

APPENDIX A

**THIRD QUARTER 2007
DATA VERIFICATION REPORT FOR GROUNDWATER SAMPLES
COLLECTED BY PHELPS DODGE SIERRITA, INC.
AND HYDRO GEO CHEM, INC.**

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1. INTRODUCTION

This report summarizes the data verification review of groundwater samples collected and analyzed during the third quarter 2007 (Q3-2007) by Phelps Dodge Sierrita, Inc. (PDSI) and Hydro Geo Chem, Inc. (HGC) pursuant to Mitigation Order on Consent Docket No. P-50-06 (MO). PDSI conducted groundwater sampling and analysis at wells under its control with the exception of the Titan Missile Museum (TMM-1) well sampled during the installation of a new pump and Twin Buttes Properties, Inc. wells I-10 and M-8. HGC collected groundwater samples from wells outside the control of PDSI including samples for which the results were sent to FICO only. All analytical results for groundwater samples collected for this project during the third quarter of 2007 were provided to HGC either by PDSI, by the analytical laboratory, ACZ Laboratories Inc (ACZ), or FICO for preparation of the Q3-2007 Groundwater Monitoring Report. Data verification for samples collected and analyzed by other entities and reported by HGC is not provided in this report.

Quality assurance (QA) and quality control (QC) procedures are specified in the *Quality Assurance Project Plan for Aquifer Characterization Plan (QAPP)* (Appendix E of HGC, 2006) for field sampling, chain-of-custody (COC) documentation, laboratory analysis, and reporting. Because field sampling procedures were reviewed by PDSI following the provisions of *Quality Assurance / Quality Control Plan for Water Monitoring, Phelps Dodge Sierrita, Inc.* (PDSI, 2005), field sampling for wells sampled by PDSI is not reviewed in this report. This report does review field sampling for samples collected by HGC. Additionally, sample handling and laboratory QA/QC data are evaluated according to the data quality indicators (DQIs) given in the QAPP.

Appendix B of the main text of this report contains laboratory reports for Q3-2007 samples collected by PDSI and HGC including COC forms, laboratory correspondence, QC summaries, data qualifiers, and any case narratives. The Q3-2007 analytical results for all 100 samples collected by PDSI and HGC and are contained in 33 reports having the ACZ Project numbers identified in Table A.1.

The results of the internal QA/QC tests performed by ACZ are presented with the laboratory reports included in Appendix B. Based on the results of surrogate spike recoveries, matrix spike/recovery and matrix spike duplicate tests, ACZ did not advise HGC of any modifications that should be made regarding the usability and data validation status of the laboratory test results.

2. HGC FIELD OPERATIONS

Field operations for this project consisted of the following for all monitoring wells sampled by HGC:

- Static water level monitoring,
- Well purging (minimum of 3 wetted casing volumes),
- Collection of water quality field parameters (pH, electrical conductivity (EC), and temperature in degrees Celsius (°C)),
- Collection of groundwater samples for water quality analysis, and
- Equipment decontamination.

All documentation of field activities was evaluated for quality assurance, and has been deemed to have met the documentation requirements stated in the QAPP.

2.1 Water Level Monitoring

Static water level measurements were collected by HGC at 45 wells during the third quarter of 2007. In all cases, the wells were allowed to come to static conditions before collecting the water level measurement. Before measuring the static water level at each well, the battery on the water level indicator was checked and the sensitivity level was adjusted, if necessary. Each measurement was collected and verified by measuring the depth to water multiple times in order to obtain a consistent reading and accurate measurement.

2.2 Groundwater Sampling

During this monitoring period groundwater samples were collected from wells designated for sampling in the quarterly and semi-annual monitoring schedule of the Work Plan. Additionally, groundwater samples were collected from the newly installed MO monitoring

wells. More detailed information regarding the wells sampled for water quality and water level measurements is listed in Table 1 of the main text.

2.2.1 Pre-Sampling Field Activities

On each day of sampling, the pH¹ and EC² probes were calibrated. In addition, the water level indicator was checked for a signal, which indicates a working meter and battery strength. On each day where sampling extended for more than half a day, a mid-day calibration check was performed on the pH and EC probes to ensure their accurate measurement.

In addition to calibrating the instruments each day, measures were taken to 1) properly decontaminate field equipment, 2) ensure the appropriate storage and transport temperature of the samples, and 3) document all activities related to the collection of groundwater samples as part of this project. These objectives were met by 1) replenishing or obtaining supplies of de-ionized water and ice daily, 2) use of the proper preservative and sample collection containers, 3) properly packing the samples on ice during field activities, 4) using de-ionized water to properly decontaminate field equipment prior to the start of sampling each day and after sampling at each well, and 5) obtaining the appropriate field notebook in order to document field activities related to the groundwater monitoring program.

2.2.2 Well Purging, Field Measurements, and Sample Collection

Ideally, three wetted casing volumes were purged from each well prior to sampling. However, when three casing volumes could not be purged, this information was noted on the groundwater sampling form (Appendix C) at each well for which this was the case. In cases where purging was necessary prior to sample collection the purge water was discharged to the ground surface. Two wells, (NP-2, and CW-3) required subcontracting a well development pump rig and crew to purge the wells in order to collect groundwater samples.

¹ Field pH meter was calibrated using a two point calibration and pH buffers 4 and 7.

² Field EC meter was calibrated using a standard stock solution of 1413 $\mu\text{S}/\text{cm}$ (microsiemens per centimeter).

Field measurements were collected at varying intervals during well purging at each well where a water quality sample was collected. Field parameters were monitored until a consistent measurement was obtained every time a water quality sample was collected.

During this monitoring period, filtered and unfiltered groundwater samples were collected for analysis from wells not under the control of PDSI. Groundwater sampling consisted of the collection of a filtered sample for the analysis of the major element ions (calcium, magnesium, sodium, potassium, sulfate, chloride, nitrate, nitrite, and fluoride) and for alkalinity and total dissolved solids (TDS). All filtered samples were collected using a clean filtration apparatus and one unused, disposable 0.45-micron filter. An unfiltered sample for the analysis of sulfate was also collected. All bottles were provided by ACZ. Bottles were checked for the correct preservative and maintained in a clean and secure work area, until used in the field.

2.2.3 Post-Sampling Field Activities

Post sampling field activities consisted of equipment decontamination, sample storage, and sample shipping. Field equipment that comes into contact with the sample was decontaminated using a small amount of Alconox detergent and de-ionized water. After washing, the equipment was rinsed thoroughly with de-ionized water.

After sample collection, samples from each well were placed into a plastic bag and stored on ice until they could be packed securely for shipping to ACZ. In addition, each set of three samples collected from each well was individually bagged (without ice) to prevent the label from getting soaked with water and rubbing off or becoming illegible.

2.3 Well Survey

On July 24 and August 1, 2007, a ground surface and measuring-point elevation survey was completed for newly installed wells MO-2007-1A, MO-2007-1B, MO-2007-1C,

MO-2007-2, MO-2007-3C, and MO-2007-4C. The survey was conducted by AMEC Infrastructure, Inc. These data are shown in Table 3 and Figure 2 of the main report.

3. SAMPLE HANDLING

All samples collected by PDSI and HGC were shipped to ACZ for analysis. COC documentation accompanied all samples submitted and included the sample name, collection date and time. COCs contained in laboratory reports included the date and time the samples were received by ACZ. As noted on the analytical data reports from ACZ, all of the sample bottles were received intact, properly preserved, and in good condition.

The temperatures of the following 12 shipping containers (identified by their laboratory login numbers) exceeded 4 °C upon receipt at the laboratory:

ACZ Project ID	Sample Collection Date	Sample Relinquished Date	Sample Received Date by ACZ	Temperature Upon Receipt (°C)
L63262	06/14/07	06/14/07	06/16/07	5.5
L63562	06/28/07	06/28/07	06/30/07	8.5
L63829	07/11/07	07/12/07	07/13/07	4.7
L63915	07/16/07	07/17/07	07/18/07	11.4
L63922	07/16/07	07/16/07	07/18/07	19
L63925	07/17/07	07/17/07	7/18/207	4.5
L63937	07/18/07	07/18/07	07/19/07	4.2
L63941	07/18/07	07/18/07	07/19/07	5.5
L64202	07/31/07	07/31/07	08/01/07	14.8
L64380	08/10/07	08/10/07	08/11/07	13.3
L64565	08/20/07	08/20/07	08/22/07	15.1
L64629	08/23/07	08/23/07	08/24/07	4.2

As noted in the above table, all samples were shipped within one day of sample collection, and the time between sample collection and receipt of samples by ACZ ranged from one to two days. These temperature exceedances are not considered to have a significant impact on the analytical results pertaining to the sulfate analysis for these samples.

4. LABORATORY QUALITY CONTROL

As specified in the QAPP, laboratory QC was maintained for all analysis through proper licensure, the use of approved analytical methods, QC measurements, appropriate turn-around-time for analysis (timeliness), method detection limits (MDLs), and practical quantitation limits (PQLs). Each of these controls is discussed in the following subsections.

The review of laboratory QC included a review to identify any qualified data and an assessment to determine their significance. Additionally, the laboratory QC summaries were reviewed to verify that results met QA criteria.

4.1 Licensure

ACZ is licensed with the Arizona Department of Health Services (license number AZ0102) and is accredited in accordance with the National Environmental Laboratory Accreditation Conference.

4.2 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 MDLs.

- SM4500 SO4-D (Gravimetric): sulfate
- EPA 300.0 [Ion-Chromatography (IC)]: sulfate, chloride, fluoride
- EPA 200.7 [Inductively Coupled Plasma (ICP)]: calcium, magnesium, potassium, sodium
- EPA 353.2 [Automated Cadmium Reduction (ACR)]: nitrate/nitrite
- EPA SM2320B [Titration]: alkalinity
- EPA 160.1 [Gravimetric]: TDS

Two of these methods, IC (EPA 300.0) and ICP (EPA 200.7), involve direct injection of the sample into the analytical instrument, which does not require the analysis of preparation blanks. The other methods listed are classical wet chemistry techniques that require the use of preparation blanks under the ACZ quality assurance plan and the QAPP.

4.3 Method Detection Limits (MDLs) and Practical Quantification Limits (PQLs)

The MDLs and PQLs of the analytical methods used by ACZ are shown in the following table. The MDLs for analyses of samples were equal to or less than the target MDLs identified in the QAPP.

Parameter	MDL (mg/L)	PQL (mg/L)	Target MDL ¹ (mg/L)
Sulfate	0.5	3	10
Calcium	0.2	1	0.2
Magnesium	0.2	1	0.2
Potassium	0.3	2	0.3
Sodium	0.3	2	0.3
Alkalinity	2	20	2
Chloride	0.5	3	1
Fluoride	0.1	0.5	0.1
Nitrate/Nitrite	0.02	0.1	0.02
Total Dissolved Solids	10	20	10

Notes:

¹ Target MDL from Table E.2 of QAPP
 mg/L = milligrams per liter

4.4 Timeliness

Holding times were derived from EPA methods utilized and were calculated beginning from the time of sample collection. The majority of samples submitted to the laboratory were analyzed within their recommended method-specific holding times except for nitrate/nitrite as N and nitrite analyses in the following: Samples collected on June 28, 2007 (MO-2007-3-GW), July 9, 2007 (GW-501760, GW-509604, GW-515867, and GW-599357), July 11, 2007 (I-10, M-8, MH-30 and PZ-8), July 16, 2007 (GW-206214, GW-529142, GW-540451, and

GW-640358), and August 20, 2007 (GW-532595) were qualified with an “HE” flag, indicating analysis performed past the holding time because sample was received with less than half the holding time remaining. Samples collected on July 17, 2007 (GW-608521, GW-608597, GW-635386, and GW-635387) were qualified with an “HC” flag, referring to an initial analysis within the holding time and reanalysis past the holding time, which was required due to a QC failure during the initial analysis. One sample collected on August 2, 2007 (MO-2007-1B-GW) was qualified with an “H1” flag, indicating that the sample analysis was performed past the holding time. On August 29, 2007 sample IW-17 that was collected on July 25, 2007, was reanalyzed for sulfate and was qualified with a “C4” flag, indicating the confirmatory analysis was past the holding time of 28 days. The holding time for both nitrate/nitrite as N and nitrite is 48 hours from collection to analysis. No data were rejected on the basis of the holding time exceedances and were accepted as usable.

4.5 Quality Control Measurements

The following QC samples were prepared and analyzed:

- Preparation blanks, calibration blanks, and calibration verification standards
- Analytical spikes and analytical spike duplicates
- Laboratory control samples
- Laboratory duplicate samples
- Field blank samples

4.5.1 Preparation Blanks, Calibration Blanks, and Calibration Verification Standards

Preparation blanks were run with each group of samples submitted for alkalinity and TDS analyses. All preparation blanks were prepared from analyte-free water and treated as routine samples. Analytical results of all of the preparation blanks showed that no target analytes were detected at the indicated MDL.

Results from the analyses of the initial calibration blanks and initial calibration verification standards conducted by IC (EPA 300.0), ICP (EPA 200.7), and ACR (EPA 353.2) methods were reviewed. The results of each initial calibration blank analyzed showed no detections of the target analyte. All analytical results for the initial calibration verification standards and laboratory fortified blanks that were analyzed showed percent recoveries that were within the acceptance criteria specified by the ACZ QA plan and the QAPP.

4.5.2 Analytical Spikes and Analytical Spike Duplicates

Analytical spike and spike duplicate samples were analyzed for the following methods: IC (EPA 300.0), ICP (EPA 200.7), and ACR (EPA 353.2). Spike recoveries for most analytes were within the range of acceptability based on the acceptance criteria set by ACZ. Instances in which analytical spike recoveries were either high or low were qualified with an “M1” or “M2” flag, respectively. In each case the method control sample recoveries were acceptable. Although some analytical spikes and analytical spike duplicates were outside the acceptance limits and qualified with an “MA” flag, these recoveries are not considered to affect the overall accuracy of the dataset because the Relative Percent Difference (RPD) was within the acceptance limits.

4.5.3 Laboratory Control Samples

Laboratory control samples were run for each group of samples submitted for alkalinity and total dissolved solids. Recoveries for all laboratory control samples were within the acceptance criteria specified by ACZ.

4.5.4 Laboratory Duplicate Samples

Analyses of laboratory duplicate samples were also reviewed as part of this quality data verification report. Field duplicate samples are discussed in Section 5.1. The RPDs for most laboratory duplicate samples were within 20 percent, which is the tolerance range set by the

laboratory. In many instances, the data were qualified with an “RA” flag indicating that the RPD was not used for data validation because the sample concentration was less than ten times the MDL, which is too low for accurate evaluation according to ACZ. In all but four of these cases, the data was qualified with an “RA” flag, but the RPD was within the acceptance criteria set forth in the QAPP. In all cases, where the RPD could be calculated, the results met QA criteria and demonstrate an appropriate level of precision in laboratory analysis of these samples.

4.5.5 Field Blank Samples

During the third quarter of 2007, a total of six field blank samples were collected. Five of these were field and equipment blank samples containing filtered de-ionized water (TB-071007, EQB-071007, TB-071807, EQB-071807, TB072307A, and EQB072407A), and one field blank sample collected using unfiltered de-ionized water (TB-071807). All of these samples were collected in the field and were submitted along with other samples to evaluate the potential for contaminant introduction under field conditions. As required by Section 4.2.1.5 of the QAPP, a minimum of one field blank sample was collected for every 20 samples collected. This requirement was exceeded during this monitoring period by the collection of an additional equipment blank sample. Analytical results from field blank samples TB-071007, EQB-071007, and TB-071807 showed no detections. However, detections in field blank samples EQB-071807 included sodium, TB072307A included sodium, nitrate, sulfate and TDS, and EQB072407A included potassium, nitrate, nitrate/nitrite as N, and TDS; all between the MDL and PQL. The low level detections of these analytes are not considered significant given the concentrations of these constituents in the samples.

5. DATA QUALITY INDICATORS

The QAPP provides several DQIs for assessing the overall quality of the data. These DQIs include the following:

- Precision
- Bias
- Accuracy
- Representativeness
- Comparability
- Completeness
- Sensitivity

Each of these DQIs is discussed below in relation to the Q3-2007 groundwater sampling and analysis conducted by PDSI.

5.1 Precision

Precision indicates how well a measurement can be reproduced. Precision is quantified by calculating the RPD between duplicate samples. For the purposes of QA/QC, precision was quantified by calculating the RPDs between duplicates among the following groups of duplicate samples:

- Laboratory duplicate samples
- Field duplicate samples

As discussed in sections 4.5.2 and 4.5.4, there were no exceedances of RPD QA criteria for any laboratory duplicates.

During this monitoring period, a total of six field duplicate samples were collected. Four of these (DUP071907A, DUP071907B, DUP072407A, and DUP072507A) were collected by PDSI for filtered analysis, whereas the other two (FIELD DUP-071007A and DUP-071807) were collected by HGC for filtered and unfiltered sulfate analysis. The collection of six duplicate samples exceeds the QAQC goal of collecting one duplicate sample for every twenty groundwater samples collected, as stated in Section 4.2.1.5 of the QAPP.

Results for the six duplicate field samples collected are provided in Table A.2. The range of RPD values was between zero and 41.77 percent. The RPDs for two duplicate samples, CW-6 and MH-26B were above the 20 percent acceptance criteria for TDS and nitrate/nitrite as N, respectively. Overall, the high RPD's in these two samples is not expected to have a significant impact on the aquifer characterization and the DQI for precision is deemed to be met.

5.2 Bias

Bias is a systematic distortion of measurements causing consistent errors in one direction. Bias is managed in this data set by the consistent application of standardized sample collection and analysis procedures.

5.3 Accuracy

Accuracy is a measure of the agreement of a measurement to a known value and is measured using the recoveries from laboratory control samples. As discussed in Sections 4.5.1, 4.5.2, and 4.5.3 respectively, there were no significant exceedances of the recovery QA criteria for any of the calibration standards, analytical spikes, or laboratory control standards. Based on this information, the overall accuracy of the data is judged sufficient for the purpose of aquifer characterization.

5.4 Representativeness

All samples were taken from locations specified in the Work Plan (HGC, 2006) using sampling procedures specified in the QAPP. Therefore, the samples are judged to provide a good representation of groundwater quality at the locations. The analytical data are judged to be representative of groundwater conditions because the analyses used standard procedures and methods that met QA/QC guidelines of the QAPP.

5.5 Comparability

All samples were collected using standardized procedures (HGC, 2006 and PDSI, 2005) and were analyzed by ACZ using standardized methods. Insofar as standardized sample collection and analytical methods are adhered to, the sample results should be comparable.

5.6 Completeness

All samples collected by PDSI and HGC were subsequently analyzed and reported by ACZ Laboratories. All samples collected by PDSI and analyzed by ACZ are judged to satisfy the QA/QC criteria for this project and are deemed usable for aquifer characterization. Thus, the completeness of analytical results is 100 percent.

5.7 Sensitivity

The analytical methods used to analyze the PDSI samples meet the MDL requirements specified in Table E.2 of the QAPP. Therefore, the analytical sensitivity is considered acceptable for use in aquifer characterization.

5.8 Auxiliary Data Quality Indicators

Auxiliary DQIs are indicators that, although not mentioned in the QAPP, are useful for assessing the reliability of the laboratory analyses. These auxiliary DQIs include the laboratory measured cation-anion balance and the ratio between measured and calculated TDS. Each of these auxiliary indicators is discussed below.

5.8.1 Cation-Anion Balance

The concentration (in milliequivalents per liter [meq/L]) of cations and of anions in groundwater should theoretically be approximately the same. Therefore, the balance between anions and cations is one measure of the overall quality of the laboratory measurements. The cation-anion balance can be expressed as the difference between the milliequivalents of cations and the milliequivalents of anions divided by the sum of the milliequivalents of both cations and anions. When computed in this manner, a cation-anion balance of 5 percent is considered good (Scott Habermahl, ACZ project manager, personal communication). The cation-anion balance for all samples is presented in Table 2 and was below 5 percent for all samples except for the samples listed below. Overall, the cation-anion balance for all samples does not indicate any analytical errors. Cation-anion balances outside of 5 percent may indicate the presence of other ions not included in the analysis and ion balance.

Sample ID	Sum of Anions (meq/L)	Sum of Cations (meq/L)	Cation-Anion Balance (%)
MH-25A	3.4	4.1	9.3
TMM-1	3.2	3.6	5.9
MH-13C	2.5	3.5	16.7
MO-2007-2	17.9	15	-8.8
ESP-4	12.5	13.9	5.3
S-1	4.8	6.3	13.5
S-5	5.2	5.8	5.5

Note:

meq/L = milliequivalents per liter

5.8.2 TDS Ratio

The ratio between the measured and computed concentration of TDS is also an indicator of the overall quality of the sample analyses. A TDS ratio between 0.8 and 1.2 is considered good (Scott Habermahl, ACZ project manager, personal communication). The ratios for all samples are presented in Table 2 and fall inside the acceptance criteria specified by ACZ except for the samples presented in the following table. Overall, the low TDS ratios for all samples indicate no apparent analytical errors.

Sample ID	TDS Measured (mg/L)	TDS Calculated (mg/L)	TDS Ratio
MH-26A	260	204	1.27
MH-13C	220	164	1.34
GW-623103	250	195	1.28
S-1	400	301	1.33
S-5	390	309	1.25
GW-640358	250	199	1.26

Notes:

mg/L = milligrams per liter

TDS = Total Dissolved Solids

6. REFERENCES

- Hydro Geo Chem, Inc (HGC). 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.
- Phelps Dodge Sierrita, Inc. (PDSI). 2005. Quality Assurance/Quality Control Plan for Water Monitoring, Phelps Dodge Sierrita, Inc. June 2005.

TABLES

**TABLE A.1
ACZ Project ID and Associated Wells**

ACZ Project ID	Wells Reported
<i>Number of wells sampled by PDSI ¹: 51</i>	
<i>Number of duplicate samples collected: 4</i>	
<i>Number of blank samples collected: 2 (1 field blank and 1 equipment blank)</i>	
L63829	I-10, M-8, MH-30, PZ-8
L63915	IW-1, IW-2, IW-3A, MH10, MH-28, MH-29
L63937	MH-11, MH-13A, MH-13B, MH-13C, S-1, S-2, S-3
L63968	IW-8, IW-9, IW-10, MH-26A, MH-26B, MH-26C
L63970	IW-11, IW-22, IW-24, DUP071907A, DUP071907B
L63971	S-4, S-5, S-6, IW-4, IW-5, ST-7
L64027	MH-12, MH-25A, MH-25B, MH-25C
L64070	ESP-4, IW-20, IW-21, PZ-7, DUP072407A, TB072307A, EQB072407A
L64119	IW-6A, IW-12, IW-13, IW-14, IW-15, IW-16, IW-17, IW-18, IW-19, IW-23, DUP072507A
L64302	TMM-1
<i>Number of wells sampled by HGC ²: 48</i>	
<i>Number of duplicate samples collected: 2</i>	
<i>Number of blank samples collected: 4 (2 field blanks (U) and 2 equipment blanks (F))</i>	
L63262	MO-2PT ³
L63304	TMM-1
L63562	MO-3-1GW ⁴
L63724	GW-509604, GW-501760, GW-515867, GW-599357
L63741	GW-627485, GW-502546, GW-543600, GW-588121, GW-207982, GW-608518, GW-623102, GW-623103, GW-623104, FIELD DUP-071007A
L63742	EQB-071007, TB-071007
L63796	WG-603428, WG-603429, WG-208825
L63834	GW-634036-071207, GW-599350-071207
L63922	GW-540451, GW-529142, GW-206214, GW-640358
L63925	GW-608521, GW-608597, GW-635387, GW-635386
L63940	GW-623928, GW-623991, GW-623994, GW-624010, GW-624013, GW-624028, GW-624024, GW-624025, GW-624026, EQB-071807, TB-071807
L63941	DUP-071807
L64105	GW-550533
L64202	MO-2007-1C
L64254	MO-2007-1B-GW
L64349	GW-MO-2007-1A
L64371	MO-2007-2
L64380	CW-3
L64405	GW-NP-2
L64503	GW-MO-2007-4C
L64565	GW-532595
L64629	MO-2007-5C
L64631	GW-586729

Notes:

- 1) All samples collected by PDSI were filtered in the field using one disposable 0.45-micron filter per sample.
- 2) Samples collected by HGC were both filtered (F) and unfiltered (U) unless noted, and all filtered samples were collected using a 0.45-micron filter.
- 3) Well MO-2007-2
- 4) Well MO-2007-3C

TABLE A.2
Relative Percent Difference (RPD) of Duplicate Field Samples

	CW-6 (GW-627485)			W-9 (GW-624024)			MH-26B			MH-26C			ESP-4			IW-13			
ACZ Project Number:	L63741	L63741		L63940	L63941		L63968	L63970		L63968	L63970		L64070	L64070		L64119	L64119		
Parameter	Field Sample (mg/L)	Duplicate (mg/L)	RPD (%)	Field Sample (mg/L)	Duplicate (mg/L)	RPD (%)	Field Sample (mg/L)	Duplicate (mg/L)	RPD (%)	Field Sample (mg/L)	Duplicate (mg/L)	RPD (%)	Field Sample (mg/L)	Duplicate (mg/L)	RPD (%)	Field Sample (mg/L)	Duplicate (mg/L)	RPD (%)	
Calcium	50.7	45.5	10.81	**	72.6	0.00	510	508	0.39	227	223	1.78	190	187	1.59	508	501	1.39	
Magnesium	6.3	6	4.88	**	8.3	0.00	115	114	0.87	51	49.7	2.58	20	19.8	1.01	99.2	98	1.22	
Potassium	3.3	2.9	12.90	**	3.5	0.00	10	11	9.52	10.8	10.6	1.87	4.7	4.9	4.17	7.2	7	2.82	
Sodium	38.6	37	4.23	**	49.1	0.00	96.5	95.5	1.04	99.7	99.2	0.50	59.3	59.5	0.34	219	216	1.38	
Total Alkalinity	142	141	0.71	**	179	0.00	100	99	1.01	90	88	2.25	119	120	0.84	114	115	0.87	
Sum of Anions	4.5	4.5	0.00	**	6.4	0.00	38.1	38.3	0.52	19.1	19.3	1.04	12.5	12.7	1.59	46.1	42.8	7.42	
Sum of Cations	4.8	4.4	8.70	**	6.5	0.00	39.4	39.2	0.51	20.2	19.9	1.50	13.9	13.7	1.45	43.4	42.8	1.39	
Chloride	13.4	13.4	0.00	**	18	0.00	98	119	19.35	70	71	1.42	53	53	0.00	110	110	0.00	
Fluoride	0.5	0.5	0.00	**	0.6	0.00	0.2	0.2	0.00	0.3	0.3	0.00	0.3	0.3	0.00	0.2	0.2	0.00	
Nitrate	1.98	2.02	2.00	**	3.66	0.00	NA	NA	0.00	NA	NA	0.00	NA	NA	0.00	NA	NA	0.00	
Nitrate/Nitrite	1.98	2.02	2.00	**	3.66	0.00	2.14	3.27	41.77	2.21	2.10	5.10	1.71	1.76	2.88	1.5	1.47	2.02	
Nitrite	< 0.01	< 0.01	*	**	< 0.01	0.00	NA	NA	0.00	NA	NA	0.00	NA	NA	0.00	NA	NA	0.00	
TDS	300	230	26.42	**	420	0.00	2800	2810	0.36	1390	1410	1.43	830	840	1.20	3210	3180	0.94	
TDS (calculated)	264	257	2.69	**	373	0.00	2480	2480	0.00	1240	1250	0.80	809	817	0.98	2950	2780	5.93	
TDS Ratio (measured/calculated)	1.14	0.89	24.63	**	1.13	0.00	1.13	1.13	0.00	1.12	1.13	0.89	1.03	1.03	0.00	1.09	1.14	4.48	
Sulfate (filtered sample)	57.6	58	0.69	**	97.2	0.00	1590	1570	1.27	730	740	1.36	410	420	2.41	1940	1780	8.60	
Sulfate (unfiltered sample)	57.9	58.1	0.34		95	97.1	2.19	NA	NA	0.00	NA	NA	0.00	NA	NA	0.00	NA	NA	0.00

Notes:

* RPD was not used for data validation because the sample concentration is too low for accurate evaluation (<10x MDL)

** the owner of this property did not permit the release of analytical result for this analyte