



SECOND QUARTER 2013 MONITORING REPORT  
UIC PERMIT AZ396000001 AND APP PERMIT 101704  
FLORENCE COPPER PROJECT, FLORENCE, ARIZONA

---

Curis Resources (Arizona) Inc.  
1575 W. Hunt Highway  
Florence, AZ 85132

July 29, 2013



July 29, 2013

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

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

Dear Ms. Rumrill:

As you are aware, in February 2010, Curis Resources (Arizona) Inc. (Curis Arizona) purchased all of the assets of Florence Copper and the right to apply for the transfer of its permits to Curis Arizona, including the Aquifer Protection Permit (APP) and the UIC Permit. Curis Arizona submitted a UIC Permit application in March 2011 and, although the permit transfer is not complete, Curis Arizona is assuming the compliance obligations of those permits and 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 April 1 through June 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 May 21 through 24, and May 28, 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 Second Quarter 2013, one result exceeded an approved Alert Level (AL). Sulfate in upgradient well M1-GL was 114 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 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 Third 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 in 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.

Curis Arizona 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,

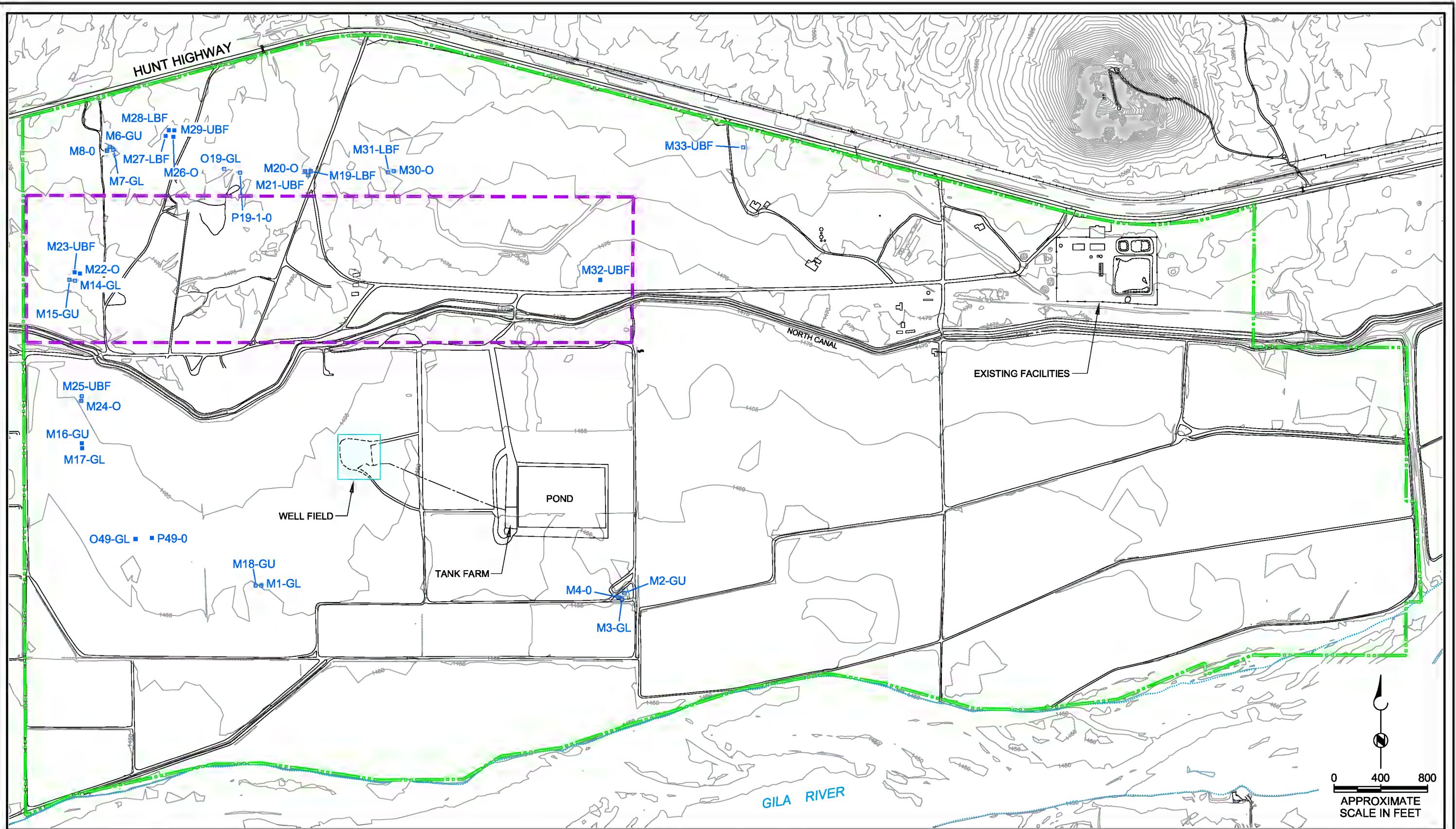
CURIS RESOURCES (ARIZONA) INC.



Daniel Johnson  
Vice President Environment and Technical Services

BAS:cr  
Attachments  
cc: Florence Copper File



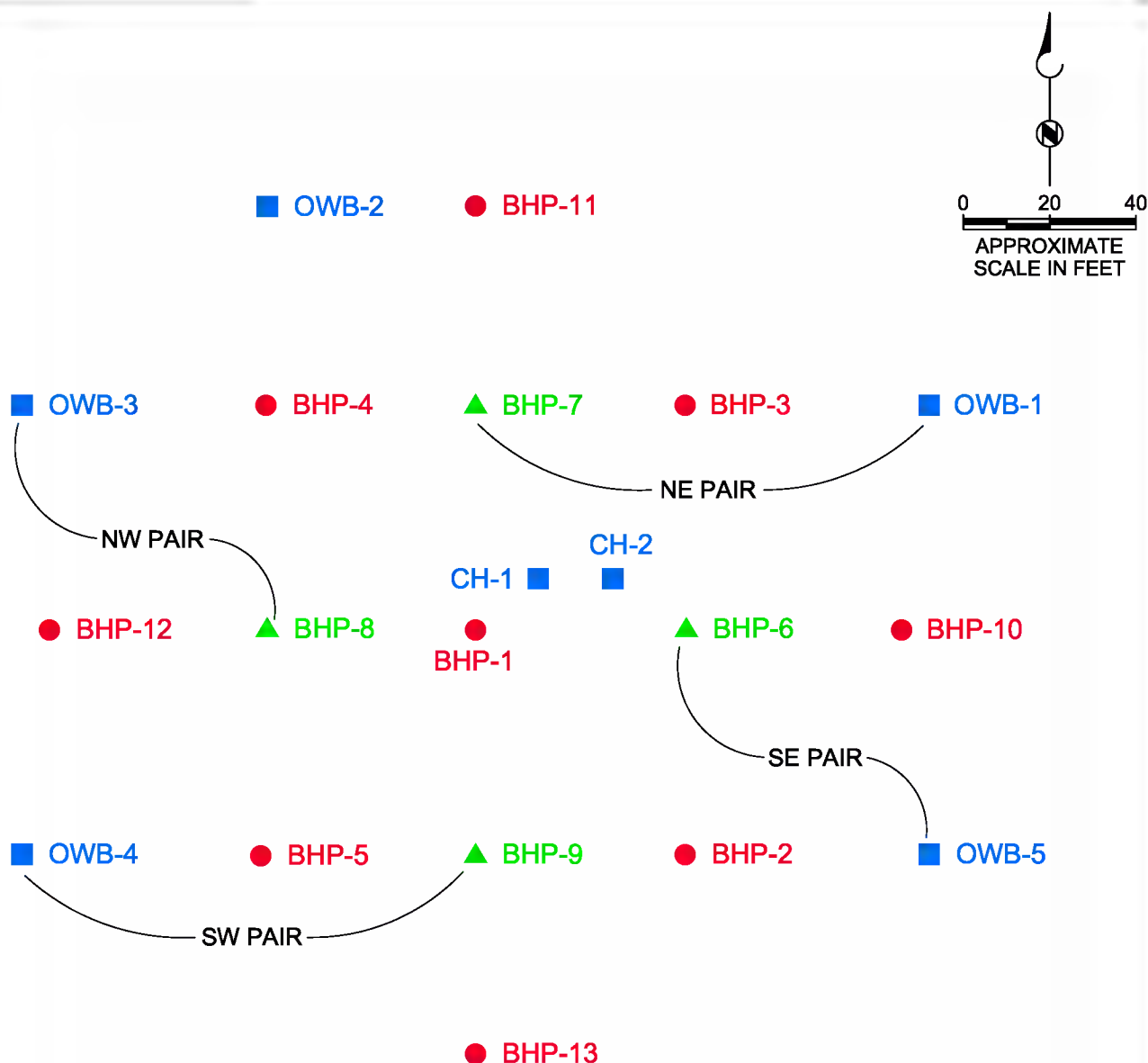


#### EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- STATE LEASE LAND BOUNDARY
- M3-GL POC MONITORING WELL
- WELL FIELD DETAIL, FIGURE 2

**Brown AND  
Caldwell**

Figure 1  
**MONITORING AREA**  
FLORENCE COPPER PROJECT  
FLORENCE, ARIZONA

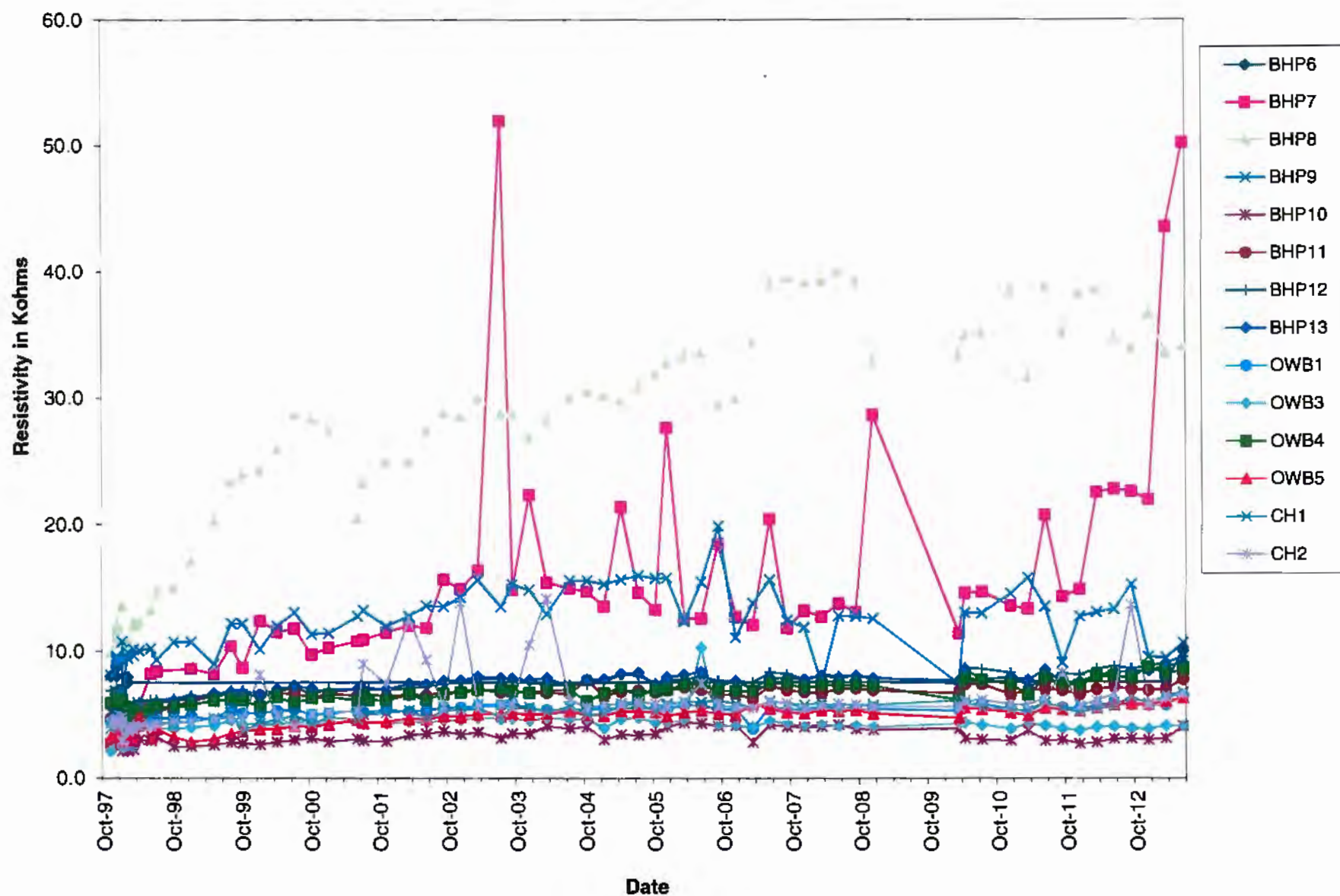


### EXPLANATION

- 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

---

### POC Quarterly Compliance Monitoring Report



FLORENCE COPPER PROJECT  
QUARTERLY COMPLIANCE MONITORING REPORT  
SECOND QUARTER 2013

---



### Sampling Activities

Groundwater sampling at the Florence Copper Project site took place on May 21 through 24, and May 28, 2013 (Second 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 monthly samples were analyzed for the same parameters required by quarterly monitoring. 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 Second 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 Second Quarter 2013, one result exceeded an approved Alert Level (AL). Sulfate in upgradient well M1-GL was 114 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). The quarterly parameters were selected on the basis of theoretical impact by the in-situ process. All four parameters would be expected to increase significantly in the event of groundwater impact by a facility discharge. 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. The facility has been inactive since the pilot test in 1998, which was performed in a very limited portion of the permitted area. Since M1-GL is an upgradient, background well to this 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 Second Quarter 2013. No contingency sampling plan is required for the Third Quarter of 2013.

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	May 24 2013	21	31	114	109	0.64	1.3	720	1028
M2-GU	May 24 2013	27	39	191	275	0.84	1.4	925	1496
M3-GL	May 24 2013	23	36	162	187	0.76	1.3	742	1157
M4-O	May 24 2013	7.1	15	80.7	405	2.34	5.1	508	1072
M6-GU	May 22 2013	2.5	5.1	55.2	86	0.59	1.3	372	620
M7-GL	May 23 2013	<0.2	1	26.0	82	0.82	1.7	272	464
M8-O	May 22 2013	<0.2	1	63.8	122	2.18	3.6	388	609
M14-GL	May 22 2013	2.3	23	63.2	144	0.57	1.4	444	874
M15-GU	May 22 2013	21	44	69.5	126	0.48	1.2	651	1359
M15-GU (Dup)	May 22 2013	21	44	69.7	126	0.49	1.2	636	1359
M16-GU	May 21 2013	29	52	181	248	0.53	1.1	904	1635
M17-GL	May 21 2013	3.2	9.3	37.8	209	0.71	1.6	322	831
M17-GL (Dup)	May 21 2013	3.2	9.3	37.8	209	0.71	1.6	319	831
M18-GU	May 24 2013	20	36	155	288	0.85	1.6	802	1323
M19-LBF	May 28 2013	13	21	51.6	89	<0.4	1	485	794
M20-O	May 28 2013	3.2	14	27.4	112	0.75	1.7	349	809
M21-UBF	May 28 2013	24	87	161	487	0.82	1.1	848	2867
M22-O	May 22 2013	6.1	8.6	55.8	86	0.67	1.3	422	1094
M23-UBF	May 21 2013	34	69	258	411	0.6	1.3	1210	2392
M24-O	May 22 2013	11	19	753	1364	1.05	2.5	1260	2363
M25-UBF	May 21 2013	39	76	260	387	0.45	1.6	1360	2683
M26-O	May 23 2013	<0.2	1	60.0	105	1.48	3.4	320	556
M27-LBF	May 24 2013	34	51	176	179	<0.4	1	1350	1745
M28-LBF	May 23 2013	<2	2.6	12.7	81	0.71	1.6	322	610
M29-UBF	May 23 2013	36	84	265	465	0.54	1.1	1220	2751
M30-O	May 28 2013	12	18	61.3	102	0.66	1.6	512	824
M31-LBF	May 28 2013	23	46	177	330	0.83	1.3	847	1665
O19-GL	May 28 2013	12	17	60.2	99	0.55	1.4	477	770
O49-GL	May 21 2013	14	18	105	159	0.43	1	667	849
P19-1-O	May 28 2013	5.6	12	67.6	107	1.62	2.8	454	767
P49-O	May 23 2013	3.4	6.2	110	181	0.9	2	454	801
P49-O (Dup)	May 23 2013	3.5	6.2	110	181	0.91	2	457	801
Arizona Aquifer Water Quality Standard		-		-		4			

All Results in Milligrams per Liter (mg/l)

< = 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	May 24 2013	21.6	70.9	7.44	1003
M2-GU	May 24 2013	20.9	69.6	7.26	1006
M3-GL	May 24 2013	21.1	70.0	7.40	1060
M4-O	May 02 2013	21.3	70.3	7.50	712
M6-GU	May 22 2013	24.2	75.6	7.98	650
M7-GL	May 23 2013	24.2	75.6	9.18	504
M8-O	May 22 2013	23.9	75.0	8.93	612
M14-GL	May 22 2013	23.0	73.4	8.20	773
M15-GU	May 22 2013	22.4	72.3	7.36	1030
M16-GU	May 21 2013	21.7	71.1	7.15	1261
M17-GL	May 21 2013	22.0	71.6	8.79	518
M18-GU	May 24 2013	21.5	70.7	7.31	1150
M19-LBF	May 28 2013	23.5	74.3	7.52	831
M20-O	May 28 2013	24.8	76.6	8.62	680
M21-UBF	May 28 2013	23.6	74.5	7.24	1459
M22-O	May 22 2013	28.1	82.6	7.96	767
M23-UBF	May 21 2013	23.0	73.4	7.01	1477
M24-O	May 22 2013	30.6	87.1	7.75	1912
M25-UBF	May 21 2013	22.1	71.8	6.97	1900
M26-O	May 23 2013	23.2	73.8	8.76	525
M27-LBF	May 24 2013	23.4	74.1	7.41	1606
M28-LBF	May 23 2013	24.5	76.1	9.13	620
M29-UBF	May 23 2013	24.4	75.9	7.10	1970
M30-O	May 28 2013	25.0	77.0	7.37	698
M31-LBF	May 28 2013	23.0	73.4	7.34	1156
O19-GL	May 28 2013	23.2	73.8	7.57	809
O49-GL	May 21 2013	25.8	78.4	7.36	950
P19-1-O	May 28 2013	23.0	73.4	7.32	765
P49-O	May 23 2013	29.4	84.9	7.68	826

°C = Degrees Celcius

°F = Degrees Fahrenheit

µmhos/cm = Micromhos per Centimeter