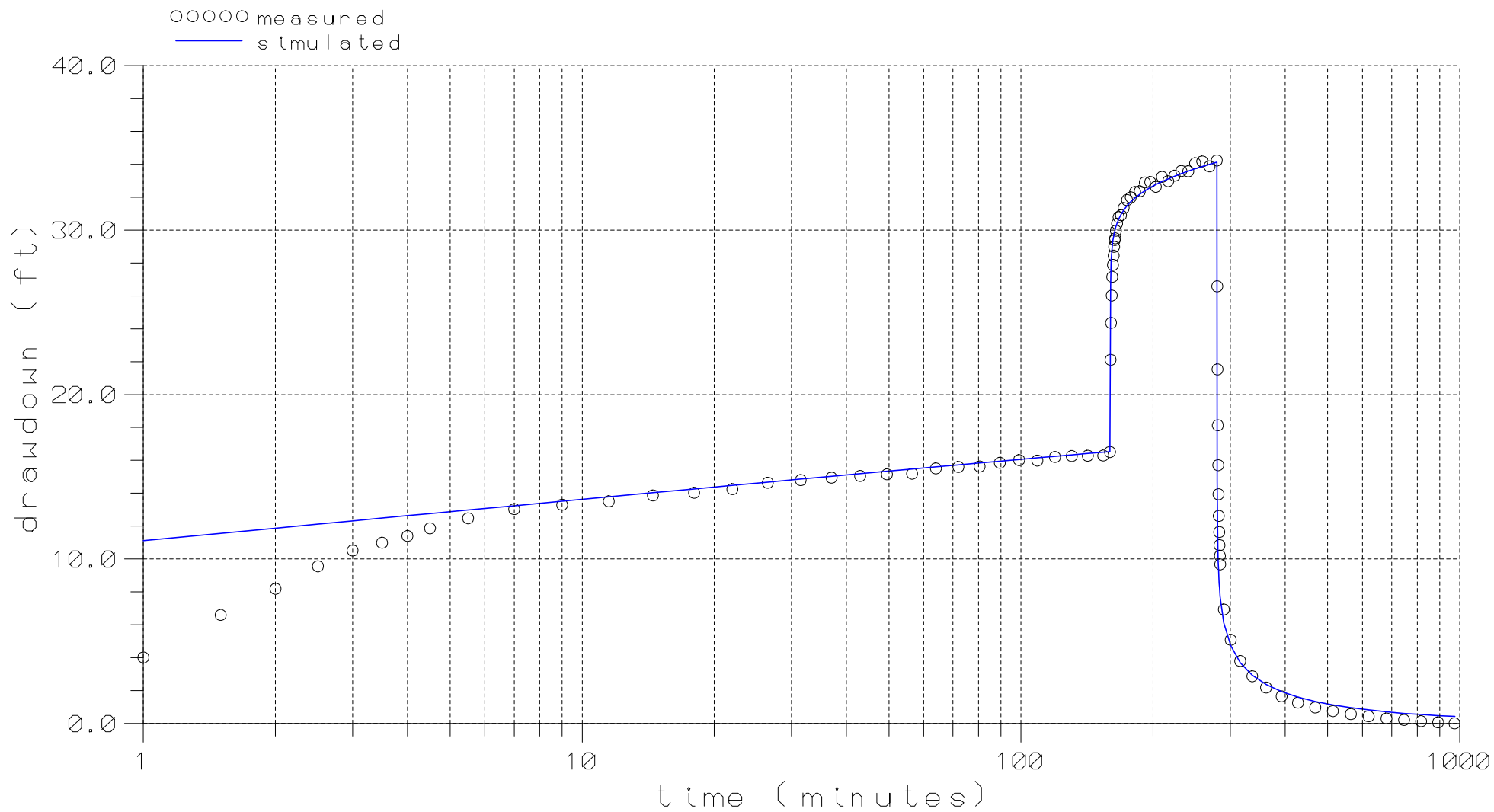
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DATE
10/30/07

REFERENCE
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MO-5/MO-5B/whip/mo5bc2.srf

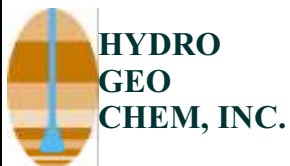
FIGURE
E.23

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 785 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.0114 ft/day
 well loss constant = 0.003
 well loss exponent = 2.05
 assumed aquifer thickness = 1085 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-5C DURING PUMPING AT 10.5 AND 21 GPM (analysis using WHIP)

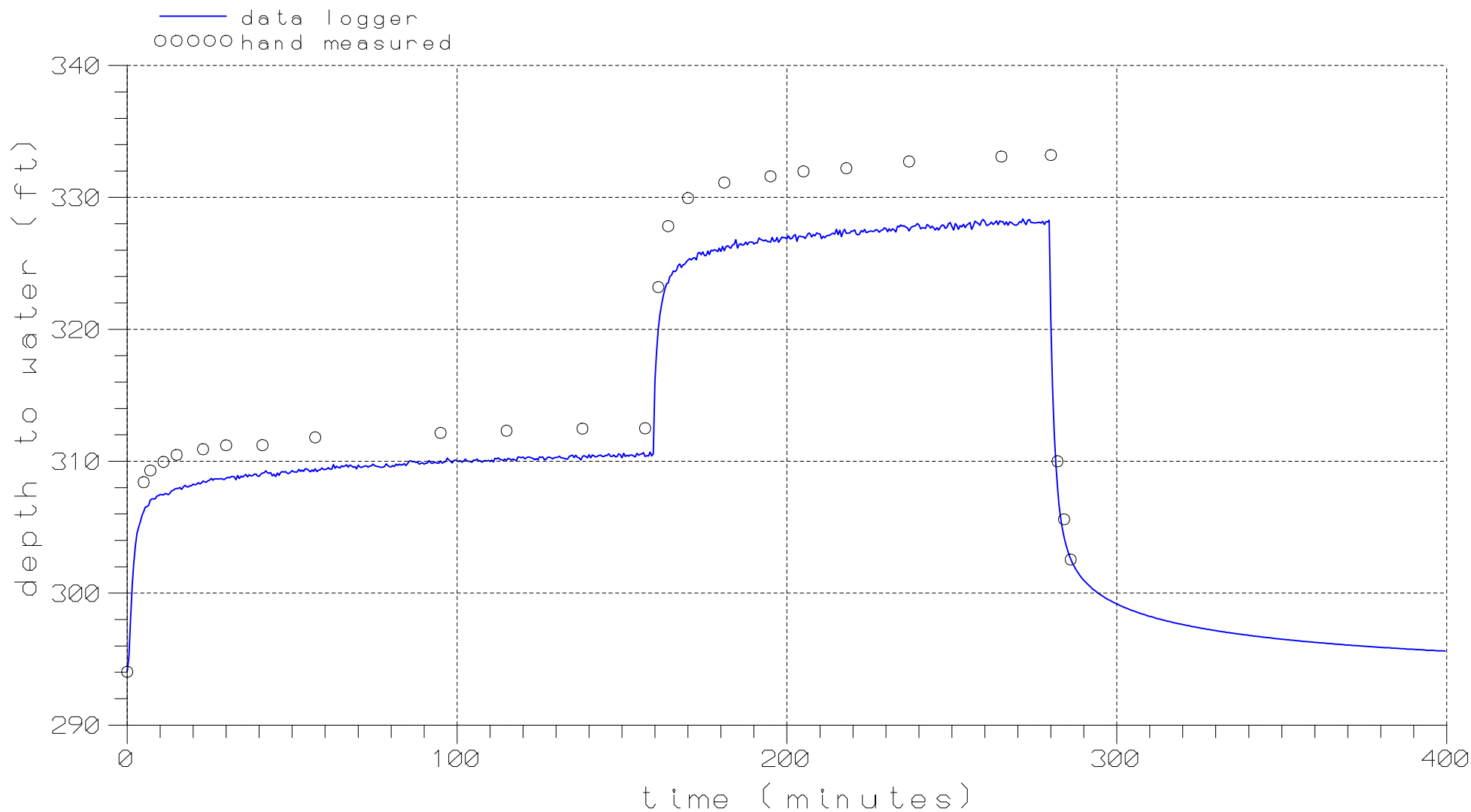
APPROVED
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10/30/07

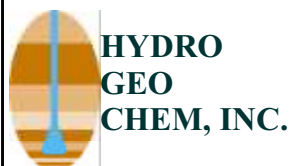
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MO-5/MO-5C/whip/mo5c.srf

FIGURE
E.24

PRIVILEGED AND CONFIDENTIAL
Prepared at the Direction of Legal Counsel

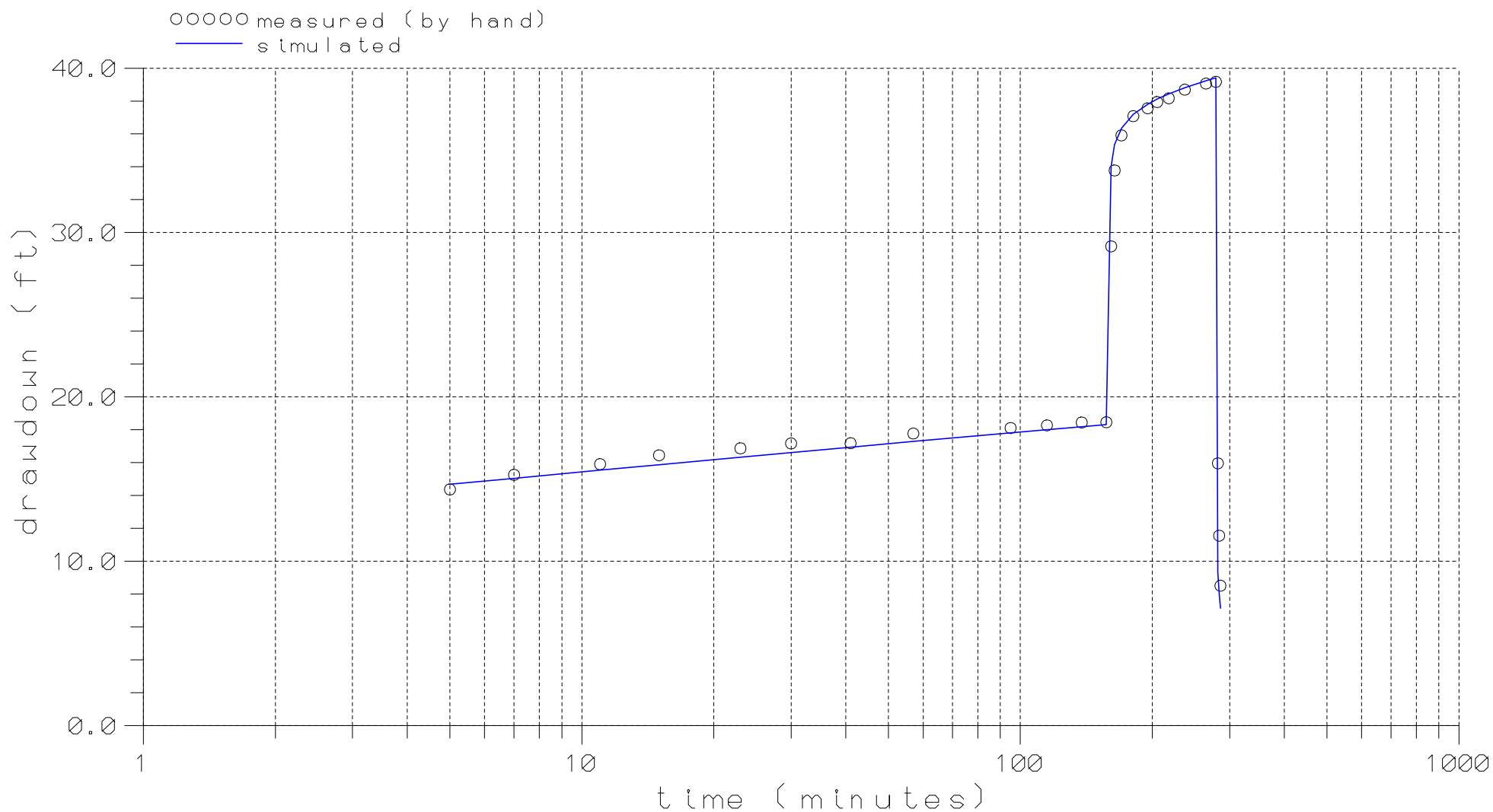


PRIVILEGED AND CONFIDENTIAL
Prepared at the Direction of Legal Counsel



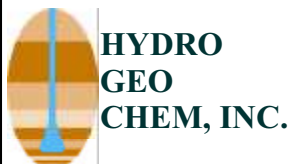
**COMPARISON OF DEPTHS TO WATER AT MO-5C
MEASURED BY HAND (USING A SOUNDER) AND
COMPUTED FROM AUTOMATICALLY LOGGED DATA
(analysis using WHIP)**

APPROVED SJS	DATE 10/30/07	REFERENCE H:/78300/78306.4/ MO-5/MO-5C/whip/mo5cdtw.srt	FIGURE E.25
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RESULTS

Transmissivity = 785 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.0114 ft/day
 well loss constant = 0.045
 well loss exponent = 1.65
 assumed aquifer thickness = 1085 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-5C DURING PUMPING AT 10.5 AND 21 GPM (HAND COLLECTED DATA) (analysis using WHIP)

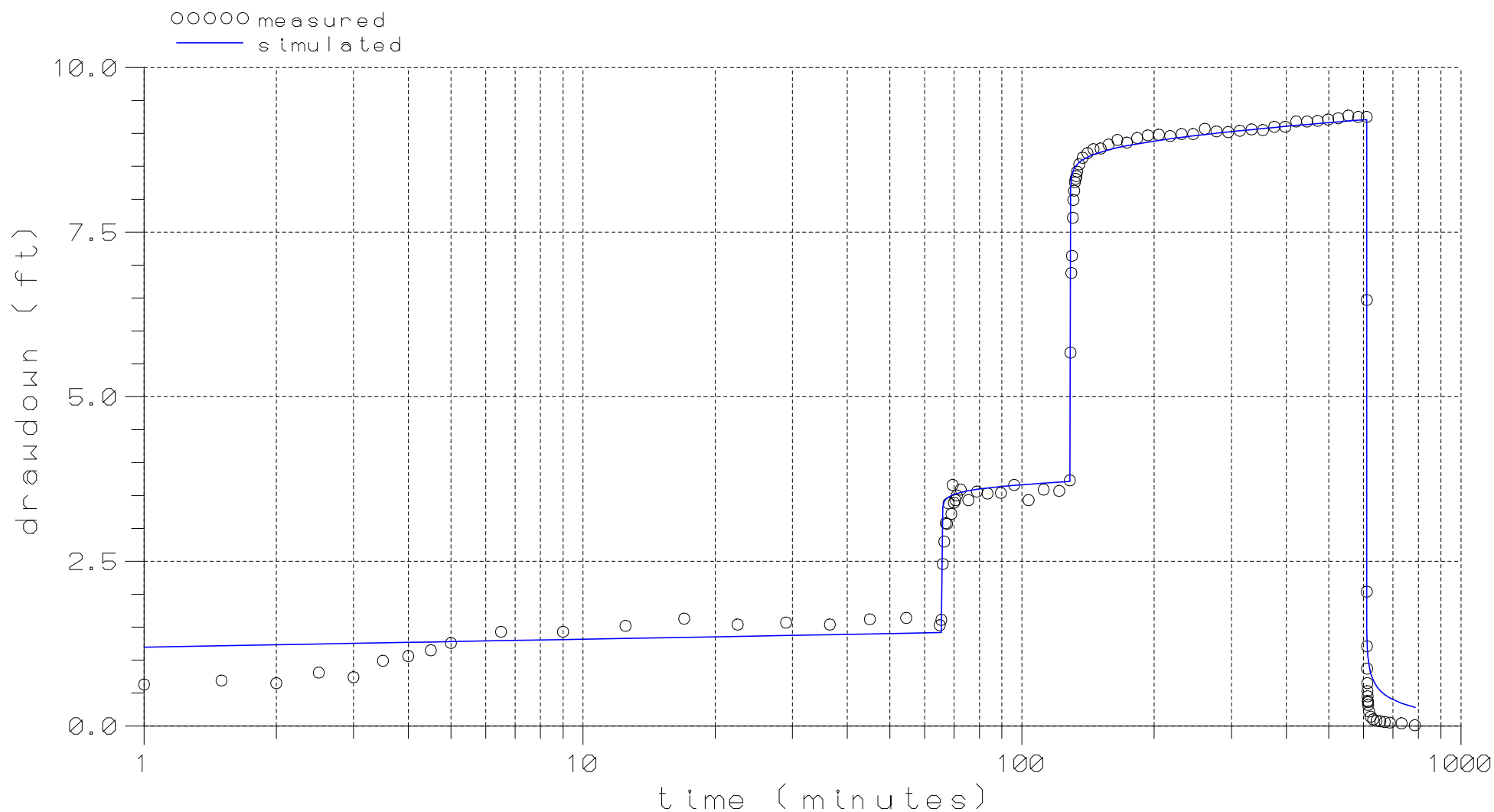
APPROVED
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DATE
10/30/07

REFERENCE
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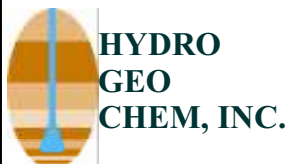
FIGURE
E.26

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 8,000 ft²/day
 Storage coefficient = 0.0057
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.014
 well loss exponent = 1.49
 assumed aquifer thickness = 655 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-6A DURING PUMPING AT 13, 28, AND 55 GPM (analysis using WHIP)

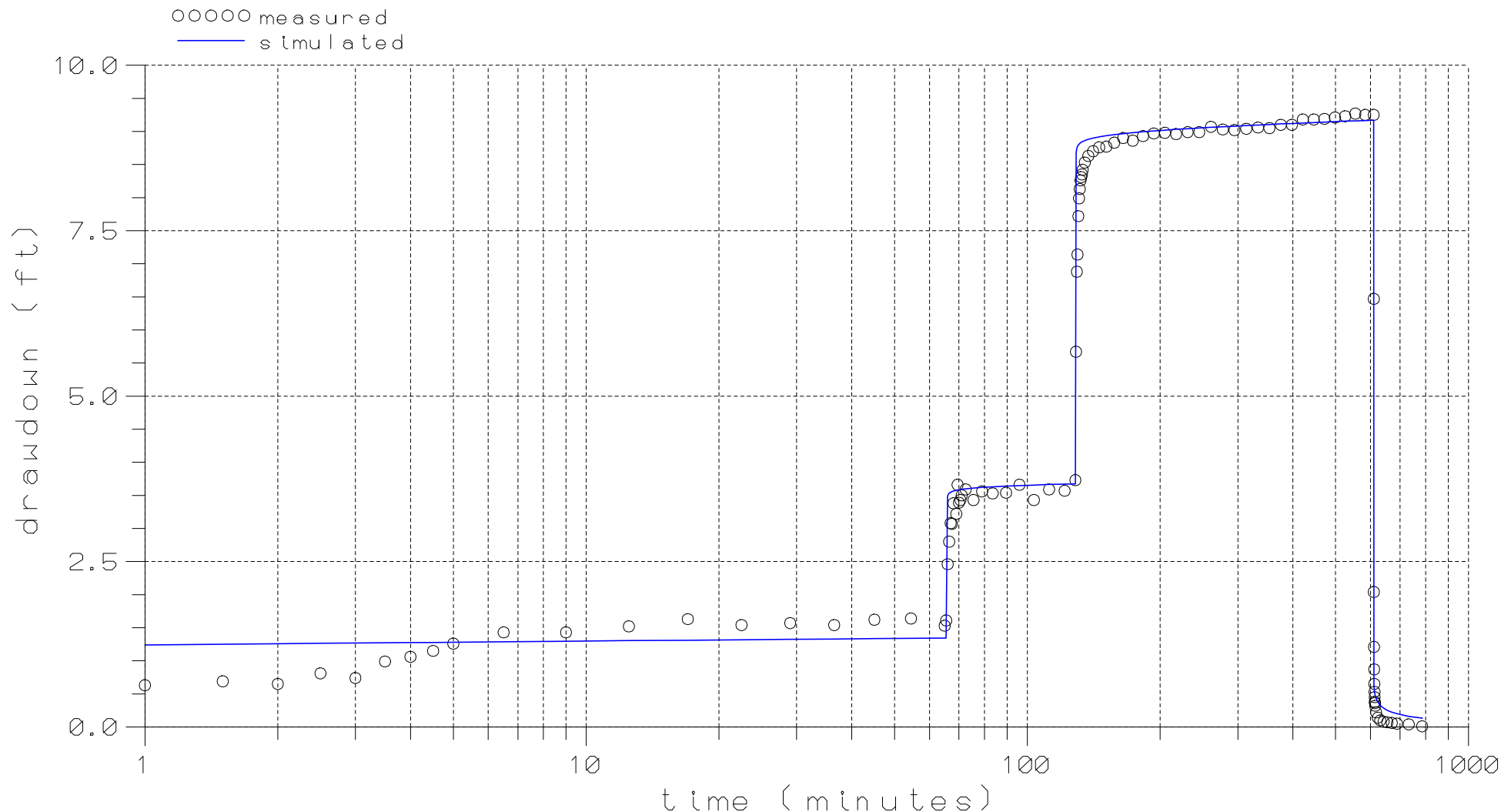
APPROVED
SJS

DATE
10/30/07

REFERENCE H:/78300/78306.4/
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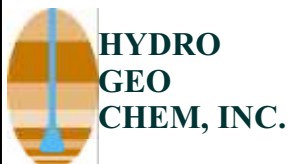
FIGURE
E.27

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 17,000 ft²/day
 Storage coefficient = 0.0057
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.0258
 well loss exponent = 1.41
 assumed aquifer thickness = 655 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-6A DURING PUMPING AT 13, 28, AND 55 GPM (FIT TO RECOVERY DATA) (analysis using WHIP)

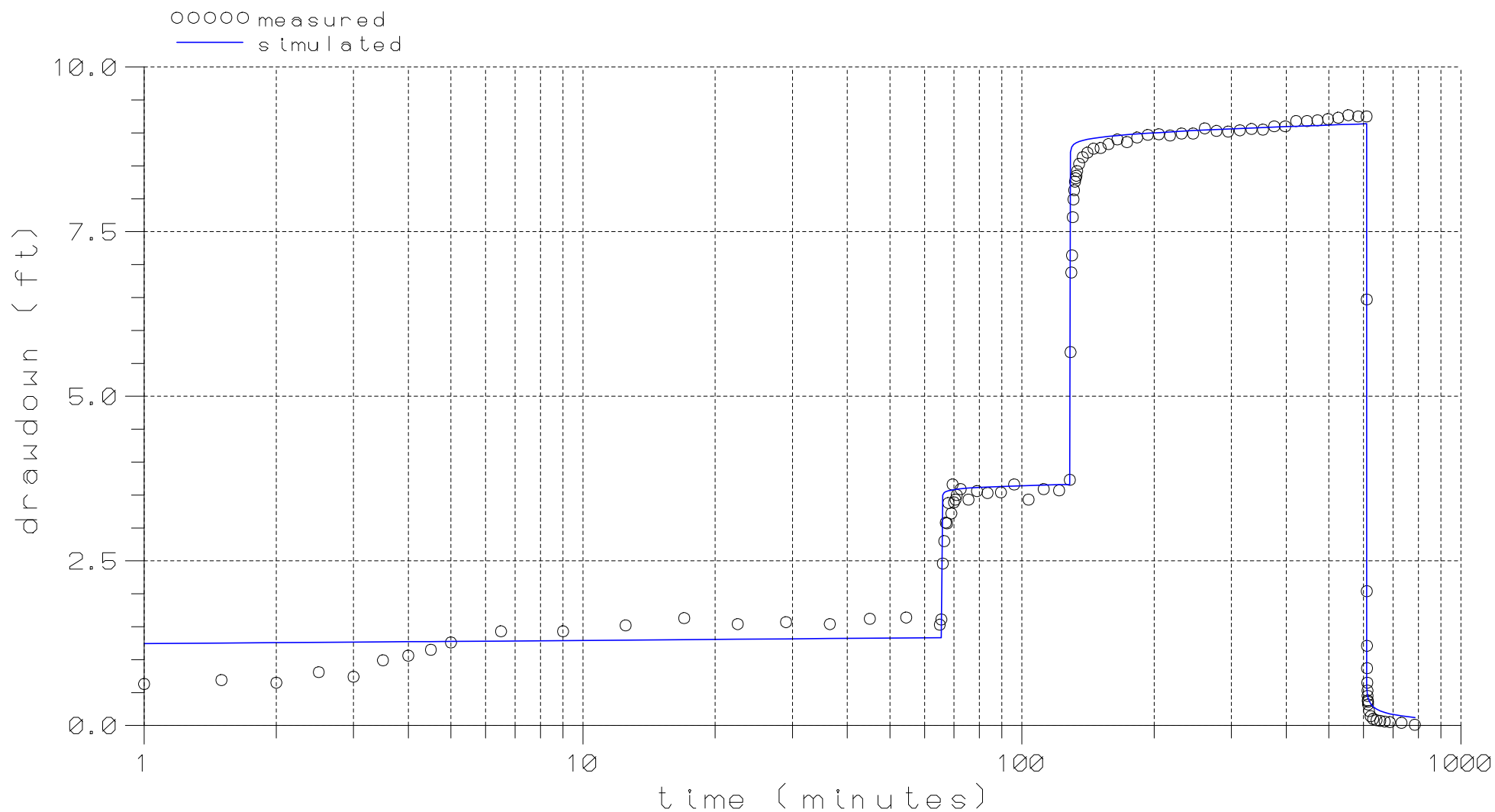
APPROVED
SJS

DATE
10/30/07

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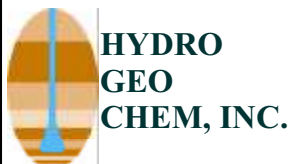
FIGURE
E.28

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 10,000 ft²/day
 Storage coefficient = 0.0057
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.0277
 well loss exponent = 1.40
 assumed aquifer thickness = 325 ft



**MEASURED AND SIMULATED DRAWDOWNS AT MO-6A
 DURING PUMPING AT 13, 28, AND 55 GPM
 (ASSUMES AQUIFER BASE AT 630 FT BLS)
 (analysis using WHIP)**

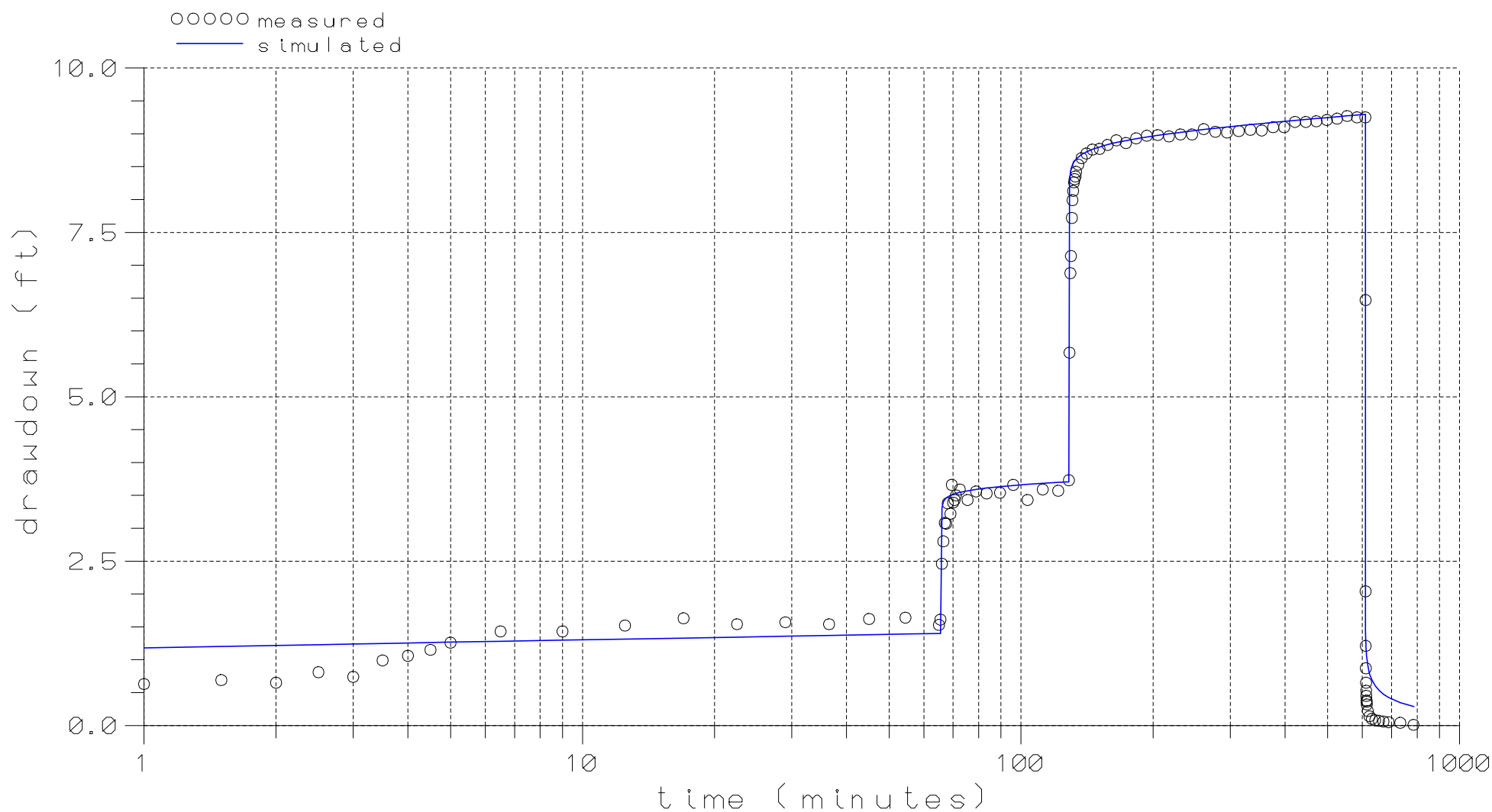
APPROVED
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DATE
 10/30/07

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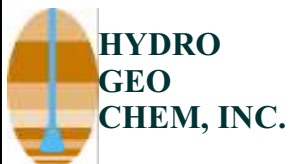
FIGURE
E.29

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 4,150 ft²/day
 Storage coefficient = 0.0057
 Vertical Hydraulic Conductivity = 0.1 ft/day
 well loss constant = 0.014
 well loss exponent = 1.50
 assumed aquifer thickness = 325 ft



**MEASURED AND SIMULATED DRAWDOWNS AT MO-6A
 DURING PUMPING AT 13, 28, AND 55 GPM
 (ASSUMES AQUIFER BASE AT 630 FT BLS)
 (analysis using WHIP)**

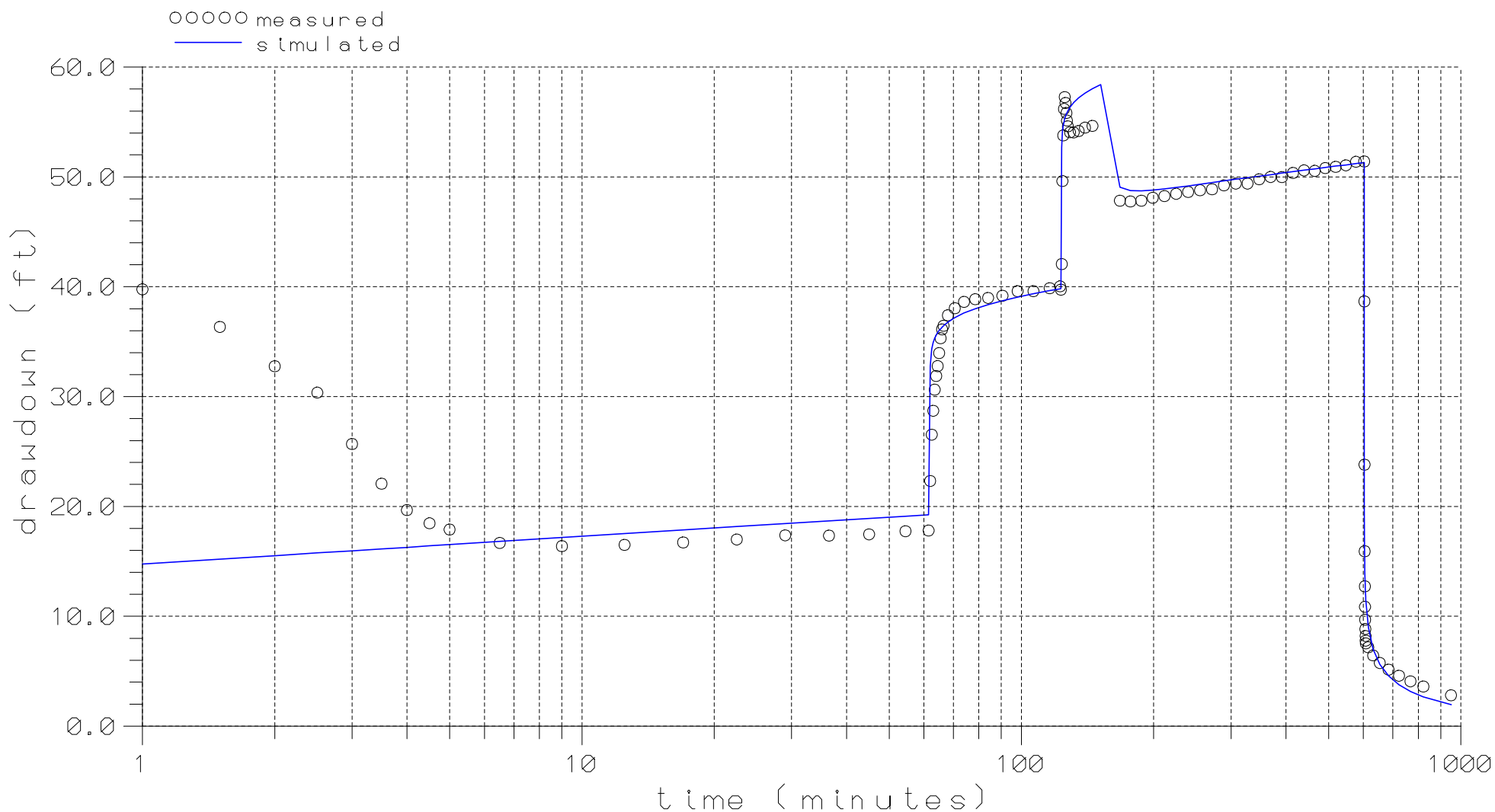
APPROVED
SJS

DATE
10/30/07

REFERENCE H:/78300/78306.4/
 MO-6/MO-6A/whip/mo6af2.srf

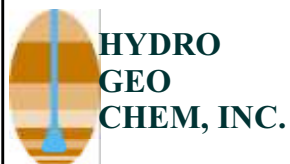
FIGURE
E.30

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 750 ft²/day
 Storage coefficient = 0.001
 Vertical Hydraulic Conductivity = 0.01 ft/day
 well loss constant = 0.2
 well loss exponent = 1.12
 assumed aquifer thickness = 655 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-6B DURING PUMPING AT 14, 28, 40, AND 33 GPM (analysis using WHIP)

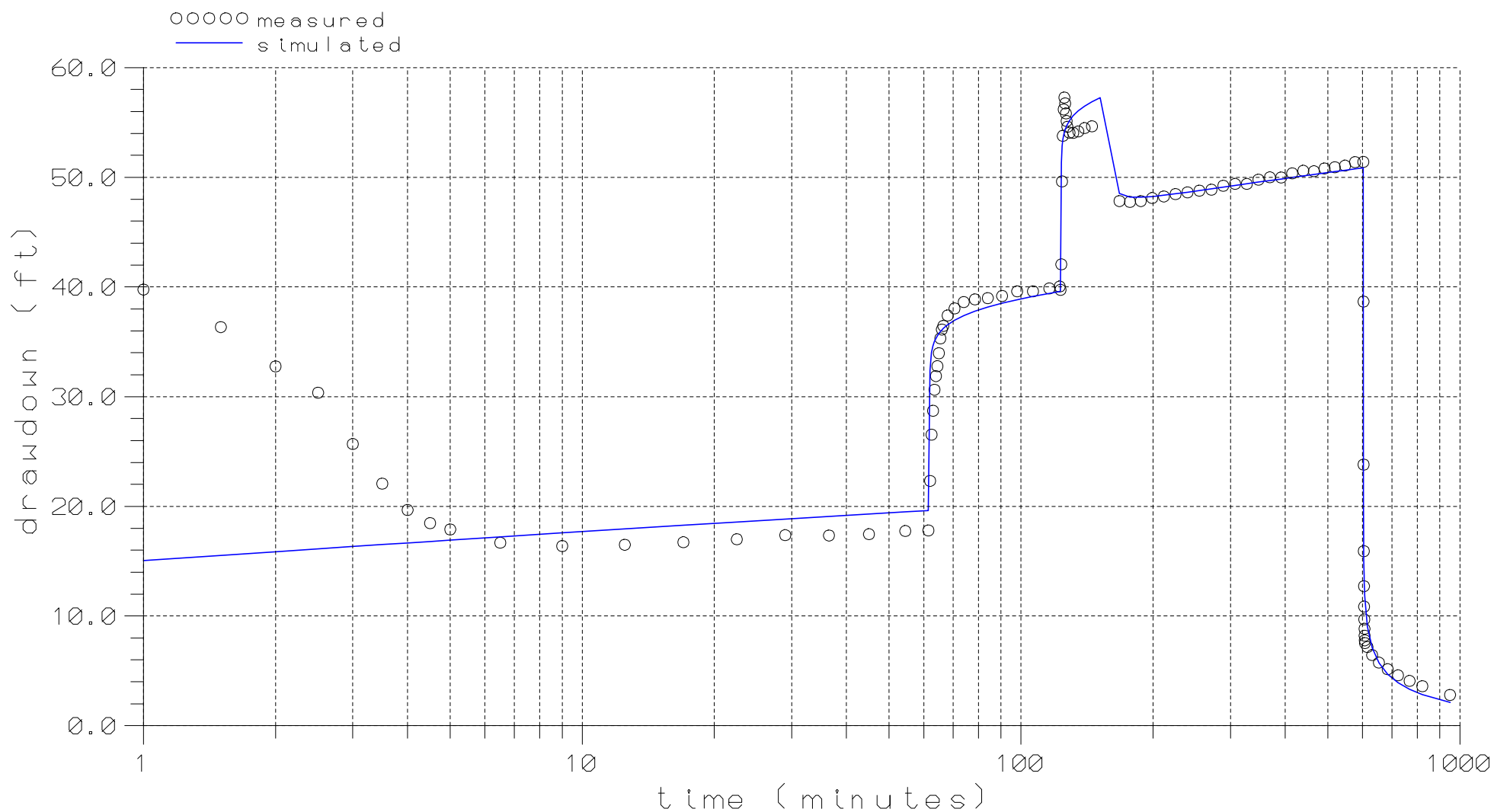
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SJS

DATE
10/30/07

REFERENCE H:/78300/78306.4/
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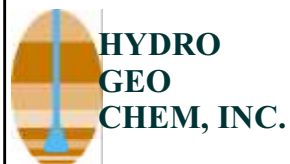
FIGURE
E.31

PRIVILEGED AND CONFIDENTIAL
 Prepared at the Direction of Legal Counsel



RESULTS

Transmissivity = 210 ft²/day
 Storage coefficient = 0.001
 Aquitard Specific Storage = 1.e-4/ft
 Vertical Hydraulic Conductivity = 0.1 ft/day
 Aquitard Hydraulic Conductivity = 0.001 ft/day
 well loss constant = 0.4
 well loss exponent = 0.95
 assumed aquifer thickness = 190 ft



MEASURED AND SIMULATED DRAWDOWNS AT MO-6B DURING PUMPING AT 14, 28, 40, AND 33 GPM (ASSUMES AQUTARD FROM 630-770 FT BLS) (analysis using WHIP)

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DATE

10/30/07

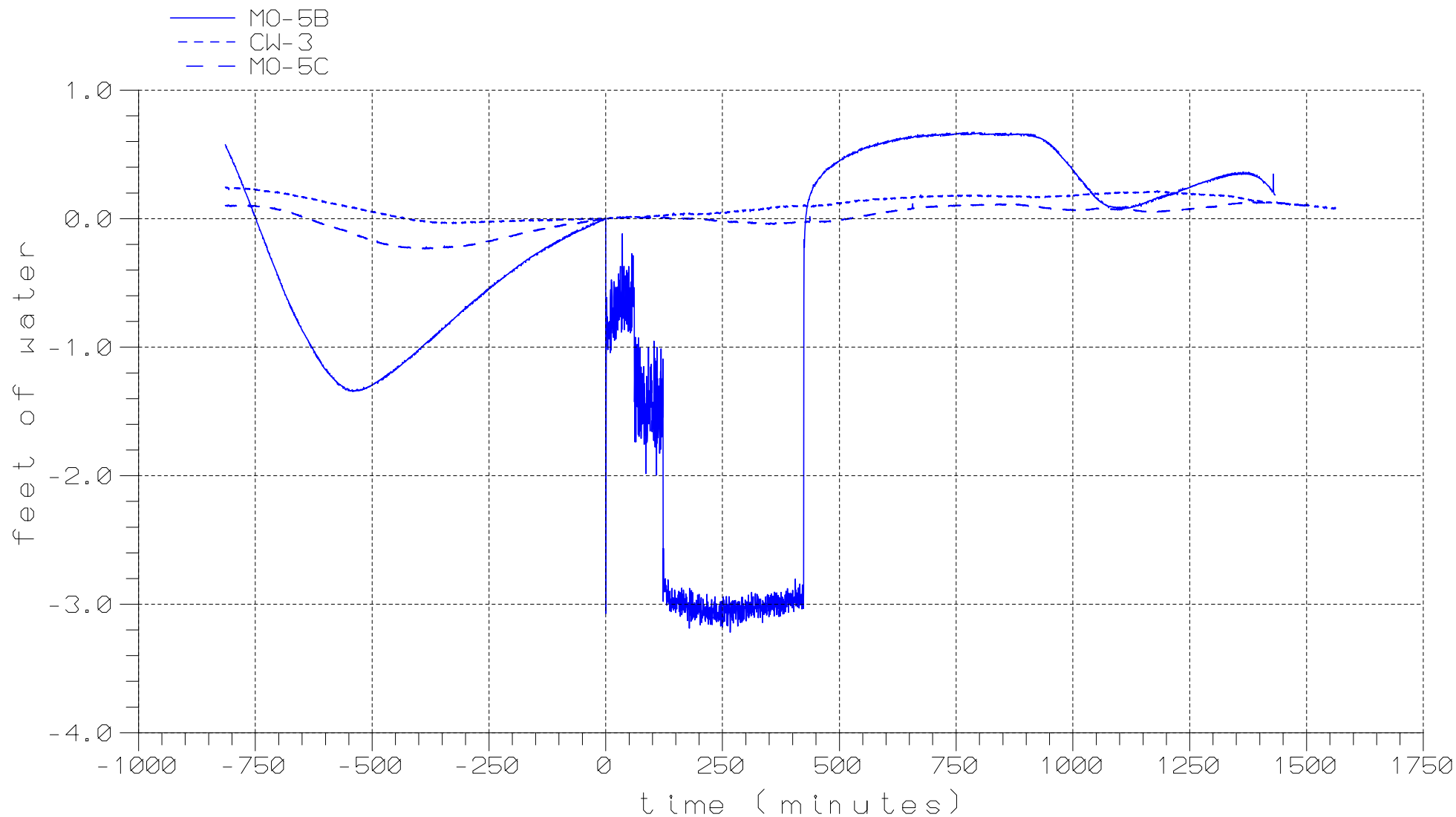
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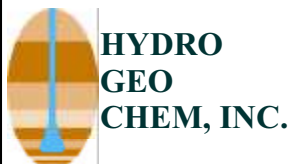
FIGURE

E.32

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 Prepared at the Direction of Legal Counsel



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Prepared at the Direction of Legal Counsel



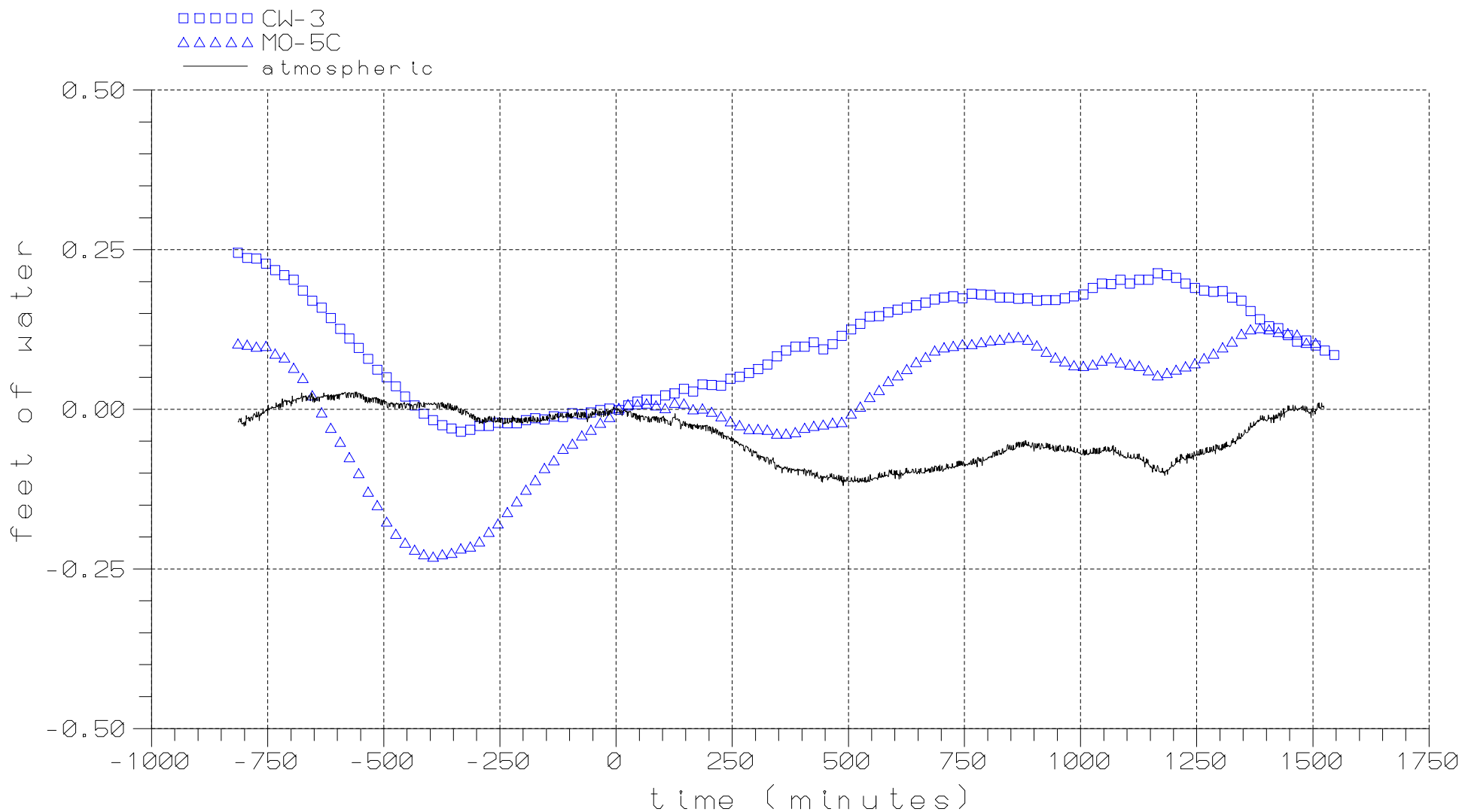
**COMPARISON OF WATER LEVEL CHANGES AT
MO-5 WELL NEST PRIOR TO, DURING, AND AFTER
PUMPING OF MO-5B**

APPROVED
SJS

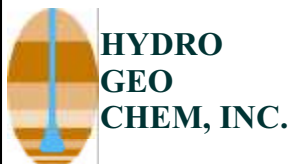
DATE
10/30/07

REFERENCE H:/78300/78306.4/
MO-5/MO-5B/preschg.srf

FIGURE
E.33



PRIVILEGED AND CONFIDENTIAL
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**COMPARISON OF WATER LEVEL CHANGES AT
CW-3 AND MO-5C WITH CHANGE IN ATMOSPHERIC PRESSURE
PRIOR TO, DURING, AND AFTER PUMPING OF MO-5B**

APPROVED SJS	DATE 10/30/07	REFERENCE H:/78300/78306.4/ MO-5/MO-5B/preschg2.srf	FIGURE E.34
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APPENDIX F

RESULTS OF INITIAL WATER QUALITY SAMPLING AT OFFSITE MONITORING WELLS

TASK 2.4 OF AQUIFER CHARACTERIZATION PLAN

APPENDIX F

**RESULTS OF INITIAL WATER QUALITY SAMPLING
AT OFFSITE MONITORING WELLS**

**TASK 2.4 OF AQUIFER CHARACTERIZATION PLAN
MITIGATION ORDER ON CONSENT DOCKET NO. P-50-06**

Prepared for:

PHELPS DODGE SIERRITA, INC.
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Green Valley, Arizona 85614

Prepared by:

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December 28, 2007

TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	GROUNDWATER SAMPLING.....	3
3.	ANALYTICAL METHODS	5
4.	RESULTS	7

TABLE

F.1	Results for Initial Water Quality Sampling of MO-2007-Series Wells
-----	--

FIGURE

F.1	Sulfate Concentrations in Initial Groundwater Samples collected from MO-2007-Series Monitoring Wells (June through October 2007)
-----	--

APPENDICES

F.1	Groundwater Sampling Forms
F.2	Analytical Data Reports from ACZ Laboratories, Inc.

1. INTRODUCTION

This data report provides the results of the initial water quality samples collected at monitor wells installed in 2007 pursuant to Task 2.4 of the Work Plan (Hydro Geo Chem, Inc. [HGC], 2006)¹ to characterize sulfate in the vicinity of the Phelps Dodge Sierrita Tailings Impoundment. The Work Plan was submitted to and approved by Arizona Department of Environmental Quality pursuant to the Mitigation Order on Consent Docket No. P-50-06. HGC conducted the sampling and prepared this report on behalf of Phelps Dodge Sierrita, Inc.

¹ Hydro Geo Chem, Inc. 2006. *Work Plan to Characterize and Mitigate Sulfate with Respect to Drinking Water Supplies in the Vicinity of the Phelps Dodge Sierrita Tailing Impoundment, Pima County, Arizona*. August 11, 2006; revised October 31, 2006.

2. GROUNDWATER SAMPLING

The scope of the groundwater monitoring program is described in Section 3.3.4 and Appendix G of the Work Plan (HGC, 2006). Pursuant to Task 2.4 of the Work Plan, thirteen new monitoring wells were installed at six offsite locations to further define the extent of the sulfate plume, to provide installations for ongoing monitoring, to characterize aquifer materials and hydraulic properties, and to determine bedrock depth.

The new offsite wells are identified as the MO-2007-series wells. The number and letter following MO-2007 (e.g., MO-2007-1B) denote the location and well depth, respectively (Figure F.1). In addition, two existing wells, NP-2 and CW-3, were developed as monitoring wells to sample the shallow basin fill aquifer. Appendix D of the main text details the geology and construction of the MO-2007-series wells, NP-2, and CW-3.

HGC conducted the initial sampling of the MO-2007-series wells, NP-2, and CW-3 from June through October 2007 in accordance with Sections 4.2 and 4.3 of the Quality Assurance Project Plan (QAPP). Pursuant to the Work Plan, samples of groundwater from the MO-2007-series wells were collected during aquifer testing conducted after the completion of well development. Pumping for the aquifer test had been purged many wetted casing volumes from the wells prior to sampling. Copies of groundwater sampling forms documenting the sampling events are presented as Appendix F.1. Samples from NP-2 and CW-3 were collected after purging a minimum of three wetted casing volumes from the wells. Samples of groundwater were collected from a sampling port connected to the well discharge line.

Groundwater samples for analysis of dissolved constituents were filtered using a 0.45 micron in-line filter. Samples for analysis of total concentration were collected unfiltered. Samples were collected in containers provided by the analytical laboratory and placed immediately on ice. Samples were shipped via overnight express under chain of custody to ACZ Laboratories, Inc. for the analyses presented in Section 3.

The wells installed and developed pursuant to Task 2.4 of the Work Plan are added to the quarterly plume monitoring program for ongoing sampling. Results of the initial groundwater sampling for Task 2.4 are included in Section 4.

3. ANALYTICAL METHODS

All analyses performed used the following U.S. Environmental Protection Agency (EPA) approved analytical methods that meet the requirements stated in Section 5.3 of the QAPP regarding target methods and target method detection limits.

- SM4500 SO4-D (Gravimetric): sulfate
- EPA 300.0 (Ion-Chromatography): sulfate, chloride, fluoride
- EPA 200.7 (Inductively Coupled Plasma): calcium, magnesium, potassium, sodium
- EPA 353.2 (Automated Cadmium Reduction): nitrate/nitrite
- EPA SM2320B (Titration): alkalinity
- EPA 160.1 (Gravimetric): total dissolved solids

4. RESULTS

Analytical results for the initial water quality sampling are presented in Table F.1. Figure F.1 shows the concentrations of dissolved sulfate in the MO-2007-series wells, NP-2, and CW-3. Dissolved sulfate concentrations ranged from 18.9 milligrams per liter (mg/L) in MO-2007-1B to 591 mg/L in MO-2007-2. Comparison of dissolved and total sulfate concentrations in Table F.1 indicates negligible difference between the two measurements.

Copies of groundwater sampling forms including field data such as pH, electrical conductivity, and temperature are presented as Appendix F.1. Analytical laboratory reports complete with the results of quality assurance and quality control data are provided as Appendix F.2.

The results of surrogate spike recoveries, matrix spike/recovery and matrix spike duplicate tests, indicated there are no quality control issues effecting the usability and data validation status of the laboratory results. The data for samples included in this report are of acceptable quality for use in the aquifer characterization being conducted pursuant to the Work Plan.

TABLE

TABLE F.1
Results for Initial Water Quality Sampling of MO-2007-Series Wells

Well Name	ADWR 55 Well Registry Number	Sample Date	Field pH (SU)	Field EC (µS/cm)	Field Temp (deg C)	Sulfate, total	Sulfate, dissolved	Chloride, dissolved	Fluoride, dissolved	Nitrate as N, dissolved	Nitrite as N, dissolved	Nitrate/Nitrite as N, dissolved	Calcium, dissolved	Magnesium, dissolved
MO-2007-1A	907342	08/08/07	7.17	370	29.0	19.2	19.2	8.4	0.4	0.54	< 0.01	0.54	40.4	6.4
MO-2007-1B	907210	08/02/07	7.41	321	30.7	18.9	18.9	12.4	0.6	0.71	< 0.01	0.71	32.4	4.3
MO-2007-1C	907209	07/31/07	7.35	523	27.9	114	112	22.4	0.5	0.82	< 0.01	0.82	57.5	9.3
MO-2007-2	906765	06/14/07	7.05	1372	32.2	596	591	28.3	0.3	0.94	< 0.01	0.94	196.0	35.5
NP-2 ¹	605898	06/04/07	7.20	411	25.9	41.3	41.2	9.1	0.2	0.34	< 0.01	0.34	50.3	10.9
MO-2007-3B	906816	09/10/07	7.53	373	28.7	38	38	7.0	0.5	0.33	< 0.01	0.33	31.5	2.8
MO-2007-3C	906817	06/28/07	7.93	570	32.2	136	136	11.4	3.1	0.30	< 0.01	0.30	28.2	1.4
MO-2007-4A	907213	10/09/07	7.46	412	27.5	37.2	37	10.2	0.3	0.93	< 0.01	0.93	42.8	6.2
MO-2007-4B	907212	10/11/07	7.93	376	26.4	37.5	37.6	9.1	0.6	0.77	< 0.01	0.77	41.6	4.3
MO-2007-4C	907211	08/16/07	7.62	472	35.2	78.6	78.7	11.8	5.0	0.48	< 0.01	0.48	13.0	0.3
CW-3 ¹	627483	06/06/07	7.74	449	25.3	58.7	57.9	17.7	0.3	2.92	< 0.01	2.92	56.1	10.9
MO-2007-5B	907456	10/12/07	7.63	1150	29.9	392	402	44.5	1.2	1.97	0.01	1.98	84.8	3.7
MO-2007-5C	907457	08/23/07	7.46	780	31.4	252	248	12.0	2.1	0.13	0.02	0.15	30.0	1.4
MO-2007-6A	907607	10/02/07	7.52	405	28.5	27	26.5	10.5	0.3	0.99	< 0.01	0.99	36.3	5.4
MO-2007-6A [DUP]	907607	10/02/07	7.52	405	28.5	26.5	26.5	10.5	0.3	0.98	< 0.01	0.98	36.4	5.4
MO-2007-6B	907606	10/04/07	7.70	483	33.1	93.5	93.6	10.9	0.5	0.67	0.02	0.69	28.1	2.9

TABLE F.1
Results for Initial Water Quality Sampling of MO-2007-Series Wells

Well Name	ADWR 55 Well Registry Number	Sample Date	Potassium, dissolved	Sodium, dissolved	Total Alkalinity	Bicarbonate as CaCO ₃	Carbonate as CaCO ₃	Hydroxide as CaCO ₃	Residue, Filterable (TDS) @ 180°C	TDS (calculated)	TDS Ratio (measured/calculated)	Sum of Anions (meq/L)	Sum of Cations (meq/L)	Cation-Anion Balance (%)
MO-2007-1A	907342	08/08/07	3.0	30.4	164	164	< 2	< 2	250	209	1.20	3.9	3.9	0.0
MO-2007-1B	907210	08/02/07	3.2	40.5	140	140	< 2	< 2	220	199	1.11	3.6	3.8	2.7
MO-2007-1C	907209	07/31/07	4.8	49.3	124	124	< 2	< 2	380	334	1.14	5.5	5.9	3.5
MO-2007-2	906765	06/14/07	7.7	73.5	108	108	< 2	< 2	1060	1000	1.06	15.4	16.1	2.2
NP-2 ¹	605898	06/04/07	3.9	31.7	169	169	< 2	< 2	280	250	1.12	4.5	4.9	4.3
MO-2007-3B	906816	09/10/07	3.1	44.1	134	134	< 2	< 2	250	209	1.20	3.7	3.8	1.3
MO-2007-3C	906817	06/28/07	3.3	93.4	103	103	< 2	< 2	380	340	1.12	5.4	5.7	2.7
MO-2007-4A	907213	10/09/07	3.3	37.1	160	155	5	< 2	270	239	1.13	4.3	4.3	0.0
MO-2007-4B	907212	10/11/07	2.9	35.7	143	143	< 2	< 2	230	221	1.04	3.9	4.0	1.3
MO-2007-4C	907211	08/16/07	1.9	80.8	103	101	2	< 2	310	256	1.21	4.3	4.2	-1.2
CW-3 ¹	627483	06/06/07	3.0	30.5	140	140	< 2	< 2	300	273	1.10	4.7	5.1	4.1
MO-2007-5B	907456	10/12/07	5.5	164.0	95	95	< 2	< 2	780	771	1.01	11.8	11.9	0.4
MO-2007-5C	907457	08/23/07	7.1	129.0	71	71	< 2	< 2	540	473	1.14	7.0	7.4	2.8
MO-2007-6A	907607	10/02/07	3.8	39.8	164	164	< 2	< 2	920	225	4.09	4.2	4.1	-1.2
MO-2007-6A [DUP]	907607	10/02/07	3.8	40.0	163	163	< 2	< 2	260	225	1.16	4.2	4.1	-1.2
MO-2007-6B	907606	10/04/07	11.3	60.6	125	119	5	< 2	400	287	1.39	4.8	4.6	-2.1

Notes:

All units are in milligrams per liter (mg/L) unless otherwise noted.

¹ = Existing well designated as monitoring well for sampling the shallow zone of the basin fill aquifer

ADWR = Arizona Department of Water Resources

SU = Standard Units

µS/cm = microsiemens per centimeter

deg C = degrees Celsius

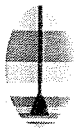
TDS = Total Dissolved Solids

meq/L = milliequivalent per liter

DUP = Duplicate Sample

FIGURE

APPENDIX F.1
GROUNDWATER SAMPLING FORMS



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INITIAL SAMPLING

Well No: MO-2007-1A

Well Name: American Legion Well

Project Name/Number: SIERRITA GW MONITORING (78306.2)

Date: 8/8/2007

Recorder/Sampler: M.A

WELL INFORMATION

Total Well Depth ("a", ft): _____

Casing Diameter ("d", in.): _____ Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA Depth to Water ("b", ft): _____

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ _____ Gallons, (3 Casing Volumes _____ gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 1300 Time Completed: _____ Total Purge Time: _____ min

Purge Method: _____ Pump Setting (depth): _____ Total Purge Volume: _____ gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (uhos/cm)	pH	Other	D.O. (mg/L)	Odor	Notes
1300		29.0	370	7.17				

SAMPLING INFORMATION AND SAMPLE RECORD

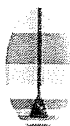
Time Started: 1300 Time Completed: 1302

Sampling Method, Type of Sampling Pump or Bailer: _____

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
FGW- <u>MO-2007-1A</u>	<u>1300</u>	PLASTIC	125 mL/250 mL	2	300.1/200.7	NONE/HNO3	FILTERED
UGW- <u>MO-2007-1A</u>		PLASTIC	250 mL	1	300.0	NONE	RAW

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INITIAL SAMPLING

Well No: MO-2007-1B

Well Name: American Legion Well

Project Name/Number: SIERRITA GW MONITORING (78306.2)

Date: 8/2/2007

Recorder/Sampler: Mark Arneson

WELL INFORMATION

Total Well Depth ("a", ft): _____

No Purge Read - Test In Progress

Casing Diameter ("d", in.): _____

Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA

Depth to Water ("b", ft): _____

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ _____ Gallons, (3 Casing Volumes _____ gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 1445

Time Completed: _____

Total Purge Time: _____ min

Purge Method: Gravelos

Pump Setting (depth): _____

Total Purge Volume: _____ gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (uhos/cm)	pH	Other	D.O. (mg/L)	Odor	Notes
1445		30.7	321	7.41				

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 1445

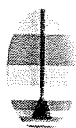
Time Completed: 1447

Sampling Method, Type of Sampling Pump or Bailer: _____

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
FGW- <u>MO-2007-1B</u>	<u>1445</u>	PLASTIC	125 mL/250 mL	2	300.1/200.7	NONE/HNO3	FILTERED
UGW- <u>MO-2007-1B</u>	<u>1445</u>	PLASTIC	250 mL	1	300.0	NONE	RAW

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INITIAL Sample No

Well No: MO-2007-1C

Well Name: American Legion Well

Project Name/Number: SIERRITA GW MONITORING (78306.2)

Date: 7 / 31 / 2007

Recorder/Sampler: Kim Garcia

WELL INFORMATION

Total Well Depth ("a", ft): 1190

Casing Diameter ("d", in.):

Screened Interval (ft): From: NA 1180 To: NA 1020

Well/Packer Depth ("a", ft): NA

Depth to Water ("b", ft): (Static @ 835') 423.58'

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ Gallons, (3 Casing Volumes) gal

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 0921 Time Completed: 1520 Total Purge Time: initial meter: 68200
Purge Method: 10HP Grounds Pump Setting (depth): Total Purge Volume: 81900 min
13,700 gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C / °F)	Conductivity (µmhos/cm)	pH	Other	D.O. (mg/L)	Odor	Notes
1005	30	31.2	420	7.52	NTU			well running / normal
1115	30	31.7	484	7.41	6.09			grounding sampling
1245	48	31.3	508	7.23	2.92			
1400		30.2	518	7.35	5.47			
1410		NA	1411	6.96/4.03	2.62			pH & Temp - calibration check
1520	48	27.9	523	7.35	7.51			

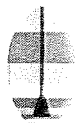
SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 1520 Time Completed: 1520
Sampling Method, Type of Sampling Pump or Bailer: grab for sample point @ well head

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
MO-2007-1C-F	1520	PLASTIC	125 mL/250 mL	2	300.1/200.7	NONE/HNO3	FILTERED
MO-2007-1C-U	1520	PLASTIC	250 mL	1	300.0	NONE	RAW

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INITIAL SAMPLING

Well No: MO-2

Well Name: _____

Project Name/Number: SIERRITA GW MONITORING (78306.2)

Date: 6/14/2007

Recorder/Sampler: NH

WELL INFORMATION

Total Well Depth ("a", ft): _____

Casing Diameter ("d", in.): _____ Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA Depth to Water ("b", ft): _____

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ _____ Gallons, (3 Casing Volumes _____ gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 1550 Time Completed: _____ Total Purge Time: _____ min

Purge Method: _____ Pump Setting (depth): _____ Total Purge Volume: _____ gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (uhos/cm)	pH	Other	D.O. (mg/L)	Odor	Notes
1550	37.5	32.2	1372	7.05				

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 1550 Time Completed: 1581

Sampling Method, Type of Sampling Pump or Bailer: _____

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
FGW- <u>MO-2PT</u>		PLASTIC	125 mL/250 mL	2	300.1/200.7	NONE/HNO3	FILTERED
UGW- <u>MO-2PT</u>		PLASTIC	250 mL	1	300.0	NONE	RAW

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

Well No: GW-605898-051407

Well Name: CW-2/NP-2

Project Name/Number: SIERRITA GW MONITORING (78306.2)

Date: 6-4-07 05-14-2007 5/1/07

Recorder/Sampler: KR/JSV MA

WELL INFORMATION

Total Well Depth ("a", ft): 515

Casing Diameter ("d", in.): 12

Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA

Depth to Water ("b", ft): [ADWR = 314] 351 (351.45 on d1107 @ 1239'

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 = 964$ Gallons, (3 Casing Volumes 2891 gal) in fld

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 1407 Time Completed: 1452 Total Purge Time: 45 min

Purge Method: Grundfos Pump Pump Setting (depth): 446' Total Purge Volume: 4500 gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C / °F)	Conductivity (mhos/cm)	pH	Other Turbidity	D.O. (mg/L)	Odor	Notes
1410	120	25.6	390	7.80	779		Slight	Musty
1417	100	25.7	405	7.70	1000		None	rusty
1426	100	25.9	413	7.75	255		None	somewhat clear
1438	100	25.9	410	7.70	271		None	milky
1445	100	26.0	408	7.13	40.41		None	more clear / aeration
1455	100	25.9	411	7.20	27.48		None	fairly clear

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 1455 Time Completed: 1458

Sampling Method, Type of Sampling Pump or Bailer: Grundfos

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
UF-605898-060407	1455	poly	250 ml	1	SO ₄	None	
FLW-605898-060407	1455	poly	250 ml	1	Anions	None	Filtered
FLW-605898-060407	1455	poly	250 ml	1	metals	HNO ₃	Filtered
UF-605898-060407	1440	Glass	1L	1	oil/grease	HCL	unfiltered

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INITIAL SAMPLING

ADWR Well No: 55-906816

Well Name: MO-2007-3B

Project Name/Number: PDSI Sierrita GW Monitoring (78306.4)

Date: 9/10/2007

Sampler: M. Arneson

WELL INFORMATION

Total Well Depth ("a", ft): 950

Casing Diameter ("d", in.): 5"

Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA

Depth to Water ("b", ft): 359.38

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ Gallons, (3 Casing Volumes gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: Time Completed: Total Purge Time: min

Purge Method: Pump Setting (depth): Total Purge Volume: gal

Time (min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (μhos/cm)	pH (SU)	D.O. (mg/l)	Odor	Notes
1415	51	28.7	375	7.53		None	Pumping began at 1100
1423	51	28.7	373	7.53			

SAMPLING INFORMATION AND SAMPLE RECORD

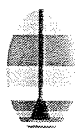
Time Started: 1426 Time Completed: 1428

Sampling Method, Type of Sampling Pump or Bailer: Submersible

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
FGW-MO-2007-3B	1426	PLASTIC	125 ml/250 ml	2	300.1/200.7	NONE/HNO ₃	FILTERED
UGW-MO-2007-3B	1426	PLASTIC	250 ml	1	300.0	NONE	UNFILTERED

QUALITY CONTROL SAMPLE RECORD

Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INM AL Sampling

Well No: MD-3-1

Well Name: MD-2007-3C

Project Name/Number: SIERRITA GW MONITORING (78306.2) Date: 6/28/2007

Recorder/Sampler: GS/MA

WELL INFORMATION

PUMP TEST

Total Well Depth ("a", ft): _____

Casing Diameter ("d", in.): _____ Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA Depth to Water ("b", ft): _____

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ _____ Gallons, (3 Casing Volumes _____ gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: _____ Time Completed: _____ Total Purge Time: _____ min

Purge Method: _____ Pump Setting (depth): _____ Total Purge Volume: _____ gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (uhos/cm)	pH	Other	D.O. (mg/L)	Odor	Notes
16:00		32.2	570	7.93				

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: _____ Time Completed: _____

Sampling Method, Type of Sampling Pump or Bailer: _____

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
FGW- <u>MD-3-1 FGW</u>	<u>16:00</u>	PLASTIC	125 mL/250 mL	2	300.1/200.7	NONE/HNO3	FILTERED
UGW- <u>MD-3-1 GW</u>	<u>16:00</u>	PLASTIC	250 mL	1	300.0	NONE	RAW

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time

HYDRO GEO CHEM, INC.
Groundwater Sampling Form

INTERNAL ZIMMER

Project Name/Number: ~~Unsub. Item 64800~~
PDSI-783000

Well No: *Mo-2007-4A*

Date: 10-9-07

Recorder/Sampler: N.J. Babb

WELL INFORMATION

Total Well Depth: 570 ft

Screened Interval (ft) From: 360 To: 560

Casing Diameter ("d", in.): 5"

Depth to Water & Time ("b", ft btic): 307.67

Well/Packer Depth ("a", ft): 570

One Wetted Casing Volume: $(a - b) * d^2 * 0.0408 = 267.6$ gallons, (3 Casing Volumes ~~803~~ 803 gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 14:00

Time Completed: 14:45

Total Purge Time: ~~2~~ ~~1~~ ~~0~~

Purge Method: 10-hp grinder

Pump Depth & Setting: 533'ft bfac

Total Purge Volume: ~~9.125~~

[illegible]

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 14:45

Time Completed: 14:45

Sampling Method: Pump or Bailer:

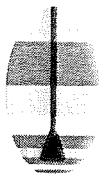
Sample No	Time	Container Type	Volume	No of Containers	Analysis Method	Preservative	Notes
Mo-2007-4A	14:45			2	ANIONS & CATIONS		
" " "	"			1	1	NONE	

QUALITY CONTROL SAMPLE RECORD N/A

Orig. Sample No	Type	QC Sample No	Time

TRANSDUCER RECORD

Transducer #: 109089 Battery Remaining: 95% Memory Remaining: _____ Replace Time: _____ WL/Time: 9:07 ft btic: _____
Notes: measurement is depth of transducer below H2O 66.070 @ 9:15 AM



HYDRO GEO CHEM, INC.
Groundwater Sampling Form

Initial Sample

Project Name/Number: ~~44-001-1000~~

PDST - 783000

Well No: no-2007-4B

Date: 10-11-07

Recorder/Sampler: NJ. Bebb

WELL INFORMATION

Total Well Depth: 950 ft

Screened Interval (ft) From: 700 To: 940

Casing Diameter ("d", in.): 5" ipd

Depth to Water & Time ("b", ft btic): 308.72 @ 7:30 AM

Well/Packer Depth ("a", ft): 950

One Wetted Casing Volume: $(a - b) * d^2 * 0.0408 =$ 653.3 gallons, (3 Casing Volumes 1960 gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 7:40

Time Completed: 8:20

Total Purge Time: 40 mins

Purge Method: 10-lp-3rundes

Pump Depth & Setting: 533' ft bgs

Total Purge Volume: 2000-gallons

Actual or Elapsed Time (Min)	Extraction Rate/Vol	pH	Conductivity (mS/cm)	Turbidity (NTU)	D.O. (mg/l)	Temp (°C)	Odor	Notes
7:40	50	7.88						
14:35	50	7.88	381	8.43	N/A	26.9	N°	Discharge clear
7:54	50	8.25	376	10.93	"	22.1	"	" "
8:01	"	8.03	382	22.4	"	25.0	"	" "
8:16	"	7.93	376	25.12	"	26.4	"	" "

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 8:20

Time Completed: 8:20

Sampling Method: Pump or Bailer: _____

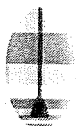
Sample No	Time	Container Type	Volume	No of Containers	Analysis Method	Preservative	Notes
no-2007-4B-f	8:20			2			filtered ^{ground} white dot
no-2007-4B	11			1			Raw

QUALITY CONTROL SAMPLE RECORD *N/A*

Orig. Sample No	Type	QC Sample No	Time

TRANSDUCER RECORD

Transducer #: _____ Battery Remaining: _____ Memory Remaining: _____ Replace Time: _____ WL/Time: _____ ft btic _____
Notes: _____



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INITIAL SAMPLING

Well No: GW-907211

Well Name: MO-2007-4C

Project Name/Number: SIERRITA GW MONITORING (78306.2)

Date: 08 / 16 / 2007

Recorder/Sampler: N.J. Babb

WELL INFORMATION

Total Well Depth ("a", ft): 1140' btoce

Casing Diameter ("d", in.): 5" in. Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA 1140' btoce Depth to Water ("b", ft): 307.13' ft btoce

One Wetted Casing Volume: $(a-b) \cdot d \cdot 0.0408 = 849.5$ Gallons, (3 Casing Volumes 2550 gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 7:48 Time Completed: 11:50 Total Purge Time: 182 min

Purge Method: 4" in. 10-hp ground fcs Pump Setting (depth): 429' ft btoce Total Purge Volume: 9147 gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (uhos/cm)	pH	Other turbidity	D.O. (mg/L)	Odor	Notes
7:48	15 gpm	26.0	467	7.58	12.2 NTU	N/A	NO	clear discharge 900
8:27	"	28.7	471	7.83	8.52	"	"	" 60 min @ 15 gpm = 800-2015
8:49	27 gpm	30.1	477	7.75	7.95	"	"	clear discharge
9:15	"	31.5	473	7.70	5.06	"	"	" "
9:50	55 gpm	32.1	474	7.71	4.72	"	"	" " 61 mins @ 55 gpm = 1647-2015
10:20	"	33.7	"	7.63	9.61	"	"	clear discharge
11:36	"	35.2	472	7.62	4.87	"	"	
11:50	"							obtained samples: (SO ₄ , ANIONS, metals) 120 mins @ 55 gpm = 6600
2 hrs @ 55 gpm = 6600								

Total Time
3 hrs 2 min

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 11:50 Time Completed: 11:50

Sampling Method, Type of Sampling Pump or Bailer: 4" in. 10-hp ground fcs w/ sampling port

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
FGW-907211	11:50	PLASTIC	125 mL/250 mL	2	300.1/200.7	NONE/HNO ₃	FILTERED
UGW-907211	"	PLASTIC	250 mL	1	300.0	NONE	RAW

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time
N/A			



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

Well No: GW-627483-051407Well Name: CW-3Project Name/Number: SIERRITA GW MONITORING (78306.2)Date: 05/14/2007 5/17/07Recorder/Sampler: KGSV MIA

WELL INFORMATION

Total Well Depth ("a", ft): 501Casing Diameter ("d", in.): 16 Screened Interval (ft): From: NA To: NAWell/Packer Depth ("a", ft): NA Depth to Water ("b", ft): ADWR = 260 265.35 @ 1145One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 = 2461$ Gallons, (3 Casing Volumes) 7384 gal

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 0650 Time Completed: 0750 Total Purge Time: 60 minPurge Method: Gravel/Fos Pump Setting (depth): 363' Total Purge Volume: 9000 gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C / °F)	Conductivity (mhos/cm)	pH	Other	D.O. (mg/L)	Odor	Notes
0650	150	24.8	444	7.40	9.99		None	clear
0700	150	25.3	453	7.64	9.52			
0715	150	25.2	448	7.73	8.34			
0725	150	25.3	449	7.72	0.00			Temp reading was done twice to confirm
0740	150	25.3	448	7.74	3.19			
0745	150	25.3	449	7.74	0.00			

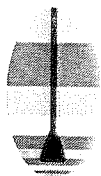
SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 0750 Time Completed: 0753Sampling Method, Type of Sampling Pump or Bailer: Pump

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
GW-627483-060609	0740	Glass	1L	1	1664	HCl	oil/crease
GW-627483-060607	0750	Poly	250	1	200.0	Raw	SO ₄
FW-627483-060607	0750	Poly	250	1	200.7	HNO ₃	Metals/Filtered
FW-627483-060607	0750	Poly	250	1	200.0	None	Metals/Filtered

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INITIAL SAMPLE

Project Name/Number: Honed Hole 64800
PDSE-783060

Well No: 140-2007-5B
 Date: 10-12-07
 Recorder/Sampler: N.J. Babb

WELL INFORMATION

Total Well Depth: 970 ft
 Casing Diameter ("d", in.): 5" in
 Well/Packer Depth ("a", ft): 970
 Screened Interval (ft) From: 660 To: 960'
 Depth to Water & Time ("b", ft btic): 268.27 @ 8:10.4
 One Wetted Casing Volume: $(a - b) * d^2 * 0.0408 =$ 716 gallons, (3 Casing Volumes 2148 gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 8:04 Time Completed: 10:30 Total Purge Time: 2 hrs 26 min 5
 Purge Method: 10 hp - 2 minutes Pump Depth & Setting: 533 ft 6.95 Total Purge Volume: 4150-gallons

Actual or Elapsed Time (Min)	Extraction Rate/Vol	pH	Conductivity (mS/cm)	Turbidity (NTU)	D.O. (mg/l)	Temp (°C)	Odor	Notes
8:05	16	8.41	1072	14.5	N/A	24.4	No	slightly cloudy
8:35	11	8.35	928	25.2	"	27.7	"	" "
8:55	11	8.22	1030	5.31	"	28.7	"	clear 9:03 Increased flow
9:10	30	8.18	1058	2.45	"	29.3	"	61 min @ 16 gpm = 976
9:40	30	"	1130	3.04	"	29.4	"	clear 30 gpm between 9:05
9:47	"	7.56	1114	N/A	"	29.5	"	" re-calibrated Hanna probe
10:15	56 gpm	7.65	1133	16.7	"	29.8	"	clear, Increased flow @ 10:06
10:25	"	7.63	1150	3.48	"	29.9	"	clear
10:30	Obtained Samples							

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 10:30 Time Completed: 10:30
 Sampling Method: Pump or Bailer:

Sample No	Time	Container Type	Volume	No of Containers	Analysis Method	Preservative	Notes
140-2007-5B-f	10:30	small plastic	3	1	ANIONS	HNO3	green dot
140-2007-5B-f	"	small plastic	3	1	CATIONS		white dot
140-2007-5B	"	larger plastic	3	1		RAW	

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No	Type	QC Sample No	Time

TRANSDUCER RECORD

Transducer #: _____ Battery Remaining: _____ Memory Remaining: _____ Replace Time: _____ WL/Time: _____ ft btic _____
 Notes: _____



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

INITIAL SAMPLING

Well No: GW-

Well Name: MO-2007-5C

Project Name/Number: SIERRITA GW MONITORING (78306.2)

Date: 8/23/2007

Recorder/Sampler: M. Anneson

WELL INFORMATION

Total Well Depth ("a", ft): 1370

Casing Diameter ("d", in.): 5

Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA

Depth to Water ("b", ft): 294.04

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ _____ Gallons, (3 Casing Volumes _____ gal)

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: _____ Time Completed: _____ Total Purge Time: _____ min

Purge Method: _____ Pump Setting (depth): _____ Total Purge Volume: _____ gal

Actual or Elapsed Time (Min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (uhos/cm)	pH	Other Turb (NTU)	D.O. (mg/L)	Odor	Notes
1625	21	32.5	930	7.47	4.10			Sample was collected during aquifer testing
1702		33.0	952	7.43	5.52			
1730		33.2	956	7.47	2.93			

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 1430 Time Completed: 1432

Sampling Method, Type of Sampling Pump or Bailer: _____

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
FGW-MO-2007-5C	1430	PLASTIC	125 mL/250 mL	2	300.1/200.7	NONE/HNO3	FILTERED
UGW-MO-2007-5C	1430	PLASTIC	250 mL	1	300.0	NONE	RAW

QUALITY CONTROL SAMPLE RECORD

Orig. Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Groundwater Sampling Form

Initial Sample

ADWR Well No: 55-907607

Well Name: MO-2007-6A

Project Name/Number: PDSI Sierrita GW Monitoring (78306.2)

Date: 10/2/2007

Sampler: M. Arneson

WELL INFORMATION

Total Well Depth ("a", ft): 620

Casing Diameter ("d", in.): 5"

Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA

Depth to Water ("b", ft): 303.60

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ _ Gallons, (3 Casing Volumes _ gal) No purg req
qualifer test in progress

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: _ Time Completed: _ Total Purge Time: _ min

Purge Method: _ Pump Setting (depth): _ Total Purge Volume: _ gal

Time (min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (µhos/cm)	pH (SU)	D.O. (mg/l)	Odor	Notes
1422	55	28.7	406	7.54			
1426	55	28.6	405	7.53			
1445	55	28.5	405	7.52			

SAMPLING INFORMATION AND SAMPLE RECORD

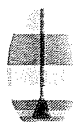
Time Started: _ Time Completed: _

Sampling Method, Type of Sampling Pump or Bailer: _

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
MO-2007-6AF	1455	PLASTIC	125ml / 250 ml	2	300.0 / 200.7	NONE / HNO ₃	FILTERED
MO-2007-6A	1455	PLASTIC	250 ml	1	300.0	NONE	UNFILTERED
MO-2007-DUPF	1500	"	125 / 250	2	300.0 / 200.7	None / HNO ₃	Filtered
MO-2007-DUP	1500	"	250 /	1	300.0	NONE	Unfiltered

QUALITY CONTROL SAMPLE RECORD

Sample No.	Type	QC Sample No.	Time



HYDRO GEO CHEM, INC.

Initial Sample

Groundwater Sampling Form

ADWR Well No: 55-907606

Well Name: MO-2007-6B

Project Name/Number: PDSI Sierrita GW Monitoring (78306.2)

Date: 10/4/2007

Sampler: M. Arneson

WELL INFORMATION

Total Well Depth ("a", ft): 950

Casing Diameter ("d", in.): 5"

Screened Interval (ft): From: NA To: NA

Well/Packer Depth ("a", ft): NA

Depth to Water ("b", ft): 319.17 (NB)

One Wetted Casing Volume: $(a-b) \cdot d^2 \cdot 0.0408 =$ _ Gallons, (3 Casing Volumes _ gal) *Amber test in progress*

PURGE INFORMATION AND FIELD MEASUREMENTS

Time Started: 1322 Time Completed: 1400 Total Purge Time: 38 min

Purge Method: Pump Pump Setting (depth): _ Total Purge Volume: 129 gal

Time (min)	Extraction Rate/Vol (gpm)	Temp (°C)	Conductivity (µhos/cm)	pH (SU)	D.O. (mg/l)	Odor	Notes
1322	34	33.5	479	7.63		None	Tan. Turbidity is 190 NTU
1330	"	33.2	486	7.64			
1337	"	33.2	484	7.71			Water color is still grey/tan
1350	"	33.2	483	7.69			
1356		33.1	483	7.70			

SAMPLING INFORMATION AND SAMPLE RECORD

Time Started: 1400 Time Completed: 1402

Sampling Method, Type of Sampling Pump or Bailer: Pump

Sample No.	Time	Container Type	Volume	No. of Containers	Analysis Method	Preservative	Notes
MO-2007-6BF	1400	PLASTIC	125ml / 250 ml	2	300.0 / 200.7	NONE / HNO3	FILTERED
MO-2007-6B	1400	PLASTIC	250 ml	1	300.0	NONE	UNFILTERED

QUALITY CONTROL SAMPLE RECORD

Sample No.	Type	QC Sample No.	Time

APPENDIX F.2

ANALYTICAL DATA REPORTS FROM ACZ LABORATORIES, INC.

June 19, 2007

Report to:

Ned Hall
Phelps Dodge Sierrita
P.O. Box 527 6200 W. Duval Mine Rd.
Green Valley, AZ 85622-0527

Bill to:

Accounts Payable
Phelps Dodge Sierrita
P.O. Box 2671
Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Kim Garcia

Project ID: OJ03Z5

ACZ Project ID: L63026

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 05, 2007. This project has been assigned to ACZ's project number, L63026. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L63026. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 19, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: UF-605898-060407

ACZ Sample ID: **L63026-01**

Date Sampled: 06/04/07 14:55

Date Received: 06/05/07

Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	41.3		*	mg/L	0.5	3	06/12/07 3:09	jlf

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: FGW-605898-060407

ACZ Sample ID: **L63026-02**

Date Sampled: 06/04/07 14:55

Date Received: 06/05/07

Sample Matrix: Ground Water

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	50.3			mg/L	0.2	1	06/15/07 20:11	djt
Magnesium, dissolved	M200.7 ICP	10.9			mg/L	0.2	1	06/15/07 20:11	djt
Potassium, dissolved	M200.7 ICP	3.9			mg/L	0.3	2	06/15/07 20:11	djt
Sodium, dissolved	M200.7 ICP	31.7			mg/L	0.3	2	06/15/07 20:11	djt

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		169			mg/L	2	20	06/14/07 0:00	cas
Carbonate as CaCO ₃			U		mg/L	2	20	06/14/07 0:00	cas
Hydroxide as CaCO ₃			U		mg/L	2	20	06/14/07 0:00	cas
Total Alkalinity		169			mg/L	2	20	06/14/07 0:00	cas
Cation-Anion Balance	Calculation								
Cation-Anion Balance		4.3			%			06/19/07 0:00	calc
Sum of Anions		4.5			meq/L	0.1	0.5	06/19/07 0:00	calc
Sum of Cations		4.9			meq/L	0.1	0.5	06/19/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	9.1		*	mg/L	0.5	3	06/12/07 3:27	jlf
Fluoride	M300.0 - Ion Chromatography	0.2	B	*	mg/L	0.1	0.5	06/12/07 3:27	jlf
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.34			mg/L	0.02	0.1	06/19/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.34		*	mg/L	0.02	0.1	06/05/07 18:59	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	06/05/07 18:59	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	280			mg/L	10	20	06/11/07 13:44	aeh
Sulfate	300.0 - Ion Chromatography	41.2		*	mg/L	0.5	3	06/12/07 3:27	jlf
TDS (calculated)	Calculation	250			mg/L	10	50	06/19/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.12						06/19/07 0:00	calc

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63026**

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226491													
WG226491PBW1	PBW	06/14/07 13:05				U	mg/L		-20	20			
WG226491LCSW2	LCSW	06/14/07 13:16	WC070601-1	820		795.7	mg/L	97	90	110			
L63038-02DUP	DUP	06/14/07 16:25			378	375.9	mg/L				0.6	20	
WG226491PBW2	PBW	06/14/07 16:31				U	mg/L		-20	20			
WG226491LCSW5	LCSW	06/14/07 16:44	WC070601-1	820		816.8	mg/L	99.6	90	110			
WG226491PBW3	PBW	06/14/07 21:05				U	mg/L		-20	20			
WG226491LCSW8	LCSW	06/14/07 21:16	WC070601-1	820		821.3	mg/L	100.2	90	110			
WG226491PBW4	PBW	06/15/07 0:31				U	mg/L		-20	20			
WG226491LCSW11	LCSW	06/15/07 0:44	WC070601-1	820		820.5	mg/L	100.1	90	110			
WG226491LCSW14	LCSW	06/15/07 3:13	WC070601-1	820		821.3	mg/L	100.2	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226498													
WG226498ICV	ICV	06/15/07 18:28	II070612-3	100		102.28	mg/L	102.3	95	105			
WG226498ICB	ICB	06/15/07 18:31				U	mg/L		-0.6	0.6			
WG226498LFB	LFB	06/15/07 18:44	II070601-2	67.99189		74.02	mg/L	108.9	85	115			
L63006-05AS	AS	06/15/07 19:34	II070601-2	67.99189	125	186.34	mg/L	90.2	85	115			
L63006-05ASD	ASD	06/15/07 19:37	II070601-2	67.99189	125	190.11	mg/L	95.8	85	115	2	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250LFB1	LFB	06/11/07 14:28	IC070205-3	30		30.76	mg/L	102.5	90	110			
WG226250LFB2	LFB	06/11/07 23:13	IC070205-3	30		30.82	mg/L	102.7	90	110			
L62993-03DUP	DUP	06/11/07 23:50			8	8.05	mg/L				0.6	20	
L62993-04AS	AS	06/12/07 0:26	IC070205-3	30	10.8	33.52	mg/L	75.7	90	110			M2
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250LFB1	LFB	06/11/07 14:28	IC070205-3	1.5		1.58	mg/L	105.3	90	110			
WG226250LFB2	LFB	06/11/07 23:13	IC070205-3	1.5		1.57	mg/L	104.7	90	110			
L62993-03DUP	DUP	06/11/07 23:50			.2	.11	mg/L				58.1	20	RA
L62993-04AS	AS	06/12/07 0:26	IC070205-3	1.5	.2	1.36	mg/L	77.3	90	110			M2
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63026**

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226498													
WG226498ICV	ICV	06/15/07 18:28	II070612-3	100		104.21	mg/L	104.2	95	105			
WG226498ICB	ICB	06/15/07 18:31				U	mg/L		-0.6	0.6			
WG226498LFB	LFB	06/15/07 18:44	II070601-2	54.96149		60.39	mg/L	109.9	85	115			
L63006-05AS	AS	06/15/07 19:34	II070601-2	54.96149	129	178.88	mg/L	90.8	85	115			
L63006-05ASD	ASD	06/15/07 19:37	II070601-2	54.96149	129	183.06	mg/L	98.4	85	115	2.31	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225946													
WG225946ICV	ICV	06/05/07 18:01	WI070308-3	2.416		2.346	mg/L	97.1	90	110			
WG225946ICB	ICB	06/05/07 18:02				U	mg/L		-0.06	0.06			
WG225946LFB1	LFB	06/05/07 18:07	WI070307-9	2		1.989	mg/L	99.5	90	110			
WG225946LFB2	LFB	06/05/07 18:45	WI070307-9	2		1.942	mg/L	97.1	90	110			
L63006-07AS	AS	06/05/07 18:51	WI070307-9	2	.5	2.477	mg/L	98.9	90	110			
L63006-08DUP	DUP	06/05/07 18:53			.11	.108	mg/L				1.8	20	RA

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG225946													
WG225946ICV	ICV	06/05/07 18:01	WI070308-3	.609		.616	mg/L	101.1	90	110			
WG225946ICB	ICB	06/05/07 18:02				U	mg/L		-0.03	0.03			
WG225946LFB1	LFB	06/05/07 18:07	WI070307-9	1		1.021	mg/L	102.1	90	110			
WG225946LFB2	LFB	06/05/07 18:45	WI070307-9	1		1.002	mg/L	100.2	90	110			
L63006-07AS	AS	06/05/07 18:51	WI070307-9	1	U	1.032	mg/L	103.2	90	110			
L63006-08DUP	DUP	06/05/07 18:53			.02	.023	mg/L				14	20	RA

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226498													
WG226498ICV	ICV	06/15/07 18:28	II070612-3	20		20.01	mg/L	100.1	95	105			
WG226498ICB	ICB	06/15/07 18:31				U	mg/L		-0.9	0.9			
WG226498LFB	LFB	06/15/07 18:44	II070601-2	99.69893		104.95	mg/L	105.3	85	115			
L63006-05AS	AS	06/15/07 19:34	II070601-2	99.69893	1.9	108.67	mg/L	107.1	85	115			
L63006-05ASD	ASD	06/15/07 19:37	II070601-2	99.69893	1.9	115.95	mg/L	114.4	85	115	6.48	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226260													
WG226260PBW	PBW	06/11/07 13:20				U	mg/L		-20	20			
WG226260LCSW	LCSW	06/11/07 13:21	PCN27107	261		278	mg/L	106.5	80	120			
L63045-02DUP	DUP	06/11/07 13:54			3650	3648	mg/L				0.1	20	

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63026**

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226498													
WG226498ICV	ICV	06/15/07 18:28	II070612-3	100		100.99	mg/L	101	95	105			
WG226498ICB	ICB	06/15/07 18:31				U	mg/L		-0.9	0.9			
WG226498LFB	LFB	06/15/07 18:44	II070601-2	98.01954		103.97	mg/L	106.1	85	115			
L63006-05AS	AS	06/15/07 19:34	II070601-2	98.01954	84.6	180.7	mg/L	98	85	115			
L63006-05ASD	ASD	06/15/07 19:37	II070601-2	98.01954	84.6	187.73	mg/L	105.2	85	115	3.82	20	

Sulfate 300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250LFB1	LFB	06/11/07 14:28	IC070205-3	30		30.86	mg/L	102.9	90	110			
WG226250LFB2	LFB	06/11/07 23:13	IC070205-3	30		30.57	mg/L	101.9	90	110			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
L62993-03DUP	DUP	06/12/07 17:42			390	388	mg/L				0.5	20	
L62993-04AS	AS	06/12/07 18:18	IC070205-3	600	1120	1606	mg/L	81	90	110			M2

Phelps Dodge SierritaACZ Project ID: **L63026**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L63026-01	WG226250	Sulfate	300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
L63026-02	WG226250	Chloride	M300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
		Fluoride	M300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
			M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG225946	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG226250	Sulfate	300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.

Phelps Dodge Sierrita

ACZ Project ID: **L63026**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L63026
Date Received: 6/5/2007
Received By:
Date Printed: 6/5/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA3706		4.2	15

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L63026
 Date Received: 6/5/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L63026-01	UF-605898-060407									X		<input type="checkbox"/>
L63026-02	FGW-605898-060407		Y									<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

CHAIN of CUSTODY

Report to:

Name: Kim Garcia
Company: Hydro Gea Chem Inc
E-mail: kimgarcia@hgcinc.com

Address: 51 W Wetmore Rd
Tucson, AZ 85705-1678
Telephone: (520) 293-1500 x123

Copy of Report to:

Name: Ned Hall / Bill Davis / Jim Norris
Company: PDST / HGL

E-mail: Jimn@hycinc.com, billydorris@FmL.com
Telephone: 293-1500 x 123 648-8873

Invoice to:

Name: Ned Hall
Company: PDSI
E-mail: ned-hall@fmi.com

Address: 6200 W. Duval Mine Rd
PO Box 527 Green Valley, AZ 85622
Telephone: 648-8857

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES	<input checked="" type="checkbox"/>
NO	<input type="checkbox"/>

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: *Sierrita short*
Project/PO #: *0JQ325*
Reporting state for compliance testing: *AZ*
Sampler's Name: *Mark Arneson*
Are any samples NRC licensable material? *No*

of Containers

SO ⁴⁻	Ca Mg Na K	ALK, TDS, SO ₄ ⁻ Cl ⁻ F ⁻ NO ₃ ⁻ NO ₂ ⁻
------------------	------------	--

pH	EC	Temp ^o
----	----	-------------------

[illegible]

Matrix	SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)
--------	--

REMARKS

UF = unFiltered
FGW = Filtered Groundwater sample

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	6/4/07: 1715	<i>[Signature]</i>	6-5-07 11:46

June 19, 2007

Report to:

Ned Hall
Phelps Dodge Sierrita
P.O. Box 527 6200 W. Duval Mine Rd.
Green Valley, AZ 85622-0527

Bill to:

Accounts Payable
Phelps Dodge Sierrita
P.O. Box 2671
Phoenix, AZ 85002-2671

cc: Kim Garcia, Jim Norris, Bill Dorris

Project ID: OJ03Z5

ACZ Project ID: L63094

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 07, 2007. This project has been assigned to ACZ's project number, L63094. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L63094. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 19, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: UGW-627483-060607

ACZ Sample ID: **L63094-01**

Date Sampled: 06/06/07 07:50

Date Received: 06/07/07

Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	58.7			mg/L	0.5	3	06/14/07 18:02	jlf

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: FGW-627483-060607

ACZ Sample ID: **L63094-02**

Date Sampled: 06/06/07 07:50

Date Received: 06/07/07

Sample Matrix: Ground Water

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	56.1			mg/L	0.2	1	06/15/07 2:26	djt
Magnesium, dissolved	M200.7 ICP	10.9		*	mg/L	0.2	1	06/15/07 2:26	djt
Potassium, dissolved	M200.7 ICP	3.0			mg/L	0.3	2	06/15/07 2:26	djt
Sodium, dissolved	M200.7 ICP	30.5			mg/L	0.3	2	06/15/07 2:26	djt

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		140			mg/L	2	20	06/14/07 0:00	cas
Carbonate as CaCO ₃			U		mg/L	2	20	06/14/07 0:00	cas
Hydroxide as CaCO ₃			U		mg/L	2	20	06/14/07 0:00	cas
Total Alkalinity		140			mg/L	2	20	06/14/07 0:00	cas
Cation-Anion Balance	Calculation								
Cation-Anion Balance		4.1			%			06/19/07 11:04	calc
Sum of Anions		4.7			meq/L	0.1	0.5	06/19/07 11:04	calc
Sum of Cations		5.1			meq/L	0.1	0.5	06/19/07 11:04	calc
Chloride	M300.0 - Ion Chromatography	17.7			mg/L	0.5	3	06/14/07 18:38	jlf
Fluoride	M300.0 - Ion Chromatography	0.3	B	*	mg/L	0.1	0.5	06/14/07 18:38	jlf
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	2.92			mg/L	0.02	0.1	06/19/07 11:04	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	2.92		*	mg/L	0.02	0.1	06/07/07 22:06	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	06/07/07 22:06	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	300		*	mg/L	10	20	06/13/07 11:35	aeh
Sulfate	300.0 - Ion Chromatography	57.9			mg/L	0.5	3	06/14/07 18:38	jlf
TDS (calculated)	Calculation	273			mg/L	10	50	06/19/07 11:04	calc
TDS (ratio - measured/calculated)	Calculation	1.10						06/19/07 11:04	calc

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63094**

Alkalinity as CaCO₃ SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226491													
WG226491PBW1	PBW	06/14/07 13:05				U	mg/L		-20	20			
WG226491LCSW2	LCSW	06/14/07 13:16	WC070601-1	820		795.7	mg/L	97	90	110			
WG226491PBW2	PBW	06/14/07 16:31				U	mg/L		-20	20			
WG226491LCSW5	LCSW	06/14/07 16:44	WC070601-1	820		816.8	mg/L	99.6	90	110			
WG226491PBW3	PBW	06/14/07 21:05				U	mg/L		-20	20			
WG226491LCSW8	LCSW	06/14/07 21:16	WC070601-1	820		821.3	mg/L	100.2	90	110			
L63094-02DUP	DUP	06/14/07 22:47			140	138.9	mg/L				0.8	20	
WG226491PBW4	PBW	06/15/07 0:31				U	mg/L		-20	20			
WG226491LCSW11	LCSW	06/15/07 0:44	WC070601-1	820		820.5	mg/L	100.1	90	110			
WG226491LCSW14	LCSW	06/15/07 3:13	WC070601-1	820		821.3	mg/L	100.2	90	110			

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226522													
WG226522ICV	ICV	06/15/07 1:15	II070612-3	100		98.57	mg/L	98.6	95	105			
WG226522ICB	ICB	06/15/07 1:19				U	mg/L		-0.6	0.6			
WG226522LFB	LFB	06/15/07 1:36	II070601-2	67.99189		68.69	mg/L	101	85	115			
L63071-02AS	AS	06/15/07 1:44	II070601-2	67.99189	135	198.46	mg/L	93.3	85	115			
L63071-02ASD	ASD	06/15/07 1:48	II070601-2	67.99189	135	196.18	mg/L	90	85	115	1.16	20	

Chloride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG226534													
WG226534ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226534ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226534ICV1	ICV	06/14/07 16:31	IC070606-1	20		20.3	mg/L	101.5	90	110			
WG226534ICB1	ICB	06/14/07 16:49				U	mg/L		-1.5	1.5			
WG226534LFB	LFB	06/14/07 17:07	IC070205-3	30		30	mg/L	100	90	110			
L63014-01DUP	DUP	06/14/07 17:43			49.3	49.1	mg/L				0.4	20	
L63094-01AS	AS	06/14/07 18:20	IC070205-3	30	18	46.28	mg/L	94.3	90	110			
WG226534ICV2	ICV	06/18/07 11:10	IC070606-1	20		20.25	mg/L	101.3	90	110			
WG226534ICB2	ICB	06/18/07 11:28				U	mg/L		-1.5	1.5			

Phelps Dodge Sierrita
Project ID: OJ03Z5

ACZ Project ID: **L63094**

Fluoride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG226534													
WG226534ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226534ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226534ICV1	ICV	06/14/07 16:31	IC070606-1	3.984		4.12	mg/L	103.4	90	110			
WG226534ICB1	ICB	06/14/07 16:49				U	mg/L		-0.3	0.3			
WG226534LFB	LFB	06/14/07 17:07	IC070205-3	1.5		1.55	mg/L	103.3	90	110			
L63014-01DUP	DUP	06/14/07 17:43			.3	.29	mg/L				3.4	20	RA
L63094-01AS	AS	06/14/07 18:20	IC070205-3	1.5	.2	1.77	mg/L	104.7	90	110			
WG226534ICV2	ICV	06/18/07 11:10	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226534ICB2	ICB	06/18/07 11:28				.11	mg/L		-0.3	0.3			

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226522													
WG226522ICV	ICV	06/15/07 1:15	II070612-3	100		99.9	mg/L	99.9	95	105			
WG226522ICB	ICB	06/15/07 1:19				U	mg/L		-0.6	0.6			
WG226522LFB	LFB	06/15/07 1:36	II070601-2	54.96149		54.94	mg/L	100	85	115			
L63071-02AS	AS	06/15/07 1:44	II070601-2	54.96149	11.9	71.91	mg/L	109.2	85	115			
L63071-02ASD	ASD	06/15/07 1:48	II070601-2	54.96149	11.9	76.64	mg/L	117.8	85	115	6.37	20	MA

Nitrate/Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226127													
WG226127ICV	ICV	06/07/07 21:06	WI070308-3	2.416		2.331	mg/L	96.5	90	110			
WG226127ICB	ICB	06/07/07 21:07				U	mg/L		-0.06	0.06			
WG226127LFB1	LFB	06/07/07 21:12	WI070307-9	2		2.008	mg/L	100.4	90	110			
WG226127LFB2	LFB	06/07/07 21:50	WI070307-9	2		1.938	mg/L	96.9	90	110			
L63089-08AS	AS	06/07/07 21:56	WI070307-9	2	U	1.981	mg/L	99.1	90	110			
L63089-09DUP	DUP	06/07/07 21:59			U	U	mg/L				0	20	RA

Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226127													
WG226127ICV	ICV	06/07/07 21:06	WI070308-3	.609		.61	mg/L	100.2	90	110			
WG226127ICB	ICB	06/07/07 21:07				U	mg/L		-0.03	0.03			
WG226127LFB1	LFB	06/07/07 21:12	WI070307-9	1		1.017	mg/L	101.7	90	110			
WG226127LFB2	LFB	06/07/07 21:50	WI070307-9	1		.992	mg/L	99.2	90	110			
L63089-08AS	AS	06/07/07 21:56	WI070307-9	1	U	1.026	mg/L	102.6	90	110			
L63089-09DUP	DUP	06/07/07 21:59			U	U	mg/L				0	20	RA

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63094**

Potassium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226522													
WG226522ICV	ICV	06/15/07 1:15	II070612-3	20		20.56	mg/L	102.8	95	105			
WG226522ICB	ICB	06/15/07 1:19				U	mg/L		-0.9	0.9			
WG226522LFB	LFB	06/15/07 1:36	II070601-2	99.69893		102.15	mg/L	102.5	85	115			
L63071-02AS	AS	06/15/07 1:44	II070601-2	99.69893	28.5	135.22	mg/L	107	85	115			
L63071-02ASD	ASD	06/15/07 1:48	II070601-2	99.69893	28.5	132.62	mg/L	104.4	85	115	1.94	20	

Residue, Filterable (TDS) @180C 160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226419													
WG226419PBW	PBW	06/13/07 11:20				U	mg/L		-20	20			
WG226419LCSW	LCSW	06/13/07 11:21	PCN27107	261		296	mg/L	113.4	80	120			
L63119-03DUP	DUP	06/13/07 11:38			60	70	mg/L				15.4	20	RA

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226522													
WG226522ICV	ICV	06/15/07 1:15	II070612-3	100		101.88	mg/L	101.9	95	105			
WG226522ICB	ICB	06/15/07 1:19				U	mg/L		-0.9	0.9			
WG226522LFB	LFB	06/15/07 1:36	II070601-2	98.01954		100.11	mg/L	102.1	85	115			
L63071-02AS	AS	06/15/07 1:44	II070601-2	98.01954	91.3	189.06	mg/L	99.7	85	115			
L63071-02ASD	ASD	06/15/07 1:48	II070601-2	98.01954	91.3	188.61	mg/L	99.3	85	115	0.24	20	

Sulfate 300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG226534													
WG226534ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226534ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226534ICV1	ICV	06/14/07 16:31	IC070606-1	50.15		51.2	mg/L	102.1	90	110			
WG226534ICB1	ICB	06/14/07 16:49				U	mg/L		-1.5	1.5			
WG226534LFB	LFB	06/14/07 17:07	IC070205-3	30		30.14	mg/L	100.5	90	110			
L63094-01AS	AS	06/14/07 18:20	IC070205-3	30	58.7	85.95	mg/L	90.8	90	110			
WG226534ICV2	ICV	06/18/07 11:10	IC070606-1	50.15		50.97	mg/L	101.6	90	110			
WG226534ICB2	ICB	06/18/07 11:28				U	mg/L		-1.5	1.5			
L63014-01DUP	DUP	06/18/07 12:05			385	385.9	mg/L				0.2	20	

Phelps Dodge SierritaACZ Project ID: **L63094**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L63094-02	WG226522	Magnesium, dissolved	M200.7 ICP	MA	Recovery for either the spike or spike duplicate was outside of the acceptance limits; the RPD was within the acceptance limits.
	WG226534	Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG226127	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG226419	Residue, Filterable (TDS) @180C	160.1 / SM2540C	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Phelps Dodge Sierrita

ACZ Project ID: **L63094**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L63094
Date Received: 6/7/2007
Received By:
Date Printed: 6/8/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA3729		2.5	14

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L63094
 Date Received: 6/7/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L63094-01	UGW-627483-060607									X		<input type="checkbox"/>
L63094-02	FGW-627483-060607		Y									<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____



Laboratories, Inc.

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

L63094

CHAIN of CUSTODY

Report to:

Name: Kim Garcia
Company: Hydroben Chem Inc.
E-mail: kimg@hgcinc.com

Address: 51 W. Wetmore Rd
Tucson, AZ 85705
Telephone: 520) 293-1500 x123

Copy of Report to:

Name: Ned Hall, Bill Davis, Jim Morris
Company: PDSE/HGC

E-mail: jimnphgcinc.com billdavis@fmi.com
Telephone: 293-1500 x123 648-8873

Invoice to:

Name: Ned Hall
Company: PDSE
E-mail: ned-hall@fmi.com

Address: 6200 W. Duval Mine Rd
PO Box 527 Green Valley, AZ 85602
Telephone: 520) 648-8857

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES ☒
NO ☐

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Sierra short
Project/PO #: OJ0325
Reporting state for compliance testing: AZ
Sampler's Name: Mark Aleson
Are any samples NRC licensable material? No

SAMPLE IDENTIFICATION	DATE:TIME	Matrix	# of Containers	SO ⁴⁻	Ca Mg Na K	Al, TDS, SO ₄ ²⁻	Cl ⁻ , F ⁻ , NO ₃ ⁻ , NO ₂ ⁻	PH	EC	Temp °C
UGW-627483-060607	6/6/07: 0750	GLW	1	X				7.74	449	25.3
FGW-627483-060607	6/6/07: 0750	GLW	2		X	X		7.74	449	25.3

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

Please Rush Results

UGW = Unfiltered Groundwater Sample

FGW = Filtered Groundwater Sample

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
Mark Aleson	6/6/07: 1558	KLJ	6/7/07: 1217

June 26, 2007

Report to:

Ned Hall
Phelps Dodge Sierrita
P.O. Box 527 6200 W. Duval Mine Rd.
Green Valley, AZ 85622-0527

Bill to:

Accounts Payable
Phelps Dodge Sierrita
P.O. Box 2671
Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Rick Zimmerman

Project ID: OJ03Z5

ACZ Project ID: L63262

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 16, 2007. This project has been assigned to ACZ's project number, L63262. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L63262. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after July 26, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2PT

ACZ Sample ID: **L63262-01**

Date Sampled: 06/14/07 15:50

Date Received: 06/16/07

Sample Matrix: Ground Water

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	196			mg/L	0.2	1	06/22/07 1:48	msh
Magnesium, dissolved	M200.7 ICP	35.5			mg/L	0.2	1	06/22/07 1:48	msh
Potassium, dissolved	M200.7 ICP	7.7			mg/L	0.3	2	06/22/07 1:48	msh
Sodium, dissolved	M200.7 ICP	73.5			mg/L	0.3	2	06/22/07 1:48	msh

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		108			mg/L	2	20	06/20/07 0:00	cas
Carbonate as CaCO ₃			U		mg/L	2	20	06/20/07 0:00	cas
Hydroxide as CaCO ₃			U		mg/L	2	20	06/20/07 0:00	cas
Total Alkalinity		108		*	mg/L	2	20	06/20/07 0:00	cas
Cation-Anion Balance	Calculation								
Cation-Anion Balance		2.2			%			06/26/07 0:00	calc
Sum of Anions		15.4			meq/L	0.1	0.5	06/26/07 0:00	calc
Sum of Cations		16.1			meq/L	0.1	0.5	06/26/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	28.3			mg/L	0.5	3	06/20/07 23:58	jlf
Fluoride	M300.0 - Ion Chromatography	0.3	B	*	mg/L	0.1	0.5	06/20/07 23:58	jlf
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.94			mg/L	0.02	0.1	06/26/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.94			mg/L	0.02	0.1	06/16/07 15:33	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	06/16/07 15:33	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	1060			mg/L	10	20	06/20/07 14:49	seb
Sulfate	300.0 - Ion Chromatography	591			mg/L	5	30	06/21/07 16:45	jlf
TDS (calculated)	Calculation	1000			mg/L	10	50	06/26/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.06						06/26/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2PT(RAW)

ACZ Sample ID: **L63262-02**

Date Sampled: 06/14/07 15:50

Date Received: 06/16/07

Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	596			mg/L	5	30	06/21/07 17:03	jlf

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
Project ID: OJ03Z5

ACZ Project ID: **L63262**

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226816													
WG226816PBW1	PBW	06/19/07 15:52				U	mg/L		-20	20			
WG226816LCSW2	LCSW	06/19/07 16:04	WC070614-1	820		819	mg/L	99.9	90	110			
WG226816PBW2	PBW	06/19/07 18:54				U	mg/L		-20	20			
WG226816LCSW5	LCSW	06/19/07 19:06	WC070614-1	820		821.1	mg/L	100.1	90	110			
WG226816PBW3	PBW	06/19/07 22:17				U	mg/L		-20	20			
WG226816LCSW8	LCSW	06/19/07 22:30	WC070614-1	820		822.5	mg/L	100.3	90	110			
WG226816PBW4	PBW	06/20/07 1:19				U	mg/L		-20	20			
WG226816LCSW11	LCSW	06/20/07 1:32	WC070614-1	820		825.2	mg/L	100.6	90	110			
L63272-09DUP	DUP	06/20/07 4:36			54	53.7	mg/L				0.6	20	
WG226816LCSW14	LCSW	06/20/07 4:48	WC070614-1	820		825.4	mg/L	100.7	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226818													
WG226818ICV	ICV	06/21/07 23:38	II070612-3	100		98.44	mg/L	98.4	95	105			
WG226818ICB	ICB	06/21/07 23:42				U	mg/L		-0.6	0.6			
WG226818LFB	LFB	06/21/07 23:58	II070615-2	67.97008		68.98	mg/L	101.5	85	115			
L63114-01AS	AS	06/22/07 1:03	II070615-2	339.8504	1100	1431.5	mg/L	97.5	85	115			
L63114-01ASD	ASD	06/22/07 1:07	II070615-2	339.8504	1100	1428.9	mg/L	96.8	85	115	0.18	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG226894													
WG226894ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226894ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226894ICV1	ICV	06/20/07 15:49	IC070606-1	20		20	mg/L	100	90	110			
WG226894ICB1	ICB	06/20/07 16:07				U	mg/L		-1.5	1.5			
WG226894LFB	LFB	06/20/07 16:25	IC070205-3	30		30.39	mg/L	101.3	90	110			
L63250-05DUP	DUP	06/20/07 21:15			80.2	80.3	mg/L				0.1	20	
WG226894ICV2	ICV	06/21/07 11:55	IC070606-1	20		20.72	mg/L	103.6	90	110			
WG226894ICB2	ICB	06/21/07 12:13				U	mg/L		-1.5	1.5			
L63250-06AS	AS	06/21/07 16:27	IC070205-3	600	80	675	mg/L	99.2	90	110			

Phelps Dodge Sierrita
Project ID: OJ03Z5

ACZ Project ID: **L63262**

Fluoride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG226894													
WG226894ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226894ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226894ICV1	ICV	06/20/07 15:49	IC070606-1	3.984		4.07	mg/L	102.2	90	110			
WG226894ICB1	ICB	06/20/07 16:07				.12	mg/L		-0.3	0.3			
WG226894LFB	LFB	06/20/07 16:25	IC070205-3	1.5		1.54	mg/L	102.7	90	110			
L63250-05DUP	DUP	06/20/07 21:15			3.3	3.31	mg/L				0.3	20	
L63250-06AS	AS	06/20/07 21:51	IC070205-3	1.5	2.7	3.94	mg/L	82.7	90	110			M2
WG226894ICV2	ICV	06/21/07 11:55	IC070606-1	3.984		4.09	mg/L	102.7	90	110			
WG226894ICB2	ICB	06/21/07 12:13				U	mg/L		-0.3	0.3			

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226818													
WG226818ICV	ICV	06/21/07 23:38	II070612-3	100		99.49	mg/L	99.5	95	105			
WG226818ICB	ICB	06/21/07 23:42				U	mg/L		-0.6	0.6			
WG226818LFB	LFB	06/21/07 23:58	II070615-2	54.96908		55.39	mg/L	100.8	85	115			
L63114-01AS	AS	06/22/07 1:03	II070615-2	274.8454	2360	2610.8	mg/L	91.3	85	115			
L63114-01ASD	ASD	06/22/07 1:07	II070615-2	274.8454	2360	2609.2	mg/L	90.7	85	115	0.06	20	

Nitrate/Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226660													
WG226660ICV	ICV	06/16/07 15:27	WI070609-1	2.416		2.318	mg/L	95.9	90	110			
WG226660ICB	ICB	06/16/07 15:28				U	mg/L		-0.06	0.06			
L63262-01DUP	DUP	06/16/07 15:34			.94	.943	mg/L				0.3	20	
L63262-01AS	AS	06/16/07 15:35	WI070307-9	2	.94	3.002	mg/L	103.1	90	110			
WG226660LFB	LFB	06/16/07 15:38	WI070307-9	2		2.036	mg/L	101.8	90	110			

Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226660													
WG226660ICV	ICV	06/16/07 15:27	WI070609-1	.609		.609	mg/L	100	90	110			
WG226660ICB	ICB	06/16/07 15:28				U	mg/L		-0.03	0.03			
L63262-01DUP	DUP	06/16/07 15:34			U	U	mg/L				0	20	RA
L63262-01AS	AS	06/16/07 15:35	WI070307-9	1	U	1.042	mg/L	104.2	90	110			
WG226660LFB	LFB	06/16/07 15:38	WI070307-9	1		.995	mg/L	99.5	90	110			

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63262**

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226818													
WG226818ICV	ICV	06/21/07 23:38	II070612-3	20		20.1	mg/L	100.5	95	105			
WG226818ICB	ICB	06/21/07 23:42				.4	mg/L		-0.9	0.9			
WG226818LFB	LFB	06/21/07 23:58	II070615-2	99.76186		101.28	mg/L	101.5	85	115			
L63114-01AS	AS	06/22/07 1:03	II070615-2	498.8093	138	703.2	mg/L	113.3	85	115			
L63114-01ASD	ASD	06/22/07 1:07	II070615-2	498.8093	138	706.8	mg/L	114	85	115	0.51	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226892													
WG226892PBW	PBW	06/20/07 14:28				U	mg/L		-20	20			
WG226892LCSW	LCSW	06/20/07 14:30	PCN27102	260		274	mg/L	105.4	80	120			
L63276-04DUP	DUP	06/20/07 15:00			150	144	mg/L				4.1	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226818													
WG226818ICV	ICV	06/21/07 23:38	II070612-3	100		101.29	mg/L	101.3	95	105			
WG226818ICB	ICB	06/21/07 23:42				U	mg/L		-0.9	0.9			
WG226818LFB	LFB	06/21/07 23:58	II070615-2	98.21624		100.19	mg/L	102	85	115			
L63114-01AS	AS	06/22/07 1:03	II070615-2	491.0812	841	1360.5	mg/L	105.8	85	115			
L63114-01ASD	ASD	06/22/07 1:07	II070615-2	491.0812	841	1367.2	mg/L	107.2	85	115	0.49	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG226894													
WG226894ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226894ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226894ICV1	ICV	06/20/07 15:49	IC070606-1	50.15		50.43	mg/L	100.6	90	110			
WG226894ICB1	ICB	06/20/07 16:07				U	mg/L		-1.5	1.5			
WG226894LFB	LFB	06/20/07 16:25	IC070205-3	30		30.38	mg/L	101.3	90	110			
WG226894ICV2	ICV	06/21/07 11:55	IC070606-1	50.15		50.81	mg/L	101.3	90	110			
WG226894ICB2	ICB	06/21/07 12:13				U	mg/L		-1.5	1.5			
L63250-05DUP	DUP	06/21/07 15:14			305	305.3	mg/L				0.1	20	
L63250-06AS	AS	06/21/07 16:27	IC070205-3	600	750	1329	mg/L	96.5	90	110			

Phelps Dodge SierritaACZ Project ID: **L63262**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L63262-01	WG226894	Fluoride	M300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG226660	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG226816	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.

Phelps Dodge Sierrita

ACZ Project ID: **L63262**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L63262
Date Received: 6/16/2007
Received By:
Date Printed: 6/18/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA3792		5.5	16

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita

ACZ Project ID: L63262
 Date Received: 6/16/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L63262-01	MO-2PT		Y									<input type="checkbox"/>
L63262-02	MO-2PT(RAW)									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparatiior

Sample IDs Reviewed By: _____

ACZ Laboratories, Inc.

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Report to:

Name: Rick Zimmerman
Company: Hydro Geo Chem
E-mail: rickz@hgchem.com

Address: 51 W. Wetmore Rd., Suite 101
Tucson, AZ 85705
Telephone: (520) 293-1500

Copy of Report to:

Name: Ned Hall / Billy Dorris / Jim Norris
Company: PDSE / HGL

E-mail: Jimn@hgcinc.com, billydorris@fmi.com
Telephone: (520) 293-1500 x 123, (520) 648-8873

Invoice to:

Name: Ned Hall
Company: PDSI
E-mail: ned_hall@fmi.com

Address: 6200 W. Duval Mine Rd
PO Box 527 Green Valley, AZ 85622
Telephone: (520) 648-8857

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES	<input checked="" type="checkbox"/>
NO	<input type="checkbox"/>

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

is indicated. ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Sierrita Short
Project/PO #: OJ 325
Reporting state for compliance testing: AZ
Sampler's Name: NATHAN HANS
Are any samples NRC licensable material? No

of Containers

 α, Mg, Na, K

Alk, TDS, SO₄⁻
Cl⁻, F⁻, NO₃⁻

24

4

22 (57)

Temp/°C

SAMPLE IDENTIFICATION	DATE:TIME	Matrix
-----------------------	-----------	--------

MO-2 PT	6-14-07 1550	GW	2					7.05	1372	32.2
MO-2 PT (Raw)	6-14-07 1550	GW	1					7.05	1372	32.2

Matrix	SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)
--------	--

REMARKS

R_{105}H

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:

DATE:TIME

RECEIVED BY:

DATE:TIME

Robert Shaw	6-15-07 9:15	1788	6-16-07 11:03

July 18, 2007

Report to:

Ned Hall
Phelps Dodge Sierrita
P.O. Box 527 6200 W. Duval Mine Rd.
Green Valley, AZ 85622-0527

Bill to:

Accounts Payable
Phelps Dodge Sierrita
P.O. Box 2671
Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Kim Garcia

Project ID: OJ03Z5

ACZ Project ID: L63562

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on June 30, 2007. This project has been assigned to ACZ's project number, L63562. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 11.0. The enclosed results relate only to the samples received under L63562. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after August 18, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

July 18, 2007

Project ID: OJ03Z5

ACZ Project ID: L63562

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 2 ground water samples from Phelps Dodge Sierrita on June 30, 2007. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L63562. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Samples were received outside the EPA recommended temperature of 0-6 degrees C.

Holding Times

Any analyses not performed within EPA recommended holding times have been qualified with an "H" flag.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures.

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-3-1FGW

ACZ Sample ID: **L63562-01**

Date Sampled: 06/28/07 16:00

Date Received: 06/30/07

Sample Matrix: Ground Water

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	28.2			mg/L	0.2	1	07/13/07 18:00	msh
Magnesium, dissolved	M200.7 ICP	1.4			mg/L	0.2	1	07/13/07 18:00	msh
Potassium, dissolved	M200.7 ICP	3.3			mg/L	0.3	2	07/13/07 18:00	msh
Sodium, dissolved	M200.7 ICP	93.4			mg/L	0.3	2	07/13/07 18:00	msh

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		103			mg/L	2	20	07/05/07 0:00	jlf/lcp
Carbonate as CaCO ₃			U		mg/L	2	20	07/05/07 0:00	jlf/lcp
Hydroxide as CaCO ₃			U		mg/L	2	20	07/05/07 0:00	jlf/lcp
Total Alkalinity		103			mg/L	2	20	07/05/07 0:00	jlf/lcp
Cation-Anion Balance	Calculation								
Cation-Anion Balance		2.7			%			07/18/07 11:01	calc
Sum of Anions		5.4			meq/L	0.1	0.5	07/18/07 11:01	calc
Sum of Cations		5.7			meq/L	0.1	0.5	07/18/07 11:01	calc
Chloride	M300.0 - Ion Chromatography	11.4		*	mg/L	0.5	3	07/16/07 22:04	jag
Fluoride	M300.0 - Ion Chromatography	3.1		*	mg/L	0.1	0.5	07/16/07 22:04	jag
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.30			mg/L	0.02	0.1	07/18/07 11:01	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.30	H	*	mg/L	0.02	0.1	06/30/07 16:16	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		HU	*	mg/L	0.01	0.05	06/30/07 16:16	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	380			mg/L	10	20	07/05/07 13:42	kmc
Sulfate	300.0 - Ion Chromatography	136		*	mg/L	3	10	07/17/07 12:21	jag
TDS (calculated)	Calculation	340			mg/L	10	50	07/18/07 11:01	calc
TDS (ratio - measured/calculated)	Calculation	1.12						07/18/07 11:01	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5
Sample ID: MO-3-1GW

ACZ Sample ID: **L63562-02**
Date Sampled: 06/28/07 16:00
Date Received: 06/30/07
Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	136		*	mg/L	3	10	07/17/07 12:40	jag

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63562**

Alkalinity as CaCO₃

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG228017													
WG228017PBW1	PBW	07/05/07 10:52				U	mg/L		-20	20			
WG228017LCSW1	LCSW	07/05/07 11:01	WC070628-1	820		816.9	mg/L	99.6	90	110			
L63561-01DUP	DUP	07/05/07 14:24			125	125.5	mg/L				0.4	20	
WG228017PBW2	PBW	07/05/07 14:43				U	mg/L		-20	20			
WG228017LCSW2	LCSW	07/05/07 14:53	WC070628-1	820		828.6	mg/L	101	90	110			
WG228017PBW3	PBW	07/05/07 18:25				U	mg/L		-20	20			
WG228017LCSW3	LCSW	07/05/07 18:35	WC070628-1	820		823.4	mg/L	100.4	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG228215													
WG228215ICV	ICV	07/13/07 17:16	II070703-2	100		100.2	mg/L	100.2	95	105			
WG228215ICB	ICB	07/13/07 17:20				U	mg/L		-0.6	0.6			
WG228215LFB	LFB	07/13/07 17:34	II070709-3	67.97008		71.72	mg/L	105.5	85	115			
L63470-01AS	AS	07/13/07 17:45	II070709-3	67.97008	45.5	117.35	mg/L	105.7	85	115			
L63470-01ASD	ASD	07/13/07 17:49	II070709-3	67.97008	45.5	118.43	mg/L	107.3	85	115	0.92	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG228384													
WG228384ICV	ICV	06/11/07 13:52	IC070710-1	20		20.34	mg/L	101.7	90	110			
WG228384ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG228384ICV1	ICV	07/16/07 13:37	IC070710-1	20		20.13	mg/L	100.7	90	110			
WG228384ICB1	ICB	07/16/07 13:55				U	mg/L		-1.5	1.5			
WG228384LFB1	LFB	07/16/07 14:13	IC070205-3	30		31.26	mg/L	104.2	90	110			
L63539-03DUP	DUP	07/16/07 19:03			.6	.62	mg/L				3.3	20	RA
L63539-04AS	AS	07/16/07 19:39	IC070205-3	30	1.5	30.9	mg/L	98	90	110			
WG228384LFB2	LFB	07/16/07 22:58	IC070205-3	30		31.37	mg/L	104.6	90	110			

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63562**

Fluoride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG228384													
WG228384ICV	ICV	06/11/07 13:52	IC070710-1	3.984		4.13	mg/L	103.7	90	110			
WG228384ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG228384ICV1	ICV	07/16/07 13:37	IC070710-1	3.984		4.08	mg/L	102.4	90	110			
WG228384ICB1	ICB	07/16/07 13:55				U	mg/L		-0.3	0.3			
WG228384LFB1	LFB	07/16/07 14:13	IC070205-3	1.5		1.58	mg/L	105.3	90	110			
L63539-03DUP	DUP	07/16/07 19:03			.1	.12	mg/L				18.2	20	RA
L63539-04AS	AS	07/16/07 19:39	IC070205-3	1.5	.2	1.7	mg/L	100	90	110			
WG228384LFB2	LFB	07/16/07 22:58	IC070205-3	1.5		1.63	mg/L	108.7	90	110			

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG228215													
WG228215ICV	ICV	07/13/07 17:16	II070703-2	100		101.15	mg/L	101.2	95	105			
WG228215ICB	ICB	07/13/07 17:20				U	mg/L		-0.6	0.6			
WG228215LFB	LFB	07/13/07 17:34	II070709-3	54.96908		58.16	mg/L	105.8	85	115			
L63470-01AS	AS	07/13/07 17:45	II070709-3	54.96908	21	82.02	mg/L	111	85	115			
L63470-01ASD	ASD	07/13/07 17:49	II070709-3	54.96908	21	82.9	mg/L	112.6	85	115	1.07	20	

Nitrate/Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG227541													
WG227541ICV	ICV	06/30/07 15:19	WI070609-1	2.416		2.314	mg/L	95.8	90	110			
WG227541ICB	ICB	06/30/07 15:20				U	mg/L		-0.06	0.06			
WG227541ICV1	ICV	06/30/07 15:42	WI070609-1	2.416		2.268	mg/L	93.9	90	110			
WG227541ICB1	ICB	06/30/07 15:44				U	mg/L		-0.06	0.06			
WG227543													
WG227543ICV	ICV	06/30/07 15:55	WI070609-1	2.416		2.336	mg/L	96.7	90	110			
WG227543ICB	ICB	06/30/07 15:56				U	mg/L		-0.06	0.06			
WG227543LFB	LFB	06/30/07 15:57	WI070307-9	2		2.065	mg/L	103.3	90	110			
L63526-02AS	AS	06/30/07 16:00	WI070307-9	2	.1	2.07	mg/L	98.5	90	110			
L63559-01DUP	DUP	06/30/07 16:02			U	.022	mg/L				200	20	RA

Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG227543													
WG227543ICV	ICV	06/30/07 15:55	WI070609-1	.609		.621	mg/L	102	90	110			
WG227543ICB	ICB	06/30/07 15:56				U	mg/L		-0.03	0.03			
WG227543LFB	LFB	06/30/07 15:57	WI070307-9	1		1.031	mg/L	103.1	90	110			
L63526-02AS	AS	06/30/07 16:00	WI070307-9	1	U	1.02	mg/L	102	90	110			
L63559-01DUP	DUP	06/30/07 16:02			U	U	mg/L				0	20	RA

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L63562**

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG228215													
WG228215ICV	ICV	07/13/07 17:16	II070703-2	20		19.92	mg/L	99.6	95	105			
WG228215ICB	ICB	07/13/07 17:20				U	mg/L		-0.9	0.9			
WG228215LFB	LFB	07/13/07 17:34	II070709-3	99.76186		103.41	mg/L	103.7	85	115			
L63470-01AS	AS	07/13/07 17:45	II070709-3	99.76186	20.1	123.34	mg/L	103.5	85	115			
L63470-01ASD	ASD	07/13/07 17:49	II070709-3	99.76186	20.1	124.18	mg/L	104.3	85	115	0.68	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG227774													
WG227774PBW	PBW	07/05/07 12:45				U	mg/L		-20	20			
WG227774LCSW	LCSW	07/05/07 12:47	PCN27105	261		278	mg/L	106.5	80	120			
L63562-01DUP	DUP	07/05/07 13:45			380	376	mg/L				1.1	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG228215													
WG228215ICV	ICV	07/13/07 17:16	II070703-2	100		101.02	mg/L	101	95	105			
WG228215ICB	ICB	07/13/07 17:20				U	mg/L		-0.9	0.9			
WG228215LFB	LFB	07/13/07 17:34	II070709-3	98.21624		102.85	mg/L	104.7	85	115			
L63470-01AS	AS	07/13/07 17:45	II070709-3	98.21624	38.7	135.71	mg/L	98.8	85	115			
L63470-01ASD	ASD	07/13/07 17:49	II070709-3	98.21624	38.7	137.01	mg/L	100.1	85	115	0.95	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG228384													
WG228384ICV	ICV	06/11/07 13:52	IC070710-1	50.15		51.51	mg/L	102.7	90	110			
WG228384ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG228384ICV1	ICV	07/16/07 13:37	IC070710-1	50.15		50.8	mg/L	101.3	90	110			
WG228384ICB1	ICB	07/16/07 13:55				U	mg/L		-1.5	1.5			
WG228384LFB1	LFB	07/16/07 14:13	IC070205-3	30		31.21	mg/L	104	90	110			
L63539-03DUP	DUP	07/16/07 19:03			2.7	2.75	mg/L				1.8	20	RA
L63539-04AS	AS	07/16/07 19:39	IC070205-3	30	3	32.31	mg/L	97.7	90	110			
WG228384LFB2	LFB	07/16/07 22:58	IC070205-3	30		31.13	mg/L	103.8	90	110			

Phelps Dodge SierritaACZ Project ID: **L63562**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L63562-01	WG228384	Chloride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG227543	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG228384	Sulfate	300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
L63562-02	WG228384	Sulfate	300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Phelps Dodge Sierrita

ACZ Project ID: **L63562**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L63562
Date Received: 6/30/2007
Received By:
Date Printed: 6/30/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA3885		8.5	15

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
 OJ03Z5

ACZ Project ID: L63562
 Date Received: 6/30/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L63562-01	MO-3-1FGW		Y									<input type="checkbox"/>
L63562-02	MO-3-1GW									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

ACZ Laboratories, Inc.

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Report to:

Name: Greg Schnoor	Address: 51 W. Wetmore Rd
Company: Hydro Gen Chem, Inc.	Tucson AZ 85705-1678
E-mail: greg@ghcinc.com	Telephone: 520-293-1500 ext. 118

Copy of Report to:

Name: Ned Hall / Billy Dennis / Tim Norris	E-mail: TimN@hgcinc.com, BillyDennis@F4i.com
Company: PDST/HGC	Telephone: 293-1500, ext 113, 646-8873

Invoice to:

Name: Ned Hall	Address: 6200 W. Dural Mine Rd.
Company: PDSI	PO Box 527 Green Valley AZ 85622
E-mail: Ned-Hall@fmi.com	Telephone: 602-8857

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES	<input checked="" type="checkbox"/>
NO	<input type="checkbox"/>

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

Is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

[illegible]

Matrix	SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)
--------	--

REMARKS

FGW = Filtered groundwater
GW = Unfiltered groundwater

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
621	6.28.07 16:30	M88	6.30.07 12:49

August 13, 2007

Report to:

Ned Hall
Phelps Dodge Sierrita
P.O. Box 527 6200 W. Duval Mine Rd.
Green Valley, AZ 85622-0527

Bill to:

Accounts Payable
Phelps Dodge Sierrita
P.O. Box 2671
Phoenix, AZ 85002-2671

cc: Dan Simpson, Bill Dorris, Jim Norris

Project ID: OJ03Z5

ACZ Project ID: L64202

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 01, 2007. This project has been assigned to ACZ's project number, L64202. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L64202. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 13, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

August 13, 2007

Project ID: OJ03Z5

ACZ Project ID: L64202

Sample Receipt

ACZ Laboratories, Inc. (ACZ) received 2 ground water samples from Phelps Dodge Sierrita on August 1, 2007. The samples were received in good condition. Upon receipt, the sample custodian removed the samples from the cooler, inspected the contents, and logged the samples into ACZ's computerized Laboratory Information Management System (LIMS). The samples were assigned ACZ LIMS project number L64202. The custodian verified the sample information entered into the computer against the chain of custody (COC) forms and sample bottle labels.

Samples were received outside the EPA recommended temperature of 0-6 degrees C.

Holding Times

Any analyses not performed within EPA recommended holding times have been qualified with an "H" flag.

Sample Analysis

These samples were analyzed for inorganic parameters. The individual methods are referenced on both, the ACZ invoice and the analytical reports. The extended qualifier reports may contain footnotes qualifying specific elements due to QC failures.

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-IC-F

ACZ Sample ID: **L64202-01**

Date Sampled: 07/31/07 15:20

Date Received: 08/01/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	523			mS/cm			07/31/07 15:20	kg
pH (Field)	Field Measurement	7.4			units			07/31/07 15:20	kg
Temperature (Field)	Field Measurement	27.9			C			07/31/07 15:20	kg

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	57.5			mg/L	0.2	1	08/09/07 3:47	djt
Magnesium, dissolved	M200.7 ICP	9.3			mg/L	0.2	1	08/09/07 3:47	djt
Potassium, dissolved	M200.7 ICP	4.8			mg/L	0.3	2	08/09/07 3:47	djt
Sodium, dissolved	M200.7 ICP	49.3			mg/L	0.3	2	08/09/07 3:47	djt

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		124		*	mg/L	2	20	08/06/07 0:00	lcp/jlf
Carbonate as CaCO ₃			U	*	mg/L	2	20	08/06/07 0:00	lcp/jlf
Hydroxide as CaCO ₃			U	*	mg/L	2	20	08/06/07 0:00	lcp/jlf
Total Alkalinity		124		*	mg/L	2	20	08/06/07 0:00	lcp/jlf
Cation-Anion Balance	Calculation								
Cation-Anion Balance		3.5			%			08/13/07 0:00	calc
Sum of Anions		5.5			meq/L	0.1	0.5	08/13/07 0:00	calc
Sum of Cations		5.9			meq/L	0.1	0.5	08/13/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	22.4			mg/L	0.5	3	08/03/07 22:52	jag
Fluoride	M300.0 - Ion Chromatography	0.5		*	mg/L	0.1	0.5	08/03/07 22:52	jag
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.82			mg/L	0.02	0.1	08/13/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.82		*	mg/L	0.02	0.1	08/01/07 18:08	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	08/01/07 18:08	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	380			mg/L	10	20	08/07/07 9:18	aeh
Sulfate	300.0 - Ion Chromatography	112			mg/L	5	30	08/08/07 20:47	jag
TDS (calculated)	Calculation	334			mg/L	10	50	08/13/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.14						08/13/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-IC-U

ACZ Sample ID: **L64202-02**

Date Sampled: 07/31/07 15:20

Date Received: 08/01/07

Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	114			mg/L	5	30	08/08/07 21:42	jag

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L64202**

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229683													
WG229683PBW1	PBW	08/06/07 11:12				U	mg/L		-20	20			
WG229683LCSW2	LCSW	08/06/07 11:23	WC070723-9	820		816.7	mg/L	99.6	90	110			
WG229683PBW2	PBW	08/06/07 14:13				U	mg/L		-20	20			
WG229683LCSW5	LCSW	08/06/07 14:26	WC070723-9	820		823.2	mg/L	100.4	90	110			
WG229683PBW3	PBW	08/06/07 17:41				U	mg/L		-20	20			
WG229683LCSW8	LCSW	08/06/07 17:54	WC070723-9	820		822.9	mg/L	100.4	90	110			
L64210-01DUP	DUP	08/06/07 20:48			99	99.1	mg/L				0.1	20	
WG229683PBW4	PBW	08/06/07 20:54				U	mg/L		-20	20			
WG229683LCSW11	LCSW	08/06/07 21:06	WC070723-9	820		824.7	mg/L	100.6	90	110			
WG229683LCSW14	LCSW	08/06/07 23:51	WC070723-9	820		825.4	mg/L	100.7	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229899													
WG229899ICV	ICV	08/09/07 1:29	II070725-7	100		97.05	mg/L	97.1	95	105			
WG229899ICB	ICB	08/09/07 1:33				U	mg/L		-0.6	0.6			
WG229899LFB	LFB	08/09/07 1:50	II070806-9	67.97008		68.56	mg/L	100.9	85	115			
L64189-10AS	AS	08/09/07 2:57	II070806-9	67.97008	113	179.72	mg/L	98.2	85	115			
L64189-10ASD	ASD	08/09/07 3:01	II070806-9	67.97008	113	175.95	mg/L	92.6	85	115	2.12	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG229613													
WG229613ICV	ICV	06/11/07 13:52	IC070710-1	20		20.34	mg/L	101.7	90	110			
WG229613ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG229613ICV1	ICV	08/03/07 14:25	IC070710-1	20		20.22	mg/L	101.1	90	110			
WG229613ICB1	ICB	08/03/07 14:44				U	mg/L		-1.5	1.5			
WG229613LFB	LFB	08/03/07 15:02	WI070727-1	30		31.38	mg/L	104.6	90	110			
L63999-07DUP	DUP	08/03/07 19:51			27.8	27.75	mg/L				0.2	20	
L64014-01AS	AS	08/03/07 20:28	WI070727-1	30	66	95.08	mg/L	96.9	90	110			
WG229613ICV1	ICV	08/08/07 17:28	IC070710-1	20		20.11	mg/L	100.6	90	110			
WG229613ICB1	ICB	08/08/07 17:46				U	mg/L		-1.5	1.5			
L64014-01AS	AS	08/08/07 19:35	WI070727-1	300	62	356.8	mg/L	98.3	90	110			

Phelps Dodge Sierrita
Project ID: OJ03Z5

ACZ Project ID: **L64202**

Fluoride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG229613													
WG229613ICV	ICV	06/11/07 13:52	IC070710-1	3.984		4.13	mg/L	103.7	90	110			
WG229613ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG229613ICV1	ICV	08/03/07 14:25	IC070710-1	3.984		4.14	mg/L	103.9	90	110			
WG229613ICB1	ICB	08/03/07 14:44				U	mg/L		-0.3	0.3			
WG229613LFB	LFB	08/03/07 15:02	WI070727-1	1.5		1.61	mg/L	107.3	90	110			
L63999-07DUP	DUP	08/03/07 19:51			U	U	mg/L				0	20	RA
L64014-01AS	AS	08/03/07 20:28	WI070727-1	1.5	.2	1.92	mg/L	114.7	90	110			M1
WG229613ICV1	ICV	08/08/07 17:28	IC070710-1	3.984		4.09	mg/L	102.7	90	110			
WG229613ICB1	ICB	08/08/07 17:46				U	mg/L		-0.3	0.3			

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229899													
WG229899ICV	ICV	08/09/07 1:29	II070725-7	100		98.49	mg/L	98.5	95	105			
WG229899ICB	ICB	08/09/07 1:33				U	mg/L		-0.6	0.6			
WG229899LFB	LFB	08/09/07 1:50	II070806-9	54.96908		55.4	mg/L	100.8	85	115			
L64189-10AS	AS	08/09/07 2:57	II070806-9	54.96908	22.1	78.74	mg/L	103	85	115			
L64189-10ASD	ASD	08/09/07 3:01	II070806-9	54.96908	22.1	77.24	mg/L	100.3	85	115	1.92	20	

Nitrate/Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229490													
WG229490ICV	ICV	08/01/07 17:47	WI070609-1	2.416		2.47	mg/L	102.2	90	110			
WG229490ICB	ICB	08/01/07 17:48				U	mg/L		-0.06	0.06			
WG229490LFB	LFB	08/01/07 17:53	WI070307-9	2		2.168	mg/L	108.4	90	110			
L64185-01AS	AS	08/01/07 17:56	WI070307-9	2	U	2.155	mg/L	107.8	90	110			
L64185-02DUP	DUP	08/01/07 17:58			U	.022	mg/L				200	20	RA

Nitrite as N, dissolved M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229490													
WG229490ICV	ICV	08/01/07 17:47	WI070609-1	.609		.647	mg/L	106.2	90	110			
WG229490ICB	ICB	08/01/07 17:48				U	mg/L		-0.03	0.03			
WG229490LFB	LFB	08/01/07 17:53	WI070307-9	1		1.078	mg/L	107.8	90	110			
L64185-01AS	AS	08/01/07 17:56	WI070307-9	1	.03	1.102	mg/L	107.2	90	110			
L64185-02DUP	DUP	08/01/07 17:58			.09	.091	mg/L				1.1	20	RA

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L64202**

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229899													
WG229899ICV	ICV	08/09/07 1:29	II070725-7	20		20.13	mg/L	100.7	95	105			
WG229899ICB	ICB	08/09/07 1:33				U	mg/L		-0.9	0.9			
WG229899LFB	LFB	08/09/07 1:50	II070806-9	99.76186		102.4	mg/L	102.6	85	115			
L64189-10AS	AS	08/09/07 2:57	II070806-9	99.76186	16.8	127.68	mg/L	111.1	85	115			
L64189-10ASD	ASD	08/09/07 3:01	II070806-9	99.76186	16.8	124.13	mg/L	107.6	85	115	2.82	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229752													
WG229752PBW	PBW	08/07/07 9:00				U	mg/L		-20	20			
WG229752LCSW	LCSW	08/07/07 9:01	PCN27688	260		306	mg/L	117.7	80	120			
L64217-04DUP	DUP	08/07/07 9:29			6820	6780	mg/L				0.6	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229899													
WG229899ICV	ICV	08/09/07 1:29	II070725-7	100		100.25	mg/L	100.3	95	105			
WG229899ICB	ICB	08/09/07 1:33				U	mg/L		-0.9	0.9			
WG229899LFB	LFB	08/09/07 1:50	II070806-9	98.21624		100.45	mg/L	102.3	85	115			
L64189-10AS	AS	08/09/07 2:57	II070806-9	98.21624	116	216.52	mg/L	102.3	85	115			
L64189-10ASD	ASD	08/09/07 3:01	II070806-9	98.21624	116	212.59	mg/L	98.3	85	115	1.83	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG229613													
WG229613ICV	ICV	06/11/07 13:52	IC070710-1	50.15		51.51	mg/L	102.7	90	110			
WG229613ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG229613ICV1	ICV	08/03/07 14:25	IC070710-1	50.15		51.03	mg/L	101.8	90	110			
WG229613ICB1	ICB	08/03/07 14:44				U	mg/L		-1.5	1.5			
WG229613LFB	LFB	08/03/07 15:02	WI070727-1	30		32.91	mg/L	109.7	90	110			
L63999-07DUP	DUP	08/03/07 19:51			41.5	41.5	mg/L				0	20	
WG229613ICV1	ICV	08/08/07 17:28	IC070710-1	50.15		50.57	mg/L	100.8	90	110			
WG229613ICB1	ICB	08/08/07 17:46				U	mg/L		-1.5	1.5			
L64014-01AS	AS	08/08/07 19:35	WI070727-1	300	68	357.6	mg/L	96.5	90	110			

Phelps Dodge SierritaACZ Project ID: **L64202**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64202-01	WG229683	Bicarbonate as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
		Carbonate as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
	WG229613	Fluoride	M300.0 - Ion Chromatography	M1	Matrix spike recovery was high, the method control sample recovery was acceptable.
			M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG229683	Hydroxide as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
	WG229490	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG229683	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.

Phelps Dodge Sierrita

ACZ Project ID: **L64202**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L64202
Date Received: 8/1/2007
Received By:
Date Printed: 8/1/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA4088		14.8	14

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L64202
Date Received: 8/1/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L64202-01	MO-2007-IC-F		Y									<input type="checkbox"/>
L64202-02	MO-2007-IC-U									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

August 20, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Rick Zimmerman, Bill Dorris, Jim Norris, Dan Simpson

Project ID: OJ03Z5

ACZ Project ID: L64254

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 03, 2007. This project has been assigned to ACZ's project number, L64254. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L64254. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 20, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-1B-FGW

ACZ Sample ID: **L64254-01**

Date Sampled: 08/02/07 14:45

Date Received: 08/03/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	321			mS/cm			08/02/07 14:45	ma
pH (Field)	Field Measurement	7.4			units			08/02/07 14:45	ma
Temperature (Field)	Field Measurement	30.7			C			08/02/07 14:45	ma

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	32.4			mg/L	0.2	1	08/16/07 21:26	djt
Magnesium, dissolved	M200.7 ICP	4.3			mg/L	0.2	1	08/16/07 21:26	djt
Potassium, dissolved	M200.7 ICP	3.2			mg/L	0.3	2	08/16/07 21:26	djt
Sodium, dissolved	M200.7 ICP	40.5			mg/L	0.3	2	08/16/07 21:26	djt

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		140			mg/L	2	20	08/08/07 0:00	jlf
Carbonate as CaCO ₃			U		mg/L	2	20	08/08/07 0:00	jlf
Hydroxide as CaCO ₃			U		mg/L	2	20	08/08/07 0:00	jlf
Total Alkalinity		140		*	mg/L	2	20	08/08/07 0:00	jlf
Cation-Anion Balance	Calculation								
Cation-Anion Balance		2.7			%			08/17/07 16:14	calc
Sum of Anions		3.6			meq/L	0.1	0.5	08/17/07 16:14	calc
Sum of Cations		3.8			meq/L	0.1	0.5	08/17/07 16:14	calc
Chloride	M300.0 - Ion Chromatography	12.4		*	mg/L	0.5	3	08/10/07 15:31	jag
Fluoride	M300.0 - Ion Chromatography	0.6		*	mg/L	0.1	0.5	08/10/07 15:31	jag
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.71			mg/L	0.02	0.1	08/17/07 16:14	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.71	H	*	mg/L	0.02	0.1	08/07/07 18:36	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.01	0.05	08/07/07 18:36	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	220			mg/L	10	20	08/09/07 13:33	aeh
Sulfate	300.0 - Ion Chromatography	18.9			mg/L	0.5	3	08/10/07 15:31	jag
TDS (calculated)	Calculation	199			mg/L	10	50	08/17/07 16:14	calc
TDS (ratio - measured/calculated)	Calculation	1.11						08/17/07 16:14	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-1B-UGW

ACZ Sample ID: **L64254-02**

Date Sampled: 08/02/07 14:45

Date Received: 08/03/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	321			mS/cm			08/02/07 14:45	ma
pH (Field)	Field Measurement	7.4			units			08/02/07 14:45	ma
Temperature (Field)	Field Measurement	30.7			C			08/02/07 14:45	ma

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	18.9			mg/L	0.5	3	08/10/07 15:49	jag

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

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Project ID: OJ03Z5

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Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229895													
WG229895PBW1	PBW	08/08/07 17:01				U	mg/L		-20	20			
WG229895LCSW2	LCSW	08/08/07 17:13	WC070723-9	820		800.6	mg/L	97.6	90	110			
WG229895PBW2	PBW	08/08/07 20:01				U	mg/L		-20	20			
WG229895LCSW5	LCSW	08/08/07 20:13	WC070723-9	820		800	mg/L	97.6	90	110			
L64255-02DUP	DUP	08/08/07 22:57			318	314.4	mg/L				1.1	20	
WG229895PBW3	PBW	08/08/07 23:20				U	mg/L		-20	20			
WG229895LCSW8	LCSW	08/08/07 23:30	WC070723-9	820		801.1	mg/L	97.7	90	110			
WG229895PBW4	PBW	08/09/07 2:17				U	mg/L		-20	20			
WG229895LCSW11	LCSW	08/09/07 2:29	WC070723-9	820		804.1	mg/L	98.1	90	110			
WG229895LCSW14	LCSW	08/09/07 5:38	WC070723-9	820		805	mg/L	98.2	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230464													
WG230464ICV	ICV	08/16/07 20:19	II070815-5	100		96.81	mg/L	96.8	95	105			
WG230464ICB	ICB	08/16/07 20:24				U	mg/L		-0.6	0.6			
WG230464LFB	LFB	08/16/07 20:40	II070814-4	67.97008		69.34	mg/L	102	85	115			
L64131-03AS	AS	08/16/07 20:48	II070814-4	67.97008	36.6	102.42	mg/L	96.8	85	115			
L64131-03ASD	ASD	08/16/07 20:52	II070814-4	67.97008	36.6	103.76	mg/L	98.8	85	115	1.3	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG230073													
WG230073ICV	ICV	06/11/07 13:52	IC070710-1	20		20.34	mg/L	101.7	90	110			
WG230073ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG230073ICV1	ICV	08/10/07 14:37	IC070710-1	20		20.11	mg/L	100.6	90	110			
WG230073ICB1	ICB	08/10/07 14:55				U	mg/L		-1.5	1.5			
WG230073LFB	LFB	08/10/07 15:13	WI070727-1	30		29.43	mg/L	98.1	90	110			
L64277-01DUP	DUP	08/10/07 16:26			1	1.04	mg/L				3.9	20	RA
L64277-02AS	AS	08/10/07 17:02	WI070727-1	30	1	30.81	mg/L	99.4	90	110			

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Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG230073													
WG230073ICV	ICV	06/11/07 13:52	IC070710-1	3.984		4.13	mg/L	103.7	90	110			
WG230073ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG230073ICV1	ICV	08/10/07 14:37	IC070710-1	3.984		4.11	mg/L	103.2	90	110			
WG230073ICB1	ICB	08/10/07 14:55				.15	mg/L		-0.3	0.3			
WG230073LFB	LFB	08/10/07 15:13	WI070727-1	1.5		1.5	mg/L	100	90	110			
L64277-01DUP	DUP	08/10/07 16:26			.1	.11	mg/L				9.5	20	RA
L64277-02AS	AS	08/10/07 17:02	WI070727-1	1.5	U	1.54	mg/L	102.7	90	110			

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230464													
WG230464ICV	ICV	08/16/07 20:19	II070815-5	100		98.8	mg/L	98.8	95	105			
WG230464ICB	ICB	08/16/07 20:24				U	mg/L		-0.6	0.6			
WG230464LFB	LFB	08/16/07 20:40	II070814-4	54.96908		56.95	mg/L	103.6	85	115			
L64131-03AS	AS	08/16/07 20:48	II070814-4	54.96908	38.9	92.36	mg/L	97.3	85	115			
L64131-03ASD	ASD	08/16/07 20:52	II070814-4	54.96908	38.9	93.44	mg/L	99.2	85	115	1.16	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229813													
WG229813ICV	ICV	08/07/07 18:09	WI070609-1	2.416		2.4	mg/L	99.3	90	110			
WG229813ICB	ICB	08/07/07 18:11				U	mg/L		-0.06	0.06			
WG229818													
WG229818ICV	ICV	08/07/07 18:32	WI070609-1	2.416		2.283	mg/L	94.5	90	110			
WG229818ICB	ICB	08/07/07 18:33				U	mg/L		-0.06	0.06			
WG229818LFB	LFB	08/07/07 18:34	WI070307-9	2		1.965	mg/L	98.3	90	110			
L64254-01AS	AS	08/07/07 18:37	WI070307-9	2	.71	2.013	mg/L	65.2	90	110			M2
L64274-01DUP	DUP	08/07/07 18:39			.04	.041	mg/L				2.5	20	RA

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229813													
WG229813ICV	ICV	08/07/07 18:09	WI070609-1	.609		.624	mg/L	102.5	90	110			
WG229813ICB	ICB	08/07/07 18:11				U	mg/L		-0.03	0.03			
WG229818													
WG229818ICV	ICV	08/07/07 18:32	WI070609-1	.609		.631	mg/L	103.6	90	110			
WG229818ICB	ICB	08/07/07 18:33				U	mg/L		-0.03	0.03			
WG229818LFB	LFB	08/07/07 18:34	WI070307-9	1		1.02	mg/L	102	90	110			
L64254-01AS	AS	08/07/07 18:37	WI070307-9	1	U	1.05	mg/L	105	90	110			
L64274-01DUP	DUP	08/07/07 18:39			U	U	mg/L				0	20	RA

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Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230464													
WG230464ICV	ICV	08/16/07 20:19	II070815-5	20		20.67	mg/L	103.4	95	105			
WG230464ICB	ICB	08/16/07 20:24				U	mg/L		-0.9	0.9			
WG230464LFB	LFB	08/16/07 20:40	II070814-4	99.76186		107.73	mg/L	108	85	115			
L64131-03AS	AS	08/16/07 20:48	II070814-4	99.76186	4.4	113.89	mg/L	109.8	85	115			
L64131-03ASD	ASD	08/16/07 20:52	II070814-4	99.76186	4.4	115.5	mg/L	111.4	85	115	1.4	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229962													
WG229962PBW	PBW	08/09/07 13:20				U	mg/L		-20	20			
WG229962LCSW	LCSW	08/09/07 13:21	PCN27688	260		268	mg/L	103.1	80	120			
L64255-02DUP	DUP	08/09/07 13:38			470	474	mg/L				0.8	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230464													
WG230464ICV	ICV	08/16/07 20:19	II070815-5	100		103.53	mg/L	103.5	95	105			
WG230464ICB	ICB	08/16/07 20:24				U	mg/L		-0.9	0.9			
WG230464LFB	LFB	08/16/07 20:40	II070814-4	98.21624		106.12	mg/L	108	85	115			
L64131-03AS	AS	08/16/07 20:48	II070814-4	98.21624	276	361.73	mg/L	87.3	85	115			
L64131-03ASD	ASD	08/16/07 20:52	II070814-4	98.21624	276	364.24	mg/L	89.8	85	115	0.69	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG230073													
WG230073ICV	ICV	06/11/07 13:52	IC070710-1	50.15		51.51	mg/L	102.7	90	110			
WG230073ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG230073ICV1	ICV	08/10/07 14:37	IC070710-1	50.15		50.61	mg/L	100.9	90	110			
WG230073ICB1	ICB	08/10/07 14:55				U	mg/L		-1.5	1.5			
WG230073LFB	LFB	08/10/07 15:13	WI070727-1	30		30.61	mg/L	102	90	110			
L64277-01DUP	DUP	08/10/07 16:26			6.6	6.61	mg/L				0.2	20	
L64277-02AS	AS	08/10/07 17:02	WI070727-1	30	1.5	31.05	mg/L	98.5	90	110			

Phelps Dodge SierritaACZ Project ID: **L64254**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64254-01	WG230073	Chloride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG229818	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H1	Sample analysis performed past holding time.
			M353.2 - Automated Cadmium Reduction	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H1	Sample analysis performed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG229895	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.

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ACZ Project ID: **L64254**

No certification qualifiers associated with this analysis

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OJ03Z5

ACZ Project ID: L64254
Date Received: 8/3/2007
Received By:
Date Printed: 8/3/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA4016		3.7	15

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
 OJ03Z5

ACZ Project ID: L64254
 Date Received: 8/3/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L64254-01	MO-2007-1B-FGW		Y									<input type="checkbox"/>
L64254-02	MO-2007-1B-UGW									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

3-L64254

Report to:

Name: Rick Zimmerman
Company: Hydro Gas Chem Inc.
E-mail: rickz@hgcinc.com

Address: 51 W. Weymore Rd
Lucas AZ 85705
Telephone: 520 293-1580 x131

Copy of Report to:

Name: Ned Hall/Bill Dorris/Jim Norris
Company: PDSI/HGC


E-mail: Jimn@hgcinc.com/billy-dorris@cmi.com
Telephone: 520)293-1500x112, 520)648-8873

Invoice to:

Name: Ned Hall
Company: PDST
E-mail: ned-hall@fmi.com

Address: 6200 W. Duval Mine Rd.
PO Box 527 Green Valley, AZ 85622
Telephone: 520-648-8857

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES	
NO	

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Sierra Short
Project/PO #: OJQ 325
Reporting state for compliance testing: AZ
Sampler's Name: Mark Aineson
Are any samples NRC licensable material? No

# of Containers	
1	$MgNaK$
1	$1/16 TDS S_{O_4}^{2-}$
1	$F^- NO_3^- NO_2^-$
1	PO_4^{3-}
1	
1	
1	
1	

[illegible]

Matrix	SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)
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REMARKS

FGW = Filtered Groundwater Sample
UGW = Unfiltered Groundwater Sample

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	1500 8/2/01 1500	<i>[Signature]</i>	8-3-02 9:11

August 24, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Dan Simpson, Bill Dorris, Jim Norris

Project ID: OJ03Z5

ACZ Project ID: L64349

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 09, 2007. This project has been assigned to ACZ's project number, L64349. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L64349. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 24, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: FGW-MO-2007-1A

ACZ Sample ID: **L64349-01**

Date Sampled: 08/08/07 13:00

Date Received: 08/09/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	370			mS/cm			08/08/07 13:00	ma
pH (Field)	Field Measurement	7.2			units			08/08/07 13:00	ma
Temperature (Field)	Field Measurement	29.0			C			08/08/07 13:00	ma

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	40.4			mg/L	0.2	1	08/22/07 0:55	wfg
Magnesium, dissolved	M200.7 ICP	6.4			mg/L	0.2	1	08/22/07 0:55	wfg
Potassium, dissolved	M200.7 ICP	3.0			mg/L	0.3	2	08/22/07 0:55	wfg
Sodium, dissolved	M200.7 ICP	30.4			mg/L	0.3	2	08/22/07 0:55	wfg

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		164		*	mg/L	2	20	08/14/07 0:00	lcp/jlf
Carbonate as CaCO ₃			U	*	mg/L	2	20	08/14/07 0:00	lcp/jlf
Hydroxide as CaCO ₃			U	*	mg/L	2	20	08/14/07 0:00	lcp/jlf
Total Alkalinity		164		*	mg/L	2	20	08/14/07 0:00	lcp/jlf
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.0			%			08/23/07 9:53	calc
Sum of Anions		3.9			meq/L	0.1	0.5	08/23/07 9:53	calc
Sum of Cations		3.9			meq/L	0.1	0.5	08/23/07 9:53	calc
Chloride	M300.0 - Ion Chromatography	8.4		*	mg/L	0.5	3	08/16/07 6:23	jag
Fluoride	M300.0 - Ion Chromatography	0.4	B	*	mg/L	0.1	0.5	08/16/07 6:23	jag
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.54			mg/L	0.02	0.1	08/23/07 9:53	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.54		*	mg/L	0.02	0.1	08/09/07 19:46	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	08/09/07 19:46	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	250			mg/L	10	20	08/14/07 14:57	ear
Sulfate	300.0 - Ion Chromatography	19.2		*	mg/L	0.5	3	08/16/07 6:23	jag
TDS (calculated)	Calculation	209			mg/L	10	50	08/23/07 9:53	calc
TDS (ratio - measured/calculated)	Calculation	1.20						08/23/07 9:53	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: UGW-MO-2007-1A

ACZ Sample ID: **L64349-02**

Date Sampled: 08/08/07 13:00

Date Received: 08/09/07

Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	19.2		*	mg/L	0.5	3	08/16/07 6:41	jag

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L64349**

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230251													
WG230251PBW1	PBW	08/14/07 10:08				U	mg/L		-20	20			
WG230251LCSW2	LCSW	08/14/07 10:20	WC070809-7	820		797.4	mg/L	97.2	90	110			
WG230251PBW2	PBW	08/14/07 14:29				U	mg/L		-20	20			
WG230251LCSW5	LCSW	08/14/07 14:41	WC070809-7	820		807.9	mg/L	98.5	90	110			
WG230251PBW3	PBW	08/14/07 17:30				U	mg/L		-20	20			
WG230251LCSW8	LCSW	08/14/07 17:41	WC070809-7	820		809	mg/L	98.7	90	110			
L64357-01DUP	DUP	08/14/07 20:30			97	96	mg/L				1	20	
WG230251PBW4	PBW	08/14/07 20:36				U	mg/L		-20	20			
WG230251LCSW11	LCSW	08/14/07 20:47	WC070809-7	820		808.9	mg/L	98.6	90	110			
WG230251LCSW14	LCSW	08/14/07 23:46	WC070809-7	820		810.1	mg/L	98.8	90	110			

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230744													
WG230744ICV	ICV	08/21/07 23:31	II070821-3	100		98.13	mg/L	98.1	95	105			
WG230744ICB	ICB	08/21/07 23:35				U	mg/L		-0.6	0.6			
WG230744LFB	LFB	08/21/07 23:52	II070814-4	67.97008		68.22	mg/L	100.4	85	115			
L64349-01AS	AS	08/22/07 0:59	II070814-4	67.97008	40.4	107.42	mg/L	98.6	85	115			
L64349-01ASD	ASD	08/22/07 1:03	II070814-4	67.97008	40.4	107.97	mg/L	99.4	85	115	0.51	20	

Chloride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG230384													
WG230384ICV	ICV	06/11/07 13:52	IC070710-1	20		20.34	mg/L	101.7	90	110			
WG230384ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG230384LFB	LFB	08/15/07 22:32	WI070727-1	30		31.17	mg/L	103.9	90	110			
L63661-02DUP	DUP	08/16/07 3:04			.8	.75	mg/L				6.5	20	RA
L63661-02AS	AS	08/16/07 3:58	WI070727-1	30	.8	30.36	mg/L	98.5	90	110			
L63661-02AS	AS	08/16/07 9:48	WI070727-1	300	6	285.8	mg/L	93.3	90	110			
L63661-02DUP	DUP	08/16/07 10:06			6	5.7	mg/L				5.1	20	RA

Phelps Dodge Sierrita

ACZ Project ID: **L64349**

Project ID: OJ03Z5

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			

WG230384

WG230384ICV	ICV	06/11/07 13:52	IC070710-1	3.984		4.13	mg/L	103.7	90	110			
WG230384ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG230384LFB	LFB	08/15/07 22:32	WI070727-1	1.5		1.62	mg/L	108	90	110			
L63661-02DUP	DUP	08/16/07 3:04			.3	.3	mg/L				0	20	RA
L63661-02AS	AS	08/16/07 3:58	WI070727-1	1.5	.3	1.86	mg/L	104	90	110			
L63661-02AS	AS	08/16/07 9:48	WI070727-1	15	U	15.7	mg/L	104.7	90	110			
L63661-02DUP	DUP	08/16/07 10:06			U	U	mg/L				0	20	RA

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230744													
WG230744ICV	ICV	08/21/07 23:31	II070821-3	100		99.43	mg/L	99.4	95	105			
WG230744ICB	ICB	08/21/07 23:35				U	mg/L		-0.6	0.6			
WG230744LFB	LFB	08/21/07 23:52	II070814-4	54.96908		54.69	mg/L	99.5	85	115			
L64349-01AS	AS	08/22/07 0:59	II070814-4	54.96908	6.4	61.65	mg/L	100.5	85	115			
L64349-01ASD	ASD	08/22/07 1:03	II070814-4	54.96908	6.4	61.71	mg/L	100.6	85	115	0.1	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229998													
WG229998ICV	ICV	08/09/07 18:50	WI070609-1	2.416		2.407	mg/L	99.6	90	110			
WG229998ICB	ICB	08/09/07 18:51				U	mg/L		-0.06	0.06			
WG229998LFB1	LFB	08/09/07 18:56	WI070307-9	2		2.013	mg/L	100.7	90	110			
WG229998LFB2	LFB	08/09/07 19:32	WI070307-9	2		1.994	mg/L	99.7	90	110			
L64337-06AS	AS	08/09/07 19:38	WI070307-9	2	.68	2.71	mg/L	101.5	90	110			
L64337-07DUP	DUP	08/09/07 19:40			U	U	mg/L				0	20	RA

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG229998													
WG229998ICV	ICV	08/09/07 18:50	WI070609-1	.609		.637	mg/L	104.6	90	110			
WG229998ICB	ICB	08/09/07 18:51				U	mg/L		-0.03	0.03			
WG229998LFB1	LFB	08/09/07 18:56	WI070307-9	1		1.021	mg/L	102.1	90	110			
WG229998LFB2	LFB	08/09/07 19:32	WI070307-9	1		1.012	mg/L	101.2	90	110			
L64337-06AS	AS	08/09/07 19:38	WI070307-9	1	.06	1.073	mg/L	101.3	90	110			
L64337-07DUP	DUP	08/09/07 19:40			U	U	mg/L				0	20	RA

Phelps Dodge Sierrita

ACZ Project ID: **L64349**

Project ID: OJ03Z5

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230744													
WG230744ICV	ICV	08/21/07 23:31	II070821-3	20		19.93	mg/L	99.7	95	105			
WG230744ICB	ICB	08/21/07 23:35				U	mg/L		-0.9	0.9			
WG230744LFB	LFB	08/21/07 23:52	II070814-4	99.76186		99.96	mg/L	100.2	85	115			
L64349-01AS	AS	08/22/07 0:59	II070814-4	99.76186	3	105.56	mg/L	102.8	85	115			
L64349-01ASD	ASD	08/22/07 1:03	II070814-4	99.76186	3	105.87	mg/L	103.1	85	115	0.29	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230298													
WG230298PBW	PBW	08/14/07 14:00				16	mg/L		-20	20			
WG230298LCSW	LCSW	08/14/07 14:02	PCN27692	260		284	mg/L	109.2	80	120			
L64349-01DUP	DUP	08/14/07 15:00			250	246	mg/L				1.6	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230744													
WG230744ICV	ICV	08/21/07 23:31	II070821-3	100		100.54	mg/L	100.5	95	105			
WG230744ICB	ICB	08/21/07 23:35				U	mg/L		-0.9	0.9			
WG230744LFB	LFB	08/21/07 23:52	II070814-4	98.21624		98.35	mg/L	100.1	85	115			
L64349-01AS	AS	08/22/07 0:59	II070814-4	98.21624	30.4	129.53	mg/L	100.9	85	115			
L64349-01ASD	ASD	08/22/07 1:03	II070814-4	98.21624	30.4	129.34	mg/L	100.7	85	115	0.15	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG230384													
WG230384ICV	ICV	06/11/07 13:52	IC070710-1	50.15		51.51	mg/L	102.7	90	110			
WG230384ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG230384LFB	LFB	08/15/07 22:32	WI070727-1	30		32.71	mg/L	109	90	110			
L63661-02AS	AS	08/16/07 9:48	WI070727-1	300	162	429.5	mg/L	89.2	90	110			M2
L63661-02DUP	DUP	08/16/07 10:06			162	162.5	mg/L				0.3	20	

Phelps Dodge SierritaACZ Project ID: **L64349**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64349-01	WG230251	Bicarbonate as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
		Carbonate as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
	WG230384	Chloride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG230251	Hydroxide as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
	WG229998	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG230384	Sulfate	300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG230251	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
L64349-02	WG230384	Sulfate	300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.

Phelps Dodge Sierrita

ACZ Project ID: **L64349**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L64349
Date Received: 8/9/2007
Received By:
Date Printed: 8/9/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA4154		3.7	19

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
 OJ03Z5

ACZ Project ID: L64349
 Date Received: 8/9/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L64349-01	FGW-MO-2007-1A		Y									<input type="checkbox"/>
L64349-02	UGW-MO-2007-1A									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

August 28, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Dan Simpson, Bill Dorris, Jim Norris

Project ID: OJ03Z5

ACZ Project ID: L64503

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 17, 2007. This project has been assigned to ACZ's project number, L64503. Please reference this number in all future inquiries.

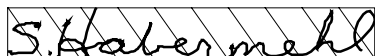
All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L64503. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after September 28, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: FGW-MO-2007-4C

ACZ Sample ID: **L64503-01**

Date Sampled: 08/16/07 11:50

Date Received: 08/17/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	472			mS/cm			08/16/07 11:50	nb
pH (Field)	Field Measurement	7.6			units			08/16/07 11:50	nb
Temperature (Field)	Field Measurement	35.2			C			08/16/07 11:50	nb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	13.0			mg/L	0.2	1	08/23/07 20:33	wfg
Magnesium, dissolved	M200.7 ICP	0.3	B		mg/L	0.2	1	08/23/07 20:33	wfg
Potassium, dissolved	M200.7 ICP	1.9	B		mg/L	0.3	2	08/23/07 20:33	wfg
Sodium, dissolved	M200.7 ICP	80.8			mg/L	0.3	2	08/23/07 20:33	wfg

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		101			mg/L	2	20	08/19/07 0:00	cas
Carbonate as CaCO ₃		2	B		mg/L	2	20	08/19/07 0:00	cas
Hydroxide as CaCO ₃			U		mg/L	2	20	08/19/07 0:00	cas
Total Alkalinity		103		*	mg/L	2	20	08/19/07 0:00	cas
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-1.2			%			08/28/07 0:00	calc
Sum of Anions		4.3			meq/L	0.1	0.5	08/28/07 0:00	calc
Sum of Cations		4.2			meq/L	0.1	0.5	08/28/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	11.8		*	mg/L	0.5	3	08/25/07 0:00	jag
Fluoride	M300.0 - Ion Chromatography	5.0		*	mg/L	0.1	0.5	08/25/07 0:00	jag
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.48			mg/L	0.02	0.1	08/28/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.48		*	mg/L	0.02	0.1	08/17/07 18:59	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	08/17/07 18:59	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	310			mg/L	10	20	08/22/07 11:05	lcp
Sulfate	300.0 - Ion Chromatography	78.7			mg/L	0.5	3	08/25/07 0:00	jag
TDS (calculated)	Calculation	256			mg/L	10	50	08/28/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.21						08/28/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: UGW-MO-2007-4C

ACZ Sample ID: **L64503-02**

Date Sampled: 08/16/07 11:50

Date Received: 08/17/07

Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	78.6			mg/L	0.5	3	08/25/07 0:19	jag

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L64503**

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230595													
WG230595PBW1	PBW	08/18/07 16:05				3	mg/L		-20	20			
WG230595LCSW2	LCSW	08/18/07 16:17	WC070809-7	820		808	mg/L	98.5	90	110			
WG230595PBW2	PBW	08/18/07 19:21				U	mg/L		-20	20			
WG230595LCSW5	LCSW	08/18/07 19:33	WC070809-7	820		799.8	mg/L	97.5	90	110			
WG230595PBW3	PBW	08/18/07 22:29				U	mg/L		-20	20			
WG230595LCSW8	LCSW	08/18/07 22:42	WC070809-7	820		806.4	mg/L	98.3	90	110			
WG230595PBW4	PBW	08/19/07 1:33				U	mg/L		-20	20			
WG230595LCSW11	LCSW	08/19/07 1:45	WC070809-7	820		802	mg/L	97.8	90	110			
L64506-02DUP	DUP	08/19/07 2:45			52	52.7	mg/L				1.3	20	
WG230595LCSW14	LCSW	08/19/07 3:20	WC070809-7	820		803.5	mg/L	98	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230926													
WG230926ICV	ICV	08/23/07 18:30	II070821-3	100		100.08	mg/L	100.1	95	105			
WG230926ICB	ICB	08/23/07 18:34				U	mg/L		-0.6	0.6			
WG230926LFB	LFB	08/23/07 18:48	II070823-2	67.97008		70.66	mg/L	104	85	115			
L64394-04AS	AS	08/23/07 19:48	II070823-2	67.97008	26.8	92.6	mg/L	96.8	85	115			
L64394-04ASD	ASD	08/23/07 19:52	II070823-2	67.97008	26.8	94.15	mg/L	99.1	85	115	1.66	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG230989													
WG230989LFB	LFB	08/24/07 16:28	WI070727-1	30		32.1	mg/L	107	90	110			
L64434-01AS	AS	08/24/07 21:17	WI070727-1	600	40	671	mg/L	105.2	90	110			
L64434-01DUP	DUP	08/24/07 21:36			40	43	mg/L				7.2	20	RA

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG230989													
WG230989LFB	LFB	08/24/07 16:28	WI070727-1	1.5		1.63	mg/L	108.7	90	110			
L64434-01AS	AS	08/24/07 21:17	WI070727-1	30	U	35.1	mg/L	117	90	110			M1
L64434-01DUP	DUP	08/24/07 21:36			U	U	mg/L				0	20	RA

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L64503**

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230926													
WG230926ICV	ICV	08/23/07 18:30	II070821-3	100		100.01	mg/L	100	95	105			
WG230926ICB	ICB	08/23/07 18:34				U	mg/L		-0.6	0.6			
WG230926LFB	LFB	08/23/07 18:48	II070823-2	54.96908		57.39	mg/L	104.4	85	115			
L64394-04AS	AS	08/23/07 19:48	II070823-2	54.96908	2	57.46	mg/L	100.9	85	115			
L64394-04ASD	ASD	08/23/07 19:52	II070823-2	54.96908	2	58.77	mg/L	103.3	85	115	2.25	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230583													
WG230583ICV	ICV	08/17/07 18:01	WI070609-1	2.416		2.353	mg/L	97.4	90	110			
WG230583ICB	ICB	08/17/07 18:02				U	mg/L		-0.06	0.06			
WG230583LFB1	LFB	08/17/07 18:07	WI070307-9	2		1.971	mg/L	98.6	90	110			
L64501-05AS	AS	08/17/07 18:45	WI070307-9	2	.02	1.82	mg/L	90	90	110			
WG230583LFB2	LFB	08/17/07 18:46	WI070307-9	2		1.87	mg/L	93.5	90	110			
L64501-06DUP	DUP	08/17/07 18:52			U	U	mg/L				0	20	RA

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230583													
WG230583ICV	ICV	08/17/07 18:01	WI070609-1	.609		.627	mg/L	103	90	110			
WG230583ICB	ICB	08/17/07 18:02				U	mg/L		-0.03	0.03			
WG230583LFB1	LFB	08/17/07 18:07	WI070307-9	1		.983	mg/L	98.3	90	110			
L64501-05AS	AS	08/17/07 18:45	WI070307-9	1	U	.927	mg/L	92.7	90	110			
WG230583LFB2	LFB	08/17/07 18:46	WI070307-9	1		.959	mg/L	95.9	90	110			
L64501-06DUP	DUP	08/17/07 18:52			U	U	mg/L				0	20	RA

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230926													
WG230926ICV	ICV	08/23/07 18:30	II070821-3	20		19.97	mg/L	99.9	95	105			
WG230926ICB	ICB	08/23/07 18:34				U	mg/L		-0.9	0.9			
WG230926LFB	LFB	08/23/07 18:48	II070823-2	99.76186		100.53	mg/L	100.8	85	115			
L64394-04AS	AS	08/23/07 19:48	II070823-2	99.76186	U	99.53	mg/L	99.8	85	115			
L64394-04ASD	ASD	08/23/07 19:52	II070823-2	99.76186	U	101.2	mg/L	101.4	85	115	1.66	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230779													
WG230779PBW	PBW	08/22/07 10:45				20	mg/L		-20	20			
WG230779LCSW	LCSW	08/22/07 10:46	PCN27691	260		312	mg/L	120	80	120			
L64519-03DUP	DUP	08/22/07 11:14			260	250	mg/L				3.9	20	

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L64503**

Sodium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG230926													
WG230926ICV	ICV	08/23/07 18:30	II070821-3	100		99.9	mg/L	99.9	95	105			
WG230926ICB	ICB	08/23/07 18:34				U	mg/L		-0.9	0.9			
WG230926LFB	LFB	08/23/07 18:48	II070823-2	98.21624		98.26	mg/L	100	85	115			
L64394-04AS	AS	08/23/07 19:48	II070823-2	98.21624	4	97.19	mg/L	94.9	85	115			
L64394-04AS	AS	08/23/07 19:48	II070823-2	98.21624	4	94.1	mg/L	91.7	85	115			
L64394-04ASD	ASD	08/23/07 19:52	II070823-2	98.21624	4	95.1	mg/L	92.8	85	115	1.06	20	
L64394-04ASD	ASD	08/23/07 19:52	II070823-2	98.21624	4	98.61	mg/L	96.3	85	115	1.06	20	

Sulfate 300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG230989													
WG230989LFB	LFB	08/24/07 16:28	WI070727-1	30		32.21	mg/L	107.4	90	110			
L64434-01AS	AS	08/24/07 21:17	WI070727-1	600	670	1298	mg/L	104.7	90	110			
L64434-01DUP	DUP	08/24/07 21:36			670	680	mg/L				1.5	20	

Phelps Dodge SierritaACZ Project ID: **L64503**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64503-01	WG230989	Chloride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Fluoride	M300.0 - Ion Chromatography	M1	Matrix spike recovery was high, the method control sample recovery was acceptable.
			M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG230583	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG230595	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.

Phelps Dodge Sierrita

ACZ Project ID: **L64503**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L64503
Date Received: 8/17/2007
Received By:
Date Printed: 8/17/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA4227		1.3	16

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L64503
Date Received: 8/17/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L64503-01	FGW-MO-2007-4C		Y									<input type="checkbox"/>
L64503-02	UGW-MO-2007-4C									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

September 18, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Dan Simpson

Project ID: OJO3Z5

ACZ Project ID: L64629

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on August 24, 2007. This project has been assigned to ACZ's project number, L64629. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L64629. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 18, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJO3Z5

Sample ID: FGW-MO-2007-5C

ACZ Sample ID: **L64629-01**

Date Sampled: 08/23/07 14:30

Date Received: 08/24/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	780			mS/cm			08/23/07 14:30	ma
pH (Field)	Field Measurement	7.5			units			08/23/07 14:30	ma
Temperature (Field)	Field Measurement	31.4			C			08/23/07 14:30	ma

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	30.0			mg/L	0.2	1	09/03/07 19:54	djt
Magnesium, dissolved	M200.7 ICP	1.4			mg/L	0.2	1	09/03/07 19:54	djt
Potassium, dissolved	M200.7 ICP	7.1			mg/L	0.3	2	09/03/07 19:54	djt
Sodium, dissolved	M200.7 ICP	129		*	mg/L	0.3	2	09/03/07 19:54	djt

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		71			mg/L	2	20	08/30/07 0:00	lcp
Carbonate as CaCO ₃			U		mg/L	2	20	08/30/07 0:00	lcp
Hydroxide as CaCO ₃			U		mg/L	2	20	08/30/07 0:00	lcp
Total Alkalinity		71		*	mg/L	2	20	08/30/07 0:00	lcp
Cation-Anion Balance	Calculation								
Cation-Anion Balance		2.8			%			09/18/07 0:00	calc
Sum of Anions		7.0			meq/L	0.1	0.5	09/18/07 0:00	calc
Sum of Cations		7.4			meq/L	0.1	0.5	09/18/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	12			mg/L	3	10	09/14/07 10:29	ccp
Fluoride	M300.0 - Ion Chromatography	2.1		*	mg/L	0.1	0.5	09/13/07 18:42	ccp
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.13			mg/L	0.02	0.1	09/18/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.15			mg/L	0.02	0.1	08/24/07 21:18	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.02	B	*	mg/L	0.01	0.05	08/24/07 21:18	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	540			mg/L	10	20	08/29/07 11:05	cas
Sulfate	300.0 - Ion Chromatography	248		*	mg/L	3	10	09/14/07 10:29	ccp
TDS (calculated)	Calculation	473			mg/L	10	50	09/18/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.14						09/18/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJO3Z5

Sample ID: UGW-MO-2007-5C

ACZ Sample ID: **L64629-02**

Date Sampled: 08/23/07 14:30

Date Received: 08/24/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	780			mS/cm			08/23/07 14:30	ma
pH (Field)	Field Measurement	7.5			units			08/23/07 14:30	ma
Temperature (Field)	Field Measurement	31.4			C			08/23/07 14:30	ma

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	252		*	mg/L	3	10	09/14/07 10:47	ccp

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJO3Z5

ACZ Project ID: **L64629**

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231352													
WG231352PBW1	PBW	08/30/07 11:22				U	mg/L		-20	20			
WG231352LCSW2	LCSW	08/30/07 11:34	WC070828-1	820		811.7	mg/L	99	90	110			
L64658-01DUP	DUP	08/30/07 14:17			125	125.6	mg/L				0.5	20	
WG231352PBW2	PBW	08/30/07 14:22				U	mg/L		-20	20			
WG231352LCSW5	LCSW	08/30/07 14:35	WC070828-1	820		824.4	mg/L	100.5	90	110			
WG231352PBW3	PBW	08/30/07 18:14				U	mg/L		-20	20			
WG231352LCSW8	LCSW	08/30/07 18:26	WC070828-1	820		826.8	mg/L	100.8	90	110			
WG231352PBW4	PBW	08/30/07 21:22				U	mg/L		-20	20			
WG231352LCSW11	LCSW	08/30/07 21:34	WC070828-1	820		828.7	mg/L	101.1	90	110			
WG231352LCSW14	LCSW	08/31/07 0:12	WC070828-1	820		826.4	mg/L	100.8	90	110			

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231536													
WG231536ICV	ICV	09/03/07 17:42	II070821-3	100		101.94	mg/L	101.9	95	105			
WG231536ICB	ICB	09/03/07 17:47				U	mg/L		-0.6	0.6			
WG231536LFB	LFB	09/03/07 18:03	II070829-11	67.97008		71.99	mg/L	105.9	85	115			
L64613-03AS	AS	09/03/07 19:09	II070829-11	67.97008	3.3	76.71	mg/L	108	85	115			
L64613-03ASD	ASD	09/03/07 19:13	II070829-11	67.97008	3.3	75.24	mg/L	105.8	85	115	1.93	20	

Chloride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232234													
WG232234ICV	ICV	09/13/07 15:59	WI070910-1	20		19.89	mg/L	99.5	90	110			
WG232234ICB	ICB	09/13/07 16:17				U	mg/L		-1.5	1.5			
WG232234LFB	LFB	09/13/07 16:35	WI070727-1	30		29.34	mg/L	97.8	90	110			
L64532-01DUP	DUP	09/13/07 17:11			69	70.9	mg/L				2.7	20	
L64532-02AS	AS	09/13/07 17:47	WI070727-1	30	8.4	36.91	mg/L	95	90	110			

Fluoride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232234													
WG232234ICV	ICV	09/13/07 15:59	WI070910-1	3.984		4.19	mg/L	105.2	90	110			
WG232234ICB	ICB	09/13/07 16:17				U	mg/L		-0.3	0.3			
WG232234LFB	LFB	09/13/07 16:35	WI070727-1	1.5		1.54	mg/L	102.7	90	110			
L64532-01DUP	DUP	09/13/07 17:11			44.6	45.71	mg/L				2.5	20	
L64532-02AS	AS	09/13/07 17:47	WI070727-1	1.5	4.3	5.51	mg/L	80.7	90	110			M2

Magnesium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231536													
WG231536ICV	ICV	09/03/07 17:42	II070821-3	100		103.02	mg/L	103	95	105			
WG231536ICB	ICB	09/03/07 17:47				U	mg/L		-0.6	0.6			
WG231536LFB	LFB	09/03/07 18:03	II070829-11	54.96908		58.14	mg/L	105.8	85	115			
L64613-03AS	AS	09/03/07 19:09	II070829-11	54.96908	.8	59.62	mg/L	107	85	115			
L64613-03ASD	ASD	09/03/07 19:13	II070829-11	54.96908	.8	58.43	mg/L	104.8	85	115	2.02	20	

Phelps Dodge Sierrita
 Project ID: OJO3Z5

ACZ Project ID: **L64629**

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231014													
WG231014ICV	ICV	08/24/07 20:17	WI070609-1	2.416		2.375	mg/L	98.3	90	110			
WG231014ICB	ICB	08/24/07 20:18				U	mg/L		-0.06	0.06			
WG231014LFB1	LFB	08/24/07 20:23	WI070307-9	2		1.979	mg/L	99	90	110			
WG231014LFB2	LFB	08/24/07 21:02	WI070307-9	2		1.881	mg/L	94.1	90	110			
L64613-07AS	AS	08/24/07 21:08	WI070307-9	2	U	1.794	mg/L	89.7	90	110			
L64621-01DUP	DUP	08/24/07 21:10			1.33	1.351	mg/L				1.6	20	

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231014													
WG231014ICV	ICV	08/24/07 20:17	WI070609-1	.609		.633	mg/L	103.9	90	110			
WG231014ICB	ICB	08/24/07 20:18				U	mg/L		-0.03	0.03			
WG231014LFB1	LFB	08/24/07 20:23	WI070307-9	1		1.016	mg/L	101.6	90	110			
WG231014LFB2	LFB	08/24/07 21:02	WI070307-9	1		1.018	mg/L	101.8	90	110			
L64613-07AS	AS	08/24/07 21:08	WI070307-9	1	U	.984	mg/L	98.4	90	110			
L64621-01DUP	DUP	08/24/07 21:10			U	U	mg/L				0	20	RA

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231536													
WG231536ICV	ICV	09/03/07 17:42	II070821-3	20		19.71	mg/L	98.6	95	105			
WG231536ICB	ICB	09/03/07 17:47				U	mg/L		-0.9	0.9			
WG231536LFB	LFB	09/03/07 18:03	II070829-11	99.76186		100.95	mg/L	101.2	85	115			
L64613-03AS	AS	09/03/07 19:09	II070829-11	99.76186	3.5	112.67	mg/L	109.4	85	115			
L64613-03ASD	ASD	09/03/07 19:13	II070829-11	99.76186	3.5	110.41	mg/L	107.2	85	115	2.03	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231255													
WG231255PBW	PBW	08/29/07 11:00				U	mg/L		-20	20			
WG231255LCSW	LCSW	08/29/07 11:01	PCN27686	260		282	mg/L	108.5	80	120			
L64652-02DUP	DUP	08/29/07 11:15			6040	6072	mg/L				0.5	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG231536													
WG231536ICV	ICV	09/03/07 17:42	II070821-3	100		98.2	mg/L	98.2	95	105			
WG231536ICV	ICV	09/03/07 17:42	II070821-3	100		99.2	mg/L	99.2	95	105			
WG231536ICB	ICB	09/03/07 17:47				U	mg/L		-6	6			
WG231536ICB	ICB	09/03/07 17:47				U	mg/L		-0.9	0.9			
WG231536LFB	LFB	09/03/07 18:03	II070829-11	98.21624		99.2	mg/L	101	85	115			
WG231536LFB	LFB	09/03/07 18:03	II070829-11	98.21624		99.28	mg/L	101.1	85	115			
L64613-03AS	AS	09/03/07 19:09	II070829-11	98.21624	612	684.6	mg/L	73.9	85	115			M3
L64613-03ASD	ASD	09/03/07 19:13	II070829-11	98.21624	612	684.2	mg/L	73.5	85	115	0.06	20	M3

Phelps Dodge Sierrita
Project ID: OJO3Z5

ACZ Project ID: **L64629**

Sulfate 300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232234													
WG232234ICV	ICV	09/13/07 15:59	WI070910-1	50.1		52.62	mg/L	105	90	110			
WG232234ICB	ICB	09/13/07 16:17				U	mg/L		-1.5	1.5			
WG232234LFB	LFB	09/13/07 16:35	WI070727-1	30		30.67	mg/L	102.2	90	110			
L64532-01DUP	DUP	09/13/07 17:11			U	U	mg/L				0	20	RA
L64532-02AS	AS	09/14/07 11:59	WI070727-1	300	494	798.9	mg/L	101.6	90	110			

Phelps Dodge SierritaACZ Project ID: **L64629**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64629-01	WG231536	Sodium, dissolved	M200.7 ICP	M3	The accuracy of the spike recovery does not apply because analyte concentration in the sample is disproportionate to the spike level. The recovery of the method control sample was acceptable.
	WG232234	Fluoride	M300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG231014	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG232234	Sulfate	300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG231352	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
L64629-02	WG232234	Sulfate	300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Phelps Dodge Sierrita

ACZ Project ID: **L64629**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJO3Z5

ACZ Project ID: L64629
Date Received: 8/24/2007
Received By:
Date Printed: 8/28/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA4279		4.2	14

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
OJO3Z5

ACZ Project ID: L64629
Date Received: 8/24/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L64629-01	FGW-MO-2007-5C		Y									<input type="checkbox"/>
L64629-02	UGW-MO-2007-5C									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

CHAIN of CUSTODY

164629

Name: Dan Simpson
Company: Hydro Geo Chem Inc.
E-mail: duns@hgcinc.com

Address: 51 West Wetmore Rd
Tulson, AZ 85705
Telephone: 520 293-1500

Name: Ned Hall/Billy Darris/Don Norris
Company: PDSE/HCC

E-mail: Jim@mcinc.com, billy-dorris@fmi.com
Telephone: 520 293-1500 x113 520 648-8673

Name: Ned Hall
Company: PDST
E-mail: ned-hall@fmi.com

Address:	6200 W. Duval Mine Rd
	Green Valley, AZ 85622
Telephone:	(520) 648-8857

YES	<input checked="" type="checkbox"/>
NO	<input type="checkbox"/>

is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Siemens Short
Project/PO #: 0J0325
Reporting state for compliance testing: AZ
Sampler's Name: Mark Arneson
Are any samples NRC licensable material? No


# of Containers	
	CaMgNa_2K
	$\text{K}, \text{TD}, \text{SO}_4$
	$\text{SO}_4, \text{F}, \text{NO}_3, \text{NO}_3$
	SO_4, SO_4

[illegible]

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

FGW = Filtered Groundwater
UGW = Unfiltered Groundwater

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
	4/23/07:1512	KY	824:07 12

September 27, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Dan Simpson

Project ID: OJ03Z5

ACZ Project ID: L64942

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on September 11, 2007. This project has been assigned to ACZ's project number, L64942. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L64942. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after October 27, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: FGW-MO-2007-3B

ACZ Sample ID: **L64942-01**

Date Sampled: 09/10/07 14:26

Date Received: 09/11/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	28.7			mS/cm			09/10/07 14:26	ma
pH (Field)	Field Measurement	7.5			units			09/10/07 14:26	ma
Temperature (Field)	Field Measurement	373.0			C			09/10/07 14:26	ma

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	31.5			mg/L	0.2	1	09/13/07 18:06	msh
Magnesium, dissolved	M200.7 ICP	2.8			mg/L	0.2	1	09/13/07 18:06	msh
Potassium, dissolved	M200.7 ICP	3.1			mg/L	0.3	2	09/13/07 18:06	msh
Sodium, dissolved	M200.7 ICP	44.1			mg/L	0.3	2	09/13/07 18:06	msh

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		134			mg/L	2	20	09/19/07 0:00	lcp
Carbonate as CaCO ₃			U		mg/L	2	20	09/19/07 0:00	lcp
Hydroxide as CaCO ₃			U		mg/L	2	20	09/19/07 0:00	lcp
Total Alkalinity		134		*	mg/L	2	20	09/19/07 0:00	lcp
Cation-Anion Balance	Calculation								
Cation-Anion Balance		1.3			%			09/27/07 0:00	calc
Sum of Anions		3.7			meq/L	0.1	0.5	09/27/07 0:00	calc
Sum of Cations		3.8			meq/L	0.1	0.5	09/27/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	7			mg/L	1	5	09/14/07 11:05	ccp
Fluoride	M300.0 - Ion Chromatography	0.5		*	mg/L	0.1	0.5	09/13/07 20:30	ccp
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.33			mg/L	0.02	0.1	09/27/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.33			mg/L	0.02	0.1	09/11/07 20:09	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		UH	*	mg/L	0.01	0.05	09/19/07 20:29	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	250			mg/L	10	20	09/14/07 15:06	ear
Sulfate	300.0 - Ion Chromatography	38		*	mg/L	1	5	09/14/07 11:05	ccp
TDS (calculated)	Calculation	209			mg/L	10	50	09/27/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.20						09/27/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: UGW-MO-2007-3B

ACZ Sample ID: **L64942-02**

Date Sampled: 09/10/07 14:26

Date Received: 09/11/07

Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	38		*	mg/L	1	5	09/14/07 11:23	ccp

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita

ACZ Project ID: **L64942**

Project ID: OJ03Z5

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232583													
WG232583PBW1	PBW	09/19/07 10:18				U	mg/L		-20	20			
WG232583LCSW2	LCSW	09/19/07 10:30	WC070917-1	820		829.6	mg/L	101.2	90	110			
WG232583PBW2	PBW	09/19/07 13:42				U	mg/L		-20	20			
WG232583LCSW5	LCSW	09/19/07 13:55	WC070917-1	820		838.2	mg/L	102.2	90	110			
L64945-01DUP	DUP	09/19/07 15:21			451	452.8	mg/L				0.4	20	
WG232583PBW3	PBW	09/19/07 16:51				U	mg/L		-20	20			
WG232583LCSW8	LCSW	09/19/07 17:04	WC070917-1	820		840.6	mg/L	102.5	90	110			
WG232583PBW4	PBW	09/19/07 20:24				U	mg/L		-20	20			
WG232583LCSW11	LCSW	09/19/07 20:36	WC070917-1	820		842.6	mg/L	102.8	90	110			
WG232583LCSW14	LCSW	09/19/07 23:19	WC070917-1	820		846.6	mg/L	103.2	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232231													
WG232231ICV	ICV	09/13/07 17:01	II070911-1	100		97.12	mg/L	97.1	95	105			
WG232231ICB	ICB	09/13/07 17:05				U	mg/L		-0.6	0.6			
WG232231LFB	LFB	09/13/07 17:20	II070829-11	67.97008		69.37	mg/L	102.1	85	115			
L64933-02AS	AS	09/13/07 17:32	II070829-11	67.97008	80.4	149.47	mg/L	101.6	85	115			
L64933-02ASD	ASD	09/13/07 17:35	II070829-11	67.97008	80.4	149.24	mg/L	101.3	85	115	0.15	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232234													
WG232234ICV	ICV	09/13/07 15:59	WI070910-1	20		19.89	mg/L	99.5	90	110			
WG232234ICB	ICB	09/13/07 16:17				U	mg/L		-1.5	1.5			
WG232234LFB	LFB	09/13/07 16:35	WI070727-1	30		29.34	mg/L	97.8	90	110			
L64532-01DUP	DUP	09/13/07 17:11			69	70.9	mg/L				2.7	20	
L64532-02AS	AS	09/13/07 17:47	WI070727-1	30	8.4	36.91	mg/L	95	90	110			

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232234													
WG232234ICV	ICV	09/13/07 15:59	WI070910-1	3.984		4.19	mg/L	105.2	90	110			
WG232234ICB	ICB	09/13/07 16:17				U	mg/L		-0.3	0.3			
WG232234LFB	LFB	09/13/07 16:35	WI070727-1	1.5		1.54	mg/L	102.7	90	110			
L64532-01DUP	DUP	09/13/07 17:11			44.6	45.71	mg/L				2.5	20	
L64532-02AS	AS	09/13/07 17:47	WI070727-1	1.5	4.3	5.51	mg/L	80.7	90	110			M2

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232231													
WG232231ICV	ICV	09/13/07 17:01	II070911-1	100		98.04	mg/L	98	95	105			
WG232231ICB	ICB	09/13/07 17:05				U	mg/L		-0.6	0.6			
WG232231LFB	LFB	09/13/07 17:20	II070829-11	54.96908		55.54	mg/L	101	85	115			
L64933-02AS	AS	09/13/07 17:32	II070829-11	54.96908	7.1	64.3	mg/L	104.1	85	115			
L64933-02ASD	ASD	09/13/07 17:35	II070829-11	54.96908	7.1	64.05	mg/L	103.6	85	115	0.39	20	

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L64942**

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232070													
WG232070ICV	ICV	09/11/07 18:54	WI070911-1	2.416		2.428	mg/L	100.5	90	110			
WG232070ICB	ICB	09/11/07 18:55				U	mg/L		-0.06	0.06			
WG232070LFB	LFB	09/11/07 19:00	WI070911-4	2		2.052	mg/L	102.6	90	110			
L64923-01AS	AS	09/11/07 19:21	WI070911-4	2	.64	2.564	mg/L	96.2	90	110			
L64924-01DUP	DUP	09/11/07 19:24			.67	.707	mg/L				5.4	20	

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232665													
WG232665ICV	ICV	09/19/07 20:15	WI070911-1	.609		.613	mg/L	100.7	90	110			
WG232665ICB	ICB	09/19/07 20:16				U	mg/L		-0.03	0.03			
WG232665LFB1	LFB	09/19/07 20:22	WI070911-4	1		1.007	mg/L	100.7	90	110			
L64923-01AS	AS	09/19/07 20:24	WI070911-4	1	U	.959	mg/L	95.9	90	110			
L64924-01DUP	DUP	09/19/07 20:27			U	U	mg/L				0	20	RA
WG232665LFB2	LFB	09/19/07 21:00	WI070911-4	1		1.008	mg/L	100.8	90	110			

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232231													
WG232231ICV	ICV	09/13/07 17:01	II070911-1	20		19.91	mg/L	99.6	95	105			
WG232231ICB	ICB	09/13/07 17:05				U	mg/L		-0.9	0.9			
WG232231LFB	LFB	09/13/07 17:20	II070829-11	99.76186		102.39	mg/L	102.6	85	115			
L64933-02AS	AS	09/13/07 17:32	II070829-11	99.76186	1.5	109.32	mg/L	108.1	85	115			
L64933-02ASD	ASD	09/13/07 17:35	II070829-11	99.76186	1.5	109.12	mg/L	107.9	85	115	0.18	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232320													
WG232320PBW	PBW	09/14/07 14:55				10	mg/L		-20	20			
WG232320LCSW	LCSW	09/14/07 14:57	PCN27694	261		288	mg/L	110.3	80	120			
L64959-01DUP	DUP	09/14/07 15:23			3780	3774	mg/L				0.2	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232231													
WG232231ICV	ICV	09/13/07 17:01	II070911-1	100		99.91	mg/L	99.9	95	105			
WG232231ICB	ICB	09/13/07 17:05				U	mg/L		-0.9	0.9			
WG232231LFB	LFB	09/13/07 17:20	II070829-11	98.21624		100.88	mg/L	102.7	85	115			
L64933-02AS	AS	09/13/07 17:32	II070829-11	98.21624	1.7	106.91	mg/L	107.1	85	115			
L64933-02ASD	ASD	09/13/07 17:35	II070829-11	98.21624	1.7	106.52	mg/L	106.7	85	115	0.37	20	

Phelps Dodge Sierrita
Project ID: OJ03Z5

ACZ Project ID: **L64942**

Sulfate 300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG232234													
WG232234ICV	ICV	09/13/07 15:59	WI070910-1	50.1		52.62	mg/L	105	90	110			
WG232234ICB	ICB	09/13/07 16:17				U	mg/L		-1.5	1.5			
WG232234LFB	LFB	09/13/07 16:35	WI070727-1	30		30.67	mg/L	102.2	90	110			
L64532-01DUP	DUP	09/13/07 17:11			U	U	mg/L				0	20	RA
L64532-02AS	AS	09/14/07 11:59	WI070727-1	300	494	798.9	mg/L	101.6	90	110			

Phelps Dodge Sierrita

ACZ Project ID: **L64942**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L64942-01	WG232234	Fluoride	M300.0 - Ion Chromatography	M2	Matrix spike recovery was low, the method control sample recovery was acceptable.
	WG232665	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HC	Initial analysis within holding time. Reanalysis was past holding time, which was required due to a QC failure during the initial analysis.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG232234	Sulfate	300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG232583	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
L64942-02	WG232234	Sulfate	300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Phelps Dodge Sierrita

ACZ Project ID: **L64942**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L64942
Date Received: 9/11/2007
Received By:
Date Printed: 9/11/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?			
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id		Temp (°C)	Rad (µR/hr)
NA4410		2.2	16

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L64942
Date Received: 9/11/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L64942-01	FGW-MO-2007-3B		Y									<input type="checkbox"/>
L64942-02	UGW-MO-2007-3B											<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

L64942

ACZ Laboratories, Inc.

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Report to:

Name: Dan Simpson
Company: Hydro Geo Chem Inc.
E-mail: dans@hgcinc.com

Address: 51 W. Wetmore Rd
Tucson, AZ 85705
Telephone: 520) 293-1500

Copy of Report to:

Name: Ned Hall/Bill Dorris/Jim Norris
Company: PDST/HGC

E-mail: Jimn@hgcinc.com/billy-dorris@fmi.com
Telephone: 520) 293-1500 x112 648-8873

Invoice to:

Name: Ned Hall
Company: PDST
E-mail: ned-hall@fmi.com

Address: 6200 W. Dural Mine Rd.
PO Box 527 Green Valley, AZ 85622
Telephone: 520) 648-8857

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES ☒
NO ☐

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #: Sierrita Short
Project/PO #: OJQ3Z5
Reporting state for compliance testing: AZ
Sampler's Name: M. Arneson
Are any samples NRC licensable material? No

SAMPLE IDENTIFICATION		DATE:TIME	Matrix	# of Containers	Ca	Mg	Na	K	AlK, TDS, SO ₄ ⁻	Cl ⁻	F ⁻	NO ₃ ⁻	NO ₂ ⁻	SO ₄ ⁻	pH	EL	Temp
FGW-MO-2007-3B		9-10-07: 1426	GLW	2	X				X						7.53	323	28.7
UGW-MO-2007-3B		9-10-07: 1426	GLW	1										X	7.53	323	28.7

Matrix SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

FGW = Filtered Groundwater sample
UGW = Unfiltered Groundwater sample

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<u>[Signature]</u>	9-10-07: 1500	<u>LPZ</u>	9-11-07 11:07

October 19, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Dan Simpson

Project ID: OJ03Z5

ACZ Project ID: L65452

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 04, 2007. This project has been assigned to ACZ's project number, L65452. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L65452. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 19, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-6AF

ACZ Sample ID: **L65452-01**

Date Sampled: 10/02/07 14:55

Date Received: 10/04/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	405			mS/cm			10/02/07 14:55	ma
pH (Field)	Field Measurement	7.5			units			10/02/07 14:55	ma
Temperature (Field)	Field Measurement	28.5			C			10/02/07 14:55	ma

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	36.3			mg/L	0.2	1	10/13/07 6:22	erf
Magnesium, dissolved	M200.7 ICP	5.4			mg/L	0.2	1	10/13/07 6:22	erf
Potassium, dissolved	M200.7 ICP	3.8			mg/L	0.3	2	10/13/07 6:22	erf
Sodium, dissolved	M200.7 ICP	39.8			mg/L	0.3	2	10/13/07 6:22	erf

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		164			mg/L	2	20	10/06/07 0:00	lcp
Carbonate as CaCO ₃			U		mg/L	2	20	10/06/07 0:00	lcp
Hydroxide as CaCO ₃			U		mg/L	2	20	10/06/07 0:00	lcp
Total Alkalinity		164		*	mg/L	2	20	10/06/07 0:00	lcp
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-1.2			%			10/19/07 0:00	calc
Sum of Anions		4.2			meq/L	0.1	0.5	10/19/07 0:00	calc
Sum of Cations		4.1			meq/L	0.1	0.5	10/19/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	10.5			mg/L	0.5	3	10/11/07 23:58	jlf
Fluoride	M300.0 - Ion Chromatography	0.3	B	*	mg/L	0.1	0.5	10/11/07 23:58	jlf
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.99			mg/L	0.02	0.1	10/19/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.99	H	*	mg/L	0.02	0.1	10/04/07 21:16	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		HU	*	mg/L	0.01	0.05	10/04/07 21:16	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	920			mg/L	10	20	10/04/07 16:35	ear
Sulfate	300.0 - Ion Chromatography	26.5			mg/L	0.5	3	10/11/07 23:58	jlf
TDS (calculated)	Calculation	225			mg/L	10	50	10/19/07 0:00	calc

Arizona license number: **AZ0102**

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-6A

ACZ Sample ID: **L65452-02**

Date Sampled: 10/02/07 14:55

Date Received: 10/04/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	405			mS/cm			10/02/07 14:55	ma
pH (Field)	Field Measurement	7.5			units			10/02/07 14:55	ma
Temperature (Field)	Field Measurement	28.5			C			10/02/07 14:55	ma

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Chloride	M300.0 - Ion Chromatography	11		*	mg/L	3	10	10/12/07 0:16	jlf
Residue, Filterable (TDS) @180C	160.1 / SM2540C	4110		*	mg/L	10	20	10/04/07 16:37	ear
Sulfate	300.0 - Ion Chromatography	27		*	mg/L	3	10	10/12/07 0:16	jlf

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-DUPF

ACZ Sample ID: **L65452-03**

Date Sampled: 10/02/07 15:00

Date Received: 10/04/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	405			mS/cm			10/02/07 15:00	ma
pH (Field)	Field Measurement	7.5			units			10/02/07 15:00	ma
Temperature (Field)	Field Measurement	28.5			C			10/02/07 15:00	ma

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	36.4			mg/L	0.2	1	10/13/07 6:26	erf
Magnesium, dissolved	M200.7 ICP	5.4			mg/L	0.2	1	10/13/07 6:26	erf
Potassium, dissolved	M200.7 ICP	3.8			mg/L	0.3	2	10/13/07 6:26	erf
Sodium, dissolved	M200.7 ICP	40.0			mg/L	0.3	2	10/13/07 6:26	erf

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		163			mg/L	2	20	10/06/07 0:00	lcp
Carbonate as CaCO ₃			U		mg/L	2	20	10/06/07 0:00	lcp
Hydroxide as CaCO ₃			U		mg/L	2	20	10/06/07 0:00	lcp
Total Alkalinity		163		*	mg/L	2	20	10/06/07 0:00	lcp
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-1.2			%			10/19/07 0:00	calc
Sum of Anions		4.2			meq/L	0.1	0.5	10/19/07 0:00	calc
Sum of Cations		4.1			meq/L	0.1	0.5	10/19/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	10.5			mg/L	0.5	3	10/12/07 0:34	jlf
Fluoride	M300.0 - Ion Chromatography	0.3	B	*	mg/L	0.1	0.5	10/12/07 0:34	jlf
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.98			mg/L	0.02	0.1	10/19/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.98	H	*	mg/L	0.02	0.1	10/04/07 21:18	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		HU	*	mg/L	0.01	0.05	10/04/07 21:18	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	260			mg/L	10	20	10/05/07 14:48	ear
Sulfate	300.0 - Ion Chromatography	26.5			mg/L	0.5	3	10/12/07 0:34	jlf
TDS (calculated)	Calculation	225			mg/L	10	50	10/19/07 0:00	calc

Arizona license number: **AZ0102**

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-DUP

ACZ Sample ID: **L65452-04**

Date Sampled: 10/02/07 15:00

Date Received: 10/04/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	405			mS/cm			10/02/07 15:00	ma
pH (Field)	Field Measurement	7.5			units			10/02/07 15:00	ma
Temperature (Field)	Field Measurement	28.5			C			10/02/07 15:00	ma

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Chloride	M300.0 - Ion Chromatography	10.5		*	mg/L	0.5	3	10/12/07 0:52	jlf
Residue, Filterable (TDS) @180C	160.1 / SM2540C	240			mg/L	10	20	10/05/07 14:50	ear
Sulfate	300.0 - Ion Chromatography	26.5		*	mg/L	0.5	3	10/12/07 0:52	jlf

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

- (1) EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
- (2) EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
- (3) EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
- (5) EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
- (6) Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

- (1) QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
- (2) Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
- (3) Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita

ACZ Project ID: **L65452**

Project ID: OJ03Z5

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG233788													
WG233788PBW1	PBW	10/05/07 17:34				U	mg/L		-20	20			
WG233788LCSW2	LCSW	10/05/07 17:47	WC070928-1	820		834	mg/L	101.7	90	110			
WG233788PBW2	PBW	10/05/07 20:17				U	mg/L		-20	20			
WG233788LCSW5	LCSW	10/05/07 20:28	WC070928-1	820		841.5	mg/L	102.6	90	110			
WG233788PBW3	PBW	10/05/07 23:47				U	mg/L		-20	20			
WG233788LCSW8	LCSW	10/05/07 23:59	WC070928-1	820		830.9	mg/L	101.3	90	110			
WG233788PBW3	PBW	10/06/07 9:12				8.5	mg/L		-20	20			
WG233788LCSW8	LCSW	10/06/07 9:24	WC070928-1	820		833	mg/L	101.6	90	110			
L65464-09DUP	DUP	10/06/07 11:11			1300	1292.7	mg/L				0.6	20	
WG233788PBW4	PBW	10/06/07 12:50				2.7	mg/L		-20	20			
WG233788LCSW11	LCSW	10/06/07 13:02	WC070928-1	820		840.1	mg/L	102.5	90	110			
WG233788LCSW14	LCSW	10/06/07 15:59	WC070928-1	820		842.5	mg/L	102.7	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234257													
WG234257ICV	ICV	10/13/07 4:07	II071009-7	100		98.89	mg/L	98.9	95	105			
WG234257ICB	ICB	10/13/07 4:12				U	mg/L		-0.6	0.6			
WG234257LFB	LFB	10/13/07 4:28	II071012-2	67.97008		69.17	mg/L	101.8	85	115			
L65449-07AS	AS	10/13/07 5:36	II071012-2	67.97008	23	91.75	mg/L	101.1	85	115			
L65449-07ASD	ASD	10/13/07 5:40	II071012-2	67.97008	23	92.03	mg/L	101.6	85	115	0.3	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234134													
WG234134ICV	ICV	06/11/07 13:52	WI070910-1	20		20.34	mg/L	101.7	90	110			
WG234134ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG234134LFB1	LFB	10/11/07 12:30	WI070727-1	30		30.84	mg/L	102.8	90	110			
WG234134LFB2	LFB	10/11/07 21:15	WI070727-1	30		29.41	mg/L	98	90	110			
L65451-09DUP	DUP	10/11/07 21:51			8.4	8.44	mg/L				0.5	20	
L65451-10AS	AS	10/11/07 22:27	WI070727-1	30	8.2	37.81	mg/L	98.7	90	110			

Phelps Dodge Sierrita

ACZ Project ID: **L65452**

Project ID: OJ03Z5

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG234134													
WG234134ICV	ICV	06/11/07 13:52	WI070910-1	3.984		4.13	mg/L	103.7	90	110			
WG234134ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG234134LFB1	LFB	10/11/07 12:30	WI070727-1	1.5		1.58	mg/L	105.3	90	110			
WG234134LFB2	LFB	10/11/07 21:15	WI070727-1	1.5		1.51	mg/L	100.7	90	110			
L65451-09DUP	DUP	10/11/07 21:51			.6	.64	mg/L				6.5	20	RA
L65451-10AS	AS	10/11/07 22:27	WI070727-1	1.5	.7	2.18	mg/L	98.7	90	110			

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234257													
WG234257ICV	ICV	10/13/07 4:07	II071009-7	100		99.98	mg/L	100	95	105			
WG234257ICB	ICB	10/13/07 4:12				U	mg/L		-0.6	0.6			
WG234257LFB	LFB	10/13/07 4:28	II071012-2	54.96908		55.73	mg/L	101.4	85	115			
L65449-07AS	AS	10/13/07 5:36	II071012-2	54.96908	9.3	65.4	mg/L	102.1	85	115			
L65449-07ASD	ASD	10/13/07 5:40	II071012-2	54.96908	9.3	65.45	mg/L	102.1	85	115	0.08	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG233713													
WG233713ICV	ICV	10/04/07 20:50	WI070911-1	2.416		2.38	mg/L	98.5	90	110			
WG233713ICB	ICB	10/04/07 20:51				U	mg/L		-0.06	0.06			
WG233713LFB	LFB	10/04/07 20:56	WI070911-4	2		1.964	mg/L	98.2	90	110			
L65452-01AS	AS	10/04/07 21:17	WI070911-4	2	.99	2.848	mg/L	92.9	90	110			
L65452-03DUP	DUP	10/04/07 21:19			.98	.981	mg/L				0.1	20	

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG233713													
WG233713ICV	ICV	10/04/07 20:50	WI070911-1	.609		.606	mg/L	99.5	90	110			
WG233713ICB	ICB	10/04/07 20:51				U	mg/L		-0.03	0.03			
WG233713LFB	LFB	10/04/07 20:56	WI070911-4	1		.991	mg/L	99.1	90	110			
L65452-01AS	AS	10/04/07 21:17	WI070911-4	1		1.002	mg/L	100.2	90	110			
L65452-03DUP	DUP	10/04/07 21:19				U	mg/L				0	20	RA

Phelps Dodge Sierrita

ACZ Project ID: **L65452**

Project ID: OJ03Z5

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234257													
WG234257ICV	ICV	10/13/07 4:07	II071009-7	20		20.33	mg/L	101.7	95	105			
WG234257ICB	ICB	10/13/07 4:12				U	mg/L		-0.9	0.9			
WG234257LFB	LFB	10/13/07 4:28	II071012-2	99.76186		102.31	mg/L	102.6	85	115			
L65449-07AS	AS	10/13/07 5:36	II071012-2	99.76186	2.8	107.88	mg/L	105.3	85	115			
L65449-07ASD	ASD	10/13/07 5:40	II071012-2	99.76186	2.8	108.46	mg/L	105.9	85	115	0.54	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG233688													
WG233688PBW	PBW	10/04/07 15:50				U	mg/L		-20	20			
WG233688LCSW	LCSW	10/04/07 15:52	PCN28206	260		312	mg/L	119.5	80	120			
L65452-02DUP	DUP	10/04/07 16:39			4110	4136	mg/L				0.6	20	
WG233773													
WG233773PBW	PBW	10/05/07 14:30				U	mg/L		-20	20			
WG233773LCSW	LCSW	10/05/07 14:32	PCN28206	260		254	mg/L	97.3	80	120			
L65462-01DUP	DUP	10/05/07 15:01			1380	1374	mg/L				0.4	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234257													
WG234257ICV	ICV	10/13/07 4:07	II071009-7	100		100.25	mg/L	100.3	95	105			
WG234257ICB	ICB	10/13/07 4:12				U	mg/L		-0.9	0.9			
WG234257LFB	LFB	10/13/07 4:28	II071012-2	98.21624		99.59	mg/L	101.4	85	115			
L65449-07AS	AS	10/13/07 5:36	II071012-2	98.21624	15.2	115.4	mg/L	102	85	115			
L65449-07ASD	ASD	10/13/07 5:40	II071012-2	98.21624	15.2	115.35	mg/L	102	85	115	0.04	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234134													
WG234134ICV	ICV	06/11/07 13:52	WI070910-1	50.1		51.51	mg/L	102.8	90	110			
WG234134ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG234134LFB1	LFB	10/11/07 12:30	WI070727-1	30		32.06	mg/L	106.9	90	110			
WG234134LFB2	LFB	10/11/07 21:15	WI070727-1	30		30.14	mg/L	100.5	90	110			
L65451-09DUP	DUP	10/11/07 21:51			47.7	47.66	mg/L				0.1	20	
L65451-10AS	AS	10/11/07 22:27	WI070727-1	30	47.4	75.63	mg/L	94.1	90	110			

Phelps Dodge Sierrita

ACZ Project ID: **L65452**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L65452-01	WG234134	Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG233713	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG233788	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
L65452-02	WG234134	Chloride	M300.0 - Ion Chromatography	DH	Sample required dilution due to high TDS and/or EC value.
			M300.0 - Ion Chromatography	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
	WG233688	Residue, Filterable (TDS) @180C	160.1 / SM2540C	ZO	TDS concentration is based on a final residue greater than 200 mg.
	WG234134	Sulfate	300.0 - Ion Chromatography	DH	Sample required dilution due to high TDS and/or EC value.
			300.0 - Ion Chromatography	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
L65452-03	WG234134	Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG233713	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	HE	Analysis performed past holding time. Method holding time is less than or equal to 7 days and sample was received with less than half of the holding time remaining (refer to item C5 of ACZ's Terms & Conditions).
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG233788	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
L65452-04	WG234134	Chloride	M300.0 - Ion Chromatography	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
		Sulfate	300.0 - Ion Chromatography	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.

Phelps Dodge Sierrita

ACZ Project ID: **L65452**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L65452
Date Received: 10/4/2007
Received By:
Date Printed: 10/5/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (μR/hr)
1964	6	17

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Sample 1 on COC has an F on the end of ID the bottle's from that sample are missing the F on the bottle ID, but are Filtered samples.

Phelps Dodge Sierrita
 OJ03Z5

ACZ Project ID: L65452
 Date Received: 10/4/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L65452-01	MO-2007-6AF		Y									<input type="checkbox"/>
L65452-02	MO-2007-6A									X		<input type="checkbox"/>
L65452-03	MO-2007-DUPF		Y									<input type="checkbox"/>
L65452-04	MO-2007-DUP									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH - Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____



Laboratories, Inc.

L65452

CHAIN of CUSTODY

2773 Downhill Drive - Steamboat Springs, CO 80487 (800) 334-5493

Report to:

Name:

Company:

E-mail:

Address:

Telephone:

Copy of Report to:

Name:

Company:

E-mail:

Telephone:

Invoice to:

Name:

Company:

E-mail:

Address:

Telephone:

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES
NO

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

Quote #:

Project/PO #:

Reporting state for compliance testing:

Sampler's Name:

Are any samples NRC licensable material?

SAMPLE IDENTIFICATION

DATE:TIME

Matrix

of Containers

CaMK Na

ALK, TDS, SO₄
Cl⁻, F⁻, NO₃⁻SO₄

PH

EC

Temp

MO-2007-6AF

10/2/07: 1455

GW

2

X

X

7.92

405

26.5

MO-2007-6A

10/2/07: 1455

GW

1

X

7.52

405

26.5

MO-2007-DUP

10/2/07: 1500

GW

2

X

X

7.52

405

26.5

MO-2007-DUP

10/2/07: 1500

GW

X

7.52

405

26.5

Matrix

SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

* F is a Filtered Sample

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:

DATE:TIME

RECEIVED BY:

DATE:TIME

[Signature]

10/4/07 1538

[Signature]

10-4-07 10:34

October 22, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Dan Simpson

Project ID: OJ03Z5

ACZ Project ID: L65477

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 05, 2007. This project has been assigned to ACZ's project number, L65477. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L65477. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 22, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-6BF

ACZ Sample ID: **L65477-01**

Date Sampled: 10/04/07 14:00

Date Received: 10/05/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	483			mS/cm			10/14/07 14:00	ma
pH (Field)	Field Measurement	7.7			units			10/14/07 14:00	ma
Temperature (Field)	Field Measurement	33.1			C			10/14/07 14:00	ma

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	28.1			mg/L	0.2	1	10/14/07 4:30	erf
Magnesium, dissolved	M200.7 ICP	2.9			mg/L	0.2	1	10/14/07 4:30	erf
Potassium, dissolved	M200.7 ICP	11.3			mg/L	0.3	2	10/14/07 4:30	erf
Sodium, dissolved	M200.7 ICP	60.6			mg/L	0.3	2	10/14/07 4:30	erf

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		119		*	mg/L	2	20	10/09/07 0:00	lcp
Carbonate as CaCO ₃		5	B	*	mg/L	2	20	10/09/07 0:00	lcp
Hydroxide as CaCO ₃			U	*	mg/L	2	20	10/09/07 0:00	lcp
Total Alkalinity		125		*	mg/L	2	20	10/09/07 0:00	lcp
Cation-Anion Balance	Calculation								
Cation-Anion Balance		-2.1			%			10/19/07 0:00	calc
Sum of Anions		4.8			meq/L	0.1	0.5	10/19/07 0:00	calc
Sum of Cations		4.6			meq/L	0.1	0.5	10/19/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	10.9			mg/L	0.5	3	10/12/07 1:10	jlf
Fluoride	M300.0 - Ion Chromatography	0.5		*	mg/L	0.1	0.5	10/12/07 1:10	jlf
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.67			mg/L	0.02	0.1	10/19/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.69		*	mg/L	0.02	0.1	10/05/07 20:02	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.02	B	*	mg/L	0.01	0.05	10/05/07 20:02	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	400			mg/L	10	20	10/08/07 13:50	ear
Sulfate	300.0 - Ion Chromatography	93.6			mg/L	0.5	3	10/12/07 1:10	jlf
TDS (calculated)	Calculation	287			mg/L	10	50	10/19/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.39						10/19/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-6B

ACZ Sample ID: **L65477-02**

Date Sampled: 10/04/07 14:00

Date Received: 10/05/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	483			mS/cm			10/14/07 14:01	ma
pH (Field)	Field Measurement	7.7			units			10/14/07 14:01	ma
Temperature (Field)	Field Measurement	33.1			C			10/14/07 14:01	ma

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	93.5		*	mg/L	0.5	3	10/12/07 1:29	jlf

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita

ACZ Project ID: **L65477**

Project ID: OJ03Z5

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG233896													
WG233896PBW1	PBW	10/09/07 10:20				22.1	mg/L		-20	20			B4
WG233896LCSW2	LCSW	10/09/07 10:32	WC070928-1	820		816.3	mg/L	99.5	90	110			
L65479-02DUP	DUP	10/09/07 13:23			5	5.8	mg/L				14.8	20	RA
WG233896PBW2	PBW	10/09/07 13:29				U	mg/L		-20	20			
WG233896LCSW5	LCSW	10/09/07 13:40	WC070928-1	820		833.8	mg/L	101.7	90	110			
WG233896PBW3	PBW	10/09/07 16:16				U	mg/L		-20	20			
WG233896LCSW8	LCSW	10/09/07 16:28	WC070928-1	820		845.7	mg/L	103.1	90	110			
WG233896PBW4	PBW	10/09/07 19:23				U	mg/L		-20	20			
WG233896LCSW11	LCSW	10/09/07 19:36	WC070928-1	820		853.5	mg/L	104.1	90	110			
WG233896LCSW14	LCSW	10/09/07 22:37	WC070928-1	820		846.9	mg/L	103.3	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234289													
WG234289ICV	ICV	10/14/07 2:11	II071009-7	100		99.61	mg/L	99.6	95	105			
WG234289ICB	ICB	10/14/07 2:16				U	mg/L		-0.6	0.6			
WG234289LFB	LFB	10/14/07 2:32	II071012-2	67.97008		75.27	mg/L	110.7	85	115			
L65410-03AS	AS	10/14/07 4:00	II071012-2	67.97008	15.9	91.41	mg/L	111.1	85	115			
L65410-03ASD	ASD	10/14/07 4:05	II071012-2	67.97008	15.9	88.99	mg/L	107.5	85	115	2.68	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234134													
WG234134ICV	ICV	06/11/07 13:52	WI070910-1	20		20.34	mg/L	101.7	90	110			
WG234134ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG234134LFB1	LFB	10/11/07 12:30	WI070727-1	30		30.84	mg/L	102.8	90	110			
WG234134LFB2	LFB	10/11/07 21:15	WI070727-1	30		29.41	mg/L	98	90	110			
L65451-09DUP	DUP	10/11/07 21:51			8.4	8.44	mg/L				0.5	20	
L65451-10AS	AS	10/11/07 22:27	WI070727-1	30	8.2	37.81	mg/L	98.7	90	110			

Phelps Dodge Sierrita

ACZ Project ID: **L65477**

Project ID: OJ03Z5

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG234134													
WG234134ICV	ICV	06/11/07 13:52	WI070910-1	3.984		4.13	mg/L	103.7	90	110			
WG234134ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG234134LFB1	LFB	10/11/07 12:30	WI070727-1	1.5		1.58	mg/L	105.3	90	110			
WG234134LFB2	LFB	10/11/07 21:15	WI070727-1	1.5		1.51	mg/L	100.7	90	110			
L65451-09DUP	DUP	10/11/07 21:51			.6	.64	mg/L				6.5	20	RA
L65451-10AS	AS	10/11/07 22:27	WI070727-1	1.5	.7	2.18	mg/L	98.7	90	110			

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234289													
WG234289ICV	ICV	10/14/07 2:11	II071009-7	100		100.54	mg/L	100.5	95	105			
WG234289ICB	ICB	10/14/07 2:16				U	mg/L		-0.6	0.6			
WG234289LFB	LFB	10/14/07 2:32	II071012-2	54.96908		59.92	mg/L	109	85	115			
L65410-03AS	AS	10/14/07 4:00	II071012-2	54.96908	.9	62.54	mg/L	112.1	85	115			
L65410-03ASD	ASD	10/14/07 4:05	II071012-2	54.96908	.9	60.93	mg/L	109.2	85	115	2.61	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG233802													
WG233802ICV	ICV	10/05/07 19:08	WI070911-1	2.416		2.388	mg/L	98.8	90	110			
WG233802ICB	ICB	10/05/07 19:09				U	mg/L		-0.06	0.06			
WG233802LFB1	LFB	10/05/07 19:13	WI070911-4	2		1.988	mg/L	99.4	90	110			
WG233802LFB2	LFB	10/05/07 19:51	WI070911-4	2		2.004	mg/L	100.2	90	110			
L65470-06AS	AS	10/05/07 19:53	WI070911-4	2		1.945	mg/L	97.3	90	110			
L65470-07DUP	DUP	10/05/07 20:00			.03	.023	mg/L				26.4	20	RA

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG233802													
WG233802ICV	ICV	10/05/07 19:08	WI070911-1	.609		.604	mg/L	99.2	90	110			
WG233802ICB	ICB	10/05/07 19:09				U	mg/L		-0.03	0.03			
WG233802LFB1	LFB	10/05/07 19:13	WI070911-4	1		.988	mg/L	98.8	90	110			
WG233802LFB2	LFB	10/05/07 19:51	WI070911-4	1		1.023	mg/L	102.3	90	110			
L65470-06AS	AS	10/05/07 19:53	WI070911-4	1		.974	mg/L	97.4	90	110			
L65470-07DUP	DUP	10/05/07 20:00				U	mg/L				0	20	RA

Phelps Dodge Sierrita

ACZ Project ID: **L65477**

Project ID: OJ03Z5

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234289													
WG234289ICV	ICV	10/14/07 2:11	II071009-7	20		20.02	mg/L	100.1	95	105			
WG234289ICB	ICB	10/14/07 2:16				U	mg/L		-0.9	0.9			
WG234289LFB	LFB	10/14/07 2:32	II071012-2	99.76186		107.85	mg/L	108.1	85	115			
L65410-03AS	AS	10/14/07 4:00	II071012-2	99.76186	.9	113.9	mg/L	113.3	85	115			
L65410-03ASD	ASD	10/14/07 4:05	II071012-2	99.76186	.9	111.92	mg/L	111.3	85	115	1.75	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG233879													
WG233879PBW	PBW	10/08/07 13:25				U	mg/L		-20	20			
WG233879LCSW	LCSW	10/08/07 13:26	PCN28214	260		278	mg/L	106.5	80	120			
L65502-01DUP	DUP	10/08/07 14:09			4120	4156	mg/L				0.9	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234289													
WG234289ICV	ICV	10/14/07 2:11	II071009-7	100		99.93	mg/L	99.9	95	105			
WG234289ICB	ICB	10/14/07 2:16				U	mg/L		-0.9	0.9			
WG234289LFB	LFB	10/14/07 2:32	II071012-2	98.21624		106.13	mg/L	108.1	85	115			
L65410-03AS	AS	10/14/07 4:00	II071012-2	98.21624	36.6	143.53	mg/L	108.9	85	115			
L65410-03ASD	ASD	10/14/07 4:05	II071012-2	98.21624	36.6	140.73	mg/L	106	85	115	1.97	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234134													
WG234134ICV	ICV	06/11/07 13:52	WI070910-1	50.1		51.51	mg/L	102.8	90	110			
WG234134ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG234134LFB1	LFB	10/11/07 12:30	WI070727-1	30		32.06	mg/L	106.9	90	110			
WG234134LFB2	LFB	10/11/07 21:15	WI070727-1	30		30.14	mg/L	100.5	90	110			
L65451-09DUP	DUP	10/11/07 21:51			47.7	47.66	mg/L				0.1	20	
L65451-10AS	AS	10/11/07 22:27	WI070727-1	30	47.4	75.63	mg/L	94.1	90	110			

Phelps Dodge Sierrita

ACZ Project ID: **L65477**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L65477-01	WG233896	Bicarbonate as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
		Carbonate as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
	WG234134	Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG233896	Hydroxide as CaCO ₃	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
	WG233802	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG233896	Total Alkalinity	SM2320B - Titration	B4	Target analyte detected in blank at or above the acceptance criteria.
			SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
			SM2320B - Titration	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG234134	Sulfate	300.0 - Ion Chromatography	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.

Phelps Dodge Sierrita

ACZ Project ID: **L65477**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L65477
Date Received: 10/5/2007
Received By:
Date Printed: 10/5/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?	X		
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (μR/hr)
1375	1.2	14

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
 OJ03Z5

ACZ Project ID: L65477
 Date Received: 10/5/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L65477-01	MO-2007-6BF		Y									<input type="checkbox"/>
L65477-02	MO-2007-6B									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

CHAIN of CUSTODY

2773 Downhill Drive Steamboat Springs, CO 80487 (800) 334-5493

Report to:

Name: Dan Simpson	Address: 51 West Wetmore Rd
Company: HydrGeo Chem Inc.	Tucson AZ 85705
E-mail: dms@hgcinc.com	Telephone: 520) 293-1500 x133

Copy of Report to:

Name: Ned Hall/Billy Darris/Jim Norris	E-mail: Jimn@hgcinc.com, billydarris@fmi.com
Company: PD&I/AGC	Telephone: 520 293-1500 648-8873

Invoice to:

Name: Ned Hall	Address: 6200 W. Deval Mine Rd
Company: PDSI	PO Box 527 Green Valley, AZ 85622
E-mail: ned-hall@fmi.com	Telephone: 520 648-4857

If sample(s) received past holding time (HT), or if insufficient HT remains to complete analysis before expiration, shall ACZ proceed with requested short HT analyses?

YES	<input checked="" type="checkbox"/>
NO	<input type="checkbox"/>

If "NO" then ACZ will contact client for further instruction. If neither "YES" nor "NO"

is indicated, ACZ will proceed with the requested analyses, even if HT is expired, and data will be qualified.

PROJECT INFORMATION

ANALYSES REQUESTED (attach list or use quote number)

[illegible]

Matrix	SW (Surface Water) · GW (Ground Water) · WW (Waste Water) · DW (Drinking Water) · SL (Sludge) · SO (Soil) · OL (Oil) · Other (Specify)

REMARKS

* F is a filtered sample

Please refer to ACZ's terms & conditions located on the reverse side of this COC.

RELINQUISHED BY:	DATE:TIME	RECEIVED BY:	DATE:TIME
<i>[Signature]</i>	10/4/07 1513	WPL	10-5-07 11:2

October 24, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Dan Simpson

Project ID: OJ03Z5

ACZ Project ID: L65562

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 10, 2007. This project has been assigned to ACZ's project number, L65562. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L65562. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 24, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-4A

ACZ Sample ID: **L65562-01**

Date Sampled: 10/09/07 14:45

Date Received: 10/10/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	412			mS/cm			10/09/07 14:45	njb
pH (Field)	Field Measurement	7.5			units			10/09/07 14:45	njb
Temperature (Field)	Field Measurement	27.5			C			10/09/07 14:45	njb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	42.8			mg/L	0.2	1	10/20/07 18:06	erf
Magnesium, dissolved	M200.7 ICP	6.2			mg/L	0.2	1	10/20/07 18:06	erf
Potassium, dissolved	M200.7 ICP	3.3			mg/L	0.3	2	10/20/07 18:06	erf
Sodium, dissolved	M200.7 ICP	37.1			mg/L	0.3	2	10/20/07 18:06	erf

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		155			mg/L	2	20	10/11/07 0:00	lcp
Carbonate as CaCO ₃		5	B		mg/L	2	20	10/11/07 0:00	lcp
Hydroxide as CaCO ₃			U		mg/L	2	20	10/11/07 0:00	lcp
Total Alkalinity		160		*	mg/L	2	20	10/11/07 0:00	lcp
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.0			%			10/24/07 0:00	calc
Sum of Anions		4.3			meq/L	0.1	0.5	10/24/07 0:00	calc
Sum of Cations		4.3			meq/L	0.1	0.5	10/24/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	10.2			mg/L	0.5	3	10/19/07 19:50	ccp
Fluoride	M300.0 - Ion Chromatography	0.3	B	*	mg/L	0.1	0.5	10/19/07 19:50	ccp
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.93			mg/L	0.02	0.1	10/24/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.93		*	mg/L	0.02	0.1	10/10/07 18:44	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	10/10/07 18:44	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	270			mg/L	10	20	10/11/07 12:53	ear
Sulfate	300.0 - Ion Chromatography	37.0			mg/L	0.5	3	10/19/07 19:50	ccp
TDS (calculated)	Calculation	239			mg/L	10	50	10/24/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.13						10/24/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-4A

ACZ Sample ID: **L65562-02**

Date Sampled: 10/09/07 14:45

Date Received: 10/10/07

Sample Matrix: Ground Water

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	37.2		*	mg/L	0.5	3	10/19/07 20:08	ccp

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L65562**

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234142													
WG234142PBW1	PBW	10/11/07 13:49				2.1	mg/L		-20	20			
WG234142LCSW2	LCSW	10/11/07 14:01	WC070928-1	820		805.8	mg/L	98.3	90	110			
WG234142PBW2	PBW	10/11/07 16:55				U	mg/L		-20	20			
WG234142LCSW5	LCSW	10/11/07 17:07	WC070928-1	820		823.7	mg/L	100.5	90	110			
WG234142PBW3	PBW	10/11/07 19:57				U	mg/L		-20	20			
WG234142LCSW8	LCSW	10/11/07 20:09	WC070928-1	820		828.8	mg/L	101.1	90	110			
WG234142PBW4	PBW	10/11/07 23:16				U	mg/L		-20	20			
WG234142LCSW11	LCSW	10/11/07 23:27	WC070928-1	820		828	mg/L	101	90	110			
L65566-01DUP	DUP	10/12/07 0:52			38	37.4	mg/L				1.6	20	
WG234142LCSW14	LCSW	10/12/07 2:41	WC070928-1	820		831.4	mg/L	101.4	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234667													
WG234667ICV	ICV	10/20/07 16:22	II071009-7	100		98.84	mg/L	98.8	95	105			
WG234667ICB	ICB	10/20/07 16:25				U	mg/L		-0.6	0.6			
WG234667LFB	LFB	10/20/07 16:39	II071012-2	67.97008		66.17	mg/L	97.4	85	115			
L65555-01AS	AS	10/20/07 17:56	II071012-2	67.97008	6.7	75.37	mg/L	101	85	115			
L65555-01ASD	ASD	10/20/07 17:59	II071012-2	67.97008	6.7	73.74	mg/L	98.6	85	115	2.19	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234617													
WG234617ICV1	ICV	10/19/07 13:12	WI071019-1	20		19.22	mg/L	96.1	90	110			
WG234617ICB1	ICB	10/19/07 13:30				U	mg/L		-1.5	1.5			
WG234617LFB1	LFB	10/19/07 13:48	WI070727-1	30		29.11	mg/L	97	90	110			
WG234617LFB2	LFB	10/19/07 22:33	WI070727-1	30		30.05	mg/L	100.2	90	110			
L65535-07AS	AS	10/23/07 17:18	WI070727-1	300	432	724.7	mg/L	97.6	90	110			
L65535-07DUP	DUP	10/23/07 17:36			432	430.1	mg/L				0.4	20	

Phelps Dodge Sierrita

ACZ Project ID: **L65562**

Project ID: OJ03Z5

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			

WG234617

WG234617ICV1	ICV	10/19/07 13:12	WI071019-1	3.984		3.94	mg/L	98.9	90	110			
WG234617ICB1	ICB	10/19/07 13:30				U	mg/L		-0.3	0.3			
WG234617LFB1	LFB	10/19/07 13:48	WI070727-1	1.5		1.49	mg/L	99.3	90	110			
L65535-07AS	AS	10/19/07 19:14	WI070727-1	1.5	.5	2.03	mg/L	102	90	110			
L65535-07DUP	DUP	10/19/07 19:32			.5	.54	mg/L				7.7	20	RA
WG234617LFB2	LFB	10/19/07 22:33	WI070727-1	1.5		1.55	mg/L	103.3	90	110			

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234667													
WG234667ICV	ICV	10/20/07 16:22	II071009-7	100		100.12	mg/L	100.1	95	105			
WG234667ICB	ICB	10/20/07 16:25				U	mg/L		-0.6	0.6			
WG234667LFB	LFB	10/20/07 16:39	II071012-2	54.96908		53.47	mg/L	97.3	85	115			
L65555-01AS	AS	10/20/07 17:56	II071012-2	54.96908	1.3	56.81	mg/L	101	85	115			
L65555-01ASD	ASD	10/20/07 17:59	II071012-2	54.96908	1.3	55.82	mg/L	99.2	85	115	1.76	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234081													
WG234081ICV	ICV	10/10/07 18:07	WI070911-1	2.416		2.513	mg/L	104	90	110			
WG234081ICB	ICB	10/10/07 18:08				U	mg/L		-0.06	0.06			
WG234081LFB1	LFB	10/10/07 18:13	WI070911-4	2		2.069	mg/L	103.5	90	110			
L65550-11AS	AS	10/10/07 18:34	WI070911-4	2	U	2.09	mg/L	104.5	90	110			
L65550-12DUP	DUP	10/10/07 18:37			.04	.054	mg/L				29.8	20	RA
WG234081LFB2	LFB	10/10/07 19:18	WI070911-4	2		2.157	mg/L	107.9	90	110			

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234081													
WG234081ICV	ICV	10/10/07 18:07	WI070911-1	.609		.616	mg/L	101.1	90	110			
WG234081ICB	ICB	10/10/07 18:08				U	mg/L		-0.03	0.03			
WG234081LFB1	LFB	10/10/07 18:13	WI070911-4	1		.991	mg/L	99.1	90	110			
L65550-11AS	AS	10/10/07 18:34	WI070911-4	1	.02	1.075	mg/L	105.5	90	110			
L65550-12DUP	DUP	10/10/07 18:37			U	U	mg/L				0	20	RA
WG234081LFB2	LFB	10/10/07 19:18	WI070911-4	1		1.055	mg/L	105.5	90	110			

Phelps Dodge Sierrita

ACZ Project ID: **L65562**

Project ID: OJ03Z5

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234667													
WG234667ICV	ICV	10/20/07 16:22	II071009-7	20		20.04	mg/L	100.2	95	105			
WG234667ICB	ICB	10/20/07 16:25				U	mg/L		-0.9	0.9			
WG234667LFB	LFB	10/20/07 16:39	II071012-2	99.76186		97.21	mg/L	97.4	85	115			
L65555-01AS	AS	10/20/07 17:56	II071012-2	99.76186	.8	103.8	mg/L	103.2	85	115			
L65555-01ASD	ASD	10/20/07 17:59	II071012-2	99.76186	.8	101.44	mg/L	100.9	85	115	2.3	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234143													
WG234143PBW	PBW	10/11/07 12:40				10	mg/L		-20	20			
WG234143LCSW	LCSW	10/11/07 12:42	PCN28214	260		284	mg/L	109.2	80	120			
L65583-02DUP	DUP	10/11/07 13:06			2400	2410	mg/L				0.4	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234667													
WG234667ICV	ICV	10/20/07 16:22	II071009-7	100		99.56	mg/L	99.6	95	105			
WG234667ICB	ICB	10/20/07 16:25				U	mg/L		-0.9	0.9			
WG234667LFB	LFB	10/20/07 16:39	II071012-2	98.21624		95.02	mg/L	96.7	85	115			
L65555-01AS	AS	10/20/07 17:56	II071012-2	98.21624	2.4	101.46	mg/L	100.9	85	115			
L65555-01ASD	ASD	10/20/07 17:59	II071012-2	98.21624	2.4	99.39	mg/L	98.8	85	115	2.06	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234617													
WG234617ICV1	ICV	10/19/07 13:12	WI071019-1	50.1		49.65	mg/L	99.1	90	110			
WG234617ICB1	ICB	10/19/07 13:30				U	mg/L		-1.5	1.5			
WG234617LFB1	LFB	10/19/07 13:48	WI070727-1	30		30.34	mg/L	101.1	90	110			
L65535-07AS	AS	10/19/07 19:14	WI070727-1	30	7.5	37.38	mg/L	99.6	90	110			
L65535-07DUP	DUP	10/19/07 19:32			7.5	7.57	mg/L				0.9	20	
WG234617LFB2	LFB	10/19/07 22:33	WI070727-1	30		30.83	mg/L	102.8	90	110			

Phelps Dodge SierritaACZ Project ID: **L65562**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L65562-01	WG234617	Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG234081	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG234142	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.
L65562-02	WG234617	Sulfate	300.0 - Ion Chromatography	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.

Phelps Dodge Sierrita

ACZ Project ID: **L65562**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L65562
Date Received: 10/10/2007
Received By:
Date Printed: 10/11/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
NA4622	1.8	16

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L65562
Date Received: 10/10/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L65562-01	MO-2007-4A		Y									<input type="checkbox"/>
L65562-02	MO-2007-4A									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

October 30, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Bill Dorris, Jim Norris, Dan Simpson

Project ID: OJ03Z5

ACZ Project ID: L65645

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 12, 2007. This project has been assigned to ACZ's project number, L65645. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L65645. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 30, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-4B-F

ACZ Sample ID: **L65645-01**

Date Sampled: 10/11/07 08:20

Date Received: 10/12/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	376			mS/cm			10/11/07 8:20	nb
pH (Field)	Field Measurement	7.9			units			10/11/07 8:20	nb
Temperature (Field)	Field Measurement	26.4			C			10/11/07 8:20	nb
Turbidity (Field)	Field Measurement	5.12			NTU			10/11/07 8:20	nb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	41.6			mg/L	0.2	1	10/25/07 19:49	djt
Magnesium, dissolved	M200.7 ICP	4.3			mg/L	0.2	1	10/25/07 19:49	djt
Potassium, dissolved	M200.7 ICP	2.9			mg/L	0.3	2	10/25/07 19:49	djt
Sodium, dissolved	M200.7 ICP	35.7		*	mg/L	0.3	2	10/25/07 19:49	djt

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		143			mg/L	2	20	10/15/07 0:00	aeh
Carbonate as CaCO ₃			U		mg/L	2	20	10/15/07 0:00	aeh
Hydroxide as CaCO ₃			U		mg/L	2	20	10/15/07 0:00	aeh
Total Alkalinity		143		*	mg/L	2	20	10/15/07 0:00	aeh
Cation-Anion Balance	Calculation								
Cation-Anion Balance		1.3			%			10/30/07 0:00	calc
Sum of Anions		3.9			meq/L	0.1	0.5	10/30/07 0:00	calc
Sum of Cations		4.0			meq/L	0.1	0.5	10/30/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	9.1			mg/L	0.5	3	10/25/07 3:01	ccp
Fluoride	M300.0 - Ion Chromatography	0.6		*	mg/L	0.1	0.5	10/25/07 3:01	ccp
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	0.77			mg/L	0.02	0.1	10/30/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.77			mg/L	0.02	0.1	10/12/07 18:34	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction		U	*	mg/L	0.01	0.05	10/12/07 18:34	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	230			mg/L	10	20	10/16/07 11:24	ear
Sulfate	300.0 - Ion Chromatography	37.6			mg/L	0.5	3	10/25/07 3:01	ccp
TDS (calculated)	Calculation	221			mg/L	10	50	10/30/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.04						10/30/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-4B

ACZ Sample ID: **L65645-02**

Date Sampled: 10/11/07 08:20

Date Received: 10/12/07

Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	37.5			mg/L	0.5	3	10/25/07 3:19	ccp

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita
 Project ID: OJ03Z5

ACZ Project ID: **L65645**

Alkalinity as CaCO3 SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234306													
WG234306PBW1	PBW	10/15/07 11:34				U	mg/L		-20	20			
WG234306LCSW2	LCSW	10/15/07 11:47	WC071015-1	820		808.8	mg/L	98.6	90	110			
WG234306PBW2	PBW	10/15/07 15:36				U	mg/L		-20	20			
WG234306LCSW5	LCSW	10/15/07 15:49	WC071015-1	820		821	mg/L	100.1	90	110			
WG234306PBW3	PBW	10/15/07 18:22				U	mg/L		-20	20			
WG234306LCSW8	LCSW	10/15/07 18:35	WC071015-1	820		824.9	mg/L	100.6	90	110			
WG234306PBW4	PBW	10/15/07 21:25				U	mg/L		-20	20			
WG234306LCSW11	LCSW	10/15/07 21:36	WC071015-1	820		822	mg/L	100.2	90	110			
L65660-04DUP	DUP	10/15/07 22:50			234	233.1	mg/L				0.4	20	
WG234306LCSW14	LCSW	10/16/07 0:26	WC071015-1	820		821.1	mg/L	100.1	90	110			

Calcium, dissolved M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234965													
WG234965ICV	ICV	10/25/07 18:15	II071009-6	100		101.88	mg/L	101.9	95	105			
WG234965ICB	ICB	10/25/07 18:19				U	mg/L		-0.6	0.6			
WG234965LFB	LFB	10/25/07 18:31	II071012-2	67.97008		71.35	mg/L	105	85	115			
L65644-01AS	AS	10/25/07 19:33	II071012-2	67.97008	.3	74.03	mg/L	108.5	85	115			
L65644-01ASD	ASD	10/25/07 19:36	II071012-2	67.97008	.3	73.36	mg/L	107.5	85	115	0.91	20	

Chloride M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234870													
WG234870ICV	ICV	10/24/07 14:38	WI071019-1	20		19.89	mg/L	99.5	90	110			
WG234870ICB	ICB	10/24/07 14:57				U	mg/L		-1.5	1.5			
WG234870LFB1	LFB	10/24/07 15:15	WI070727-1	30		29.32	mg/L	97.7	90	110			
WG234870LFB2	LFB	10/25/07 0:00	WI070727-1	30		29.44	mg/L	98.1	90	110			
L65634-05AS	AS	10/25/07 17:18	WI070727-1	1500	230	1745	mg/L	101	90	110			
L65634-05DUP	DUP	10/25/07 17:36			230	223	mg/L				3.1	20	RA

Phelps Dodge Sierrita

ACZ Project ID: **L65645**

Project ID: OJ03Z5

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG234870													
WG234870ICV	ICV	10/24/07 14:38	WI071019-1	3.984		4.1	mg/L	102.9	90	110			
WG234870ICB	ICB	10/24/07 14:57				U	mg/L		-0.3	0.3			
WG234870LFB1	LFB	10/24/07 15:15	WI070727-1	1.5		1.51	mg/L	100.7	90	110			
WG234870LFB2	LFB	10/25/07 0:00	WI070727-1	1.5		1.55	mg/L	103.3	90	110			
L65634-05AS	AS	10/25/07 0:36	WI070727-1	3	.7	3.73	mg/L	101	90	110			
L65634-05DUP	DUP	10/25/07 0:54			.7	.75	mg/L				6.9	20	RA

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234965													
WG234965ICV	ICV	10/25/07 18:15	II071009-6	100		101.9	mg/L	101.9	95	105			
WG234965ICB	ICB	10/25/07 18:19				U	mg/L		-0.6	0.6			
WG234965LFB	LFB	10/25/07 18:31	II071012-2	54.96908		57.06	mg/L	103.8	85	115			
L65644-01AS	AS	10/25/07 19:33	II071012-2	54.96908	U	59.34	mg/L	108	85	115			
L65644-01ASD	ASD	10/25/07 19:36	II071012-2	54.96908	U	59.11	mg/L	107.5	85	115	0.39	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234250													
WG234250ICV	ICV	10/12/07 17:50	WI070911-1	2.416		2.559	mg/L	105.9	90	110			
WG234250ICB	ICB	10/12/07 17:51				U	mg/L		-0.06	0.06			
WG234250LFB1	LFB	10/12/07 17:55	WI070911-4	2		2.154	mg/L	107.7	90	110			
WG234250LFB2	LFB	10/12/07 18:33	WI070911-4	2		2.148	mg/L	107.4	90	110			
L65645-01AS	AS	10/12/07 18:35	WI070911-4	2	.77	2.885	mg/L	105.8	90	110			
L65646-01DUP	DUP	10/12/07 18:42			1.76	1.778	mg/L				1	20	

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234250													
WG234250ICV	ICV	10/12/07 17:50	WI070911-1	.609		.612	mg/L	100.5	90	110			
WG234250ICB	ICB	10/12/07 17:51				U	mg/L		-0.03	0.03			
WG234250LFB1	LFB	10/12/07 17:55	WI070911-4	1		1.001	mg/L	100.1	90	110			
WG234250LFB2	LFB	10/12/07 18:33	WI070911-4	1		1.015	mg/L	101.5	90	110			
L65645-01AS	AS	10/12/07 18:35	WI070911-4	1	U	.991	mg/L	99.1	90	110			
L65646-01DUP	DUP	10/12/07 18:42			U	U	mg/L				0	20	RA

Phelps Dodge Sierrita

ACZ Project ID: **L65645**

Project ID: OJ03Z5

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234965													
WG234965ICV	ICV	10/25/07 18:15	II071009-6	20		19.79	mg/L	99	95	105			
WG234965ICB	ICB	10/25/07 18:19				U	mg/L		-0.9	0.9			
WG234965LFB	LFB	10/25/07 18:31	II071012-2	99.76186		103.8	mg/L	104	85	115			
L65644-01AS	AS	10/25/07 19:33	II071012-2	99.76186	.9	106.37	mg/L	105.7	85	115			
L65644-01ASD	ASD	10/25/07 19:36	II071012-2	99.76186	.9	105.55	mg/L	104.9	85	115	0.77	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234373													
WG234373PBW	PBW	10/16/07 11:05				U	mg/L		-20	20			
WG234373LCSW	LCSW	10/16/07 11:07	PCN28213	260		254	mg/L	97.7	80	120			
L65659-03DUP	DUP	10/16/07 11:33			2220	2230	mg/L				0.4	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234965													
WG234965ICV	ICV	10/25/07 18:15	II071009-6	100		101.69	mg/L	101.7	95	105			
WG234965ICB	ICB	10/25/07 18:19				U	mg/L		-0.9	0.9			
WG234965LFB	LFB	10/25/07 18:31	II071012-2	98.21624		101.4	mg/L	103.2	85	115			
L65644-01AS	AS	10/25/07 19:33	II071012-2	98.21624	.9	104.77	mg/L	105.8	85	115			
L65644-01ASD	ASD	10/25/07 19:36	II071012-2	98.21624	.9	103.63	mg/L	104.6	85	115	1.09	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234870													
WG234870ICV	ICV	10/24/07 14:38	WI071019-1	50.1		51.76	mg/L	103.3	90	110			
WG234870ICB	ICB	10/24/07 14:57				U	mg/L		-1.5	1.5			
WG234870LFB1	LFB	10/24/07 15:15	WI070727-1	30		30.58	mg/L	101.9	90	110			
WG234870LFB2	LFB	10/25/07 0:00	WI070727-1	30		30.19	mg/L	100.6	90	110			
L65634-05AS	AS	10/25/07 17:18	WI070727-1	1500	1610	3110	mg/L	100	90	110			
L65634-05DUP	DUP	10/25/07 17:36			1610	1571	mg/L				2.5	20	

Phelps Dodge Sierrita

ACZ Project ID: **L65645**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L65645-01	WG234965	Sodium, dissolved	M200.7 ICP	BB	Target analyte detected in calibration blank at or above acceptance limit. Sample value was > 10X the concentration in the calibration blank.
	WG234870	Chloride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG234250	Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG234306	Total Alkalinity	SM2320B - Titration	QA	Sample container with preservation type specified by the method was not available for analysis. Alternate sample container was used.

Phelps Dodge Sierrita

ACZ Project ID: **L65645**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L65645
Date Received: 10/12/2007
Received By:
Date Printed: 10/12/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
NA4651	3.2	16

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L65645
Date Received: 10/12/2007
Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L65645-01	MO-2007-4B-F		Y									<input type="checkbox"/>
L65645-02	MO-2007-4B									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

White - Return with sample. Yellow - Retain for your records.

October 30, 2007

Report to:

Ned Hall

Phelps Dodge Sierrita

P.O. Box 527 6200 W. Duval Mine Rd.

Green Valley, AZ 85622-0527

Bill to:

Accounts Payable

Phelps Dodge Sierrita

P.O. Box 2671

Phoenix, AZ 85002-2671

cc: Dan Simpson, Jim Norris, Bill Dorris

Project ID: OJ03Z5

ACZ Project ID: L65663

Ned Hall:

Enclosed are the analytical results for sample(s) submitted to ACZ Laboratories, Inc. (ACZ) on October 13, 2007. This project has been assigned to ACZ's project number, L65663. Please reference this number in all future inquiries.

All analyses were performed according to ACZ's Quality Assurance Plan, version 12.0. The enclosed results relate only to the samples received under L65663. Each section of this report has been reviewed and approved by the appropriate Laboratory Supervisor, or a qualified substitute.

Except as noted, the test results for the methods and parameters listed on ACZ's current NELAC certificate letter (#ACZ) meet all requirements of NELAC.

This report shall be used or copied only in its entirety. ACZ is not responsible for the consequences arising from the use of a partial report.

All samples and sub-samples associated with this project will be disposed of after November 30, 2007. If the samples are determined to be hazardous, additional charges apply for disposal (typically less than \$10/sample). If you would like the samples to be held longer than ACZ's stated policy or to be returned, please contact your Project Manager or Customer Service Representative for further details and associated costs. ACZ retains analytical reports for five years.

If you have any questions or other needs, please contact your Project Manager.



Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-5B-F

ACZ Sample ID: **L65663-01**

Date Sampled: 10/12/07 10:30

Date Received: 10/13/07

Sample Matrix: Ground Water

Field Data

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Conductivity (Field)	Field Measurement	1150			mS/cm			10/12/07 10:30	njb
pH (Field)	Field Measurement	7.6			units			10/12/07 10:30	njb
Temperature (Field)	Field Measurement	29.9			C			10/12/07 10:30	njb
Turbidity (Field)	Field Measurement	3.48			NTU			10/12/07 10:30	njb

Metals Analysis

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Calcium, dissolved	M200.7 ICP	84.8			mg/L	0.2	1	10/26/07 18:25	djt
Magnesium, dissolved	M200.7 ICP	3.7			mg/L	0.2	1	10/26/07 18:25	djt
Potassium, dissolved	M200.7 ICP	5.5			mg/L	0.3	2	10/26/07 18:25	djt
Sodium, dissolved	M200.7 ICP	164			mg/L	0.3	2	10/26/07 18:25	djt

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Alkalinity as CaCO ₃	SM2320B - Titration								
Bicarbonate as CaCO ₃		95			mg/L	2	20	10/16/07 0:00	aeh
Carbonate as CaCO ₃			U		mg/L	2	20	10/16/07 0:00	aeh
Hydroxide as CaCO ₃			U		mg/L	2	20	10/16/07 0:00	aeh
Total Alkalinity		95			mg/L	2	20	10/16/07 0:00	aeh
Cation-Anion Balance	Calculation								
Cation-Anion Balance		0.4			%			10/30/07 0:00	calc
Sum of Anions		11.8			meq/L	0.1	0.5	10/30/07 0:00	calc
Sum of Cations		11.9			meq/L	0.1	0.5	10/30/07 0:00	calc
Chloride	M300.0 - Ion Chromatography	44.5			mg/L	0.5	3	10/25/07 8:09	ccp
Fluoride	M300.0 - Ion Chromatography	1.2		*	mg/L	0.1	0.5	10/25/07 8:09	ccp
Nitrate as N, dissolved	Calculation: NO ₃ NO ₂ minus NO ₂	1.97			mg/L	0.04	0.2	10/30/07 0:00	calc
Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	1.98	H	*	mg/L	0.04	0.2	10/16/07 20:16	pjb
Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	0.01	BH	*	mg/L	0.01	0.05	10/16/07 19:45	pjb
Residue, Filterable (TDS) @180C	160.1 / SM2540C	780			mg/L	10	20	10/16/07 12:06	ear
Sulfate	300.0 - Ion Chromatography	402			mg/L	5	30	10/25/07 21:32	ccp
TDS (calculated)	Calculation	771			mg/L	10	50	10/30/07 0:00	calc
TDS (ratio - measured/calculated)	Calculation	1.01						10/30/07 0:00	calc

Arizona license number: AZ0102

Phelps Dodge Sierrita

Project ID: OJ03Z5

Sample ID: MO-2007-5B

ACZ Sample ID: **L65663-02**

Date Sampled: 10/12/07 10:30

Date Received: 10/13/07

Sample Matrix: *Ground Water*

Wet Chemistry

Parameter	EPA Method	Result	Qual	XQ	Units	MDL	PQL	Date	Analyst
Sulfate	300.0 - Ion Chromatography	392			mg/L	5	30	10/25/07 21:50	ccp

Arizona license number: AZ0102

**Report Header Explanations**

<i>Batch</i>	A distinct set of samples analyzed at a specific time
<i>Found</i>	Value of the QC Type of interest
<i>Limit</i>	Upper limit for RPD, in %.
<i>Lower</i>	Lower Recovery Limit, in % (except for LCSS, mg/Kg)
<i>MDL</i>	Method Detection Limit. Same as Minimum Reporting Limit. Allows for instrument and annual fluctuations.
<i>PCN/SCN</i>	A number assigned to reagents/standards to trace to the manufacturer's certificate of analysis
<i>PQL</i>	Practical Quantitation Limit, typically 5 times the MDL.
<i>QC</i>	True Value of the Control Sample or the amount added to the Spike
<i>Rec</i>	Amount of the true value or spike added recovered, in % (except for LCSS, mg/Kg)
<i>RPD</i>	Relative Percent Difference, calculation used for Duplicate QC Types
<i>Upper</i>	Upper Recovery Limit, in % (except for LCSS, mg/Kg)
<i>Sample</i>	Value of the Sample of interest

QC Sample Types

<i>AS</i>	Analytical Spike (Post Digestion)	<i>LCSWD</i>	Laboratory Control Sample - Water Duplicate
<i>ASD</i>	Analytical Spike (Post Digestion) Duplicate	<i>LFB</i>	Laboratory Fortified Blank
<i>CCB</i>	Continuing Calibration Blank	<i>LFM</i>	Laboratory Fortified Matrix
<i>CCV</i>	Continuing Calibration Verification standard	<i>LFMD</i>	Laboratory Fortified Matrix Duplicate
<i>DUP</i>	Sample Duplicate	<i>LRB</i>	Laboratory Reagent Blank
<i>ICB</i>	Initial Calibration Blank	<i>MS</i>	Matrix Spike
<i>ICV</i>	Initial Calibration Verification standard	<i>MSD</i>	Matrix Spike Duplicate
<i>ICSAB</i>	Inter-element Correction Standard - A plus B solutions	<i>PBS</i>	Prep Blank - Soil
<i>LCSS</i>	Laboratory Control Sample - Soil	<i>PBW</i>	Prep Blank - Water
<i>LCSSD</i>	Laboratory Control Sample - Soil Duplicate	<i>PQV</i>	Practical Quantitation Verification standard
<i>LCSW</i>	Laboratory Control Sample - Water	<i>SDL</i>	Serial Dilution

QC Sample Type Explanations

Blanks	Verifies that there is no or minimal contamination in the prep method or calibration procedure.
Control Samples	Verifies the accuracy of the method, including the prep procedure.
Duplicates	Verifies the precision of the instrument and/or method.
Spikes/Fortified Matrix	Determines sample matrix interferences, if any.
Standard	Verifies the validity of the calibration.

ACZ Qualifiers (Qual)

B	Analyte concentration detected at a value between MDL and PQL.
H	Analysis exceeded method hold time. pH is a field test with an immediate hold time.
U	Analyte was analyzed for but not detected at the indicated MDL

Method References

(1)	EPA 600/4-83-020. Methods for Chemical Analysis of Water and Wastes, March 1983.
(2)	EPA 600/R-93-100. Methods for the Determination of Inorganic Substances in Environmental Samples, August 1993.
(3)	EPA 600/R-94-111. Methods for the Determination of Metals in Environmental Samples - Supplement I, May 1994.
(5)	EPA SW-846. Test Methods for Evaluating Solid Waste, Third Edition with Update III, December 1996.
(6)	Standard Methods for the Examination of Water and Wastewater, 19th edition, 1995.

Comments

(1)	QC results calculated from raw data. Results may vary slightly if the rounded values are used in the calculations.
(2)	Soil, Sludge, and Plant matrices for Inorganic analyses are reported on a dry weight basis.
(3)	Animal matrices for Inorganic analyses are reported on an "as received" basis.

Phelps Dodge Sierrita

ACZ Project ID: **L65663**

Project ID: OJ03Z5

Alkalinity as CaCO3

SM2320B - Titration

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234306													
WG234306PBW1	PBW	10/15/07 11:34				U	mg/L		-20	20			
WG234306LCSW2	LCSW	10/15/07 11:47	WC071015-1	820		808.8	mg/L	98.6	90	110			
WG234306PBW2	PBW	10/15/07 15:36				U	mg/L		-20	20			
WG234306LCSW5	LCSW	10/15/07 15:49	WC071015-1	820		821	mg/L	100.1	90	110			
WG234306PBW3	PBW	10/15/07 18:22				U	mg/L		-20	20			
WG234306LCSW8	LCSW	10/15/07 18:35	WC071015-1	820		824.9	mg/L	100.6	90	110			
WG234306PBW4	PBW	10/15/07 21:25				U	mg/L		-20	20			
WG234306LCSW11	LCSW	10/15/07 21:36	WC071015-1	820		822	mg/L	100.2	90	110			
L65663-01DUP	DUP	10/16/07 0:15			95	94.3	mg/L				0.7	20	
WG234306LCSW14	LCSW	10/16/07 0:26	WC071015-1	820		821.1	mg/L	100.1	90	110			

Calcium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234966													
WG234966ICV	ICV	10/26/07 17:04	II071009-7	100		99.78	mg/L	99.8	95	105			
WG234966ICB	ICB	10/26/07 17:08				U	mg/L		-0.6	0.6			
WG234966LFB	LFB	10/26/07 17:20	II071012-2	67.97008		78.02	mg/L	114.8	85	115			
L65660-10AS	AS	10/26/07 18:10	II071012-2	339.8504	604	972	mg/L	108.3	85	115			
L65660-10ASD	ASD	10/26/07 18:13	II071012-2	339.8504	604	963.2	mg/L	105.7	85	115	0.91	20	

Chloride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	20		20.34	mg/L	101.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	20		20.31	mg/L	101.6	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234870													
WG234870ICV	ICV	10/24/07 14:38	WI071019-1	20		19.89	mg/L	99.5	90	110			
WG234870ICB	ICB	10/24/07 14:57				U	mg/L		-1.5	1.5			
WG234870LFB1	LFB	10/24/07 15:15	WI070727-1	30		29.32	mg/L	97.7	90	110			
WG234870LFB2	LFB	10/25/07 0:00	WI070727-1	30		29.44	mg/L	98.1	90	110			
L65660-04AS	AS	10/25/07 4:50	WI070727-1	30	37.3	65.68	mg/L	94.6	90	110			
L65660-04DUP	DUP	10/25/07 5:44			37.3	37.29	mg/L				0	20	
L65660-04AS	AS	10/25/07 20:01	WI070727-1	150	37	186.4	mg/L	99.6	90	110			
L65660-04DUP	DUP	10/25/07 20:19			37	37.3	mg/L				0.8	20	

Phelps Dodge Sierrita

ACZ Project ID: **L65663**

Project ID: OJ03Z5

Fluoride

M300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	3.984		4.13	mg/L	103.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-0.3	0.3			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	3.984		4.11	mg/L	103.2	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-0.3	0.3			
WG234870													
WG234870ICV	ICV	10/24/07 14:38	WI071019-1	3.984		4.1	mg/L	102.9	90	110			
WG234870ICB	ICB	10/24/07 14:57				U	mg/L		-0.3	0.3			
WG234870LFB1	LFB	10/24/07 15:15	WI070727-1	1.5		1.51	mg/L	100.7	90	110			
WG234870LFB2	LFB	10/25/07 0:00	WI070727-1	1.5		1.55	mg/L	103.3	90	110			
L65660-04AS	AS	10/25/07 4:50	WI070727-1	1.5	.3	1.81	mg/L	100.7	90	110			
L65660-04DUP	DUP	10/25/07 5:44			.3	.29	mg/L				3.4	20	RA

Magnesium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234966													
WG234966ICV	ICV	10/26/07 17:04	II071009-7	100		99.99	mg/L	100	95	105			
WG234966ICB	ICB	10/26/07 17:08				U	mg/L		-0.6	0.6			
WG234966LFB	LFB	10/26/07 17:20	II071012-2	54.96908		63.04	mg/L	114.7	85	115			
L65660-10AS	AS	10/26/07 18:10	II071012-2	274.8454	510	802.2	mg/L	106.3	85	115			
L65660-10ASD	ASD	10/26/07 18:13	II071012-2	274.8454	510	787.3	mg/L	100.9	85	115	1.87	20	

Nitrate/Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234423													
WG234423ICV	ICV	10/16/07 19:39	WI070911-1	2.416		2.408	mg/L	99.7	90	110			
WG234423ICB	ICB	10/16/07 19:40				U	mg/L		-0.06	0.06			
WG234423LFB	LFB	10/16/07 19:44	WI070911-4	2		1.984	mg/L	99.2	90	110			
L65673-01DUP	DUP	10/16/07 19:49			.15	.146	mg/L				2.7	20	RA
L65663-01AS	AS	10/16/07 20:17	WI070911-4	4	1.98	6.221	mg/L	106	90	110			

Nitrite as N, dissolved

M353.2 - Automated Cadmium Reduction

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234423													
WG234423ICV	ICV	10/16/07 19:39	WI070911-1	.609		.625	mg/L	102.6	90	110			
WG234423ICB	ICB	10/16/07 19:40				U	mg/L		-0.03	0.03			
WG234423LFB	LFB	10/16/07 19:44	WI070911-4	1		1.007	mg/L	100.7	90	110			
L65663-01AS	AS	10/16/07 19:46	WI070911-4	1	.01	1.036	mg/L	102.6	90	110			
L65673-01DUP	DUP	10/16/07 19:49			U	U	mg/L				0	20	RA

Phelps Dodge Sierrita

ACZ Project ID: **L65663**

Project ID: OJ03Z5

Potassium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234966													
WG234966ICV	ICV	10/26/07 17:04	II071009-7	20		20.15	mg/L	100.8	95	105			
WG234966ICB	ICB	10/26/07 17:08				U	mg/L		-0.9	0.9			
WG234966LFB	LFB	10/26/07 17:20	II071012-2	99.76186		112.66	mg/L	112.9	85	115			
L65660-10AS	AS	10/26/07 18:10	II071012-2	498.8093	5	565.6	mg/L	112.4	85	115			
L65660-10ASD	ASD	10/26/07 18:13	II071012-2	498.8093	5	570.9	mg/L	113.5	85	115	0.93	20	

Residue, Filterable (TDS) @180C

160.1 / SM2540C

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234382													
WG234382PBW	PBW	10/16/07 11:44				U	mg/L		-20	20			
WG234382LCSW	LCSW	10/16/07 11:46	PCN28213	260		264	mg/L	101.5	80	120			
L65663-01DUP	DUP	10/16/07 12:08			780	762	mg/L				2.3	20	

Sodium, dissolved

M200.7 ICP

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG234966													
WG234966ICV	ICV	10/26/07 17:04	II071009-7	100		100.83	mg/L	100.8	95	105			
WG234966ICB	ICB	10/26/07 17:08				U	mg/L		-0.9	0.9			
WG234966LFB	LFB	10/26/07 17:20	II071012-2	98.21624		110.42	mg/L	112.4	85	115			
L65660-10AS	AS	10/26/07 18:10	II071012-2	491.0812	35	572.2	mg/L	109.4	85	115			
L65660-10ASD	ASD	10/26/07 18:13	II071012-2	491.0812	35	578.9	mg/L	110.8	85	115	1.16	20	

Sulfate

300.0 - Ion Chromatography

ACZ ID	Type	Analyzed	PCN/SCN	QC	Sample	Found	Units	Rec	Lower	Upper	RPD	Limit	Qual
WG226250													
WG226250ICV	ICV	06/11/07 13:52	IC070606-1	50.15		51.51	mg/L	102.7	90	110			
WG226250ICB	ICB	06/11/07 14:10				U	mg/L		-1.5	1.5			
WG226250ICV1	ICV	06/12/07 14:59	IC070606-1	50.15		51.17	mg/L	102	90	110			
WG226250ICB1	ICB	06/12/07 15:17				U	mg/L		-1.5	1.5			
WG234870													
WG234870ICV	ICV	10/24/07 14:38	WI071019-1	50.1		51.76	mg/L	103.3	90	110			
WG234870ICB	ICB	10/24/07 14:57				U	mg/L		-1.5	1.5			
WG234870LFB1	LFB	10/24/07 15:15	WI070727-1	30		30.58	mg/L	101.9	90	110			
WG234870LFB2	LFB	10/25/07 0:00	WI070727-1	30		30.19	mg/L	100.6	90	110			
L65660-04AS	AS	10/25/07 20:01	WI070727-1	150	218	365.7	mg/L	98.5	90	110			
L65660-04DUP	DUP	10/25/07 20:19			218	215.4	mg/L				1.2	20	

Phelps Dodge SierritaACZ Project ID: **L65663**

ACZ ID	WORKNUM	PARAMETER	METHOD	QUAL	DESCRIPTION
L65663-01	WG234870	Fluoride	M300.0 - Ion Chromatography	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
	WG234423	Nitrate/Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H1	Sample analysis performed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
		Nitrite as N, dissolved	M353.2 - Automated Cadmium Reduction	H1	Sample analysis performed past holding time.
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).
			M353.2 - Automated Cadmium Reduction	RA	Relative Percent Difference (RPD) was not used for data validation because the sample concentration is too low for accurate evaluation (< 10x MDL).

Phelps Dodge Sierrita

ACZ Project ID: **L65663**

No certification qualifiers associated with this analysis

Phelps Dodge Sierrita
OJ03Z5

ACZ Project ID: L65663
Date Received: 10/13/2007
Received By:
Date Printed: 10/13/2007

Receipt Verification

	YES	NO	NA
1) Does this project require special handling procedures such as CLP protocol?			X
2) Are the custody seals on the cooler intact?			X
3) Are the custody seals on the sample containers intact?			X
4) Is there a Chain of Custody or other directive shipping papers present?	X		
5) Is the Chain of Custody complete?	X		
6) Is the Chain of Custody in agreement with the samples received?	X		
7) Is there enough sample for all requested analyses?	X		
8) Are all samples within holding times for requested analyses?	X		
9) Were all sample containers received intact?	X		
10) Are the temperature blanks present?			X
11) Are the trip blanks (VOA and/or Cyanide) present?			X
12) Are samples requiring no headspace, headspace free?			X
13) Do the samples that require a Foreign Soils Permit have one?			X

Exceptions: If you answered no to any of the above questions, please describe

N/A

Contact (For any discrepancies, the client must be contacted)

N/A

Shipping Containers

Cooler Id	Temp (°C)	Rad (µR/hr)
NA4668	3.4	14

Client must contact ACZ Project Manager if analysis should not proceed for samples received outside of thermal preservation acceptance criteria.

Notes

Phelps Dodge Sierrita
 OJ03Z5

ACZ Project ID: L65663
 Date Received: 10/13/2007
 Received By:

Sample Container Preservation

SAMPLE	CLIENT ID	R < 2	G < 2	BK < 2	Y < 2	YG < 2	B < 2	O < 2	T > 12	N/A	RAD	ID
L65663-01	MO-2007-5B-F		Y									<input type="checkbox"/>
L65663-02	MO-2007-5B									X		<input type="checkbox"/>

Sample Container Preservation Legend

Abbreviation	Description	Container Type	Preservative/Limits
R	Raw/Nitric	RED	pH must be < 2
B	Filtered/Sulfuric	BLUE	pH must be < 2
BK	Filtered/Nitric	BLACK	pH must be < 2
G	Filtered/Nitric	GREEN	pH must be < 2
O	Raw/Sulfuric	ORANGE	pH must be < 2
P	Raw/NaOH	PURPLE	pH must be > 12 *
T	Raw/NaOH Zinc Acetate	TAN	pH must be > 12
Y	Raw/Sulfuric	YELLOW	pH must be < 2
YG	Raw/Sulfuric	YELLOW GLASS	pH must be < 2
N/A	No preservative needed	Not applicable	
RAD	Gamma/Beta dose rate	Not applicable	must be < 250 µR/hr

* pH check performed by analyst prior to sample preparation

Sample IDs Reviewed By: _____

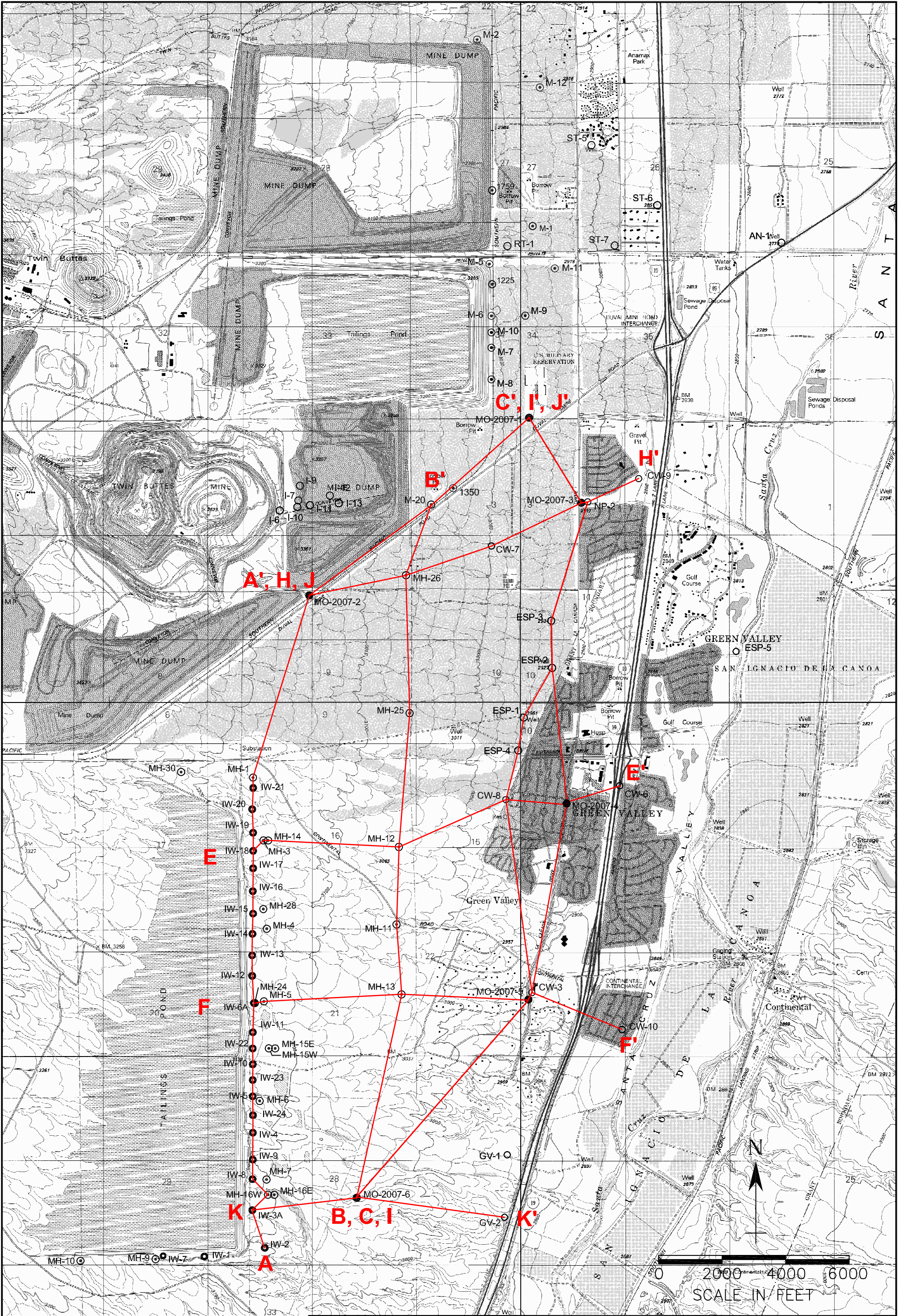
APPENDIX G
GEOLOGIC CROSS SECTIONS

APPENDIX G

TABLE OF CONTENTS

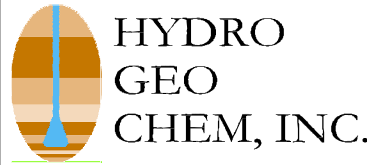
FIGURES

- G.1 Sierrita Tailings Impoundment Area, Cross Section Location Map
- G.2a A-A' Geologic Cross Section Sheet 1 of 2 Sierrita Tailing Impoundment Area
- G.2b A-A' Geologic Cross Section Sheet 2 of 2 Sierrita Tailing Impoundment Area
- G.3a B-B' Geologic Cross Section Sheet 1 of 2 Sierrita Tailing Impoundment Area Sta.
-70+00.00 to 75+50.00
- G.3b B-B' Geologic Cross Section Sheet 2 of 2 Sierrita Tailing Impoundment Area Sta.
-75+50.00 to 170+50.00
- G.4a C-C' Geologic Cross Section Sheet 1 of 2 Sierrita Tailing Impoundment Area Sta.
-90+00.00 to 60+00.00
- G.4b C-C' Geologic Cross Section Sheet 2 of 2 Sierrita Tailing Impoundment Area
- G.5 E-E' Geologic Cross Section Sierrita Tailing Impoundment Area
- G.6 F-F' Geologic Cross Section Sierrita Tailing Impoundment Area
- G.7 H-H' Geologic Cross Section Sierrita Tailing Impoundment Area
- G.8a I-I' Geologic Cross Section Sheet 1 of 2 Sierrita Tailing Impoundment Area Sta.
-90+00.00 to 50+50.00
- G.8b I-I' Geologic Cross Section Sheet 2 of 2 Sierrita Tailing Impoundment Area Sta.
50+50.00 to 205+00.00
- G.9 J-J' Geologic Cross Section Sierrita Tailing Impoundment Area
- G.10 K-K' Geologic Cross Section Sierrita Tailing Impoundment Area



EXPLANATION

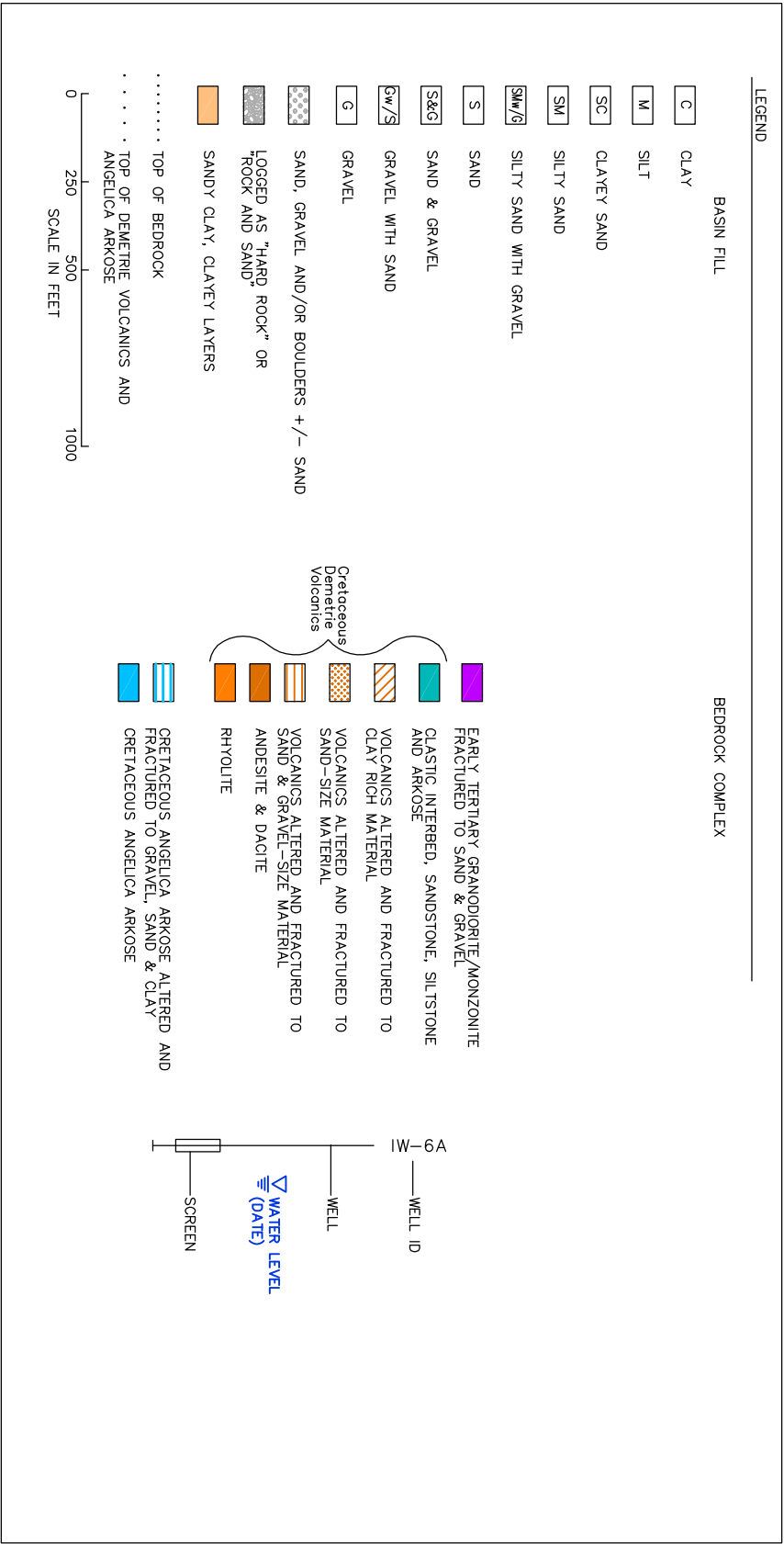
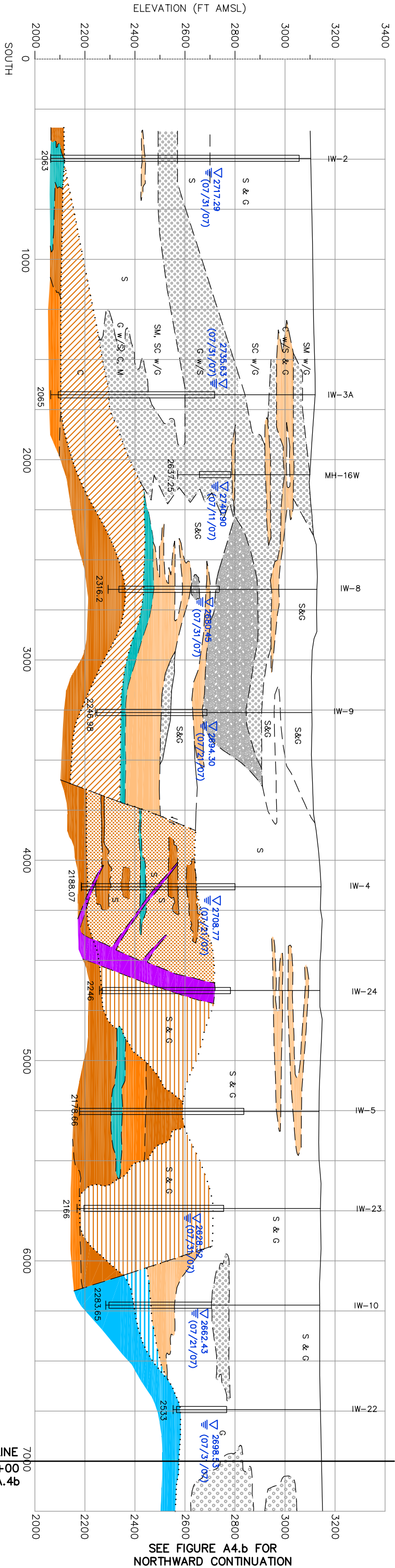
- IW-2 INTERCEPTOR WELL
- ⊙ MH-16E MONITOR WELL
- ⊗ ESP-4 OTHER WATER WELL
- ⊕ MO-2007-2 NEW MONITORING WELL



SIERRITA TAILING IMPOUNDMENT AREA
CROSS SECTION LOCATION MAP

Approved KSW	Date 09/04/07	Revised	Date	Reference: 7830023A	FIG: G.1
------------------------	-------------------------	---------	------	-------------------------------	--------------------

A



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A - A' GEOLOGIC CROSS SECTION

SHEET 1 OF 2

SIERRITA TAILING IMPOUNDMENT AREA

Approved
KW

Date
11/27/07

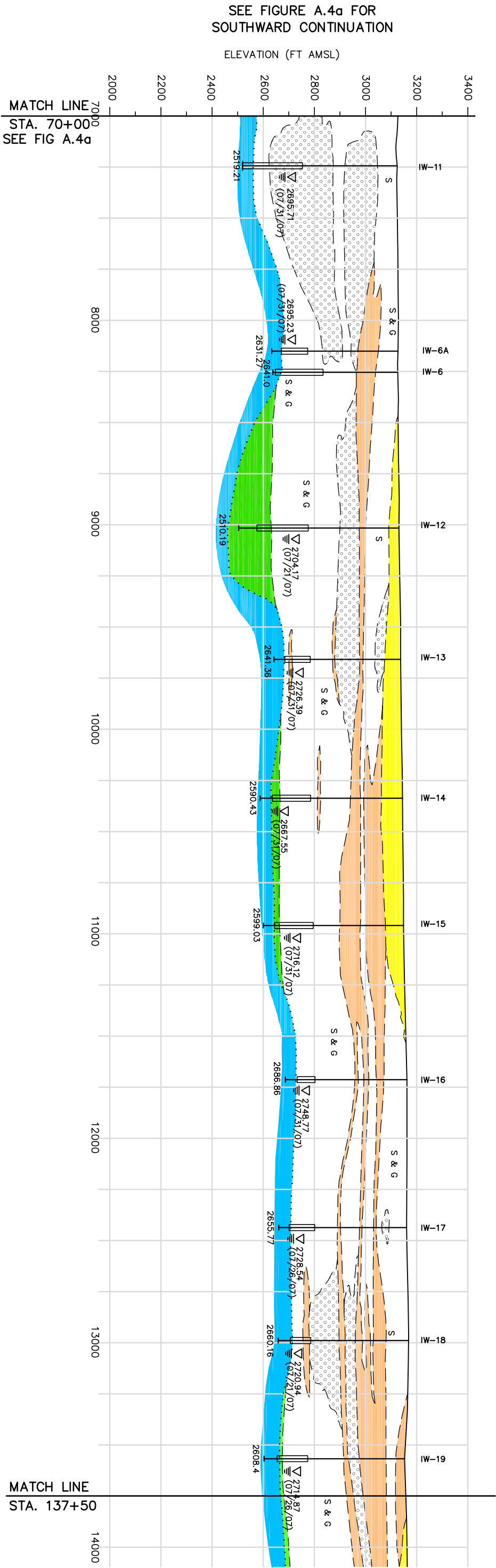
Revised

Date

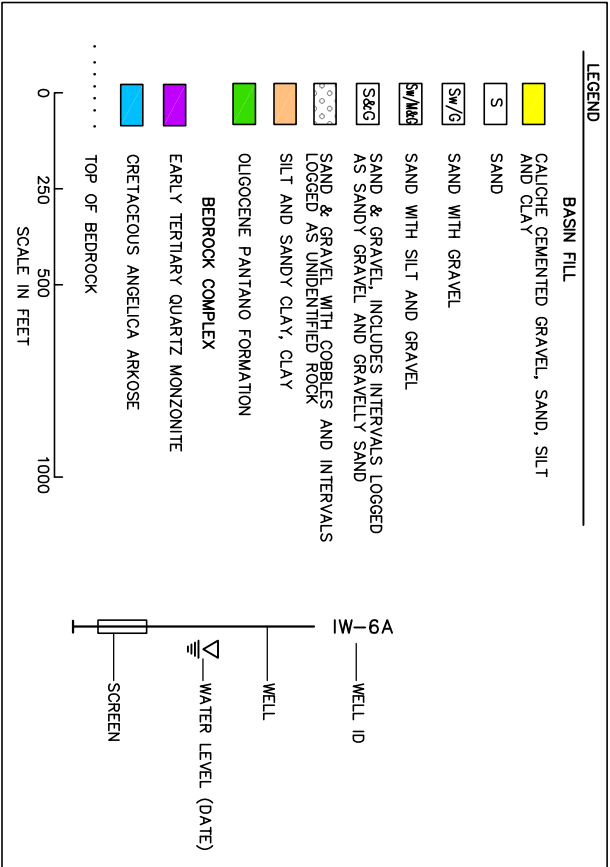
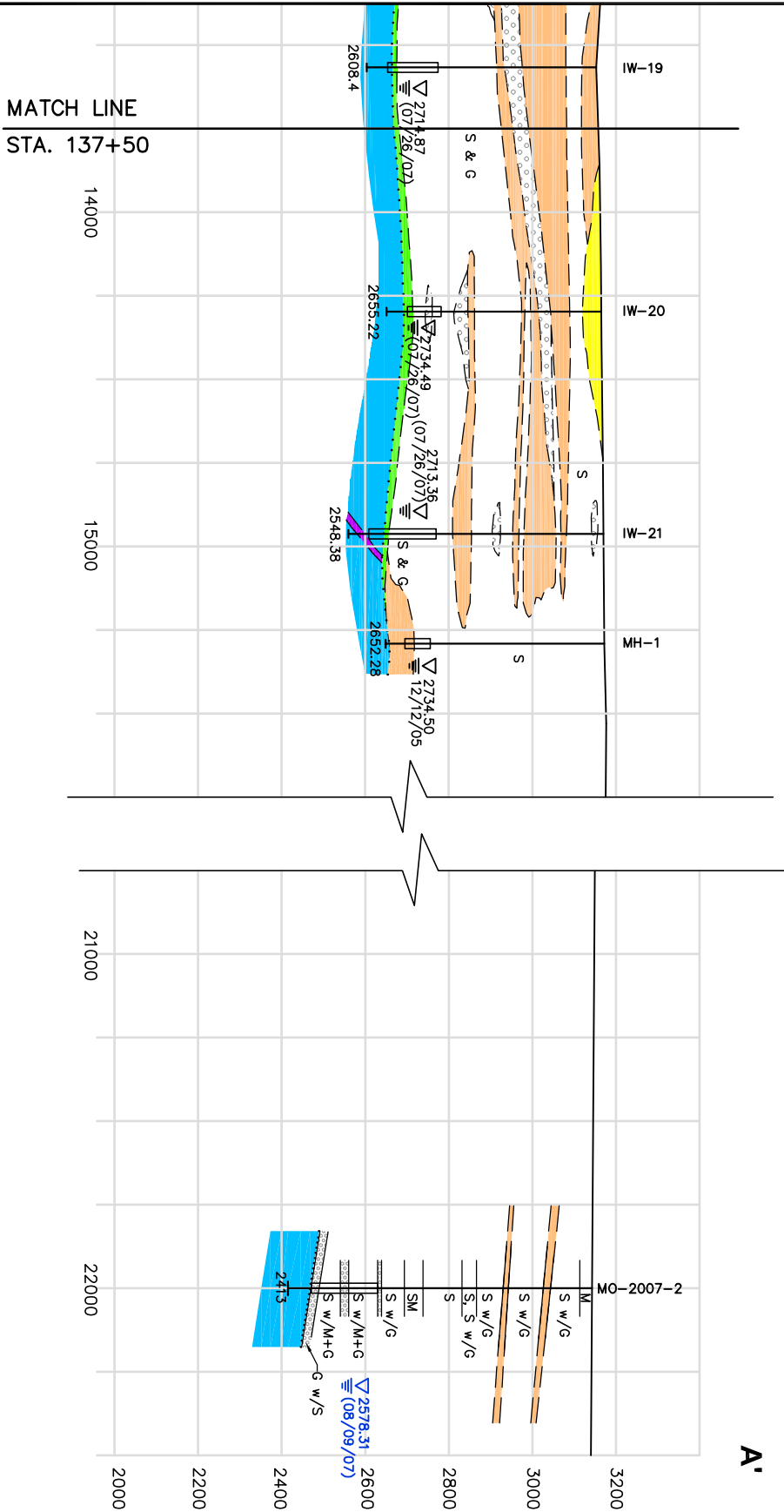
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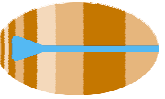
FIG.

G.1a



A'





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A - A' GEOLOGIC CROSS SECTION

SHEET 2 OF 2

SIERRITA TAILING IMPOUNDMENT AREA

Approved
KW

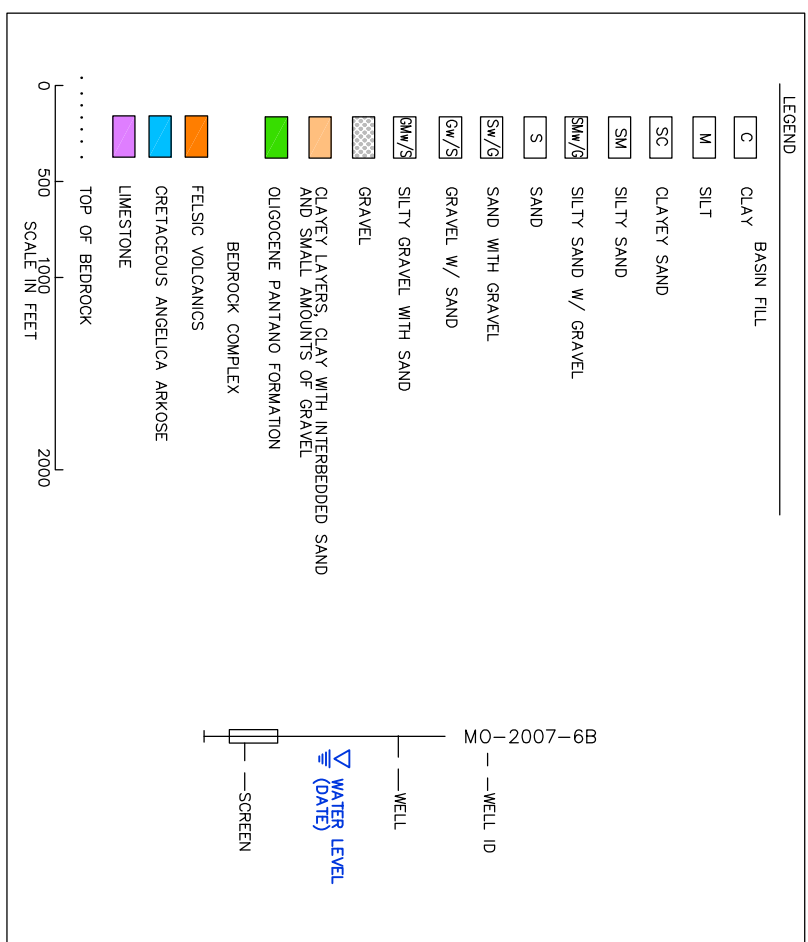
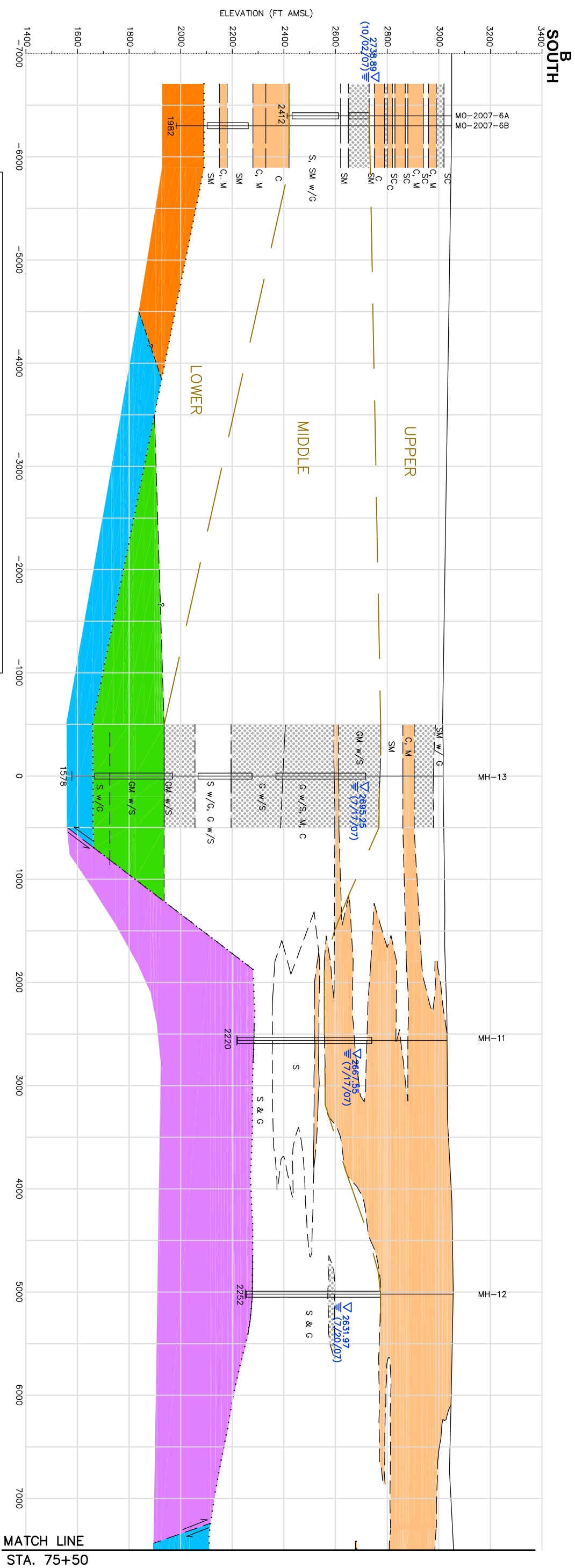
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11/20/07

Revised

Date

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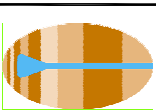
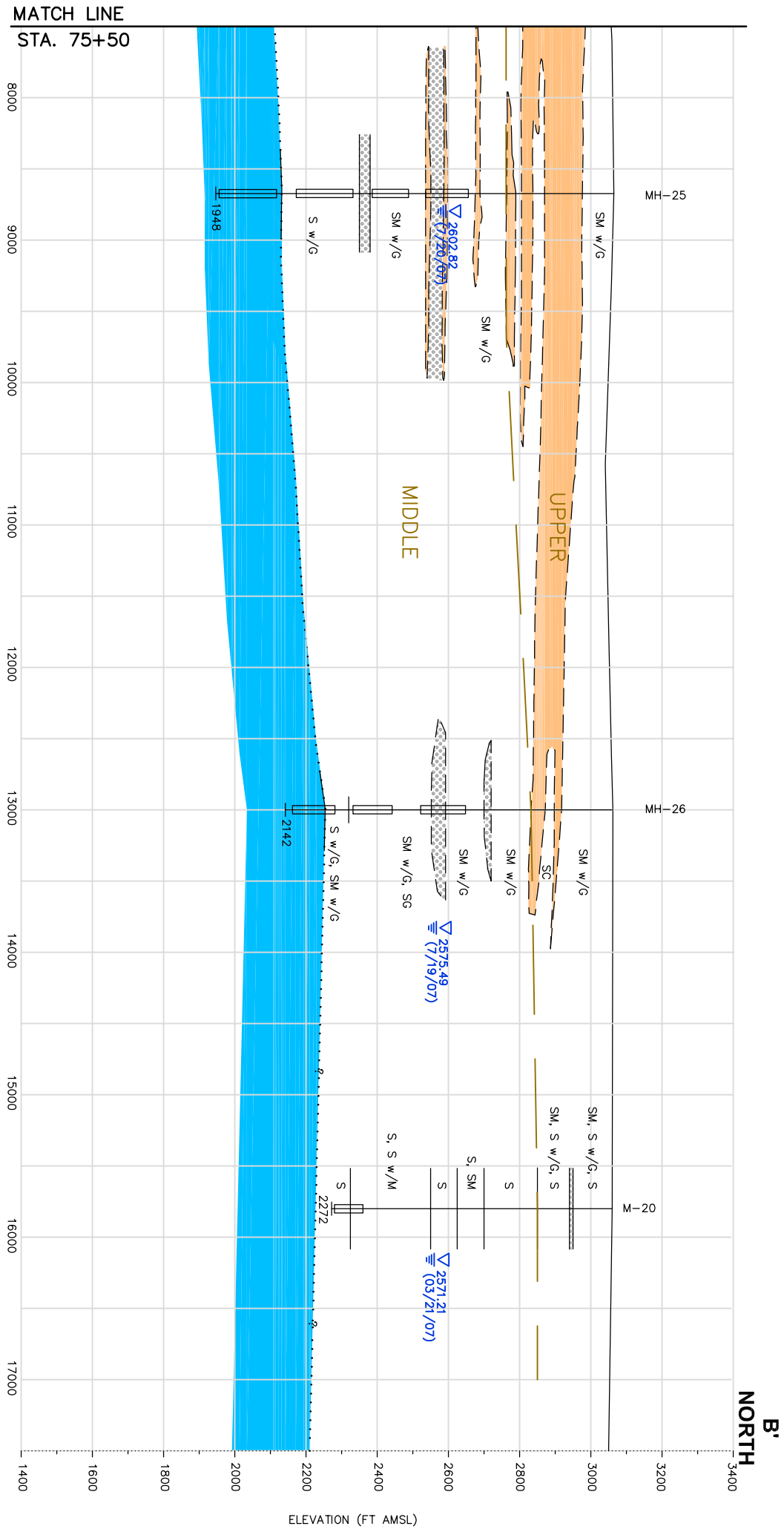
FIG.
G.2b



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**B - B' GEOLOGIC CROSS SECTION
SIERRITA TAILING IMPOUNDMENT AREA
STA. -70+00.00 TO 75+50.00** SHEET 1 OF 2

Approved KW	Date 8/31/06	Revised by KW	Date 11/01/07	File Name 7830141A	Figure G-3a
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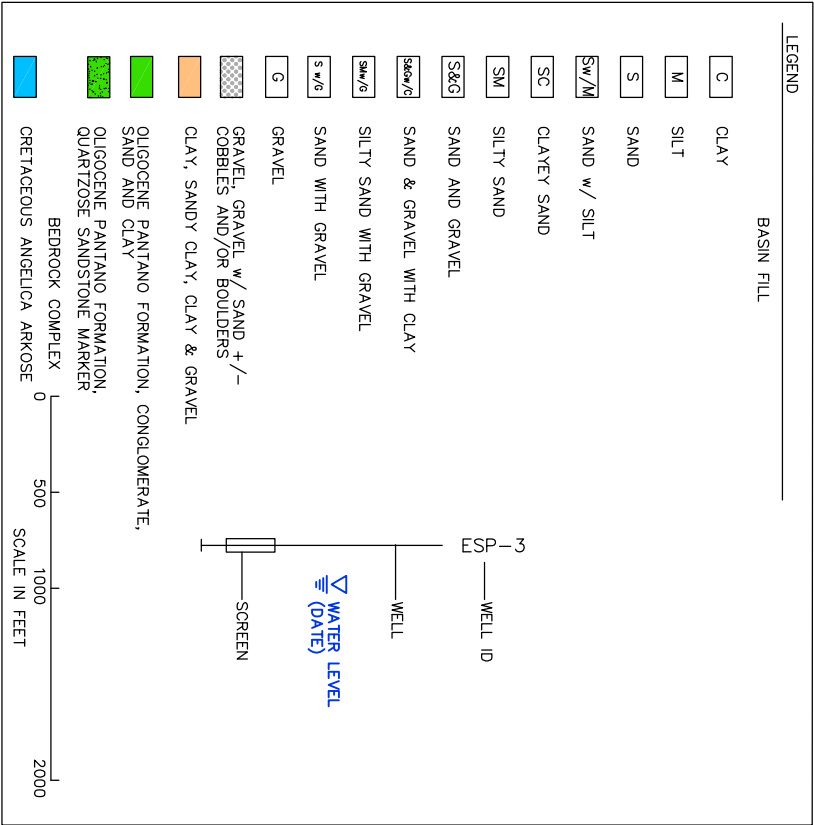
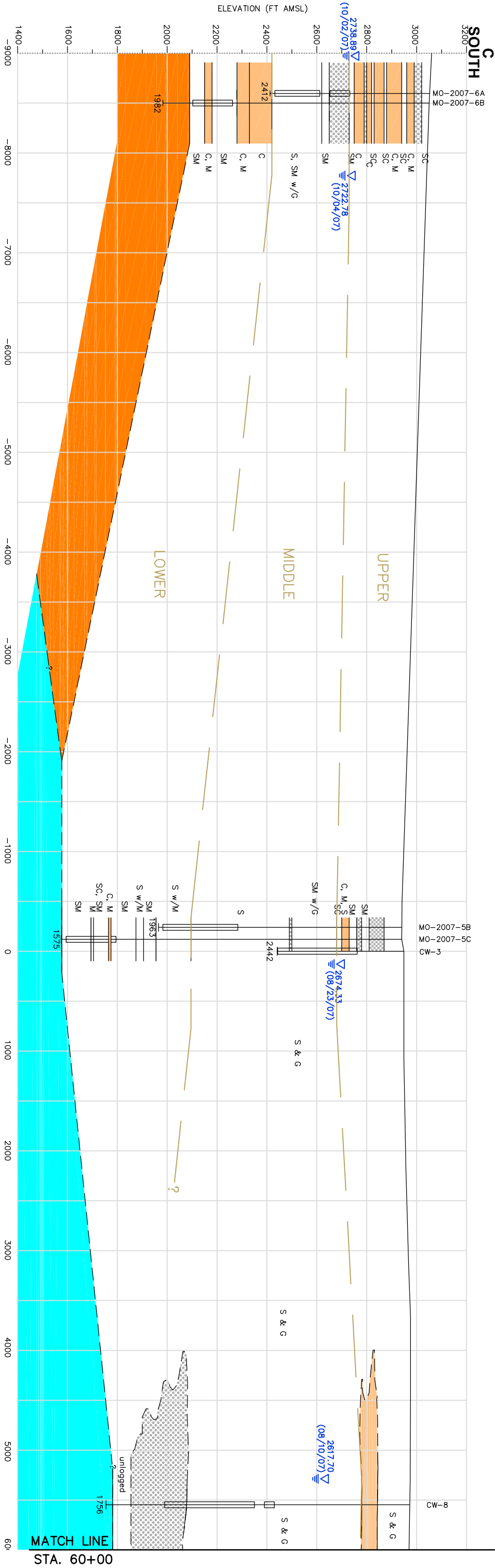


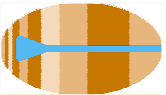
HYDRO
GEO
CHEM, INC.

B - B' GEOLOGIC CROSS SECTION
SIERRITA TAILING IMPOUNDMENT AREA
STA. 75+50.00 TO 170+50.00

SHEET 2 OF 2

Approved	Date	Revised by	Date	File Name	Figure
KW	8/31/06	KW	11/01/07	7830141A	G.3b





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C - C' GEOLOGIC CROSS SECTION

SIERRITA TAILING IMPOUNDMENT AREA

STA. -90+00.00 TO 60+00.00

Approved
KW

Date
8/30/07

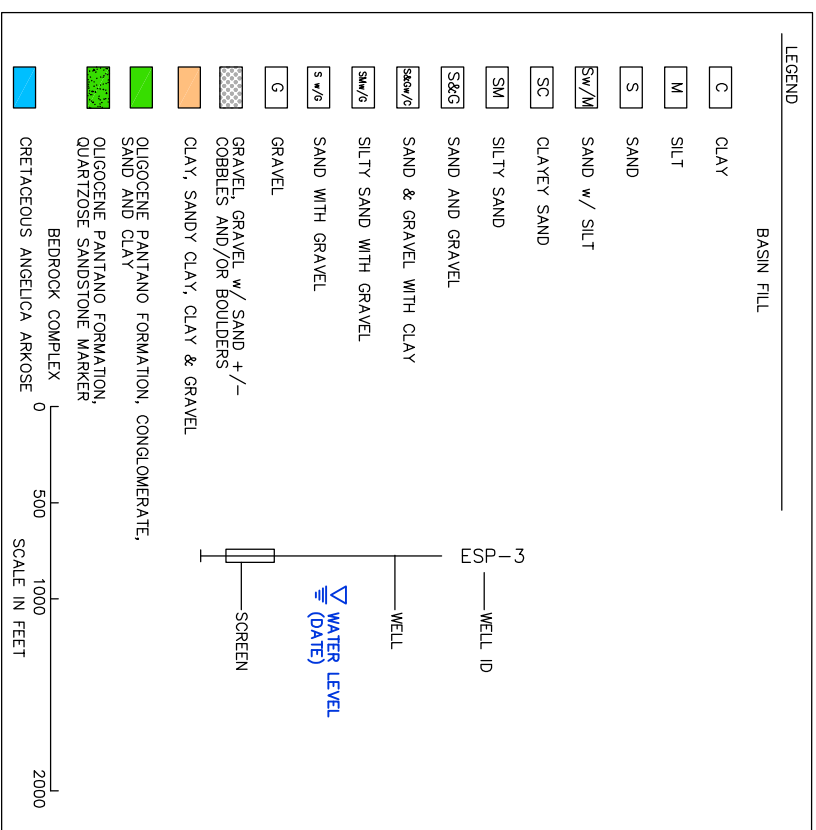
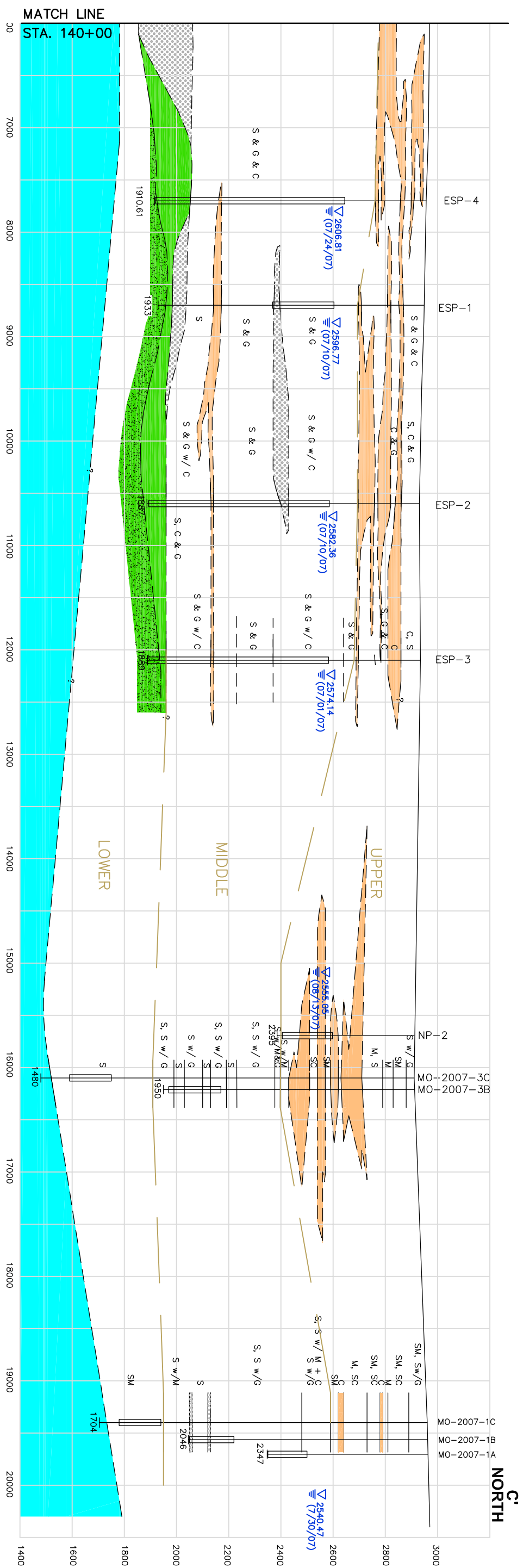
Revised

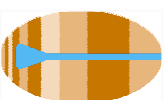
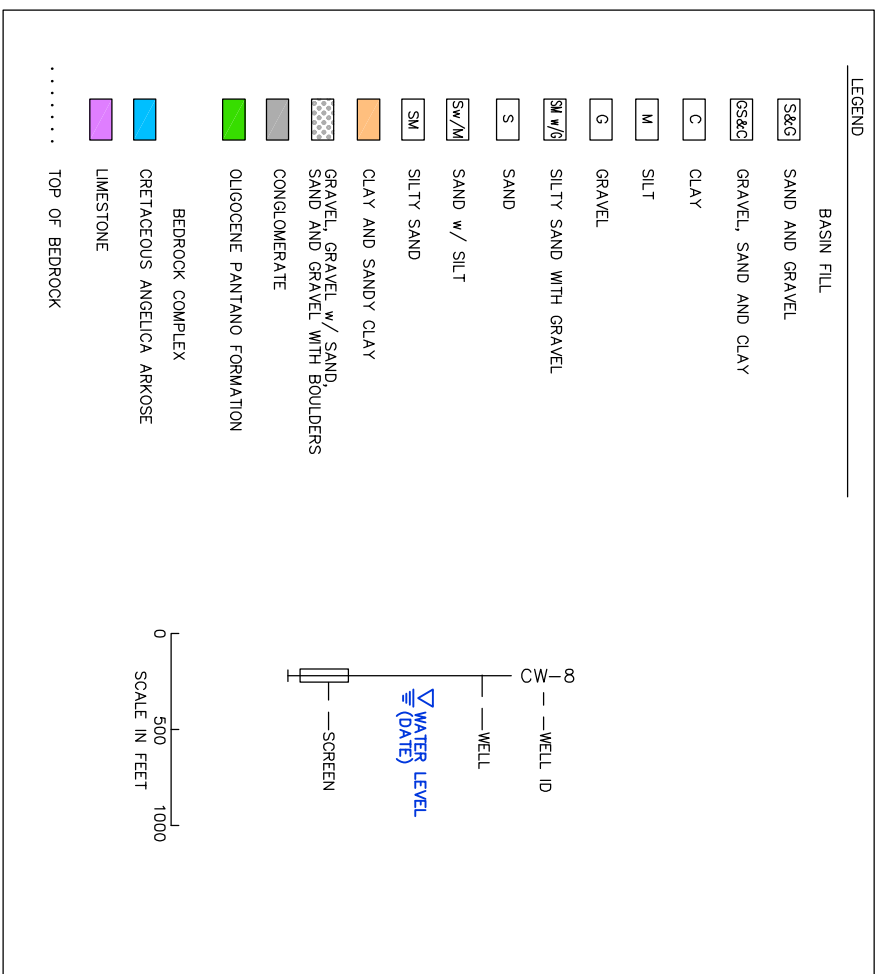
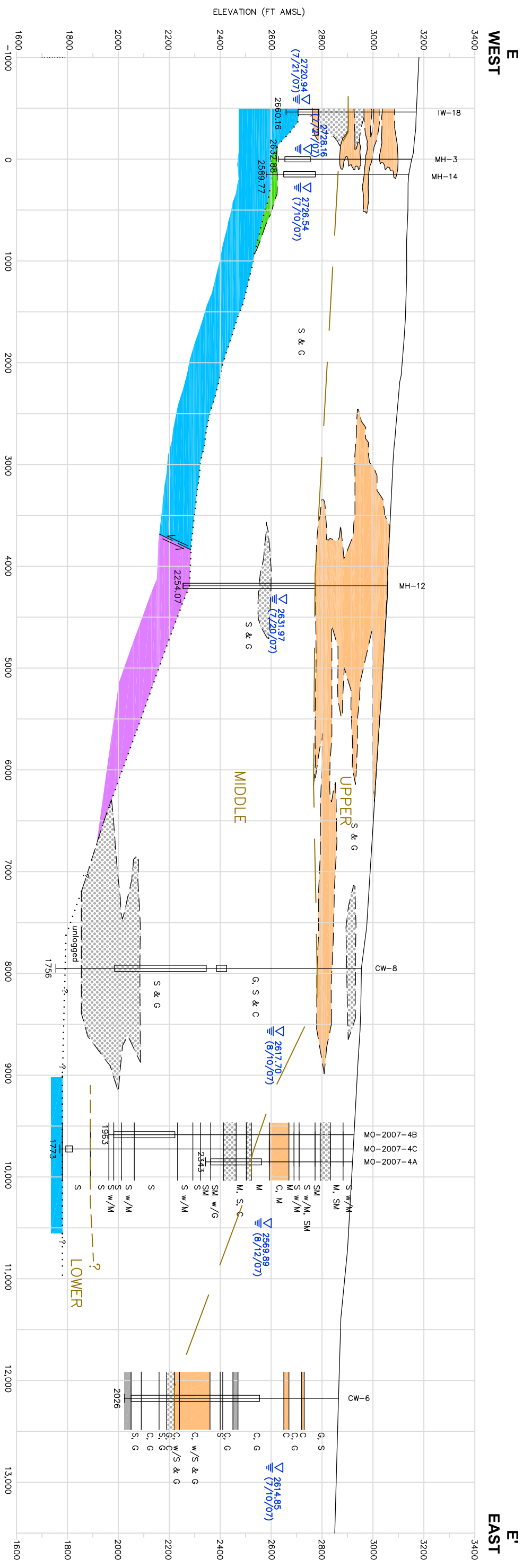
Date

Reference:
7830143A

FIG.
G.4a

SHEET 1 OF 2





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**E - E' GEOLOGIC CROSS SECTION
SIERRITA TAILING IMPOUNDMENT AREA**

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KW

Date
8/31/06

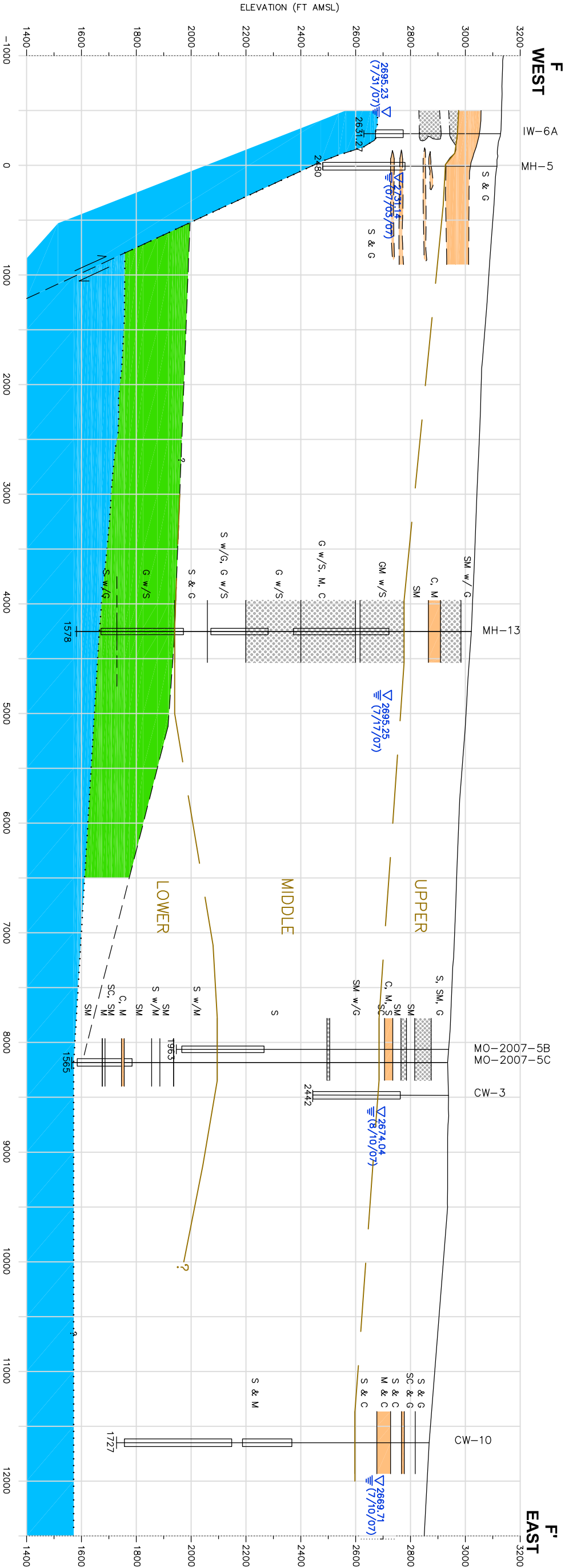
Revised

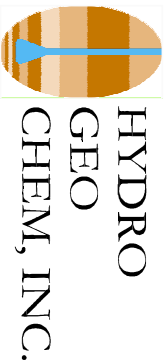
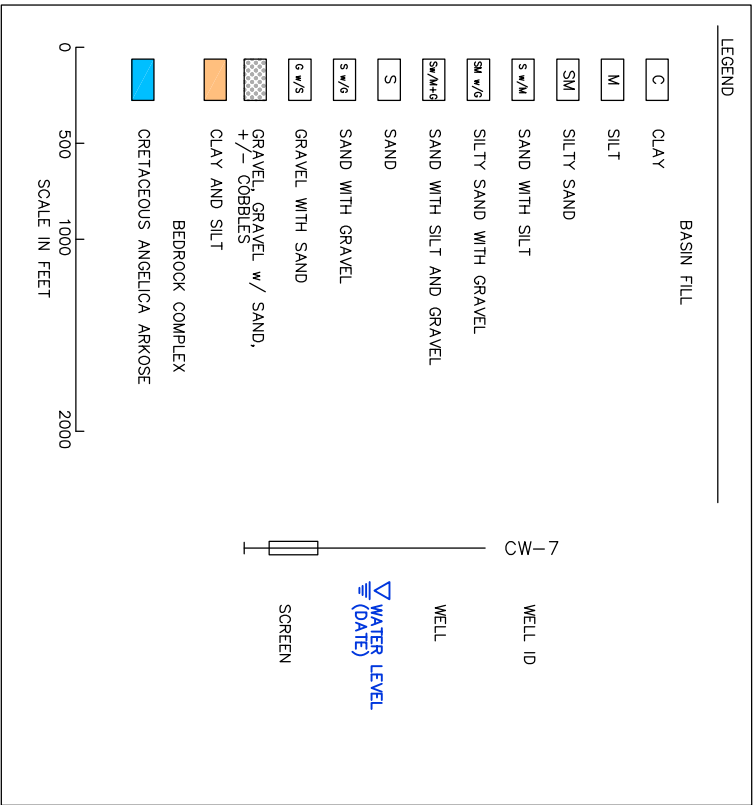
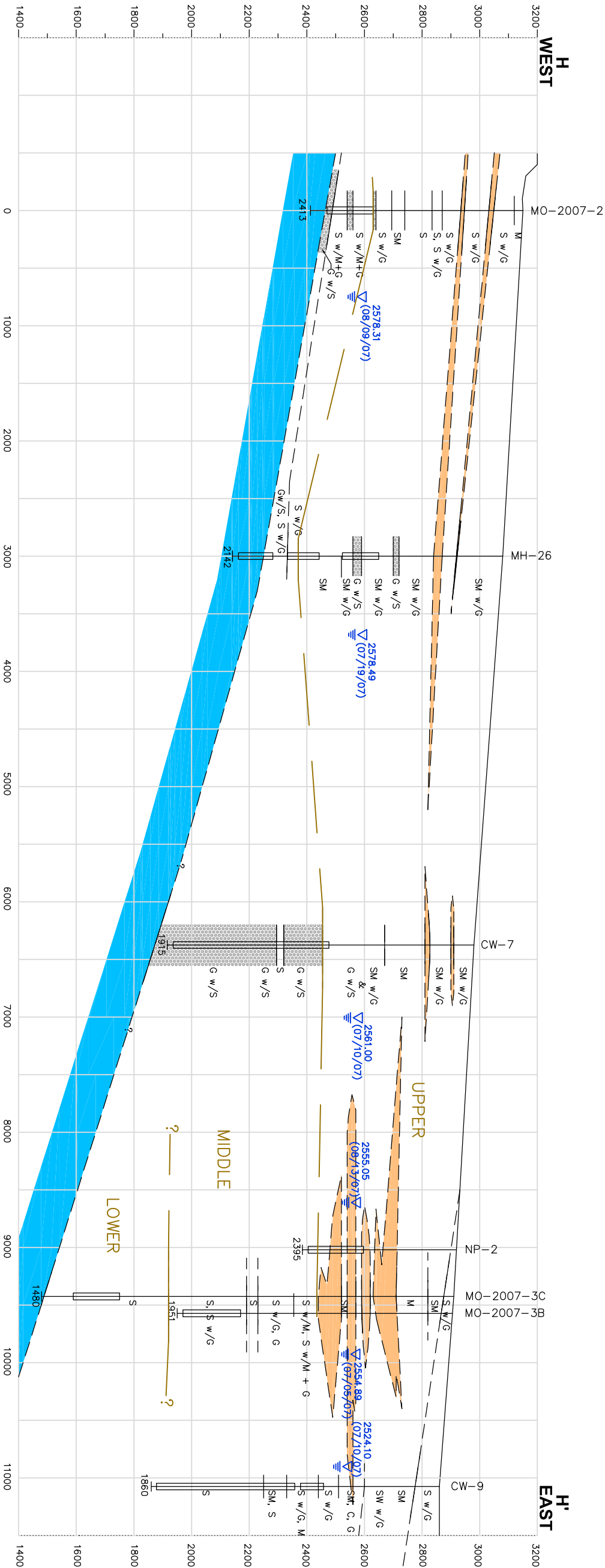
Date _____

Reference:
7830144A

FIG.

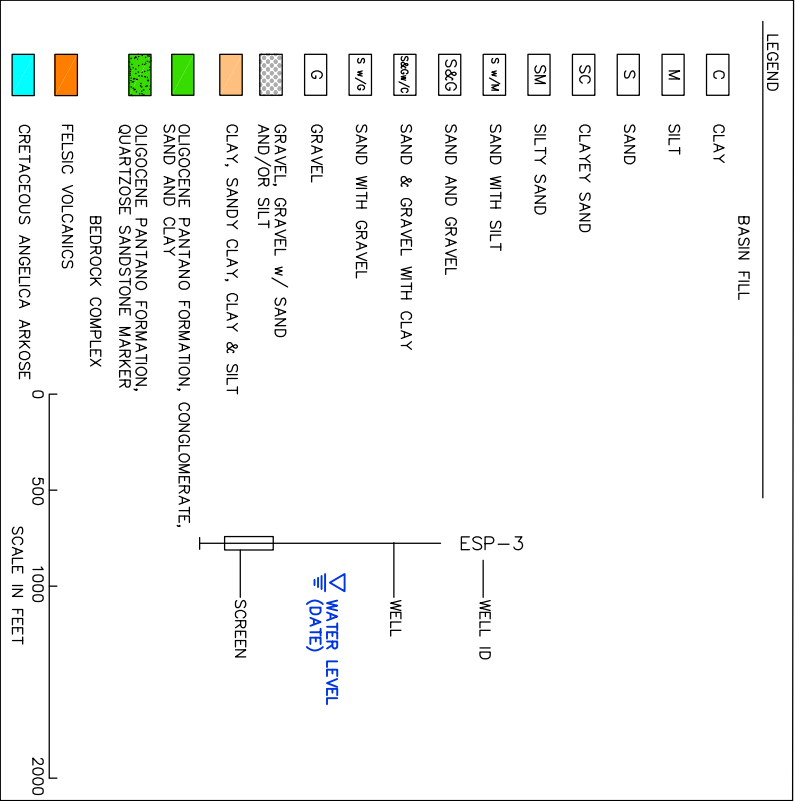
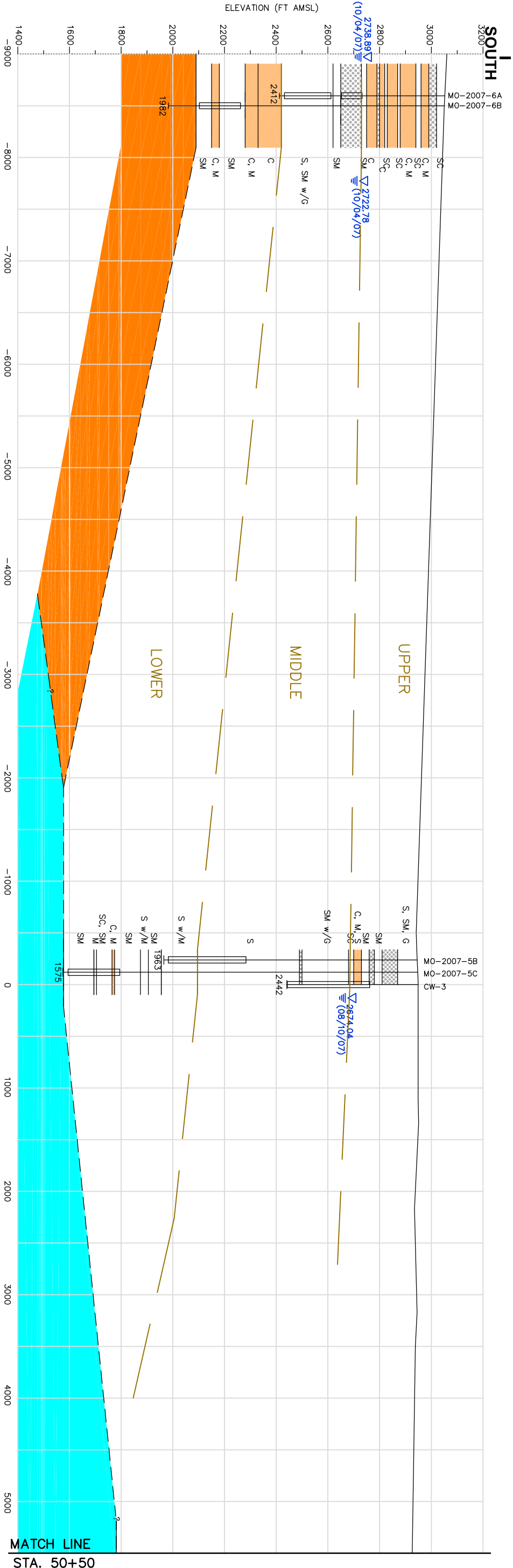
G-5

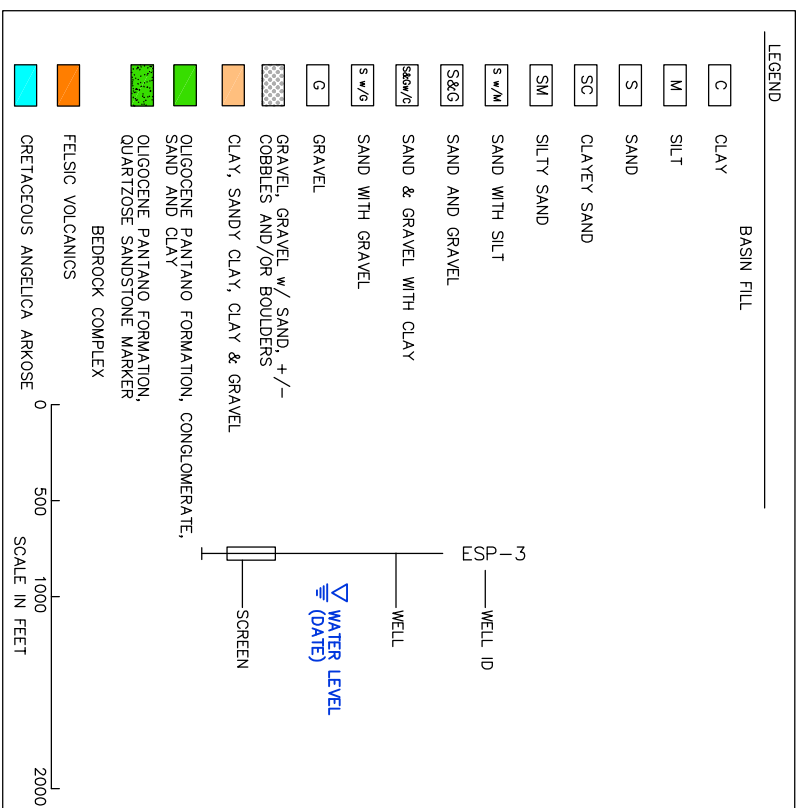
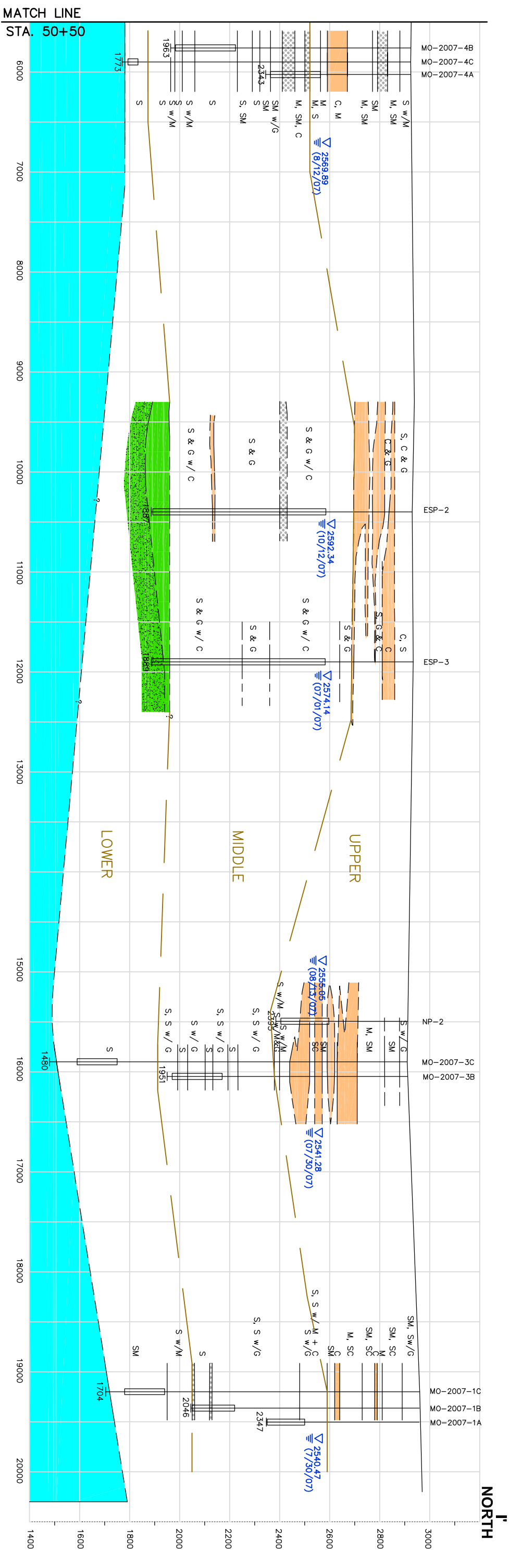


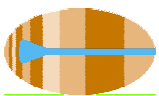
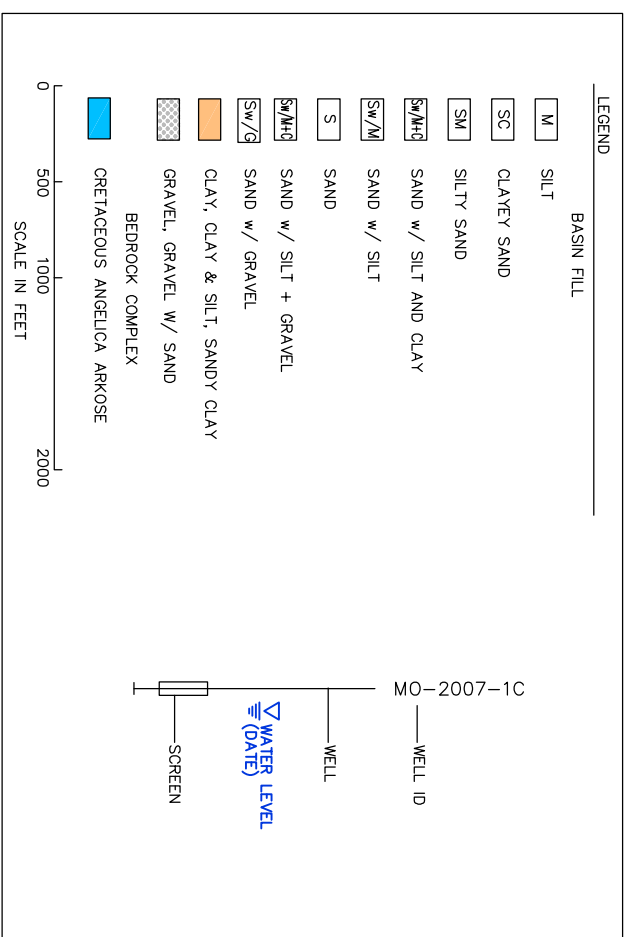
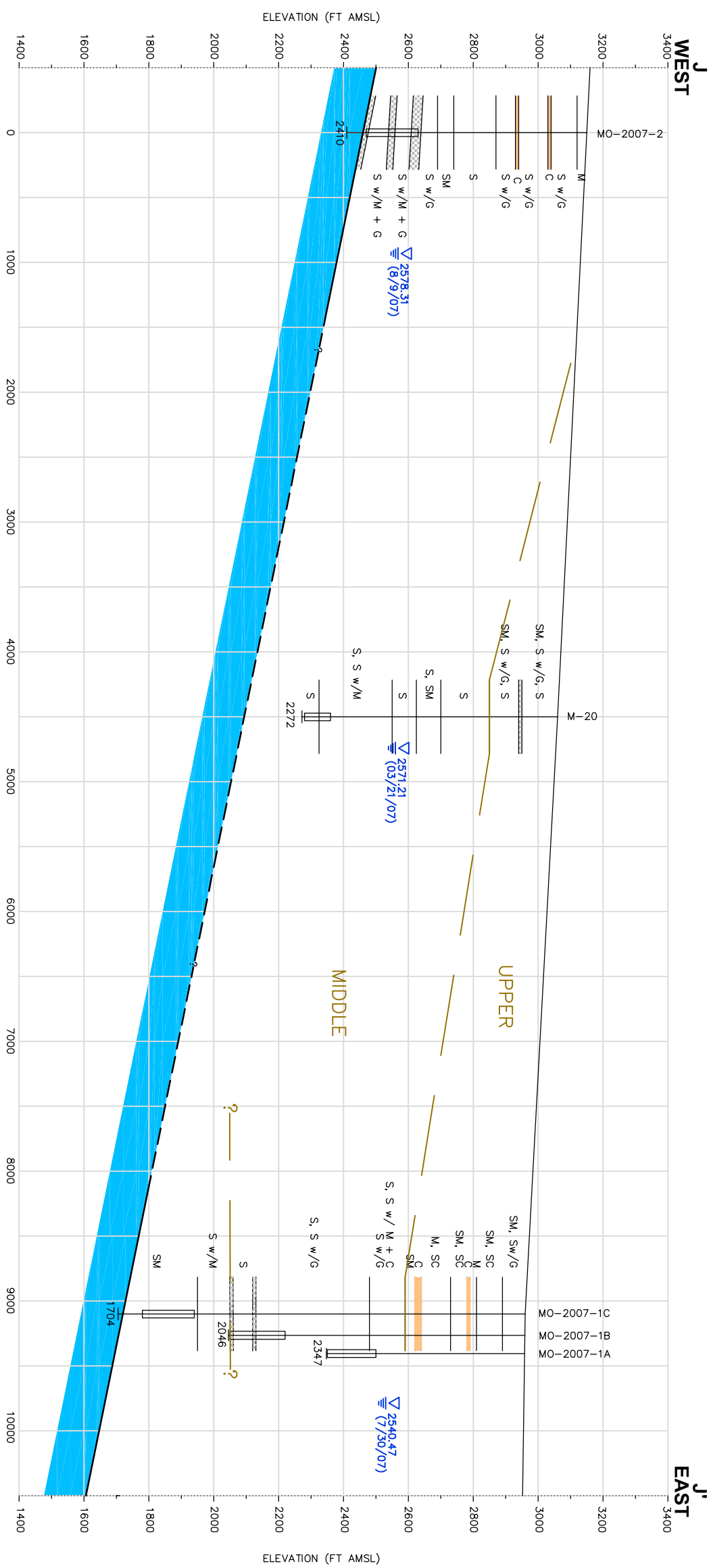


H - H' GEOLOGIC CROSS SECTION
SIERRITA TAILING IMPOUNDMENT AREA

Approved	Date	Revised	Date	Reference:	FIG.
KW	6/2/07			7830136A	G.7







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**J - J' GEOLOGIC CROSS SECTION
SIERRITA TAILING IMPOUNDMENT AREA**

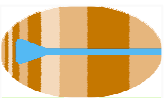
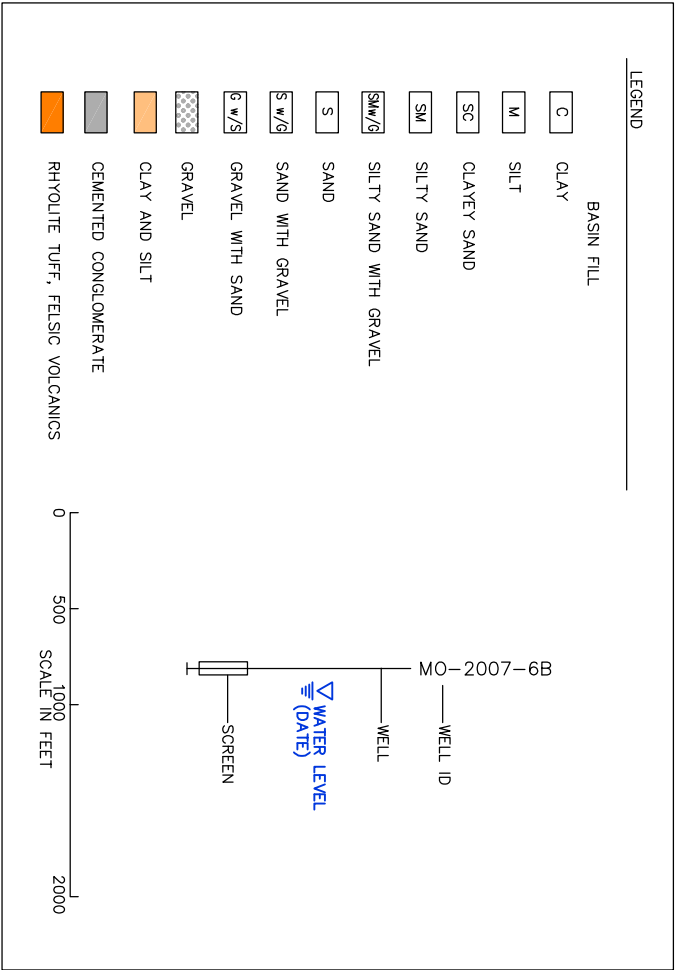
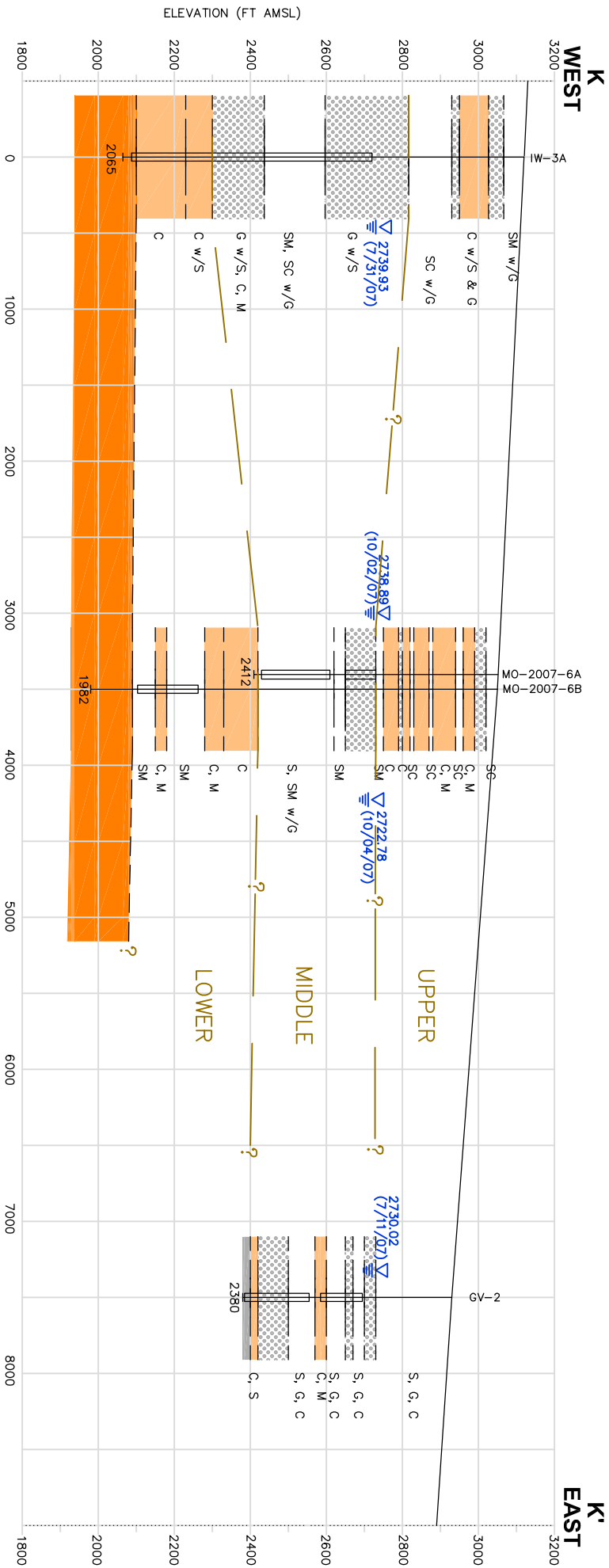
Approved
KW

Date
8/30/07

DKW

File Name	7830142A
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Figure
G.9



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**K - K' GEOLOGIC CROSS SECTION
SIERRITA TAILING IMPOUNDMENT AREA**

Approved
KW

Date
8/31/06

Revised

Date

Reference:
7830146A

F.G.

G.10

APPENDIX H

CROSS SECTIONS SHOWING

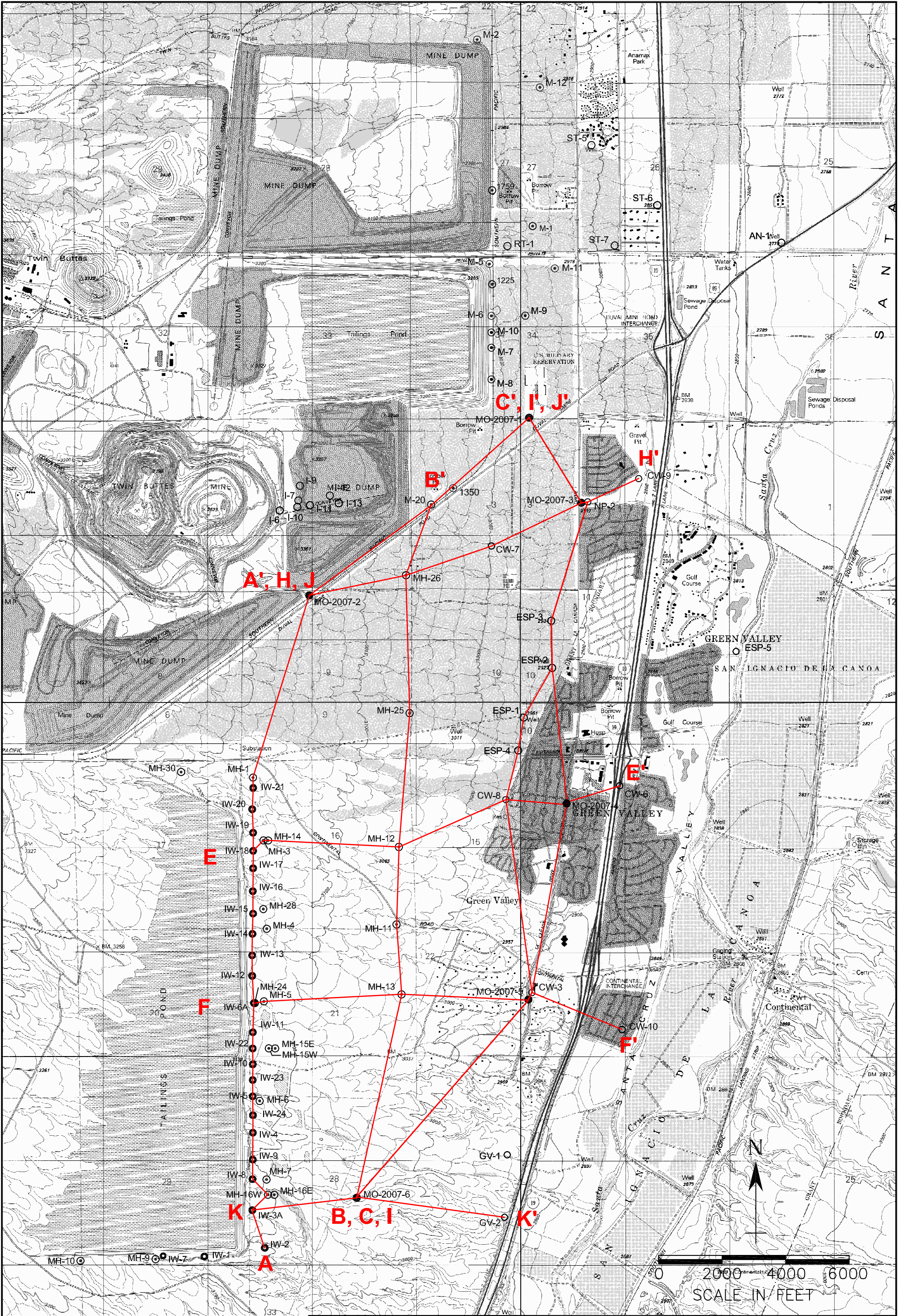
WATER QUALITY AND HYDRAULIC CONDUCTIVITY DATA

APPENDIX H

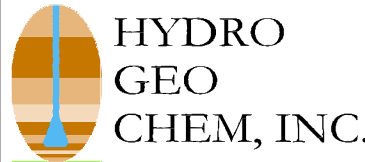
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- H.2b A-A' Cross Sections Showing Water Quality and Hydraulic Conductivity Data Sheet 2 of 2 Sierrita Tailing Impoundment Area
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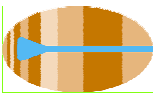
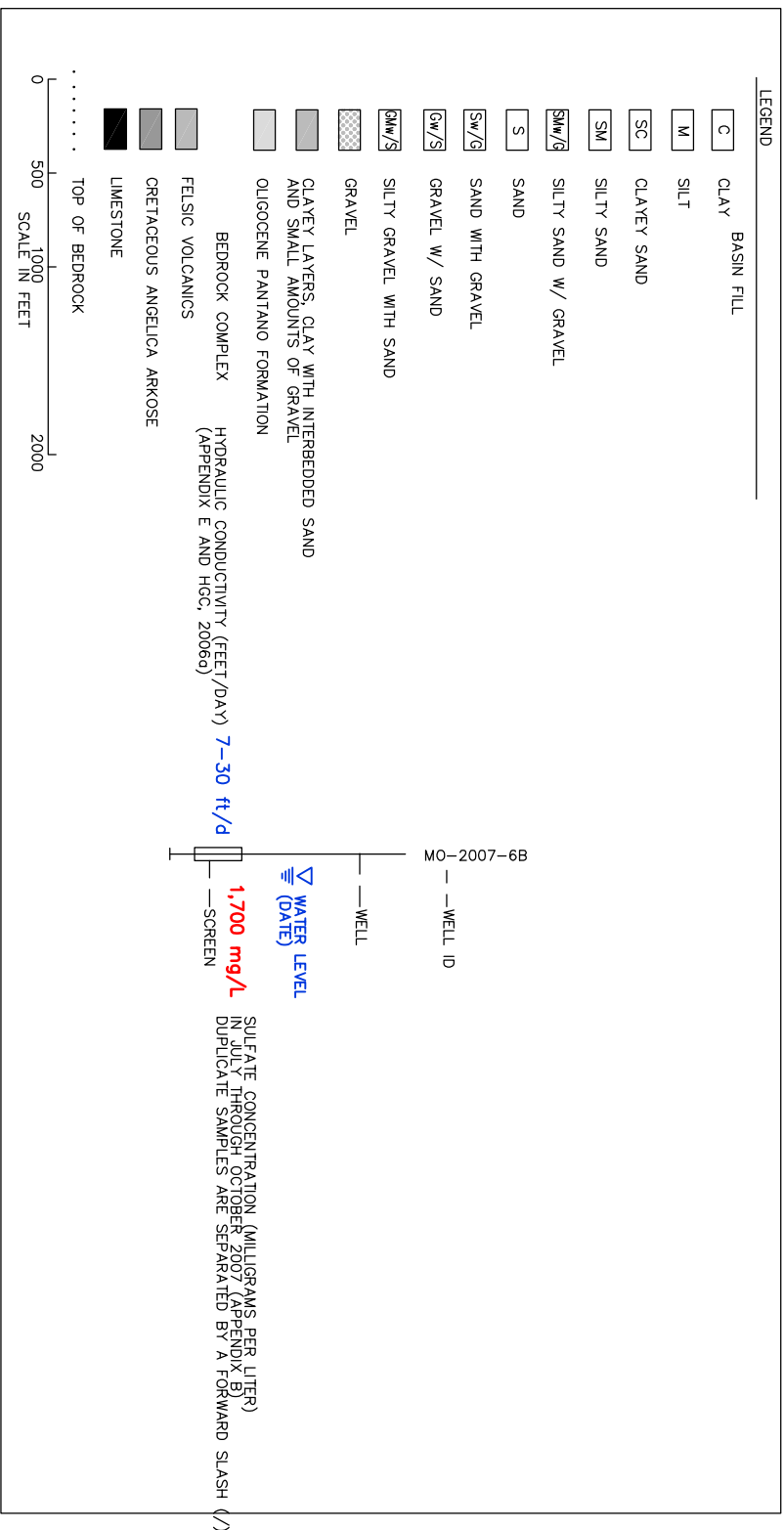
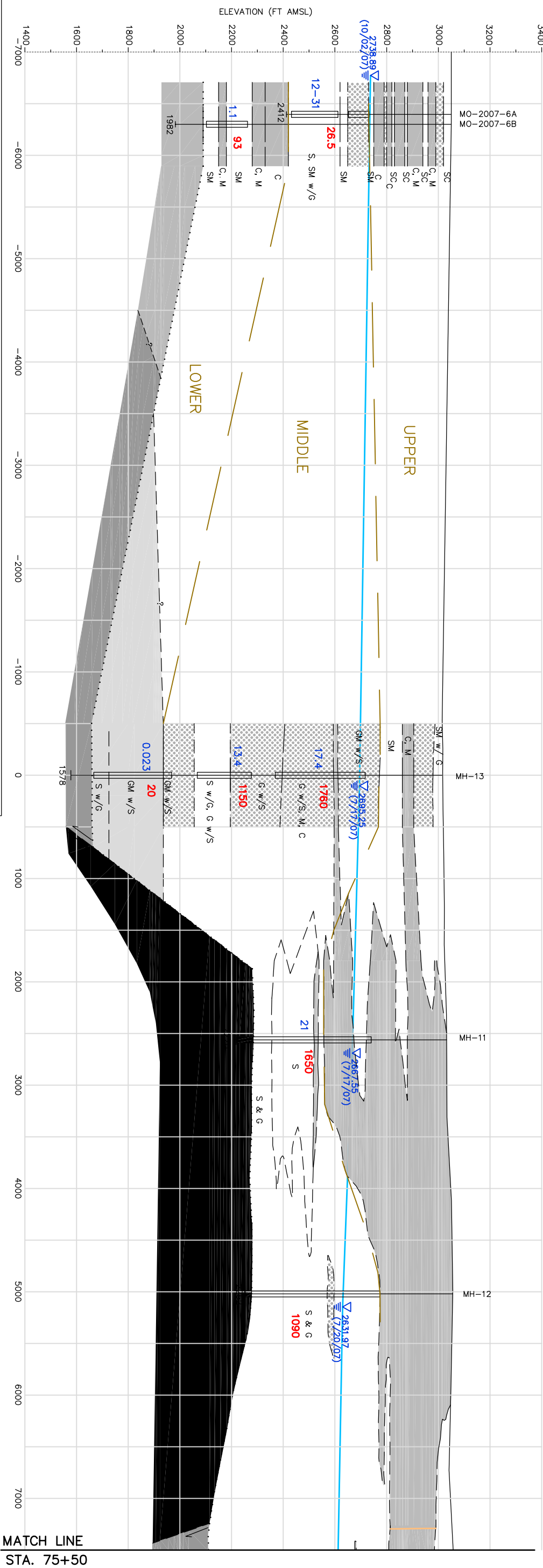


EXPLANATION	
● IW-2	INTERCEPTOR WELL
⊙ MH-16E	MONITOR WELL
○ ESP-4	OTHER WATER WELL
● MO-2007-2	NEW MONITORING WELL



SIERRITA TAILING IMPOUNDMENT AREA CROSS SECTION LOCATION MAP							
Approved KSW	Date 09/04/07	Revised	Date	Reference: 7830023A	FIG: H.1		

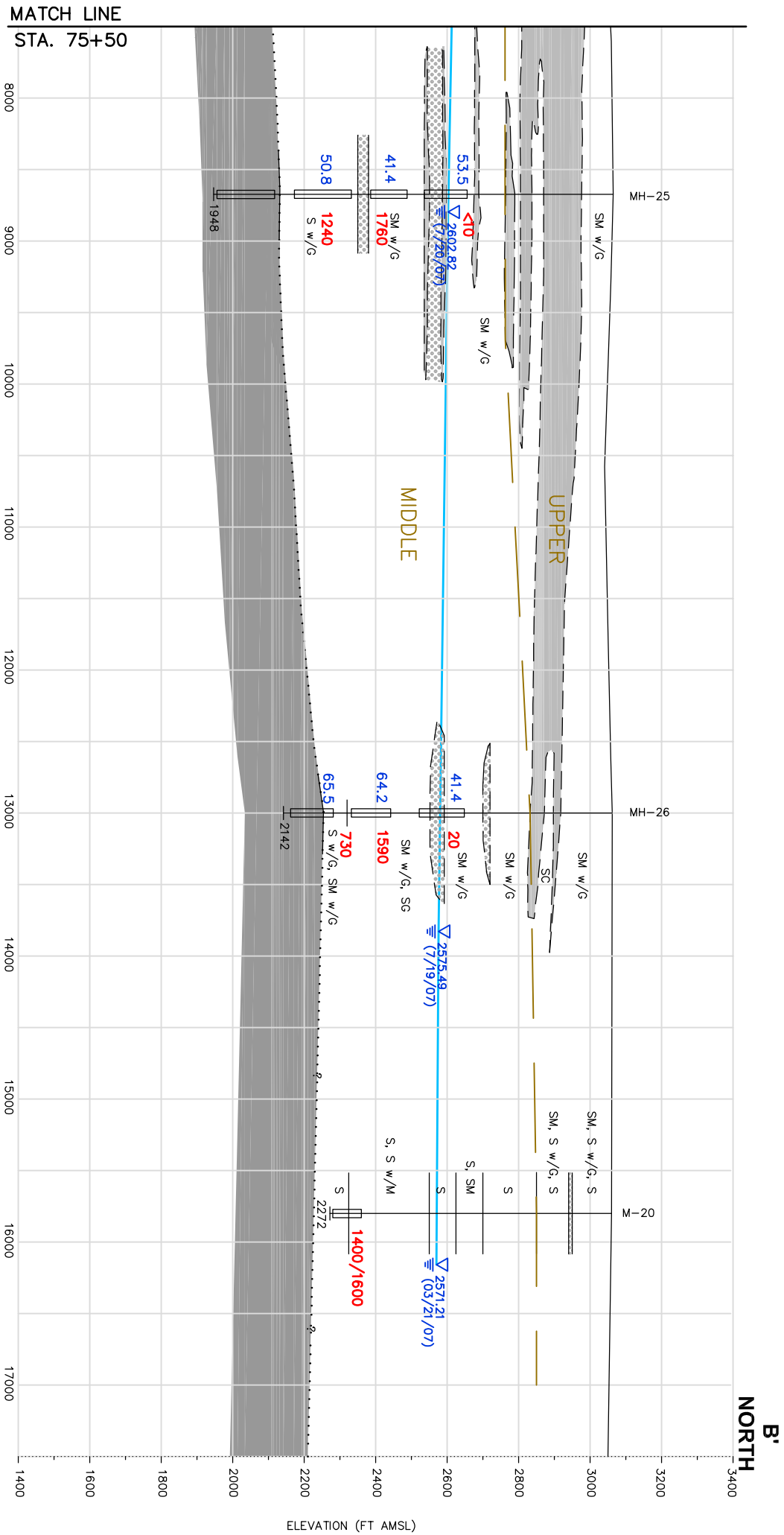
SOUTH



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**B - B' CROSS SECTION SHOWING WATER QUALITY
AND HYDRAULIC CONDUCTIVITY DATA
STA. -70+00.00 TO 75+50.00 SHEET 1 OF 2**

Approved	Date	Revised by	Date	File Name	Figure
KW	11/29/07	KW	11/29/07	7830165A	H.3a



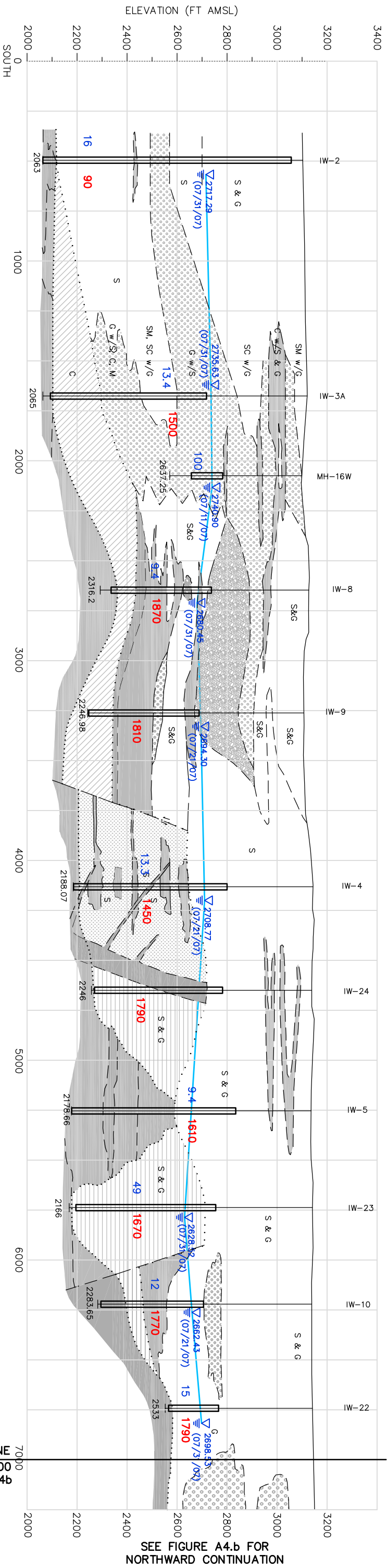
HYDRO
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**B - B' CROSS SECTION SHOWING WATER QUALITY
AND HYDRAULIC CONDUCTIVITY DATA**

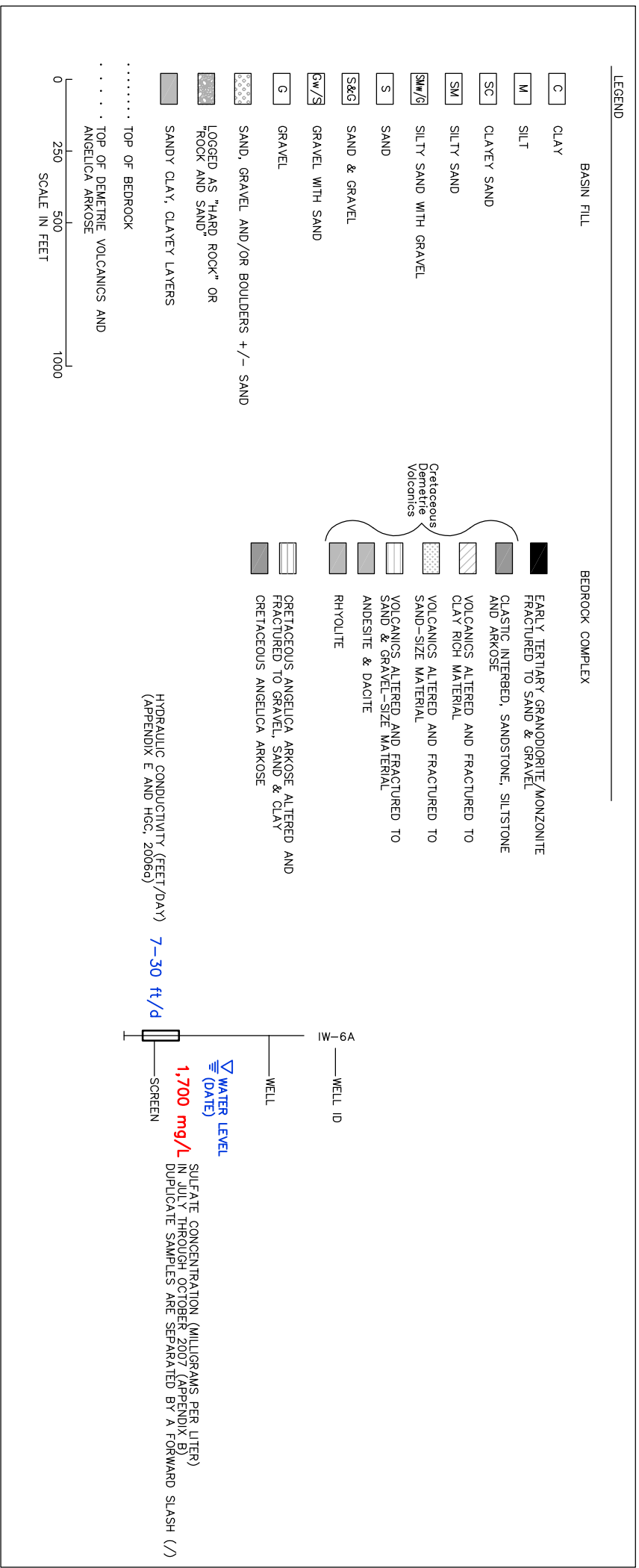
STA. 75+50.00 TO 170+50.00 SHEET 2 OF 2

Approved	Date	Revised by	Date	File Name	Figure
KW	11/29/07	KW	11/29/07	7830165A	H.3b

A

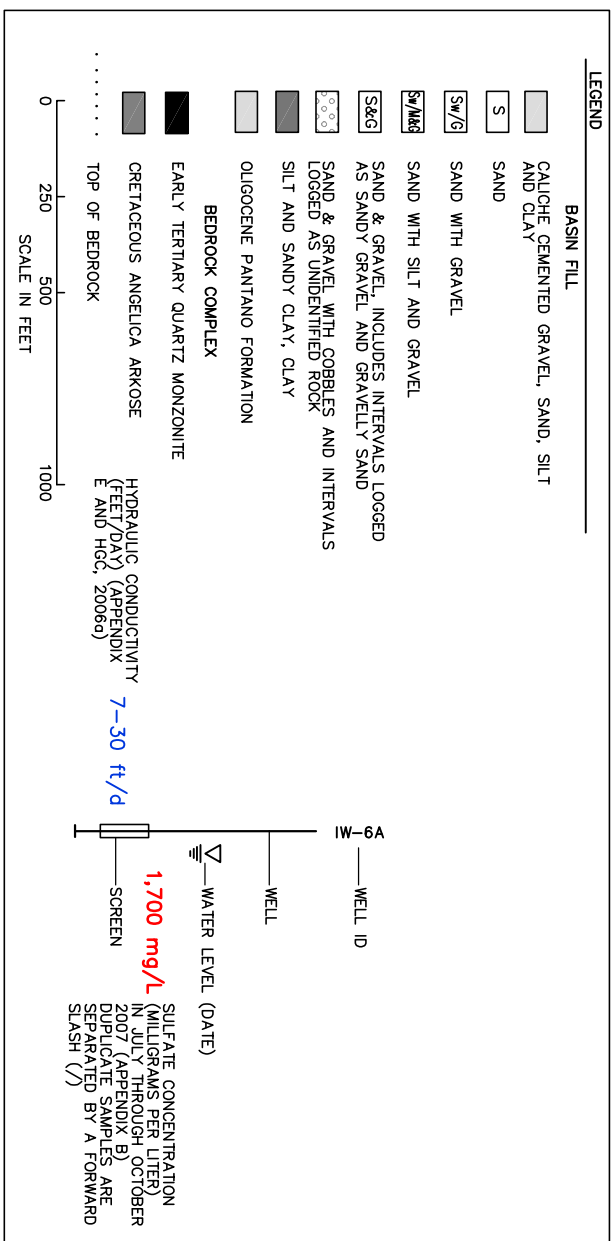
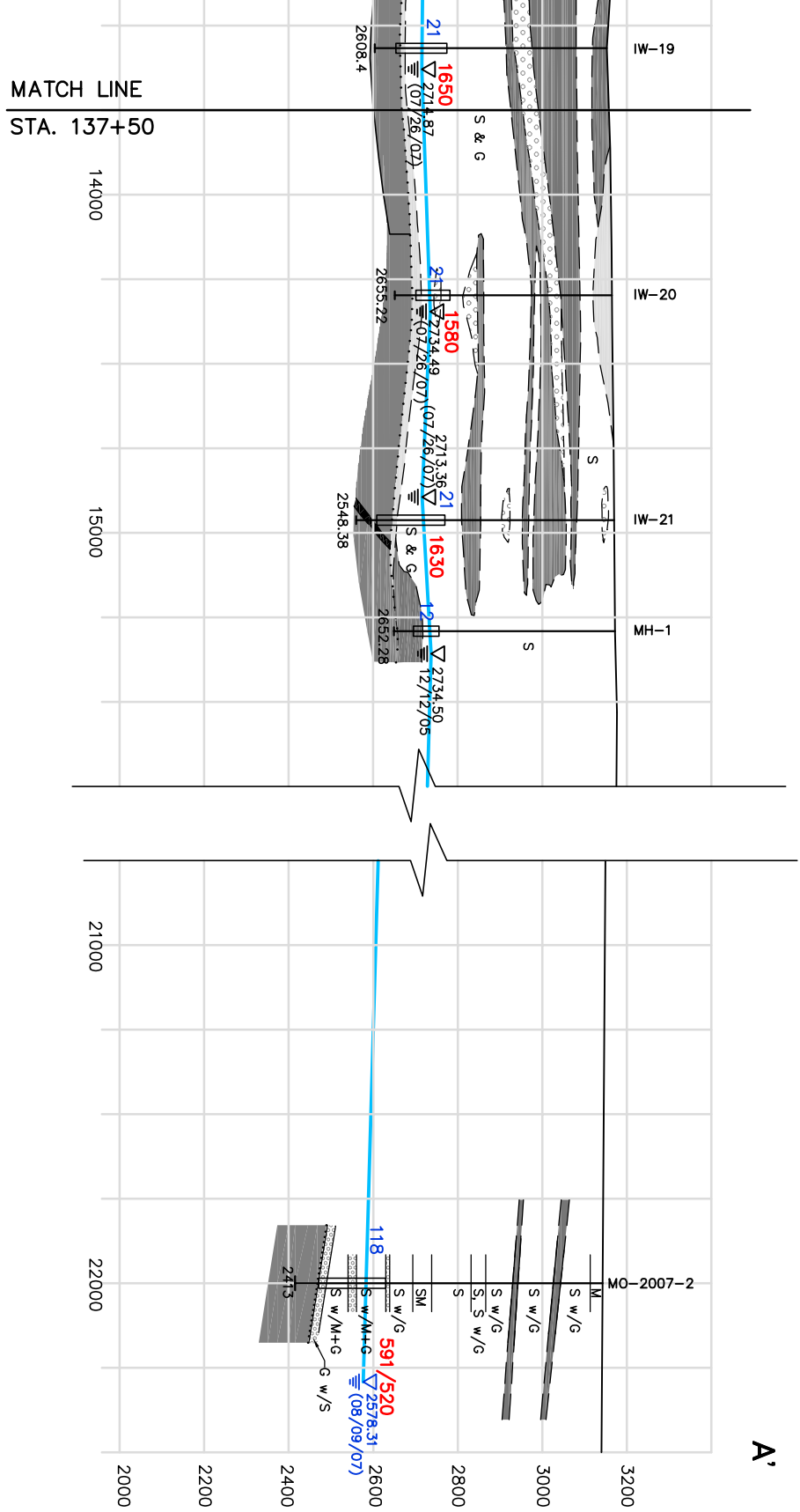
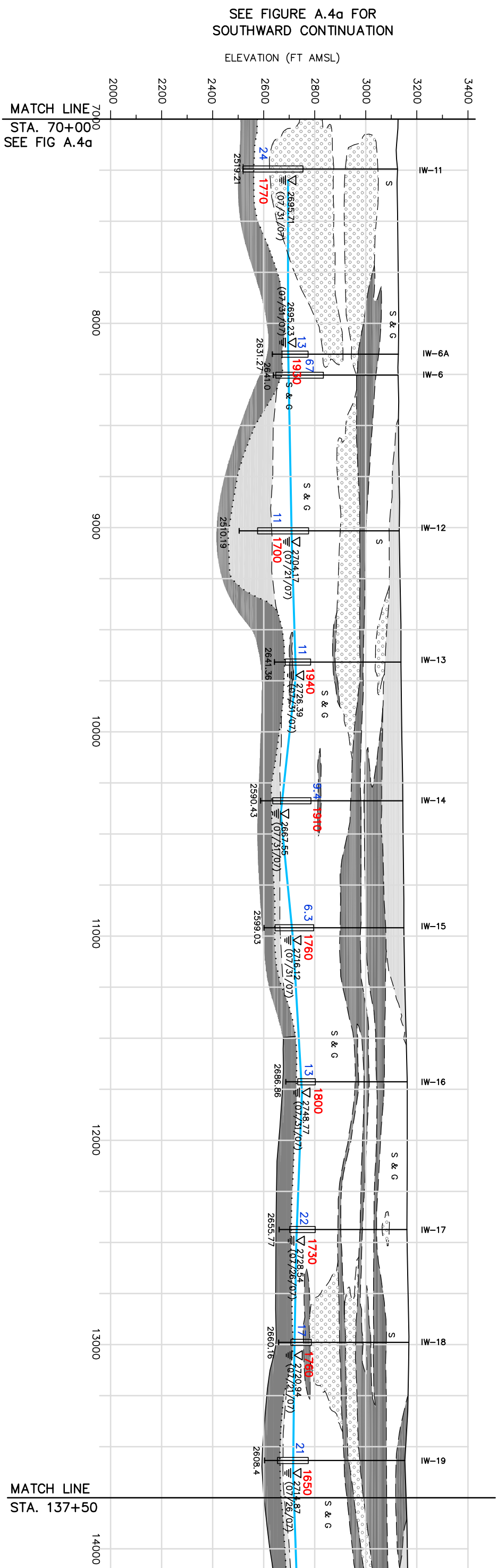


SEE FIGURE A4.b FOR
NORTHWARD CONTINUATION

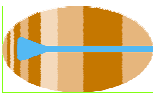
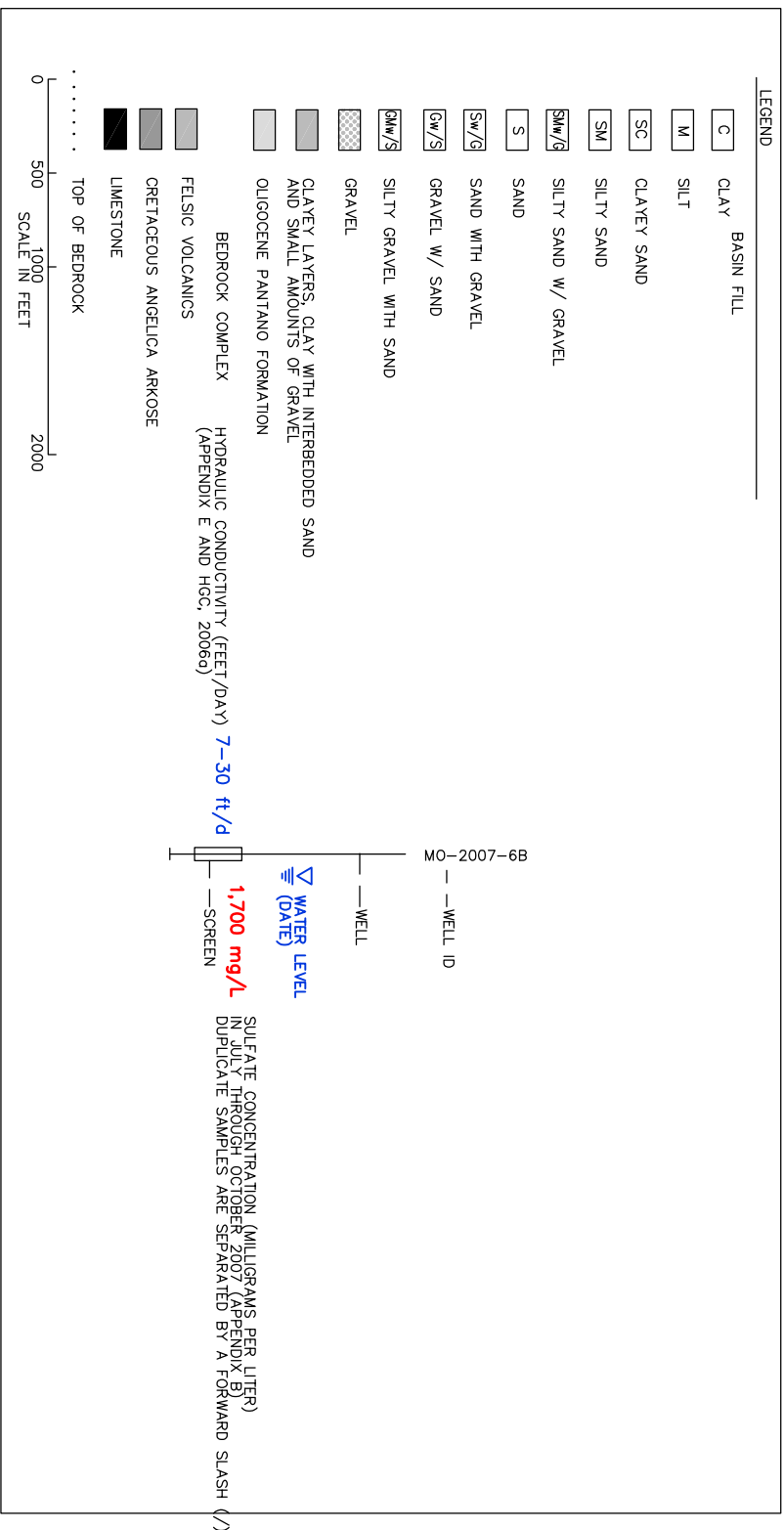
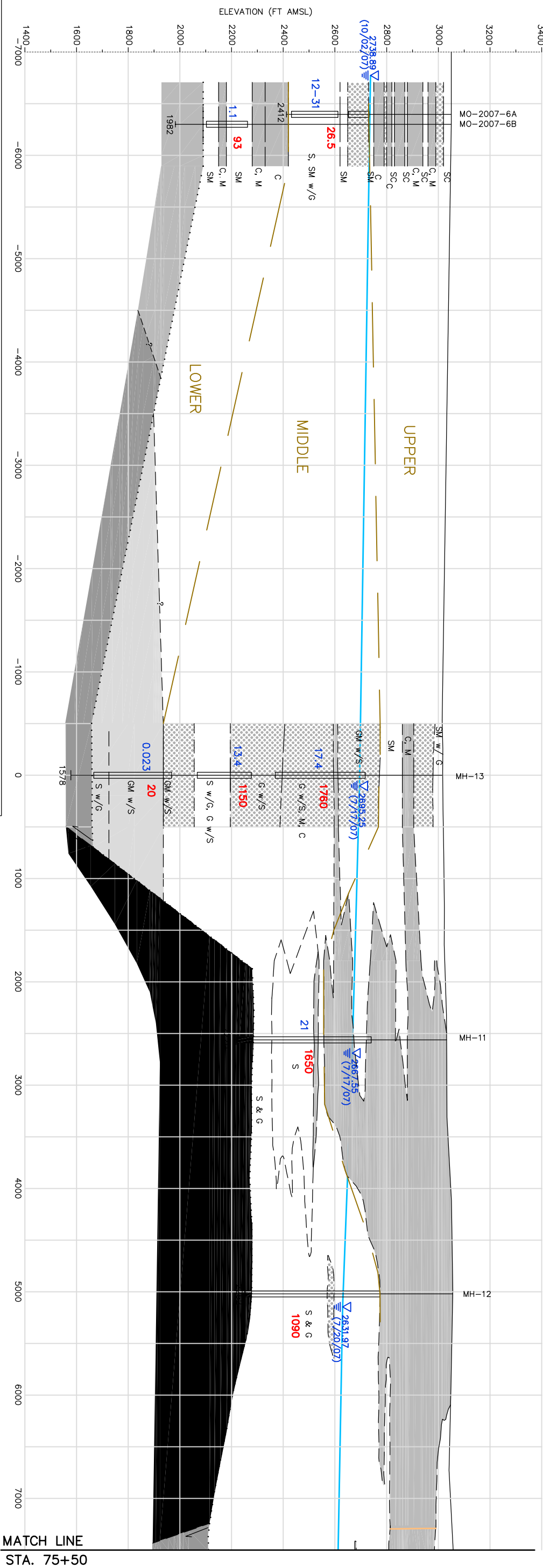


A-A' CROSS SECTION SHOWING WATER QUALITY AND HYDRAULIC CONDUCTIVITY DATA SIERRITA TAILING IMPOUNDMENT AREA

Approved KW	Date 11/29/07	Revised	Date	Reference: 7830163A	FIG. H.2a
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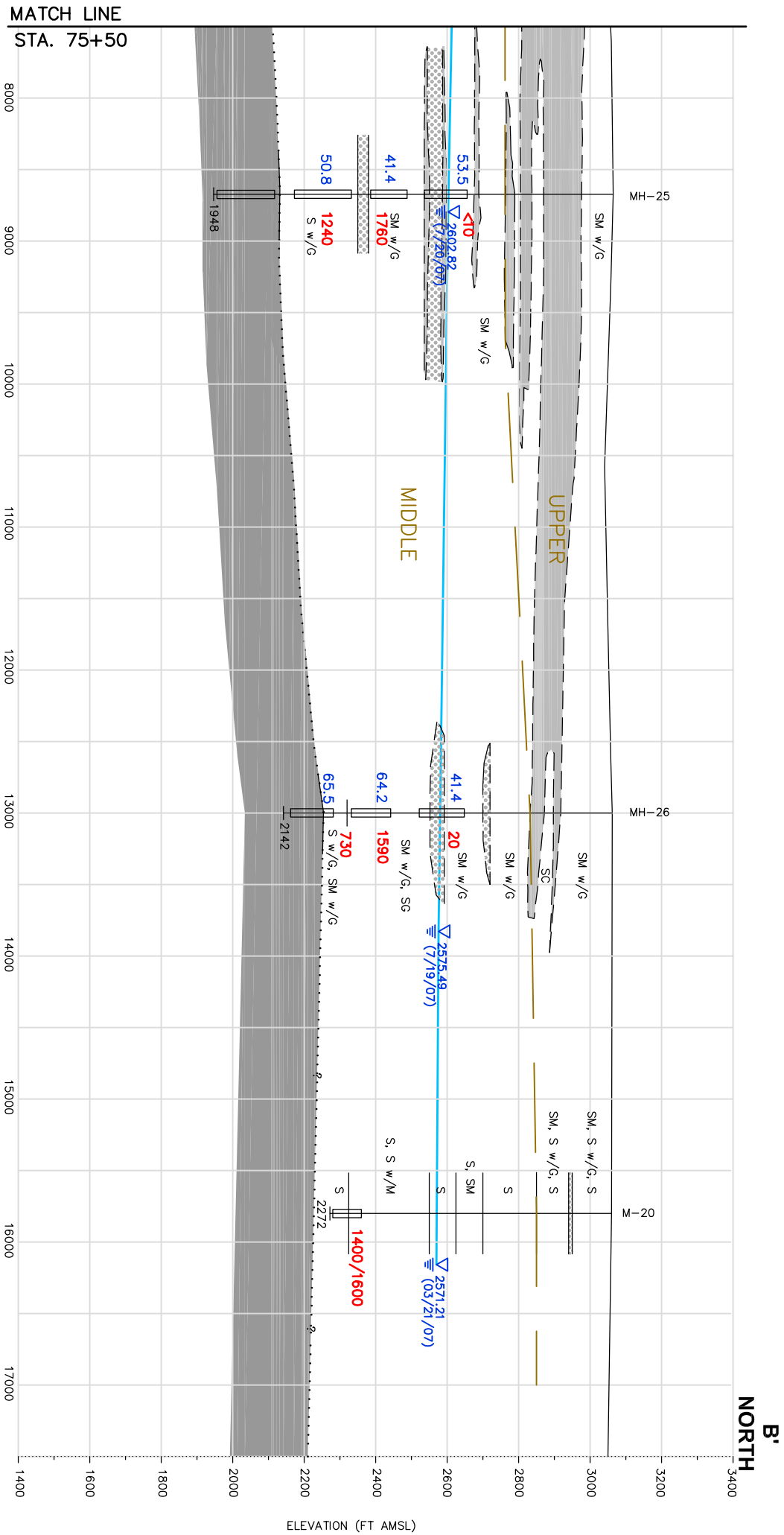
SOUTH



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**B - B' CROSS SECTION SHOWING WATER QUALITY
AND HYDRAULIC CONDUCTIVITY DATA
STA. -70+00.00 TO 75+50.00 SHEET 1 OF 2**

Approved	Date	Revised by	Date	File Name	Figure
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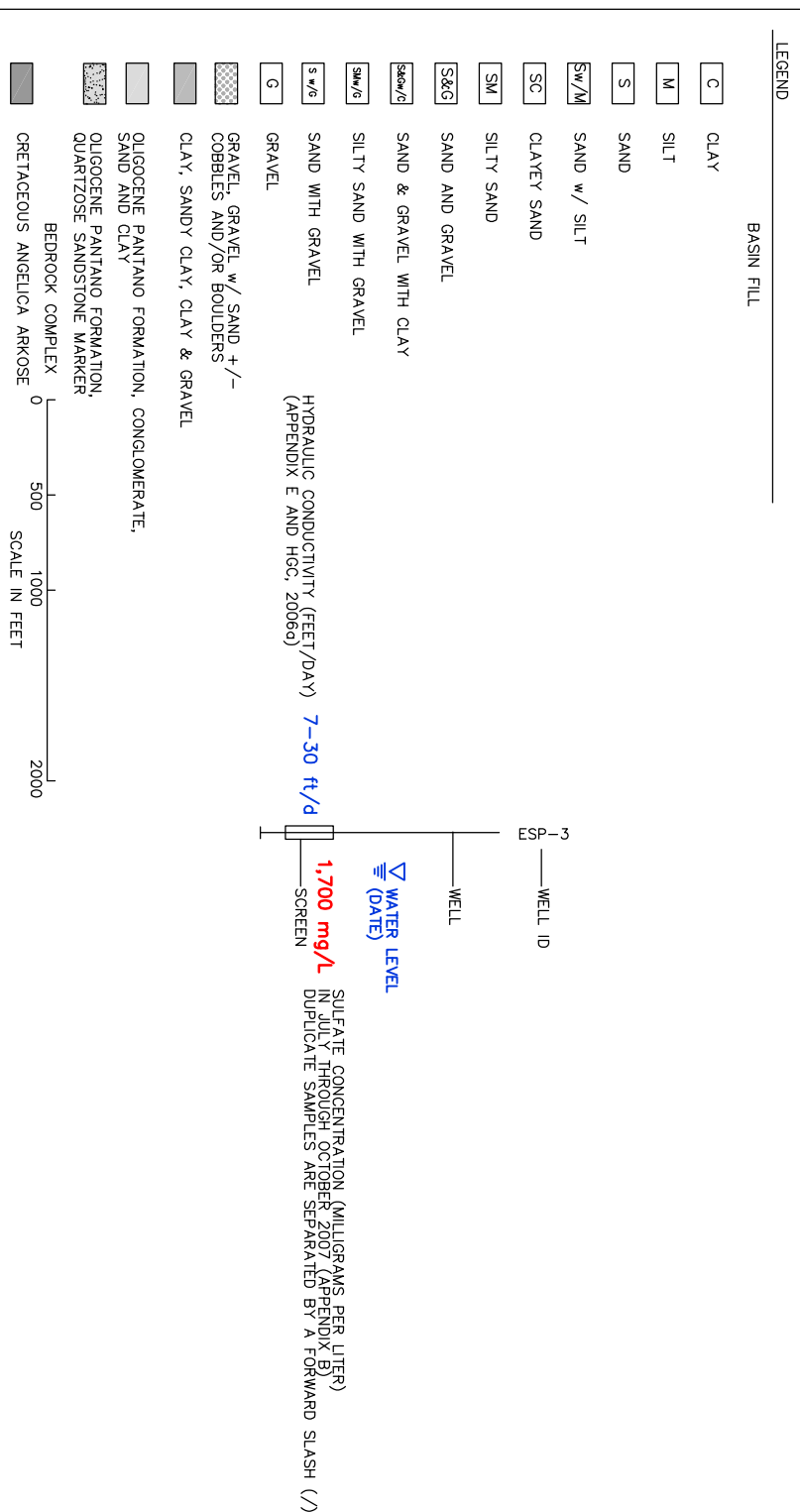
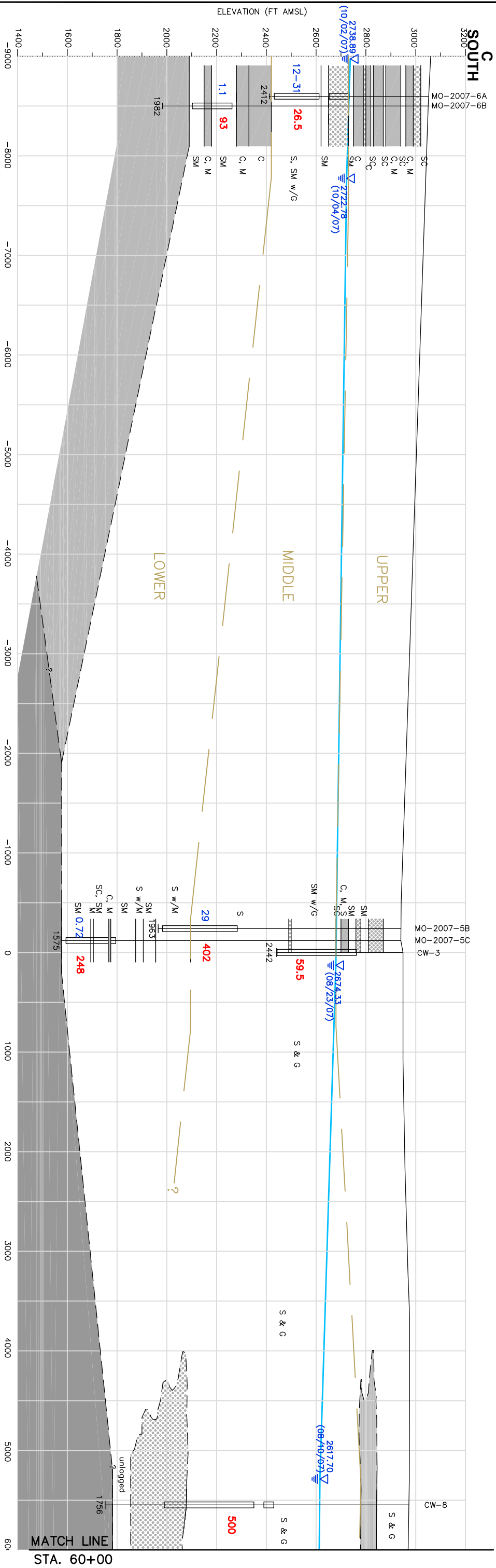


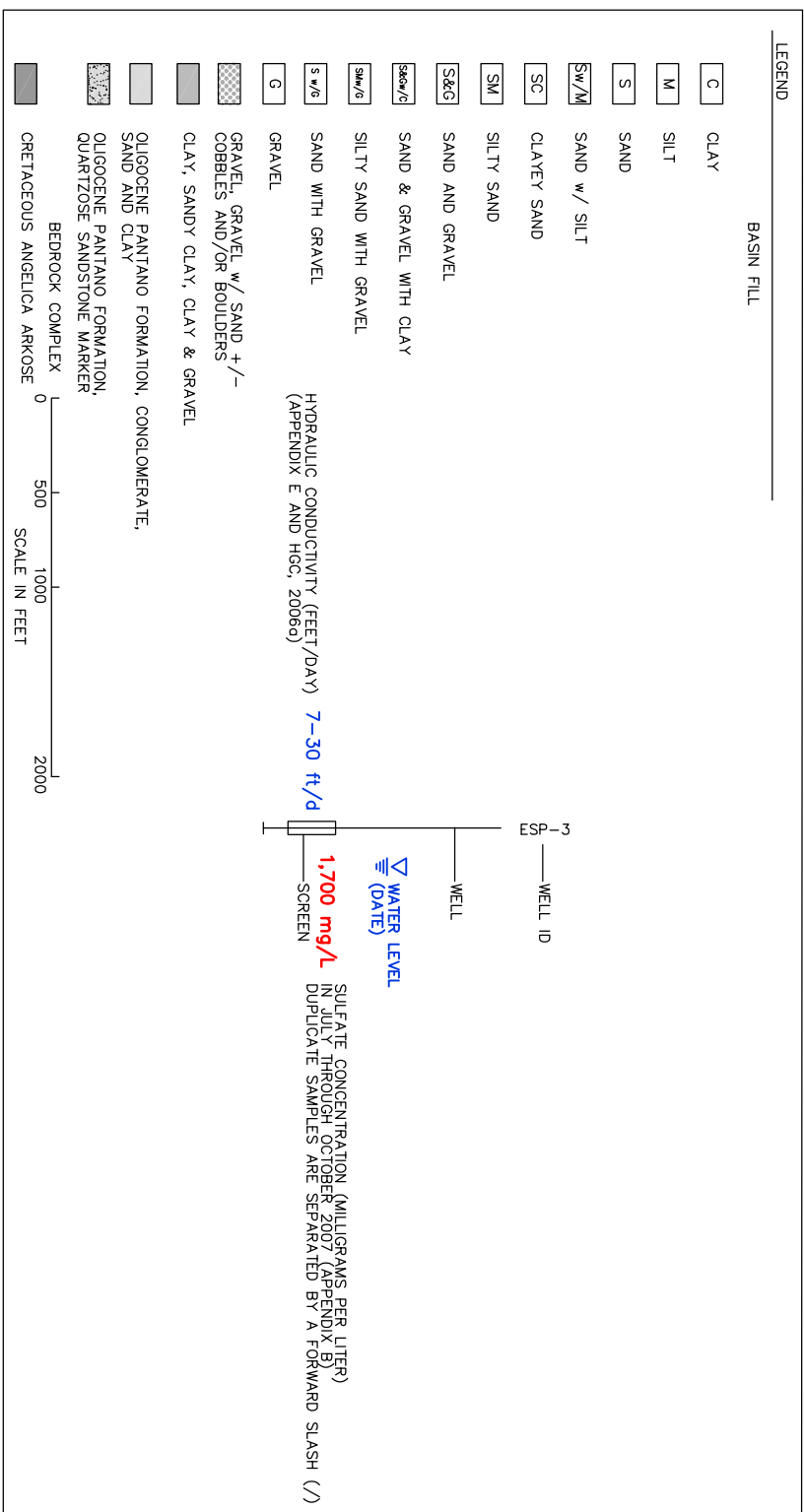
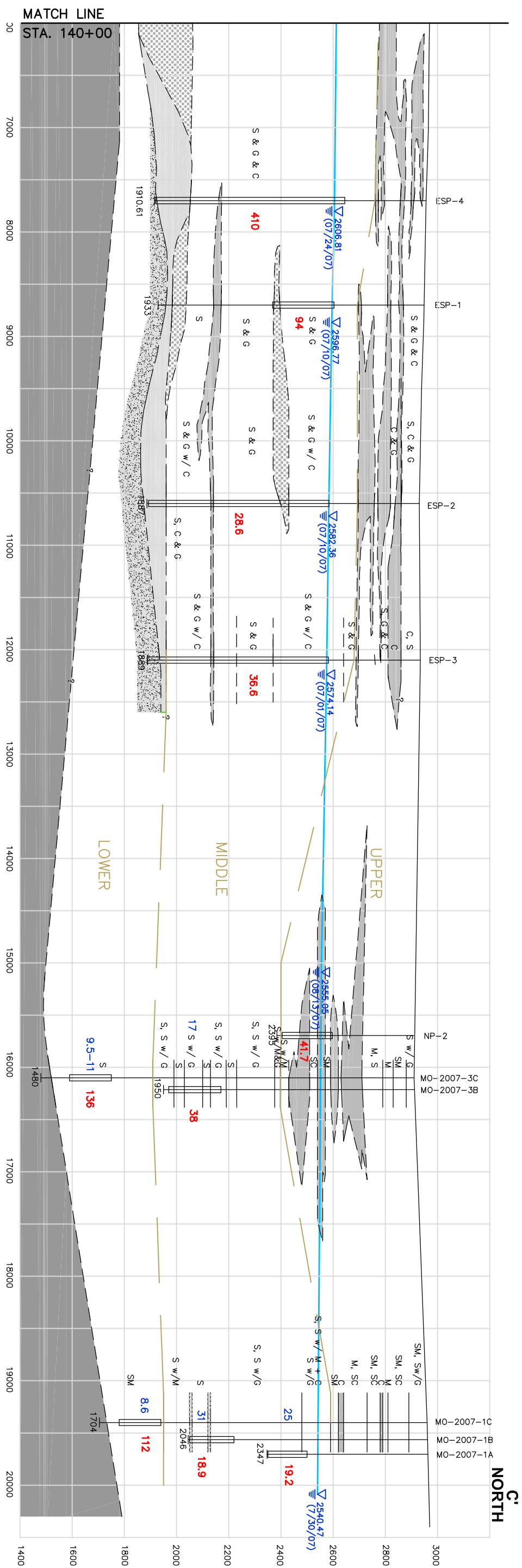
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**B - B' CROSS SECTION SHOWING WATER QUALITY
AND HYDRAULIC CONDUCTIVITY DATA**

STA. 75+50.00 TO 170+50.00 SHEET 2 OF 2

Approved	Date	Revised by	Date	File Name	Figure
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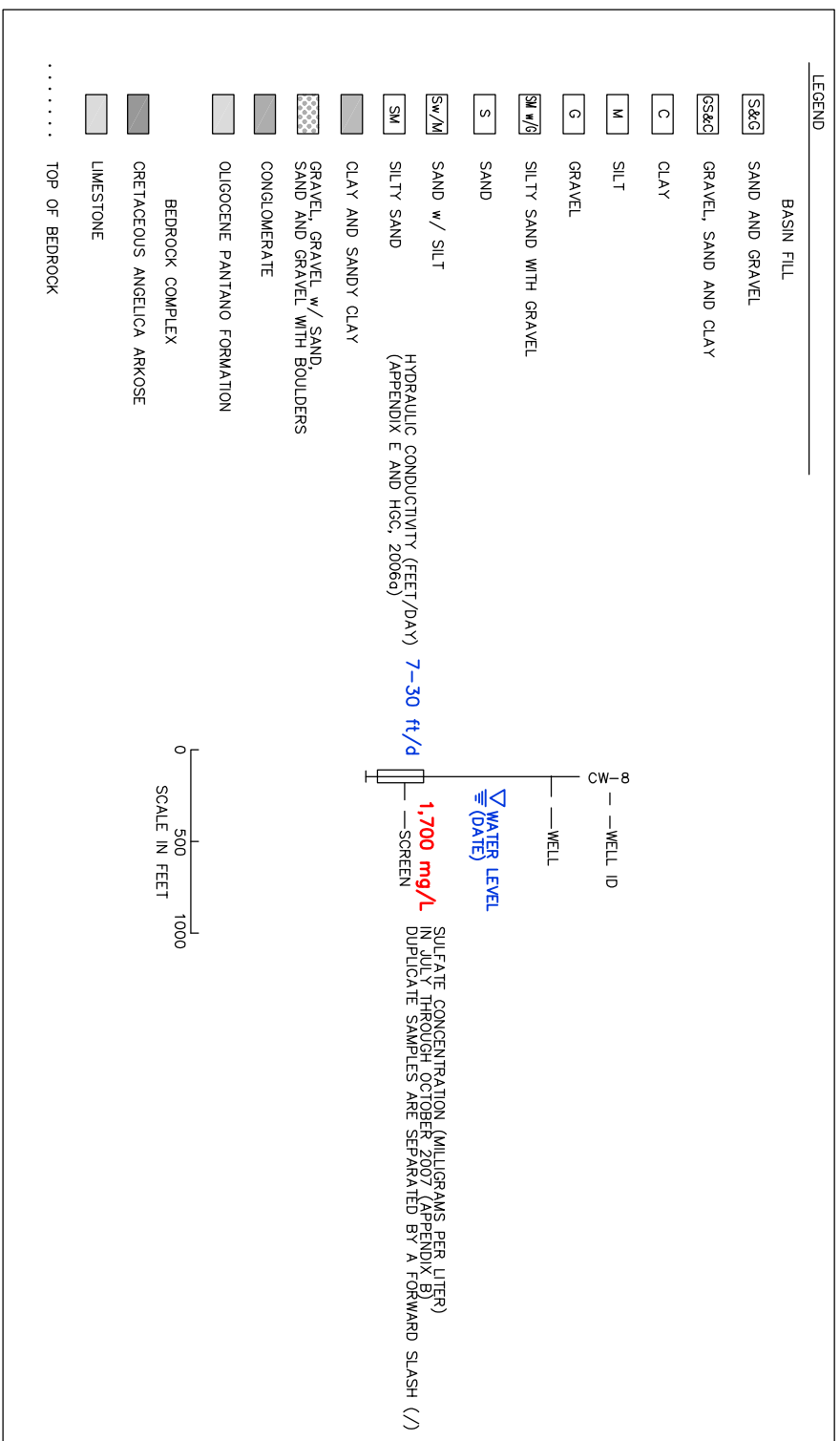
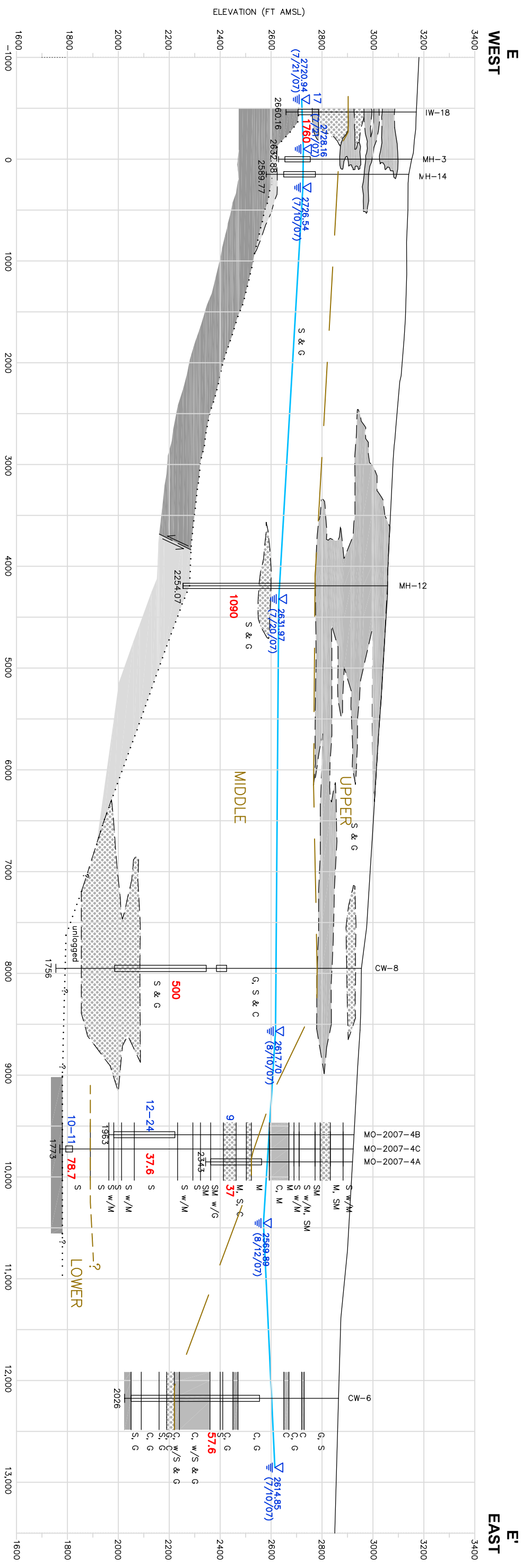





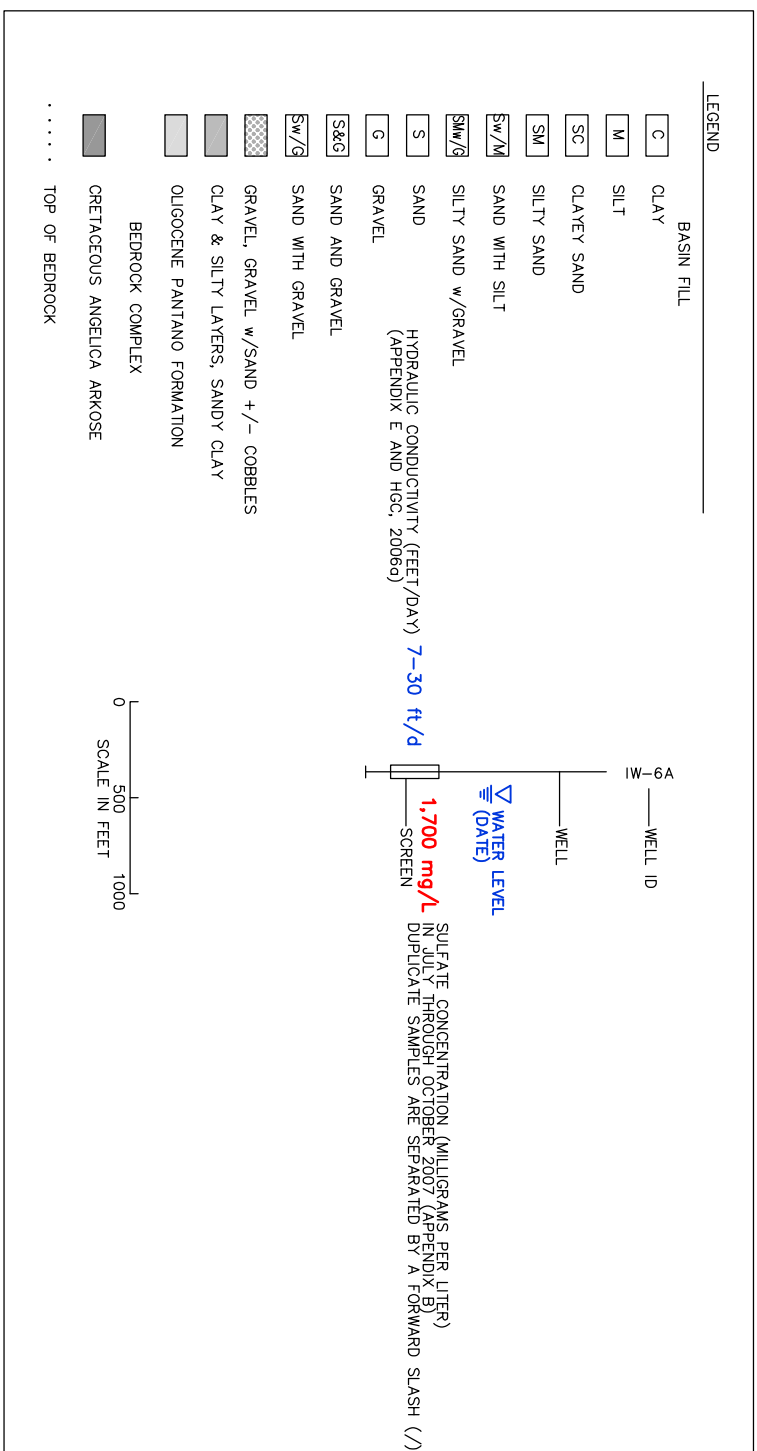
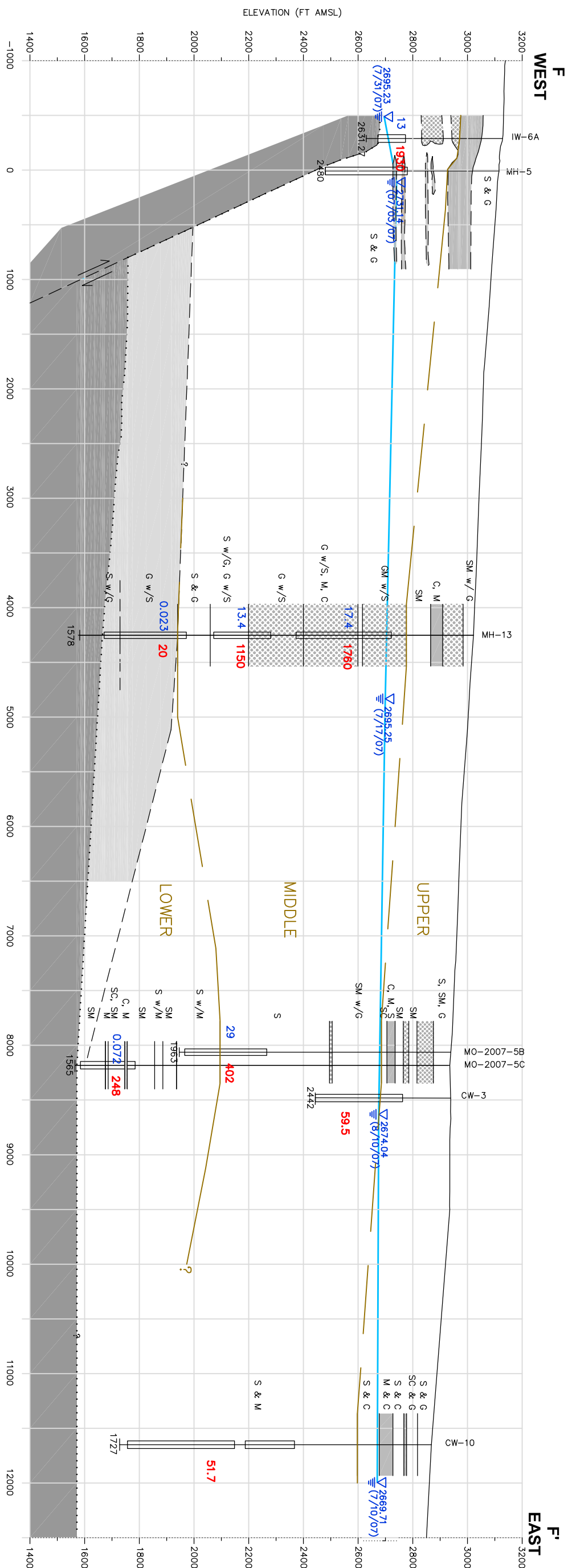
**C - C' CROSS SECTION SHOWING WATER QUALITY
AND HYDRAULIC CONDUCTIVITY DATA
SIERRITA TAILING IMPOUNDMENT AREA**

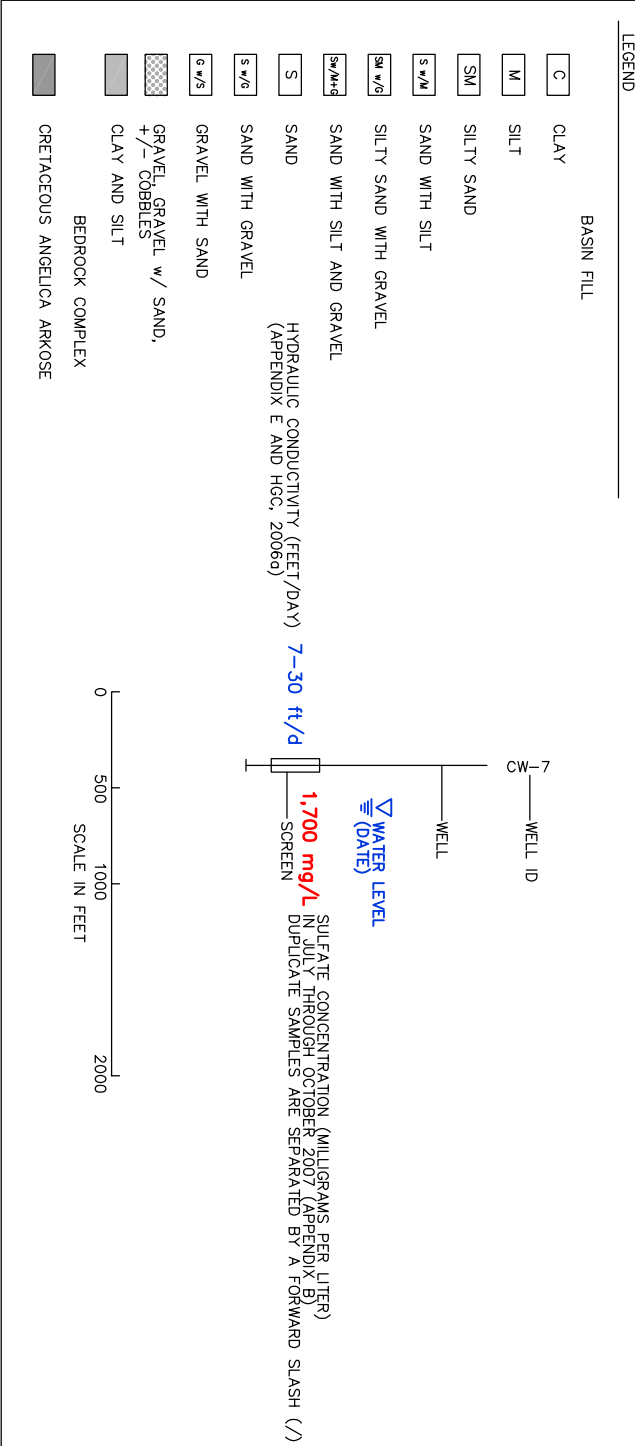
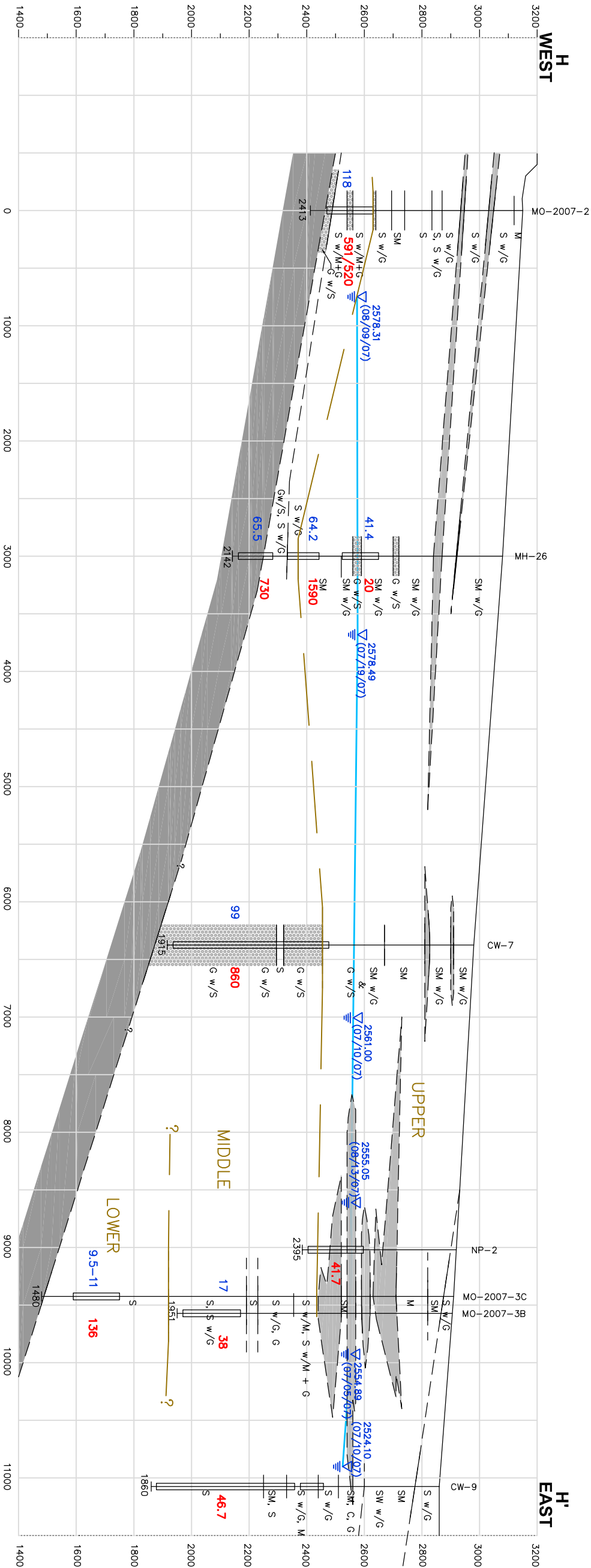
SHEET 2 OF 2

Approved	Date	Revised	Date	Reference:	FIG.
KW	11/29/07			7830166A	H.4b



 <div> HYDRO GEO CHEM, INC. </div>						<div> E - E' CROSS SECTION SHOWING WATER QUALITY AND HYDRAULIC CONDUCTIVITY DATA SIERRITA TAILING IMPOUNDMENT AREA </div>					
Approved	Date	Revised	Date	Reference:	Flt. G.						
KW	11/29/07			7830167A		H.5					





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H - H' CROSS SECTION SHOWING WATER QUALITY
AND HYDRAULIC CONDUCTIVITY DATA
SIERRITA TAILING IMPOUNDMENT AREA

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KW

Date
11/29/07

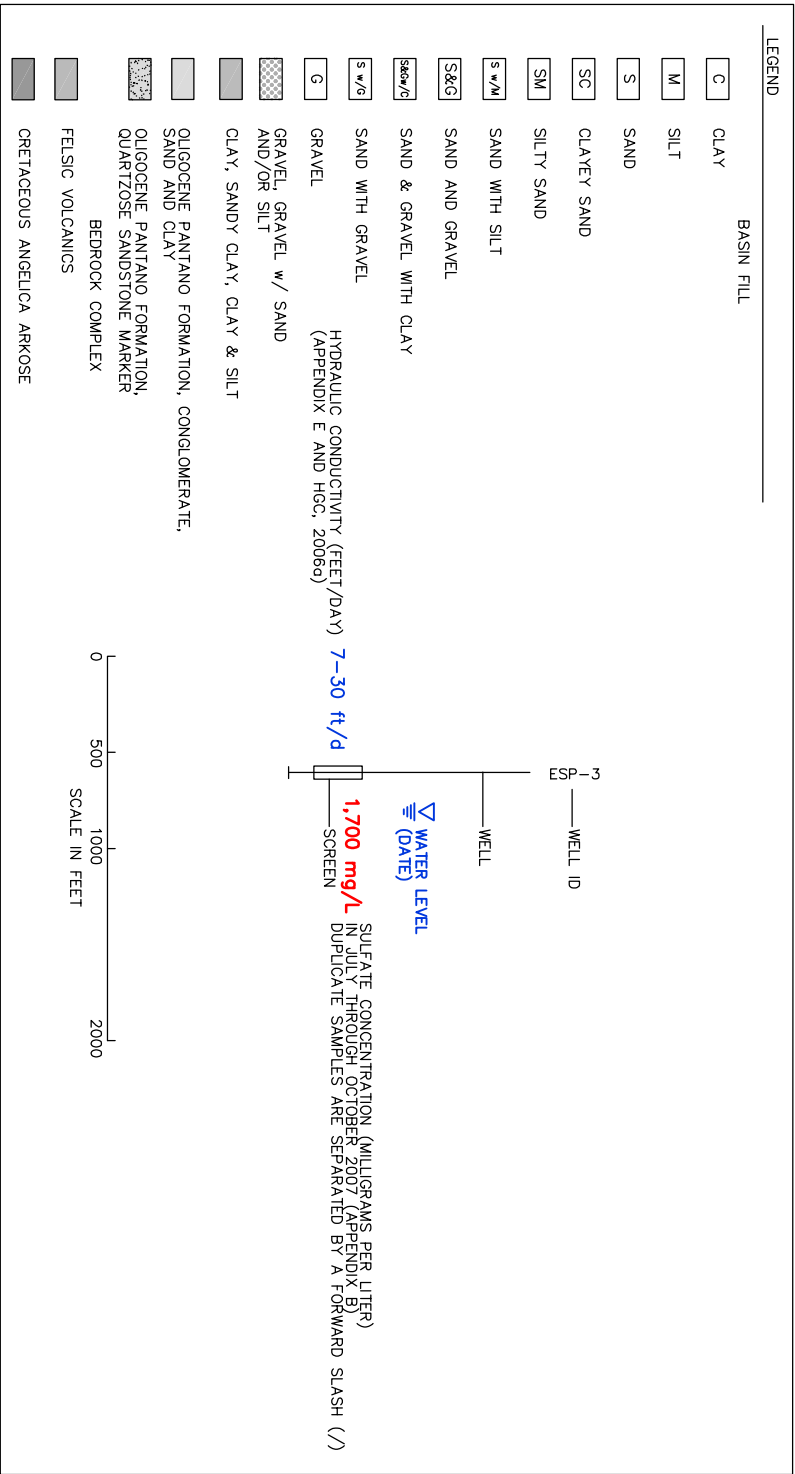
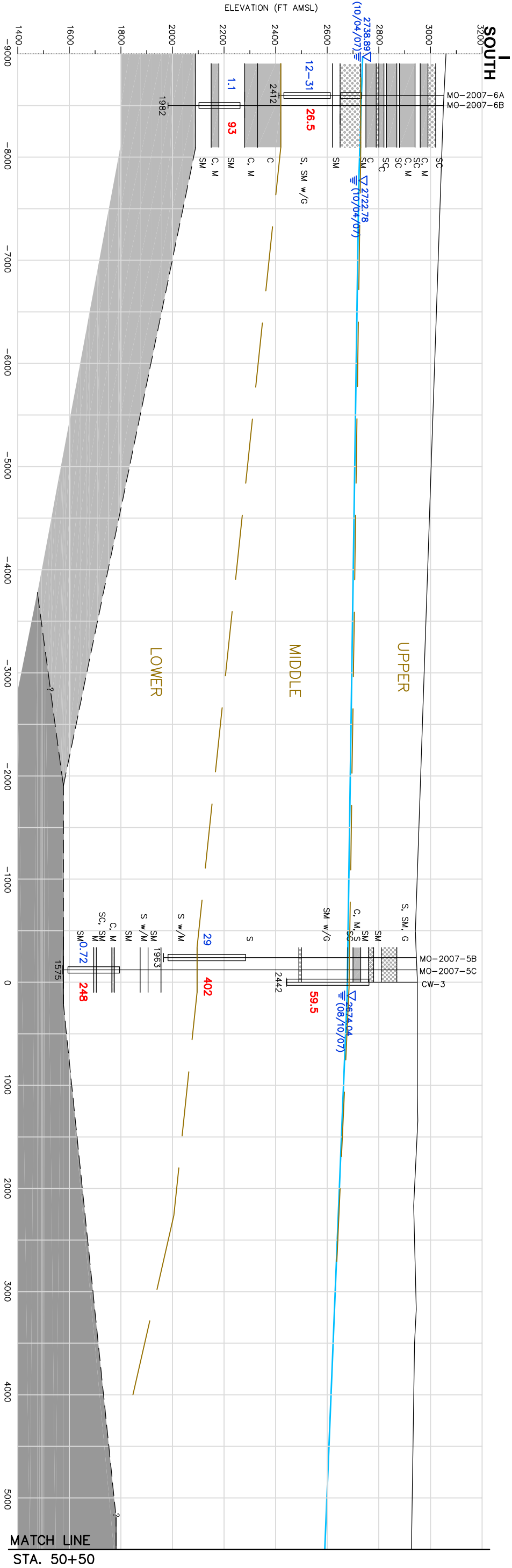
Revised

Date

Reference:
7830169A

FIG.

H.7



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I-I' CROSS SECTION SHOWING WATER QUALITY
AND HYDRAULIC CONDUCTIVITY DATA
SIERRITA TAILING IMPOUNDMENT AREA
STA. -90+00.00 TO 50+50.00 SHEET 1 OF 2

Approved
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Date
11/29/07

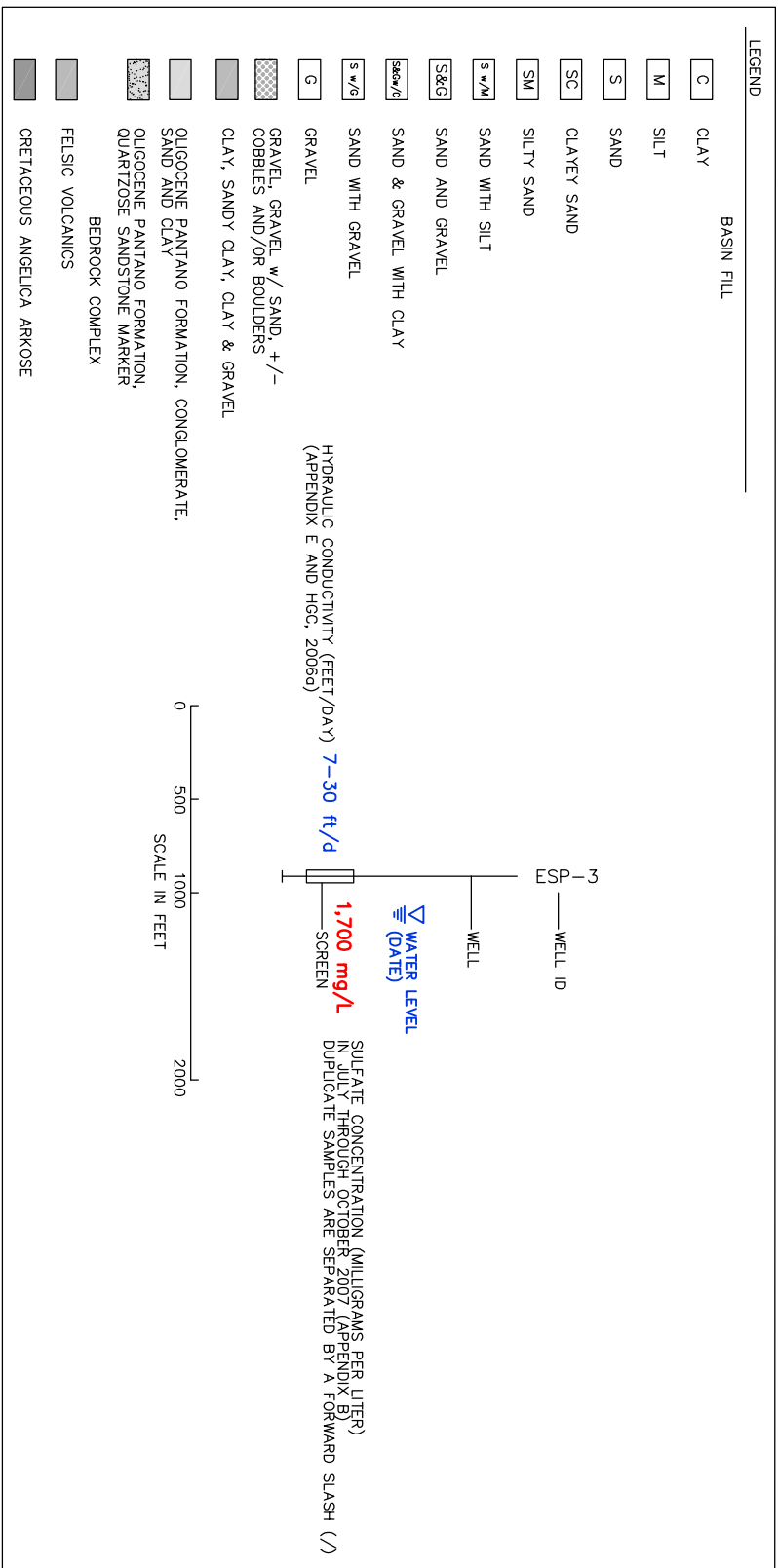
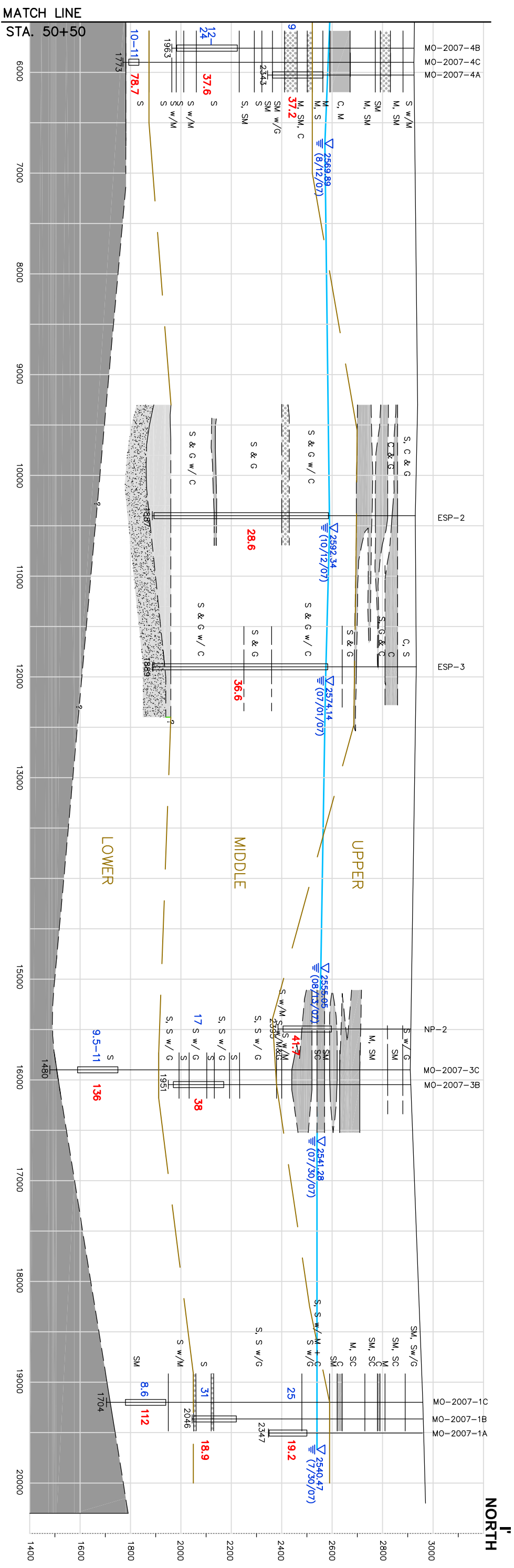
Revised

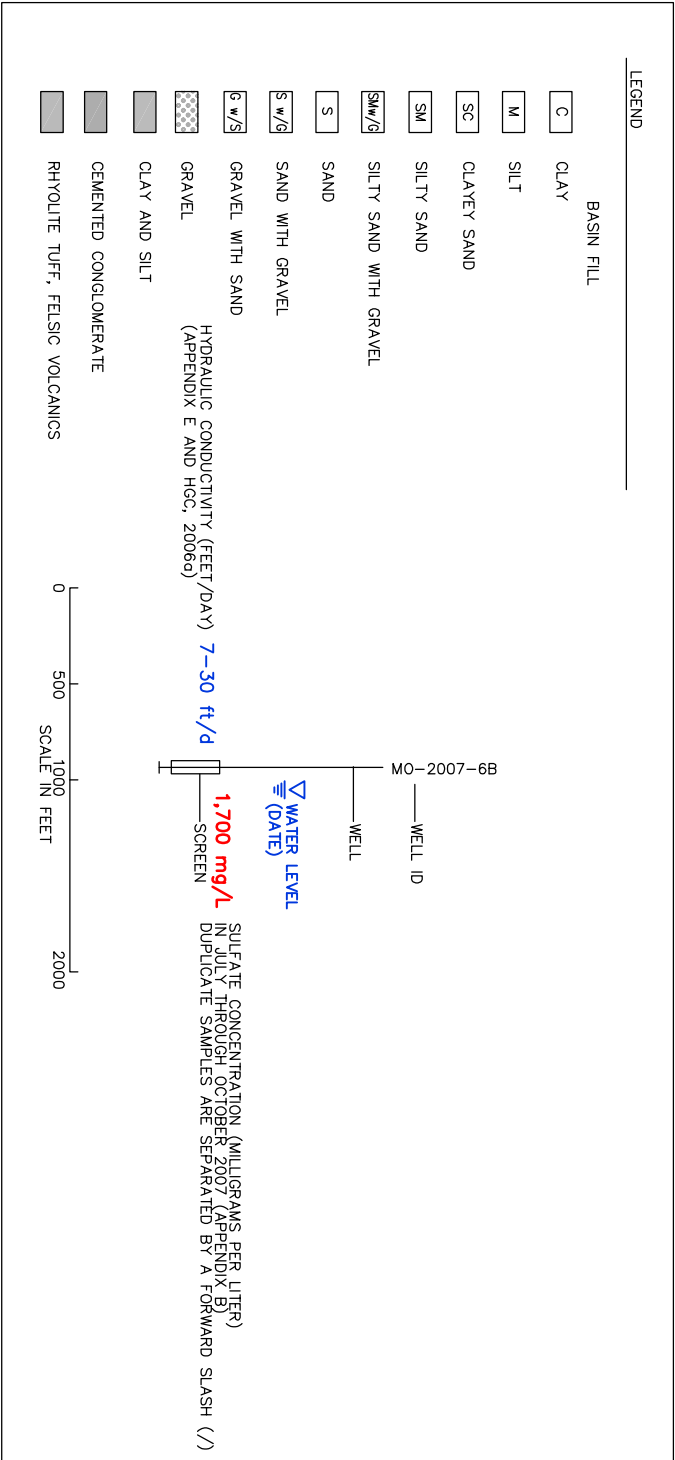
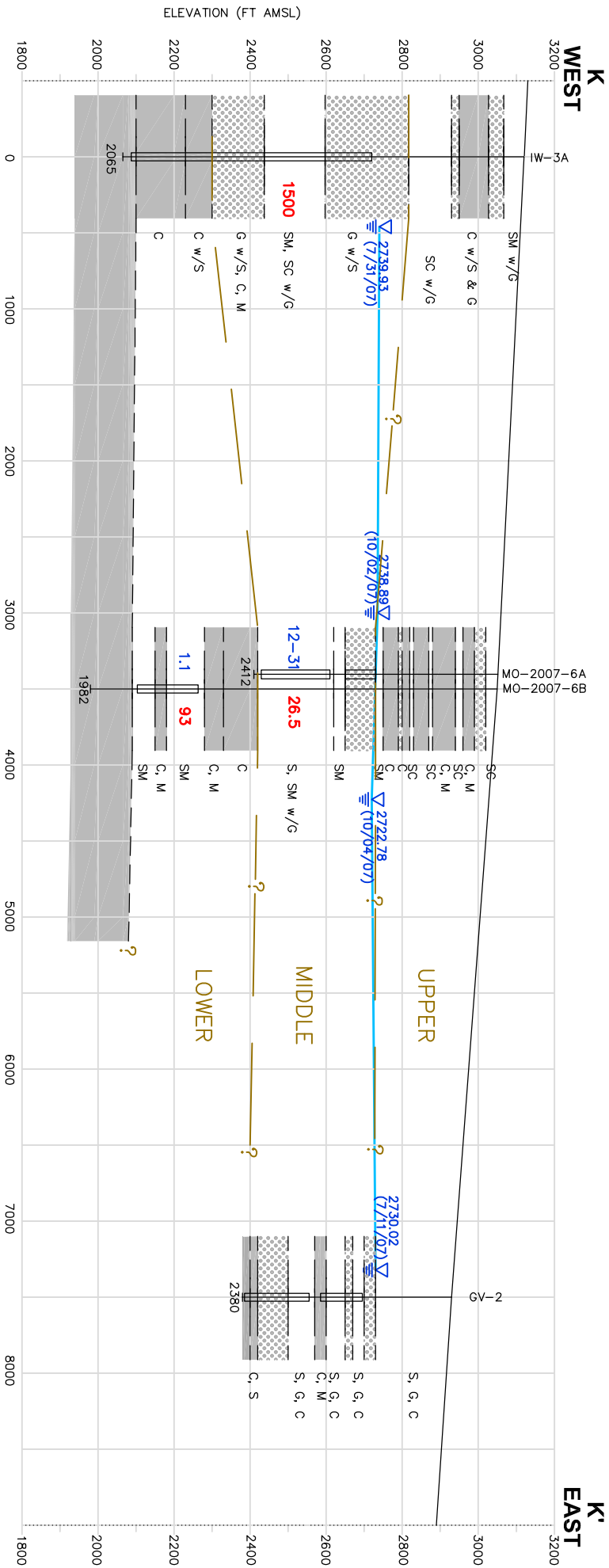
Date

Reference:
7830170A

FIG.

H.8a





**K - K' CROSS SECTION SHOWING WATER QUALITY
AND HYDRAULIC CONDUCTIVITY DATA
SIERRITA TAILING IMPOUNDMENT AREA**

Approved	Date	Revised	Date	Reference:	F/G.
KW	11/29/07			7830172A	H.10