



**FLORENCE COPPER INC.**

1575 W. Hunt Highway, Florence, Arizona 85132 USA

[florencecopper.com](http://florencecopper.com)

October 28, 2013

Ms. Nancy Rumrill  
U.S. Environmental Protection Agency  
Region 9, Ground Water Office, WTR-9  
75 Hawthorne Street  
San Francisco, California 94105-3901

Sent U.S. Certified Mail  
#7010 1670 0001 3086 2406  
Return Receipt Requested

Subject: Third Quarter 2013 Monitoring Report  
Underground Injection Control (UIC) Permit Number AZ396000001

Dear Ms. Rumrill:

Florence Copper Inc. (formerly Curis Resources (Arizona) Inc.) is submitting this report in accordance with the reporting requirements of Parts II.G.2.(a) through (j) of the UIC Permit No. AZ396000001 issued by the United States Environmental Protection Agency (USEPA) on May 1, 1997. The Florence Copper project is also subject to the requirements of APP No. 101704 issued by the Arizona Department of Environmental Quality (ADEQ) on June 9, 1997, and last amended on August 12, 2011.

This report pertains to monitoring activities conducted at the Florence Copper project from July 1 through September 30, 2013. Copies of records required by Part II.G.1 are maintained at the mine site, along with other information that is summarized below.

As you are aware, Florence Copper discontinued hydraulic control of the original pilot test facility on September 1, 2004 in order to conduct groundwater quality tests in accordance with the APP and Part II.I.2 of the UIC Permit. A report of the results has been provided to ADEQ and USEPA for review. The recovery wells have remained off until a plan for further activity can be approved. As a result, no extraction flows or water levels are reported under Sections (b) and (c) below.

**(a) A map showing the current status of the mine.**

Figure 1 shows the current monitoring area, including the Point of Compliance (POC) wells and the well field. Figure 2 shows the approximate layout of the well field and denotes the four well observation well/recovery well pairs.

There are four injection/recovery wells and nine original recovery wells. The four injection wells were later used as recovery wells during the rising of the mine block. Five observation wells were installed to demonstrate net inward hydraulic gradient for the 90 days required by the permit. Solution injection began on October 31, 1997 and ceased on February 8, 1998.

**(b) A table and graph showing daily cumulative injection flows and extraction flows in each active mine block over the reporting period.**

There are currently no active mine blocks. Hydraulic control for the test block was discontinued on September 1, 2004 for purposes of collecting groundwater samples following a 90-day period of no hydraulic control, and remains discontinued for evaluation of results. Accordingly, there are no injection or extraction flows to report.

**(c) A table and graph comparing average daily head in the four observation wells surrounding each active mine block with that of the four adjacent extraction wells.**

There are currently no active mine blocks. Hydraulic control was not required during this reporting period for the test block and water level measurements are not required.

**(d) A table showing POC monitoring wells analytical results and Alert Levels.**

The POC Quarterly Compliance Monitoring Report is included as Attachment 1. The report summarizes the results of groundwater monitoring activities and includes tables of the field parameters and analytical results for the quarterly monitoring parameters. Brown and Caldwell, along with Project personnel, conducted quarterly compliance sampling on August 5 through 13, and September 19, 2013, 2013.

Quarterly parameters were analyzed for 29 of the 31 POC monitoring wells. POC monitoring wells M32-UBF and M33-UBF were dry and could not be sampled.

For the Third Quarter 2013, four results exceeded approved Alert Levels (AL). Magnesium, sulfate, and TDS exceeded the ALs in well O49-GL. No Aquifer Quality Limits (AQLs) have been set for the parameters and there are no established Aquifer Water Quality Standards (AWQS). A verification sample was collected on October 11, 2013. The confirmation results will be reported as part of the next quarterly report, and notifications will be performed as necessary. The elevated concentrations are not believed to be related to permitted mining activities.

Sulfate also continues to exceed the AL in upgradient well M1-GL. Sulfate has exceeded the AL in M1-GL since the Third Quarter of 2011. No AQL has been set for sulfate and there is no established AWQS. A report has been submitted demonstrating that the AL exceedance is not related to the permitted mining activities. On May 10, 2012, as part of a six-month summary report of the results for M1-GL, it was stipulated that if there were no AL exceedances of the biennial monitoring parameters for the well, the monitoring frequency of M1-GL would be reduced to quarterly for the indicator suite. All biennial results for M1-GL were below the ALs. Thus, routine quarterly monitoring for the well resumed during the Fourth Quarter 2012 event.

**(e) Results of the monthly analyses of organic in the injectate**

Organic analyses are not required because no solution was injected during the reporting period.

**(f) Results of monitoring required by 40 CFR 146.33 (b)(1)**

No solution was injected.

**(g) Results of the mechanical integrity tests**

No mechanical integrity test was conducted.

**(h) Results of the annular conductivity monitoring**

Although injection ceased in early 1998, annular conductivity measurements have continued to the present time. A graph showing measurement results for this reporting period is presented on Figure 3. No unusual conditions were noted.

**(i) Well and core hole plugging and abandonment.**

None of the existing wells or core holes were abandoned during the report period.

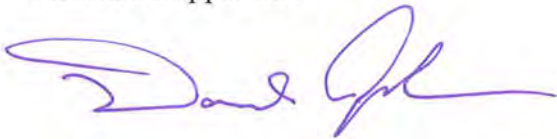
**(j) A summary of closure operations during the reporting period.**

There were no closure operations during the reporting period.

Florence Copper believes that you will find this report complete and in compliance with all permit conditions. Please contact me at (520) 374-3984 should you have any questions regarding this report.

Sincerely,

Florence Copper Inc.



Daniel Johnson  
Vice President Environment and Technical Services

BAS:cr

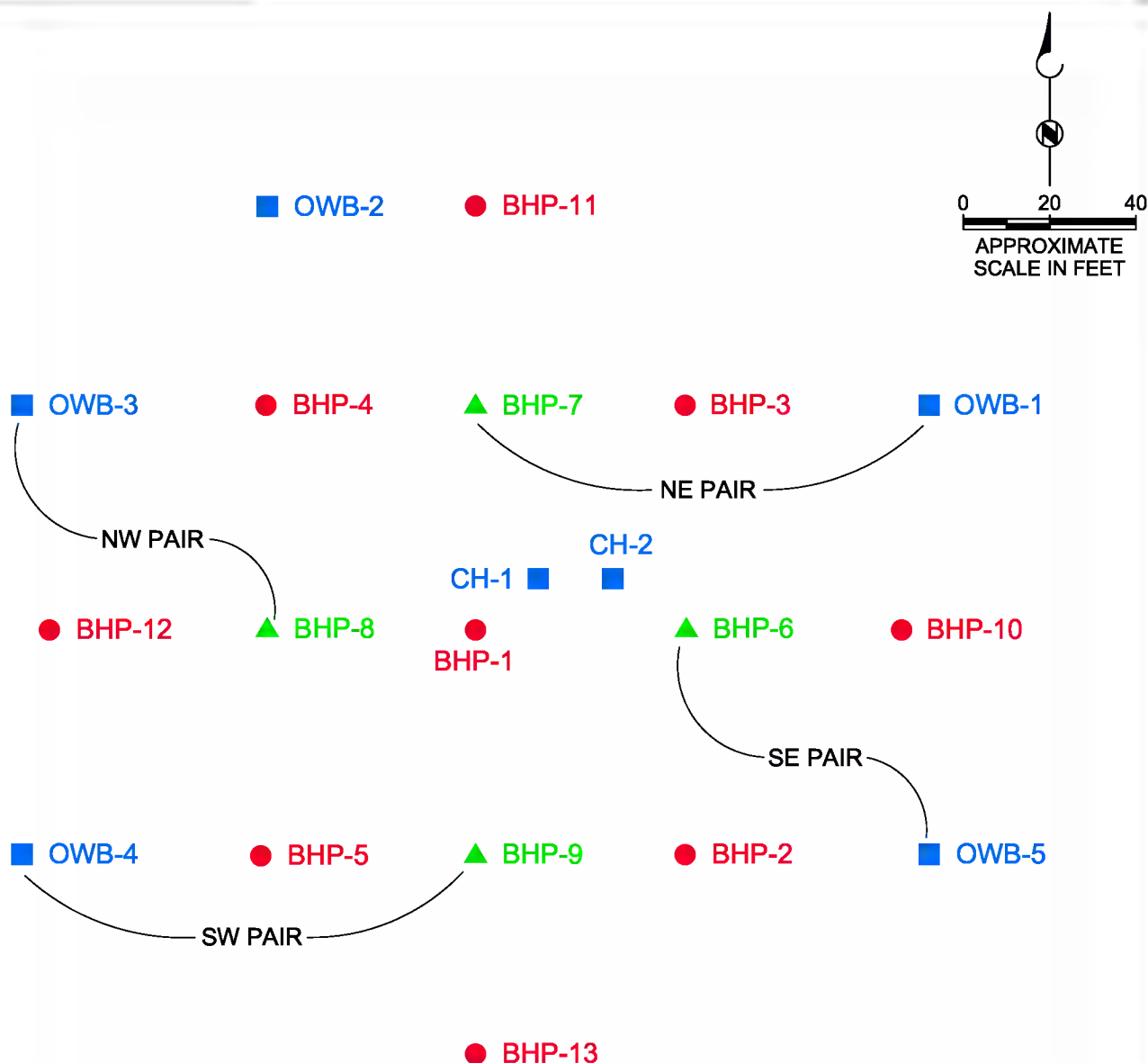
Attachments

cc: Florence Copper File

**Original enclosed map inadvertently included information about protected archeological sites.**

**EPA has removed this map as it is not relevant to the monitoring report and appears to be included in error.**

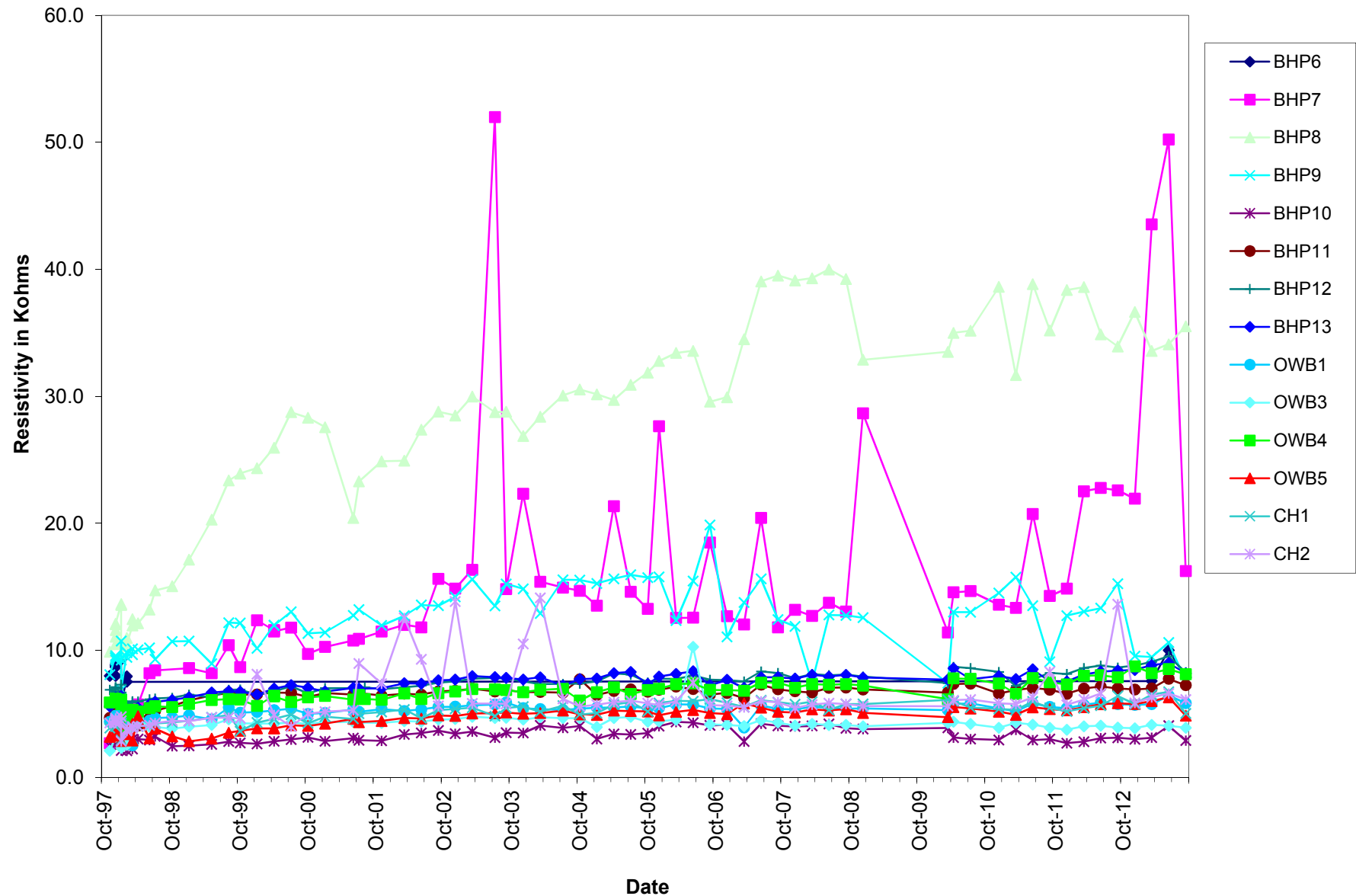
**To view a map of monitoring wells, see p. 5 of the “Fourth Quarter 2013 Monitoring Report.”**



### EXPLANATION

- BHP-10 RECOVERY WELL (CURRENTLY INACTIVE)
- OWB-2 OBSERVATION WELL
- ▲ BHP-8 INJECTION / RECOVERY WELL  
(RECOVERY MODE SINCE 1998)

**Figure 3 - Well Field Annular Resistivity**



## ATTACHMENT 1

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### POC Quarterly Compliance Monitoring Report

FLORENCE COPPER PROJECT  
QUARTERLY COMPLIANCE MONITORING REPORT  
THIRD QUARTER 2013



### Sampling Activities

Groundwater sampling at the Florence Copper Project site took place on August 5 through 13, and September 19, 2013 (Third Quarter 2013). Groundwater sampling and analysis was conducted in accordance with the requirements of Aquifer Protection Permit (APP) No. 101704, Section 2.5.3 (Groundwater Monitoring and Sampling Protocols) and Underground Injection Control (UIC) Permit No. AZ396000001 Part II.F.

Quarterly parameters, as listed in Section 4.0 Table 4.5 of the APP, were analyzed from the designated Point of Compliance (POC) wells. The quarterly analytical parameters are magnesium, sulfate, fluoride, and total dissolved solids (TDS) in addition to field pH, temperature, and specific conductance. The field parameters of dissolved oxygen (DO) and turbidity are also monitored to determine stabilization of wells sampled using low-flow purging methods, but are not reported.

During the Third Quarter 2013 sampling event, 29 POC wells were sampled. Two POC wells (M32-UBF and M33-UBF) were dry and could not be sampled. Analyses of the samples were conducted by TestAmerica Laboratories - Phoenix (TestAmerica). Analytical results for the quarterly parameters are provided in Table 1 and field parameters measured during sampling are indicated in Table 2.

The majority of the monitoring well network is equipped with low-flow bladder pumps. Low-flow sampling was conducted in accordance with Section 2.5.3 (Groundwater Monitoring and Sampling Protocols). Wells M22-O, M24-O, O49-GL and P49-O are equipped with stainless-steel electric pumps. The four wells were sampled by purging a minimum of three borehole volumes. No reduced pumping volumes occurred and there were no modified sampling procedures noted.

For the Third Quarter 2013, four results exceeded approved Alert Levels (AL).

Three initial exceedances were reported for O49-GL:

- Magnesium – 29 mg/L, above the AL of 18 mg/L,
- Sulfate – 273 mg/L, above the AL of 159 mg/L,
- TDS – 1,470 mg/L, above the AL of 849 mg/L, and
- Fluoride – 0.775 mg/L, below the AL of 1.0 mg/L.

The results were reported by the laboratory on September 30, 2013. A verification sample was collected on October 11, 2013. The confirmation results will be reported as part of the next quarterly report, and notifications will be performed as necessary.

Under prevailing conditions, O49-GL is a cross-gradient, background well in relation to the BHP 1997-98 pilot test area. Because the BHP pilot test facility is inactive, has not been active for a period of 15 years, and is located cross-gradient a distance of 1,800 feet from



POC well 049-GL, the increased concentrations are not indicated to be related to past permitted mining operations.

Well 049-GL was drilled in 1995 and is completed in the Lower Basin Fill Unit (LBFU). A video log conducted in 1997 shows a small hole in the steel casing at 220 feet. An inner casing string was installed in August 1997 to address the apparent leakage at 220 feet. Figure 1 shows that similar water quality conditions were observed in 1997, prior to the operation of the BHP test, and prior to the installation of the inner casing string. The standard sampling procedure for this well includes purging until field parameters are within the historical range. Subsequent to the last quarterly monitoring event, the condition of the well appears to have changed to the point that extended purging did not bring the field parameters into the historical range. In September, a portion of inner well casing, from land surface to approximately 500 feet below land surface, was removed and a packer was installed above the submersible pump to attempt to isolate the lower portion of the well from leakage inside the well casing and above the screen. Field parameters remained elevated during the Third Quarter 2013 sampling event.

The water quality observed at 049-GL during the sampling event resembles the long term water quality observed in the Upper Basin Fill Unit (UBFU). The elevated concentrations of magnesium, sulfate, and TDS observed at 049-GL during this sampling event are similar to the range of values observed at nearby POC well M25-UBF for pre-mining, ambient conditions. For this reason, it is believed that a defect in the well casing or well construction has allowed groundwater from the UBFU to leak downward either inside or outside of the well casing.

The other exceedance was for sulfate in upgradient well M1-GL at 112 milligrams per liter (mg/L), above the AL of 109 mg/L.

Sulfate has exceeded the AL for sulfate in M1-GL since the Third Quarter of 2011. No Aquifer Quality Limit (AQL) has been set for sulfate and there is no established Aquifer Water Quality Standard (AWQS). A general increase in the sulfate concentrations in M1-GL has been observed since 2000. The remaining three indicator parameters are relatively stable and well below the established ALs. Since M1-GL is an upgradient, background well to the pilot test area, the increased sulfate concentrations cannot be attributed to permitted facility operations.

On May 10, 2012, Curis Resources (Arizona) Inc. (Curis Arizona) submitted a six-month summary report of the results for M1-GL in accordance with Permit Section 2.6.2.3.2.7. A copy of the report was also supplied to the U.S. Environmental Protection Agency (USEPA). In the report it was stipulated that if there were no AL exceedances of the biennial monitoring parameters for the well, the monitoring frequency of M1-GL would be reduced to quarterly for the indicator suite. All biennial results for M1-GL were below the ALs. Thus routine quarterly monitoring for the well resumed during the Third Quarter 2012 event.

As described above, a general increase sulfate concentrations in M1-GL has been observed since 2000. A similar general increase has been observed in sulfate concentrations in M27-LBF since 2000; however there is no sulfate increase in nearby wells M28-LBF which is screened below M27-LBF, or M29-UBF which is screened above M27-LBF. Recently

concentrations of magnesium, sulfate, and TDS appear to be increasing in upgradient wells M2-GU, M3-GL, and M4-O. In the upper aquifer, a decreasing trend for magnesium concentrations and an increasing trend for fluoride concentrations were observed from 2000 to 2008, and stabilizing since 2008. Rising concentrations were also observed in upgradient wells M2-GU and M18-GU for magnesium, sulfate, and TDS from 2005 to 2007, and declining somewhat since 2008. Site-wide water levels have declined more than 50 feet in all three aquifer zones since the start of monitoring in 1996, and have been relatively stable or have recovered slightly since 2004.

Of the 25 wells with low-flow pumps, some changes in water quality have been observed, since these pumps were installed between the Third Quarter 2011 and the First Quarter of 2012. Concentrations of the indicator parameters in M20-O, M26-O, and M28-LFB have decreased on an average basis from 5 percent to 50 percent. Concentrations in M4-O have increased on an average basis from 20 percent to 80 percent. The changes of concentrations are likely related to the change of sampling methodology.

### Contingency Sampling Plans

No contingency sampling plan was required during the Third Quarter 2013. 049-GL will be resampled in Fourth Quarter 2013 to verify potential exceedances.

Table 1. Summary of Analytical Results, Quarterly Parameters

Well ID	Sample Date	Magnesium		Sulfate		Fluoride		Total Dissolved Solids	
		Concentration	Alert Level	Concentration	Alert Level	Concentration	Alert Level	Concentration	Alert Level
M1-GL	Aug 05 2013	19	31	112	109	0.74	1.3	697	1028
M2-GU	Aug 08 2013	24	39	185	275	0.85	1.4	932	1496
M3-GL	Aug 09 2013	22	36	159	187	0.74	1.3	769	1157
M4-O	Aug 09 2013	7.2	15	79.9	405	2.5	5.1	535	1072
M6-GU	Aug 07 2013	1.9	5.1	53.4	86	0.69	1.3	361	620
M7-GL	Aug 07 2013	<0.2	1	25.1	82	0.92	1.7	267	464
M8-O	Aug 08 2013	<0.2	1	58.6	122	2.36	3.6	375	609
M14-GL	Aug 07 2013	2.0	23	61.5	144	0.65	1.4	419	874
M15-GU	Aug 07 2013	17	44	63.6	126	0.55	1.2	582	1359
M16-GU	Aug 05 2013	26	52	172	248	0.55	1.1	908	1635
M17-GL	Aug 05 2013	3.6	9.3	58.2	209	0.72	1.6	355	831
M18-GU	Aug 05 2013	20	36	156	288	0.93	1.6	816	1323
M19-LBF	Aug 12 2013	11	21	49.4	89	0.41	1	553	794
M20-O	Aug 13 2013	2.5	14	24.3	112	0.84	1.7	336	809
M21-UBF	Aug 12 2013	23	87	167	487	0.88	1.1	843	2867
M22-O	Aug 08 2013	5.0	8.6	54.1	86	0.74	1.3	407	1094
M22-O (Dup)	Aug 08 2013	5.4	8.6	54.2	86	0.75	1.3	403	1094
M23-UBF	Aug 07 2013	32	69	246	411	0.79	1.3	1210	2392
M24-O	Aug 08 2013	9.5	19	752	1364	1.17	2.5	1280	2363
M25-UBF	Aug 05 2013	34	76	255	387	0.69	1.6	1440	2683
M25-UBF (Dup)	Aug 05 2013	39	76	255	387	0.69	1.6	1440	2683
M26-O	Aug 08 2013	<0.2	1	58.7	105	1.71	3.4	310	556
M27-LBF	Aug 13 2013	30	51	167	179	<0.4	1	1340	1745
M28-LBF	Aug 08 2013	0.75	2.6	14.3	81	0.78	1.6	322	610
M29-UBF	Aug 08 2013	29	84	237	465	0.7	1.1	1110	2751
M30-O	Aug 12 2013	11	18	59.3	102	0.69	1.6	586	824
M31-LBF	Aug 12 2013	21	46	184	330	0.88	1.3	922	1665
O19-GL	Aug 13 2013	10	17	58.5	99	0.61	1.4	486	770
O49-GL	Sep 19 2013	29	18	273	159	0.78	1	1470	849
P19-1-O	Aug 13 2013	4.4	12	65.5	107	1.7	2.8	448	767
P49-O	Aug 09 2013	3.4	6.2	106	181	1.01	2	499	801
P49-O (Dup)	Aug 09 2013	3.3	6.2	105	181	1.01	2	494	801
Arizona Aquifer Water Quality Standard									

All Results in Milligrams per Liter (mg/l)

&lt; = Less than the Laboratory Practical Quantitation Limit

**Table 2. Summary of Quarterly Field Parameters**

Well ID	Sample Date	Temperature (°C)	Temperature (°F)	pH	Conductivity (µmhos/cm)
M1-GL	Aug 05 2013	21.7	71.1	7.89	959
M2-GU	Aug 08 2013	21.4	70.5	7.85	1317
M3-GL	Aug 09 2013	22.2	72.0	7.92	1104
M4-O	Aug 09 2013	22.2	72.0	7.86	729
M6-GU	Aug 07 2013	24.0	75.2	8.48	622
M7-GL	Aug 07 2013	24.6	76.3	9.55	461
M8-O	Aug 08 2013	24.1	75.4	9.32	571
M14-GL	Aug 07 2013	23.2	73.8	8.18	733
M15-GU	Aug 07 2013	22.4	72.3	7.61	964
M16-GU	Aug 05 2013	21.9	71.4	7.51	1272
M17-GL	Aug 05 2013	22.2	72.0	9.00	565
M18-GU	Aug 05 2013	21.4	70.5	7.55	900
M19-LBF	Aug 12 2013	24.4	75.9	7.62	789
M20-O	Aug 13 2013	24.9	76.8	9.00	590
M21-UBF	Aug 12 2013	24.3	75.7	7.37	1299
M22-O	Aug 08 2013	28.5	83.3	7.87	763
M23-UBF	Aug 07 2013	23.1	73.6	7.38	1788
M24-O	Aug 08 2013	30.7	87.3	7.98	1883
M25-UBF	Aug 05 2013	22.1	71.8	7.30	1818
M26-O	Aug 08 2013	24.1	75.4	8.80	485
M27-LBF	Aug 13 2013	23.4	74.1	7.70	1568
M28-LBF	Aug 08 2013	24.0	75.2	9.43	567
M29-UBF	Aug 08 2013	24.0	75.2	7.54	1664
M30-O	Aug 12 2013	23.8	74.8	7.53	759
M31-LBF	Aug 12 2013	24.8	76.6	7.57	1290
O19-GL	Aug 13 2013	24.0	75.2	7.94	844
O49-GL	Sep 19 2013	21.8	71.2	7.57	2604
P19-1-O	Aug 13 2013	23.0	73.4	7.54	762
P49-O	Aug 09 2013	27.9	82.2	7.70	768

°C = Degrees Celcius

°F = Degrees Fahrenheit

µmhos/cm = Micromhos per Centimeter